



Perth and Kinross Local Heat & Energy Efficiency Strategy

2024-2045

DRAFT

Perth & Kinross Council

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1. FOREWORD

I am delighted to introduce Perth and Kinross Council's first Local Heat & Energy Efficiency Strategy (LHEES) which sets our ambitions until 2045. This Strategy and accompanying 5-year Delivery Plan (2024-2029) detail our approach to improve Perth and Kinross buildings' energy efficiency and to decarbonise heat in a fair and just way within a changing energy system.

Energy Efficiency and heat decarbonisation are core elements of the energy transition to Net Zero by 2045 tackling climate and biodiversity emergencies. To achieve this means all building owners in Perth and Kinross will need to do their part to cut their emissions. This strategy details how we as a Council area will approach this challenge.

Our ambitions for Perth and Kinross are reflected across two strategic priorities and multiple actions. These focus on identifying, prioritising, and delivering measures to improve buildings' energy efficiency, and where this is not possible to make a commitment to complete further research.

For a successful transition, our LHEES also emphasises the need for a just transition to Net Zero. This includes actions focussing on tackling fuel poverty by aiming to improve energy efficiency to reduce fuel bills; developing a resilient, stronger, and greener economy with green skills and jobs; working in partnership with communities to build community wealth and wellbeing from heat transition and mobilising partners and private and public investment to drive the heat transition to low and zero emissions heating.

We also want to create from the LHEES process the foundations for a more decentralised and self-sufficient energy system for our area. We have seen the consequences of not being self-reliant on energy as a result of global events and the spike in gas prices that has had an impact on everyone's energy bills. There is a commitment from UK, Scottish and local governments to increase our energy security so that this can't happen again.

This Strategy was informed by developing a rigorous evidence-base and through engagement with partners across Perth and Kinross and beyond. Ongoing collaboration, including sharing of knowledge, data, and innovations has been key to the development of Perth and Kinross's LHEES and will be key to its successful delivery.



With over half of Scottish energy demand in 2020 being for heating purposes, everyone in Perth and Kinross will either help support and deliver LHEES through improving their homes and businesses; or experience the benefits of these measures by having more energy efficient homes and workplaces with low or zero emissions heating.

I would like to thank everybody for their participation in developing the Strategy and its future delivery.

Cllr Richard Watters

Convener of Climate Change and Sustainability Committee



2. EXECUTIVE SUMMARY

Perth and Kinross Council has a statutory duty to prepare a Local Heat and Energy Efficiency Strategy and update it on a 5-year basis as part of the Local Heat and Energy Efficiency Strategies (Scotland) Order 2022 which came into force on 21 May 2022. As established in the Order, LHEES should have a two-part structure of a Strategy and Delivery Plan.

A Local Heat and Energy Efficiency Strategy is a long-term strategic framework for the improvement of the energy efficiency of buildings in the local authority's area, and the reduction of greenhouse gas emissions resulting from the heating of such buildings. A delivery plan is a document setting out how a local authority proposes to support implementation of its local heat and energy efficiency strategy.

The first Perth and Kinross Local Heat and Energy Efficiency Strategy (LHEES) (2024-2045) and accompanying 5-year Delivery Plan (2024-2029) is firmly aligned to the priorities and vision of the Council and its partners for a Perth and Kinross where everyone can live life well, free from poverty and inequality.

The LHEES 2024-2045 reflects the views of our communities, elected members, stakeholders, and partner organisations. These views have helped influence the development of the LHEES priorities and outcomes which are most important for Perth and Kinross. They will enable Perth and Kinross Council and partners to deliver more energy efficient homes and buildings, affordable warmth and heat decarbonised sources.

The LHEES vision for Perth and Kinross is that “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”. This will lead to the outcomes of significant reduction in carbon emissions, affordable and sustainable heating and health and well-being benefits.

The LHEES targets are aligned with the Scottish Targets and will be used to measure progress in the Delivery Plan (2024-2029) and subsequent plans. However, it is recognised that these targets would be very challenging if no significant public and private investments are made available or come forward as well as if behaviours are not changing. This would be particularly the case for private households and small and medium businesses.



To support the LHEES vision and outcomes, the Strategy focus on two Strategic Priorities:

- Decarbonising heat within a transitioning energy system focusing on heat networks and heat pumps.
- Improving buildings' energy efficiency aiming for affordable warmth and regulatory compliance.

These are broken down into the following delivery priorities:

- Delivering decarbonised heat within a transitioning energy system through Heat Network Zones which would include Perth City Centre, Perth Inveralmond Industrial Estate, Perth College/UHI, Perth Academy, Auchterarder, Kinross and Blairgowrie.
- Delivering decarbonised heat within a transitioning energy system - Heat Pumps focusing on off-gas social housing energy efficiency Category 1 highly suitable for a heat pump installation (i.e. well insulated property with a wet system), off-gas private homes suitable for heat pump retrofit and social housing that requires energy efficiency improvements to enable suitability for heat pumps.
- Improving buildings' energy efficiency to meet regulatory standards in
 - areas with concentrations of social housing having poorer energy efficiency (below EPC B) and low costs of intervention,
 - areas where substantial energy and CO₂ emissions savings can be achieved for privately owned homes (below EPC C) if cost effectiveness could be achieved when combined with the areas above and
 - areas with high potential for heat demand savings in non-domestic buildings with lower cost retrofit interventions.
- Improving buildings' energy efficiency aiming for affordable warmth in areas where poor energy efficiency is the highest and acts as a driver of fuel poverty, particularly if low cost retrofit options are possible and areas where social housing is likely to experience a greater reduction in fuel poverty due to low cost retrofit measures.



The delivery of the LHEES priorities will also be supported by the following mechanisms:

- Taking a Whole Energy Systems Approach: Through the development of the Local Area Energy Planning (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. This would include data and scenarios building tools and platforms, Council's Estate decarbonisation programme and business case development toolkit to develop an investment programme enabling Smart Local Energy Systems.
- Developing green skills and the capacity of the supply chain.
- Working in partnership with communities to build community wealth and wellbeing.
- Mobilising partners and public and private investments for projects including through a possible Strategic Energy Partnership to unlock delivery of, though potentially not limited to, heat networks.



3. INTRODUCTION

Perth and Kinross Council has declared Climate Change and Biodiversity emergencies. A Climate Change Strategy and Action Plan have been approved and all partners are mobilised to implement agreed actions. Heat decarbonisation and improving energy efficiency are at the centre of our efforts to achieve net zero by 2045.

As established in the Local Heat and Energy Efficiency Strategies (Scotland) Order 2022, Perth and Kinross Council has a duty to prepare a Perth and Kinross Local Heat and Energy Efficiency Strategy (LHEES).

Perth and Kinross LHEES is at the heart of a place based, locally-led and tailored approach to the heat transition. Our ambition is to use it to develop a whole energy planning approach going beyond heat and energy efficiency to include transport decarbonisation, local renewable energy generation, energy storage, demand-side flexibility and networks.

This document presents the first Perth and Kinross Local Heat and Energy Efficiency Strategy (LHEES) (2024-2045) and accompanying 5-year Delivery Plan (2024-2029). Firstly, it presents what a LHEES and provides policy and strategy context and baseline for Perth and Kinross domestic and non-domestic buildings. Then, it details our vision, outcomes and targets and presents our local challenges and opportunities and our engagement and consultation process. Finally, it details our strategic priorities, deliver plan and governance and monitoring arrangements.



4. WHAT IS A LHEES?

A LHEES focuses on transforming and reducing the demand for heat and energy.

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. Scottish Local Authorities have a statutory duty to prepare LHEES and update them on a 5-year basis.

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.

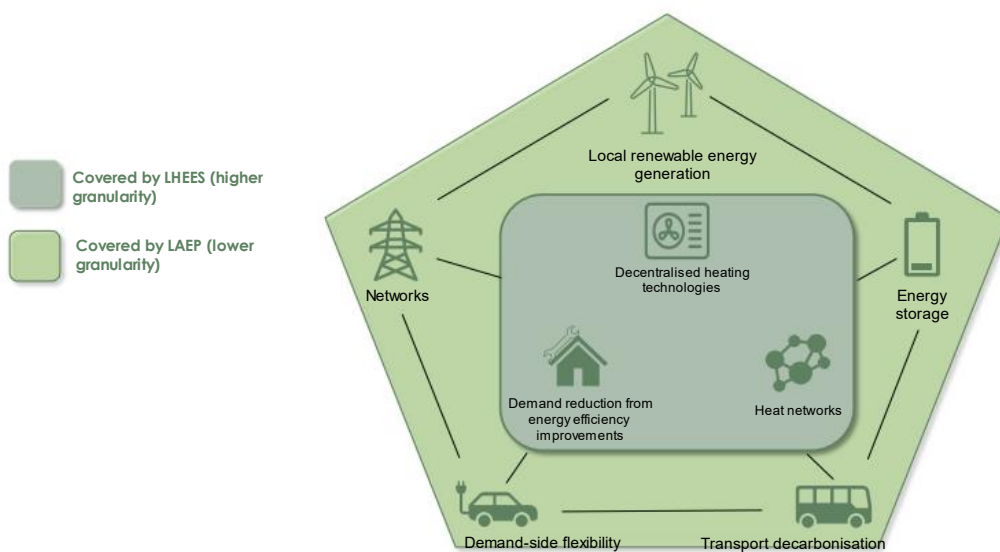
National guidance frames the Strategy around six considerations which have shaped our development of strategic and delivery priorities, as shown in Table 1.

Table 1 National LHEES considerations

	LHEES Considerations
Heat decarbonisation	Off-gas grid buildings
	On-gas grid buildings
	Heat networks
Energy efficiency and other outcomes	Poor building energy efficiency
	Poor building energy efficiency as a driver for fuel poverty
	Mixed-tenure, mixed-use and historic buildings

Recognising the need for compatibility with the wider energy system, Perth and Kinross Council 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 its 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.



5. POLICY AND STRATEGY CONTEXT

5.1 National and UK Context

This section summarises the national and UK level strategies and legislations that set out the key drivers behind LHEES.

Climate Change Plan Update (2018-2032)

This update to Scotland's 2018-2032 Climate Change Plan sets out the Scottish Government's pathway to the new and ambitious targets set by the Climate Change Act 2019. The main target is that by 2045, Scotland will be net-zero. Furthermore, by 2032:

- 35% of heat for domestic buildings will be supplied using low carbon technologies, where technically feasible, and all buildings (residential and non-domestic) will be insulated to the maximum appropriate level.
- 70% of heat and cooling for non-domestic buildings will be supplied using low carbon heat technologies.
- Improvements to the building fabric of Scotland's buildings will result in a 15% reduction in residential and 20% in non-residential heat demand.

Key outcomes relevant to the LHEES are shown in the table below:

Action Number/ Reference	Action
Buildings - Outcome 1	The heat supply to our homes and non-domestic buildings is very substantially decarbonised, with high penetration rates of renewable and zero emissions heating
Buildings- Outcome 2	Our homes and buildings are highly energy efficient, with all buildings upgraded where it is appropriate to do so, and new buildings achieving ultra-high levels of fabric efficiency



Buildings - Outcome 3	Our gas network supplies an increasing proportion of green gas (hydrogen and biomethane) and is made ready for a fully decarbonised gas future
Buildings - Outcome 4	The heat transition is fair, leaving no-one behind and stimulates employment opportunities as part of the green recovery.

Heat in Buildings Strategy (2021)

The Heat in Buildings (HiB) Strategy sets out the Scottish Government's vision for the future of heat in buildings, and the actions they are taking in the buildings sector to deliver climate change commitments, maximise economic opportunities, and ensure a just transition, including helping address fuel poverty.

