

An aerial photograph of Aberdeen, Scotland, showing a dense urban landscape. In the center, there is a large, historic building with a prominent dome, likely the Aberdeen City Hall. Surrounding it are various other buildings, including a tall, modern apartment block. The city is characterized by its grey stone architecture and numerous green spaces. The title 'LOCAL HEAT AND ENERGY EFFICIENCY STRATEGY' is overlaid in large, white, bold, sans-serif capital letters across the middle of the image.

# LOCAL HEAT AND ENERGY EFFICIENCY STRATEGY

Aberdeen City Council  
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# Executive summary

Aberdeen City's Local Heat and Energy Efficiency Strategy (LHEES) sets out how to tackle greenhouse gas emissions from buildings, whilst also improving residents' quality of life by addressing fuel poverty. Aberdeen City, and Scotland as a whole, will be net zero by 2045. This is a challenging target and the LHEES is a key step in planning our approach to achieving this goal.

## What is a Local Heat and Energy Efficiency Strategy?

The LHEES is made of two documents: the LHEES Strategy and the LHEES Delivery Plan. The LHEES Strategy is a long-term strategic framework for decarbonising heat in buildings and improving energy efficiency across Aberdeen City. It is published alongside the LHEES Delivery Plan, which sets out the actions Aberdeen City Council will take to implement the strategy over the next five years.

Aberdeen City's LHEES will support the delivery of the Council's goals of improving energy efficiency, reducing fuel poverty, and decreasing carbon emissions through zero direct emissions heating systems. The Council will use the LHEES to inform the development of housing and public buildings' asset management plans, including business cases for capital projects.

The LHEES has been developed in accordance with the Scottish Government's methodology. This consists of 8 stages which bring together:

- the Council's existing goals and strategies
- data analysis of the building stock
- input from different stakeholder groups

Overall, the content of Aberdeen City's LHEES has been informed primarily through a data-driven approach using a number of datasets and proxy indicators.

## LHEES priorities

The Council has identified four main priorities for the LHEES:

- Priority A: Heat network development
- Priority B: Building level decarbonisation
- Priority C: Improving building energy efficiency
- Priority D: Alleviating fuel poverty

## Progress in Scotland

In 2018 the Intergovernmental Panel on Climate Change (IPCC) advised that to reach the 1.5°C target set in the Paris Climate Accord the world needs to reach net zero carbon emissions by 2050. The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 then set an ambitious target of Scotland reaching net zero by 2045. Achieving net zero is crucial to mitigating the impacts of climate change to stabilise global temperatures. This is a vital step to avoid the worst consequences of climate change. The way we heat our homes, workplaces and other buildings is the third-largest cause of carbon emissions in Scotland. To meet the net zero target, both domestic and non-domestic buildings in Scotland will have to significantly reduce their carbon emissions.

## Progress in Aberdeen City

Aberdeen City Council is already making progress toward achieving its goals of decarbonisation, improving energy efficiency, and reducing fuel poverty. Within its own stock, the Council is investing in improving energy efficiency to meet required standards. Beyond the Council's buildings, improvements have been carried out to homes under the Area Based Schemes and Energy Company Obligation programmes. The LHEES will support the Council and its community planning partners to scale up and align existing programmes, and to increase the scale and pace of retrofit and heat network development that is needed to meet the national target of net zero by 2045.

## Aberdeen City building stock

A baselining exercise has been carried out to highlight key characteristics within our housing stock. This will allow benchmarking in future iterations of LHEES and enable the evaluation of progress towards targets and the ultimate target of net zero by 2045. It also highlights some of the opportunities for how and where the Council can target interventions to achieve the greatest impact.

### Domestic properties

42% of domestic properties are of cavity construction, and 13% are uninsulated cavities. 35% of properties are of solid brick or stone construction, most of which are uninsulated (29% of all domestic properties). This means that there are opportunities for standardising fabric measures to enable installations at scale in these construction type properties.

Aberdeen City had a higher level of fuel poverty compared to the Scottish national average, according to data from the 2019 Scottish House Condition Survey. Just over 26% of Aberdeen City's residents are in fuel poverty. Addressing fuel poverty remains a priority for the Council and is specifically addressed in the LHEES and Delivery Plan.

Aberdeen City Council owns 19% of the domestic properties within the local authority area. This provides the Council with opportunities to upgrade properties at scale. This is particularly important in the social housing sector, as half of all social housing properties within the local authority area are in SIMD deciles 1 (most deprived) and 2. This means that they have a high risk of fuel poverty.

Aberdeen City Council is investigating the potential for heat network expansion. Discussion with key players such as Aberdeen Heat and Power, NHS Grampian and the University of Aberdeen will need to take place in order to inform these.

## **Non-domestic buildings**

Non-domestic buildings make up only 7% of total building stock in Aberdeen City, however their heat demand accounts for 34% of the total heat demand. Buildings such as hotels including halls of residence and care homes have larger average heating demands per property than buildings such as sports and education facilities. Non-domestic buildings will also be the primary anchor loads for future heat network developments.

Electricity is the most common primary fuel type (54% of non-domestic buildings) serving 21% of the total heat demand for non-domestic properties in Aberdeen City, equivalent to around 158,886 MW/yr of heat.

Properties which use gas as a main fuel type have a higher average demand than those that use electricity. 32% of properties are heated by mains gas, and these properties are responsible for 71% of total heat demand for non-domestic properties. Non-domestic buildings using gas will be a priority focus for the decarbonisation of heat.

## **Aberdeen City's heat networks**

Heat networks have been identified as a low regrets<sup>1</sup> decarbonisation option in the Scottish Government's Heat in Buildings Strategy. The Council has carried out data-driven analysis to highlight potential areas for future heat network development, including new build developments.

98% of Aberdeen City's residents live in urban areas which may be suitable for the development of heat networks. The data-driven analysis has highlighted 13 potential heat network zones, many of which are intersected by operational heat networks. Of the 13 zones, four were identified as having high potential based on total heat demand. These are further investigated with actions for each in the Delivery Plan.

## **Beyond the page: making the LHEES Strategy a reality**

This Strategy outlines a number of challenges which need to be overcome in order to decarbonise Aberdeen City's buildings. These include:

- Certain tenure types such as owner-occupied, private rented and mixed-tenure, combined with historic buildings make significant fabric upgrades challenging
- An underdeveloped supply chain for energy efficiency and heating upgrades
- Expansion of existing heat networks, particularly the modifications required in property and ground infrastructure as well as new contractual agreements
- Consumer uncertainty about new technologies

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<sup>1</sup> Low-regrets decisions are actions that are cost-effective now and provide options and flexibility in the future rather than blocking off options.

- Market disincentives, such as the current unit price differential between gas and electricity

Not all these challenges can be addressed in the first iteration of LHEES, or the first Delivery Plan. For this reason, the LHEES will be an iterative Strategy. The regulatory landscape will change quickly over the next few years in order to drive progress in building decarbonisation in Scotland.<sup>2</sup> The LHEES Strategy and Delivery Plan will both be reviewed annually, and if necessary revised to react to legislative and market changes and to benefit from new opportunities that arise.

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<sup>2</sup> For example, the Scottish Government's proposed Heat in Buildings Bill and the Social Housing Net Zero Standard, or the UK Government's Review of Electricity Market Arrangements.

# 1. What is a Local Heat and Energy Efficiency Strategy?

## 1.1. Purpose

Scottish local authorities have a statutory duty to develop a Local Heat and Energy Efficiency Strategy (LHEES) by 31st December 2023. This duty is described in the Local Heat and Energy Efficiency Strategies (Scotland) Order 2022.<sup>3</sup>

LHEES are the principal mechanism for locally led heat planning across Scotland's local authorities. The strategies set out the long-term plan for decarbonising heat in buildings and improving energy efficiency across an entire local authority. The focus on locally led planning is to ensure that the decarbonisation of heat in buildings is delivered in a way that is relevant to local contexts and tailored to the specific needs of communities.

The purpose of this LHEES is to present the evidence base that identifies what needs to be done across Aberdeen City to change buildings and local infrastructure by 2045 to fulfil the Scottish Government's objectives and local priorities relating to heat in buildings. The interventions include fabric and heating system upgrades at the building level, as well as heat network development.

Aberdeen City's LHEES will support the delivery of the Council's priorities of improving energy efficiency, reducing fuel poverty, and decarbonising heat. The Council will use the LHEES to engage with and inform the expansion of heat networks and deployment of retrofitting pathways for all property tenures.

## 1.2. Structure

LHEES has a two-part structure, consisting of a strategy and a delivery plan.

- The **LHEES Strategy** is a long-term strategic framework over the next 15-20 years for decarbonising heat in buildings and improving energy efficiency across Aberdeen City, framed around the six considerations outlined in Table 1: Summary of the LHEES considerations.
- The **LHEES Delivery Plan** sets out how the Council will implement its strategy over the next five years. It enables the Council to work towards delivery of the changes identified in the strategy and clarifies the roles and responsibilities of stakeholders.

This document contains Aberdeen City Council's LHEES Strategy. The accompanying Delivery Plan can be found on Aberdeen City Council's website.

The LHEES Strategy explains the Council's priorities for the next 15-20 years, including the data and justification behind them. In short, this document demonstrates the direction the Council is moving towards. The LHEES Delivery Plan outlines the steps the Council will take to achieve the

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<sup>3</sup> [The Local Heat and Energy Efficiency Strategies \(Scotland\) Order 2022](#)



LHEES Strategy in the next five years. Both documents will be reviewed and updated periodically to reflect progress towards net zero, new available technologies and funding, and changing priorities in the local authority.

## 1.3. Methodology

Aberdeen City's LHEES was developed in partnership with Changeworks, following the standard methodology published by Scottish Government. This section lays out the key elements and stages that underpins the LHEES.

For detailed descriptions on the exact methodology used during the development of this LHEES, please refer to the Scottish Government issued methodology documentation. Any deviations from this methodology are described below (Table 4: *Summary of the criteria for each category of domestic properties as per the standard methodology in the LHEES Considerations*).

## Considerations

The national LHEES guidance frames the strategy around six considerations relating to heat decarbonisation and energy efficiency. They are used to identify and target interventions in different parts of the building stock. The six considerations are outlined in Table 1.

The considerations relating to heat decarbonisation focus on decarbonising buildings that are both on and off the gas grid, as well as areas with potential to develop heat networks. Considerations relating to energy efficiency and other outcomes focus on buildings with poor building energy efficiency, such as no or low levels of insulation, and areas where uninsulated buildings may contribute to high levels fuel poverty. This focus will ensure that energy efficiency projects will reduce fuel poverty. Mixed-tenure, mixed-use, and historic buildings are included as a separate consideration as these are likely to require different approaches to retrofit.

Table 1: Summary of the LHEES considerations

	No.	LHEES considerations	Description
Heat decarbonisation	1	Off-gas grid buildings	Transitioning from heating oil and LPG in off-gas areas
	2	On-gas grid	On-gas grid heat decarbonisation
	3	Heat networks	Decarbonisation with heat networks
Energy efficiency and other outcomes	4	Poor building energy efficiency	Poor building energy efficiency
	5	Poor building energy efficiency as a driver for fuel poverty	Poor building energy efficiency as a driver for fuel poverty
	6	Mixed-tenure, mixed-use and historic buildings	Mixed-tenure and mixed-use buildings, listed buildings and buildings in conservation areas

## Stages and outputs

This LHEES has been developed over eight stages, as outlined in Figure 1. The completion of stages 1-6 provided the data analysis and evidence base which forms the foundation for Aberdeen City's LHEES Strategy (Stage 7) and Delivery Plan (Stage 8)

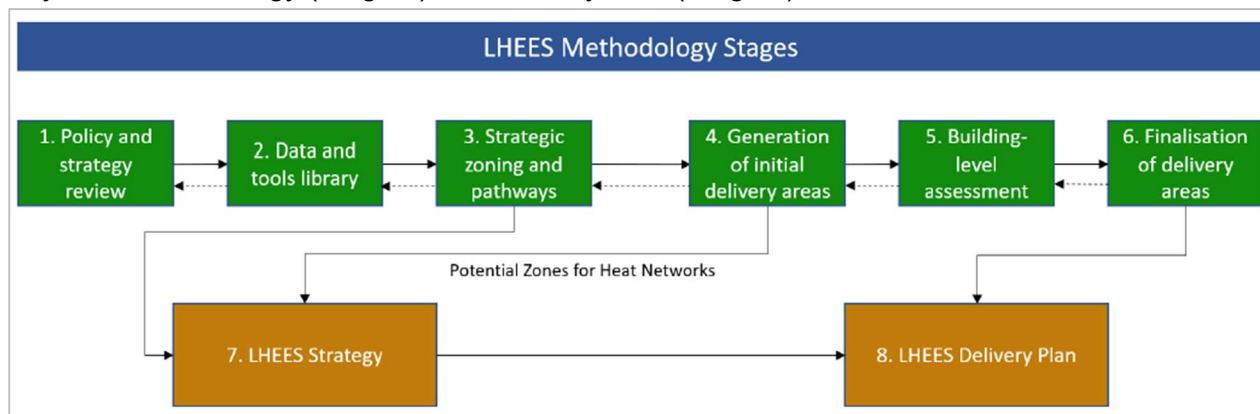


Table 2 (below) displays the outputs of each stage and how they have been used in the LHEES process.

Figure 1: Summary of LHEES Stages

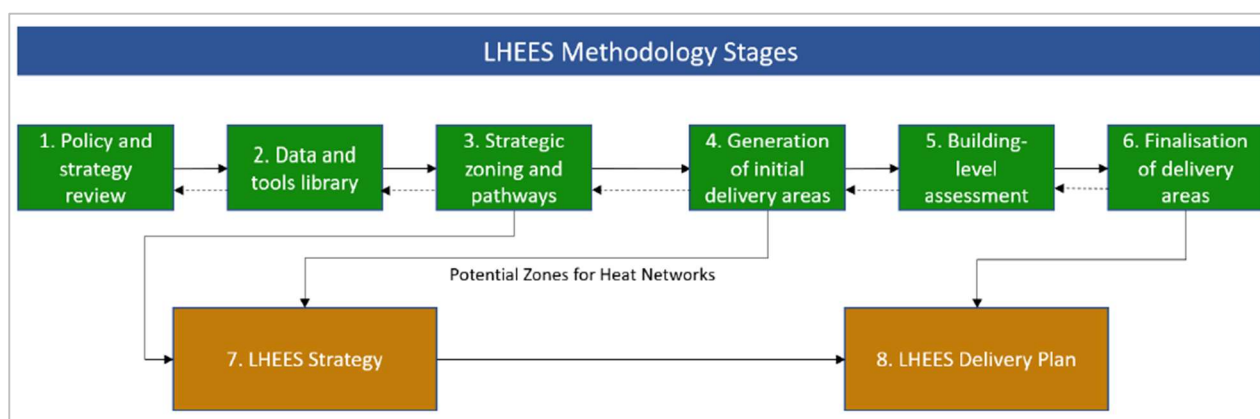


Table 2: Summary of LHEES outputs and its use in the project.

LHEES stage	Outputs and formats	Role in informing LHEES
1	Policy and Strategy Review (.pdf/.doc)	Sets priorities for LHEES and highlights relevant national and local policies and strategies
2	Data and Tools Library (.xlsx)	Dataset scoping and review exercise, including uses in subsequent LHEES stages and key contacts
3	Baseline Tools (Domestic and Non-Domestic) (.xlsx) Maps (.pdf)	Data outputs on Strategic Zones used in the identification and mapping of initial Delivery Areas (Stage 4)
4	GIS layers on Heat Networks (.mpkg) Summary table of clusters, resources and constraints (.xlsx)	Summary table used for sense-checking of initial Delivery Areas and GIS layers and also for deeper exploration of maps. Both outputs are further carried

		forward for deliberation in stakeholder workshops (Stage 6)
5	PEAT-OR Power-BI	Visual breakdown of potential costs and savings per total installation measures at property/ datazone levels. Demonstrated in stakeholder workshops to identify potential Delivery Areas
6	Ranked list of Delivery Areas	Used in the structuring and writing of the Strategy Document and Delivery Plan
7	Strategy Document (.pdf/.doc) Storymap of Strategy Document	Summary document of local authority's building stock, as well as opportunities and challenges Storymap used to supplement the Strategy document
8	Delivery Plan (.pdf/.doc)	Final output highlighting priorities and actions in delivering LHEES for the next five years

## Building categories

The analysis in Stage 3 separates domestic buildings into four categories, which are primarily based on their suitability for a heat pump retrofit. The categories are defined in the Scottish Government's LHEES guidance and are based on indicators from the Home Analytics dataset. Table 3 provides a brief description of each category. A more detailed description of the indicators used for each category can be found in Appendix F.

*Table 3: A description of each category of domestic properties.*

Building category	Description
Category 0	Buildings that currently have a low or zero direct emissions heating system, or heat network connection.
Category 1	"Heat pump ready" buildings that are well-suited to heat retrofit with minimal other changes.
Category 2	Secondary potential for heat pump retrofit. Buildings that require some fabric and/or distribution systems upgrades.
Category 3	Significant upgrades required for these buildings to be heat pump ready.

## Deviations from the standard methodology

Analysis for the LHEES Considerations mostly followed the standard Scottish Government methodology (Table 4). Deviations from the standard methodology are further summarised in Table 4.

Table 4: Summary of the criteria for each category of domestic properties as per the standard methodology in the LHEES Considerations

LHEES Consideration	Category	Standard Methodology Criteria	Deviations
On-gas grid buildings + Off-gas grid buildings	0	<ul style="list-style-type: none"> <li>Main heating system is either 'Heat Pump' or 'Communal'</li> </ul>	None
	1	<ul style="list-style-type: none"> <li>Not a Category 0 property</li> <li>Not in a conservation area</li> <li>Not in a listed building</li> <li>Wall is insulated</li> <li>Property is double/triple glazed</li> <li>Property must have a likely wet system (LPG, Oil or Biomass/Solid)</li> <li>Loft must have at least 100mm of insulation (if relevant)</li> </ul>	<p>Only wall insulation (not including loft insulation, double/triple glazing and wet systems) is considered in the analysis as most energy efficiency programmes currently focus on this indicator.</p> <p>Solar PV potential is included as an additional indicator.</p>
	2	<ul style="list-style-type: none"> <li>Not a Category 0 or 1 property</li> <li>Conservation area possibility</li> <li>Listed building possibility</li> <li>Property must have insulated walls (cavity construction or any other construction type with insulated walls)</li> <li>No risk of property having a narrow insulated cavity</li> </ul>	None
	3	<ul style="list-style-type: none"> <li>Properties that do not qualify as Categories 0,1 or 2</li> </ul>	
Poor building energy efficiency + Poor building energy efficiency as a driver of fuel poverty (EEFP)	Weighted score	<ul style="list-style-type: none"> <li>Wall insulation status</li> <li>Loft insulation status</li> <li>Double glazing</li> <li>Fuel Poverty (EEFP only)</li> </ul>	Only wall insulation (not including loft insulation, double/triple glazing and wet systems) is considered in the analysis as most energy efficiency programmes currently focus on this indicator.

## 2. Policies and progress to net zero

This section provides a review of the various policies and projects that exist at local, regional and national level surrounding heat, energy efficiency, fuel poverty and building decarbonisation. The targets laid out in these policies will help to inform the strategy and timeline in the LHEES. It also outlines the progress made by Aberdeen City Council towards its net zero targets.

### 2.1. Policies

#### Local policies

Table 5 below provides an overview of policies developed by Aberdeen City Council that relate to the LHEES in areas such as housing, local planning and development, strategic infrastructure, and asset management.

Table 5: Overview of relevant local policies

	Name	Description
Planning	Aberdeen Local Development Plan 2023	Sets out the Council's vision of creating a sustainable and socially equitable future for the city, as the home to its residents, as the regional centre of the North East, and as one of Scotland's most important economic engines. Includes policies on expanding existing heat networks using heat derived from waste processes.
	Energy Transition Zone Masterplan	Provides a spatial framework for Local Development Plan allocated sites around Aberdeen South Harbour to develop a globally recognised green energy cluster with specialist campuses for offshore wind, hydrogen, innovation and skills.
	Local Outcome Improvement Plan 2016-2026	Outlines a plan for improving people's lives across Aberdeen City and creating a place where all people can prosper. Specific targets include a 61% reduction in city-wide emissions by 2026 and 7% reduction in public sector emissions by 2026.
Climate change	Climate Change Plan 2021-2025	Sets out the scope of the Council's ambitions with net zero and interim targets for a reduction in carbon emissions. It highlights climate risks affecting the council and it outlines the project priorities across five themes being taken forward to 2025, including buildings.
	Net Zero Aberdeen Routemap	Sets out a cross-sectoral pathway for achieving net zero emissions in Aberdeen City by 2045 in line with Scottish Government targets.
	Net Zero Aberdeen – Buildings and Heat Strategy	Outlines the role of buildings and heat in the Net Zero Aberdeen Routemap, including the responsible use of materials during construction and energy use within properties.



Energy	Strategic Infrastructure Plan: Energy Transition 2020	The vision for the Strategic Infrastructure Plan - Energy Transition (SIP) is to outline infrastructure projects which will contribute to the city's energy transition from fossil based to net zero carbon, including energy efficient retrofit and expansion of existing heat networks.
Asset management	Property Asset Management Policy	Outlines the key asset management principles that are required to ensure our assets contribute to achieving the Council's strategic objectives.
Housing	Local Housing Strategy 2018 -2023 ( <i>New policy in development</i> )	Sets out the strategic vision and priorities for the future delivery of housing and housing related services. It identifies the specific commitments made by the council and its key partners to deliver the strategic outcomes within the local housing strategy, including the reduction of fuel poverty in line with climate targets. An updated version of this policy will be published in 2024.

## Regional policies

The LHEES recognises the importance of collaboration across local authorities. Aberdeen City forms part of the Aberdeen City Region alongside Aberdeenshire Council.

### Regional Economic Strategy

The Regional Economic Strategy for the North East of Scotland was approved by Aberdeen City Council, Aberdeenshire Council and Opportunity North East in 2016 and refreshed in 2024. This strategy sets out the long-term plan for North East Scotland to transform its economy and build a sustainable future for the region in line with net zero aspirations. It plans to harness Aberdeen's vast experience in offshore energy production to place the region at the forefront of Scotland's just transition to net zero and climate resilience. A key strategic objective is to establish the North East as a pioneer of the energy transition, by delivering an 80% reduction in carbon emissions per head. It also aims to develop a regional skills plan in partnership with Skills Development Scotland to support the skills needs to deliver a just transition to net zero.

## Scotland-wide policies

In 2018 the Intergovernmental Panel on Climate Change (IPCC) advised that to reach the 1.5°C target set in the Paris Climate Accord the world needs to reach net zero carbon emissions by 2050. The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 then set an ambitious target of Scotland reaching net zero by 2045. Achieving net zero is crucial to mitigating the impacts of climate change to stabilise global temperatures. As the way we heat our homes, workplaces and other buildings is the third-largest cause of carbon emissions in Scotland, we must decarbonise our built environment by improving energy efficiency and transitioning to zero direct emissions heating systems.

The LHEES is primarily driven by Scotland's statutory targets for reducing greenhouse gas emissions and fuel poverty. The following section expands on some of the key Scottish

Government policies relating to heat and energy efficiency. The targets and regulations laid out in these policies will help to inform Aberdeen City's strategy and delivery plan. Appendix A provides a more extensive list of Scottish Government policies relating to heat and energy efficiency.

### **Heat in Buildings Strategy**

The Heat in Buildings Strategy, published in 2021, sets out a vision that by 2045 Scotland's homes and buildings will be cleaner, easier to heat and no longer contribute to climate change. The strategy prioritises improvements to the fabric of buildings to reduce energy demand, alongside a focus on zero emissions heating systems, such as heat pumps and heat networks. This LHEES will contribute to the targets set out in the Heat in Buildings Strategy by identifying measures for reducing building emissions and potential heat network zones.

In the Heat in Buildings Strategy, the Scottish Government committed to the development of a Heat in Buildings Bill to provide the regulatory framework for this transition. The Bill, which went under consultation in November 2023, proposes a minimum energy efficiency standard for private landlords by the end of 2028, and for owner-occupiers by 2033. It also proposes a ban on polluting heating systems in all buildings by 2045.

### **Energy Performance Certificate reform**

To date, Scotland's energy efficiency targets have been articulated through Energy Performance Certificate (EPC) ratings. Recently, limitations of this approach have been highlighted<sup>4</sup>. One limitation is that the EPC rating is a cost efficiency rating, measuring the cost of using the heating system as opposed to the heat demand. This makes the rating less useful for setting targets for achieving net zero, as non-polluting electric heating systems rank poorly compared to gas heating systems due to the higher cost of electricity relative to gas.

The Scottish Government has launched a consultation on EPC reform. It proposes to introduce a range of new metrics, including a fabric efficiency rating based on heat demand.<sup>5</sup> Recent consultations on minimum energy efficiency standards for buildings indicate that this rating may be used.

### **Social Housing Net Zero Standard**

The Scottish Government has established targets to improve the energy efficiency of social housing. Previously, these have been set through the Energy Efficiency Standard for Social Housing (ESSH). ESSH2 guidance required all social housing to meet an energy efficiency rating of EPC band B by 2032. ESSH2 has been under review to realign the standard with net zero targets and the 2032 milestone has been put on hold.

In November 2023, the Scottish Government launched a consultation on a new Social Housing Net Zero Standard (SHNZS) which will replace ESSH2. The proposed new standard, which will come into effect in 2025, includes setting a minimum fabric efficiency rating based on annual space heating demand (measured in kWh/m<sup>2</sup>) as opposed to current EPC rating. Additionally, it will

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<sup>4</sup> [Climate Change Committee - Reform of domestic EPC rating metrics to support Net Zero](#)

<sup>5</sup> [Scottish Government - Energy Performance Certificate \(EPC\) reform: consultation](#)

require polluting heating systems to be replaced with clean alternatives by a backstop date of 2045, with possible interim targets before then.

### **Heat Network (Scotland) Act 2021**

Heat networks supply multiple buildings with heat or cooling from a central source. This avoids the need for individual heating systems in every building.

Under the Heat Networks (Scotland) Act 2021, a heat network is defined as either a district heat network, where thermal energy is transported from a source to multiple buildings; or a communal heating system, where thermal energy is transported to multiple building units within the same building. The act requires local authorities to review areas that are potentially suitable for heat networks within their constituency. This LHEES will function as the main vehicle by which Aberdeen City Council will carry out this review.

### **Fuel Poverty (Scotland) Act 2019**

The Fuel Poverty Act was passed by the Scottish Parliament in 2019.

A household is classified as fuel poor if, in order to maintain a satisfactory heating regime, total fuel costs necessary for the home are more than 10% of the household's adjusted net income (after housing costs), and if after deducting fuel costs, benefits received for a care need or disability and childcare costs, the household's remaining adjusted net income is insufficient to maintain an acceptable standard of living.

