Perth and Kinross Local Heat & Energy Efficiency Strategy

2024-2045

Consultation Document

Perth & Kinross Council

October 2023

1. INTRODUCTION

Local Heat & Energy Efficiency Strategy Consultation

Welcome to this consultation which seeks your views on the draft vision, priorities, and actions which will shape the first Perth and Kinross Local Heat and Energy Efficiency Strategy (LHEES) and accompanying 5-year Delivery Plan (2024-2029).

The Perth and Kinross LHEES is driven by Scotland's overarching statutory targets for greenhouse gas emissions reduction and fuel poverty:

Net zero emissions by 2045 and 75% reduction by 2030

No household in Scotland is in fuel poverty by 2040

The LHEES will cover the period 2024-2045, with an accompanying delivery plan focusing on 2024-2029. It sets out our vision for heat transition and energy efficiency in Perth and Kinross as well as the outcomes that we want to achieve for local people. We are required by the Scottish Government to have a LHEES and a Delivery Plan which is reviewed and updated every five years.

Following consultation with partners and stakeholders, we have now developed a draft LHEES vision with priorities for action. Before the final strategy is developed, we want to make sure that local people, communities and stakeholders have their say on whether these priorities will make a positive difference to meeting their needs.

Following this consultation, we will draft our LHEES, incorporating responses, for formal approval by Perth & Kinross Council in November 2023.

The views of residents, the local community and stakeholders are crucial in ensuring that the first LHEES truly reflects the issues faced by local people and includes the correct priorities and actions to address these issues. In developing the LHEES, we have consulted with local stakeholders from an early stage and want to continue that process with residents and the local community to make sure we get it right.

Why your views matter?

We encourage and welcome your feedback on the vision, priorities, and actions which will shape the first Perth and Kinross Local Heat and Energy Efficiency Strategy (LHEES).

This consultation document poses a number of questions we would like you to consider.

Please do not feel you have to answer all of the questions.

How to use this document

The draft LHEES vision, priorities, and actions will be subject to public consultation until 29 October 2023.

Consultation questions are contained within the document.

You can complete the questions in an online survey through the Council's Consultation Hub.

Alternatively, you can email your question response to ClimateChange@pkc.gov.uk or post to: Climate Change Team, 35 Kinnoull St, Perth PH1 5GD.

Structure of the Consultation

The Consultation is broken down into seven topics with questions associated with the last five topics. The first two topics are providing baseline information.

1. **Domestic Baseline**
2. **Non-Domestic Baseline**
3. **Strategic Vision and Outcomes**
4. **Policy and targets**
5. **Challenges and opportunities**
6. **Strategic Priorities**
7. **Delivery Plan**

The development of our draft LHEES has been based on a rigorous evidence base and key stakeholders' engagement. A stakeholder mapping exercise was carried out and identified key stakeholders with which ongoing engagement was needed (Tier 1) and a LHEES Steering Group was created. The engagement plan was structured around a series of Steering Group workshops and one-to-one interviews. Workshops' invitations and interviews were extended to other stakeholders' groups when relevant to the topic.

The most relevant associated documents are available for review on the Perth & Kinross Council Consultation Hub and key web maps are available online for our Strategic Priorities Heat Decarbonisation - Proposed Heat Networks and Heat Pumps and Improving buildings energy efficiency aiming for affordable warmth.

For details on the latest updates on the LHEES consultation process, please visit our Facebook and Twitter pages:

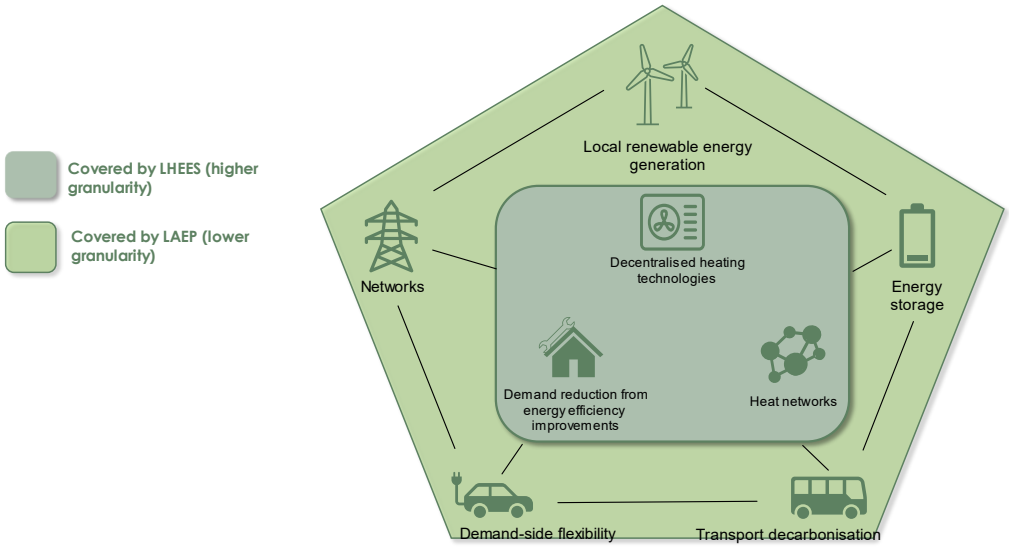
- Facebook: Perth and Kinross Council
- Twitter: @PerthandKinross

What is a Local Heat and Energy Efficiency Strategy

Scottish Local Authorities have a statutory duty to prepare LHEES and update them on a 5-year basis. LHEES are at the heart of a place based, locally led and tailored approach to the heat transition. These local strategies will underpin an area-based approach to heat and energy efficiency planning and delivery.

A LHEES focuses on transforming and reducing the demand for heat and energy. Recognising the need for compatibility with the wider energy system, PKC is developing a Local Area Energy Plan (LAEP). The relationship between the LHEES and LAEP is shown in Figure 1. The LAEP will support collaboration with network operators, and other key stakeholders, to inform the development of targets as well as deliverable actions within a net zero energy system that balances out energy generation, transmission, storage and usage, including heat, at a substation area and Council wide scale, through to 2045.

Figure 1 Overview of LHEES and LAEP



Alongside this, the Council is working to prepare a Council Estate Decarbonisation Plan for our own building stock. The Council is also developing a toolkit that will assess LHEES and LAEP delivery actions and areas to develop a pipeline of investable energy projects to inform Smart Local Energy Systems (SLES). These aligned programmes of work will support the delivery of our LHEES and are further explored in the Delivery Plan section.

What does a Local Heat and Energy Efficiency Strategy have to do?

A LHEES should have a two-part structure of a Strategy and Delivery Plan. Perth and Kinross LHEES Strategy will:

- set out how each segment of the building stock needs to change to meet national and local objectives, including achieving zero greenhouse gas emissions in the building sector, and the removal of poor energy efficiency as a driver of fuel poverty.
- identify strategic heat decarbonisation zones, and set out the principal measures for reducing buildings emissions within each zone; and
- prioritise areas for delivery, against national and local priorities.

National guidance frames the Strategy around six considerations which have shaped our development of strategic and delivery priorities, as shown in Table 1.

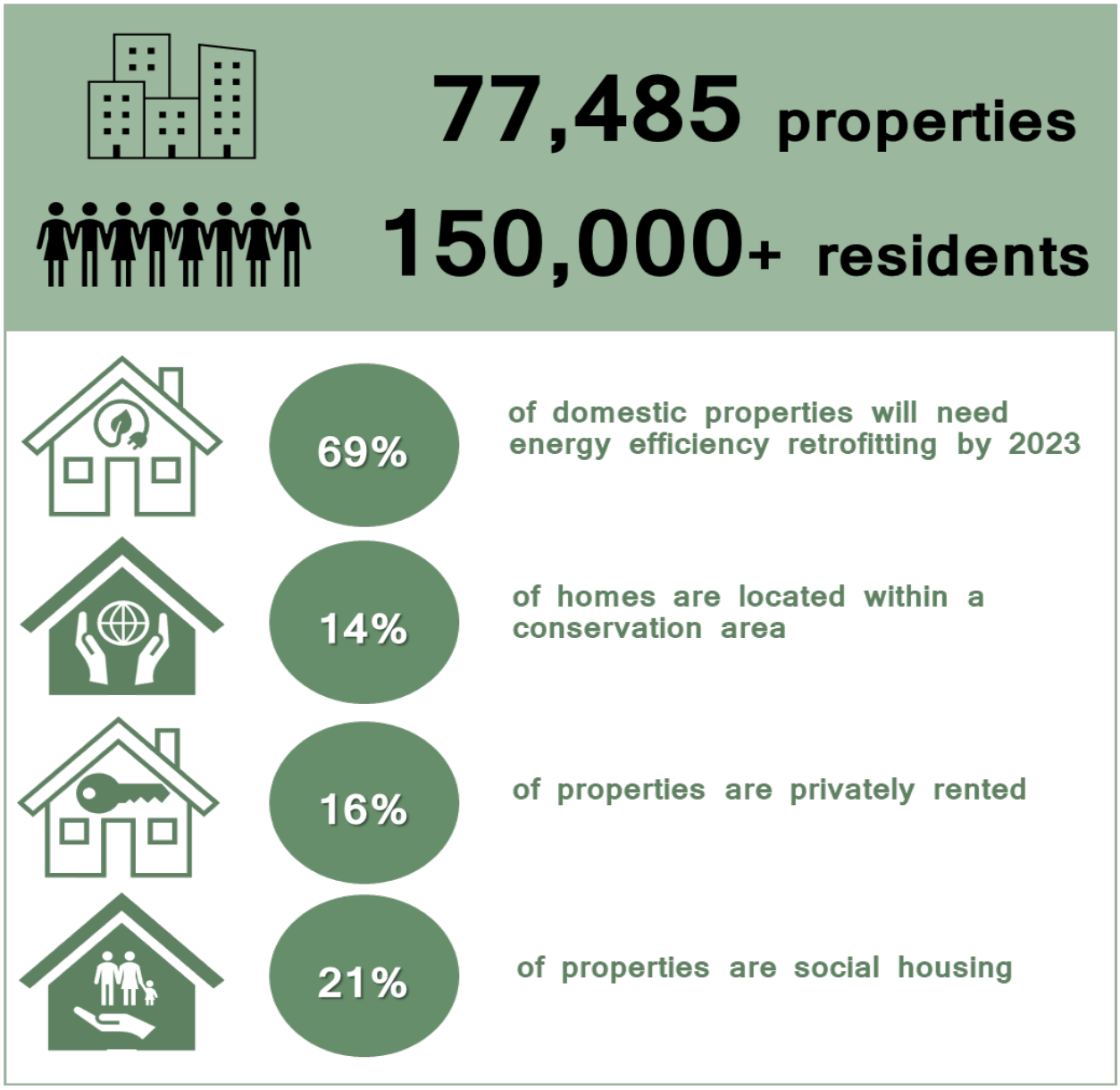
Table 1 Nation LHEES considerations

	LHEES Consideration	Description
Heat decarbonisation	Off-gas grid buildings	Transitioning from heating oil and LPG in off-gas areas
	On-gas grid buildings	On-gas grid heat decarbonisation
	Heat networks	Decarbonisation with heat networks
Energy efficiency and other outcomes	Poor building energy efficiency	Poor building energy efficiency
	Poor building energy efficiency as a driver for fuel poverty	Poor building energy efficiency as a driver for fuel poverty
	Mixed-tenure, mixed-use andhistoric buildings	Mixed-tenure, mixed-use, listed and buildings in conservation areas

Accompanying our Strategy will be a Delivery Plan. This has been developed in partnership with key stakeholders and provides a strong basis for action for local communities, government, investors, developers and wider stakeholders, pinpointing areas for targeted intervention and early, low-regrets measures. Due to the dynamic nature of this plan, and rapidly evolving regulatory, funding and policy landscapes, it is intended to be kept as a live document and published as a live plan in a digital planning platform being developed through Project RESOP (Regional Energy System Optimisation Planning) by Scottish and Southern Electricity Networks (SSEN) under Ofgem's Network Innovation Allowance.

1. DOMESTIC BASELINE

What is the current state of Perth and Kinross's Housing?



The baseline information has been summarised here to provide context for the remaining sections. To read the full baseline document for LHEES, please visit this link.