The key targets are as follows:

- Majority of buildings should achieve a good level of energy efficiency by 2030 and all homes should meet an EPC band C standard by 2033.
- All social housing to meet EPC B, or be as energy efficient as practically possible, by the end of 2032; all private rented sector properties to reach a minimum standard of EPC C by 2028 where technically feasible and cost effective.
- A 68% reduction in emissions from heat in buildings by 2030 (relative to 2020 levels).

The HiB Strategy sets out the aspirations for LHEES, in particular to:

- Support local community and wider national infrastructure issues
 - Act as an investment prospectus at national and local level, guiding delivery programmes, and signalling potential areas of investment to market actors.



- Support planning for the energy networks and over time will become an important evidence base for both the electricity Distribution Network Operators (DNOs) and Gas Distribution Network (GDN).
- Local public engagement, awareness raising and involvement in decision making
- Supporting area based regulation

The HiB Strategy sets out the ambition for regulation in Scotland for heat decarbonisation and energy efficiency performance.

Heat Networks (Scotland) Act 2021 and Heat Networks Delivery Plan

The Act aims to accelerate the deployment of heat networks in Scotland through the introduction of a regulatory system aimed at boosting consumer confidence in the sector and providing greater certainty for investors. This Act supports the growth of heat networks through a number of initiatives including ensuring that heat networks are developed in appropriate areas to maximise investor benefits and drive prices down for users and ensuring local communities are aware of developments which can support future users for heat networks. Targets include 2.6 TWh of heat to be supplied by heat networks by 2027 and 6 TWh by 2030.

The Act focuses on regulating the construction and operation of a heat network; making provisions about the powers of persons holding a heat networks licence; making provisions about conferring rights in heat network assets where a licence holder ceases operations; and for connecting purposes. The Heat Networks Delivery Plan sets out how the provision in the Act will be used to accelerate the deployment of heat networks in line with national targets.

Section 47 of the Heat Networks (Scotland) Act places a duty on local authorities to carry out a review to consider whether one or more areas in its area is likely to be particularly suitable for the construction and operation of a heat network. The LHEES Methodology sets out an approach to support local authorities to discharge this duty. This Methodology has been followed when preparing the Council's LHEES. In carrying out a review under Section 47(1), a local authority must have regard to the matters mentioned in Section 48(1). Heat Network Zones (designated by Local Authorities as per regulatory requirement) will be put out to a competitive tender process whereby operators who have



first gained a licence and project-specific consent will bid for a zone permit (likely granting exclusivity to operate over a long-term period though this is yet to be clarified). The secondary legislation is currently in development and will clarify the scope of the Act and how operators and public sector bodies will interact with it. A summary of the key provisions in the Act is included below:

Heat Network Act theme	Description
<p>Heat Networks Licence</p>	<p>Prospective heat network operators will have to first obtain this licence with the intention of ensuring that market participants are solvent, competent, fit and proper and can provide their essential service in line with conditions set by a Licensing Authority, with ongoing monitoring and enforcement where necessary. This, in turn, will provide assurances to both consumers and investors in deciding whether to become involved in the sector</p>
<p>Heat Network Consents</p>	<p>The requirement to attain project-specific consent will ensure that projects are vetted to assess how they will contribute to targets on emissions reduction or fuel poverty. Heat network operators will have to obtain this consent if they are to progress with any prospective heat network project in Scotland. The consenting authority would most likely be Scottish Ministers due to the risk of self-regulation if local authorities were to take on this responsibility.</p>



Heat Network Permits	<p>Heat networks are in-effect mini grids, isolated from the wider gas grid. This means that operators do not have the same floating customer base in which to recover their costs from that gas and electricity operators benefit from.</p> <p>Granting operators long-term permits seeks to mitigate against this by providing a natural monopoly following a competitive tender process. The guarantee that operators will have exclusivity within a designated Heat Network Zone will provide certainty of a steady return on investment. Giving operators confidence that they will be able to recover their costs over a long period of time increases the commercial viability of a heat network. This confidence will allow investors to target more ambitious projects. It is not yet clear what the permitting element of the Heat Networks Act will mean for operators and the Council will continue to engage with the Scottish Government on the development of secondary legislation for the Act.</p>
Heat Network Zones	<p>To fully maximise the benefits of a heat network, strategic planning is required to identify zones that have the most potential. This zone-specific approach allows buildings with significant heat demands (anchor loads) to be identified,</p>



	<p>along with possibilities to utilise renewable sources for the supply. The requirement to identify and legally designate heat networks zones by local authorities will provide an informed evidence base which will enable long-term planning around where a heat network is commercially attractive and how they can advance key strategic goals around decarbonisation and fuel poverty. This provision of the Act has now come into force and more information can be accessed here</p>
<p>Building Assessment Reports (BARs)</p>	<p>This puts a duty on the public sector to assess their estate for suitable heat network connection. This will provide clarity on heat demand alongside connection suitability from an architecture perspective. Whilst this only applies to the public sector at present, this may extend to all non-domestic buildings in the future. His provision of the Act has now come into force.</p>
<p>Powers of Licence Holders</p>	<p>This aspect of the Act will equip heat network licence holders with statutory undertaking powers. Operators will have similar wayleave and access rights granted to other utility providers. Such rights can be in relation to compulsory acquisition of land, wayleaves, survey works, and access to carry out work.</p>



	<p>This aims to reduce capital costs connected to construction and the associated delays often suffered. The Scottish Government are currently considering whether to extend this right to the road network, something that conventional utilities have rights over. Network wayleave rights will also be granted to operators. This will enable operators to request from the Scottish Ministers the right to install pipework and other apparatus up to any building. The building owners will be under no obligation to connect, but the ability to connect in the first place will provide operators with a higher degree of confidence in future asset connection.</p>
<p>Heat Networks Assets Schedule and Transfer Regime</p>	<p>This element of the Act requires heat networks to have a scheme in place to transfer operational rights to a third party to ensure sustained supply, if and when needed.</p>

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

The Act sets out a new target relating to the eradication of fuel poverty, as well as providing a revised definition of fuel poverty. By 2040: no more than 5% of households in Scotland are in fuel poverty; no more than 1% of households in Scotland are in extreme fuel poverty.

LHEES should be primarily driven by Scotland’s statutory targets for greenhouse gas emissions reduction and fuel poverty. The LHEES Strategy and Delivery Plan should



therefore seek to implement actions and delivery that support fuel poverty alleviation. It should be noted though, that the LHEES Consideration only covers fuel poverty driven by poor energy efficiency.

Scottish Energy Strategy & Just Transition Plan (Scottish Government)

Published in January 2023 this sets out how Scotland will meet the challenge of reducing demand within main energy-using sectors such as heat in buildings, transport, industry and agriculture whilst using energy more efficiently, and becoming largely decarbonised by 2030. The Strategy identifies the requirement of significant investment to fund the transition and suggests a financing policy model that will seek to leverage private sector investment to support public investment. The Plan is currently under consultation.

Housing to 2040 (Scottish Government)

Housing to 2040 sets out a vision for housing in Scotland to 2040 and a route map to get there. It aims to deliver an ambition for everyone to have a safe, good quality and affordable home that meets their needs in the place they want to be. This will inevitably include affordable low carbon heating systems.

National Planning Framework (NPF4) (Scottish Government)

Published in February 2023, The National Planning Framework 4 (NPF4) sets the context for development planning in Scotland and provides a framework for the spatial development of Scotland as a whole. It is a statutory document and all planning applications must consider the policy implications of NPF4. NPF4 requires that Local Development Plans take into account the area's LHEES and that the spatial strategy should take into account areas of heat network potential and any designated Heat Network Zones. Policy 19 sets out the development management considerations which will facilitate and enable new developments to incorporate and promote LHEES.

NPF4 will be a key influence on the revised Local Development Plan (LDP) for Perth & Kinross and will stipulate how planning policy can be used at local level towards the achievement of strategic goals. LHEES and the LDP should incentivise developers to switch to communal heating systems or connect to a larger district heating scheme, particularly in designated Heat Network Zones. NPF4 will also place greater emphasis on the environment and sustainability against aspects relating to heritage protection.



New Build Heat Standard (forthcoming)

From 1 April 2024, new buildings in Scotland applying for a building warrant will be required to use zero direct emissions heating systems (ZDEH) to meet their space and hot water heating and cooling demands. This will include systems such as heat pumps and heat networks. The Council will need to incorporate these requirements into the next Local Development Plan to incentivise heat network connection where practical and feasible.

Hydrogen Policy Statement (2020) (Scottish Government)

This sets out the vision for Scotland to become a leading hydrogen nation in the production of reliable, competitive, sustainable hydrogen. Whilst hydrogen is not likely to be widely used as a fuel source for district heating, it is being introduced in a pilot scheme to 300 premises in Fife as part of a H100 trial project to promote renewable energy generated hydrogen for heating and cooking.

Tenements (Scotland) Act 2004

A Tenement Management Scheme, is outlined in Schedule 1 of the Tenements (Scotland) Act 2004, lists the 'scheme property' (explaining what parts for the tenement every flat owner should maintain) and explains how to come to arrangements about maintenance ('scheme decisions') and how costs are shared between owners. The Climate Change (Scotland) Act 2009 amends the Tenement Management Scheme to log insulation installation as a maintenance measure rather than an 'improvement' so changes can be approved via a majority rather than unanimously. Tenements (and Multi-Dwelling Units - MDUs) are a challenge for the LHEES as cooperation is required from a number of owners for any works to the buildings fabric and communal areas.

Historic Environment Policy for Scotland (HEPS) (May 2019)

The Historic Environment Policy for Scotland (HEPS) is non-statutory, but relevant to a wide range of decision-making at national and local levels. It is supported by detailed policy and guidance. HEPS outlines six policies on managing change to the historic environment most notably HEP5 - Decisions affecting the historic environment should contribute to the sustainable development of communities and places.



The Planning (Listed Building Consent and Conservation Area Consent Procedure) (Scotland) Regulations 2015

Listed building consent is the mechanism by which planning authorities ensure that any changes to listed buildings are appropriate and sympathetic to their character. Conservation area consent controls the demolition of unlisted buildings in conservation areas. Both are important considerations when it comes to installing heat pumps or other technology and energy efficiency measures (such as external insulation) to the fabric of buildings.

Review of Electricity Market Arrangements (REMA)

The UK Government in 2022 launched a major review into Britain's electricity market design to identify opportunities for consumers to benefit from cheaper energy and enhanced energy security in the longer term. Proposals under the scope of REMA include the exploration of fundamental changes to the electricity market to remove volatile gas prices from setting the wholesale cost of electricity, allowing consumers to benefit from lower cost renewable energy. The outcomes of REMA are critically important to the successful delivery of the LHEES where it relates to heat pumps and district heating where the supply relies on electricity. To remove the influence of gas on electricity prices will reinforce the business case for the electrification of heat in Perth & Kinross.

5.2 Perth and Kinross Context

At a local level a suite of policy documents have been identified through the Policy review with linkages to the drivers and priorities for developing and implementing LHEES, as set by the Scottish Government. Key local policies and strategies include:

- **Climate Change Strategy and Action Plan** - Produced in 2021, this sets out the Council's next steps in relation to climate change, outlining the initial route map to support them to a net zero carbon and climate resilient Perth and Kinross, and identifies energy and buildings as a key requirement for change. The strategy commits to developing heat networks, where possible, helping to confirm LHEES as fundamental in reaching statutory targets.
- **Local Housing Strategy 2022-2027** - Priorities include a goal to deliver quality homes with affordable warmth, zero emissions and SMART technology. Intended outcomes that will drive these include supporting the



implementation of the Council's LHEES; expanding the capacity of energy and fuel poverty advice services; and improving the availability of information on fuel poverty and energy efficiency measures available to front line staff and service providers to households most in need.