The first set of targets laid out in this legislation are that by 2030 no more than 15% of households in Scotland are in fuel poverty and no more than 5% are in extreme fuel poverty. Homes with a lower energy efficiency were identified as one of the key drivers of fuel poverty. The LHEES looks to address this by improving the energy efficiency of homes, leading to a reduction in fuel costs.

### **National Planning Framework 4**

The National Planning Framework (NPF) sets the context for development planning in Scotland and provides a framework for the spatial development of Scotland as a whole. Some of the key spatial priorities of this framework include a just transition to net zero and conserving and improving existing buildings to lock in carbon. Policy 19 of NPF4 aims to encourage, promote and facilitate development that supports decarbonised solutions to heating and cooling. In line with this policy, development proposals within or adjacent to an identified Heat Network Zone will only be supported where they are designed and constructed to connect to the existing heat network.

## 2.2. Progress to net zero in Aberdeen City

This section outlines the progress that has been made in reducing carbon emissions across Aberdeen City in line with local and national net zero targets. This includes work undertaken by the Council to improve energy efficiency and reduce emissions from our own building stock, as well as progress in expanding heat networks and reducing emissions from buildings across the city as a whole.

### Emissions Reduction

Aberdeen City remains committed to achieving the goal of net zero emissions by 2045. Progress has already been made towards achieving this goal. Between 2005 and 2022, emissions within Aberdeen City's scope of influence were reduced by 45.3% from 1,826.9 kt CO<sub>2</sub>e to 999.5 kt CO<sub>2</sub>e. During this period, emissions from domestic buildings fell by 50.4%. Despite this, domestic gas use remains the largest source of emissions in Aberdeen, accounting for 22% of total emissions.<sup>6</sup>

### Building decarbonisation

**Council-owned buildings:** Aberdeen City Council aims to show early leadership in transitioning to net zero through our own assets and operations, including reducing emissions and improving energy efficiency in council-owned buildings. The details of this are included in the Council Climate Change Plan 2021-2025. This plan sets the target of net zero emissions from the Council's operations by 2045, with interim targets of 48% emissions reductions by 2025 and 75% emissions reductions by 2030 compared to 2015/16 levels. Priority outcomes include reducing energy demand in council-owned buildings through improved energy efficiency and increasing local renewable energy generation and low-carbon heating. Between 2016 and 2023, emissions from the Council's own assets were reduced by 42.8%.

**Achieving standards for social housing:** 93% of council-owned homes in Aberdeen City have an energy efficiency rating of EPC Band C or above, meeting the first phase of the Energy Efficiency Standard for Social Housing (ESSH).

The Council is working to improve the energy efficiency across its entire housing stock. All new build council homes are being built to Gold Standard, including recent developments in Summerhill, Wellheads and Cloverhill. All new build homes developed in existing heat networks zones will be connected to heat networks where feasible. Additionally, energy efficiency improvements are continuously being made to the Council's existing homes where identified, including cavity, loft and underfloor insulation.

In 2021 the Council received £5.2m in funding from the UK Government for project DORIC (Domestic Optimised Retrofit Innovation Concept). The project aimed to carry out whole-house retrofit of 50 council properties to PAS 2035 standard, including fabric improvements, ASHP, microgeneration and storage. On average, the targeted properties achieved a heat demand reduction of 60kWh/m<sup>2</sup> (from 130 down to 70), as well as improving their EPC ratings from D to A

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<sup>6</sup> DESNZ (2024). URL: [UK local authority and regional greenhouse gas emissions statistics, 2005 to 2022 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-statistics-2005-to-2022)

and reducing carbon emissions by 3.5 tonnes. This project demonstrates the benefits of a whole-house approach to retrofit including heat decarbonisation and renewable generation, while also encouraging the supply chain to adopt PAS 2035 retrofit standards. Key learnings from this project include the need for early engagement with stakeholders such as SSEN, which will inform the Council's future housing strategy.

**Energy Efficient Scotland: Area Based Schemes (ABS):** ABS is a Scottish Government scheme that provides funding for local authorities to deliver energy efficiency programmes in areas with high levels of fuel poverty. Since 2013, Aberdeen City Council has delivered over 7,000 energy efficiency measures, amounting to £16m worth of investment. Fabric first measures such as external wall insulation have proven to be successful in reducing heat demand and will continue to play a significant part in future ABS projects. Going forward, the Council's primary target is to maximise the ABS funding allocation from the Scottish Government.

**Energy Company Obligation (ECO) and Great British Insulation Scheme (GBIS):** The Energy Company Obligation (ECO) was first introduced in 2013 and places legal obligations on energy suppliers to deliver energy efficiency measures to domestic premises. The Great British Insulation Scheme (GBIS) was launched in September 2023, both schemes are UK Government energy efficiency schemes that support private tenure households on low incomes and vulnerable households. The aims of the schemes are to improve the least energy efficient homes and to help meet the Government's fuel poverty and net zero commitments. ECO measures in Aberdeen have previously focused on gas boiler replacements, basic insulation measures, EWI and external cladding for multis. During ECO3 over 600 measures were installed. The latest version of the scheme (ECO4) contains stricter rules around boiler replacements and prioritises non-polluting heating systems instead. As such, uptake of ECO4 funding has been low in Aberdeen due to the high proportion of on-gas properties. The Council will continue to encourage uptake of public funding to promote the installation of energy efficiency and heat decarbonisation measures in private homes.

## Heat network development

Aberdeen already benefits from heat networks that deliver heat and hot water to residential and commercial properties across the city. In 2002, Aberdeen Heat and Power was set up by the Council as an independent not-for-profit company to tackle fuel poverty by providing affordable heat and hot water to high-rise social housing blocks. Currently, Aberdeen Heat and Power operates five heat networks served by combined heat and power (CHP) centres in Tillydrone, Hazlehead, Seaton, Wellheads and Stockethill, with capacity to deliver 27.63 MW of heat. Over 3,500 domestic and non-domestic properties are connected to the networks, from private homes and businesses to council buildings and social housing. Carbon emissions from these buildings have reduced by 45% and typical fuel costs to tenants in high-rise blocks have been reduced by up to 50% compared to the previous electric heating systems.<sup>7</sup>

An additional district heat network is being developed in Torry using waste heat from the energy from waste (EfW) plant in East Tullos. The network, which already serves three high-rise blocks, is being expanded to include Deeside Family Centre, Provost Hogg Court and Balnagask House.

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<sup>7</sup> [Heatnet: delivering low carbon district heat | Aberdeen City Council](#)



## Community energy projects:

**Donside Community Hydro:** In 2016, Aberdeen Community Energy completed the installation of a community-owned hydro scheme on the River Don with support from the Scottish Government Community and Renewable Energy Scheme (CARES). The project generates renewable electricity which is sold to the national grid, providing revenue for the local community. This is used to support initiatives that create social and environmental benefits for the local regeneration area.<sup>8</sup> As Aberdeen's first community energy project, Donside Hydro provides a template for locally owned renewable energy generation, which can also be used to power low-carbon heating sources such as heat pumps.

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<sup>8</sup> [ACE Energy – Aberdeen's first Community Hydro initiative \(acenergy.org.uk\)](https://acenergy.org.uk)

## 3. Stakeholder engagement

The Council has engaged with a range of stakeholders during the LHEES process on several topics related to the strategy, including heat network development, energy efficiency and heat decarbonisation. This LHEES is largely driven by analysing large datasets, and it is important to combine this with local knowledge and experiences. Stakeholder engagement provides the opportunity for local organisations to provide input by sharing knowledge and identifying priorities, challenges and opportunities. This allows local stakeholders to play an active role in informing the direction of the LHEES.

The following sections outline the process for identifying and engaging with key stakeholders, their priorities and potential challenges, as well as plans for future engagement throughout the process.

### 3.1. Identifying key stakeholders

Key stakeholders were identified according to the Scottish Government LHEES Guidance.<sup>9</sup> External stakeholders with both direct and indirect influence over the LHEES strategy were invited to attend stakeholder engagement workshops and provide feedback. This included utilities, heat network providers, local waste heat producers and owners of large non-domestic buildings with high heat demands, neighbouring local authorities and registered social landlords (RSLs). Internal stakeholders from within Aberdeen City Council were also identified and invited to attend a workshop. This included representatives from departments with direct influence over the LHEES strategy such as planning, housing, climate and sustainability, energy services and property management, as well as those with indirect influence, including finance, economic development and building standards.

### 3.2. Engagement with external stakeholders

Table 6: outlines relevant external stakeholders, their relation to the six LHEES considerations and their priorities and challenges. Prior to writing this strategy, a stakeholder engagement workshop was held with various organisations identified as having a high level of interest in the development of Aberdeen's LHEES.

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<sup>9</sup> [Local Heat And Energy Efficiency Strategies And Delivery Plans: Guidance \(www.gov.scot\)](https://www.gov.scot/publications/local-heat-and-energy-efficiency-strategies-and-delivery-plans-guidance/pages/1-introduction.aspx)

Table 6: Summary of engagement with external stakeholders

Stakeholder	LHEES considerations*	Priorities and challenges
<b>Aberdeen Heat and Power</b>	3	<b>Priorities:</b> Heat network zoning, development and expansion. Encouraging new customers to connect. <b>Challenges</b> Decarbonising existing networks with waste heat. High capital costs.
<b>Robert Gordon University</b>	3	<b>Challenges</b> Ensuring data accuracy for heat network zoning.
<b>University of Aberdeen</b>	3	<b>Priorities:</b> Achieving net zero by 2040. <b>Challenges</b> Decarbonising existing heat networks. Ensuring existing heat networks achieve regulatory compliance. Ensuring data accuracy for heat network zoning.
<b>James Hutton Institute</b>	3	<b>Challenges</b> Ensuring data accuracy for heat network zoning.
<b>NHS Grampian</b>	3	<b>Priorities:</b> Ensuring heat network investment aligns with internal goals. <b>Challenges</b> Ensuring data accuracy for heat network zoning.
<b>Scottish Water</b>	3	<b>Priorities:</b> Provide source of waste heat to decarbonise heat networks.
<b>Aberdeenshire Council</b>	All considerations	<b>Priorities:</b> Collaboration on heat network development and energy efficiency improvement programmes (e.g. EES:ABS).
<b>Langstane Housing Association</b>	All considerations	<b>Priorities:</b> Improving energy efficiency. Reducing fuel poverty. <b>Challenges</b> Achieving compliance with changing energy efficiency standards (EESHS/SHNZS).
<b>Castlehill Housing Association</b>	All considerations	<b>Priorities:</b> Improving energy efficiency. Reducing fuel poverty. <b>Challenges</b> Achieving compliance with changing energy efficiency standards (EESHS/SHNZS).

<b>Grampian Housing Association</b>	All considerations	<b>Priorities:</b> Improving energy efficiency. Reducing fuel poverty. <b>Challenges</b> Achieving compliance with changing energy efficiency standards (EESH/SHNZS).
<b>Scarf</b>	1, 2, 3, 4, 5	<b>Priorities:</b> Support community-led energy and decarbonisation projects. Fuel poverty reduction.
<b>Home Energy Scotland</b>	1, 2, 3, 4, 5	<b>Priorities:</b> Support community-led energy and decarbonisation projects. Fuel poverty reduction.
<b>Aberdeen Care and Repair</b>	4, 5	<b>Priorities:</b> Provide support to households to improve energy efficiency.
<b>Scottish Enterprise</b>	3	<b>Priorities:</b> Support the development of local heat networks.
<b>Contractors</b>	1, 2, 3, 6	<b>Priorities:</b> Engaged to deliver installs at scale.
<b>Historic Environment Scotland</b>	6	<b>Priorities:</b> Support with the retrofit of historic buildings.
<b>Owner Occupiers</b>	All considerations	<b>Priorities:</b> Engaged to take part in programmes to improve energy efficiency and decarbonise heating systems.
<b>Private Landlords</b>	All considerations	<b>Priorities:</b> Engaged to take part in programmes to improve energy efficiency and decarbonise heating systems.
<b>Tenants</b>	All considerations	<b>Priorities:</b> Engaged to take part in programmes to improve energy efficiency and decarbonise heating systems.

\* LHEES considerations

1. Off Gas Buildings  
2. On Gas Buildings  
3. Heat Networks. Poor Building Energy Efficiency

4. Poor Building Energy Efficiency  
5. Poor Building Energy Efficiency as driver of Fuel Poverty

### 3.3. Engagement with internal stakeholders

An additional stakeholder engagement workshop was carried out with individuals from relevant departments within Aberdeen City Council. The aim of the workshop was to provide an opportunity for representatives from across the Council to recognise the role of the LHEES in projects and to understand the Council's ongoing progress. Additionally, the workshop provided an opportunity to

support participants in identifying energy efficiency and heat decarbonisation priorities and areas of delivery against local (and national) strategies, as well as sharing insights into solutions, operations and business models that support the development of heat networks.

Table 7 below provides a summary of the different departments that were represented at the workshop, their relevance to the LHEES and priorities and challenges they identified.

Table 7: Summary of engagement with internal stakeholders

Department	Relevant LHEES considerations*	Priorities and challenges
<b>Planning and Housing</b>	All considerations	<p><b>Priorities:</b> Achieving minimum energy efficiency standards for social housing amid changing regulations (SHNZS). Encouraging connection to heat networks.</p> <p><b>Challenges:</b> Energy efficiency improvements in mixed tenure and historic buildings.</p>
<b>Energy Services</b>	All considerations	<p><b>Priorities:</b> Encouraging decarbonisation through heat network connection. Balancing heat pump uptake and heat network development in identified heat network zones.</p> <p><b>Challenges:</b> Households in heat network zones may be ineligible for heat pump grants. Clear communication required with public on obligations in heat network zones.</p>
<b>Climate and Sustainability Services</b>	All considerations	<p><b>Priorities:</b> Policy alignment with national targets.</p>
<b>Property and Estates</b>	1, 2, 3, 4, 6	<p><b>Priorities:</b> Reducing emissions from council-owned properties.</p>
<b>Economic Development</b>	3, 4	<p><b>Priorities:</b> Collaborative approach through Scottish Cities Alliance to access funding and economies of scale. Developing local skills and supply chains Exploring different funding models.</p>

## 3.4. Next Steps

### Future engagement



Following the external stakeholder engagement session, it was agreed that another session would be held specifically for stakeholders involved in the development and expansion of heat networks. As heat networks will play a key role in achieving the Council's decarbonisation goals, this will give relevant stakeholders the opportunity to discuss heat network delivery zones, as well as potential sources of waste heat, anchor loads and constraints. Details of this session are discussed further in section 5.2.

### **Community consultation**

Once a draft LHEES report is produced, the Council plan to undertake a 4-week online consultation process. The draft report will be available on the Council's website, promoted on social media and the Council will publish a press release to ensure that residents are aware of the consultation period. This provides an opportunity for people to engage with the LHEES strategy proposed by the Council and participate in its implementation. The Council shall also notify the various key stakeholders of the consultation period to allow them to respond to any queries posed by the public.

## 4. Baseline Aberdeen's building stock

This section provides an overview of our building stock and heat networks at the time of writing. This baseline allows us to create an effective strategy and to measure progress towards targets and the ultimate target of net zero by 2045.

Age, dwelling type, wall construction, tenure, and heating fuel are key factors that impact energy performance, operational costs, and living conditions in buildings. Home Analytics data for Aberdeen City has been used to benchmark key property statistics against overall national statistics found in the Scottish House Condition Survey, 2021.<sup>10</sup> See Appendix C for an explanation of the Home Analytics dataset.

### 4.1. Domestic buildings

#### Property age and construction type for domestic buildings

Property age can be used to predict construction type which is useful when planning appropriate retrofit interventions across a large number of buildings.

The majority of our properties fall within two categories of construction: cavity (42%) and solid brick or stone (35%) (Table 9). Additionally, 18% are timber frame construction, and 5% are system built. Properties of the same construction category provide an opportunity for retrofit at scale as fabric measures can be standardised and installed at a larger scale. However, as discussed below, energy efficiency and thermal performance can vary greatly within each archetype.

Properties built before 1919 are likely to be of a **solid wall construction**, from brick or stone, with timber floor and roof construction. In Aberdeen, granite was the most used during this time. Stone buildings are likely to have a high conservation value and might be listed or within conservations areas. Retaining the facing stone in such buildings is often essential to the character of the area.<sup>11</sup> However, it also presents unique retrofit challenges and is expensive.

**Cavity wall construction** became more commonplace from the 1920s onwards and is still built today. Like traditional construction, cavity wall construction commonly uses timber for floor and roof construction. Walls are constructed using two layers of masonry, rather than a single leaf. In comparison to solid wall construction, unfilled cavity walls are almost twice as thermally efficient. Additionally, cavity wall constructed properties are much more likely to incorporate damp proof courses (DPCs) and Portland cement than traditionally constructed properties. More recent cavity wall constructed properties (post-1980) are likely to have partially filled cavities.

**System-built** usually refers to post-war non-traditional construction housing that is not cavity wall constructed. It is generally found in mass social house building programmes of the period. Such housing is normally utilitarian in design with low conservation value. This is advantageous

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<sup>10</sup> [Introduction - Scottish House Condition Survey: 2021 Key Findings - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/scottish-house-condition-survey-2021-key-findings/pages/introduction/)

<sup>11</sup> [https://consultation.aberdeencity.gov.uk/place/draft-technical-advice-note-materials/supporting\\_documents/Materials%20TAN%20for%20Public%20Consultation.pdf](https://consultation.aberdeencity.gov.uk/place/draft-technical-advice-note-materials/supporting_documents/Materials%20TAN%20for%20Public%20Consultation.pdf)

regarding potential external wall insulation interventions; however, these properties have a range of unique designs making standardised retrofit plans challenging.

**Timber frame construction** became the most common housebuilding method in Scotland in the 1980s. The proliferation of timber frame construction in Scotland has coincided with the incremental increase of insulation standards. For this reason, timber frame properties tend to be more energy efficient than other archetypes. Older timber frame properties may have minimal mineral wool insulation between timber studs whereas newer properties may have up to 140mm of phenolic foam or air tightness barriers. Retrofit solutions can be technically complex due to the importance of maintaining the moisture balance in timber structures.

*Table 8: Property ages per property type within Aberdeen City*

Property Type	1919-1949	1950-1983	1984-1991	1992-2002	Post-2002	Pre-1919	Total
Detached house	5,641	910	5,468	1,067	1,363	2,662	17,111
Semi-detached house	1,157	788	4,334	297	575	832	7,983
Mid-terraced house	621	297	2,367	122	132	277	3,816
Small block of flats/dwelling converted into flats	3,784	1,011	1,368	238	399	588	7,388
Block of flats	1,456	255	2,050	208	313	407	4,689
End-terraced house	629	251	1,873	104	106	269	3,232
Large block of flats	39	2	262	374	131	337	1,145
Flat in mixed use building	2,403	109	336	124	227	109	3,308

Figure 2: Property types by age of building in Aberdeen City

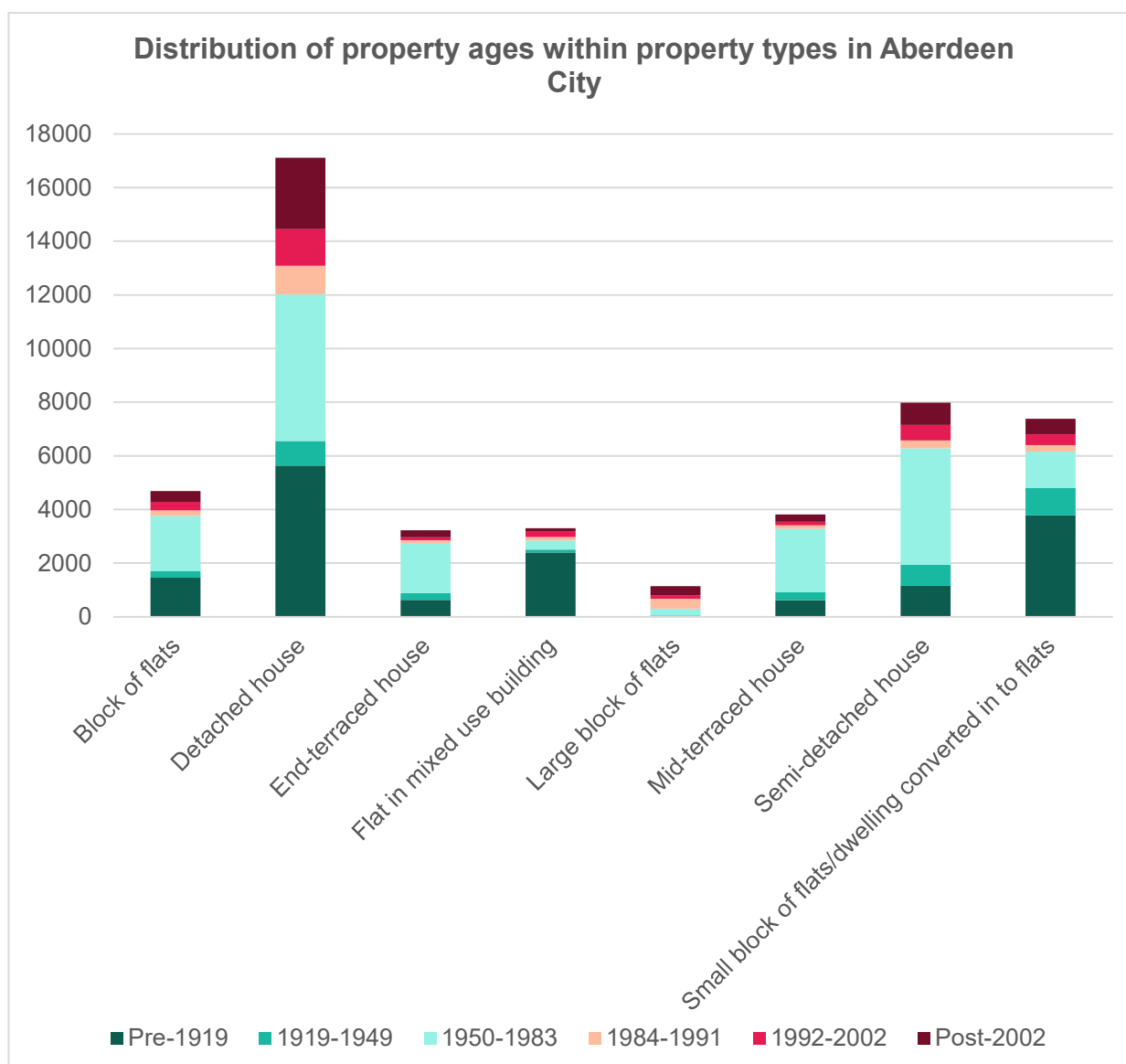


Table 9: Wall insulation by construction types of properties within Aberdeen City

Construction type	Number of properties		Number of properties with insulated walls		Number of properties with uninsulated walls	
	Count	% of total domestic properties	Count	% of total domestic properties	Count	% of total domestic properties
<b>Cavity</b>	52,212	42%	36,272	29%	15,940	13%
<b>Solid brick or stone</b>	44,207	35%	7,813	6%	36,394	29%
<b>System built</b>	6,681	5%	2,742	2%	3,939	3%
<b>Timber frame</b>	21,654	18%	14,612	12%	7,042	6%
<b>Total</b>	124,754	100%	61,439	49%	63,315	51%

## Tenure of domestic buildings

Property tenure will have a direct impact on the pace and extent of retrofit installations across Aberdeen City. Specific tenure-targeted policies, such as EESSH, have been proven to accelerate change. Conversely, the private sector has seen slower progress due to property owners not seeing a strong return on capital investment without government stimulation.

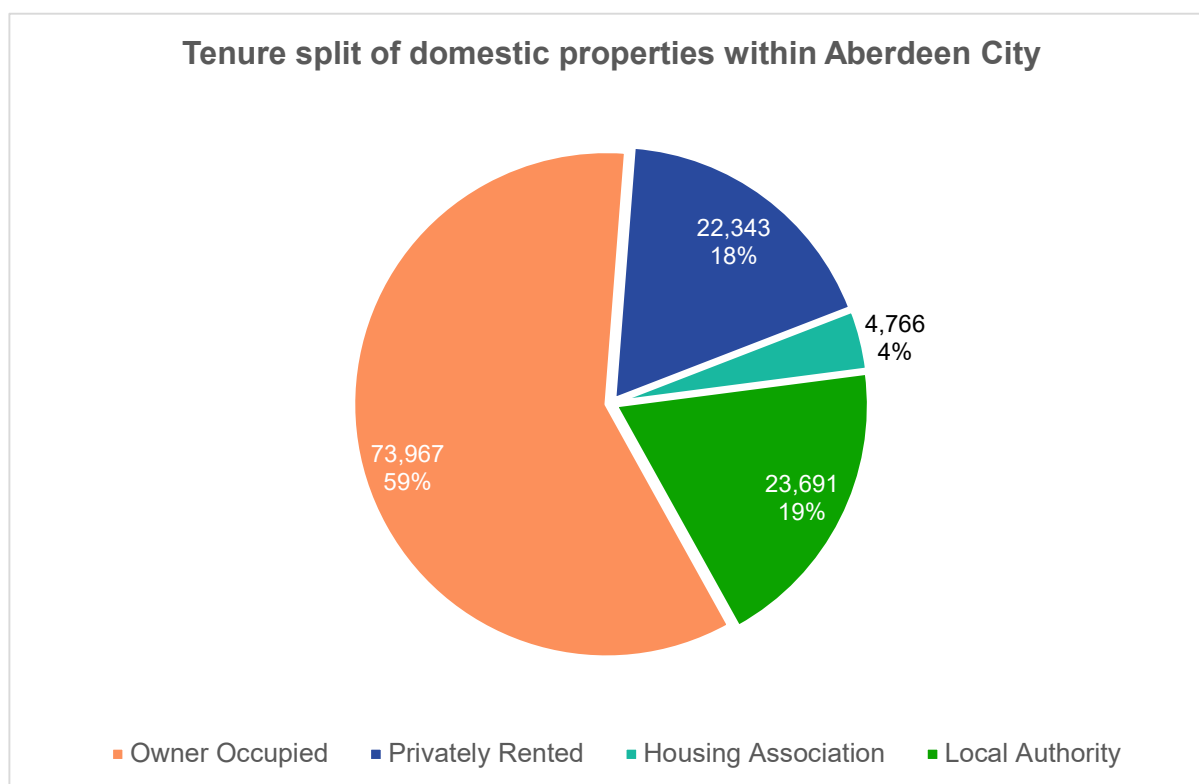
Just under a quarter (23%) of the domestic properties in Aberdeen City are social housing. Most of these are owned by the Council. While social rented properties are eligible for various government funding streams targeted at retrofit, the existing funding is not sufficient to meet the energy efficiency requirements while keeping rents affordable. This is a challenge for the social housing sector.

The majority of properties are owner-occupied or private rented. Consequently, developing a retrofit strategy for properties outside of council-ownership is essential to meet net zero.