Poor energy efficiency

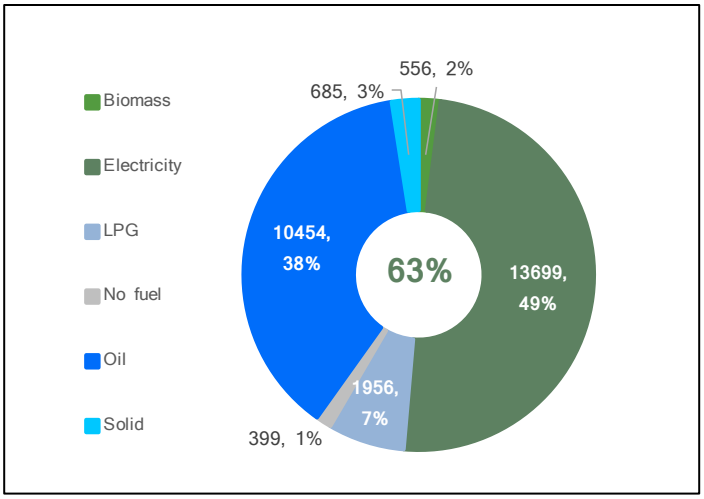
A significant proportion (58%) of domestic properties across Perth and Kinross have an Energy Performance Certificate (EPC) rating of D-G, which is higher than the national average of 51%. Key points include:

- The proportion of detached or semi-detached houses in Perth and Kinross (55%) is higher than national average (39%). This contributes to a larger number of external walls.
- 45% of domestic properties having uninsulated walls, which is higher than the national average of 41%.
- 58% of these uninsulated properties are solid stone in construction, which present challenges when it comes to upgrading the building's structure.
- Larger properties will have a higher heating demand and be more expensive to upgrade. 15% of properties in Perth and Kinross have 7 or more habitable rooms.

There is a significant spatial variation of energy efficiency by area across Perth and Kinross, with Strathearn and Highland Perthshire having some of the lowest levels.

Fuel Type

Figure 2 Breakdown of domestic fuel sources for off-gas areas



In Perth and Kinross, 63% of domestic properties are currently serviced by the gas grid, while 36% of domestic properties are not (known as being off-gas). This off-gas proportion is significantly higher than the national average. The remaining 1% of properties have unknown off-gas status. In on-gas areas, 99% of properties are currently connected to the grid. As can be seen from Figure 2, in off-gas areas there are a number of fuel sources used. To decarbonise these properties, all properties on oil,

Liquified Petroleum Gas (LPG) and solid fuel (e.g., coal) will need to transition to alternative sources.

Fuel poverty

What is Fuel Poverty? A 10% threshold is used in a two-part metric where a household is in fuel poverty if:

'After housing costs, the total fuel costs needed to maintain a satisfactory heating regime are more than 10% of the household's adjusted net income *and* if, after deducting fuel costs, housing 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'.

What is Extreme Fuel Poverty? 'Where more than 20% of the income after housing costs is spent on required fuel costs and there is insufficient residual income to maintain an acceptable standard of living.'

Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019

Table 2 shows that the percentage of households in fuel poverty and extreme fuel poverty in Perth and Kinross is higher than the national average. This is likely due to the old building stock and the associated poor energy efficiency of properties in the area. The Scottish House Condition Survey (SHCS) 2019 is the most reliable data source available to local authorities to estimate overall fuel poverty levels and how these vary spatially across Perth and Kinross.[1] However, since this was carried out, the increases of the energy price cap in 2021 and 2022 have likely led to an increase in probability of fuel poverty. To account for this the Scottish Government has developed an approach to deriving an uplifted value to the October 2022 energy price cap as shown below.

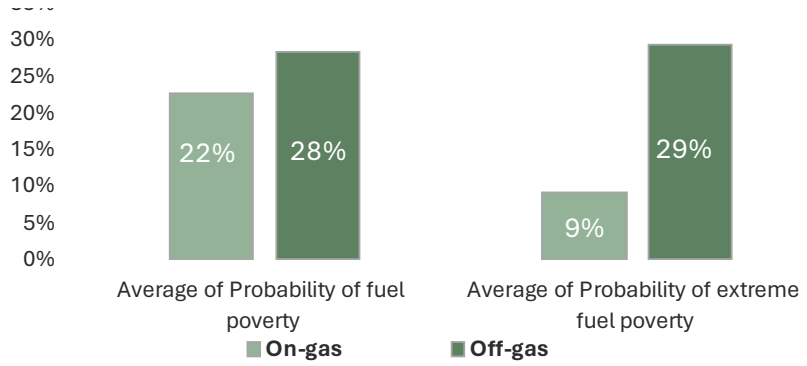
[1] Note: The datasets to calculate accurate current fuel poverty levels is not currently available to Local Authorities and so user surveys and proxy data must be relied upon to make best estimates.

Table 2 - Fuel Poverty Levels and Extreme Fuel Poverty Levels

	Scotland - SHCS 2019	Scotland - SCHS 2019 - Uplifted value (2022)	Perth & Kinross SCHS 2019 - Original value	Perth & Kinross SCHS 2019 - Uplifted value (2022)
Percentage of households in fuel poverty	24%	35%	28%	63%
Percentage of households in extreme fuel poverty	12%	Not Available	18%	40%

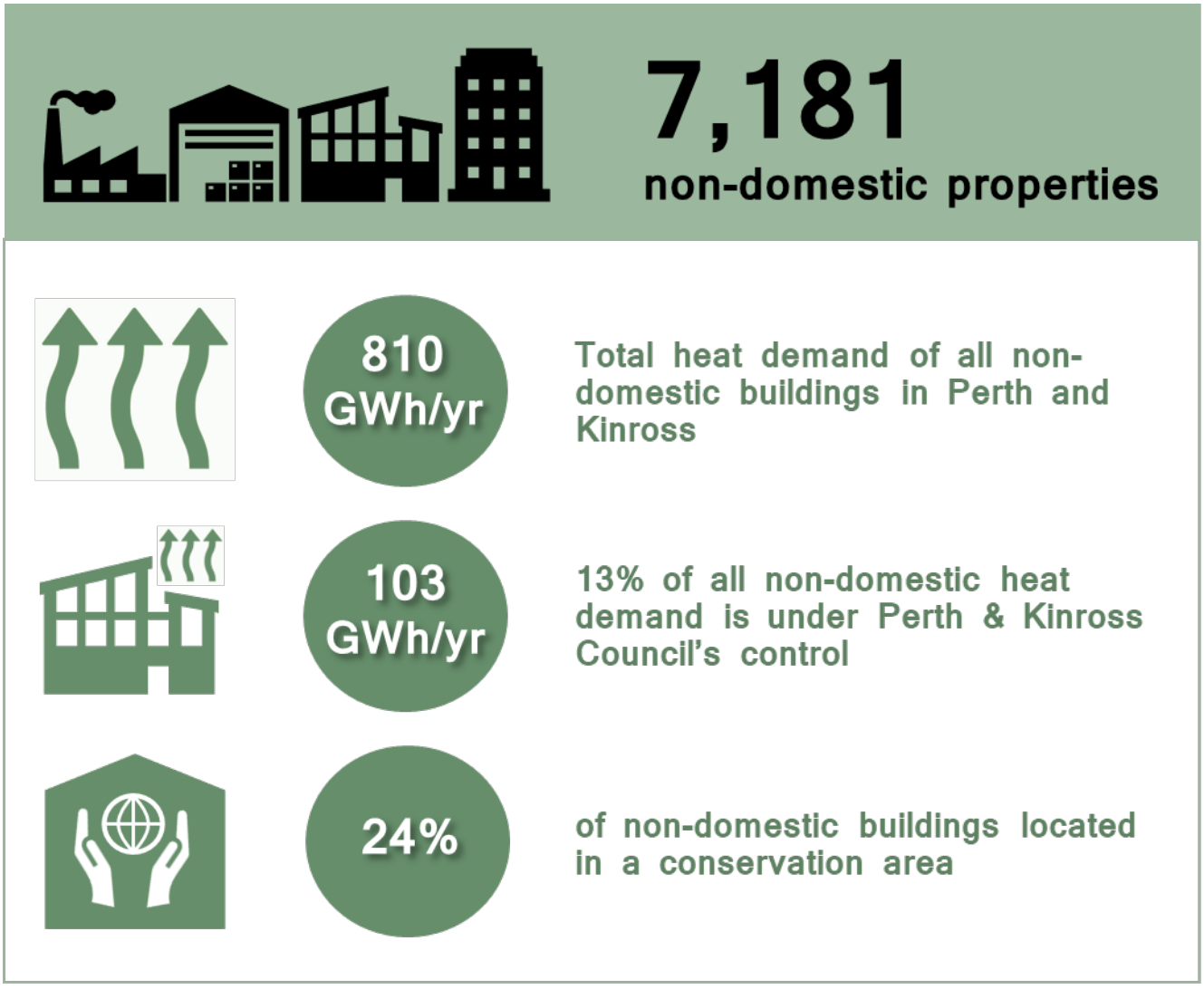
The average probability of fuel poverty and extreme fuel poverty is higher in off-gas properties than on-gas properties, as shown in Figure 3. In particular, off-gas properties with electricity and solid fuel types tend to have a higher probability of fuel poverty. Heat decarbonisation and energy efficiency improvements in off-gas properties therefore present the opportunity to reduce fuel poverty. However, any recommendations for interventions in heat decarbonisation should carefully consider the impact on fuel poverty, ensuring that it is not exacerbated.

Figure 3 Probability of fuel poverty for on-gas and off-gas properties (Note: Data is based on 2019 SHCS values as was not available for the uplifted values)



2. NON-DOMESTIC BASELINE

What is the current state of Perth and Kinross non-domestic properties?

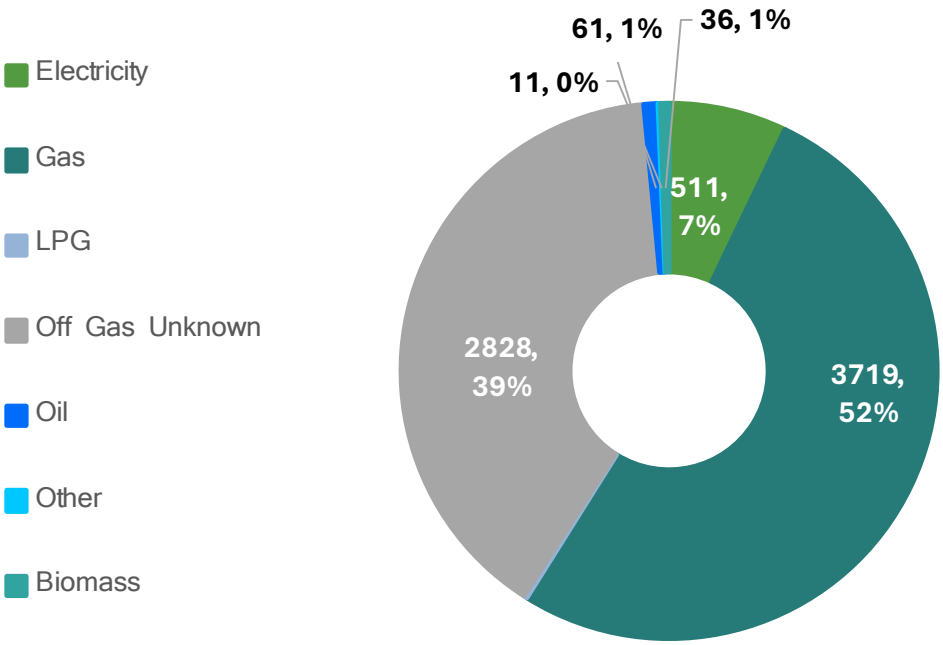


The baseline information has been summarised here to provide context for the remaining sections. To read the full baseline document for LHEES, please visit this link.

Perth and Kinross non-domestic building stock is made up of 7,181 buildings with a total annual heat demand of 810 GWh/yr. In general, acquiring energy demand data for the non-domestic sector is more challenging as valid EPCs are only in place for 19% of properties in this sector. As such, heat demand data used in this baseline is based on modelled heat demands.

The division of fuel type by property count is shown in Figure 4. Approximately 52% of non-domestic properties are served by mains gas and this accounts for 63% of the total annual heat demand.