- **Local Development Plan 2** - There are four main categories in the LDP: to create a successful, sustainable place; a low-carbon place; a natural, resilient place; and a connected place. Priorities include strategic district heating opportunity areas in Perth, Crieff and Blairgowrie, and Policy 34: Sustainable Heating relates to the coordination of Heat Network Zones, Major Developments and LDP Site Allocations.
- **Community Plan (Local Outcomes Improvement Plan)** - Strategic objectives include reducing poverty, including fuel poverty, through a suite of actions and targets including researching community renewable energy co-operative schemes elsewhere in UK and assessing the feasibility of implementing these in Perth and Kinross.
- **Corporate Plan 2022-2028** - The Plan sets out a vision for a Perth and Kinross Council, where everyone can live life well, free from poverty and inequality. Targets include 6.5% of council housing to meet minimum EPC B by 2023/24 and 12% by 2026/27.



6. PERTH AND KINROSS BASELINE

This section provides a baseline of domestic and non-domestic buildings in Perth and Kinross.

6.1 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:

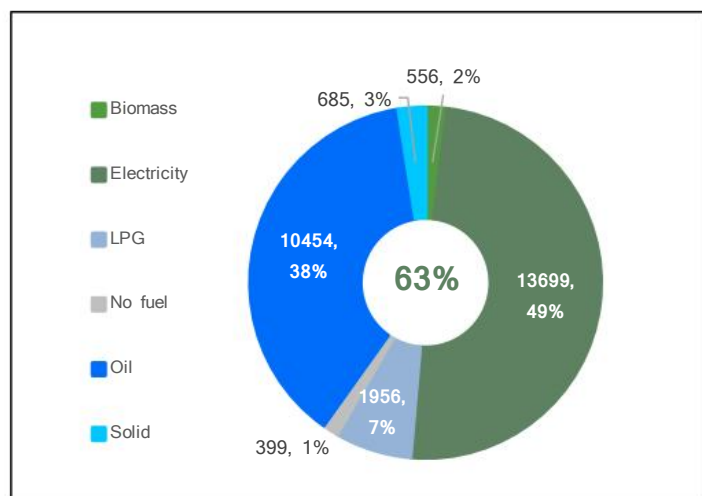
- The proportion of detached or semi-detached houses in Perth and Kinross (55%) is higher than national average (39%). This contributes to a larger number of external walls.
- 45% of domestic properties having uninsulated walls, which is higher than the national average of 41%.
- 58% of these uninsulated 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 in energy efficiency by area across Perth and Kinross, with Strathearn and Highland Perthshire having some of the lowest levels.

Fuel Type

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

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



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,



Liquefied 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 in 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.

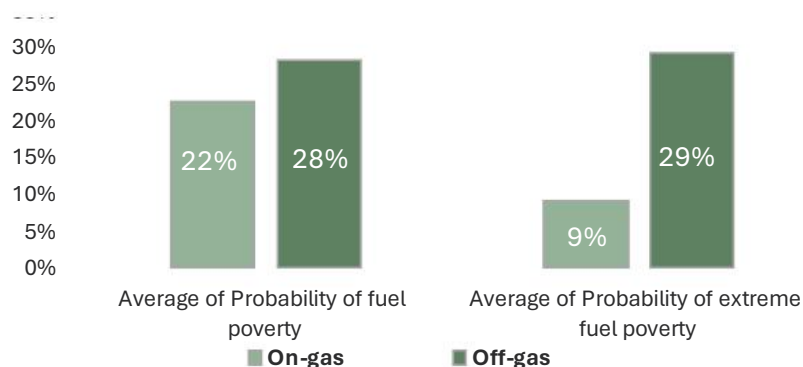


Table 2 - Fuel Poverty Levels and Extreme Fuel Poverty Levels

	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.

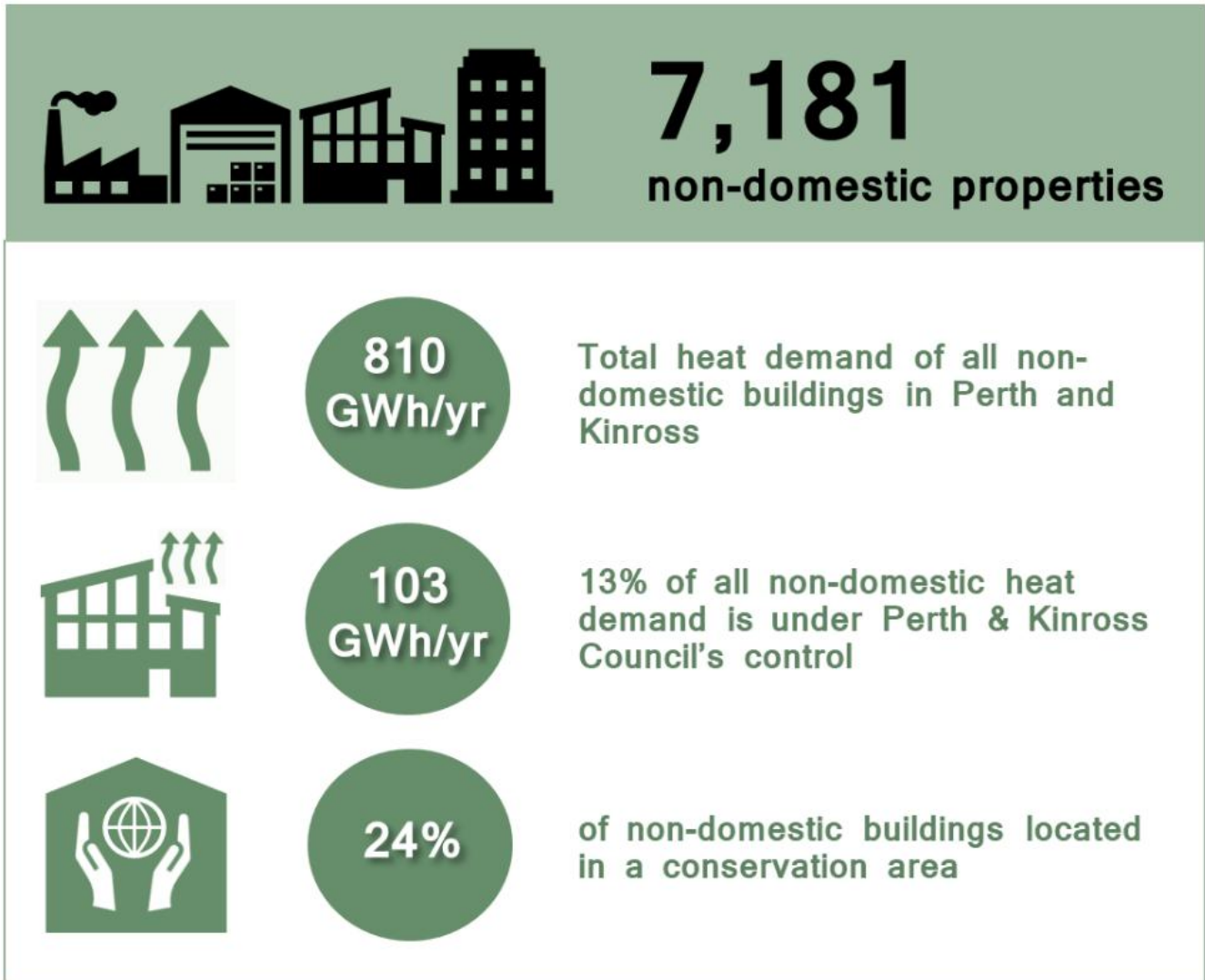
Figure 3 Probability of fuel poverty for on-gas and off-gas properties (Note: Data is based on 2019 SHCS values as was not available for the uplifted values)





6.2 Non-domestic baseline

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



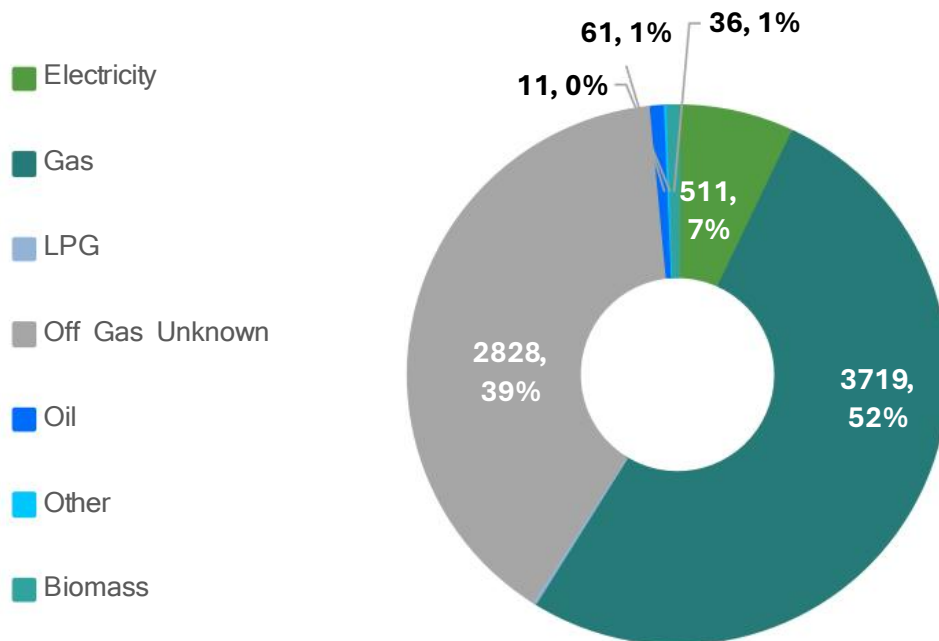
The baseline information has been summarised here to provide context for the remaining sections. To read the full baseline document for LHEES, please visit this [link](#).