Table 10: Tenure split of domestic properties within Aberdeen City

Owner-occupied	Privately Rented	Local Authority	Housing Association
73,967 (~59%)	22,343 (~18%)	23,691 (~19%)	4,766 (~4%)

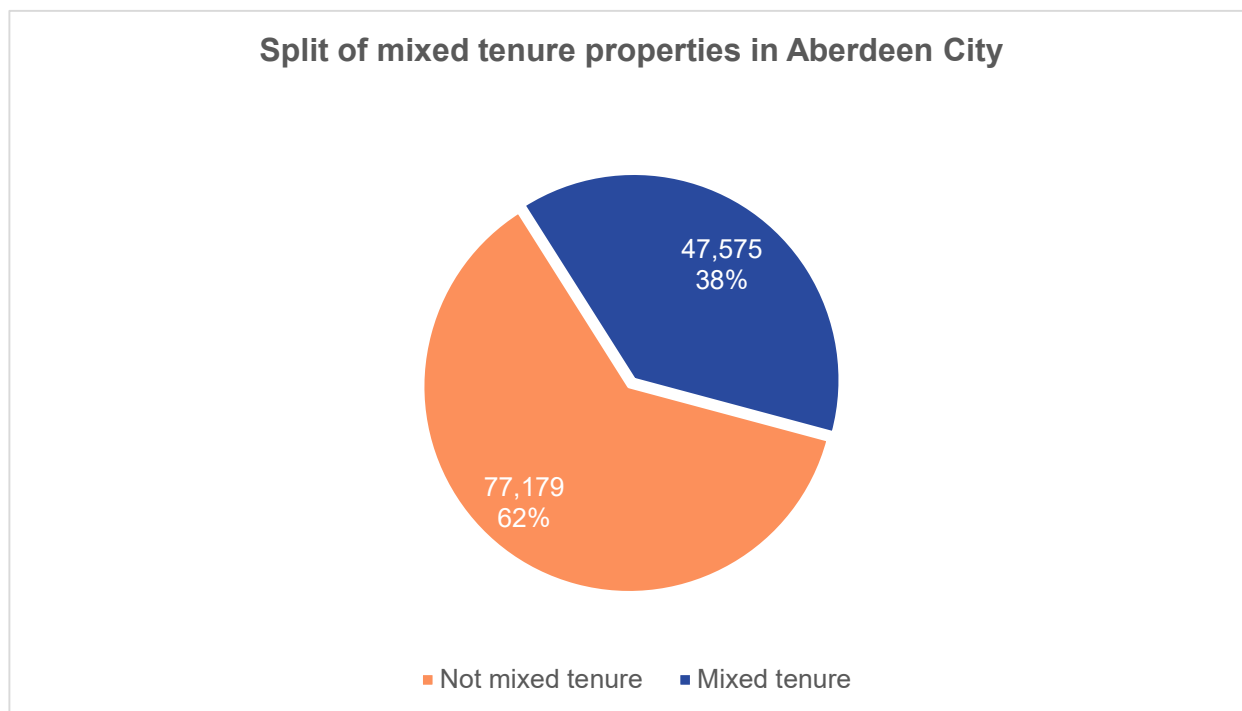
Figure 3: Pie chart of property tenure split within Aberdeen City





38% of properties in Aberdeen City are within **mixed tenure buildings**. Mixed tenure buildings have additional barriers to retrofit because multiple property owners within the same building must agree to a retrofit plan. In these buildings, there is a risk that retrofit plans are delayed or the extent of retrofit is reduced due to different priorities or capital investment plans for the property owners. Council-owned properties in mixed tenure buildings could be targeted first to develop a retrofit plan addressing challenges and opportunities.

Figure 4: Pie chart of mixed tenure properties in Aberdeen City



## Fuel poverty

### Box 1: Data sources for understanding fuel poverty

The **Scottish House Condition Survey (SHCS)** provides data on fuel poverty in Scotland. This data has been used to assess the fuel poverty of Aberdeen City. Scotland-wide data is published annually, with the latest data being from 2022. No data was published in 2020 and 2021 due to the COVID-19 pandemic. Local authority figures for fuel poverty are based on three years' worth of SHCS data in order to achieve sufficient sample sizes. The latest data is from 2017-19. This is no longer accurate but may provide an estimate of how Aberdeen City compares to the Scottish average.

The **Scottish Index of Multiple Deprivation (SIMD)** is a tool for identifying areas with relatively high levels of deprivation.<sup>1</sup> It is a relative measure of deprivation across small areas (data zones) in Scotland. 'Deprived' does not just mean 'poor' or 'low income'. It can also mean people have fewer resources and opportunities, for example in health and education. SIMD data is split into ten deciles covering the whole population, where one is most deprived and ten is least on the scale. The latest data was published in 2020.

Based on 2017-19 data from the Scottish House Condition Survey (SHCS), Aberdeen City's fuel poverty rates were 26.1%. This is slightly above the Scottish average in the same period, which was 24.4%. The national average increased in 2022 to 31% of Scottish households in fuel poverty.

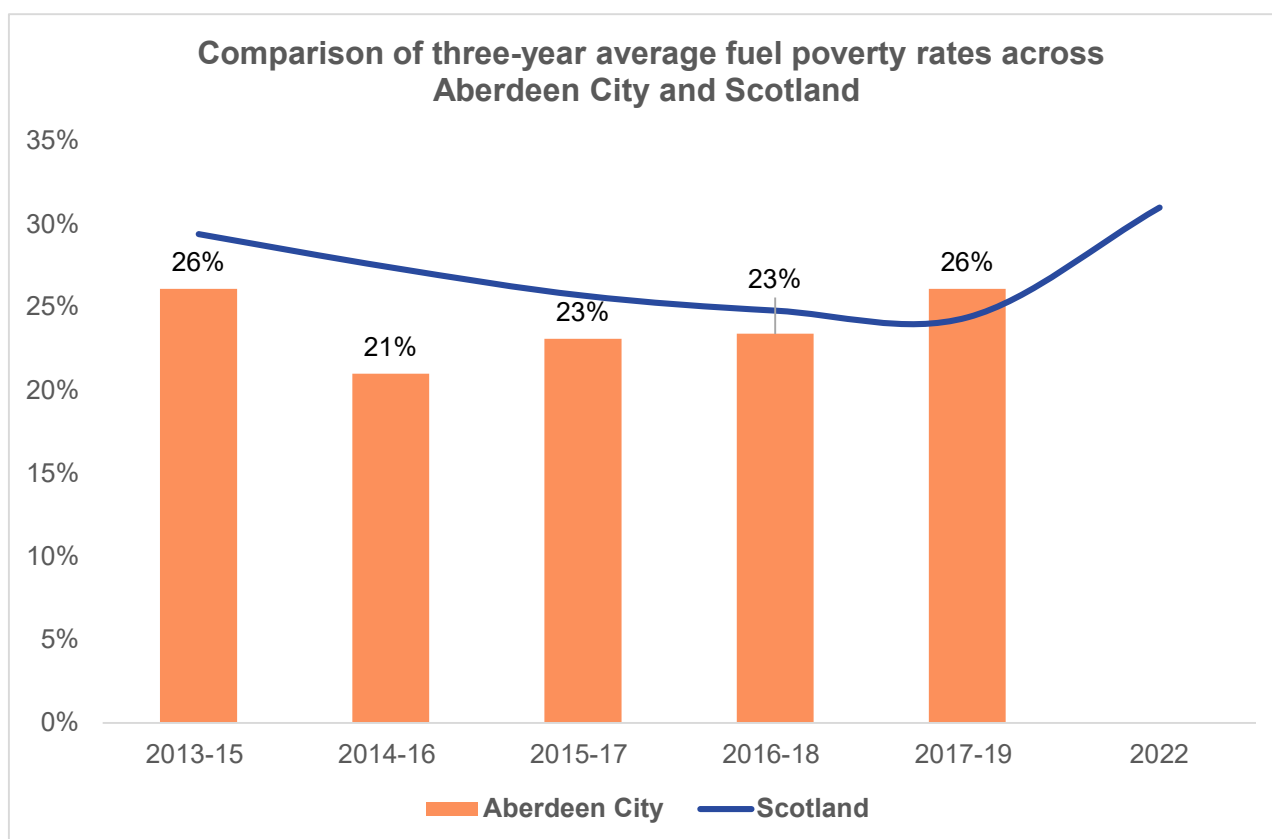
It is likely that households in Aberdeen City have experienced an increase as a result of the cost-of-living crisis and the sharp rise in energy costs since 2022.

Table 11 shows how Aberdeen City's fuel poverty rates have changed in the past decade. However, due to a change in the fuel poverty definition, direct comparisons cannot be drawn with the statistics published prior to 2016-2018.

Table 11: Scottish House Condition Survey figures showing the three-year average fuel poverty rates across Aberdeen City and Scotland<sup>12</sup>

Households (% of total population)	2013-15	2014-16	2015-17	2016-18	2017-19	2019-22
<b>Aberdeen City</b>	26.1%	21%	23.1%	23.4%	26.1%	No data <sup>13</sup>
<b>Scotland</b>	29.4%	27.4%	25.7%	24.8%	24.4%	31%
	[Old fuel poverty definition]			[New fuel poverty definition]		

Figure 5: Three-year average fuel poverty rate across Aberdeen City relative to the Scottish national average. Note that from the years 2016-18 onwards, the definition of fuel poverty differed to the previous years.



<sup>12</sup> <https://statistics.gov.scot/slice?dataset=http%3A%2F%2Fstatistics.gov.scot%2Fdata%2Ffuel-poverty-shcs&http%3A%2F%2Fpurl.org%2Flinked-data%2Fsdx%2F2009%2Fdimension%23refPeriod=http%3A%2F%2Freference.data.gov.uk%2Fid%2Fgrogorian-interval%2F2013-01-01T00%3A00%3A00%2FP3Y>

<sup>13</sup> The 2020 SHCS was suspended due to the Covid-19 pandemic, and methodological changes were introduced in 2021. The next three-year average estimates for local authorities are expected to be published in early 2026.

In a national context, Aberdeen City is the 17th most deprived area out of 32 local authorities, based on an analysis of data from the Scottish Index of Multiple Deprivation (SIMD).<sup>14</sup> A total of 12,935 properties in Aberdeen City fall within SIMD deciles one and two (most deprived). More than half of these properties are owned by the Council, indicating a strong link between the social housing tenure type and areas with high SIMD rankings.

## Primary fuel type for domestic buildings

Our domestic housing stock aligns with national averages in relation to primary fuel type. Mains gas is the most common type of primary fuel. Compared to the Scottish average, Aberdeen City has a slightly higher proportion of properties using electricity as the primary fuel type, and fewer properties using oil, LPG, solid fuel, and biomass.

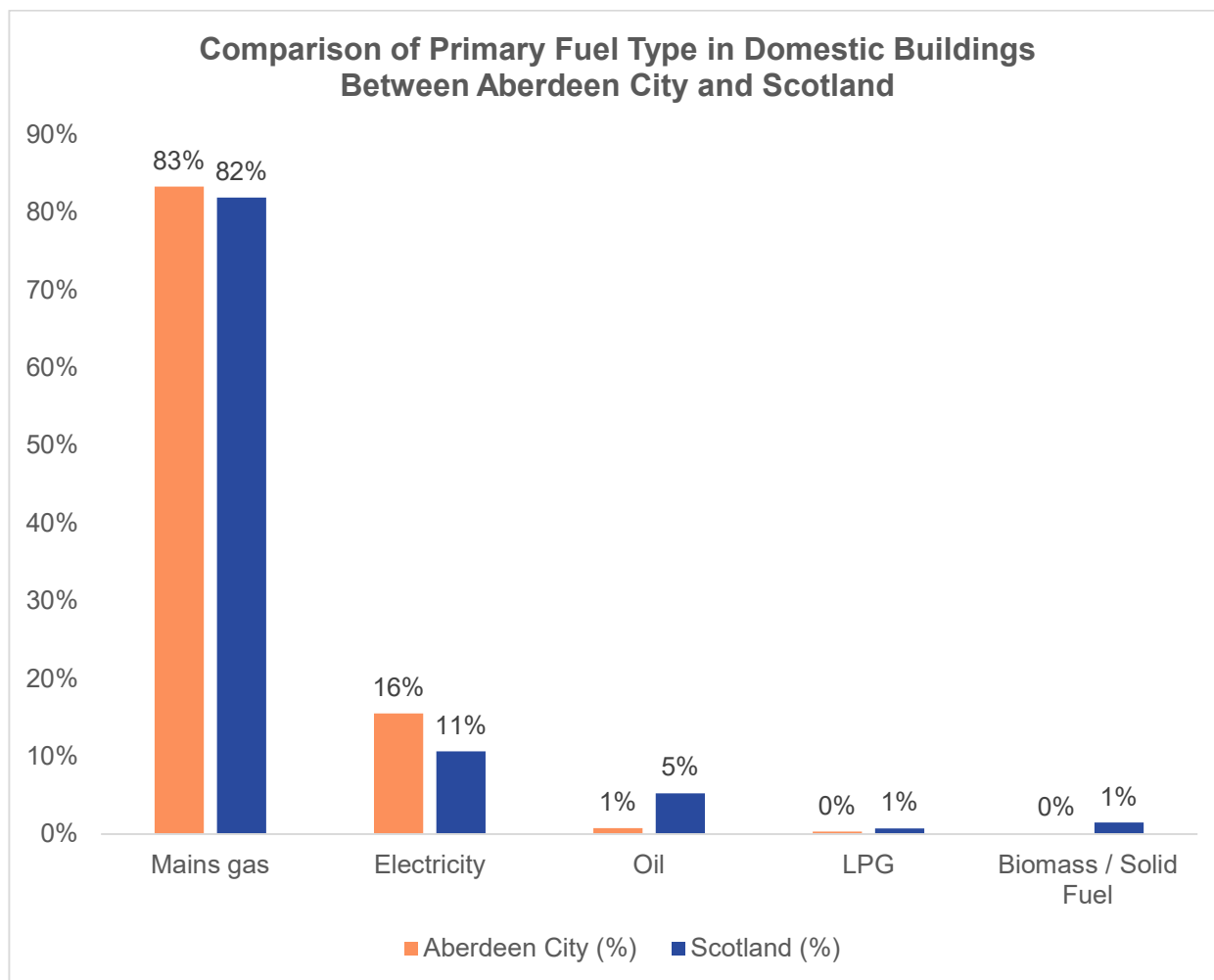
Note that the 'primary fuel type' indicator does not capture different heating systems used and does not capture the extent of heat networks. The extent of existing heat networks is discussed in a separate section below.

*Table 12: Primary fuel type statistics for domestic properties in Aberdeen City. Note that properties with no fuel type (~0.9% of total domestic stock) is not included here.*

Primary Fuel Type	Aberdeen City	Scotland
Mains gas	102,975 (82.5%)	2,016,000 (82%)
Electricity	19,168 (15.4%)	262,000 (11%)
Oil	914 (0.7%)	129,000 (5%)
LPG	368 (0.3%)	18,000 (1%)
Biomass / Solid Fuel	159 (0.1%)	36,000 (1%)

<sup>14</sup> <https://www.aberdeencity.gov.uk/sites/default/files/2018-01/Deprivation%20in%20Aberdeen%20City.pdf>

Figure 6: Primary Fuel Type in Domestic Buildings between Aberdeen City and Scotland



## Energy Performance Certificate data for domestic buildings

Compared to the national average, Aberdeen has more properties across all tenures that fall in EPC bands A-B (most energy efficient).

The social housing sector in particular has relatively high levels of energy efficiency, with only 25% of properties in band D or lower. It is also the tenure type with the largest share of properties in bands A-B. This indicates that policy drivers for the sector have been successful at driving energy efficiency improvements.

Owner-occupied properties in Aberdeen have a wider distribution across EPC bands compared to the national average. This sector has fewer properties in band C compared to Scotland overall, but in turn more properties in both bands A-B (more energy efficient) and bands D-E (less energy efficient). Overall, this tenure type has the largest share (58%) of properties in band D and below.

The private rented sector is similar to the owner-occupied sector and in line with the national average, with most properties in bands C and D. Half of the properties in this sector are in band D or below.

Table 13: EPC data for domestic properties in Aberdeen City and national averages

	A-B (81-100)	C (69-80)	D (55-68)	E (39-54)	F-G (1-38)
Aberdeen City	12%	44%	32%	9%	3%
Scotland (average)	6%	48%	34%	9%	4%

Figure 7: Distribution of EPC Bands across Aberdeen City compared to the Scottish national average

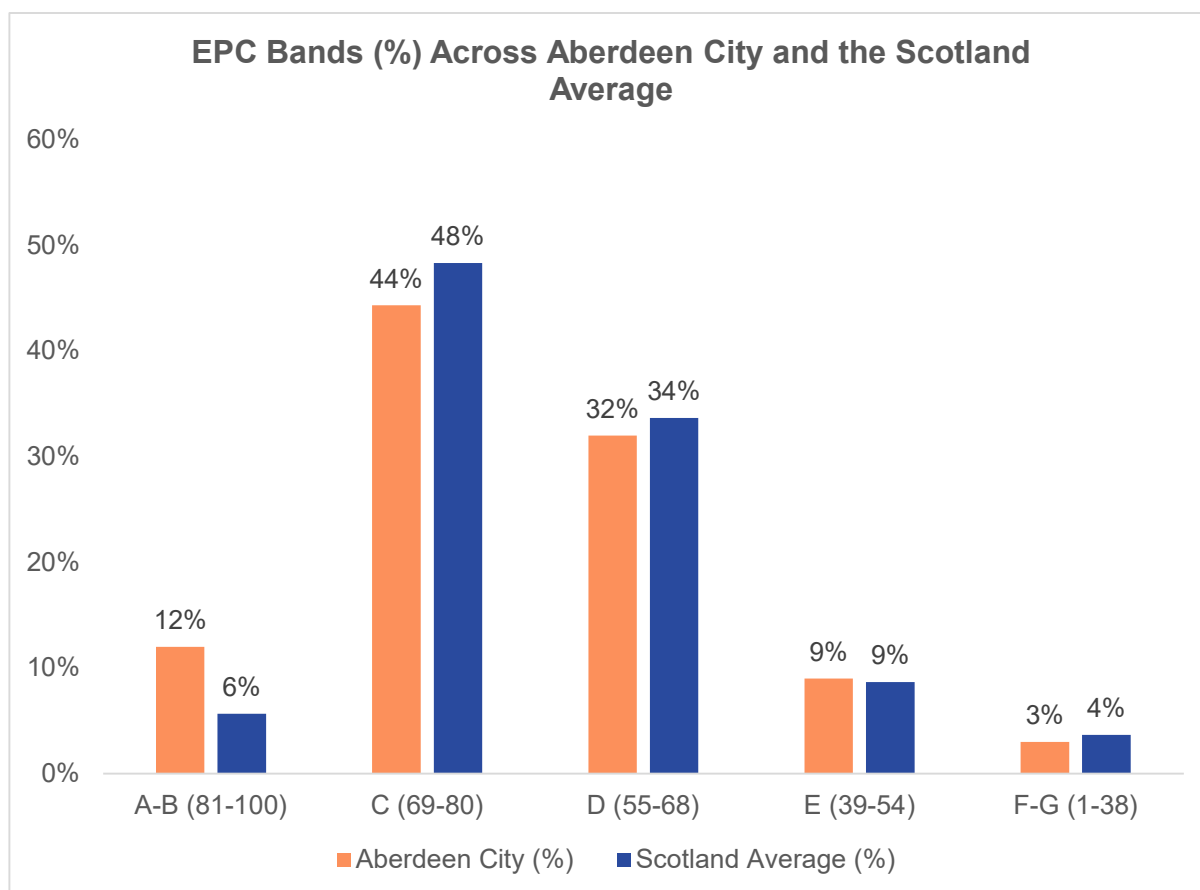
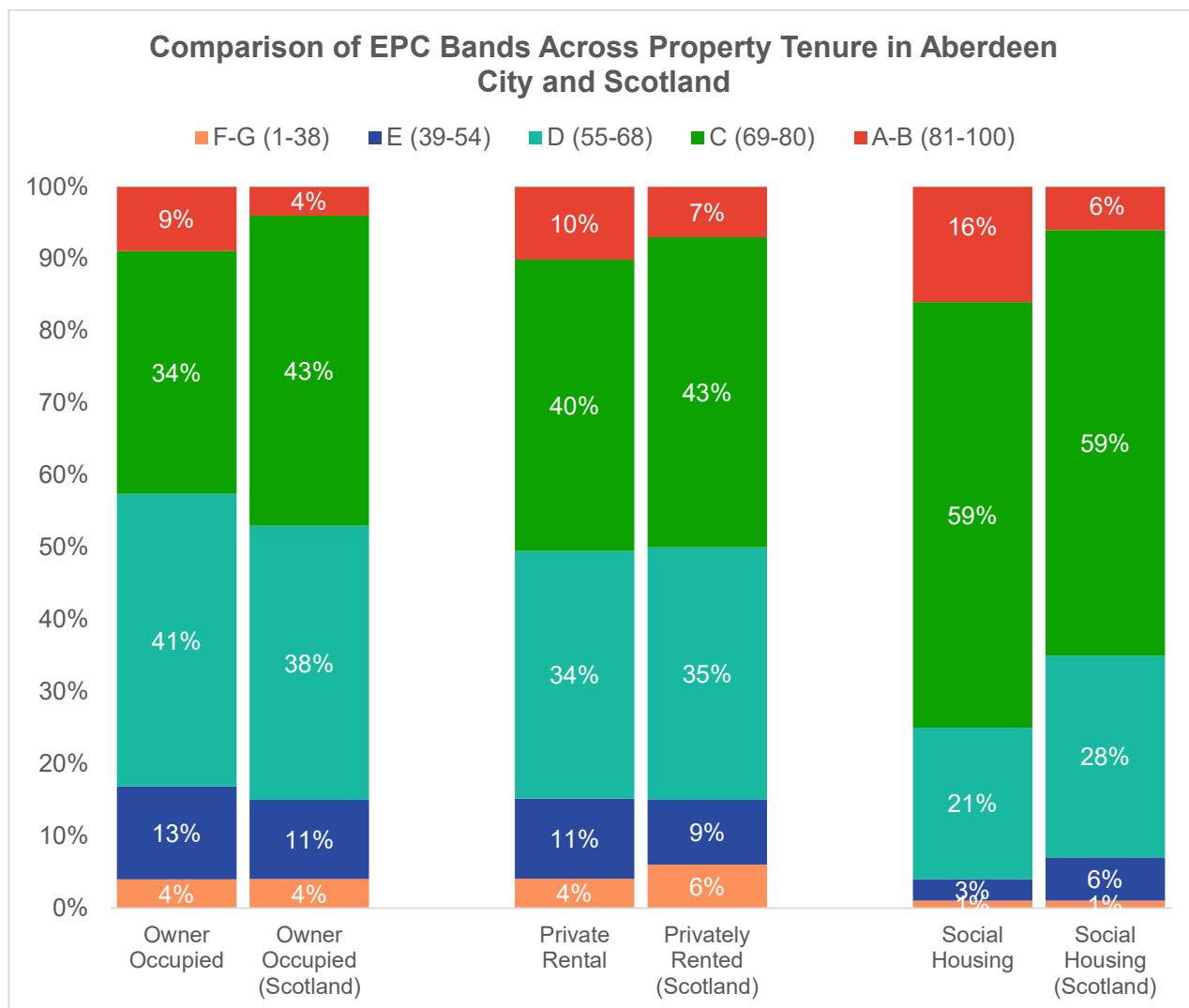


Table 14: Split of EPC data for domestic properties across property tenure in Aberdeen City

EPC Band	Owner-occupied		Private Rental		Social Housing	
	Aberdeen City	Scotland	Aberdeen City	Scotland	Aberdeen City	Scotland
A-B (81-100)	9%	4%	10%	7%	16%	6%
C (69-80)	34%	43%	40%	43%	59%	59%
D (55-68)	41%	38%	34%	35%	21%	28%
E (39-54)	13%	11%	11%	9%	3%	6%
F-G (1-38)	4%	4%	4%	6%	1%	1%

Figure 8: Split of EPC bands across all property tenures in Aberdeen City relative to the Scottish national average.



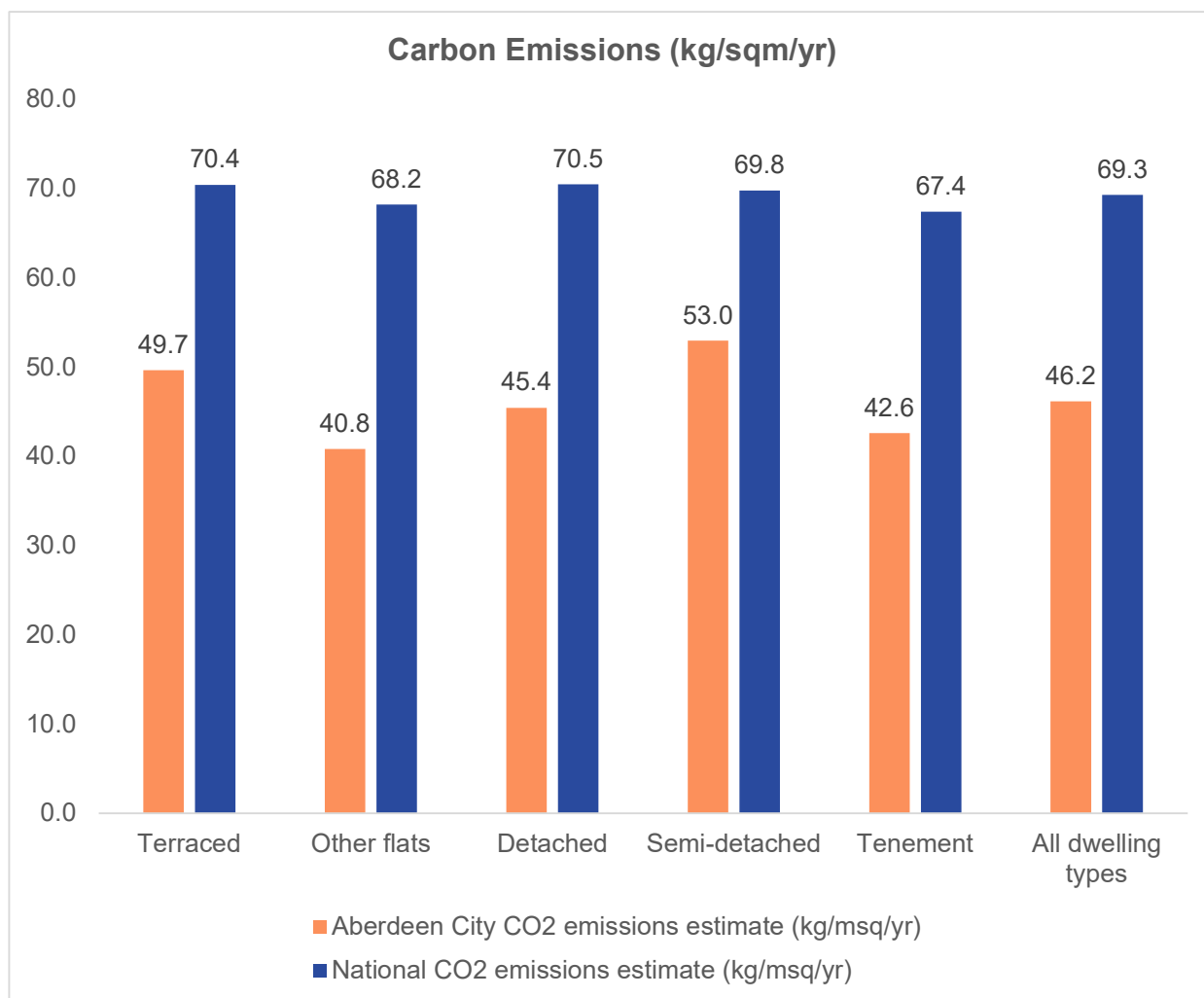
## Carbon emissions from domestic buildings

In the national housing stock, carbon emissions estimates are relatively consistent between 67.4 and 70.5kg/m<sup>2</sup>/year across all dwelling types (Figure 9). In Aberdeen City, these estimates are significantly lower and with larger variation, between 40.8 and 53 kg/m<sup>2</sup>/year and averaging 46.2 kg/m<sup>2</sup>/year. Factors such as higher energy efficiency and less carbon intensive heating systems are likely to influence this.