Figure 4 Heat source for non-domestic properties (by count of property)



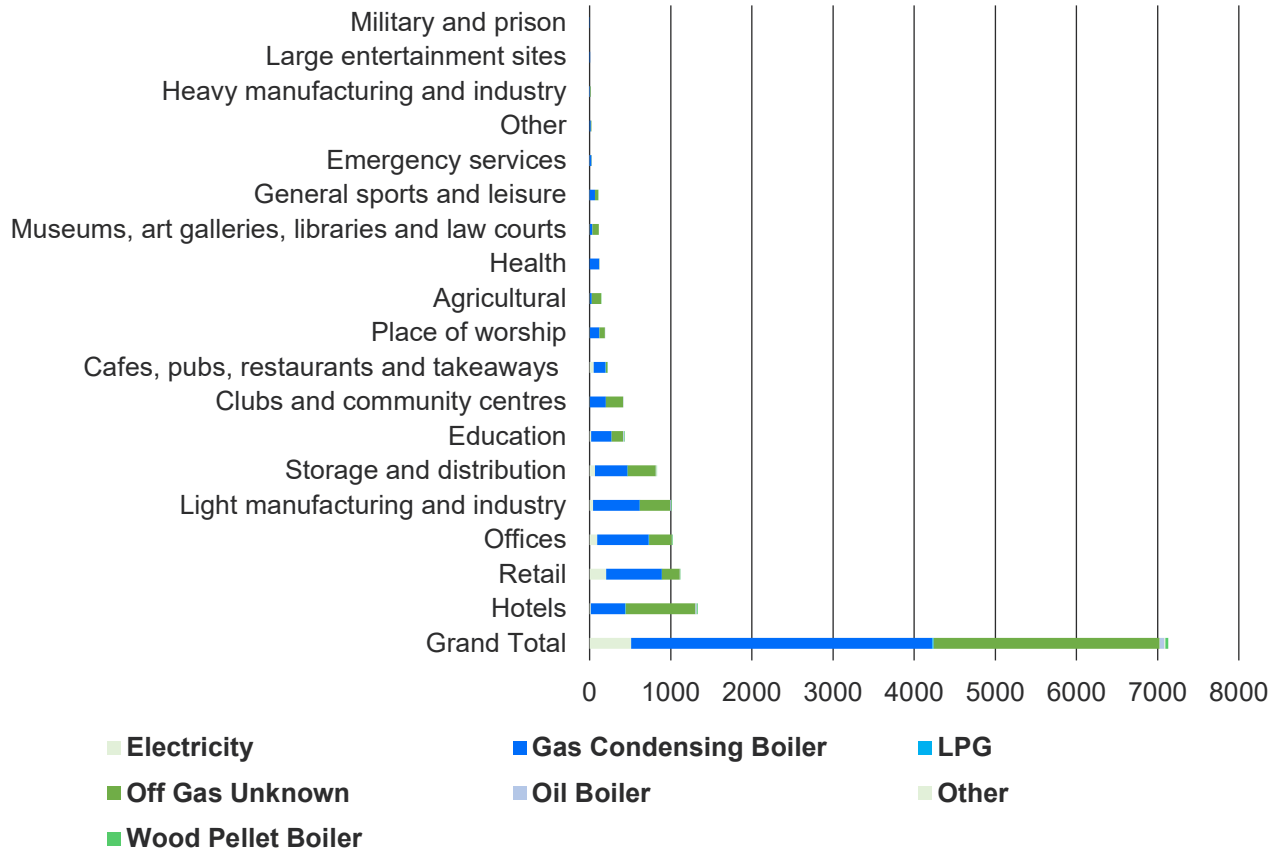
As can be seen from Figure 5, the building typologies (sectors) with the largest heat demand are educational buildings (i.e., schools, colleges, and universities), offices and hotel buildings.

- Educational buildings have the highest heating demand at ~112 GWh. Approximately 59% of these buildings rely on gas.
- Perth and Kinross is home to around 1,000 office buildings, which collectively contribute to 13% of the total non-domestic heat demand (108 GWh).
- Hotels, which include individual holiday rental properties, have a total annual heat demand of 104 GWh. Compared to other building typologies, hotel buildings have a lower proportion of heat demand met by gas (48%, 50 GWh), which is likely to be attributed to their rural location.
- Light industry and manufacturing accounts for 11% of non-domestic heat demand in Perth and Kinross. Heavy industry and manufacturing only accounts for <1% of the heat demand. It is important to recognise that this figure may potentially

be larger in reality, as certain process demands might not be accounted for in the formation of the dataset used.

The non-domestic heat demand is not uniformly distributed across Perth and Kinross. Strategic actions and zones are defined at a data zone level which is a common geography used across the public and private sector to represent communities and have populations of 500 to 1,000 residents. The data zones with the highest heat demand from non-domestic buildings are those that contain industrial estates or large campuses, such as Perth Royal Infirmary, and in urban centres such as Perth City Centre.

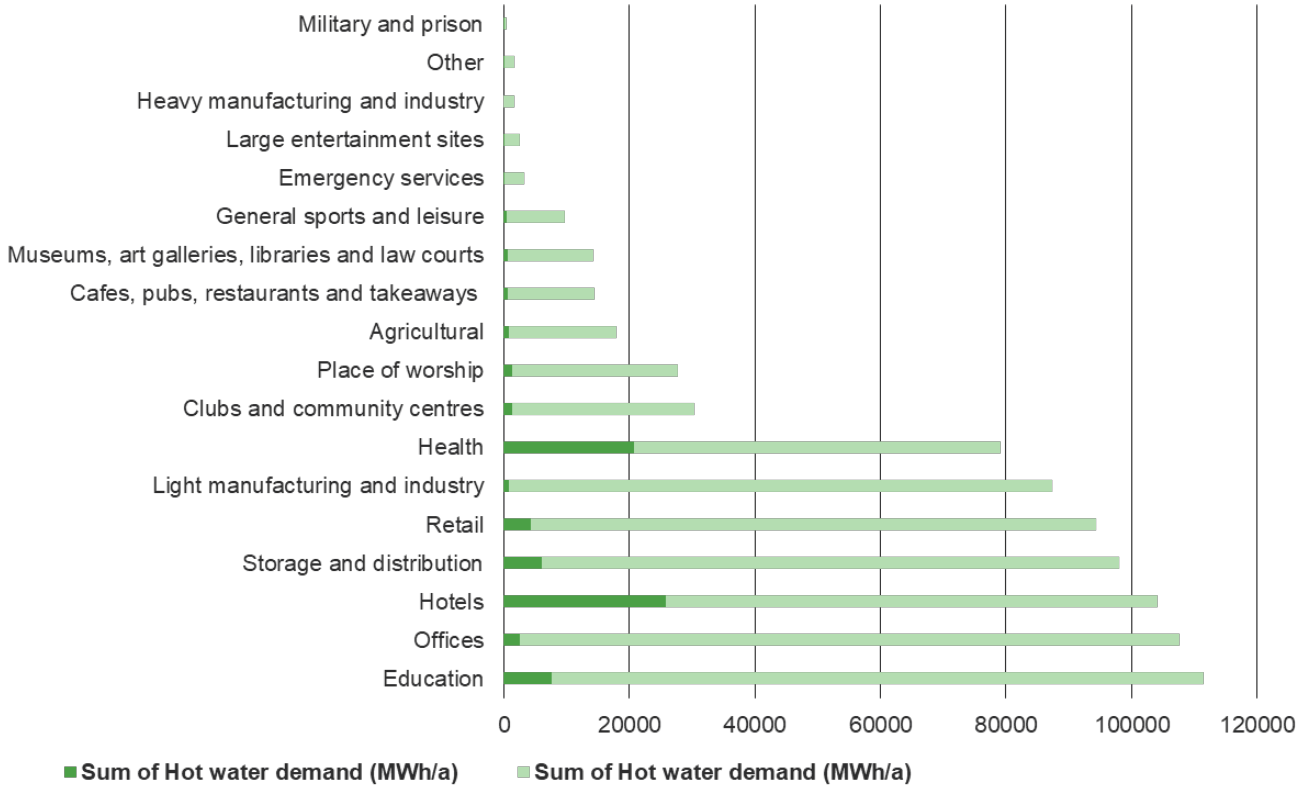
Figure 5 Building typology (sector) by heat source



The proportion of heat demand used for providing hot water will influence the zero-emissions heating system used to meet heat demand. Figure 6 shows the heat demand for each building typology, split by space heating and hot water demand. Hotels and health sector buildings have a higher proportion of hot water demand compared to other building typologies. These building typologies also tend to have high peak demands which

will impact system sizing and may require a secondary heating system to ensure peak demands can be met.

Figure 6 Split of heating demand by building typology



3. STRATEGIC VISION & OUTCOMES

LHEES Vision

Informed by the evidence and working with stakeholders, a draft vision for Perth and Kinross LHEES (2024-2045) has been developed.

Perth & Kinross Council supports Scotland's Heat in Buildings Strategy vision that by 2045 our homes and buildings are cleaner, greener, easy to heat, and no longer contributing to climate change, as part of the wider just transition to net zero. The vision for Perth and Kinross's first Local Heat and Energy Efficiency Strategy is:

> **Vision**
>
> By 2045, our homes and buildings will be more energy efficient and with more decarbonised heat sources providing more affordable warmth and no longer contributing to climate change.

The vision for Perth and Kinross's first LHEES is set within the overall ambition to become Net Zero by 2045 which the Council committed to in December 2021. The Council is also committed to a 75% reduction in carbon emissions across its area by 2030 and to make all its own buildings net zero by 2038.

LHEES Outcomes

The vision will achieve significant outcomes including:

Significant Reduction in Carbon Emissions: widespread adoption of energy-efficient technologies and decarbonised heat sources will have led to a substantial reduction in carbon emissions from homes and buildings.

Affordable and Sustainable Heating: heating in homes and buildings will become more affordable, with a greater reliance on renewable and low-carbon energy sources. This will reduce energy bills for residents and businesses while promoting sustainability. As energy becomes more affordable and efficient, it will help alleviate fuel poverty, ensuring that vulnerable communities have access to the warmth and comfort they need without straining their finances.

Health and Well-being Benefits: Energy-efficient building designs and technologies will lead to improved indoor comfort levels, ensuring that people can enjoy warm and comfortable living and working spaces without the need for excessive energy consumption. Reduced pollution will improve air quality.

Consultation question 1

Does the draft LHEES Vision and related outcomes set out a clear ambition for the heat and energy transition in Perth and Kinross?

4. POLICY & TARGETS

The Perth and Kinross LHEES is driven by Scotland's overarching statutory targets for greenhouse gas emissions reduction and fuel poverty:

Net zero emissions by 2045 and 75% reduction by 2030

No household in Scotland is in fuel poverty by 2040*

The LHEES is further aligned to targets set both locally and nationally relating to carbon reduction, energy efficiency improvements, heat networks and fuel poverty. Key national policy documents that the LHEES has been aligned to are:

- Climate Change Act (2019) and Scottish Government Climate Change Plan
- Heat in Buildings (HiB) Strategy (2021)
- Heat Networks Scotland (Act) 2021 and Heat Networks Delivery Plan
- Fuel Poverty (Targets Definition and Strategy) (Scotland) Act 2019
- Housing for 2040

The key targets and the current Perth and Kinross position are outlined in

Table 3 to **Table 5**.

Table 3 - Energy efficiency targets against Perth & Kinross Baseline

Key Targets – Housing Stock	Target Year	P&K Level of Compliance value	Number of households/properties requiring retrofit	Estimated retrofit costs (£M)
All Social Housing EPC D or Above	2026	93%	1,100	(Included in EPC B total)
All Social Housing EPC B or Above	2032	17%	13,600	£145.1
All Domestic Private Rented Properties EPC C or Above	2028	28%	8,700	£147.5
All properties should meet EPC Band C (residual Owner Occupier)	2033	32%	31,400	£616.1

Table 4 - Fuel Poverty targets against Perth & Kinross Baseline

Key Targets – Fuel Poverty	Target Year	P&K Current Fuel Poverty Levels	Number of households currently in fuel poverty
No more than 5% of households in fuel poverty (More than 10% of net household income on fuel)	2040	63%	44,900
No more than 1% of households in extreme fuel poverty (More than 10% of net household income on fuel)	2040	40%	30,200

Table 5 - Heat decarbonisation targets against Perth & Kinross Baseline

Key Targets – Heat and Decarbonisation	Target Year	P&K Current value	Estimated number of households/properties requiring interventions
70% of heat for non-domestic buildings will be using low carbon technologies	2032	9%	4,300
35% of domestic heat demand will be supplied using low carbon technologies	2032	18%	12,700

The first LHEES, when drafted, will be informed by and will contribute to local policies and strategies such as Perth and Kinross Climate Change Strategy and Action Plan, Perth and Kinross Local Housing Strategy 2022-2027, Perth and Kinross Local Development Plan 32, Perth and Kinross Community Plan (Local Outcomes Improvement Plan) and Perth & Kinross Council Corporate Plan 2022-2028.

Given the statutory targets for Scotland are already ambitious with respect to the other nations in the UK and the huge scale of the transformation required in Perth and Kinross to meet these, it is proposed that the Perth and Kinross LHEES targets are aligned with the Scottish statutory heat and energy targets.

Consultation question 2

Do you agree with the alignment of Perth and Kinross LHEES targets with the Scottish Targets?

If not, what would you change them to and why?

5. CHALLENGES & OPPORTUNITIES

Delivering a heat and energy transformation at the scale required to meet the Scottish Government requirements and Perth and Kinross ambitions poses both significant barriers and challenges and offers significant opportunities.