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)



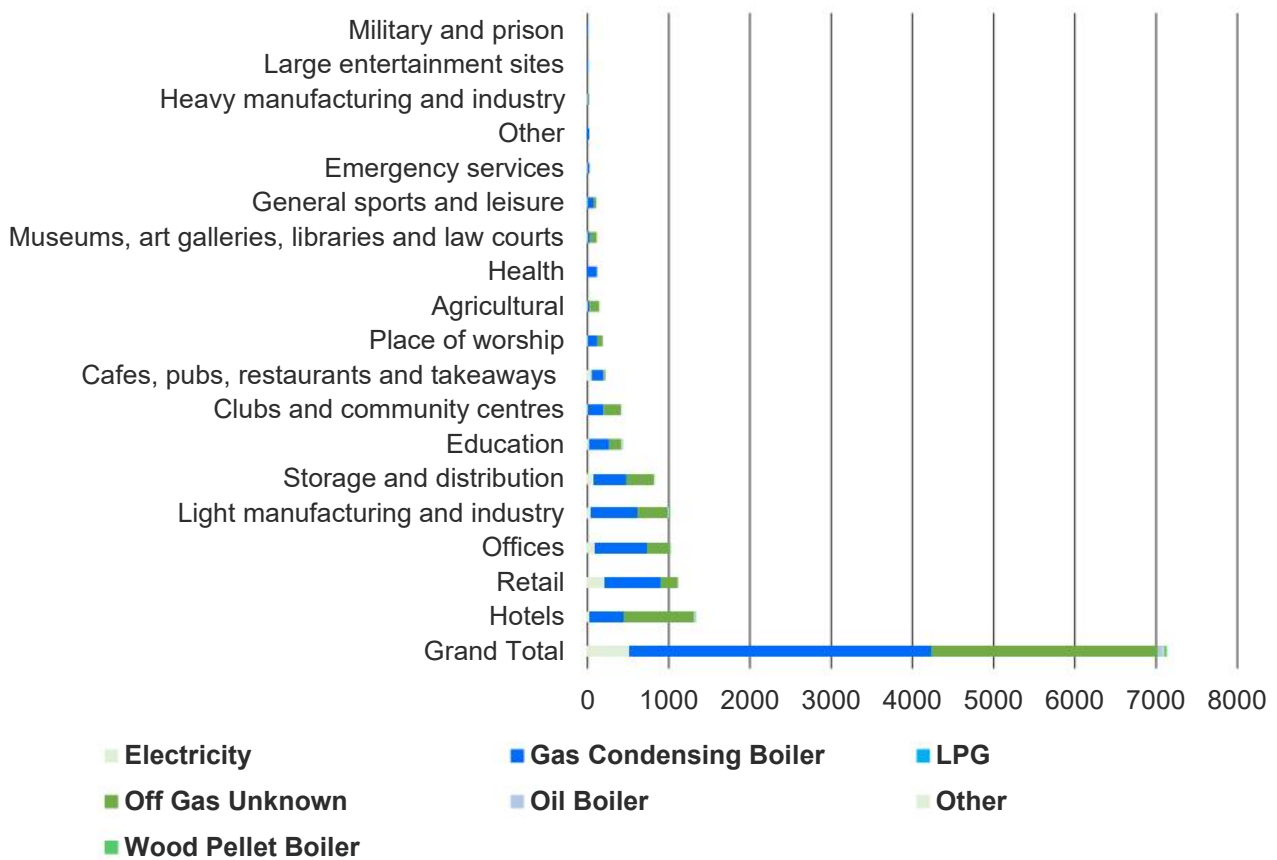
As can be seen from **Figure 5**, the building typologies (sectors) with the largest heat demand are educational buildings (i.e., schools, colleges, and universities), offices and hotel buildings.

- 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.

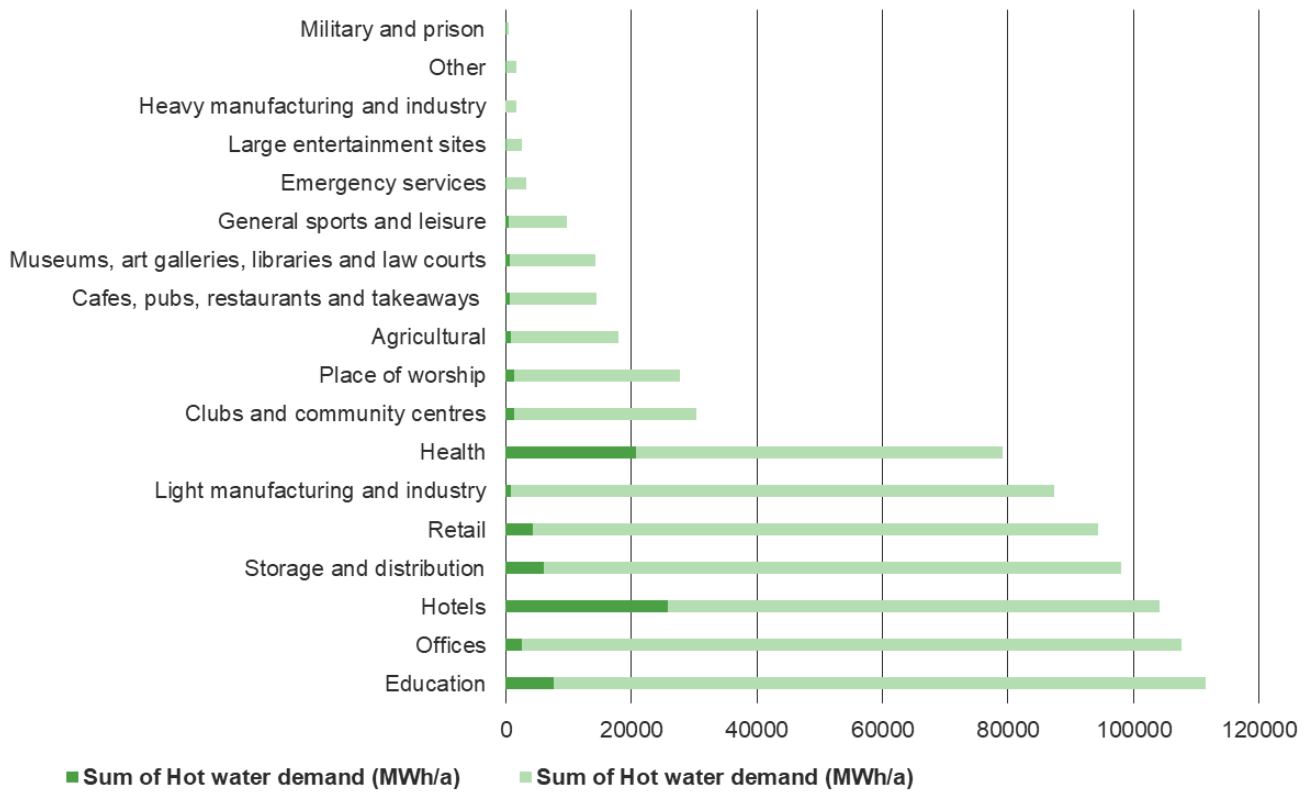
Figure 5 Building typology (sector) by heat source



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





7. VISION, OUTCOMES AND TARGETS

This section presents the LHEES Vision, Outcomes and targets.

7.1 LHEES Vision

Informed by the evidence and working with stakeholders, a 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.

7.2 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.

7.3 LHEES 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 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 20% 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

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, Perth and Kinross LHEES targets are aligned with the Scottish statutory heat and energy targets. However, it is recognised that these targets would be very challenging if no significant public and private investments are made available or come forward as well as if behaviours are not changing. This would be particularly the case for private households and small and medium businesses.



8. LOCAL CHALLENGES AND 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.

8.1 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:

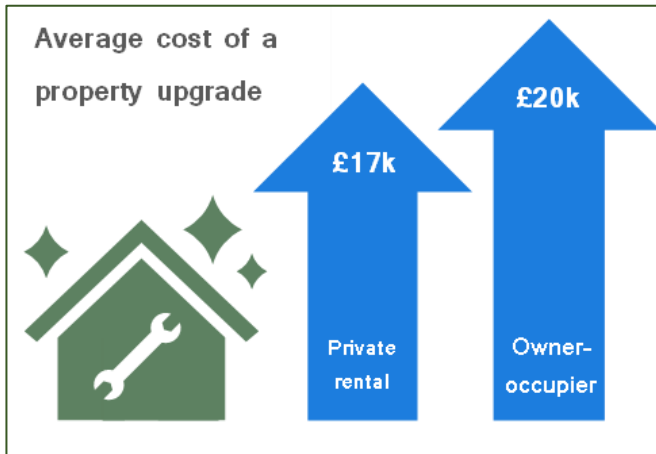
Physical building stock

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 costs of upgrading are 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 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 who 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 and even with the Scottish Government's Heat in Building Bill which sets 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 into 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 must be considered when planning strategic widespread deployment of heat pumps.

The Council are 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

8.2 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.

9. ENGAGEMENT AND CONSULTATION

This section details the engagement and consultation process which took place for the development of the LHEES Strategy and Delivery Plan.

9.1 Engagement in strategy development

In line with Perth and Kinross Offer and with best practices in strategy development, engagement with our communities and stakeholders has been the driver to design Perth and Kinross LHEES and will be crucial for its successful delivery.

We have organised ourselves to design, agree and deliver an effective engagement plan with the support of Arup, our external adviser.

Perth and Kinross Council Climate Change Board agreed the overall strategy development scope and engagement plan with the Executive Director (Communities) as the Executive Sponsor and Climate Change and Smart Investment Manager as the Senior Responsible Officer. The approval of the P&K LHEES strategy and delivery plan sits with the Council's Climate Change and Sustainability Committee.

Reporting to the Board, a Project Team led the development and engagement process with two project co-leads ensuring co-ordination and day-to-day management. A cross-Council LHEES Working group ensured that information and experience was shared across the Council with key individuals focusing on specific areas of work.

A stakeholder mapping was carried out to identify stakeholders. Based on the likely level of interest and influence on the project, stakeholders have been categorised into four groups:

- TIER 1 - Ongoing engagement throughout the project at defined workshops e.g. identifying priorities and for delivery. Specific engagement plans developed as required.



- TIER 2 - Participate in workshops and engage with the project at key milestones (if required). Potentially one-to-one contact during data collection stage and one-to-one interviews to be held with these stakeholders to gain further insight and understanding of priorities and delivery contributions.
- TIER 3 and 4 - Potentially participate in workshops and engage with the project at key milestones (ad hoc basis). Receive a direct invite to public consultation.

TIER 1 stakeholders were invited to form a LHEES Steering Group with Council's representatives and a first meeting of LHEES Steering Group took place on 30th March 2023. The Steering Group's role, remit and membership is set out in Appendix B to this Strategy.

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.

- Workshop 1 (March 2023): Objective setting - Knowledge building and awareness raising for key stakeholders; establishment of ongoing engagement opportunities and activities to support LHEES.
- Workshop 2 (May 2023): Baseline feedback and Strategic Options and Priorities - Scenarios to be developed for optimisation modelling and to support finalising focus for the LHEES Strategy.
- Workshop 3 (June 2023): Heat Network Zones - identification of Heat Network Zones and discussion.
- Workshop 4 (July 2023): Online modelling feedback - Prioritised decarbonisation pathway that will be used to inform the LHEES Strategy and Delivery Plan.
- Workshop 5 (October 2023): Draft Strategy and delivery plan - Present the draft Strategy and Delivery Plan for discussion and feedback.

In addition to the formal LHEES engagement, the Strategy development is based on wider stakeholder and community engagement by PKC and our partners. These include:

- PKC's Local Housing Strategy inputs and consultation (2022);



- Big Place Conversations held across Perth & Kinross in Spring/Summer 2023;
- Net Zero Living - Pathfinder Places public engagement in Aberfeldy, Tulloch and Blairgowrie (Spring 2023).

9.2 Outputs of community consultation

Following consultation with partners and stakeholders, a draft LHEES vision with priorities for action was developed. Before the final strategy was developed, we wanted 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.

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.

We issued a consultation document with evidence reports on 3 October 2023 with a response deadline on 29 October 2023. Details of the consultation document and related reports could be accessed at [Perth and Kinross Local Heat & Energy Efficiency Strategy 2024-2045 Consultation - Perth & Kinross Council Citizen Space - Citizen Space \(pkc.gov.uk\)](https://perthandkinross.gov.uk/citizen-space/consultation).

The Consultation document asked a number of questions and although the number of responses was low, it provided a qualitative insight into public perception of LHEES. A summary is provided below:

- Vision and outcomes: agreement and good positive support. Presented clearly- However, generally, quite complex and technical area with jargon.
- Targets: alignment to Scottish targets was supported. However, doubts about the availability of finance to achieve them as well as the need to change behaviours.
- Challenges: agreement with identified challenges. Historic and listed buildings would need more considerations.
- Opportunities: agreement with identified opportunities. Use of hydrogen was raised as difficult and not certain. More emphasis on social value opportunities as co-benefits.



Expected future decoupling of gas and electricity prices could be highlighted. Heat as by-product to support heat network could be highlighted.