Semi-detached, detached, and terraced housing have higher emissions compared to tenements and other flats. A similar pattern is found across the national housing stock, though the differences across dwelling types are less pronounced at national level.



Figure 9: Carbon emissions (kg/m<sup>2</sup>) for each dwelling type in Aberdeen City



## 4.2. Non-domestic buildings

Figure 10 provides a breakdown of the number of domestic and non-domestic buildings in Aberdeen City. There are 124,754 domestic buildings in Aberdeen, amounting to 93% of the total building stock, of which 23% are publicly owned. By comparison, non-domestic buildings make up only 7% of the building stock, including offices, retail, hotels, industry, education and leisure. In the context of non-domestic buildings, residential refers to short-term accommodation such as holiday lets.

Despite making up only 7% of buildings, non-domestic buildings account for 34% of heat demand across Aberdeen City. This demonstrates that on average heat demand is higher in non-domestic buildings than domestic ones. Due to their higher relative heat demand, non-domestic buildings have potential to be used as anchor loads to improve the feasibility of heat networks by providing guaranteed demand.

Table 15: Total property count for domestic and non-domestic buildings in Aberdeen City

Non-domestic property count	Domestic property count	Total property count
10,057 (7%)	124,754 (93%)	134,811

Table 16: Total heat demand for domestic and non-domestic buildings in Aberdeen City

Non-domestic total heat demand (MWh/yr)	Domestic total heat demand (MWh/yr)	Total heat demand (MWh/yr)
764,721 (34%)	1,483,212 (66%)	2,247,933

Figure 10: Breakdown of domestic and non-domestic building counts and respective heat demands in Aberdeen City

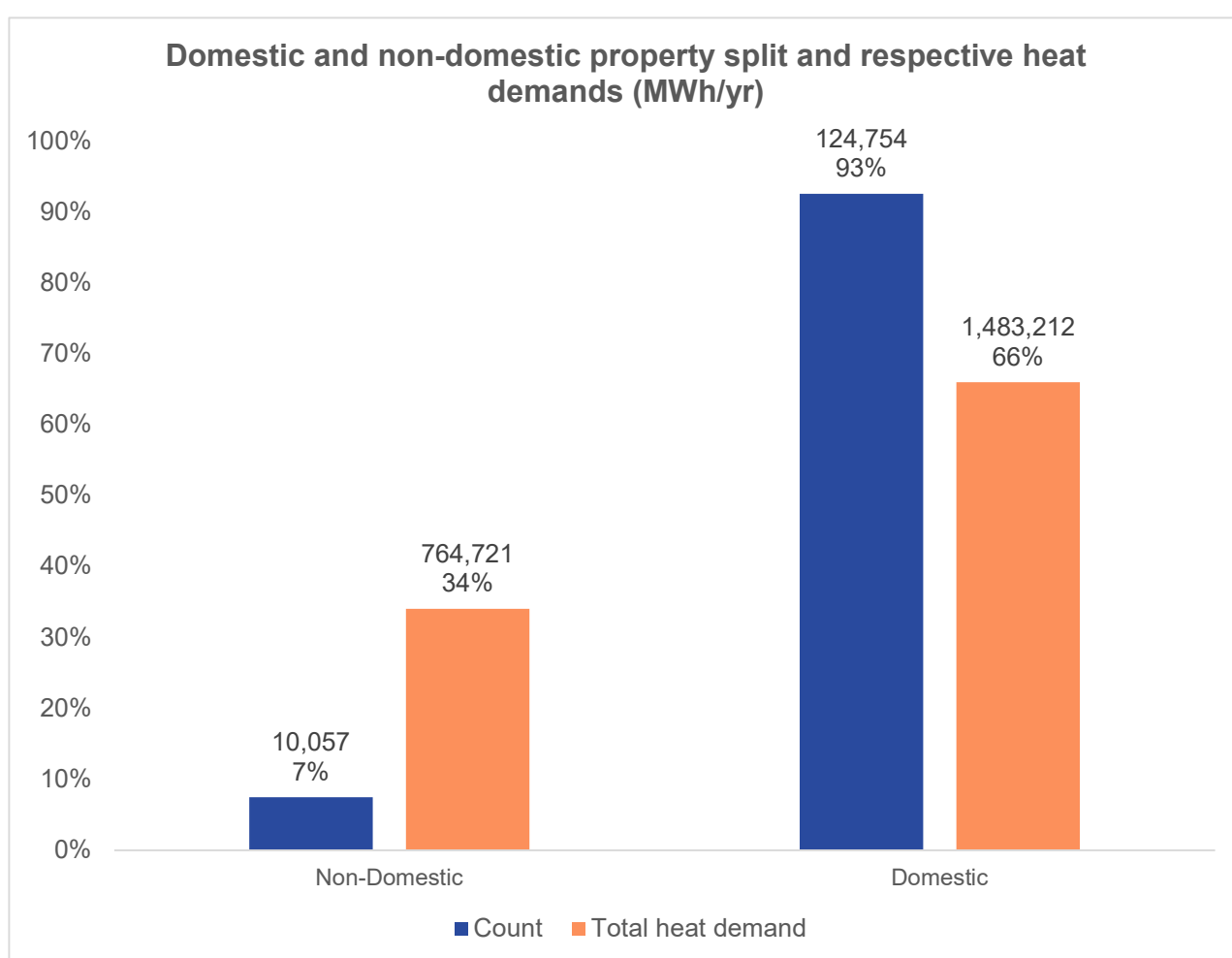
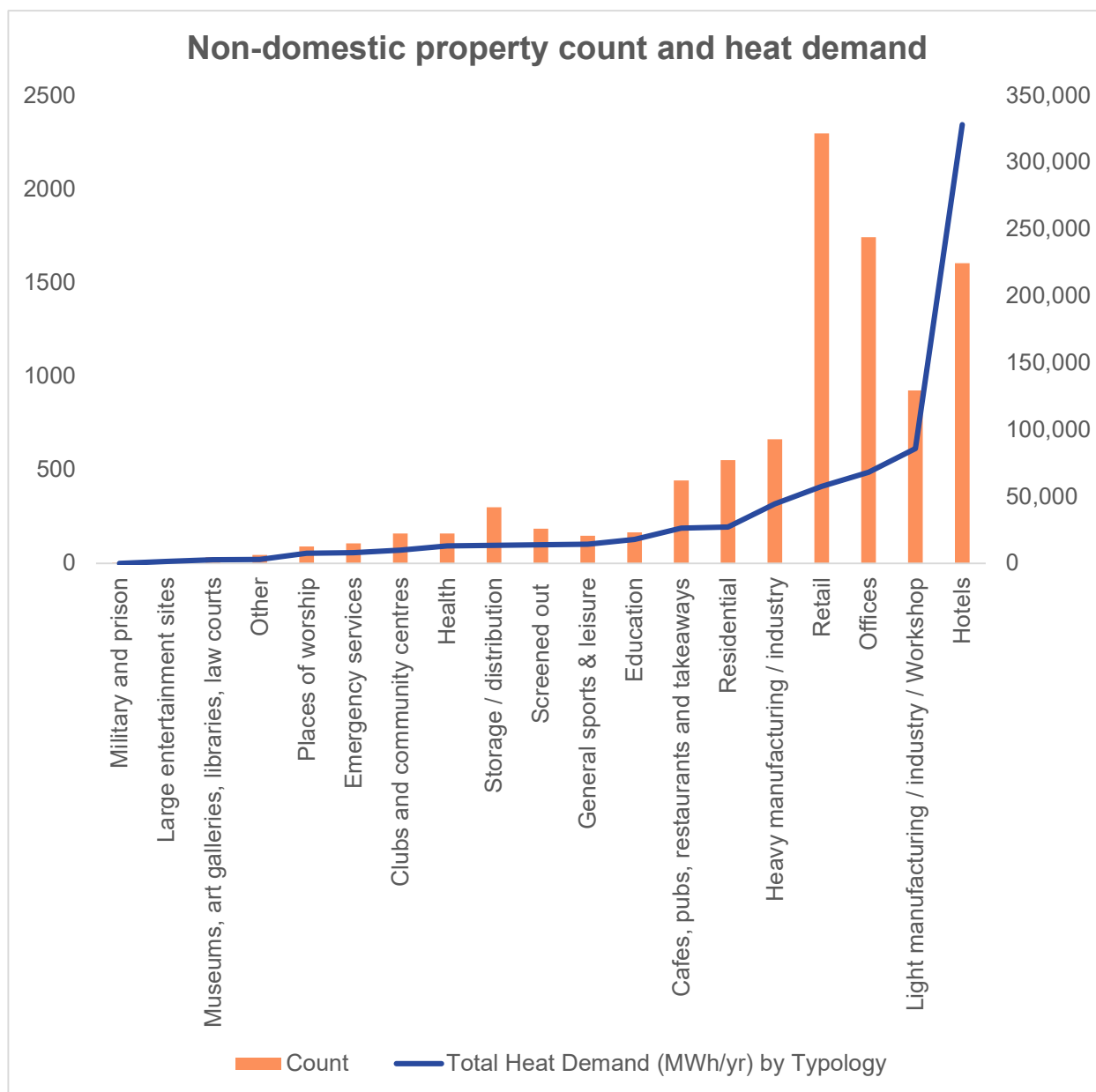


Figure 11 provides a breakdown of heat demand across different non-domestic building typologies in Aberdeen. This demonstrates that the correlation between number of properties and heat demand is not always directly proportional and is dependent on how the property is used. Building types such as hotels, education and sports and leisure centres have a higher average heat demand than retail or office buildings.

Figure 11: Non-domestic property count and total heat demand by typology



Hotels have the highest heat demand of all non-domestic building typologies, accounting for 44% of heat demand, despite making up only 17% of non-domestic buildings. This typology also includes care homes and student halls of residence, as well as traditional hotels, hostels, guest houses and bed and breakfasts. By contrast, offices and retail combined contribute only 17% of heat demand, despite making up 42% of buildings.

## Primary fuel type in non-domestic buildings

As seen in *Table 17*, electricity is the most common fuel type for non-domestic properties, with 5,403 buildings relying on electric heating systems. Mains gas is the next most common fuel source with 3,217 non-domestic properties connected to the gas grid. Note that district heating is not included as a fuel source in Non-Domestic Analytics. Heat supplied to non-domestic buildings through heat

networks is classified in terms of the fuel source for the heat network. For example, heat supplied via heat networks powered by CHP stations falls under 'mains gas'.

Table 17: Non-domestic property count by main fuel type

Electricity	Mains gas	Oil	Other
5,403 (54%)	3,217 (32%)	1,287 (13%)	150 (1%)

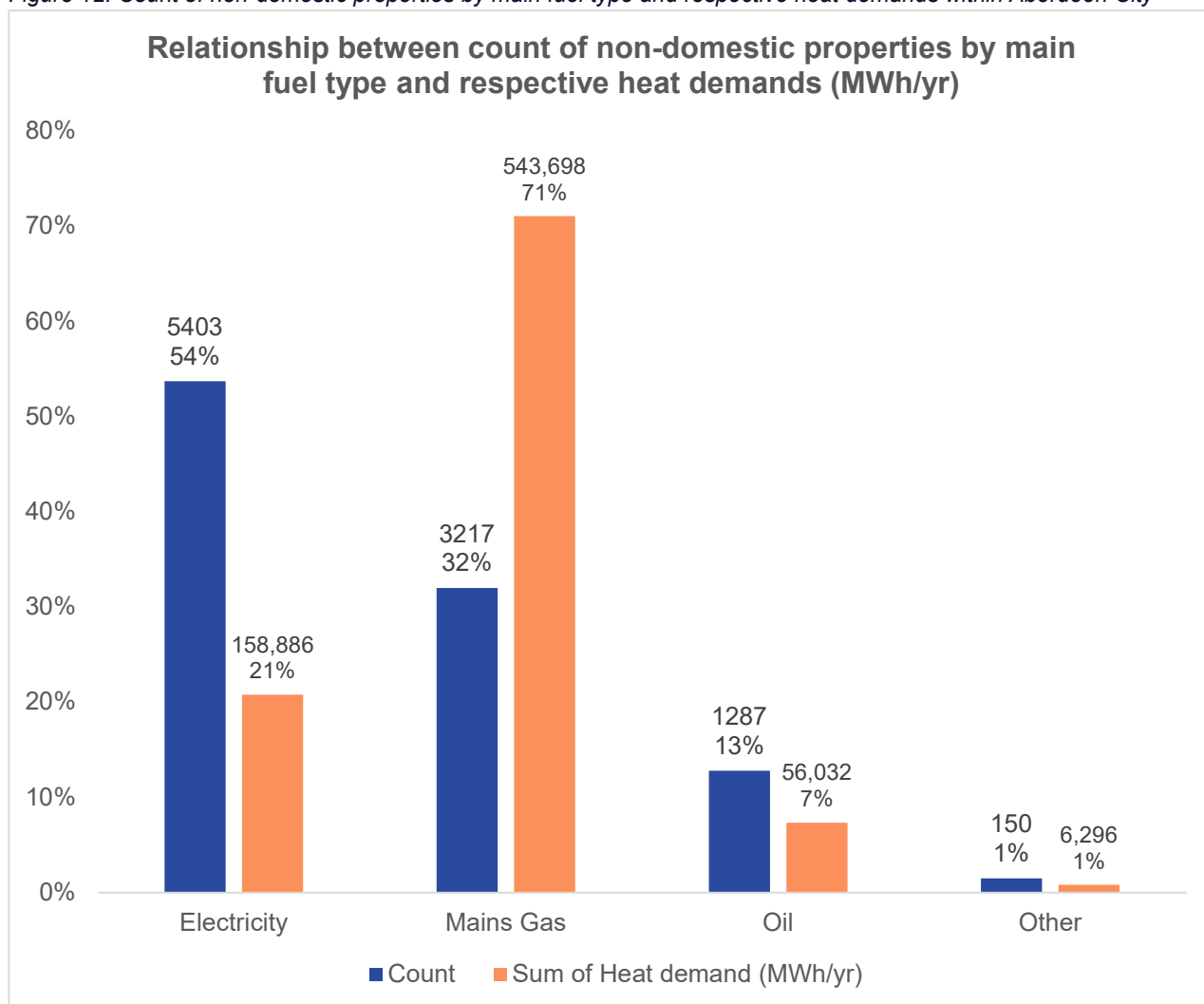
As Figure 12 demonstrates, the relationship between number of properties and heat demand according to fuel type is non-linear. Mains gas makes up the majority of heat demand in non-domestic properties and is used to meet 71% of demand despite accounting for only 32% of properties (Table 17, Table 18 and 19). Conversely, electricity meets just 21% of heat demand, and is used by 54% of properties. Other fuel types, liquified petroleum gas (LPG) and biomass, meet just 1% of heat demand.

This shows that properties which use gas as their main heating source have a significantly higher average heat demand than those that use electricity. As such, on gas buildings will be a priority focus for decarbonising non-domestic buildings.

Table 18: Heat demand by main fuel type (MWh/yr)

Electricity	Main Gas	Oil	Other
158,886 (21%)	543,689 (71%)	56,032 (7%)	6,296 (1%)

Figure 12: Count of non-domestic properties by main fuel type and respective heat demands within Aberdeen City



## 4.3. Heat Networks

### Existing heat networks

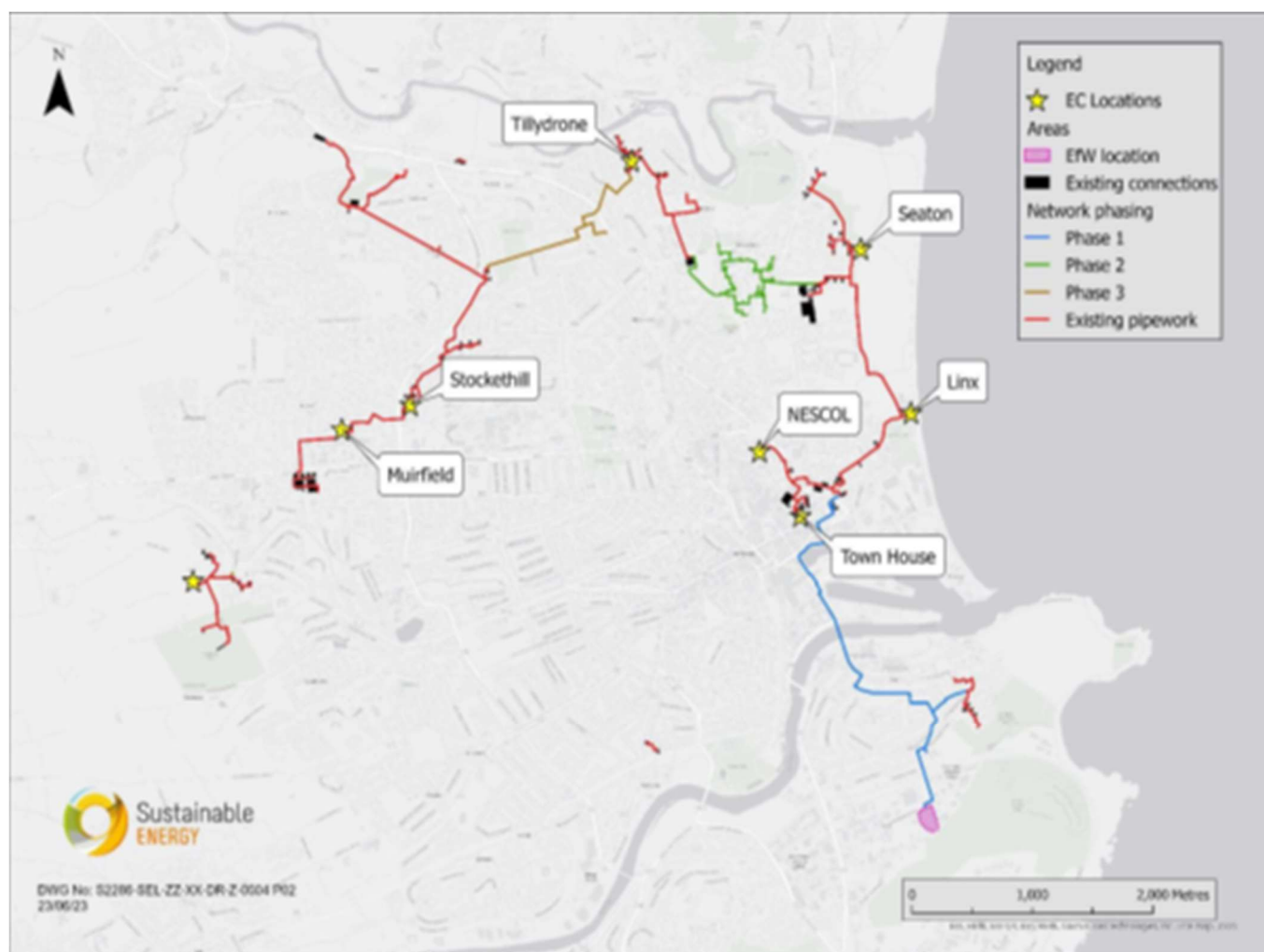
Aberdeen City has a number of heat networks that provide heat and hot water across the city. The networks are operated and maintained by Aberdeen Heat and Power, a not-for-profit company set up by the Council in 2002. The company was initially set up to address the issue of fuel poverty among social housing tenants in the Council's high-rise flats by providing affordable warmth. Since then, the networks have been expanded and now serve a number of private and public buildings, including schools, offices, student accommodation, health centres and residential flats and houses. *Table 19* below provides an overview of the heat networks currently operated by Aberdeen Heat and Power. Additionally, there are a number of standalone communal heating systems and heat networks serving domestic and non-domestic buildings across the city, including universities and health facilities. These networks are operated independently of Aberdeen Heat and Power.

Table 19: Heat networks operated by Aberdeen Heat and Power

Energy centre location	Development stage	Primary heat source	Capacity (MW)	No. of connections
Hazlehead	Operational	CHP	3.44	186
Tillydrone	Operational	CHP	5.2	495
Seaton	Operational	CHP	11.82	1,121
Stockethill	Operational	CHP	6.13	1,369
Wellheads	Operational	CHP	1.04	283
Torry	In development	Energy from waste (EfW)	10	794*

\* Number of proposed connections to Torry heat network.

Figure 13: Map of Aberdeen Heat and Power heat networks and energy centres with proposed extensions. Source: Aberdeen Heat and Power (reproduced with permission)





## 5. Priority A: Heat Network Development

### Summary of Priority A: Heat Network Development

Heat networks can provide **affordable, reliable, and decarbonised heating** to homes and businesses. Aberdeen is unique compared to other local authorities in that it already has a developed network of heat networks operated by Aberdeen Heat and Power. Expanding the existing networks, decarbonising heat sources and developing new heat networks elsewhere are important priorities for Aberdeen City Council.

**Areas of interest:** The Council is focused on expanding existing heat networks by connecting new buildings and heat sources. The Torry heat network has been expanded to use waste heat from the Energy from Waste (EfW) plant in Tullos and is currently accepting sign-ups. All new build council houses and public buildings will be connected to a heat network where feasible. If a heat network connection is not currently available, future connection plans must be considered at design and construction stages.

**Stakeholders:** The main stakeholders involved in developing new heat networks and expanding existing ones are the Council, Aberdeen Heat and Power, organisations with buildings that are potential anchor loads, and organisations with a potential source of waste heat that may be used to supply heat networks.

**Challenges:** There are various challenges associated with heat network development in Aberdeen including high capital cost of development, lack of available capacity in existing heat networks and the need to decarbonise the existing heat supply.

**Opportunities:** Several heat networks are already operational across the city with plans for expansion. In Aberdeen Heat and Power, the city already has an established organisation with over 20 years' experience in managing and developing heat networks.

### Relevant policies:

Heat Networks (Scotland) Act 2021: provides regulatory framework for the development and operation of heat networks in Scotland.

Aberdeen Local Development Plan 2023: includes policies to encourage waste heat recovery and heat network development.

## 5.1. Overview

A heat network is a heat supply technology that delivers heat from a central source to multiple properties via insulated pipes buried underground. Heat can be supplied by a range of different technologies. This could include heat generated from boilers (combined heat and power (CHP), gas, or biomass fed), or from heat pumps. They can also use recovered or waste heat from industrial processes, data centres, or energy from waste facilities. A heat network, despite its name, can provide both heating and cooling. Heat networks provide under 2% of Scotland's heating.<sup>15</sup> By 2050, it is projected that they will provide 20% of heating in the UK to meet net zero targets.<sup>16</sup>

Depending on their fuel source, heat networks can help reduce greenhouse gas emissions. The design of heat networks enables new heat sources to be added in the future with minimal disruption for the end-user. This means that heat networks are a low-regrets technology.

Heat networks will play an important role in balancing wider energy networks, as they can store energy and absorb constrained renewable electricity generation (when there is too much energy being generated for the electricity grid). Heat networks may also help to reduce householder energy bills and tackle fuel poverty, if well-designed and operating efficiently using an appropriate heat source.

To be efficient, economically viable and deliver value for money, heat networks must be well located. This means being in areas with sufficient heat demand and density to enable optimal performance. It also means securing connections to the network from buildings with large, reliable and long-term demand for heat. These are known as 'anchor loads' and are essential in allowing heat networks to operate efficiently.

## 5.2. Future heat network development

Heat networks will form a key part of the Council's strategy to decarbonise heating in Aberdeen. This will involve expanding existing networks as well as developing new ones. The Heat Networks Act requires local authorities to identify and potentially designate heat network zones. Zoning provides market signals to attract private investment from heat network developers. As part of this strategy, data from the Scottish Heat Map was used to identify areas or 'clusters' with high potential for heat network development based on linear heat demand and the presence of nearby anchor loads (see Appendix E for methodology).

In total, 13 clusters were identified as having potential for future heat network development, as identified in Figure 14 below. Many of these areas are intersected by heat networks that are already in operation, which presents an opportunity for expanding these networks if additional heat sources are added. Of the 13 clusters, four were identified as having high potential based on total heat demand. The remaining nine present additional opportunities for heat network development. These zones will be reviewed in collaboration with relevant stakeholders. Designating heat network zones will be included as an action in the LHEES Delivery Plan.

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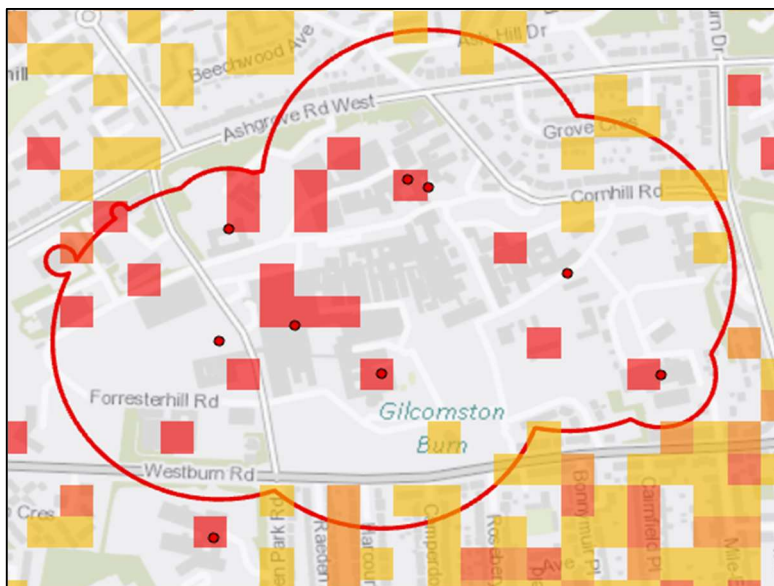
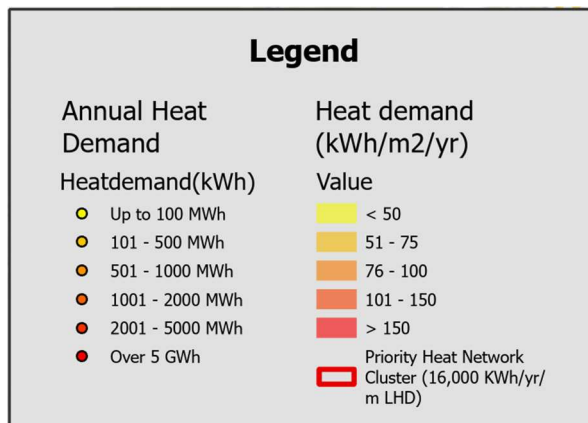
<sup>15</sup> Scottish Government (2024) [Renewable and low carbon energy](#)

<sup>16</sup> DESNZ (2023) [UK heat networks: market overview](#)



## Proposed heat network zones

A legend for the proposed heat network zone maps is shown below:



**Zone 1 – Foresterhill:** This zone covers an area of 54.9 hectares around the Aberdeen Royal Infirmary and has a total heat demand of 152,962MWh/yr. There are eight potential anchor loads within this zone. Parts of this area are covered by four existing heat networks, including Stockethill. There is potential for the existing network to be expanded in this area, depending on existing capacity and the availability of additional heat sources.