Barriers and Challenges

Several barriers and challenges to delivering the LHEES and reaching our strategic aims have been identified by PKC and key stakeholders. These include:

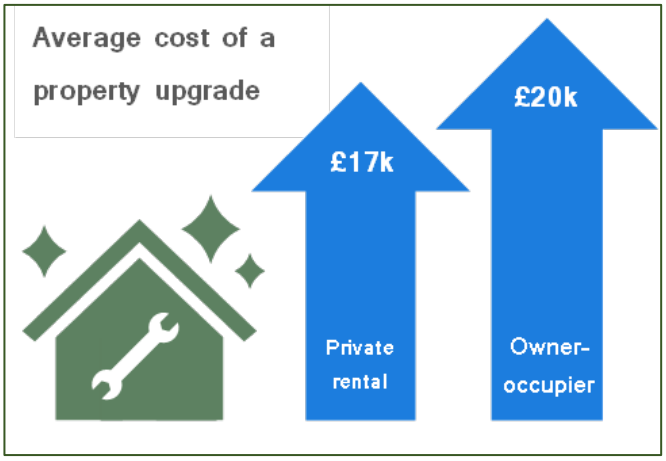
Physical building stock

Predominantly due to the age of the housing stock, Perth and Kinross houses have a higher percentage of hard-to-treat houses in every key criterion than the Scottish average, as shown in Table 6. The proportion of buildings built pre-1919 is significantly higher than national average with nearly all of these built using traditional construction methods with solid brick and stone and designed to provide passive ventilation. They are classed as "hard-to-treat" in retrofit terms as installing external or internal wall insulation for these properties can often be more expensive and involve more invasive installation procedures. The majority of these pre-1919 buildings are also either listed or located in conservation areas, or both, posing an additional challenge for retrofit interventions.

Table 6– Comparison of the Perth & Kinross vs Scottish Average Building Stock

Category	Perth and Kinross	Scottish Average
Age - Pre-1919 Buildings	24%	18%
Tenure - Private rented accommodation	16%	13%
Size - Detached or semi-detached	55%	39%
Fuel - Off gas	36%	19%
Energy Efficiency - EPC bands D-G	58%	51%
Heritage - In conservation area	14%	10%
Fuel poverty	28%	24%

Affordability and tenure



Perth and Kinross has lower levels of social housing at (14%) than the Scottish average. This is the sector that Perth & Kinross Council has the most direct control over. Private rented accommodation levels are higher than the Scottish average. While there are deadlines associated with the property transition, it has been observed that some landlords are preferring to sell their properties rather than upgrade them or it is reflected in rent uplifts.

Funding

The total investment required for homes and buildings to reach net zero by 2045 across Scotland is in excess of £33 billion. There is a lack of funding and support, at the right scale, to support the upgrade of heat in buildings. There are existing schemes to support social housing and fuel poor homes, as well as select grants and interest-free loans accessible to residents. Furthermore, the government's emphasis on funding heat networks does not lend itself well to a more rural area that has a relatively limited number of viable heat networks. Additionally, whilst there is private investment available, it is often harder to attract to more rural areas, especially given the economies of scale compared to city regions. In response to funding challenges, Scottish Government has established the Green Heat Finance Taskforce to explore and identify innovative financing mechanisms to help individuals and organisations make their properties warmer, greener and more efficient.

Public awareness and buy-in

Public awareness of what individuals and businesses can and need to do to make this energy transition is still widely lacking. For those that do want to take action - having a trusted source of technical knowledge has been identified by many as a barrier to taking further action.

In Perth and Kinross, several organisations currently provide free home energy advice and home visits, including SCARF, the HEAT Project, Warm Connection and the Citizens Advice Bureau. At the current combined scale of operation over the next 10-years, these organisations will only have the capacity to reach approximately 25% of homes requiring retrofitting.

Building public trust in new technologies will be important for adoption – both for heat pumps and heat networks. Both are still new to Scotland and Perth and Kinross with relatively low levels of consumer confidence. A key concern for consumers relates to being 'locked in' to a heat network with no option to go to the open market for a better price in response.

Skills and supply chain

Heat transition and energy efficiency bring a huge opportunity to create jobs and develop new skills in the workforce. However, there is undoubtedly a gap at present between the targets now set and the capacity of our supply chains and skills to deliver. This includes:

- For a scaled-up deployment of heat pumps, the existing workforce will need to develop (more) electrical skills to complement existing gas engineering or plumbing skills. Evidence from consultations suggests that these skills are already in great demand, with evidence of companies struggling to fill positions as a result of short supply.
- There is a need for growing capacity in the region's education and training system. This is not just for volume, but for effectiveness, responsiveness and connectivity between education and training providers and businesses.
- There is also evidence that there are not enough local businesses to supply the goods or services to support heat transition and energy efficiency improvements.

Lack of regulation and misalignment of national targets

While Scotland has leading climate targets, with a delay to the Scottish Government's Heat in Building Bill (which is to set out its plans to regulate the domestic and non-domestic sector decarbonisation) there remains limited influence the Council can exert to ensure the

timely upgrade of buildings. This risks leaving the ambitions of Perth and Kinross potentially constrained when opportunities are identified, as there are no regulatory enforcements, other than for the social housing sector, that can be readily utilised. It is not until this regulation comes in to force that the transition in the private market will be able to take full effect.

Grid capacity

Decarbonising heat, focusing on heat networks and heat pumps, which run on electricity, places significant pressures on the grid. Heat pump uptake potential for Perth and Kinross is high with approximately 49% of our buildings highly suitable for transition to meet regulatory targets. The grid is already constrained or near capacity at several locations within Perth and Kinross. Future changes in available capacity and wider energy system decarbonisation should be considered when planning strategic widespread deployment of heat pumps.

The Council are also working alongside SSEN and other partners in the Regional Energy System Optimisation Planning (RESOP) project which will utilise the outputs of our LHEES, LAEP and our live Delivery Plans to plan decarbonisation pathways by enabling low carbon technologies (LCTs) such as heat pumps to be sited in cost-effective locations whilst providing early warning to SSEN of additional demand on the network. This will help us to ensure alignment with grid investment planning in the near to medium term, while helping to improve and shape longer term roll out and investment required up to 2045. Alignment of our investment planning with SSEN and other key delivery partners will support the development and triaging of a pipeline of low carbon projects through to delivery avoiding risks and barriers posed by grid capacity.

Data availability

There are issues with the current data availability, access and sharing that impact on the ability to target priority areas for action and require the use of proxy data. These include:

- Non-domestic sector data
- Energy consumption and heat demand data, especially for large users
- Fuel poverty data

- Funding eligibility data
- Data protection and commercial sensitivity

Consultation question 3

Do you agree with these identified challenges?

Are there any additional challenges or barriers that you think should be included in the LHEES?

Opportunities

The delivery of the Perth and Kinross LHEES also brings many opportunities.

Use of natural assets, waste heat and new technologies

There is potential for several technologies using our natural assets which could be used to provide heat sources for potential heat networks. These include:

- Water source heat pumps which could use heat from the River Tay and other local bodies of water.
- Ground source heat pumps which could use heat at a maximum depth of 200 metres underground.
- Energy from waste which could use heat produced from burning waste.
- Geothermal which could use heat from 500 and 2,500 metres underground.
- Heat pumps and exchangers which could use heat from wastewater or the public sewer.
- Other sources of waste heat.

Hydrogen

Hydrogen could be used on a large scale as a cleaner replacement for natural gas in the gas grid, supplying individual boilers or heat networks. The UK Government will take decisions on the role of hydrogen in the Great Britain gas network from 2026.

Given the Scottish Government's proposed hydrogen use hierarchy and the forecasted cost and supply constraints, hydrogen is not currently considered as a significant heat source in the Perth and Kinross LHEES, but the development of the sector and alignment with developing policy will be tracked in liaison with Scottish Gas Network, one of our key stakeholders.

Green jobs and building a green economy

With over £900M in retrofit investment needed in the domestic sector alone in Perth and Kinross over the next decade, there is significant potential to grow good green jobs. In addition to the direct skills required to deliver the transition (installation of heat pumps & insulation, etc.), there is also the potential for a secondary economy to develop focused on finding circular uses for the old assets (gas boilers, single glazed windows, etc).

Financing

Heat networks typically have high up-front capital costs alongside a longer-term return on investment. This causes challenges in business case development and at present, nearly all schemes require government subsidies to make them deliverable. There is increased private sector interest in heat networks, especially when at scale. In Perth and Kinross, the development of large-scale district heating in Perth may be a key strategic heat decarbonisation opportunity attractive to the market for private investment. However, this may be more attractive when packaged with other energy projects.

Public-Private Collaboration

There are opportunities for public-private collaboration. Partnerships could be developed between Perth & Kinross Council and other public sector/social organisations such as Registered Social Landlords (RSLs) or between public/social organisations and Distribution Network Operators (DNOs) or indeed the wider private sector. One option progressed by other areas in the UK is a Strategic Energy Partnership to bring private sector expertise and to secure significant levels of capital investment required for the development of heat networks and other energy-related projects. The projects taken forward by the energy partnership could deliver on local priorities relating to carbon reduction, fuel poverty and energy security with the aim of developing Smart Local Energy Systems.

Co-benefits

There are several societal co-benefits associated with the delivery of the LHEES. These include:

- Reduction in fuel bills, associated with energy efficiency improvements and potential heating source improvements (e.g., oil to heat pump)
- Warmer and healthier homes with improved indoor air quality
- Increased energy security, with local or renewable Scottish sources able to meet a higher percentage of energy demand.

The LHEES is an opportunity to bring in a whole energy system approach to maximise all of these co-benefits.

Consultation question 4

Do you agree with these identified opportunities?

Are there any additional opportunities that you think should be included in the LHEES?

6. STRATEGIC PRIORITIES

LHEES Priorities

To achieve this vision and outcomes, two strategic priorities form the basis of the Strategy and Delivery Plan:

Priority 1

Decarbonising heat within a transitioning energy system focusing on heat networks and heat pumps.

Priority 2

Improving buildings energy efficiency to aiming for affordable warmth and regulatory compliance.

These were developed through an evidence-based approach drawing on national and local strategies; engagement with key stakeholders; and an analysis of the buildings in Perth and Kinross.

Consultation question 5

Do the LHEES draft priorities reflect the main heat transition priorities in Perth and Kinross?

The delivery of these two strategic priorities will be supported through prioritisation of actions, a whole energy system approach and key supporting delivery mechanisms.

To support the successful delivery of our Strategic vision and priorities, a number of ideas for action have been identified, assessed and prioritised by the Council with key stakeholders.

Perth and Kinross-wide mapping of heat decarbonisation opportunities, alongside whole energy system considerations, was completed to identify where interventions are most suitable and where challenges exist. The analysis supports the development of a long term, strategic investment framework through prioritisation of our strategic zones, including heat network zones and more granular delivery priorities - targeting areas for projects,

programmes, engagement and providing a focus for delivery of a pipeline of projects over the short to medium term.

Strategic Zoning

Strategic zones were generated to assess our strategic priorities - decarbonised heat within a transitioning energy system (potential heat network zones and heat pump suitability) and improving buildings energy efficiency, to meet regulatory targets and address fuel poverty delivering affordable warmth.

A range of evidence was used to prioritise strategic zones and actions including:

- the domestic baseline and non-domestic baseline for our building stock
- Portfolio Energy Analysis Tool (PEAT) retrofit scenarios to ensure that buildings are retrofitted to comply with policy set out in the regulatory standards outlined in the Heat in Buildings and Energy Efficiency Standards for Social Housing post-2020 (EESSH2)
- Non-domestic retrofit analysis modelling energy efficiency measures influenced by the building typology to assess possible energy savings.
- Scottish and Southern Electricity Networks (SSEN) infrastructure and capacities including Primary substations (33kV/11kV) and the Electricity Supply Areas (ESAs) that they serve as an indicator of substation capacity.

Strategic Zones for our identified priorities aim to spatially set out areas of focus to decarbonise the building stock, with a focus on understanding the current performance of buildings, and an analysis of cost-effective opportunities for significant energy and emissions reductions. Strategic Zoning evaluates various aspects of energy efficiency and heat decarbonisation in Perth and Kinross.

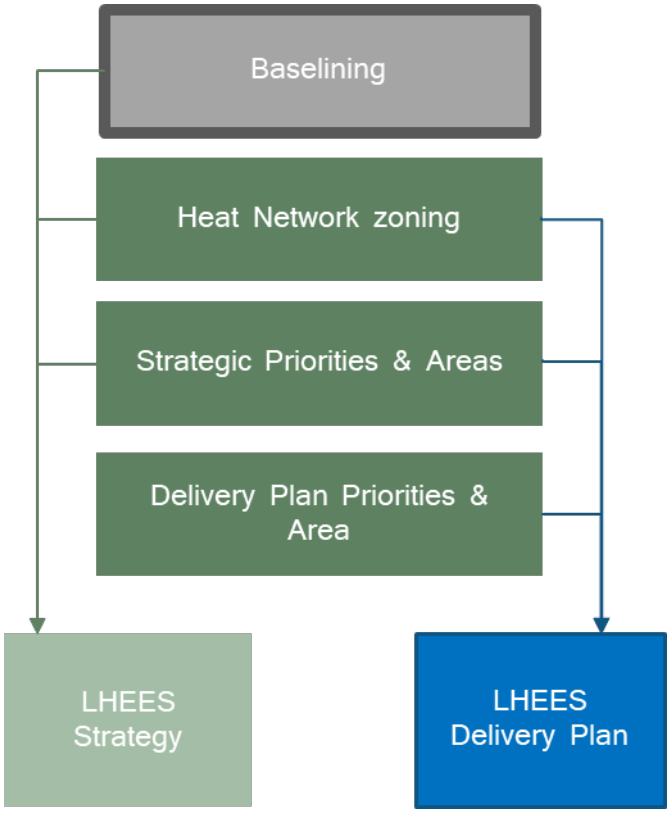
The aim of Strategic Zoning is to understand the opportunities and potential challenges associated with heat decarbonisation and energy efficiency improvements, at a strategic data zone level (e.g., 500-1000 residents) for inclusion in the LHEES.