- Strategic priorities: Strategic priorities may need to be prioritized with improving the fabric of buildings first before changes to the heating system.
- Strategic actions: heat network zones focus should put more emphasis on the scope to use District Heating systems in rural towns, especially where there is active and motivated community involvement and therefore not use the model too rigidly. Emphasis on heat pumps is questioned in relation to installation and operating costs and this should be reflected in the delivery timescale and considering phased heat supply (lowering temperature in line with energy efficiency progress). Funding capacity of private owners was also highlighted as a challenge particularly when gas prices are cheaper than electricity. More generally, actions are comprehensive. It was suggesting adding an action to complete a detailed risk review and maintain the resultant risk matrix/register for each action with early engagement with private sector partners through this process to sense check and advise on actions and their progress/outcomes.
- Delivery Plan: early engagement with potential private sector partners would be beneficial and lead to quicker resolutions. The selection of criteria was supported. It was suggested to add information on the compatibility with target timelines for each of these.
- Supporting mechanisms: the whole energy system approach was supported. Skills supply and demand and local supply chain were highlighted as important with attraction of new people to the industry, upskilling and keep it local. Supporting Community to take advantage of heat transition was also highlighted as important by informing better, providing financial support, but also building on existing practices. Mobilising public and private investment was supported including exploring strategic energy partnership as this could simplify procurement, ensure commitment from partner/s, and is likely to lead to wider positive impacts. However, there is a need to ensure it does not prevent other investment in the area. Early involvement of private sector delivery partners, to prevent challenges and delays in procurement and delivery. In particular, early confirmation and clarity on a) the role that the Council wishes to play in the long term energy solution (and heat network) development and deployment and b) the method by which it will procure development, investment, delivery and operational services for the energy system and c) the model which it will establish for how it will work with industry in the supply of services, for example Memorandum of Understanding, joint venture or concession model. This will be



important to provide investors with signals on scale of opportunity and likely commercial arrangements underpinning heat networks deployment.

The outputs from the consultation have been used in finalising the LHEES Strategy and Delivery Plan.

9.3 Impact Assessments

Perth and Kinross Council has considered the following impact assessments in developing the LHEES.

Table 7 PKC LHEES Impact Assessment

Impact Assessment	Status	Comments
Strategic Environmental Assessment	Screened out at the Screening Stage	To view the Screening Report and Determination, please visit: https://www.pkc.gov.uk/article/23543/Strategic-Environmental-Assessment
Data Protection Impact Assessment	Required - Completed	
Equality and Fairness Impact Assessment	Required - On-going	Consultation with Perth & Kinross Equalities groups on-going as part of wider public engagement. Potential for significant positive impact.
Business and Regulatory Impact Assessment	Scoped out	Following internal screening this Strategy was deemed not applicable



10. STRATEGIC PRIORITIES

10.1 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 aiming for affordable warmth and regulatory compliance.

There are not ranked in order of priorities and a fabric first approach should always be used. 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.

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.



10.2 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 (EESH2)
- 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.

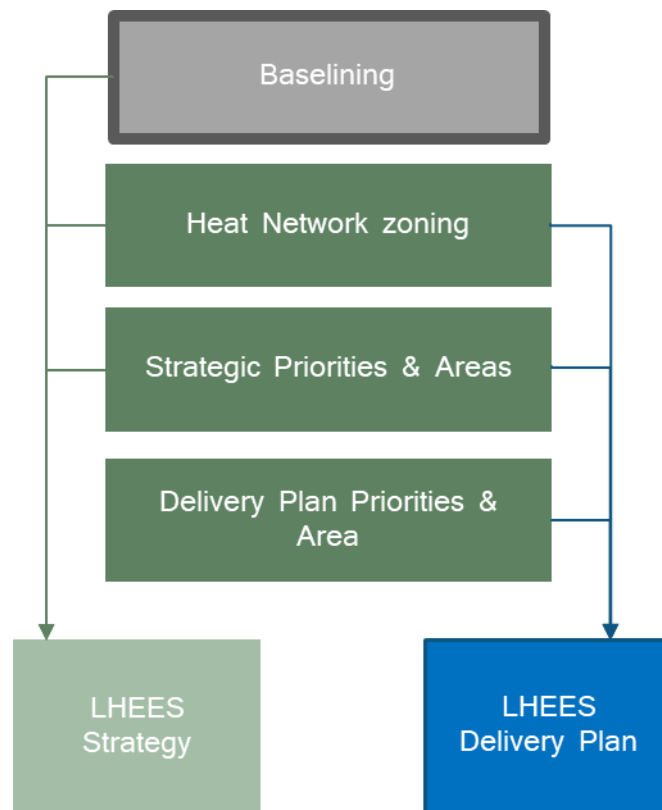
The analysis and visualisation were undertaken using mapping which integrates multiple variables affecting heat decarbonisation, energy efficiency and deliverability to identify specific challenges and opportunities in delivering interventions. This approach represents a significant advancement beyond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

10.3 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 11.





10.4 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)



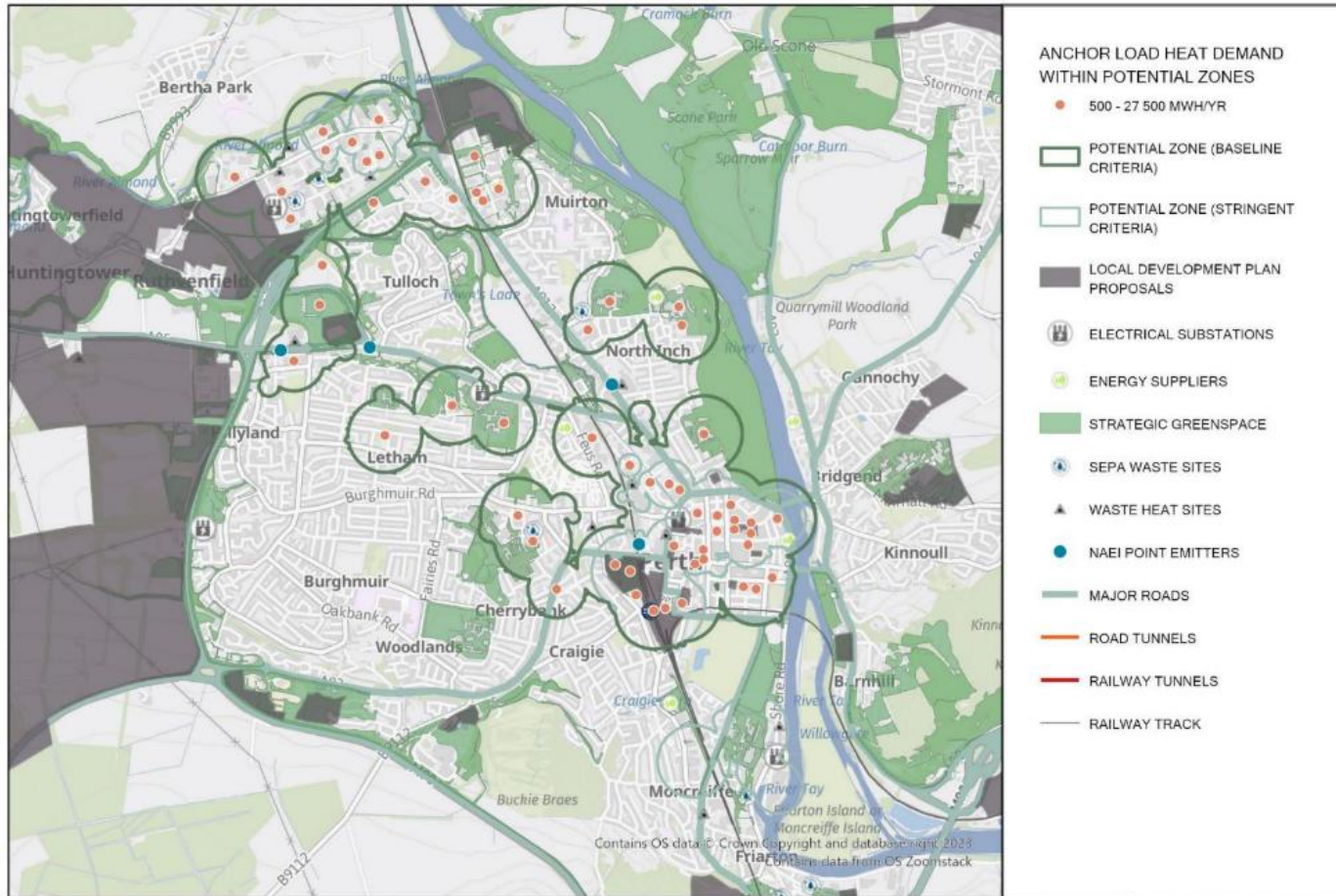
-
- Auchterarder (Baseline only)
 - Kinross (Baseline only)
 - Blairgowrie (Baseline only)

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.



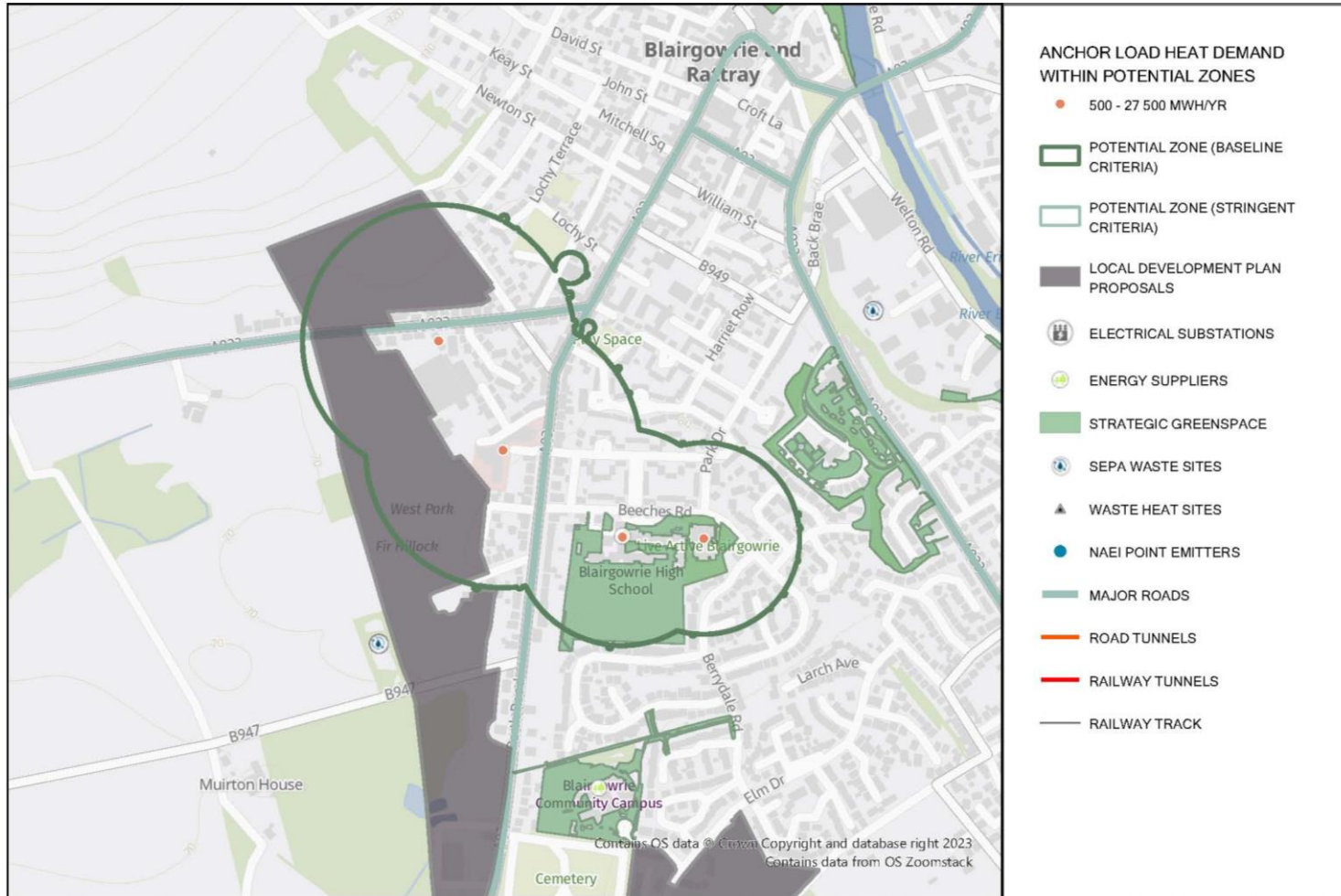
Figure 7 Indicative Heat Network Zones Perth