Figure 15: Proposed heat network cluster 1 in Foresterhill



**Zone 2 – Old Aberdeen:** This zone covers an area of 45 hectares in the north of the city and has a total heat demand of 78,622MWh/yr. There are eight potential anchor loads within this area belonging to the University of Aberdeen, one of which is served by Kings College district heat network. Additionally, the cluster contains two existing heat networks and is intersected by a third. The University of Aberdeen District Heating Scheme sits between the Seaton and Tillydrone heat networks operated by Aberdeen Heat and Power. There is potential for the existing networks to be expanded and connected if additional low carbon heat sources are added. Any plans for expansion will require close engagement between the Council and relevant stakeholders.

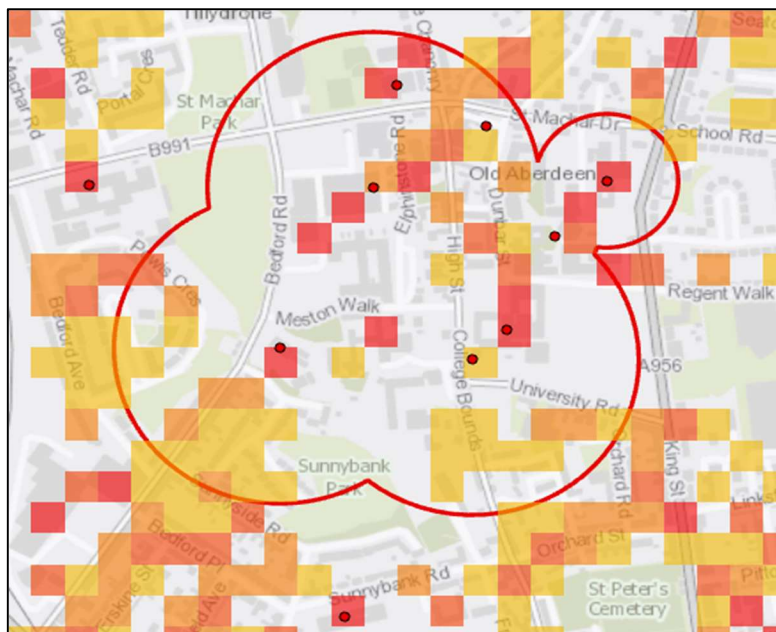


Figure 16: Proposed heat network cluster 2 in Old Aberdeen

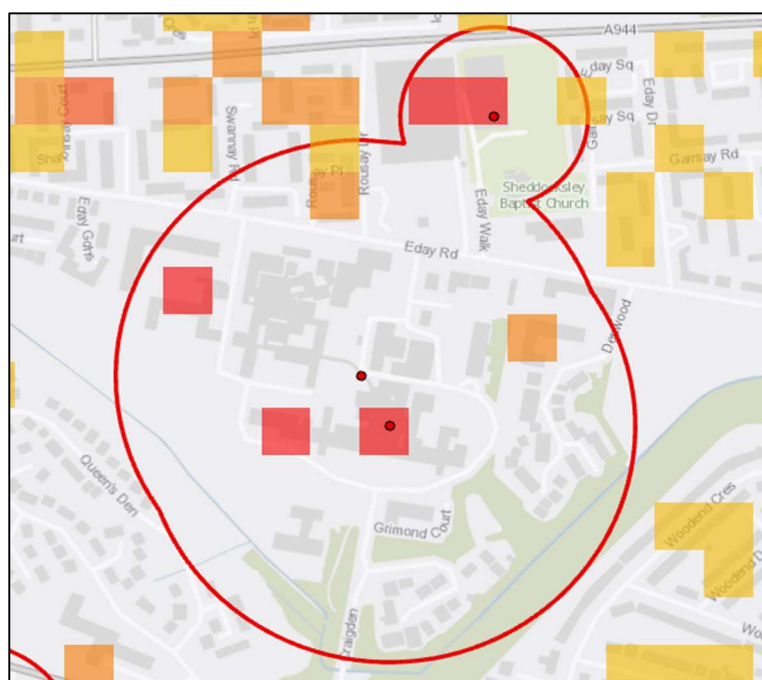


Figure 17: Proposed heat network cluster 3 in Woodend

**Zone 3 – Woodend:** This zone covers an area of 23 hectares to the east of the city and has a total heat demand of 25,392MWh/yr. There are three potential anchor loads within this zone and the area is intersected by three existing heat networks, including Hazlehead.

**Zone 4 – Queens Links:** This zone covers an area of 22 hectares and has a total heat demand of 11,925MWh/yr. There are three identified anchor loads within the area including the Linx Ice Arena, which is already served by a heat network. The area is also intersected by a second existing heat network.

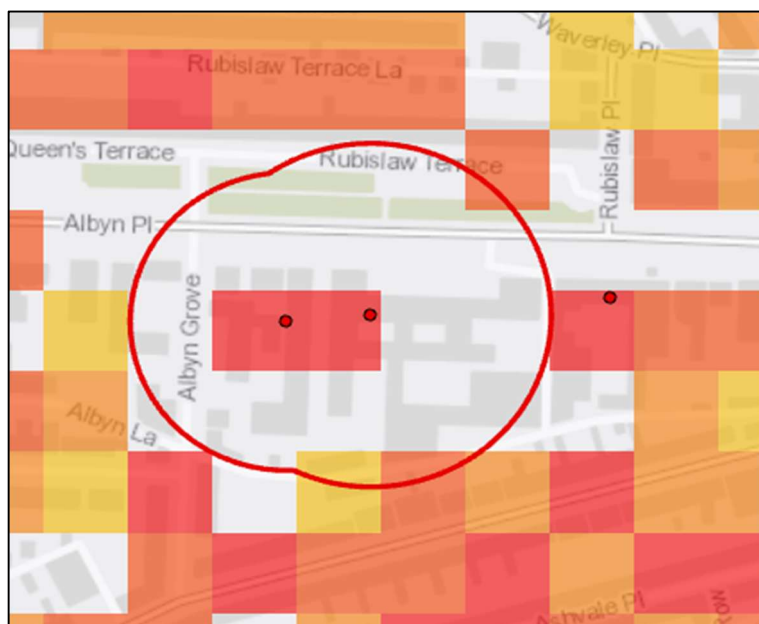


Figure 18: Proposed heat network cluster 4 in Queens Links



In order to be economically viable, heat networks must be connected to anchor loads with sufficient and consistent heat demand. Non-domestic buildings typically have higher heat demand than domestic buildings and can often serve as viable anchor loads. Policy R8 of the Local Development Plan states that new developments in the city centre and/or identified heat network zones must connect to an existing heat network where available or provide a communal heating/cooling system capable of connecting to the wider network at a later date. Aberdeen City Council Planning Department is currently working on drafting guidance for developers on the process for connecting to heat networks in designated heat networks zones.

Aberdeen City Council has committed to all new council housing and non-domestic buildings being connected to heat networks where feasible. If no connection is currently available, future connection plans must be considered at design and construction stages. Buildings that are adjacent to council-owned buildings are also encouraged to engage with Aberdeen Heat & Power for heat network connections.

## **Feedback from heat network stakeholders workshop**

In June 2024, a stakeholder engagement workshop was held online with heat network stakeholders to discuss Aberdeen's plans for heat network development in more detail. This workshop provided the opportunity for stakeholders to give feedback on the data zones identified during Stage 4 and to clarify any inaccuracies in the Scottish Heat Map data regarding heat demand, anchor loads and waste heat availability. During the session, Aberdeen Heat and Power provided further detail on their existing plans for expanding their network, as well as highlighting some of the challenges and opportunities for decarbonising these networks. It was also agreed that future sessions with heat network stakeholders would be held on an ongoing basis to provide updates and get feedback from relevant stakeholders.

## **5.3. Decarbonisation of existing heat networks**

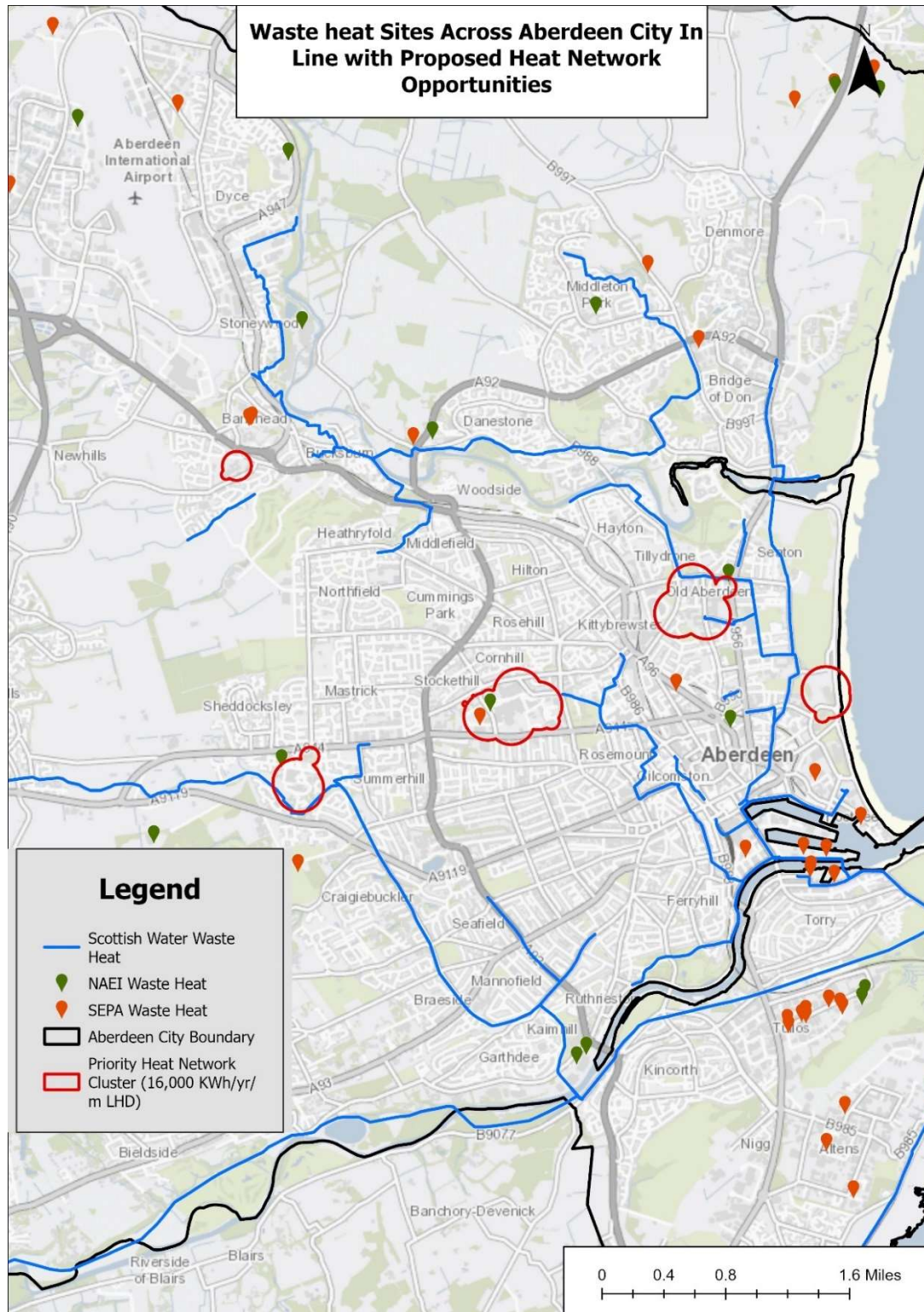
At present, the majority of the heat generated in Aberdeen Heat and Power's heat networks is through combustion of gas, either in CHP generators or gas boilers. However, due to the climate emergency and Scotland's net zero targets, these networks must be decarbonised as quickly and efficiently as possible.

Changeover of the primary heat source may be supported with the introduction of the energy from waste plant (EfW), now operational in Tullos, South East Aberdeen. The EfW plant site is adjacent to a fish processing plant operated by Pelagia, which currently releases waste heat into the North Sea and is close to a proposed hydrogen electrolysis plant to be sited in Nigg. A network is currently under construction to take the waste heat from the EfW plant into Torry, and these two other heat supplies could potentially be connected to this network at a later date. The EfW plant can generate 20MW(h) whilst Pelagia has the ability to generate 5MW(h) of waste heat.

All three heat suppliers are on the south side of the River Dee and the main east coast railway line. To connect the pipe from Torry to the City Centre network it will be necessary to cross the river. Aberdeen City Council have already crossed the railway line as part of the Torry network and it is

assumed that this pipe has the capacity to carry 20 MWh of heat. A verified pipe route is currently being developed with a view to ACC submitting a grant application for capital funding from Scottish Government. **Error! Reference source not found.**Figure 19 highlights potential waste heat sites that have been identified during Stage 4.

Figure 19: Map of heat network clusters with potential waste heat sites in Aberdeen





Replacement of the backup gas boilers will be more challenging as they will need to be replaced by technologies that are currently expensive, such as heat pumps, or by technologies as yet undeveloped. Aberdeen Heat and Power are actively researching new technologies and potential partnerships for the connection of equipment that would lower the current carbon output. Aberdeen Heat and Power are in discussions with the main utility companies and leading CHP and renewable heat companies to ensure they remain at the forefront of future low carbon developments. Aberdeen Heat and Power have provided the following estimated time frames to achieve these aims:

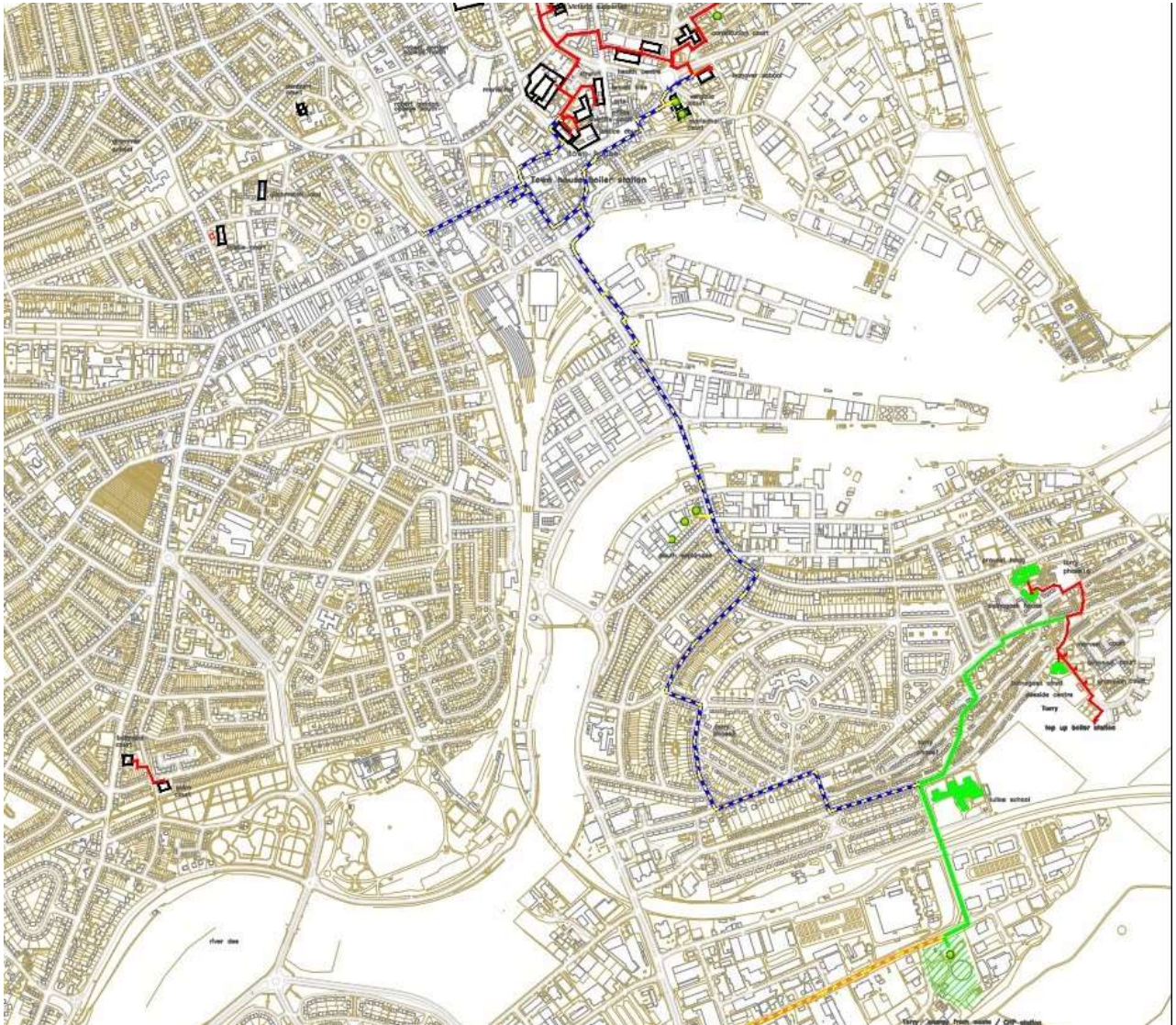


Figure 20: Aberdeen Heat and Power's proposed plans for expansion of Torry heat network to connect city centre heat network to EfW plant. Source: Aberdeen Heat and Power (reproduced with permission).

## 5.4. Attracting investment in energy infrastructure

The delivery of city-wide energy efficiency and decarbonisation actions will require a number of solutions and input from a range of organisations, extending beyond the Council. The Net Zero Aberdeen Routemap sets the direction for collaborative action across sectors to reach net zero by 2045, acknowledging that the pace, depth and scale of system change will require significant funding and investment. While Aberdeen has a track record of working collaboratively and securing funding, the Scottish Government's Green Heat Finance Taskforce acknowledges that changes to our buildings will require a mixture of public and private financing in various combinations to ensure that the transition is affordable for all. This will require significant investment in Aberdeen's energy infrastructure and heat networks to ensure that they are suitable to meet the demands of the future.

Unlocking finance and funding will be crucial to deliver the Aberdeen LHEES. Collaboration across stakeholders will be essential to evolve detailed plans and costings; as well as to explore appropriate funding mechanisms, investment opportunities and sufficient external funding to support scalable solutions.

Aberdeen City Council is considering all possible options for investment in green heat networks. We have a strong track record of successful funding applications to support heat network development. The Council has received over £11m from the Scottish Government Low Carbon Infrastructure Transition Partnership (LCITP) and Heat Network Fund for Phase 1 and 2 of the Torry Heat Network Project.<sup>17</sup> The Council will continue to seek both public and private funding to further develop and decarbonise the network of district heating systems across the city.

## 5.5. Stakeholders

The following key stakeholders have been highlighted in relation to the development and decarbonisation of heat networks in Aberdeen City:

- Aberdeen City Council
- Aberdeen Heat and Power
- Independent heat network operators:
  - University of Aberdeen
  - NHS Grampian
- Potential anchor loads
- Potential sources of waste heat (industrial, commercial, EfW, Scottish Water)
- Heat network developers and delivery partners

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<sup>17</sup> [Low Carbon Infrastructure Transition Programme: capital projects - list - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/low-carbon-infrastructure-transition-programme/capital-projects-list/pages/11.aspx)

## 6. Priority B: Improving Building Energy Efficiency

### Summary of Priority B: Improving Building Energy Efficiency

Improving the energy efficiency of buildings reduces heat demand, whilst simultaneously addressing fuel poverty and climate change. Aberdeen City Council has made significant improvements to the energy efficiency of domestic and non-domestic properties. However, a significant number of properties require improved insulation.

**Areas of Interest:** Data on the energy efficiency of Aberdeen's domestic stock indicates a need for measures to be installed at scale. For example, over half (51%) of domestic properties do not have wall insulation. Specific areas of Aberdeen City have the lowest levels of wall insulation and will require targeted support. These include Midstocket, Frogwall, Powis and Sunnybank.

**Stakeholders:** A range of stakeholders need to be involved to improve the energy efficiency of different buildings. The Council will need to engage housing associations, and their tenants, to install measures in social housing stock at scale. Equally, the Council will engage owner-occupiers, private landlords and tenants, and non-domestic building owners and tenants.

#### Key Challenges:

- Limited insulation uptake for solid wall insulation programmes due to cost.
- Extensive engagement required to increase insulation in mixed tenure properties.

#### Key Opportunities:

- Building on the success of existing insulation programmes, especially in hard-to-treat buildings.
- Promoting partners services, such as Scarf, that support householders with retrofit and energy advice.

#### Key Relevant policies:

Heat in Buildings Bill (under consultation): Proposes a minimum energy efficiency standard for private landlords by 2028, and for owner-occupiers by 2033.

Local Housing Strategy (2018-2023): Sets out strategic outcome to reduce fuel poverty in line with climate targets.

Building Performance Policy (2016): Requirement for energy efficiency improvements when refurbishing Council owned properties. Policy is being updated to reflect net zero standards.



## 6.1. Overview

### Background

One of Aberdeen City's key priorities is improving building energy efficiency. Reducing heat demand simultaneously addresses fuel poverty and climate change as it results in lower carbon emissions and can reduce heating bills.

The LHEES methodology includes three considerations relating to energy efficiency:

- Poor building energy efficiency
- Poor building energy efficiency as a driver for fuel poverty
- Mixed-tenure, mixed-use and historic buildings

Progress on these considerations is detailed below, apart from fuel poverty as a driver, which is discussed in Section 8: Alleviating Fuel Poverty.

### Current Energy Efficiency Levels

Just over half of all domestic properties in Aberdeen City have uninsulated walls. This equates to around 63,000 individual properties (Table 9). Of those that are currently insulated, further investigation will be required to determine whether the levels of insulation are compatible with Aberdeen City's net zero targets.

Private rented properties are the tenure type with the highest rate of uninsulated walls (64%). Owner-occupied properties follow closely with 54% uninsulated walls. In social housing, only 29% of walls are uninsulated. This may be because social housing tends to be in newer housing with construction types that are easier to insulate, as well as previous statutory energy efficiency requirements for social housing such as the Energy Efficiency Standard for Social Housing (ESSH). This indicates that additional funding and incentives are necessary in order to achieve high levels of energy efficiency in privately owned properties.

The vast majority (94%) of domestic properties in Aberdeen have double glazing, and 3% have triple glazing. Only 3% have single glazing.

Another key indicator on energy efficiency is the extent of loft insulation. Best practice recommends that at least 250 mm is installed. Currently, loft insulation with a thickness of at least 250mm is installed in 25% of domestic properties. 11% of domestic properties have a low standard of loft insulation thickness (0-99mm).

### Projects and Progress: Hard to Treat Build Domestic Buildings

Work to improve the energy efficiency of domestic buildings is underway in Aberdeen City. The council has focused on hard-to-treat build types in areas with low SIMD rankings. This has been achieved through two key projects:

## 1. The Aberdeen Victorian Tenements Project

There are over 12,000 granite tenements flats in Aberdeen, built in Victorian and Edwardian times. These properties are now over 100 years old and due to their age and construction, are particularly hard to heat. The tenement blocks are often made up of a mixture of all tenures. This can make it difficult to get the necessary multiple consents to carry out remedial works on communal areas of the building. Absent owners can also make getting majority consent very challenging.

The Council Home Energy Team set up the project to address this issue. They have employed dedicated case officers, to help provide a consistent point of contact through the complicated process of insulating mixed tenure tenements. The officers provide individual and group visits to help coordinate the communal insulation work. This has proved successful, with just under 500 shared lofts and under floors within tenements being insulated over the past 15 years through the scheme. At the same time hot water jackets and reflective radiator panels have also been issued. Learnings have been recorded and are being used to continuously improve the delivery of the scheme, which is still underway.

## 2. Area Based Schemes (ABS)

ABS is a Scottish Government scheme that provides funding for local authorities to deliver energy efficiency programmes in areas with high levels of fuel poverty. Aberdeen City Council has used the funding for areas with non-traditional and hard to treat properties such as Northfield and Mastrick, Dyce, Bucksburn and Cove. Since 2013, Aberdeen City Council has delivered over 7,000 energy efficiency measures through the scheme, amounting to £16m worth of investment. Fabric first measures such as external wall insulation have proven to be successful in reducing heat demand and will continue to play a significant part in future ABS projects. Going forward, the Council's primary target is to maximise the ABS funding allocation from the Scottish Government. This will allow the success of the completed Area Based Schemes to be replicated in other areas.

## Projects and Progress: Private Households

In addition to these projects, Aberdeen City also supports and promotes various schemes to encourage private households to decarbonise more widely. This will ensure that these homes are compliant with the upcoming Heat in Buildings Bill, which proposes minimum energy efficiency standards for landlords and owner occupiers.

We promote the Home Energy Scotland advice service, to maximise the number of households receiving free or subsidised measures under the Warmer Homes Scotland Scheme, which includes insulation measures.

Similarly, the Council promotes, and provides financial support to Scarf. Scarf provides households in Aberdeen City with energy advice, supporting households to receive energy efficiency grants and providing home visits to assess households for energy efficiency improvements.

The Council also promotes ECO funding as another avenue for households to receive funding for energy efficiency improvements. The Council has developed an 'ECO Flex' programme, which widens the criteria for more households in the local authority area to qualify for funding.



## **Projects and Progress: Social Housing**

The Council is currently drafting an updated Local Housing Strategy to be published later in 2024, which will take into account the requirements for meeting the new Social Housing Net Zero Standard. Tenants are currently supported through organisations such as Scarf, and through existing programmes such as the Victorian Tenements Project to improve energy efficiency.

Aberdeen City's Buildings and Heat Strategy also includes an objective to develop a fabric first approach for both new builds and retrofit projects, which is taken into account in the social housing owned by the council.