The analysis and visualisation were undertaken using mapping which integrates multiple variables affecting heat decarbonisation, energy efficiency and deliverability to identify specific challenges and opportunities in delivering interventions. This approach represents

a significant advancement beyond the LHEES methodology and facilitates a deeper understanding of opportunities and challenges, as well as actions that could form the basis of delivery planning for the Council.

Strategic vs Delivery zoning for priorities

The LHEES methodology requires development of strategic priorities and zones which set out how a local authority proposes to meet longer term national and local objectives and prioritise areas to meet these targets. This is supported by complementary, more granular delivery priorities and areas pinpointing targeted intervention and early, low-regrets measures in the near to medium term (5-year focus). This process is illustrated in the diagram below and delivery plan priorities are described further in section 7.



Strategic Priority 1a: "Delivering decarbonised heat within a transitioning energy system - Heat Network Zones"

Regulatory targets for heat decarbonisation are:

- **By 2030**, emissions from buildings have to be 68% lower than 2020 levels
- **By 2032**, 70% of heat for non-domestic buildings will be using low carbon technologies

What is a Heat Network? Heat networks (also known as district heating) supply heat from a central source to consumers, via a network of underground pipes carrying hot water. Heat networks can cover a large area or even an entire city or be fairly local supplying a small cluster of buildings.

What are Potential Heat network zones? Potential Heat network zones are areas particularly suitable for heat network development. The purpose of the zones is to attract investment from heat network developers.

Approach for Identifying Potential Heat Network Zones

Heat Networks (Scotland) Act 2021 places a duty on local authorities to carry out a review of potential areas for heat networks. The formal designation of heat network zones will use outputs from LHEES as a starting point for more detailed work on consideration and formal designation of heat network zones. Secondary legislation and guidance are being phased-in between May 2023 and 2025 and will include the formal designation of potential heat network zones.

The approach to identifying potential zones builds upon the national heat network assessment methodology. Potential zones have been preliminarily screened by key stakeholders to identify any known issues or barriers which limit taking the zone forward for further investigation.

What is a Linear Heat Density? "Linear heat density is an industry standard metric that relates heat to distance, for a heat network it is heat demand per meter of pipe."

What is an Anchor Load? "Anchor loads are high heat demand buildings and key connections on a heat network that usually drive the economics of heat networks."

LHEES methodology: Heat Networks - Generation of Potential Zones Detailed Practitioner Approach

The LHEES methodology uses two sets of criteria to identify potential heat network zones (Table 6). Stringent zones have a higher level of heat demand and greatest potential financial viability, while Baseline Zones are still expected to be viable, but less so than Stringent Zones.

Table 6: Thresholds criteria used for Potential Zone identification and prioritisation

	Linear heat density benchmark (kWh/yr./m)	Anchor load threshold (MWh/yr)	Minimum number of anchor loads per cluster
Baseline	4,000	500	2
Stringent	8,000	500	5

Potential Heat Network Zones

Due to the rural nature of Perth and Kinross, the potential for heat networks in the local authority area is limited to a few urban areas and towns. Two zones were identified using Stringent criteria – one in the Perth City Centre and one in the Inveralmond Industrial Estate (Perth). These zones have higher heat demand density with a larger number of anchor loads, making them more likely to be financially viable. Five further zones were identified using Baseline criteria, indicating financial viability in these locations may be limited. The identified zones include:

- Perth City Centre (Stringent and Baseline)
- Perth Inveralmond Industrial Estate (Stringent and Baseline)
- Perth College/UHI (Baseline only)
- Perth Academy (Baseline only)

- Auchterarder (Baseline only)
- Kinross (Baseline only)
- Blairgowrie (Baseline only)

A full summary of potential heat network zones can be viewed here and via a web map available to explore the full range of heat network opportunities available in further detail. The seven potential zones are shown indicatively in **Figure 7** to **Figure 10**. Currently the extent of the zones is indicative based on the criteria and approach outlined above. The Council will work towards improving demand confidence, clarifying supply options, and engaging with potential anchor load connections to support formal designation and refine zone boundaries. Potential zones will be further verified and reviewed in terms of suitability as part of the Heat Network Designation work to be undertaken in 2024/25.

Challenges exist for the financial viability of heat networks. Improved regulation, evidence, funding and policies at both a local and national level are required to maximise the incentive to invest in heat networks. The cost of heat compared to conventional fuels like gas is a key driver of this, but heat networks must also be shown as the most cost-effective decarbonisation option for buildings within Potential Heat Network Zones.

Key actions include:

- Verify and review the suitability of heat network zones, following submission of the Building Assessment Report demands data required for all public buildings.
- Proceed with requirements of The Heat Networks (Heat Network Zones and Building Assessment Reports) Regulations 2023 following the LHEES initial screening by proceeding with requirements for formal designation.
- Explore potential viability of heat sources for heat networks (biomass, waste heat from wastewater, ground source heat pumps, etc.)
- Explore the potential for development of a **Perth City Centre heat network** and long-term expansion potential to other parts of the city to create a city-wide heat network and investment opportunity.
- Explore the development of heat networks in **Blairgowrie, Kinross and Auchterarder**

Figure 7 Indicative Heat Network Zones Perth

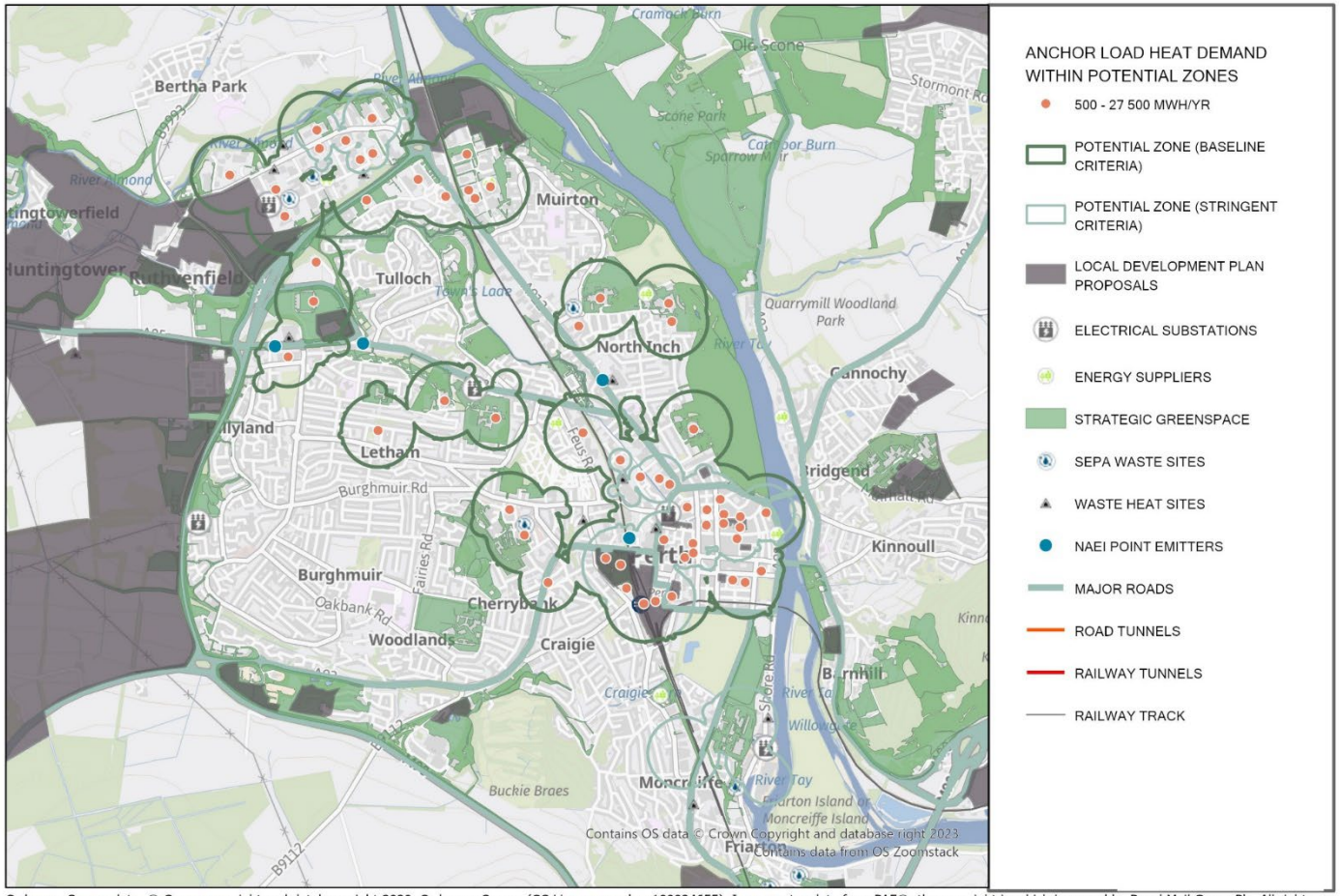


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Figure 8 Indicative Blairgowrie Heat Network Zone

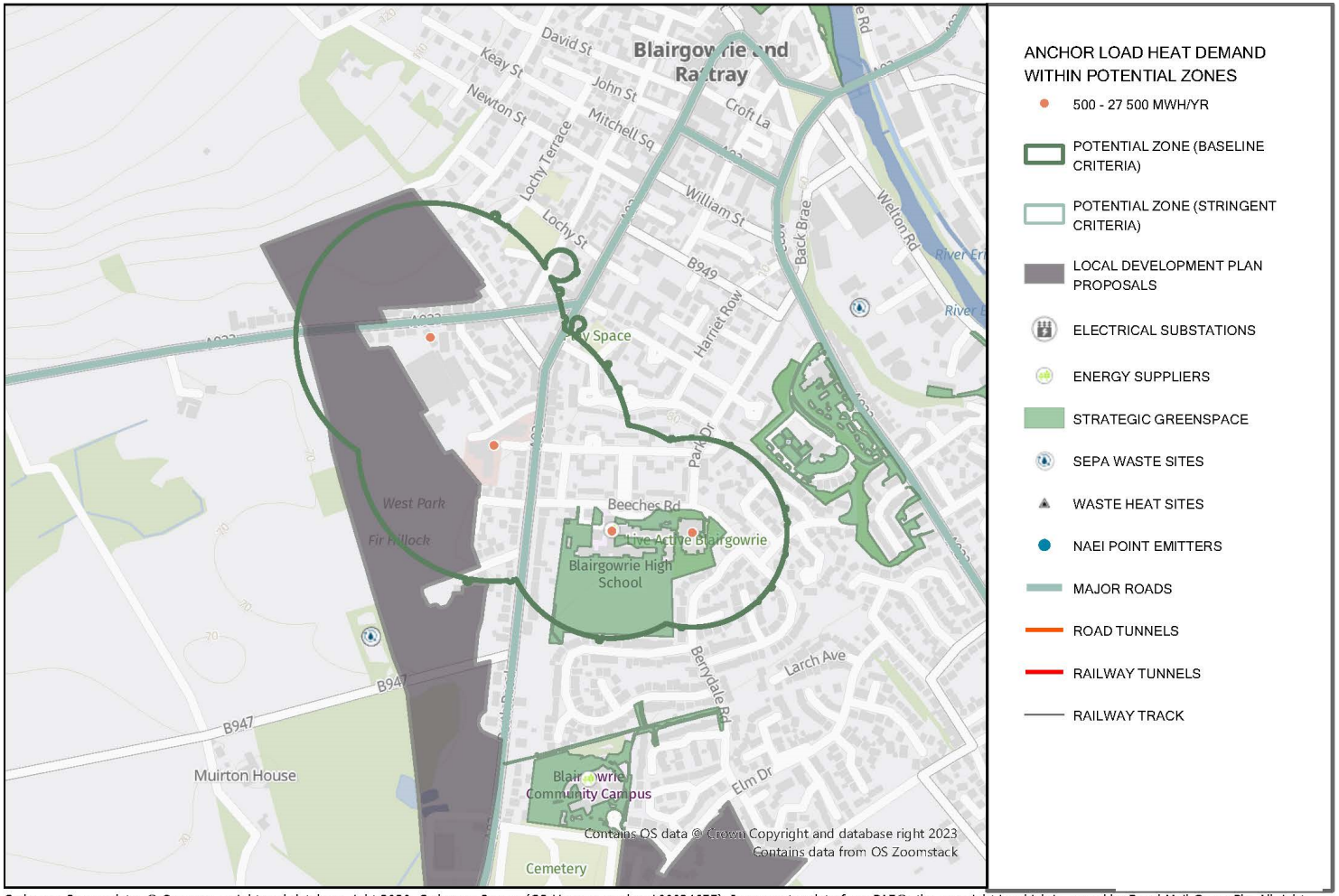

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Figure 9 Indicative Kinross Heat Network Zone