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Figure 8 Indicative Blairgowrie Heat Network Zone



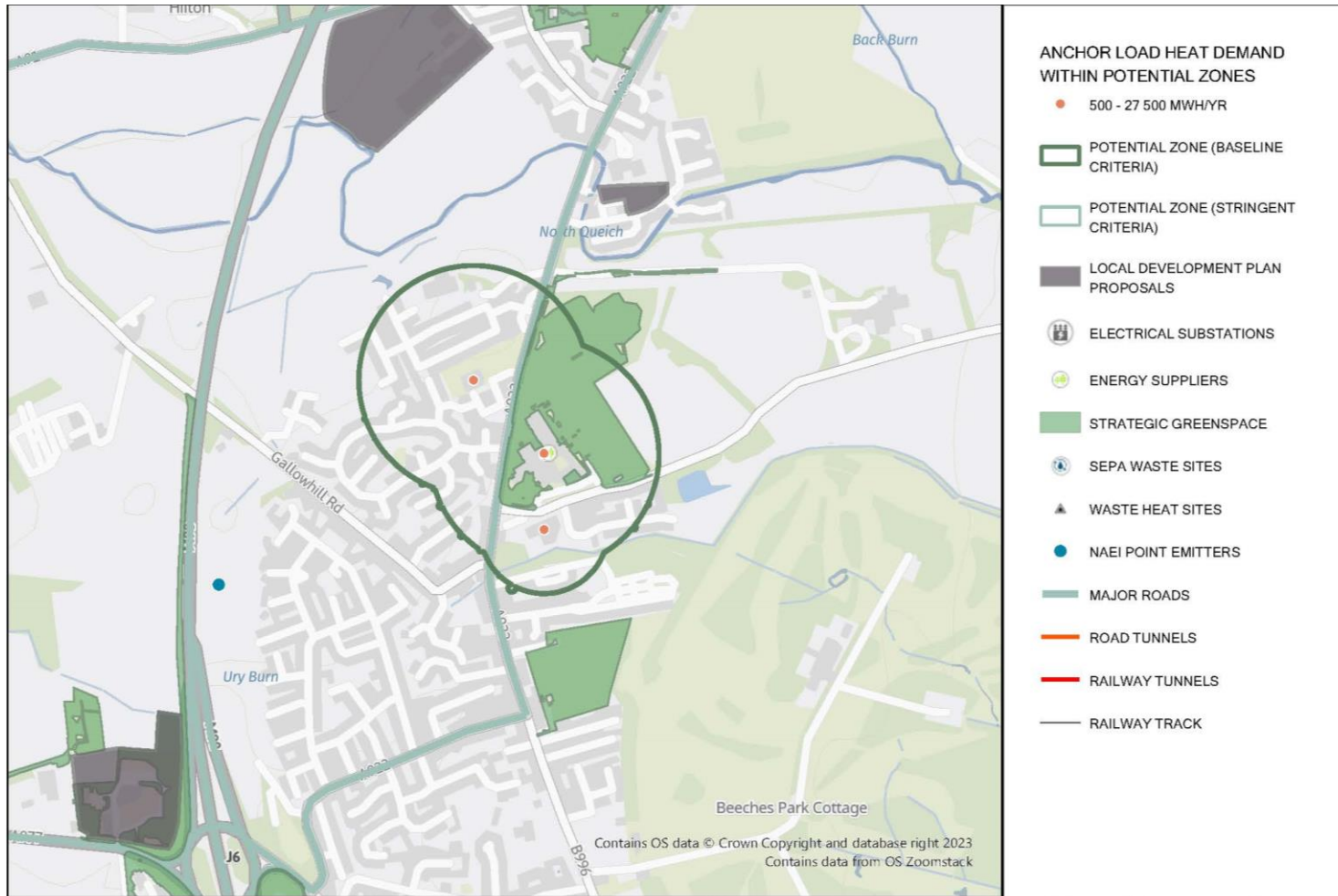
ANCHOR LOAD HEAT DEMAND WITHIN POTENTIAL ZONES

- 500 - 27 500 MWH/YR
- ▭ POTENTIAL ZONE (BASELINE CRITERIA)
- ▭ POTENTIAL ZONE (STRINGENT CRITERIA)
- LOCAL DEVELOPMENT PLAN PROPOSALS
- ⚡ ELECTRICAL SUBSTATIONS
- ⚡ ENERGY SUPPLIERS
- 🌳 STRATEGIC GREENSPACE
- ♻️ SEPA WASTE SITES
- ♻️ WASTE HEAT SITES
- ⚡ NAEI POINT EMITTERS
- 🛣️ MAJOR ROADS
- 🚇 ROAD TUNNELS
- 🚇 RAILWAY TUNNELS
- 🚇 RAILWAY TRACK

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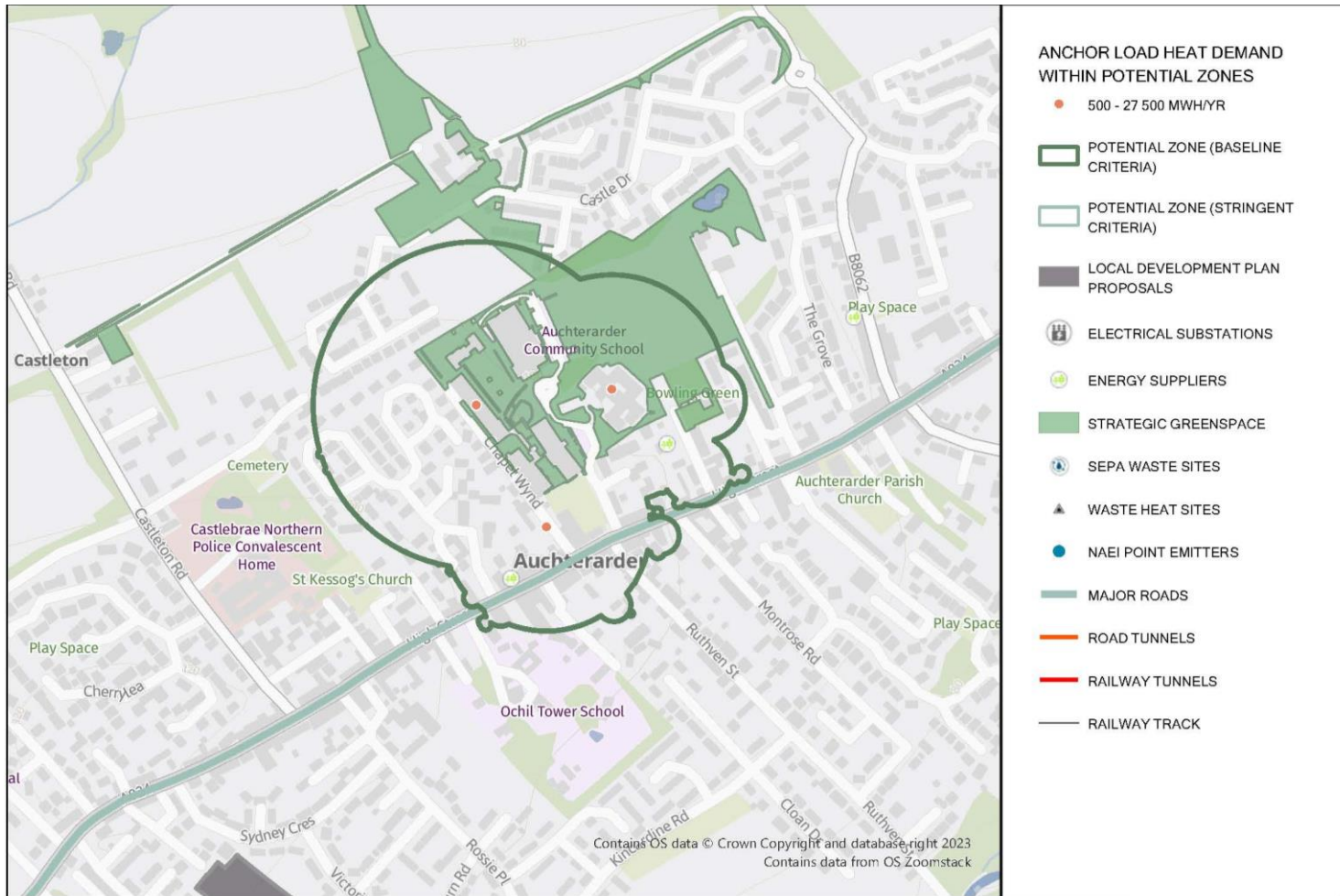
Figure 9 Indicative Kinross Heat Network Zone



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Figure 10 Indicative Auchterarder Heat Network Zone



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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 to 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.

10.5 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. However, we understand that this would be challenging in terms of costs and public perception and will therefore will need to manage carefully and where and when it makes sense.

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 8. 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 8 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 - <i>Either requires significant fabric upgrades) or more suited to other low or zero emission heating system (i.e., biomass, direct electric or electric storage).</i>	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 headroom². 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.

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.

10.6 Strategic Priority 2a: "Improving buildings' energy efficiency to meet regulatory standards"

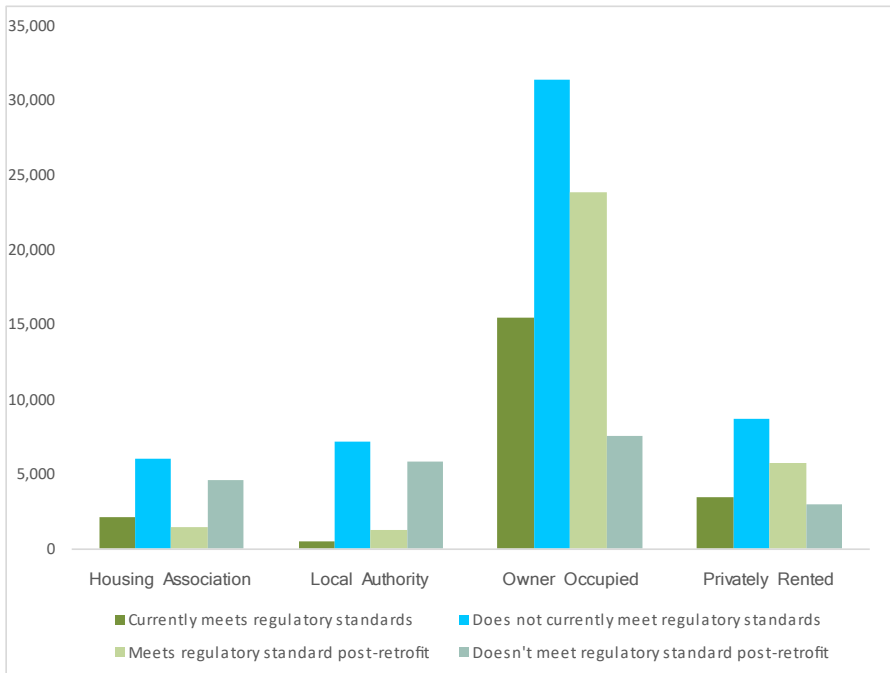
Regulatory targets for Energy Efficiency are:

- 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 Inchtute, 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 including privately owned homes, 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.