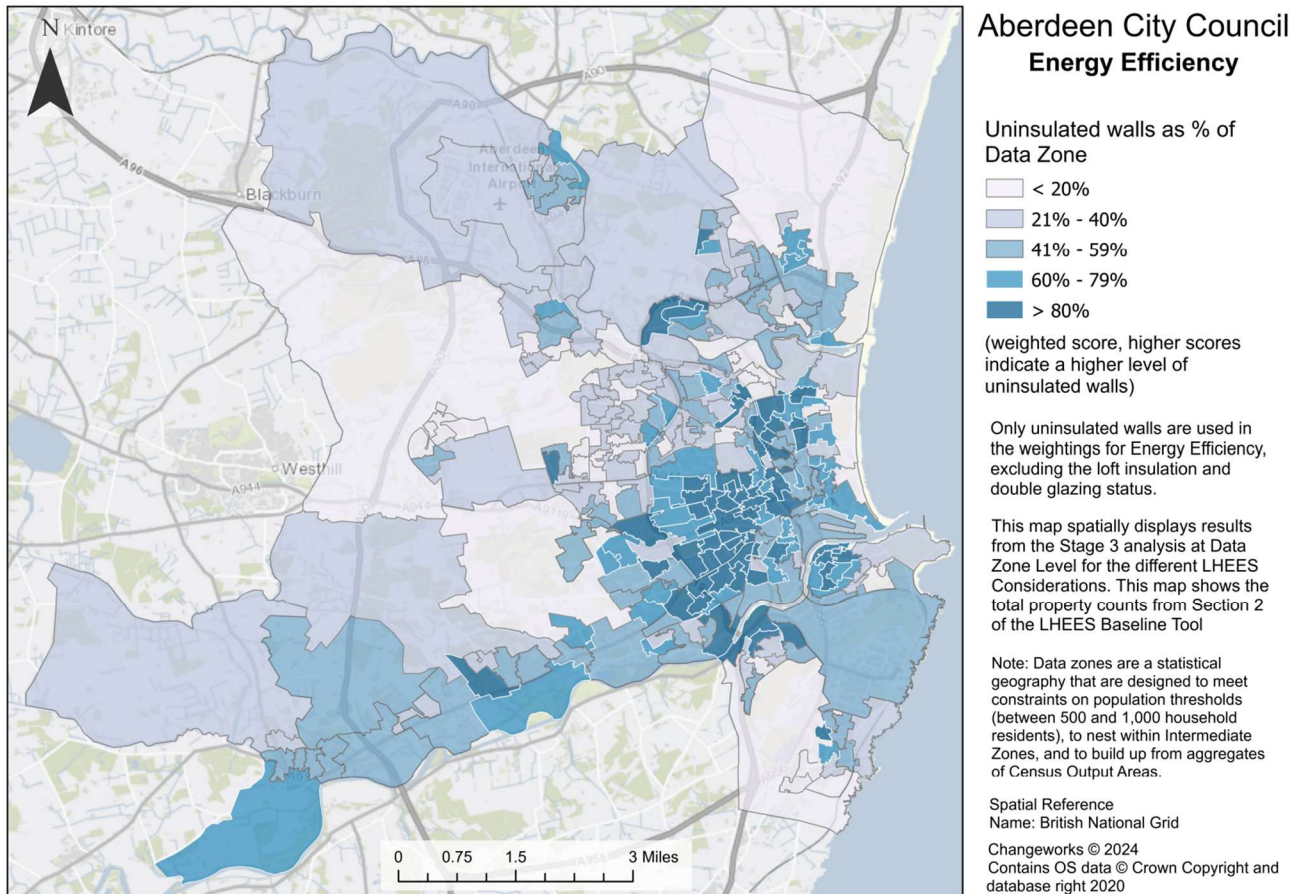
## **Projects and Progress: Public Buildings**

Energy use in buildings is the largest source of emissions from the Council's operations, however significant progress has been made in this area. Aberdeen City Council has an ongoing programme for improving energy efficiency in public buildings including schools, community centres, leisure centres and administrative buildings. We will continue to install energy efficiency measures such as LED lighting, insulation, window and door replacements and smart heating controls to reduce energy demand. The Council's Building Energy Performance Policy for refurbishment projects, which includes requirement for energy efficiency improvements, is currently being refreshed to consider Net Zero Public Building Standard principles. This refresh will be done in conjunction with the Capital Design Team, Energy Team and Sustainability Team.

## 6.2. Data

The map below shows the areas of Aberdeen City where domestic properties are likely to have low levels of energy efficiency. This is indicated by the level of uninsulated walls in each data zone. As shown in the map, the data zones<sup>18</sup> with the highest levels of uninsulated walls (shown in dark blue) are: Midstocket - 04, Froghall, Powis and Sunnybank - 03, and Midstocket - 01.

Figure 21: Map of energy efficiency by data zone.



<sup>18</sup> Data zones are defined areas which are used for the analysis of statistics across the public and private sector in Scotland. Data zone boundaries can be viewed here:

<https://spatialdata.gov.scot/geonetwork/srv/api/records/7d3e8709-98fa-4d71-867c-d5c8293823f2>

## 6.3. Stakeholders:

The following key stakeholders are highlighted in relation to energy efficiency in Aberdeen City:

- Aberdeen City Council, Energy Management team, Housing Improvements, Housing Repairs.
- Scarf
- Housing associations: Langstane, Castlehill, and Grampian
- Owner-occupiers
- Private rented landlords
- Contractors and installers delivering energy efficient retrofits
- Historic Environment Scotland (for hard-to-treat historic buildings)

## 7. Priority C: Building Level Decarbonisation

### Summary of Priority C: Building Level Decarbonisation

Decarbonising heat across buildings in Aberdeen City will ensure the Council meets its net zero Targets. Whilst the Council will connect buildings to heat networks where possible, properties that are unable to join a network will be encouraged to install a zero direct emissions heating system.

#### Areas of interest:

In areas where there are no existing or potential heat network connections, the approach is for individual zero direct emission heating systems to be installed. A 'fabric first' approach will be taken, meaning that the energy efficiency of individual buildings should be up to standard before the install of a zero direct emissions heating system.

#### Stakeholders:

To achieve building level decarbonisation, stakeholder engagement with those who are not able to connect to a heat network will be required. This will include owners and occupiers of all housing tenure, alongside the managers of non-domestic buildings.

#### Challenges:

- Need to develop skilled local supply chain to meet demand

#### Opportunities:

- Review of housing assets plan in progress to ensure housing standards are met.

#### Key Relevant policies:

Social Housing Net Zero Standard: Use of polluting heating systems– such as gas boilers – will be prohibited in all buildings from 2045 onwards.

Heat in Buildings Bill (under consultation): Use of polluting heating systems – such as gas boilers – will be prohibited in all buildings from 2045 onwards.

Local Outcome Improvement Plan (2016-2026): Specific targets include a 61% reduction in city-wide emissions by 2026 and 7% reduction in public sector emissions.

### 7.1. Overview

Another one of the council's key priorities is the decarbonisation of heat. This aims to meet local and national net zero targets.

The LHEES methodology includes three considerations relating to heat decarbonisation:

- Heat networks
- Off-gas grid
- On-gas grid

The council have several ongoing and proposed programmes to decarbonise heat at scale in domestic and non-domestic properties, both on and off gas. This section focuses on building level decarbonisation where heat network connection is not possible.

## **Areas unsuitable for heat network development**

Not all buildings in the city will be able to connect to a heat network due to geographical and technical constraints. In areas where there are no existing or potential heat network connections, the approach is for zero direct emissions heating such as individual air source heat pumps, or ground source heat pumps, to be installed. A fabric first approach will be taken on these properties (see Section 6: Improving Building Energy Efficiency).

An example of this is the recently completed project DORIC (Domestic Optimised Retrofit Innovation Concept). This project was to demonstrate innovative approaches to retrofitting social housing at scale, using a whole house approach. It was a match funded project between the UK Government and the Council. We used the funding to install solar panels and heat pumps, alongside battery storage systems across 50 of our socially rented properties. Each property was also surveyed using thermal imaging technology to identify where fabric improvements were required to reduce space heating demand. Through implementing these fabric upgrades in tandem with decarbonising energy systems, the project has ensured that decarbonised building stock performs efficiently. This has provided valuable learnings on planning and implementing a whole house retrofit approach to PAS 2035 standard for social housing, including installation of renewable technologies. The Council are looking to apply the learnings from this project to other social housing retrofit projects where possible.

In addition to these types of programmes, we are working in conjunction with our partners at Scarf and Home Energy Scotland to continue to promote the benefits of heat pumps along with the financial assistance available for installation for individual households.

## **Review of Housing Asset Management**

The Council is reviewing the Housing Asset Management Plan to ensure that it meets a variety of housing decarbonisation standards for social housing.

We plan to consider the requirements for meeting the upcoming Social Housing Net Zero Standard and to link this with LHEES delivery plan for an area-based approach to retrofit programme.

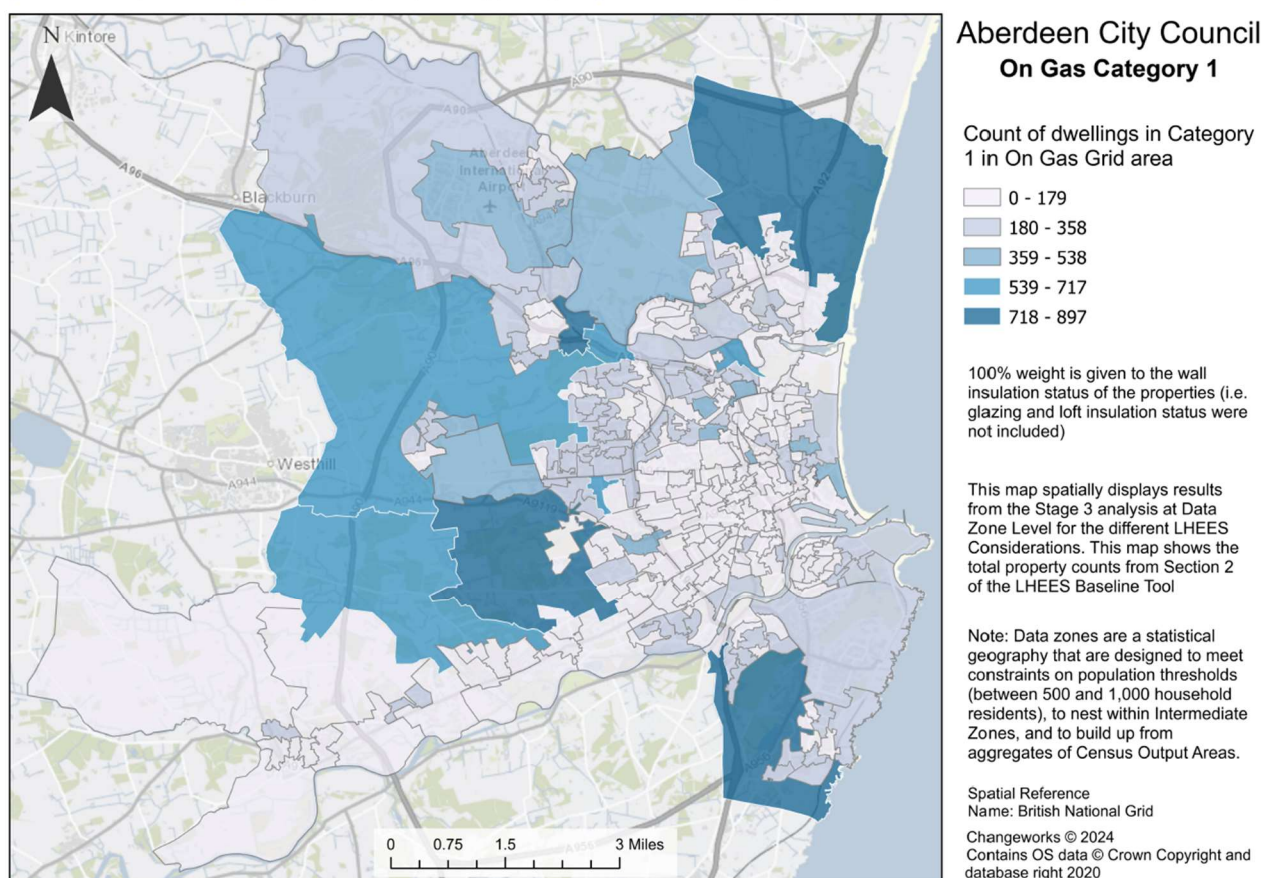


## 7.2. Data

**Error! Reference source not found.**Figure 22 highlights the location of on-gas domestic buildings that are 'heat pump ready'. These are mostly located outside the centre of Aberdeen and could be targeted through programmes promoting heat pump installs. Any programmes would need to be targeted at areas where the development of heat networks is unlikely or unfeasible.

As shown in the map, the data zones<sup>19</sup> with the highest levels of heat pump ready homes are (shown in dark blue) are: Hazlehead - 01, Kincorth, Leggart and Nigg South - 01, and Bucksburn South - 01.

Figure 22: Map of Category 1 (heat pump ready) on-gas grid domestic properties



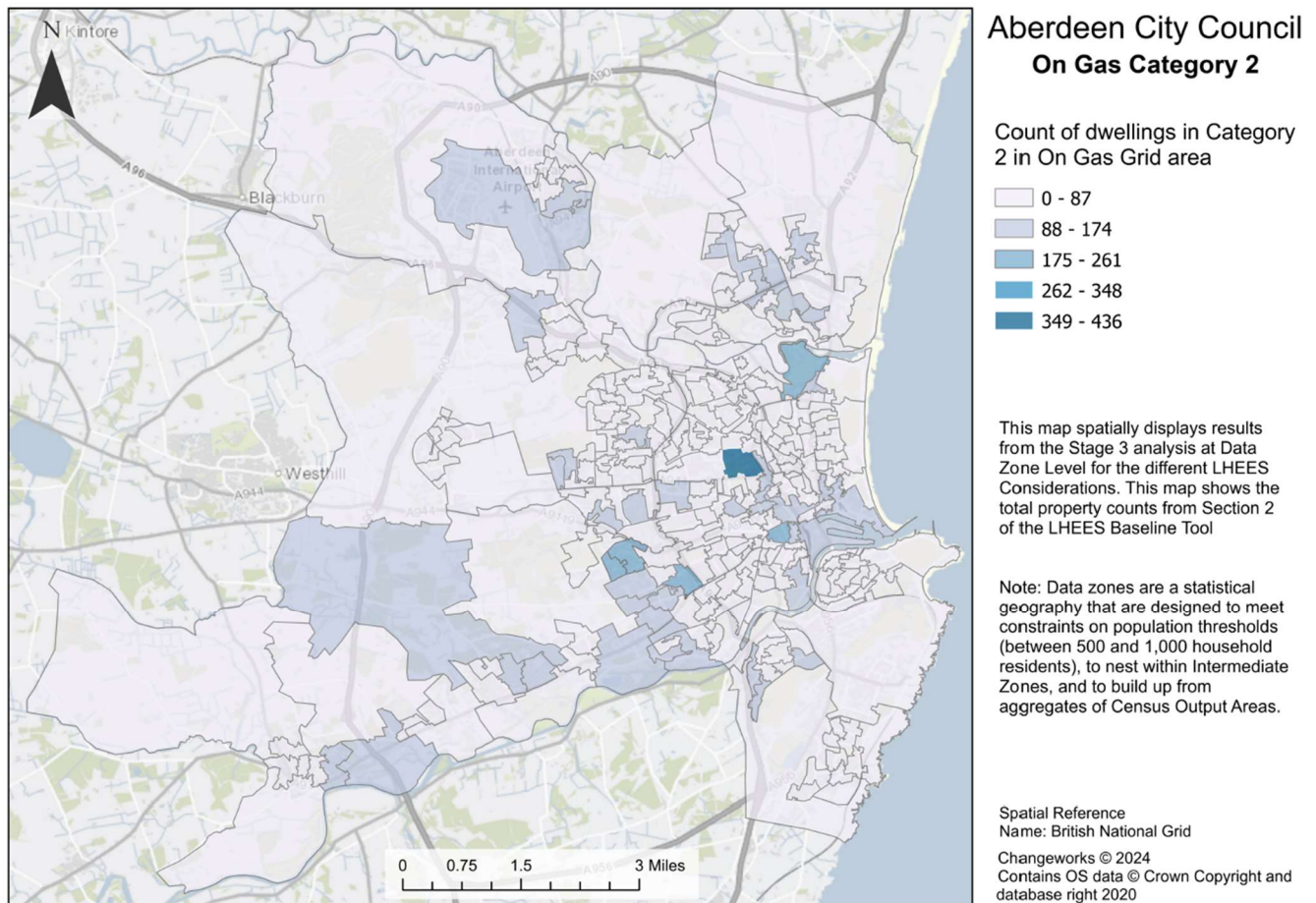
**Error! Reference source not found.** highlights areas of on-gas grid Category 2 properties where fabric improvements are required to become heat pump ready. These data zones (shown in dark blue) are Ashgrove - 03, Braeside, Mannofield, Broomhill and Seafeld North - 04, and Old Aberdeen - 01. As with Figure 22, heat pump deployment in any areas highlighted on the maps will be targeted in areas where properties are unlikely to connect to a heat network in the future.

<sup>19</sup> Data zones are defined areas which are used for the analysis of statistics across the public and private sector in Scotland. Data zone boundaries can be viewed here:

<https://spatialdata.gov.scot/geonetwork/srv/api/records/7d3e8709-98fa-4d71-867c-d5c8293823f2>

These properties will need increased levels of insulation before or in tandem with heat pump installs, to meet a fabric first approach.

Figure 23: Map of Category 2 (requiring fabric improvements to become heat pump ready) on-gas grid domestic properties



## 7.3. Stakeholders

The following key stakeholders are highlighted in relation to heat decarbonisation in Aberdeen City:

- Aberdeen City Council Energy Team
- Owner occupiers
- Private sector landlords
- Private sector tenants
- Registered Social Landlords
- Scottish Enterprise
- Scarf
- Home Energy Scotland

## 8. Priority D: Alleviating Fuel Poverty

### Overview of Priority D: Alleviating Fuel Poverty

The LHEES presents an opportunity to address the high levels of fuel poverty within Aberdeen City. Aberdeen City Council has worked through a range of programmes to target support to fuel poor households. The Council has made the alleviation of fuel poverty a priority within the LHEES strategy.

**Areas of Interest** The latest available data from the LHEES methodology indicates that 26% of households in Aberdeen City are in fuel poverty.

**Stakeholders:** Aberdeen City Council (Energy Team and Financial Inclusion Team), Scarf, Aberdeen Care and Repair, Aberdeen Heat and Power, Home Energy Scotland.

#### Challenges:

- There is no recent data available on the extent of fuel poverty across Aberdeen City, meaning it is challenging to accurately target resources at the areas in most need.

#### Opportunities:

- The Council will continue to build on the success of its Area Based Scheme and ECO Programmes in order to address fuel poverty.

#### Relevant policies:

Aberdeen City's Local Outcome Improvement Plan (LOIP) (2016-26): includes an aim that 10% of people seeking fuel poverty support are no longer in fuel poverty by 2026.

Local Housing Strategy (2018-2023): Sets out strategic outcome to reduce fuel poverty in line with climate targets.

Fuel Poverty (Scotland) Act (2019): No more than 15% of households in fuel poverty by 2030, and no more than 5% in extreme fuel poverty.

### 8.1. Overview

#### Background

Like the rest of Scotland, Aberdeen City faces high rates of fuel poverty. The latest available data from indicates that during 2017-19, 26% of households in Aberdeen City were in fuel poverty.<sup>20</sup> Of

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<sup>20</sup> <https://www.gov.scot/publications/scottish-house-condition-survey-local-authority-analysis-2017-2019/>



these, half (13%) were in extreme fuel poverty. The median fuel poverty gap was estimated at £600. This is the annual amount that would be required to move a household out of fuel poverty.

These statistics are from the Scottish House Condition Survey, the Scottish Government's source of data on fuel poverty. The latest data at local authority level is an average of 2017-2019 data. There is no local authority level fuel poverty data available between 2020-2024 (see 4.1 for more detail). Since 2019, the energy crisis and cost of living crisis has resulted in an increased rate and depth of fuel poverty across Scotland. There is no data quantifying the impact of these developments for Aberdeen City. However, it is likely that rates of fuel poverty are now considerably worse than the statistics outlined above.

The Scottish Government recognises four main drivers of fuel poverty:<sup>21</sup>

- Energy prices
- Household income
- Energy efficiency
- How energy is used in the home

Due to the complexity of fuel poverty, it is a challenging issue to address. Issues such as energy prices and household income especially are difficult to address at local authority level. Interventions or support from local authorities can help to improve building energy efficiency. For this reason, LHEES has a specific consideration for poor building energy efficiency as a driver for fuel poverty.

## Progress and Projects

Scarf are partially funded by the Council to offer a free and impartial service to all residents within Aberdeen City. The team can offer over-the-phone and in-person consultations with members of the public, with 1400 home visits carried out every year. Scarf assist with fuel debt and make referrals to other organisations in order to keep individuals and families out of fuel poverty.

Aberdeen City Council works closely with Aberdeen Care and Repair. As part of this, the Aberdeen Affordable Warmth scheme can help those in most need with advice as well as practical repairs and low-cost loans. The scheme is mostly targeted at owner occupiers who might not be able to access other sources of support.

The deployment of heat networks (see Section 5) has supported the alleviation of fuel poverty for some through lower energy costs. Similarly, projects such as the Victorian Tenement Project and Area Based Schemes have targeted energy efficiency improvements to areas at risk of fuel poverty, by funding insulation measures in hard-to-treat buildings located in areas with low SIMD rankings. Despite this, Aberdeen City has 2% more households in fuel poverty than the average across Scotland, according to the latest data<sup>22</sup>. This data was collected before the energy and cost of living crisis. Therefore, the rate of fuel poverty is expected to have risen further, both nationally

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<sup>21</sup> <https://www.gov.scot/publications/evidence-review-lived-experience-fuel-poverty-scotland/pages/3/>

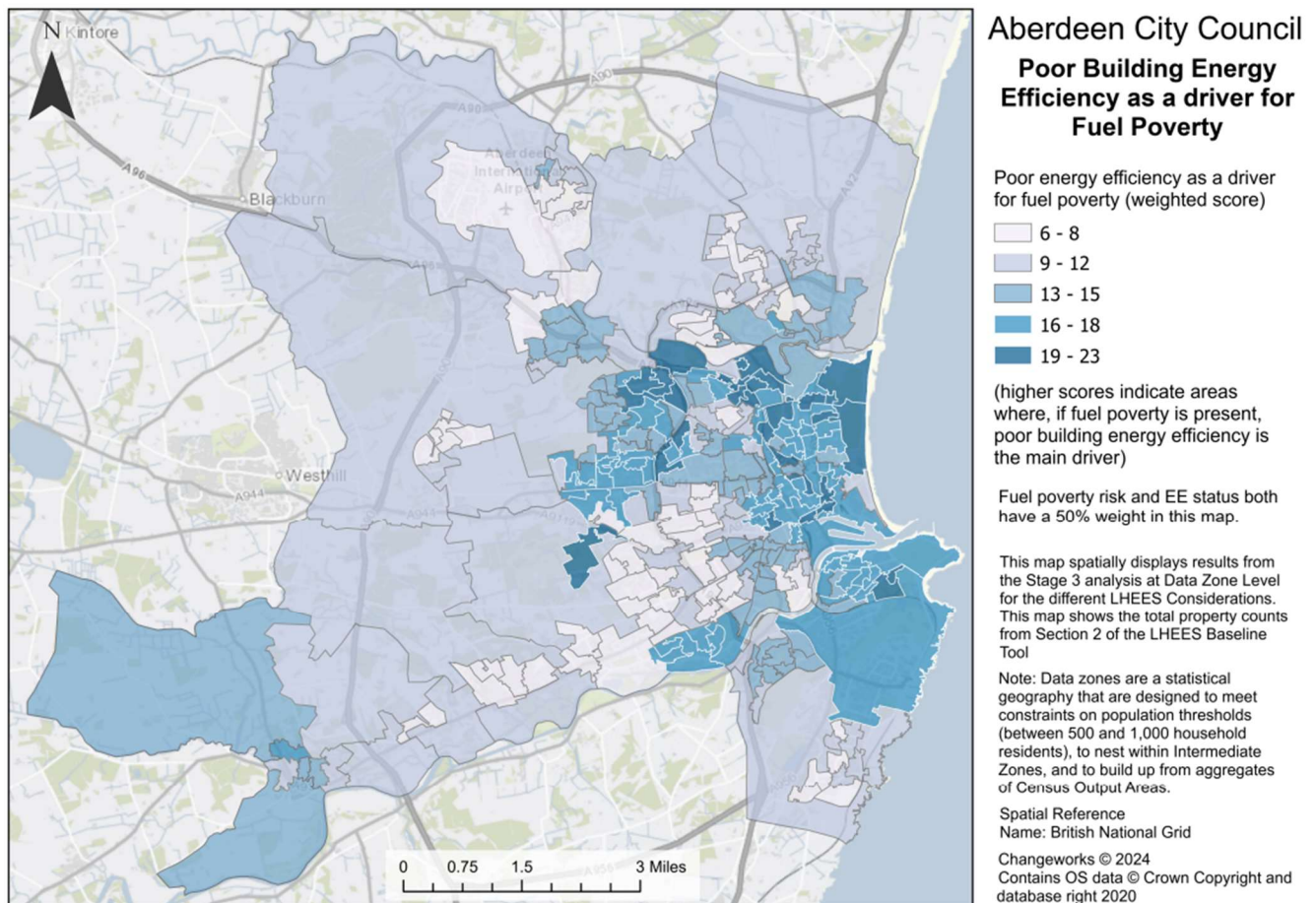
<sup>22</sup> <https://www.gov.scot/publications/scottish-house-condition-survey-local-authority-analysis-2017-2019/>

and in Aberdeen City. The Council is continuing to review progress and to build on the existing programmes and partnerships to address rising fuel poverty in the region.

## 8.2. Data

Figure 24 shows the areas of Aberdeen City that are likely to be in fuel poverty due to poor energy efficiency. The data zones<sup>23</sup> with the highest levels of fuel poverty (shown in dark blue) are George Street - 01, George Street - 03, and Tillydrone – 06.

Figure 24: Map of energy efficiency as a driver for fuel poverty by data zone.



<sup>23</sup>Data zones are defined areas which are used for the analysis of statistics across the public and private sector in Scotland. Data zone boundaries can be viewed here:

<https://spatialdata.gov.scot/geonetwork/srv/api/records/7d3e8709-98fa-4d71-867c-d5c8293823f2>

## 8.3. Stakeholders

The following key stakeholders are highlighted in relation to reducing fuel poverty in Aberdeen City:

- Aberdeen City Council Energy Team
- Aberdeen City Financial Inclusion Team
- Scarf
- Aberdeen Care and Repair
- Aberdeen Heat and Power
- Home Energy Scotland
- Householders across all tenures who are at risk of fuel poverty

## 9. Challenges

Table 20 highlights some of the challenges to achieving the aims of the LHEES. The table illustrates which of the Council's LHEES priorities are impacted by the challenges. These challenges are described in more detail below.