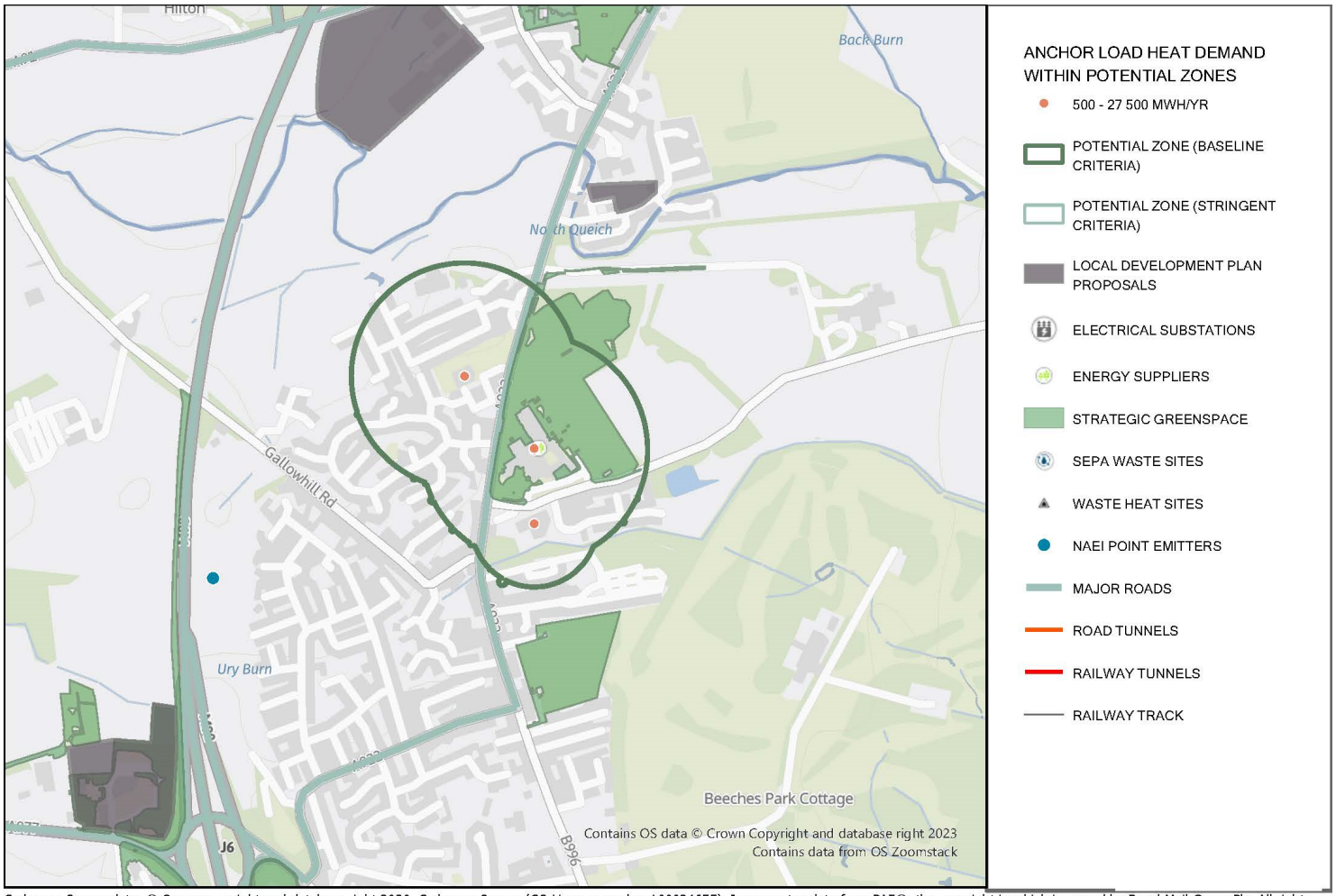
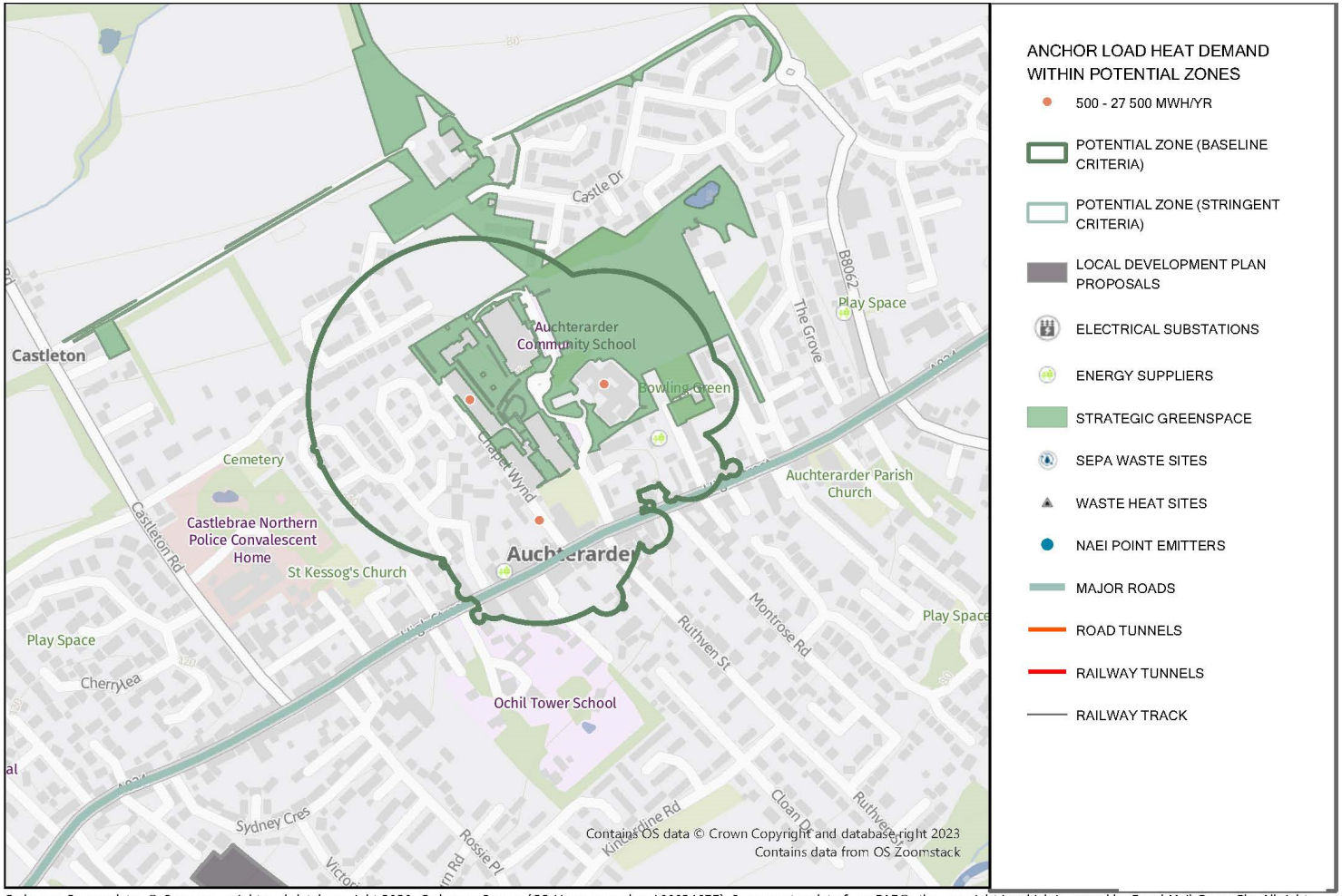


Figure 10 Indicative Auchterarder Heat Network Zone



Perth City Centre Heat Network

Perth's heat demand using the Scotland Heat Map, indicated a total heat demand of 0.5 TWh/yr. For comparison, the City of Edinburgh has a total heat demand of 5.4 TWh/yr. Much of Perth's heat demand is concentrated in smaller areas of the city, providing areas of high density of heat that present a significant opportunity for the deployment of a large-scale district heating system over time. The most significant opportunity for heat networks lies in Perth, where a feasibility study for a Perth City Centre heat network has recently been completed. It was proposed that this network could be supplied by a closed loop ground source heat pump located and supply heat to 15 core sites. Additional buildings to the south and west of the proposed route (e.g., Dewars Centre, Perth Leisure Centre and social housing) were identified as potential future connections. Other heat sources such as geothermal or the River Tay could also be explored.

The development of a commercial delivery model or strategic energy partnership for the city centre provides an opportunity to inform how this, and other low carbon opportunities, could be delivered. The establishment of an energy partnership may help to unlock heat network development in those areas of Perth and Kinross that are less commercially attractive but could benefit the most from what district heating can offer. Additionally, an energy partnership may help to unlock delivery of the wider LHEES and LAEP outcomes.

Blairgowrie, Kinross and Auchterarder Potential Heat Networks

Blairgowrie: A Baseline Zone has been identified in Blairgowrie anchored by loads at the Blairgowrie Community Hospital, Blairgowrie High School and Live Active Blairgowrie. Proctor Production Facilities and Blairgowrie Community Campus are located to the north and south of the zone respectively. The zone is adjacent to a development site identified for mixed-use development.

Kinross: A Baseline Zone has been identified in Kinross anchored by loads at the Live Active Loch Leven Leisure Centre, Kinross High School, Loch Leven Community Campus and Loch Leven Health Centre.

Auchterarder: A Baseline Zone has been identified in Auchterarder anchored by loads at the Auchterarder Community School and Parkdale Care Home (Council owned). The zone also includes Auchterarder Library and Aytoun Hall. There is a moderate proportion of social housing (33%) and fuel poverty probability (28%) in the zone.

Ground source heat pumps have been identified as the likely heat source for all three zones.

Key actions for the development of a Perth City Heat Network include:

- Continue to explore the suitability of the Perth City Centre Network through further investigation of technical and financial considerations.
- Engage with local community around appetite for connection of domestic properties to the heat network.
- Explore a strategic energy partnership to assist the delivery of heat networks and low carbon pipeline projects.
- Engage with non-Council owned commercial anchor loads to understand heat demand and appetite for expansion of the heat network including Perth Royal Infirmary
- Explore long-term potential for interconnection with Perth College UHI, Perth Grammar School, nearby residential estates and through connecting the heat network to planned redevelopment of the bus and railway station, Perth Leisure Centre and Dewars Centre
- Engage with Historic England Scotland to understand implications that conservation area status might have on heat network development in Perth City Centre. Engage with SSEN on the impact of the proposed heat network on electricity infrastructure, and potential capacity for expansion of the proposed heat network.
- Explore a strategic energy partnership to assist the delivery of heat networks and low carbon pipeline projects.

Key actions for the development of the additional heat network zones include:

- Explore opportunities for ground and water source heat pumps.
- Engage public and private building owners to improve heat demand data.
- Engage with local communities around the appetite for connection of domestic properties to heat networks.
- Assess the suitability for nearby housing stock for connection to a heat network.
- Consider potential for connecting to heat networks at early stages of site development for future housing and employment.
- Engagement with non-Council owned commercial anchor loads to understand heat demand and appetite for expansion of heat networks.
- Engage with Proctor Production Facilities to understand existing project, appetite for connection to a heat network and potential for waste heat opportunity from the site.

Consultation question 6

Are the actions proposed in delivering decarbonised heat - Heat Network Zones the right ones?

Strategic Priority 1b: "Delivering decarbonised heat within a transitioning energy system - Heat Pumps"

For the majority of Perth and Kinross properties that fall outside of potential heat network zones, heat pumps will be the recommended low carbon heating source.

What is a Heat Pump? A heat pump captures heat from outside - either from the air or ground - and moves it into your home. The heat pump uses electricity to do this, but the heat energy delivered to your home is much more than the electrical energy used to power the system. In well-insulated homes, heat pumps can be comparable in operating costs to gas and lower than oil. As they produce heat at lower temperatures than gas or oil-fired systems, their relative cost increases for poorly insulated homes.

On-gas and off-gas grid properties have been grouped into four categories depending on their heat pump suitability as shown in Table 7. It shows that over 28,500 properties in Perth and Kinross are potentially highly suitable for a heat pump. At 2023 energy prices, the potential for energy cost savings by switching to heat pumps for well insulated off-gas households is significantly more than for on-gas households.