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.

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.

10.7 Strategic Priority 2b: “Improving 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 through 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 and provide information to Elected Members to disseminate. 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.



11. DELIVERY PLAN

Accompanying our Strategy is our 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 in the near to medium term. 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 by February 2024 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.

11.1 Delivery Plan Priorities

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 9.



Table 9 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. Improving 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.

11.2 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.

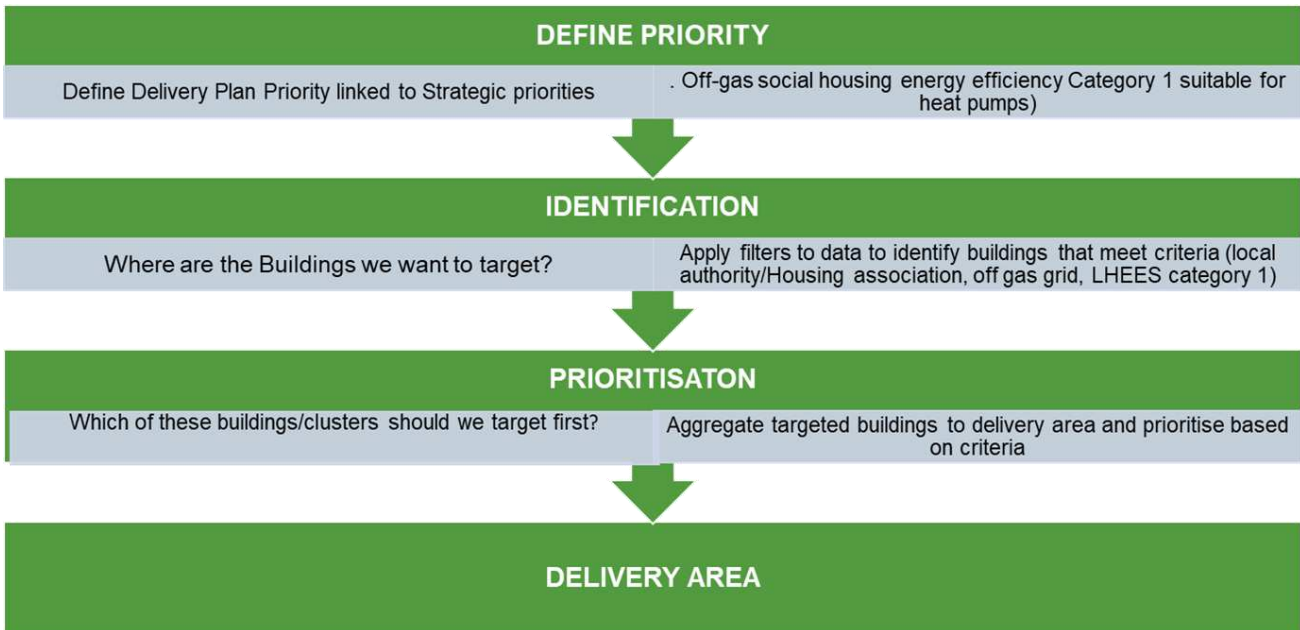
The key criteria used to develop delivery plan areas are as follows:

- 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



11.3 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 is 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.

11.4 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.

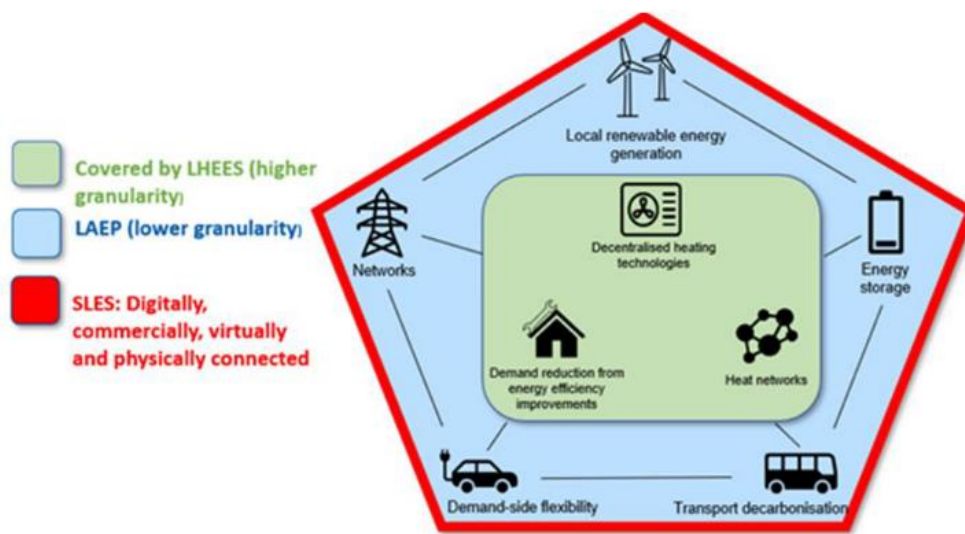
Key on-going areas of work to support this approach include:

- ***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



Developing green skills and the capacity of the supply chain

There are now numerous studies and policy documents that point to the opportunity for green jobs in the future. In Scotland the [National Strategy for Economic Transformation](#) published in March 2022 set out a number of Actions including:

- working collaboratively with employers and unions to increase investment in upskilling and retraining to better meet the needs of employers and employees in Scotland’s transition to net zero
- supporting and incentivising employees, and their employers, to invest in skills and training throughout their working lives
- expanding Scotland’s available talent pool, at all skills levels, to give employers the skills pipeline they need to take advantage of opportunities
- implementing the Climate Emergency Skills Action Plan to align Scotland’s skills system with business needs to reach net zero



- implementing the next phase of the Green Jobs Workforce Academy and launching a new skills guarantee for workers in carbon intensive industries
- developing proposals for a national digital academy to open up access to a range of subjects for all learners

The priority in decarbonising Scotland’s domestic heat by retrofitting homes and improving energy efficiency will dramatically reduce consumption and hence bills, regardless of the ultimate source of heat. Thanks to boiler or heat pump efficiency improvements, any of the options will deliver significantly cheaper heat for households than older inefficient boilers or electric radiators.

The [STUC report on Green Jobs in Scotland](#) estimated - with the right policies and funding in place - Scotland could see job creation in the region of 156,000 - 367,000 jobs. Perth & Kinross is identified as one of the geographical hubs for energy development and may be well placed for energy related jobs because of the presence of SSE (see picture below).

	Industry	Jobs	% of jobs in Scotland	Key workplace	
1	ABERDEEN CITY	Extraction of crude petroleum and natural gas	7000	80.4%	
2	PERTH & KINROSS	Production of electricity	2000	35.7%	SSE
3	GLASGOW CITY	Manufacture of gas; distribution of gaseous fuels through mains	1750	25.9%	
4	CITY OF EDINBURGH	Manufacture of gas; distribution of gaseous fuels through mains	1500	28.4%	
5	SOUTH LANARKSHIRE	Distribution of electricity	1500	28.4%	
6	NORTH LANARKSHIRE	Distribution of electricity	1500	22.2%	
7	FALKIRK	Manufacture of refined petroleum products	1000	71.9%	Grangemouth Refinery

Source: ONS Business Register and Employment Survey; Transition Economics analysis



The shift away from fossil fuels for electricity and heating means that there will be increasing demand for more electricians, electrical engineers. Employers point towards specific skills and understanding in fields such as insulation, Passivhaus standards, maintenance of low carbon tech (including district heating, EV charge points, heat pumps, solar DC systems, etc.)



Already there are large-scale programmes of retrofitting, with domestic gas boilers being replaced with air- or ground-source heat pumps. From 2025, gas and oil boilers will not be permitted in newbuild homes. The H100 Fife project³ is a demonstrator project providing green hydrogen through a new gas network to around 300 households in Buckhaven and Dunbeath.

This means that the incumbent workforce will require to develop (more) electrical skills to complement existing gas engineering or plumbing skills. This will not only be for the installation of low carbon heating systems, but the replacement of electricity distribution boards in domestic and commercial properties where such heating systems are retrofitted. However, 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. Nevertheless, there remains a significant challenge in fully understanding skills demand across region, by sector and for Clean Growth as a whole. Business engagement is a critical factor here. There is limited intelligence, poor channels of communication on need where there is engagement, and no smooth engagement with businesses. This serves to constrain education and training providers' ability to respond to business skills need effectively. There is a clear requirement to engage with businesses to drive participation in and contribute to the discourse on green jobs, and to stimulate meaningful conversations around skills need in this area. This is particularly important in light of some of the findings of the recently published Independent Review of the Skills Delivery Landscape. 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 the Net Zero/Clean Growth business base.

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.

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.

³ <https://www.h100fife.co.uk/>



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.

There are several on-going projects across Perth & Kinross that are either community-led or community-focused that support the heat and energy transformation. A collection of these is listed in the Table below.

Theme	On-going projects
Home Energy Advice to Residents	The HEAT Project, SCARF, Warm Connections, Citizens Advice Bureau all provide free home energy advice
Community Energy Projects	Rumbling Bridge Hydro, Welton of Creuchies Wind Farm, Comrie Croft Smart Energy Grid Demonstrator Project are a sample of a few of the several on-going community energy projects
Support businesses to address energy efficiency and decarbonisation	Green Business Grants from PKC provide funding for businesses, The HEAT Project provides free energy advice to SMEs
Community decarbonisation	Several groups are focused on decarbonising their communities and community assets - examples include CATCH - Loch Leven and the Blairgowrie and Rattray Development Trust

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

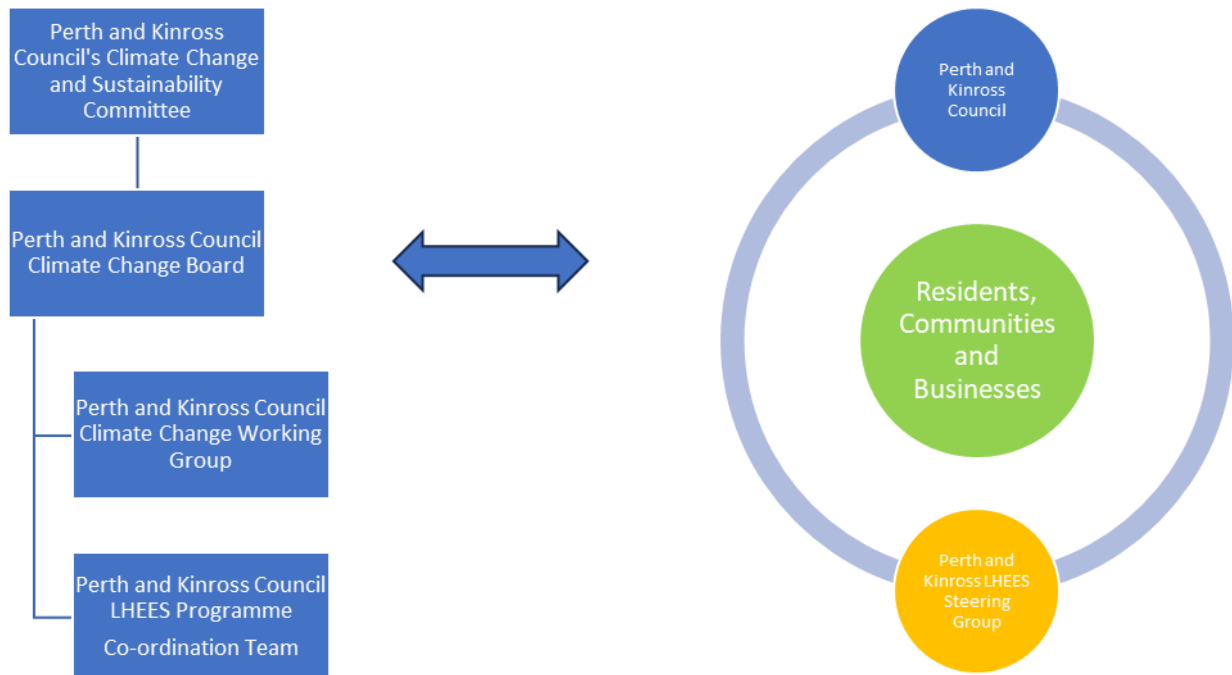


capability into large energy-related projects. The projects taken forward by the energy partnership could deliver on local priorities relating to carbon reduction, fuel poverty, and energy resilience. The Council is also considering the scope of any partnership proposed and will assess the potential 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 procurement route, governance structures, control versus risk arrangements and co-investment would be explored.