### 9.1. Summary table

Table 20: Summary of challenges and what LHEES priorities they impact

Category	Challenge	Priorities impacted by this challenge
Heat networks	Expanding existing heat networks	Priority A
	Minimum performance guarantees	Priority A
	High capital costs	Priority A
	Heat network demand assurance	Priority A
	Consumer uncertainty	Priority A
Retrofitting	Unit cost of electricity	Priority B, Priority C, Priority D
	Grid capacity	Priority B, Priority C
	High upfront capital costs	Priority B, Priority C
	Local housing stock	Priority B, Priority C, Priority D
	Skills gap	Priority B, Priority C
	Supply chain	Priority A, Priority B, Priority C
	Public confidence	All
	Disruption	Priority B, Priority C
Tenure type	Owner-occupied properties	Priority B, Priority C
	Private rented sector	Priority B, Priority C
	Social housing	Priority B, Priority C, Priority D
	Mixed tenure	Priority B, Priority C
	Non-domestic properties	Priority B, Priority C
Geographic challenges	Urban areas	All
	Cold and wet climate	Priority C, Priority D

### 9.2. Barriers to developing heat networks

#### Expanding existing heat networks

Expansion of existing heat networks will require co-operation between the heat network operator and any prospective customers. Many of the existing heat networks are not currently sized for

expansion and are already operating at capacity. The challenges associated with network expansion include redesigning energy centres, laying new connecting pipework and developing new contractual arrangements.

Modifications to individual buildings will be required, primarily installing new heat interface units (HIU) for each property connecting to a heat network for the first time. Internal pipework will need to be rerouted to the new HIU. An assessment of any change in supply temperature from the network should be carried out, this may require changes to radiator sizes within properties.

### **Minimum performance guarantees**

Current contractual agreements for heat networks generally do not include key performance indicators such as overall system efficiencies. This is a challenge as there is little incentive for heat network operators to maintain high system efficiencies if they have a minimum price guarantee. Introducing minimum levels of service is important when entering into a contractual agreement with heat network operators.

### **High capital costs**

Heat networks require a significant amount of upfront investment for the development of both the heat generator (e.g. heat from waste facility) and the underground network of pipework. As such, most existing networks in Scotland have been developed with some form of public subsidy.

### **Heat network demand assurance**

Investment in heat networks is only viable where investors have assurance that there will be enough heat demand to recover their investment. Assurances, such as customer contracts, are needed prior to development to ensure financial returns on investment. The uncertainty surrounding heat demand impacts on the willingness for investors to commit to the project, where initial investment is high and returns are uncertain. Reducing demand risk is key to encouraging heat network development.

### **Consumer uncertainty**

Heat networks are uncommon in Scotland and therefore are an unfamiliar concept for most energy consumers. There may be a reluctance to engage with a planned heat network project, and householders may require incentives to encourage a connection and a significant amount of support throughout the process. Consumers would also be limited to one heating supplier, and therefore be subject to any fluctuations in energy prices without the option to shop around for a cheaper alternative.

## **9.3. Barriers to retrofitting**

### **Unit cost of electricity**

Those with fossil fuel boilers who are not in a heat network catchment would have to consider switching to a heat pump or other electric heating system to decarbonise their home. Consumers moving from mains gas (currently the cheapest form of heating) to heat pumps may see an increase in energy costs. The unit price of electricity is currently a barrier to the installation of heat

pumps. This may be addressed by changes under the UK Government's Review of Electricity Market Arrangements (REMA).

### Grid capacity

Transitioning to zero direct emissions heating systems will significantly increase reliance on electricity, putting additional pressure on the electricity grid. The grid will need to be reinforced to enable large scale heat decarbonisation. This will be managed through engagement with the distribution network operator, SSEN. Working with SSEN will ensure that work to deliver the LHEES will be aligned with grid investment planning to ensure an informed solution for heat decarbonisation and grid balancing opportunities.

### High upfront capital costs

High upfront costs and long-payback periods are associated with some more expensive measures such as external wall insulation (EWI). This is a particular barrier for privately owned homes (owner-occupiers and private sector landlords) without the funds to invest upfront in energy efficiency improvements. Funding does exist for these tenures, as detailed in the Delivery Plan. At present, this has not been enough to mobilise private homeowners at the pace required to meet targets.

### Local housing stock

The nature of the local housing stock in Aberdeen City poses specific retrofit challenges. Significant fabric upgrades would be required in 46.3% of on-gas properties and 6.4% of off-gas properties in Aberdeen City in order to be heat pump ready. Several factors can result in a property being classified in this category. These include the property being listed or in a conservation area, being difficult to insulate, and a lack of an existing wet central heating system.

Aberdeen has a large proportion of pre-1919 solid stone wall properties. These properties typically have poor levels of energy efficiency and require significant fabric upgrades to achieve a sufficient energy demand reduction for transitioning to low carbon heating. Furthermore, due to their heritage value many of these properties are located in conservation areas or are listed buildings. This means certain energy efficiency measures such as external wall insulation and window replacements may not be permitted. Retrofit in historic buildings also requires specific attention to hygrothermal<sup>24</sup> performance and moisture management, meaning specialist contractors may be required.

Aberdeen City's housing stock is characterised by a high number of mixed tenure properties. This poses additional challenges around contracting, procuring and funding retrofit work.

### Skills gap

There are major shortfalls facing the retrofit and decarbonisation industry in many specific trades and professions such as plumbers, HVAC (Heating, Ventilation, and Air Conditioning) specialists, surveyors and Retrofit Coordinators.<sup>25</sup> Investment is needed to encourage existing contractors to upskill and train young workers to enter the retrofit and decarbonisation workforce. This is a

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<sup>24</sup> the movement of heat and moisture through buildings.

<sup>25</sup> ClimateXChange (2022) [Clean Heat and Energy Efficiency Workforce Assessment](#)



particular challenge in areas beyond the Central Belt where there is lower demand for green skills and retrofit supply chains are less developed.

The Just Transition Commission has stated that the market will not drive the change required, and systemic change must be driven by legislation and regulation from Scottish Government.<sup>26</sup> Similarly, reforming public procurement mechanisms can create demand and support growth of local workforces.

In 2019, PAS 2035 was introduced as a new standard to manage risks and ensure high quality during the retrofit process. This standard provides a specification for whole-house retrofit and aims to ensure the right measures are installed and unintended consequences such as damp and mould are avoided. However, the development of PAS 2035 presents an additional challenge to the current skills gap, due to the requirements for additional roles such as Retrofit Coordinators, Retrofit Assessors and Retrofit Designers. Certain grant funded retrofit schemes such as ECO4 require all works to be carried out to PAS 2035 standard, placing additional pressure on contractors.

### Supply chain

Beyond the skills gap, the supply chains that underpin heat decarbonisation will also need to be developed to meet future demand. A 2020 research report found that heat pump manufacturers were confident in their ability to scale up operations as demand increases.<sup>27</sup> Concerns about meeting future demand was primarily associated with upskilling and training of installers. The current supply chain for energy efficiency and low carbon heating contractors is limited, with particular shortages outside of the Central Belt. This can lead to increased costs and delays when procuring retrofit work.

### Public confidence

Recent research shows that there is broad concern about climate change among the public in Scotland, however this does not seem to be translating into widespread uptake of decarbonised heating systems. Whilst there are high levels of awareness of decarbonised heating, awareness does not necessarily indicate confidence. Advice from trusted sources, such as installers and Scottish Government-backed advice services, as well as new energy-service business models will help to build consumer confidence in these systems.

### Disruption

The large-scale electrification of heat will require significant reinforcement of the transmission network and changes to the operation of distribution networks in Scotland. It is expected that the majority of network reinforcements will occur in semi-rural networks, where disruption will be low. However, much of the urban network could also need upgrading, which will be disruptive as most lines are underground.<sup>28</sup>

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<sup>26</sup> Just Transition Commission (2023) [Scotland's Retrofit Workforce: A Briefing on the Built Environment and Construction](#)

<sup>27</sup> Eunomia (2020) [Heat pump manufacturing supply chain research project](#)

<sup>28</sup> Vivid Economics, for CCC (2019) [Accelerated electrification and the GB electricity system](#)



Additionally, householders can face significant disruptions when retrofitting their homes with zero direct emissions heating systems. This has been highlighted in research with early adopters of heat pumps.<sup>29</sup> The level of disruption varies across heating systems and will depend on the existing heating system and pipework.

## 9.4. Challenges with different housing tenure types

### Owner-occupied properties

In Aberdeen City, 59% of properties are owner-occupied. Of these, 43% are in EPC bands A-C, and will likely meet the proposed 2033 requirements for energy efficiency.<sup>30</sup> The remaining 57% will require improvements to the buildings' fabric and/or heating system within the next 10 years.<sup>31</sup> In the longer term, the owner-occupied properties that are currently using fossil fuel-based heating systems will need to change by 2045.

Since both deadlines are many years in the future, owner-occupiers may not be motivated to take action sooner. This is likely to be compounded by uncertainty around local energy developments. This LHEES is part of the actions the Council is taking to develop clear plans around how the entire building stock will need to change.

### Private rented sector

Privately rented properties account for 18% of Aberdeen City's domestic housing stock. Half of these are in EPC bands D or below. Under proposed legislation, privately rented properties will be required to meet a minimum energy efficiency standard equivalent to an EPC band C by 2028. Funding exists to support landlords to improve the energy efficiency of their properties, however limited funding is available for heating system upgrades.

The 'split incentive' associated with privately rented properties is a barrier to improving the energy efficiency of these buildings. This describes the issue faced by a private landlord who is responsible for paying for the cost of energy efficiency upgrades to their property, but does not gain from the financial benefits associated with cheaper energy bills.

### Social housing

In Aberdeen City, 23% of properties are social housing, with the majority of these being owned by the Council. Aberdeen City's social housing has higher EPC ratings compared to both owner-occupied and privately rented housing. The city also has more than twice as many social housing properties in EPC bands A-B compared to the national average.

Only 25% of Aberdeen City's social housing is in EPC bands D or below. These properties will need to undergo significant energy efficiency improvements to meet the new energy efficiency standard being developed for social housing. Delivering the improvements will require assurance

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<sup>29</sup> ClimateXChange (2023) [Experiences of early adopters of zero emissions heating](#)

<sup>30</sup> [Delivering net zero for Scotland's buildings - Heat in Buildings Bill: consultation](#)

<sup>31</sup> This depends on how the targets will be measured. At the moment, some properties will be able to meet the EPC requirement by switching from electric storage heaters to a gas boiler. Future measurements (as described in Scottish EPC reform consultation) may set more ambitious targets specific to the fabric efficiency.

of long-term and adequate funding available to support social landlords, to avoid rent increases which could worsen fuel poverty.

### **Mixed tenure**

In Aberdeen City, 38% of properties are in mixed tenure buildings. These properties present a challenge when it comes to retrofit and heat decarbonisation.

Mixed-tenure buildings are often slow to renovate because for some measures all occupants in the building must agree to the installation and pay towards funding the project. If one occupant does not have the funding available or does not agree to proceed with the project, this creates a risk that the project will not go ahead. Mixed-tenure buildings have been highlighted as a challenge in Aberdeen City Council's Local Housing Strategy.

Mixed-tenure buildings that are factored privately face challenges in coordinating retrofit projects, for example the lack of building management structures such as owners' associations.

### **Non-domestic properties**

Data is limited on non-domestic buildings, as many existing datasets are incomplete. Energy efficiency upgrade information is not currently well-reported in the non-domestic sector. This is an issue across Scotland, and not just in Aberdeen City.<sup>32</sup>

## **9.5. Geographic challenges**

### **Urban areas**

In Aberdeen City, 98% of people live in areas classified as 'urban' or 'small town'.<sup>33</sup> Urban areas are faced with unique barriers to decarbonisation. These include a greater number of mixed-tenure properties, such as tenement blocks, which can be difficult to retrofit due to the size and scale of the work required as well as issues related to buy-in from property owners.

Additionally, due to the high number of properties connected to the gas grid, mains gas is the predominant heating fuel. In some cases, switching from gas heating to zero direct emissions heating systems such as heat pumps can lead to increased energy bills for householders due to the higher cost of electricity compared to gas (see 9.3 above). This is a significant barrier to householder engagement with the decarbonisation agenda.

### **Cold and wet climate**

Cold, wet and windy weather is common in Aberdeen and residents have a longer period of heating required compared to other parts of Scotland. This, combined with homes that are not energy efficient, can lead to higher heating costs for householders. Extreme weather conditions also cause more damage to homes, meaning higher maintenance costs.<sup>34</sup>

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<sup>32</sup> ClimateXChange (2022) [An evidence review of data associated with non-domestic buildings](#)

<sup>33</sup> Defined as Large Urban, Other Urban, and Accessible Small Towns in the [Scottish Government 6-fold Urban Rural Classifications](#)

<sup>34</sup> Changeworks (2023) [A Perfect Storm: Fuel Poverty in Rural Scotland](#)

## 10. Opportunities for Aberdeen City

A significant portion of the social housing in Aberdeen City is owned by the Council. This provides an opportunity to make the necessary investments in the social housing sector. By doing this, the Council will lead by example to encourage retrofit in other sectors of the housing market.

Developing heat networks and improving the energy efficiency of buildings through retrofit provides a range of economic and development opportunities for communities, businesses, individuals, and the Council.

### 10.1. Economic opportunities

#### Supply chain and skills development

Aberdeen is renowned worldwide as major centre for the oil and gas industry with a highly skilled workforce. As the region transitions away from the fossil fuels, there are opportunities for this workforce to upskill and retrain in other areas of the energy sector.

The Scottish Government has committed to a £100m Green Jobs Fund over the next five years, which will be used to support the development of sustainable and low-carbon products and services. Additionally, in 2021 the Scottish Government committed £500m over 10 years towards the Just Transition Fund for the North East and Moray to help finance organisations, businesses, communities and individuals to transition to net zero, creating jobs in low carbon industries and contributing to the region's future prosperity. The Council has successfully submitted bids to this fund in the past and will continue to bid throughout the programme with transformational energy and skills-based local and regional projects.

The Council also aims to work with partners to support the development of the local supply chain to deliver on the priorities. A number of programmes are being delivered locally to support the expansion of skills and supply chain activity to meet demand. This is in line with the Regional Economic Strategy for North East Scotland – which has an outcome on education, employment and skills to provide a regional skills plan in 2024 that will support the skills needed for delivering a just transition. Examples of skills development programmes include:

- The North East Scotland College 'energy transition' programmes are designed to ensure students leave College equipped with the knowledge, technical capability and experience to undertake opportunities associated with the energy transition. The courses work closely with industry partners within the region to ensure students are developing skills in line with local supply chain needs.
- The Aberdeen & Grampian Chamber of Commerce is rolling out an innovative approach to career development in schools as the city continues to build its future energy workforce. Aberdeen City Council will work with employers in the energy sector to strengthen educational links and help pupils learn about the industry, careers, and the various routes into them.

- The Energy Transition Zone is a private sector-led and not-for-profit company, which provides training within the sector. It is developing a skills campus that will enable and promote a future in clean fuel technologies and low carbon careers. The campus will be home to Scotland's first dedicated 'Energy Transition Skills Hub' This will support full and part time students to develop skills for the energy transition and provide local employers a go to pool of talent to expand their workforce.

The LHEES Delivery Plan will outline the substantial pipeline of work required to achieve the net zero targets of local authority areas in more detail. This visibility will help to improve the local availability of 'green skills' by encouraging the existing workforce to invest in upskilling and attracting young people into the workforce. The implementation of heat networks will also create new roles within the local area, both short-term and for long-term operation.

### **Financial returns**

Heat networks and electricity generation sites can provide an additional source of income for the Council. Any additional income generated can help to fund future decarbonisation programmes, helping to accelerate progress towards net zero targets. Aberdeen Heat and Power already generates income through the sale of heat and electricity both to the National Grid and through private wire arrangements, which is used to fund extensions to the network.

### **Community wealth building**

Community Wealth Building (CWB) is an alternative approach to traditional economic development, which seeks to develop resilient, inclusive local economies, with more local employment and a larger and more diverse business base. It aims to reorganise local economies to be fairer and aims to reduce wealth flowing out of our communities, towns and cities by helping local investments and assets to generate more and better jobs for local residents and businesses.

### **Regional collaboration**

Aberdeen City's existing regional engagement with Aberdeenshire Council as a part of the Aberdeen City Region provides opportunities for further collaboration and knowledge exchange in relation to energy efficiency and heat decarbonisation. The Council will explore opportunities for cross-boundary collaboration on heat network infrastructure and energy efficiency projects through ABS.

Additionally, the Scottish Cities Alliance is a potential route to unlock retrofit action and funding at scale through partnerships with other cities. This approach could allow both parties to achieve cost savings through shared procurement and economies of scale.

Furthermore, due to its long history of successfully developing and operating heat networks, Aberdeen Heat and Power is well placed to share learnings and experience with other councils interested in developing heat networks.

## 10.2. New business models to accelerate retrofit

Meeting the targets to improve the energy efficiency of homes and buildings will require rapid action across sectors. While some of the development and investment will come from the public sector, the scale and cost of retrofit means that new business models need to be developed. These models will provide opportunities for businesses, individuals, communities and the Council. Aberdeen City Council will be proactive in further exploring the opportunities and potential risks of new business models and in partnering with others to maximise their potential.

This section outlines four business models that have the potential to accelerate retrofit in Aberdeen City. As they are likely to require a central or anchor organisation, the Council is well-placed for facilitation, implementation and engaging with local stakeholders.

### Area-based approaches

Area-based, or 'neighbourhood' approaches to delivery of retrofit programmes can help motivate people to decarbonise their homes and provide support throughout a project. A central delivery vehicle is set up to support local authority implementation of area-based decarbonisation programmes. This vehicle finances the project and is responsible for recruiting investors to supplement public financing made available through the local authority. This is a holistic approach to decarbonisation of an area which includes the implementation of community co-benefits (e.g., improved transport links, more green spaces).

### Collective purchase

This approach combines support, guidance and group purchasing of energy renovation services to reduce upfront costs and accelerate retrofit at scale. Costs can be reduced by grouping together a number of properties looking to undertake the same renovation works. A central delivery agent is responsible for householder engagement and support, procurement and can also fulfil a project management function. This delivery agent may also provide up-front financial support, such as a loan, which is then repaid over time by the property owner.

### Split ownership of communal heat networks

The split ownership approach has been developed to support the rollout of networked heat pumps, such as a shared ground loop array. This approach helps to separate the homeowner from the upfront cost of infrastructure installation (e.g., underground pipework). A private company or a not-for-profit community group finances and installs the heating infrastructure, and local residents pay a fee to connect to the network as well as a monthly charge for the energy they use in the home. Individual homeowners would still pay for the systems in the home, in the same way as those who are connected to the mains gas grid purchase and maintain their own boiler.

Currently, there is funding available through Local Energy Scotland to provide community organisations and groups of householders with technical support to explore the feasibility of communal heating projects.<sup>35</sup>

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<sup>35</sup> [Community heat development programme · Local Energy Scotland](#)

## **Integrated Energy Systems (IES)**

Integrated energy systems (IES) combine energy sources to collectively supply electricity, transport, heating, and cooling demands of an area. The idea is that by looking across all areas of demand, and thinking about the local service needs that determine energy use, a more effective and efficient system can be created to help reduce waste and lower carbon emissions. There is one central control platform to automate decision making and operate the grid accordingly.

### **10.3. Local opportunities**

#### **Local employment opportunities**

Retrofit work carried out by Aberdeen City Council has already led to local employment opportunities through the use of local contractors on ABS projects. As the pace and scale of retrofit and heat decarbonisation work ramps up there will be even more demand for tradespeople such as plumbers, heat pump installers, joiners and insulation installers. This presents an opportunity to create lasting employment in green industries. Training and skills development work identified in section 7.1 above can be leveraged to take advantage of these opportunities.

# 11. Summary

## 11.1. Summary of context

Aberdeen City's LHEES sets out how to tackle greenhouse gas emissions from buildings, whilst also improving residents' quality of life by addressing fuel poverty. This Strategy informs, and should be read alongside, the LHEES Delivery Plan.

Aberdeen City's LHEES will support the delivery of the Council's goals of developing heat networks, improving energy efficiency, reducing fuel poverty, and decreasing carbon emissions through zero direct emissions heating systems. The LHEES will support the Council and its community planning partners to scale-up and align existing programmes, and to increase the scale and pace of retrofit and heat network development that is needed to meet the national target of net zero by 2045.

Overall, the content of Aberdeen City's LHEES has been informed primarily through a data-driven approach using a number of datasets and proxy indicators. The Strategy outlines numerous challenges which need to be overcome in order to decarbonise Aberdeen City's buildings. It also highlights opportunities, such as the existing heat network infrastructure and potential zones for further heat network development and expansion.

There is a statutory duty on the Council to update the LHEES every five years. Due to the urgency of the climate emergency, and the rapidly evolving policy landscape, the Strategy and Delivery Plan will both be reviewed and updated on an annual basis. This means they should be treated as live documents which will respond to the introduction of new standards, regulation, and delivery programmes, to any changes in the LHEES process, and to future opportunities within Aberdeen City.

## 11.2. Summary of priorities

Aberdeen City identified the following priorities for heat and energy efficiency:

### **Priority A: Heat network development**

- Aberdeen will prioritise the expansion and development of existing heat network infrastructure to decarbonise heat at scale across the city
- Potential heat network areas identified during stage 4 will be explored in collaboration with Aberdeen Heat and Power and other key stakeholders, taking into consideration existing plans for expansion
- Aberdeen City Council will continue to seek both public and private funding to deliver the investment required to expand and decarbonise heat networks



## **Priority B: Improving building energy efficiency**

- The Council will pursue a fabric first approach to retrofit to improve energy efficiency. This will help to reduce energy demand, facilitating the transition to zero direct emissions heating systems, as well as reducing fuel poverty
- We continue to improve the energy efficiency of our public buildings and social housing and are reviewing our Building Energy Performance policies to align with net zero standards
- Close engagement with key stakeholders including Scarf, housing associations, private landlords and owner-occupiers will be required to encourage uptake of available funding for energy efficiency improvements

## **Priority C: Building level decarbonisation**

- Mains gas is the predominant fuel type in Aberdeen. Fabric efficiency improvements will be required in many properties across the city for buildings to be decarbonised
- Heat networks powered by waste heat sources will form the backbone of the Council's building decarbonisation strategy. Outside of heat network zones, zero direct emissions heating systems such as individual air source heat pumps and shared ground loop arrays will be prioritised
- Increasing the local supply chain and developing skills in this area are seen as key priorities to deliver this transition

## **Priority D: Alleviating fuel poverty**

- Based on latest SHCS data, 26.1% of households in Aberdeen are in fuel poverty, higher than the national average. The current figure is likely to be higher than this.
- As poor energy efficiency is recognised as a main driver of fuel poverty, this priority is closely linked to priority B
- The Council aims to maximise the impact of schemes such as ABS, ECO and Affordable Warmth Aberdeen to reduce fuel poverty across the city. Collaboration between stakeholders such as the Aberdeen City Council Energy Team, Scarf, Home Energy Scotland, Aberdeen Heat and Power and fuel poor households will be key to delivering this priority

## **11.3. Next Steps: LHEES Delivery Plan**

The next step for this LHEES Strategy is for the Council to seek feedback as part of a public consultation.

The LHEES Delivery Plan has also been developed, which details how the LHEES Strategy will be delivered in practice, providing more detail on delivery areas, timelines, stakeholder engagement and monitoring methods.

## 12. Glossary

### Abbreviations

Acronym	Description
AHP	Aberdeen Heat and Power
CHP	Combined Heat and Power
DNO	Distribution Network Operator
ECO	Energy Company Obligation
EES	Energy Efficient Scotland
EESSH	Energy Efficiency Standard for Social Housing
EfW	Energy from Waste
EPC	Energy Performance Certificate
EST	Energy Saving Trust
GIS	Geographic Information System
HA	Housing Association
ABS	Energy Efficiency Scotland: Area Based Schemes
INTOG	Innovation and Targeted Oil and Gas Leasing
LA	Local Authority
LHEES	Local Heat and Energy Efficiency Strategy
LPG	Liquefied Petroleum Gas
PEAT	Portfolio Energy Analysis Tool

SHIP	Strategic Housing Investment Programme
SHNZS	Social Housing Net Zero Standard
SPEN	Scottish Power Energy Networks
SSEN	Scottish and Southern Electricity Networks

## Defining terms

Terms	Description
Baselining	Baselining is the purpose of understanding at local authority or strategic level, the current status of the buildings against the Priorities, Targets and Indicators set out in the Baseline tool.
Building-level Pathway	As part of LHEES Stage 5, a building-level pathway is the outcome of the assessment undertaken using PEAT. It provides the likely energy efficiency retrofit technologies, as well as the low carbon heating system (where applicable) to support building level decarbonisation.
Criteria	Criteria are the settings applied to the Indicators for each Priority in order to support Baselining, Strategic Zoning and the identification of Delivery Areas. An example of Criteria is a simple “no” applied to the Indicator of “wall insulation (Y/N)” to identify properties with uninsulated walls. Another example is the definition of an “anchor load” within the Heat Networks analysis, which applies a minimum threshold to the “heat demand” Indicator. The LHEES methodology provides a set of default Criteria that local authorities may wish to use, with flexibility to update and augment these to support local needs or for more focused analysis linked to specific actions and project identification within the Delivery Plan.
Data - Alternative	Alternative data, can overwrite the Core data to improve accuracy (national to local level of detail, e.g. local housing data to overwrite fields in Home Analytics).
Data - Core	Core data is the data that is essential to complete the minimum requirements of the LHEES analysis. Core data will come from national datasets e.g. Home Analytics or the Scotland Heat Map.
Data - Supplementary	Supplementary data allows inclusion of additional Indicators to inform specific, local priorities & targets; also, Supplementary data can be used in GIS investigation to complement the Core analysis carried out in any assessment. An example of Supplementary data would be the inclusion of low carbon heat supply information layers within a district heating analysis.