Table 7 Heat Pump Suitability Classification

Heat Pump Suitability Category	On-gas properties in Perth and Kinross	Off-gas properties in Perth and Kinross
Category 0 - Already have a low or zero emission heating system.	1% (314)	5% (1,472)
Category 1 Considered highly suitable for a heat pump installation (i.e., well insulated property with a wet system).	49% (23,938)	18% (4,851)
Category 2 - Require moderate fabric upgrades and/ or the addition of a wet system	18% (8,836)	34% (9,522)
Category 3 - *Either requires significant fabric upgrades) or more suited to other low or zero emission heating system (i.e., biomass, direct electric or electric storage).*	*32%* *(15,559)*	*43%* *(11,904)*

Off-gas social housing energy efficiency Category 1 suitable for heat pump

By prioritizing heat pump deployment in social housing properties that are off-gas, especially those heated by inefficient, carbon intensive systems such as LPG and oil boiler there is potential for significant fuel poverty and carbon reduction.

Dunkeld, Crieff, Blairgowrie and Rattray, and **Glenfarg** emerge as priority regions for heat pump deployment in social housing properties not connected to the gas network. These

areas host a substantial number of social housing properties that are readily suitable for heat pump retrofitting and display high substation demand headroom[2]. In addition, areas around **Crieff, Blairgowrie and Rattray** and **Perth** have a higher number of social housing properties connected to the gas networks, which are also suitable for heat pump deployment.

Key actions for these zones include:

- Develop and implement a heat pump retrofit plan within the Council's social housing stock, targeting properties first with inefficient, carbon intensive systems (e.g., LPG and Oil).
- Prioritise working with private landlords that own large portfolios to decarbonise to their housing stock.
- Collaborate with housing associations to encourage heat pump installations. This could involve providing support in securing funding and grants, such as the Social Housing Net Zero Heat Fund and streamlining the installation process for registered social landlords through partnerships with heat pump suppliers and installers.
- Develop awareness campaigns to educate property owners about heat pumps, installation, and funding.
- Continue to collaborate with local energy groups and advise providers, such as the Heat Project, to promote awareness.
- Promote existing schemes and funding options.

Off-gas private homes suitable for heat pump retrofit

Crieff, Dunkeld, Blairgowrie and Rattray, Glenfarg, Powmill have significant potential for heat pump deployment in privately owned properties that are off-gas. **Crieff, Perth** and **Blairgowrie and Rattray** have higher suitability for heat pump installation amongst on-gas, privately owned properties. However, retrofitting these properties can prove to be challenging as the responsibility of installing the heat pump falls on the property owner. **Kinross and Milnathort**, and **Coupar Angus** have high concentrations of properties that are heat pump ready however have limited spare grid capacity posing a risk to deployment.

[2] Demand headroom is the gap between the rating of the electricity network to supply electrical demand and the actual demand in that part of the network.

The Council will continue to work with SSEN to align investment planning in these areas. Work being completed for the associated LAEP will undertake modelling to explore the impact of low-carbon technology roll out on the area's whole energy system in different demand scenarios.

Social housing that requires energy efficiency improvements to enable suitability for heat pumps

The areas of **Dunkeld, Crieff, Blairgowrie** and **Rattray, Perth, Bridge of Earn** and, **Glenfarg**, have been identified as having both spare network capacity and a high concentration of social housing with secondary potential for heat pumps - requiring moderate fabric upgrades and/or the addition of a wet heating system to be heat pump ready (i.e., Category 2). The same areas are suitable for retrofit for heat pumps on-gas apart from Dunkeld. Privately owned properties with secondary potential for heat pump retrofit and spare grid capacity are located in these same areas, however actioning retrofit in this sector is made more challenging as the responsibility lies with owner-occupiers and landlords.

A full summary of potential heat pump and secondary heat pump deployment areas can be viewed here and is supported by web mapping here to explore the full range of opportunities available in further detail.

Key actions for these zones include:

- Prioritise retrofit across Council properties to be further informed by the associated Council estate decarbonisation assessment currently underway.
- Conducting energy audits and assessments initially targeting properties with cavity walls more readily suitable for fabric upgrades.
- Support housing associations by providing assistance with funding applications, such as Social Housing Net Zero Heat Fund.
- Work with Home Energy Scotland to engage domestic sector; develop awareness and engagement campaigns that can target LHEES priority areas, including available funding information on installation and benefits of retrofit.
- Collaborate with community energy groups to advocate for fabric upgrades and raise awareness within the community.

Consultation question 7

Are the actions proposed in delivering decarbonised heat - Heat Pumps the right ones?

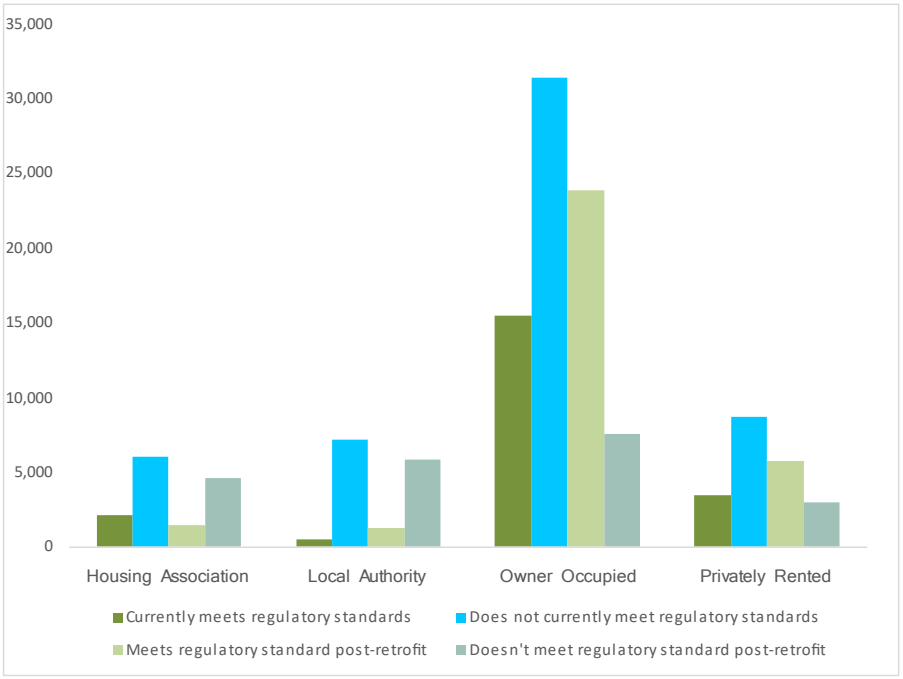
Strategic Priority 2a: "Improve buildings energy efficiency to meet regulatory standards"

Regulatory targets for Energy Efficiency are:

- By 2026 All Social Housing EPC D and EPC B by 2032
- By 2028 Private Rented Sector EPC C
- By 2033, all homes have the equivalent of EPC C.

All domestic properties in Perth and Kinross were modelled using the regulatory scenario produced by the Energy Savings Trust in their PEAT model, alongside specific tools developed for LHEES. Figure 11 outlines the current status and post-retrofit status of properties according to the PEAT model. It demonstrates that there are many hard-to-treat properties, that even after implementing the full suite of standard retrofitting measures, would still not comply with regulatory requirements.

Figure 11 Predicted regulatory compliance pre- and post-retrofitting status of domestic properties in Perth & Kinross



Areas with concentrations of social housing having poorer energy efficiency in **Crieff and Pitlochry**, could be strategically targeted for cost effective “quick wins” to meet regulatory targets for 2026 and 2033, as the total cost of interventions to meet regulatory standards is low.

Challenges for the private sector are present across the area, where many privately owned properties have high intervention costs to meet EPC C targets, which may not be perceived as an attractive investment for property owners.

Areas where substantial energy and CO2 emissions savings can be achieved at the lowest cost are limited and concentrated in **Bridge of Earn and Abernethy, North Muirton and Old Scone, Guildtown, Balbeggie** and **St Madoes, Errol and Inchture, and Coupar Angus and Meigle**

These areas represent immediate opportunities for cost-effective interventions and could also be used to plan works to take advantage of economies of scale, by strategically retrofitting nearby buildings simultaneously and in alignment with the Council decarbonisation assessment. This coordinated approach may lead to cost efficiencies and drive down the overall expenses associated with energy efficiency upgrades.

Key actions include:

- Prioritise social housing with poor energy efficiency but relatively low intervention costs for "quick wins.”
- Prioritise areas with substantial energy savings and CO2 emissions reductions potential at a lowest cost.
- Collaborate with partners and Scottish Government to incentivise improving energy efficiency in privately owned homes.

Non-domestic buildings that require retrofit to meet regulatory targets

Non-domestic buildings in areas across **Glenavon and Glendevon** have been identified as high potential for heat demand savings in non-domestic buildings with lower cost retrofit interventions. There are several hotels around these areas, which present opportunities for cost-effective retrofitting. However, retrofitting hotels will present certain challenges to owners, primarily due to restrictions imposed by the building's age and the need to preserve the architectural integrity.

Private ownership limits the Council's authority over decarbonisation plans and strategies beyond legislation. Engaging with the private sector around their existing decarbonisation plans can facilitate collaboration between the public and private sectors and align low carbon planning. Additionally, the Council can play a role in promoting awareness of funding incentives available for small and medium-sized enterprises (SMEs). For instance, through the Resource Efficient SME Loan, SMEs can access an interest-free loan of up to £100,000, specifically designed to support energy efficiency improvements.

Key actions include:

- Facilitate collaboration between the public and private sectors and align strategic energy planning potentially through Strategic Energy Partnerships
- Promote awareness of funding incentives available for small and medium-sized enterprises (SMEs)
- Continued engagement with the private sector, to identify barriers associated with building retrofit to provide tailored solutions aimed at addressing the specific challenges.
- Work with Business Energy Scotland to engage the non-domestic sector to develop awareness and engagement campaigns, and identification and engagement with non-domestic building owners.

Continued engagement with the private sector, supported by the Council, would help to identify barriers associated with building retrofit and help to provide tailored solutions aimed at addressing the specific challenges faced by non-domestic building owners.

Consultation question 8

Are the actions proposed in improving buildings to meet regulatory standards the right ones?

Strategic Priority 2b: "Improve buildings energy efficiency aiming for affordable warmth"

To assess at a strategic level where poor energy efficiency is believed to be driving fuel poverty (i.e., where there is a greater impact of poor energy efficiency on fuel poverty) an approach was followed that considers three different building fabric criteria - low loft

insulation, uninsulated walls, and single glazed windows as indicators of poor energy efficiency, alongside fuel poverty with specific weightings.
Energy efficiency, which acts as a driver of fuel poverty, is highest in areas around **Pitlochry, Aberfeldy, Crieff, Dunkeld, Perth and Blairgowrie & Rattray** emphasising the need for intervention to address fuel poverty in these regions.

When comparing areas with high energy efficiency driven fuel poverty with properties requiring lower cost retrofit options, the areas of **Pitlochry, Comrie, Gilmerton and St Fillans, Blair Atholl, Strathardle and Glenshee, and areas of Perth** showed the greatest opportunity.

Targeting these areas though tailored awareness campaigns about available funding to support fuel-poor households, such as the Energy Company Obligation (ECO4), which provides grants for energy efficiency upgrades funded by the applicant's energy supplier, is critical. By disseminating information about these financial support options, the Council can encourage greater participation in retrofitting initiatives. Furthermore, recognising the unique needs of vulnerable individuals, the Council should continue to provide support services and guidance to households that require assistance with the application process through organisations such as the HEAT Project and Scarf. This approach ensures that those who may face challenges in navigating the application process receive the necessary help to access available funding.

Social housing properties in **Crieff, Pitlochry and Blairgowrie and Rattray** are likely to experience a greater reduction in fuel poor households due to the implementation of low-cost retrofit interventions. Local authority owned properties in these areas offer "quick win" opportunities for the Council, as they provide substantial impact in terms of reducing fuel poverty, while requiring relatively lower financial investment compared to other locations.

Retrofitting social housing properties presents several challenges, primarily due to the occupancy of fuel-poor, vulnerable tenants. Access to the property can be limited as tenants might face difficulties in vacating their homes, and tenants may be resistant to changes to their home. To address these complexities, a person-centred retrofit approach should be implemented during the early planning stages.

Collaborating with local financial institutions, building societies, and mortgage providers can open possibilities for funding solutions aimed at making retrofitting more accessible to homeowners. One promising solution to consider is Property Linked Finance, which has the potential to cover up to 100% of intervention costs. The uniqueness of this financing option lies in its linkage to the property rather than the individual owner, which can offer a more inclusive financing opportunity for homeowners interested in retrofitting their homes.

Key actions for these zones include:

- Prioritise social housing likely to experience a greater reduction in fuel poor households due to the implementation of low-cost retrofit measures.
- Promote retrofitting in targeted areas though awareness campaigns about available funding to support fuel-poor households.

Consultation question 9

Are the actions proposed in improving buildings aiming for affordable warmth right ones?

7. DELIVERY PLAN

Delivery Plan Priorities

Accompanying the Strategy will be a Delivery Plan, which will be developed in partnership with key stakeholders, and provide a strong basis for action for local communities, government, investors, developers and wider stakeholders, pinpointing areas for targeted intervention and early, low-regrets measures in the near to medium term.