12. GOVERNANCE AND MONITORING

12.1 Governance

The delivery and review of Perth and Kinross LHEES Strategy and Delivery Plan will be supported by the following Council’s Governance arrangements and relationships:



Perth and Kinross Council’s Climate Change and Sustainability Committee will provide scrutiny, assess performance and consider LHEES Strategy and Delivery Plan reviews. The nomination of an elected member or elected members as Champions will be explored.

Perth and Kinross Council Climate Board will provide strategic directions and monitor progress and performance. An Executive Sponsor and a Senior Responsible Owner will be identified.

Perth and Kinross Council Climate Change Working Groups and external partners will deliver actions via identified project managers and agreed workstreams.

Perth and Kinross Council LHEES co-ordination team will ensure coordination and monitoring of Delivery Plan actions and will report to the Climate Change Board.



12.2 Monitoring

Perth and Kinross Council LHEES co-ordination team's main tasks will include:

- Data: update data and support access to data to all stakeholders
- Communication and engagement: co-ordinate communication and engagement plan
- Risk & Monitoring: develop risk register and produce monitoring reports
- Reviews: prepare and co-ordinate LHEES Strategy and Delivery Plan reviews
- Best practices and training: provide support to project managers in the form of templates, best practices and training.
- LHEES Steering Group: coordinate and support LHEES Steering Group

Monitoring reports will be produced every quarter for the Steering Group and the Board and annually for the Climate Change & Sustainability Committee with a full review of the Strategy and Delivery Plan every 5 years. The next full review will be in 2029. A Risk register will be developed and has been included as one of the early actions of the Delivery Plan.

Engagement will be maintained and developed with key stakeholders through the LHEES Steering Group and between the Steering Group, Perth and Kinross Council and our residents, communities and businesses to achieve a successful LHEES Strategy and Delivery plan delivery. A Communication and Engagement Plan will be developed by the Steering Group and has been included as one of the early actions of the Delivery Plan. The Plan will set out how the Steering Group will conduct regular consultation and engagement with stakeholders. Engagement with residents, communities, businesses and private landlords would be particularly important. It will also ensure there is awareness of the key heat transition and energy efficiency priorities for Perth and Kinross until 2029.



13. GLOSSARY

13.1 Abbreviations

Acronym	Description
EES	Energy Efficient Scotland
EESSH	Energy Efficiency Standard for Social Housing
EPC	Energy Performance Certificate
EST	Energy Saving Trust
GIS	Geographic Information System
HEEPS:ABS	Home Energy Efficiency Programmes for Scotland: Area Based Schemes
HIB	Heat in Buildings
IZ	Intermediate Zone
LA	Local Authority
LAEP	Local Area Energy Planning
LHEES	Local Heat and Energy Efficiency Strategy
LPG	Liquefied Petroleum Gas
mxd	Map Exchange Document
PEAT	Portfolio Energy Analysis Tool
SAP	Standard Assessment Procedure
ToC	Table of Contents
UPRN	Unique Property Reference Number



13.2 Terms

Terms	Description
Baselining	Baselining is the purpose of understanding at local authority or strategic level, the current status of the buildings against the LHEES Considerations, Targets and Indicators.
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 Consideration 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 basel & 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 a constraints appraisal as part of a district heating analysis.
Data Zone	Data zones are groups output areas which have populations of around 500 to 1,000 residents.
Delivery Area	Delivery areas are at a higher granularity than Strategic Zones. These spatial zones should set out clusters of buildings within a Strategic Zone or across the whole local authority that identify potential solution(s) at a delivery level. They will be an important starting point for identifying a range of projects, regulation and actions that are within the competence of the Scottish Government, local authorities and wider partners (included as actions to be developed in the LHEES Delivery Plan).
Detailed practitioner approach	These Steps form part of the detailed practitioner approach 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 Consideration, the purpose of an Indicator is: <ol style="list-style-type: none"> 1) to act as a key information field to help characterise and baseline the local authority. 2) to act as a key information field to support strategic zoning and generation of initial delivery areas; 3) if suitable, to act as a key information field to measure progress against Targets over the duration of the LHEES - set out in the LHEES Delivery Plan. For some Considerations, one Indicator may be sufficient, but for others a range may be appropriate.



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 Considerations	The LHEES Considerations are a list of technologies, building typologies and policy priorities used to identify and target interventions. They include: <ul style="list-style-type: none"> - Heat networks - Off-gas grid buildings - On-gas grid buildings - Poor building energy efficiency - Poor building energy efficiency as a driver for fuel poverty - Mixed-tenure, mixed-use and historic buildings
LHEES Delivery Plan	An LHEES Delivery Plan is a document setting out how a local authority proposes to support implementation of its local heat and energy efficiency strategy.
LHEES Guidance	The LHEES Guidance sets out the production and content requirements for a local authority to prepare a Local Heat and Energy Efficiency Strategy and Delivery Plan. Its purpose is to ensure that a Local Heat and Energy Efficiency Strategy and Delivery Plan contain outcomes and actions that are backed up by robust data and analysis, supported by stakeholder engagement, and that are linked to national and local priorities, plans and targets.
LHEES Methodology	The LHEES Methodology is a more detailed, step by step approach, which includes models, tools and templates, and represents best practice in how to produce an LHEES in accordance with the requirements set out in the LHEES Order and Guidance.
LHEES Stages	There are 8 LHEES Stages proposed in this methodology. 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 reporting templates included alongside this methodology– LHEES Strategy example template and LHEES Delivery Plan example template. The completion of these two templates will satisfy the completion of LHEES Stages 7 and 8. The 8 LHEES Stages proposed in this methodology are: <ol style="list-style-type: none"> 1 - Policy and strategy review 2 - Data and tools library 3 - Strategic zoning and pathways 4 - Generation of initial delivery areas 5 - Building-level pathway assessment 6 - Finalisation of delivery areas 7 - LHEES Strategy 8 - LHEES Delivery Plan
LHEES Strategy	An LHEES Strategy is a long-term strategic framework for— <ul style="list-style-type: none"> - the improvement of the energy efficiency of buildings in the local authority’s area, and - the reduction of greenhouse gas emissions resulting from the heating of such buildings
Mixed-tenure, mixed-use and historic buildings	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 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.
Potential Zones	The analysis carried out for strategic zoning and pathways for the heat networks Consideration 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 should inform actions around further investigation / progression within the LHEES Delivery Plan. The heat networks Consideration analysis and activity carried out within LHEES is also anticipated to support activity related to formal zone designation as required by the Heat Networks (Scotland) Act 2021.

Raster	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.
Strategic Zone	Strategic Zones present a visualisation of the potential pathways to decarbonise the building stock at a local authority level. These could, for example, be split out by intermediate zone or data zone. They are useful to understand the baseline performance, the scale of potential and initial areas of focus, which could be used to inform Delivery Areas and follow on engagement.
Targets	Targets are the measurable aspect of the Consideration 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.
Weighting	For some Considerations, 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 Consideration. 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 support local needs or for more focused analysis linked to specific actions and project identification within the Delivery Plan.



14. APPENDICES

Annex A. Baselineing

- LHEES Strategy Domestic Baseline Report [link](#)
- LHEES Strategy Non-Domestic Baseline Report [link](#).

Annex B. Engagement and consultation

- LHEES Steering Group agreed role, remit and membership.

Annex C. Strategic Zones and pathways

- LHEES Heat Network Analysis Report [here](#)
- Potential Heat Network Zones Maps [web map](#)
- LHEES potential Heat pump and secondary heat pump deployment areas Report [here](#)
- LHEES potential Heat pump and secondary heat pump deployment areas Maps [here](#)



PERTH AND KINROSS LOCAL HEAT & ENERGY EFFICIENCY STRATEGY (LHEES) 2024-2045 AND LOCAL AREA ENERGY PLANNING (LAEP) STEERING GROUP ROLE AND REMIT

Purpose

The purpose of the Perth & Kinross LHEES/LAEP Steering Group is to provide a platform to bring together key stakeholders to support the delivery of the Perth & Kinross LHEES/LAEP Strategies and Delivery Plans.

The LHEES/LAEP requires input from a range of key stakeholders to ensure relevant plans, strategies, projects & data help to inform the final outputs as well as enabling key opportunities and challenges to be explored together. It will also provide an opportunity to develop collaborative partnership working in areas of work where there are commonalities, increase efficiencies in the delivery of shared projects/pieces of work, and, where possible, provide sustainable outcomes across a number of themes including:

- Addressing poor building energy efficiency as a driver of fuel poverty
- Poor building energy efficiency
- Heat decarbonisation
- Wider energy systems considerations

Remit:

To support this, the Group will work collaboratively to:

- provide updates on the LHEES & LAEP programme, including through planned external workshops to seek feedback on specific outputs & deliverables.
- share information and associated data of existing and future projects & plans linked to LHEES/LAEP.
- discuss key topics and areas linked to LHEES/LAEP including any concerns, risks and challenges.
- through strategic collaboration build upon areas of commonality and joint working – developments, programmes, projects and sharing of best practice.

Frequency of Meetings

The first external stakeholder meeting took place on 30 March 2023. The Group shall meet every quarter or more often if required. If members of the group are unable to attend, they shall send a representative on their behalf. An action plan log will be circulated before meetings and updated after meetings.



Membership

Membership of the group will initially comprise the following stakeholders.

Stakeholders	Key Contact(s)
Perth & Kinross Council (various officers)	Climate Change & Smart Investment Manager - Serge Merone (Chair) Shelley McCann (Lead Officer - Co-ordination Team) Representatives from Properties: Grant Key / Nicola Lennon
Energy Savings Trust	Dai Grady Victor Chamosa Pino
The Heat Project	Martin Mathers
Home Energy Scotland	TBC
Horsecross	Ginger Ramsden
Live Active	Gary Watson
Culture PK	Kenny McWilliam
NHS	John Ruddy
Perth & Kinross Climate Change Commission	Nathan Jamieson John Ferguson Martin Mathers
PKAVS	Graham Illsley
SCARF	David Mackay
Scottish Water	Helen Smith
Scottish Futures Trust	Stephen Vere
SGN	Colin Thomson
SPEN	Stuart Walker Nick Evans
SSEN	Rhys Williams Adam Bain
TACTRAN	Mark Speed
Advanced Infrastructure	Lily Cairns Haylor



Zero Waste Scotland	Calum Robertson Chris Morrison
Federation of Small Businesses	David Groundwater
Growbiz	Jackie Brierton
Perthshire Chamber of Commerce	Vickie Unite