Data Zone	Data zones are groups output areas which have populations of around 500 to 1,000 residents.
Delivery Area	<p>Delivery Areas (sometimes referred to as Delivery Level Areas) are a term used for all LHEES Priorities with the exception of Heat Networks. These Areas will be an important starting point for identifying a range of projects, regulation and actions that are within the competence of the Scottish Government and local authorities (projects and actions to be developed in the LHEES Delivery Plan). Delivery Areas are at a higher granularity than Strategic Zones, are generated as part of LHEES Stage 4 and are presented in the LHEES Delivery Plan. Guidance is provided for one approach to identify Delivery Areas, but there are other approaches that local authorities may wish to use.</p> <p>The identification of Delivery Level Areas through LHEES will be indicative only, with further investigation being required to determine the viability of progressing projects associated with the area identification activity.</p>
Detailed practitioner guidance Steps	These Steps form part of the detailed practitioner guidance in LHEES Stage 4, Generation of Initial Areas to set out particularly suitable heat network zones and to support project identification.
Indicator	For a given Priority, the purpose of an Indicator is 1) To act as a key information field to help characterise the local authority using the Baseline tool as part of LHEES Stage 3 (authority-wide and at a strategic level); 2) To act as a key information field to support strategic zoning and generation of initial delivery areas (as part of LHEES Stage 3 and 4); 3) if suitable, to act as a key information field to measure progress against Targets over the duration of the LHEES - set out in LHEES Stage 8, LHEES Delivery Plan. For some Priorities, one Indicator may be sufficient, but for others a range may be appropriate. The LHEES methodology sets out a core set of default Indicators that local authorities may wish to use, with flexibility to update and augment these to support local needs or for more focused analysis linked to specific actions and project identification within the Delivery Plan.
Intermediate Zone	Intermediate zones are a statistical geography that are designed to meet constraints on population thresholds (2,500 - 6,000 household residents), to nest within local authorities, and to be built up from aggregates of data zones.
LHEES Delivery Plan	An LHEES Delivery Plan is an action plan that enables a local authority and its partners to work towards delivery of the changes identified in the LHEES Strategy. Actions will contribute to achieving Scotland's statutory targets on net zero greenhouse gas emissions and fuel poverty, as well as enabling the delivery of changes to buildings and local infrastructure needed to fulfil the Scottish Government's objectives relating to heat and energy efficiency in buildings. The Delivery Plan will clarify stakeholder roles and responsibilities in delivering the Strategies; build on existing

	plans and policies, such as HEEPS:ABS Plans, as far as possible and; coordinate across local partners and provide a mechanism for identifying new delivery actions.
LHEES Priorities	<p>The LHEES Priorities are a list of technologies, building typologies and policy priorities that the LHEES Methodology uses to identify and target interventions. They include:</p> <ul style="list-style-type: none"> <li>- Heat networks</li> <li>- Off-gas grid buildings</li> <li>- On-gas grid buildings</li> </ul> <p>Secondary outcomes include:</p> <ul style="list-style-type: none"> <li>- Poor building energy efficiency</li> <li>- Poor building energy efficiency as a driver for fuel poverty</li> <li>- Mixed-tenure, mixed-use properties and historic buildings</li> </ul>
LHEES Stages	<p>There are 8 LHEES Stages. The purpose of the LHEES Methodology is to enable the local authority to complete LHEES Stages 1 to 6. The completion of these Stages will provide the local authority with the data analysis and evidence base to enable them to complete their LHEES Strategy and Delivery Plan documentation. There are two LHEES guidance templates included alongside this methodology– LHEES Strategy guidance and LHEES Delivery Plan guidance. The completion of these two templates will satisfy the completion of LHEES Stages 7 and 8. The 8 LHEES Stages are:</p> <ol style="list-style-type: none"> <li>1 - Policy and strategy review</li> <li>2 - Data and tools library</li> <li>3 - Strategic zoning and pathways</li> <li>4 - Generation of initial delivery areas</li> <li>5 - Building-level pathway assessment</li> <li>6 - Finalisation of delivery areas</li> <li>7 - LHEES Strategy</li> <li>8 - LHEES Delivery Plan</li> </ol>
LHEES Strategy	<p>An LHEES Strategy identifies what needs to be done to change buildings and relevant local infrastructure by 2045 to fulfil the Scottish Government's objectives and local priorities relating to heat and energy efficiency in buildings. These interventions might occur at building level or in energy supply networks or in a combination of both. The Strategy will reflect national and local priorities, policies and wider strategies. Where feasible, it will take into account local and national factors, such as the timing of planned infrastructure upgrades, access to resources and funding, major projects, decisions over the gas grid and community engagement.</p>
Mixed-tenure, mixed-use and historic buildings	<p>Mixed-tenure and mixed-use buildings could include a mixture of owner-occupied, private rented and social housing, and also non-domestic uses, or simply multiple ownership within the same tenure. Historic buildings include the buildings that are within conservation areas or those that are</p>

	<p>listed buildings. These categories may require established alternative approaches and regulation for the installation of low carbon heat and energy efficiency solutions and where specific advice and support might be available relating to the installation of these solutions.</p>
Potential Zones	<p>The Heat Networks Priority follows a distinct methodology to the other LHEES Priorities – Stage 3 does not apply and the outputs from Stage 4 are of a different type, showing Potential Zones for Heat Networks as opposed to the identification of Delivery Areas (notionally using a 100m raster approach). The Heat Networks Priority analysis and activity carried out within LHEES is also anticipated to support activity related to formal zone designation as required by the Heat Networks Act. For these reasons, the analysis carried out in Stage 4 for Heat Networks is to identify Potential Zones rather than the otherwise used naming convention of Delivery Areas. The Potential Zones identified are to be included in the LHEES Strategy and could also inform actions around further investigation / progression within the LHEES Delivery Plan.</p>
Raster	<p>A matrix of squares, or grid, used as a method of data analysis in GIS. Each cell in the grid contains a value representing information on the cell's contents.</p>
Strategic Level Zone	<p>Strategic Zones (sometimes referred to as Strategic Level Zones) are a term used for all LHEES Priorities with the exception of Heat Networks. Strategic Level Zones are identified in Stage 3 and are presented in the LHEES Strategy. These zones offer a visualisation of the potential pathways to decarbonise the building stock at a local authority level, split out by intermediate zone level. They are useful to understand the baseline performance, the scale of potential and initial areas of focus. Strategic Zones could be used to inform or prioritise focus areas for the more granular identification of Delivery Level Areas.</p> <p>The identification of Strategic Zones through LHEES will be indicative only.</p>
Targets	<p>Targets are the measurable aspect of the Priority and are likely to be taken directly from national and/or local policy documentation, for example net-zero by 2045, or EPC C by 2040. Targets are likely to comprise of end-point targets and milestone targets and would sit along a timeline within (and beyond) the LHEES. This timeline would help to prioritise the types of projects undertaken within the LHEES over its duration.</p>
Weighting	<p>For some Priorities, one Target and Indicator may be sufficient, but for others a range of Indicators may be appropriate to contextualise and characterise performance against a Target and/or progress towards a Priority. If multiple Indicators are used in strategic zoning or the identification of delivery areas, a Weighting can be applied based on the importance of each. The LHEES methodology sets out a core set of default Weightings for instances where multiple Indicators are suggested as a default setting. There is flexibility to update and augment these to</p>



support local needs or for more focused analysis linked to specific actions and project identification within the Delivery Plan.

# 13. Appendices

## Appendix A: Additional national policy drivers

	Policy/strategy	Description	Targets/aims
Climate Change	Climate Change (Emissions Reduction Targets) (Scotland) Act 2019	Targets to reduce Scotland's emissions of all GHGs to net-zero.	2045: Net zero GHG emissions 2020: 56% reduction in GHG emissions
	Update to the Climate Change Plan 2018–2032	Sets out a pathway to deliver our Scotland's climate change targets, including ambitions for Scotland's buildings.	Multiple targets, including: 2030: At least 50% of buildings heated using zero emission systems
	Public Sector Leadership on the Global Climate Emergency: Guidance (2021)	This guidance provides advice for public bodies on: leadership; robust, consistent and comprehensive carbon management; interpretations of the strengthened legislation; and resources available to support public bodies.	Provides advice to public bodies to assist with achieving the targets set in the climate change plan 2018–2032 update.
	NHS Scotland climate emergency and sustainability strategy: 2022-2026	Sets out plans for NHS Scotland to reduce its greenhouse gas emissions and impact on the environment, adapt to climate change and to better contribute to the United Nation's sustainable development goals.	NHS Scotland is aiming to become a net-zero health service by 2040 at the latest.
	Police Scotland - Environmental Strategy 2021	The Environmental Strategy sets out Police Scotland's commitment to environmental sustainability and represents an organisational response to the climate crisis.	Reduce carbon emissions by 35% over the next 5 years. Includes ambitions to improve energy efficiency of buildings.
	Historic Environment Policy for Scotland	HEPS is a non-statutory policy statement that should be taken into account whenever a decision will affect the historic environment.	Promote a way of understanding the value of the historic environment while encouraging consistent, integrated management and decision-making to support a positive outcome for Scotland's historic assets.
Housing	Heat in Buildings Strategy 2021	Sets out a pathway to reduce emissions from buildings and to remove poor energy performance as a driver for fuel poverty.	By 2030, majority of buildings should achieve EPC band C, and 1 million homes use zero emission heating
	Heat in Buildings Supply Chain Delivery Plan	This plan sets out how the supply chain needs to grow and develop to meet the future of heating and energy efficiency regulations.	Accelerate efforts to build on energy efficiency and reduce our demand for energy. Rapidly scale up deployment of zero emissions heating systems, such as heat pumps and heat networks.

## Appendix B: Datasets used in the development of this LHEES

Data Resource/Tool	Description	Data Format	Weblink
<b>Scotland Heat Map</b> (Summer 2020)	Valuable spatial dataset with point-level heat demand data for all properties in Scotland / various other useful data fields and additional information layers. Updated approximately annually. Source data (including from public sector) requested at each update.	Spatial geodatabase	<a href="https://www.gov.scot/publications/scotland-heat-map-documents/">https://www.gov.scot/publications/scotland-heat-map-documents/</a>
<b>Home Analytics v3.7 (Feb 2021)</b>	Database covering all domestic properties in Scotland, built using information from the domestic EPC register and other sources; statistical models are used to provide estimates giving 100% property coverage	Excel spreadsheet	<a href="https://energy-savingtrust.org.uk/service/home-analytics/">https://energy-savingtrust.org.uk/service/home-analytics/</a>
<b>Non-Domestic Analytics (version 1.1)</b>	Database covering all non-domestic properties in Scotland, built using information from the non-domestic EPC register and various other sources, with extensive modelling to provide estimates giving 100% property coverage	Excel spreadsheet	
<b>Portfolio Energy Analysis Tool (PEAT)[VS1]</b>	Tool to accompany Home Analytics; can be used to investigate and cost intervention options for a portfolio of up to 500 properties; can be driven by a price cap or a target EPC score	Tool hosted online; input / output as Excel spreadsheet	<a href="https://homeanalyticspeat.east.org.uk/">https://homeanalyticspeat.east.org.uk/</a>
<b>One Scotland Gazetteer (OSG) - Address Gazetteer (AG)</b>	Central database for all addresses within an authority	GIS API or csv file	
<b>Local Development Plan sites</b>	Information, ideally in spatial format, on development sites in the LDP and LDP2. To include detail on development type and expected build-out where available.	GIS shapefiles	
	SEPA waste heat data	Online interactive map viewer/	

<b>Waste sites capacity tool (SEPA, NAEI)</b>	NAEI waste heat data	Excel spreadsheet	<a href="https://www.sepa.org.uk/data-visualisation/waste-sites-and-capacity-tool/">https://www.sepa.org.uk/data-visualisation/waste-sites-and-capacity-tool/</a>
<b>Green Heat in Greenspaces (GHiGs)</b>	GHiGs investigated the suitability of many types of urban open space across Scotland for use as low carbon heat sources, heat storage sites and heat transmission corridors.	Excel spreadsheet	<a href="https://www.greenspacescotland.org.uk/introducing-ghigs#:~:text=Green%20Heat%20in%20Greenspaces%20(GHiGs)%20is%20a%20project%20within%20the,Scottish%20low%20carbon%20heat%20transition">https://www.greenspacescotland.org.uk/introducing-ghigs#:~:text=Green%20Heat%20in%20Greenspaces%20(GHiGs)%20is%20a%20project%20within%20the,Scottish%20low%20carbon%20heat%20transition</a>
<b>Geographic boundary datasets</b>	Information, ideally in spatial format, on council-owned assets.	GIS shapefiles	<a href="https://border.s.ukdataservice.ac.uk/bds.html">https://border.s.ukdataservice.ac.uk/bds.html</a>

## Appendix C: Datasets and limitations of the LHEES approach

### Home Analytics

Home Analytics Scotland provides essential data on the Scottish housing stock. This data is provided down to the address level and is available to the Scottish Government and local authorities to assist them in developing, targeting and delivering policies, schemes and programmes designed to improve energy efficiency, install renewable technologies and alleviate fuel poverty. The core datasets that make up Home Analytics Scotland are:

- Energy Performance Certificate data
- Home Energy Efficiency Database (HEED) data
- Energy Saving Trust Home Energy Check (HEC) data
- Ordnance Survey AddressBase, MasterMap Topography layer and StreetMap data
- Scotland Gas Networks data
- Scottish Census data
- Scottish Index of Multiple Deprivation (SIMD) data

While there is full coverage of the Council's property stock, the data is not entirely accurate given that not all properties are surveyed; where gaps exist property information will have been estimated based on neighbouring characteristics using statistical modelling.

Fuel poverty figures in the dataset only act as an indication. To date, there has not been a comprehensive dataset detailing fuel poverty given the resources required to do so and the risk of identifying individuals and communities through the use of sensitive information such as income data. The fuel poverty data is therefore probability driven and users should not treat figures as an absolute number or percentage but rather a likelihood of fuel poverty. An instance where fuel poverty data lacks confidence and leads to a poor representation of the geographical area is in households in affluent areas who may be labelled as in fuel poverty because they live in stone buildings with poor heating capture.

Currently, fuel poverty data is calculated by the following:

- Probability of wall being uninsulated
- Loft Insulation Prediction
- Loft Insulation: 0-99mm
- Loft Insulation: 100-249mm
- Loft Insulation: >250mm
- No loft
- Excess Cold Category 1 Hazard
- Probability of Fuel Poverty (Fuel Bill >10% of Income)

## Non-domestic Analytics

Non-domestic Analytics is a new data set developed by Energy Saving Trust on behalf of Scottish Government, to provide more property-level details about the non-domestic building stock in Scotland. The dataset brings together property details from a variety of data sources such as the Scottish EPC Register, Ordnance Survey, Scottish Assessors and BEIS, to establish property attributes and energy profiles for each non-domestic building. Like Home Analytics, gaps in these records are imputed using a series of statistical models. The final database is therefore a combination of known and modelled records.

There are limitations on the confidence of using Non-Domestic Analytics due to the lack of robust information from the non-domestic sector compared to the domestic sector with much of the data relying on significant modelling. Therefore, users should not take figures as an absolute number or percentage but rather an estimation. Due to the reliance on probability, analysis was limited to exploring groupings of building typologies.

The dataset relies on the use of an external categorisation of property typology (Ordnance Survey) resulting in a deviation in standard interpretation of property classes. For example, church can be classified as either a commercial or place of worship depending on its main function, while residential (non-domestic) buildings can also indicate short-term lets and sheltered accommodation.

## Scotland Heat Map (2020)

Containing both domestic and non-domestic heat demand data, the Scotland Heat Map is an important resource to identify the opportunities for efficient heat supply projects and support their development. Developed with data provided by public and private sector organisations including all local authorities, it will help to identify opportunities for new and expanding heat projects including efficient supply projects, such as district heating. The dataset also contains various additional layers such as Geology and hydrogeology, waste energy supply points, and existing heat networks.

As the dataset was captured in the summer of 2020, demand data exists only as a snapshot in time. Since network viability is based around the demand of individual buildings, the difference between modelled and expected demand may affect that viability.

## PEAT-OR tool

The PEAT-OR tool, developed by EST, accompanies Home Analytics. It is used to investigate cost intervention options for a portfolio of up to 500 properties. The tool has a relatively high degree of flexibility to be tailored to reveal target areas and properties by price cap or a target EPC score.

However, there are the following limitations:

- Individual measures cannot be isolated or removed, the tool will show all possible interventions. This means some impractical measures are proposed such as installing wind turbines
- Costs and Carbon savings are calculated for all possible measures, this means it is not possible to investigate the impact of individual measures



- Fuel cost data used within PEAT-OR was released at the start of July 2023, with fuel costs modifying frequently these costs are not totally accurate

These limitations will affect the outputs from Stage 5, which should be understood as estimates only.

### **Ordnance Survey**

Various mapping data, central to the development and use of Scotland's Heat Map and other GIS information sources. OS product data and licenses are required to use SHM & other OS-derived datasets. Key to GIS analysis elements of LHEES.

## Appendix D: LHEES stage descriptions

### Stage 1: Policy and strategy review

A policy review was carried out to highlight national, regional and local policies that are linked to, impact, or could be impacted by LHEES. Results from this review, along with initial stakeholder mapping were logged in the policy review template for reference during subsequent stages of the LHEES.

### Stage 2: Data and tools library

This stage involves identifying and maintaining a record of the data and tools used to support analysis in the subsequent stages of the LHEES process. The record captures data sources, ownership rights, requirements for the LHEES Considerations and data format.

### Stage 3: Strategic zoning and pathways

The purpose of LHEES Stage 3 is to support local authorities to understand the current energy efficiency and heat decarbonisation performance of the building stock at a local authority wide level. It also supports further analysis to set out Strategic Zones and pathways for each LHEES Consideration, as far as reasonably possible, at data zone level, a commonly used standard for statistical reporting of socio-economic data.

These Strategic Zones identify potential solutions for inclusion in the LHEES Strategy (Stage 7). The analysis sets out the strategic starting point for the generation and prioritisation of Delivery Areas (Stage 4), as well as further engagement and actions for the Delivery Plan (Stage 8).

LHEES Stage 3 is supported by both the 'Domestic Baseline Tool' and the 'Non-domestic Baseline Tool'. The Domestic Baseline Tool was developed by Zero Waste Scotland for analysis of the domestic sector drawing on Home Analytics as the core source data to support this. The tool was used to generate a performance baseline of buildings and to set out Strategic Zones with respect to the LHEES Considerations. The 'Non-domestic Baseline Tool' was developed following the release of Non-Domestic Analytics, as a means to support better understanding of the breakdown of non-domestic building typologies and by other criteria, such as age, heating system type or floor area category. Given the limitations of the non-domestic dataset, the outputs are focused on providing property count and / or total heat demand information for these groupings, rather than suggesting suitability for specific interventions.

When assessing heat decarbonisation options in the tools, heat pump installation is one of the suggestions. According to the LHEES methodology, the level of heat pump 'readiness' in domestic properties are sorted into four categories:

Building category	Description
Category 0	Currently have a low or zero direct emissions heating system, or heat network connection
Category 1	"Heat pump ready" buildings that are well-suited to heat retrofit with minimal other changes.

Category 2	Secondary potential for heat pump retrofit. Require some fabric and/or distribution systems upgrades.
Category 3	Significant upgrades required to be heat pump ready.

In the standard Zero Waste Scotland methodology, Category 1 properties are assessed based on a range of indicators including wall insulation, glazing status, wet heating system and loft insulation prediction. For South Lanarkshire's LHEES, only wall insulation was accounted for in Stage 3 given that this was the most relevant factor to the local domestic property stock.

#### **Stage 4: Generation of initial Delivery Areas**

Stage 4 is informed by the LHEES Strategy and analysis from Stages 1-3. The purpose of Stage 4 is to support the Council's decision making by generating initial Delivery Areas for each of the LHEES Considerations. This Stage uses GIS to generate initial Delivery Areas at a higher granularity than LHEES Stage 3, to enable the Council to understand specific locations of potential Delivery Areas within a Strategic Zone or across the whole local authority. The level of granularity is advised at 250m<sup>2</sup> to reflect an appropriately sized delivery area without the risk of identifying individual properties.

This analysis is the starting point for more detailed engagement, building level assessment of interventions and cross-checking against the policy and strategy review (stage 1) to enable finalisation of the Delivery Areas (LHEES Stage 6). These Delivery Areas should then support actions in the Delivery Plan (Stage 8) that are within the competence of the Scottish Government, local authorities and wider partners.

#### **Stage 5: Building-level pathway assessment**

The purpose of LHEES Stage 5 is to support with delivery area identification of Stages 4 and 6 to establish in more detail the type of intervention(s) required to decarbonise the building from a heating and energy efficiency perspective. This stage provides an understanding of the costs and the energy and carbon savings associated with interventions.

Stage 5 enabled South Lanarkshire Council to select and analyse domestic buildings for assessment in the Energy Saving Trust's PEAT-OR, for the domestic sector only. PEAT-OR enables the local authority to evaluate energy efficiency and heat decarbonisation retrofit options in terms of costs and carbon emissions reduction. Results can be presented at the building level or at a zone level. The buildings to be evaluated can be selected and taken from the analysis in LHEES Stage 3 or Stage 4.

It is recognised that PEAT-OR has not been designed specifically to support LHEES. Therefore, in this LHEES, a PowerBI report has been developed to enable the Council to explore potential decarbonisation results in an interactive and customised manner to assess viability and decision making of delivery areas.

#### **Stage 6: Finalisation of Delivery Areas**

During this stage, Strategic Zones, initial Delivery Areas and any building-level assessment were considered alongside the detail included as part of the policy and strategy review and all stakeholder engagement undertaken. The outcomes from this stage are documented in the stage 8 Delivery Plan.

## Appendix E: Detailed methodology for the identification of potential heat network zones

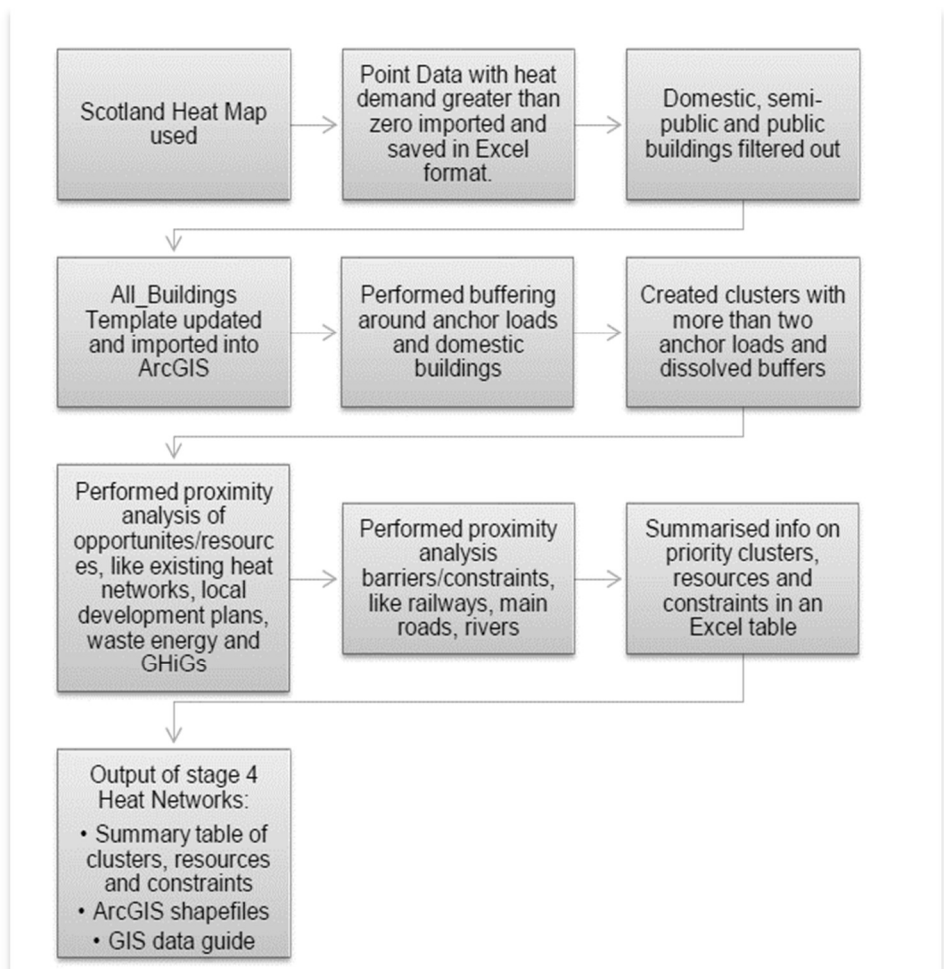
Analysis was undertaken to identify the areas where heat networks present a decarbonisation pathway that could be of strategic importance for South Lanarkshire. Heat Data Point non-domestic properties were filtered to only include semi-public and public buildings. These were refined using OS AddressBase classification codes identified as semi-public or public by the Green Heat in Greenspaces project. Additionally, a sense check of building names was carried out to identify council-owned buildings. If that was the case, the buildings were added to analysis. This approach was chosen so that only non-domestic buildings that the Council has full or partial control over are treated as potential anchor loads in the heat network zoning. When defining anchor loads, public and council-owned buildings have been prioritised as the Council has greater control over the operation of these buildings.

Heat network zones have been identified based on a 4,000 kWh/yr/m linear heat density (a means of relating annual heat demand to a distance). Areas of greatest potential for heat network development have been further identified based on a solely heat demand perspective where at least two anchor loads were required > 500MWh/yr.

Further analysis through feasibility studies and constraints analysis were required to understand the viability of heat network development in each identified area. Existing heat networks have been added to potential heat network zones to identify viability of heat network expansion. For the purpose of LHEES, a 500m radius buffer has been drawn around the existing heat network points to provide a sensible estimate of the area within which heat demand can serve.

The methodology for identification of heat networks has been summarised in the figure below. For a comprehensive methodology, please see the Heat Network Zoning methodology in the LHEES documentation.

*Figure 25: Summary of the methodology for identifying heat network zones*



## Appendix F: Detailed description of indicators used for building categorisation

Building category	Description	Indicators
Category 0	Currently have a low or zero direct emissions heating system, or heat network connection.	<ul style="list-style-type: none"> <li>Properties with a heat pump (off-gas only) or communal heating as the main heating system</li> </ul>
Category 1	“Heat pump ready” buildings that are well-suited to heat pump retrofit with minimal other changes.	<ul style="list-style-type: none"> <li>Cannot be a category 0 property</li> <li>Not listed or in a conservation area</li> <li>Properties with insulated walls and double or triple glazed windows</li> <li>If the property has a loft, it must have at least 100mm of loft insulation</li> <li>Properties which are likely to have a wet heating system (i.e. LPG, Oil or Biomass/solid fuels)</li> </ul>
Category 2	Secondary potential for heat pump retrofit. Require some fabric and/or heat distribution systems upgrades.	<ul style="list-style-type: none"> <li>Cannot be a category 0 or 1 property</li> <li>Properties that are cavity construction (either insulated or uninsulated), or any other construction type, with insulated walls</li> <li>There must be no risk of the property having a narrow uninsulated cavity</li> <li>Properties can be listed or in a conservation area</li> </ul>
Category 3	Significant upgrades required to be heat pump ready.	<p><b>Off-Gas Categorisation Process</b> The subcategory indicates the most viable decarbonisation technology. Heat pumps are the priority solution. The suitability of storage or direct electric heating, and biomass are indicated by the characteristics listed below:</p> <p><b>Category 3 – Heat pump</b></p> <ul style="list-style-type: none"> <li>If the property is currently heated via an oil or LPG system</li> </ul> <p><b>Category 3 – Electricity (storage or direct)</b></p> <ul style="list-style-type: none"> <li>Properties already using electricity as the main fuel type</li> <li>Flats</li> <li>Properties with double or triple glazed windows</li> <li>Properties in urban areas (1, 2 or 3 in the 8-fold classification<sup>36</sup>)</li> </ul> <p><b>Category 3 – Biomass</b></p> <ul style="list-style-type: none"> <li>Properties already using biomass as the main fuel type</li> <li>Detached and semi-detached properties</li> <li>Properties of a solid brick or stone construction type</li> </ul>

<sup>36</sup> [Scottish Government Urban Rural Classification 2020](#)



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