The LHEES Guidance outlines that the LHEES scope should be framed around the 'LHEES Considerations', outlined earlier in this document. LHEES priorities are also shaped by the local context and as such the delivery of the LHEES will be supported through targeting areas and related actions linked to our local strategic priorities, supported by key delivery mechanisms and embedded in a whole energy system approach.

For each LHEES consideration, strategic priorities and areas have been identified to target both national and local objectives longer term. At a more granular level, delivery priorities and areas, have been identified to define potential decarbonisation pathways and pinpoint areas for near term, low-regret actions to support LHEES delivery. Delivery areas are at a higher granularity than strategic areas (i.e., data zones) and set out clusters of buildings, such as postcodes, where potential solution(s) can be targeted to meet our strategic vision and priorities.

The LHEES Delivery Plan will focus on these areas to take forward actions in the near term that are within the remit of the Scottish Government, local authorities and wider partners to deliver. Proposed Delivery Plan priorities for the Perth and Kinross' first LHEES are centred around the Council and our partners local strategic priorities identified through a series of workshops and engagement sessions as illustrated in Table 8 .

Table 8 LHEES Strategic and Delivery Plan Priorities

NATIONAL LHEES CONSIDERATIONS	PERTH AND KINROSS STRATEGIC PRIORITIES	PROPOSED PERTH AND KINROSS DELIVERY PRIORITIES
Heat networks	1. Delivering decarbonised heat within a transitioning energy system	1. Potential heat network zones
Off-gas heat decarbonisation	1. Delivering decarbonised heat within a transitioning energy system	2. Off-gas social housing suitable for heat pump retrofit 3. Off-gas private homes suitable for heat pump retrofit
Off-gas and on-gas heat decarbonisation	1. Delivering decarbonised heat within a transitioning energy system	4. Social housing that requires energy efficiency improvements to enable suitability for heat pump
Energy efficiency and energy efficiency as a driver of fuel poverty	2. Improve buildings energy efficiency to meet regulatory standards	5. Social housing that does not meet regulations (e.g., below EPC B) identified for energy efficiency retrofit 6. Owner occupied properties that do not meet targets (e.g., below EPC C) 7. Owner-occupied properties that do not meet targets (e.g., below EPC C) AND potential suitability for HEEPS:ABS funding 8. Owner-occupied properties below EPC Band E

Delivery Plan priorities are the starting point for identifying projects and actions to include in the Delivery Plan. Each Delivery Plan priority may result in several delivery areas (e.g., clusters of buildings at neighbourhood or postcode level) for targeted interventions. Potential actions range from prioritising retrofit of our Council assets, wider social housing joint working to support heat pump roll out, and engagement and awareness raising with communities and the private sector as detailed below.

Delivery Plan Area Criteria

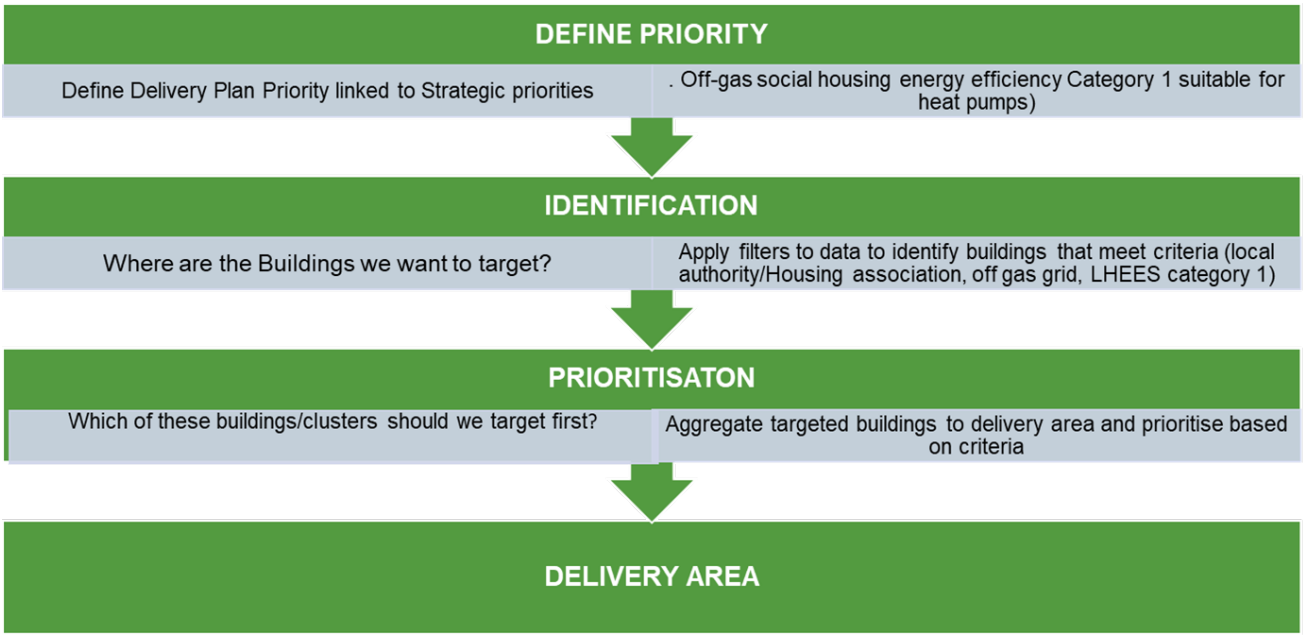
Our delivery priorities are shaped by our strategic priorities and associated stakeholder priorities. The LHEES evidence base, including consideration of grid capacity, has been analysed to target properties which match these priorities.

The key criteria used to develop delivery plan areas are as follows:

- Meeting regulatory targets - change in EPC, Energy savings (kWh), CO2 reduction (tCO2e)
- Fuel Poverty - fuel poverty change (%), Energy bill change
- Deliverable, technically feasible and evidence based - grid capacity, cost of intervention, type of wall insulation, etc.
- Potential funding availability (e.g., HEEPS-ABS eligible properties)
- Interventions that are already beneficial and no/low-regret (off-gas heat pumps, heat networks)
- Ability to influence.

The diagram in Figure 12 sets out an example of how the criteria will be used to identify Delivery Plan areas.

Figure 12 Example of how delivery plan area criteria will be applied to identify delivery plan focus areas



Consultation question 10

Are the Delivery Plan priorities for each of the strategic priorities the right ones?

Consultation question 11

Are the Delivery Plan area criteria proposed for each delivery priority the right ones?

LHEES/LAEP Live Delivery Plan

The Scottish Government recognises that LHEES will evolve with the introduction of future standards and regulation, as well as the introduction of new delivery and funding programmes. This first LHEES will be largely focussed on delivery within the scope of the current and near future funding, regulatory and policy landscape. For example, supporting the delivery of existing funding (e.g., HEEPS ABS, ECO4); while providing a pathway to meeting medium to long-term targets and objectives.

The LHEES Delivery Plan is intended to provide a high-level evidence base and a live tool for Perth & Kinross Council and partners to identify interventions across a range of technical solutions and funding streams.

Live Delivery Plans will be further informed and be informed by our Local Area Energy Plan (LAEP) providing a single, integrated process to consider the whole energy system alongside heat decarbonisation. The LAEP will develop a model to test a range of build-out rates from 2023 to deliver the future system through various target years (e.g., 2030, 2033 or 2045, or any year in-between).

The LAEP deployment model will incorporate outputs of the policies and strategies review, building level demand pathways, heat network zoning and include an assessment of the alignment with key relevant targets and milestones across heat, transport and supply and transmission. Multiple scenarios for the future energy system demand, generation, distribution and storage, will help us mitigate risk by testing the potential limits of the uncertain aspects of the energy system. The Council area will be split into zones based on primary substation locations. Data on both demand and supply for different parts of the energy system will be aggregated for each zone and modelling will optimise the energy mix for each of these zones.

Key supporting delivery mechanisms

To deliver the LHEES priorities, key supporting mechanisms and programmes have been identified as follows:

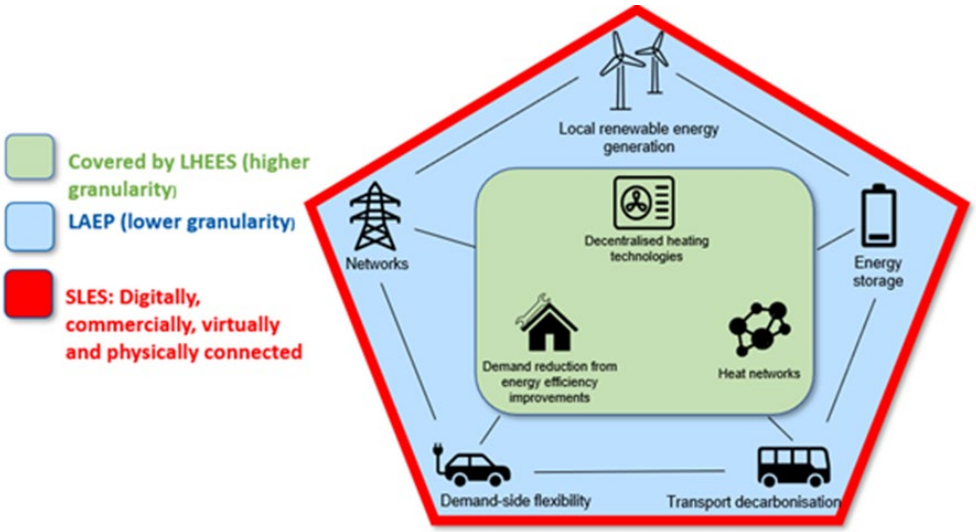
Taking a Whole Energy Systems Approach

Through the development of the LAEP and a collection of complementary initiatives, the Council is taking a whole systems energy approach to the development and implementation of the LHEES from generation through to demand.

Key on-going areas of work to support this approach include:

- *Project RESOP (Regional Energy System Optimisation Planning)* - RESOP is a public/private collaboration led by SSEN that takes a 'whole system' approach, by drawing together data on building suitability for heat decarbonisation (heat pumps and heat networks), building fabric retrofit and wider energy system demand (e.g. Electric Vehicles) and generation considerations into a single tool (LAEP+) that can be used to plan retrofit and roll out of low carbon technologies and will facilitate collaboration between network operators, local authorities and other energy transition stakeholders to achieve our strategic priorities and outcomes.
- *Council Estate Decarbonisation Planning* - The Council is currently undertaking work to design and deliver a major programme of retrofitting both for its domestic and non-domestic building stock, focusing on how decarbonising projects should be prioritised. The work will consider detailed programming, risk analysis, supply chain capacity and the Council's operating model, to identify how the Council could progress and where critical gaps exist (such as in the local retrofit supply chain) that the Council can start to influence in preparation for major retrofit projects.
- *Smart Local Energy Systems (SLES)* - The Council has developed a toolkit that will allow us to filter projects and develop business cases to triage delivery actions and areas into a pipeline of investable energy projects based on a range of priorities. This will lead to the development of an investment programme enabling Smart Local Energy Systems.

Figure 13 Whole energy systems approach



Consultation question 12

Do you agree with the Whole Energy Systems Approach taken to develop the LHEES?

Developing green skills and the capacity of the supply chain

Perth & Kinross Council, with stakeholders, has identified the need to assess skills provision and support providers as well as the local supply chain to meet the demand arising from heat transition and energy efficiency works, operations and maintenance.

Consultation question 13

Do you think Perth & Kinross Council should assess and support local skills supply and demand and local supply chain?

Working in partnership with communities to build community wealth and wellbeing

Perth & Kinross Council is committed to work in partnership with communities through the Perth and Kinross Offer and for communities to develop solutions locally shared and owned. Communities could take advantage of heat transition and energy efficiency opportunities and build community wealth and wellbeing. This could cover energy production, storage or distribution as well as purchasing goods or services. Perth & Kinross Council with

stakeholders has identified the need to evaluate mechanisms to support communities in achieving such aim.

Consultation question 14

Do you think Perth & Kinross Council should evaluate mechanisms to support communities to take advantage of heat transition and energy efficiency opportunities?

Mobilising partners and public and private investments for projects

Perth & Kinross Council, with stakeholders, has identified the need to evaluate a possible Strategic Energy Partnership to unlock delivery of, though potentially not limited to, heat networks. An energy partnership would be a legally defined, collaborative arrangement between Perth & Kinross Council and an external organisation to bring capital investment and delivery capability into large energy-related projects. The projects taken forward by the energy partnership could deliver on local priorities relating to carbon reduction, fuel poverty, and energy resilience. The Council is also considering the scope of any partnership proposed and will assess the potential for an energy partnership to be the leading body in the delivery of the wider net zero agenda for Perth and Kinross rather than focused solely on heat networks. This could mean mobilising other public/social partner organisations to aggregate demand and programmes. Development of this is a key action in the LHEES Delivery Plan and all options relating to governance structures, control versus risk arrangements and co-investment would be explored.

Consultation question 15

Do you think Perth & Kinross Council should explore a possible Strategic Energy Partnership to mobilise partners and public and private investments?