ITEM No …3……..

REPORT TO: **CLIMATE, ENVIRONMENT & BIODIVERSITY COMMITTEE – 22 APRIL 2024**

REPORT ON: **DUNDEE LOCAL HEAT AND ENERGY EFFICIENCY STRATEGY (LHEES)**

REPORT BY: **EXECUTIVE DIRECTOR OF CITY DEVELOPMENT**

REPORT NO: **106-2024**

1 PURPOSE OF REPORT

1.1 This report seeks approval of the first Local Heat and Energy Efficiency Strategy (LHEES) for Dundee as required under The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022.

2 RECOMMENDATION

2.1 It is recommended that the Committee:

a approves the Dundee Local Heat and Energy Efficiency Strategy (LHEES), as set out in Appendix 1, and notes that a detailed LHEES Delivery Plan will be brought to Committee for approval in the Autumn; and

b remits the Executive Director of City Development to establish the LHEES Governance Group.

3 FINANCIAL IMPLICATIONS

3.1 There are no financial implications arising for the Council as a direct result of approving the report.

3.2 The LHEES Delivery Plan will define more detailed actions, including the role of the Council and that of respective partners in the Delivery Plan actions. However, implementation of the Strategy and Delivery Plan will be financially challenging, considering the current financial climate and the funding challenges faced by local authorities and the Scottish Government.

3.3 The LHEES identifies the scale of the investment required to decarbonise heat and improve the energy efficiency of buildings in Dundee. The Council is proactively engaging with the UK and Scottish Government, and working with colleagues in COSLA to investigate the additional funding and resources required to achieve delivery of the LHEES goals.

4 BACKGROUND

4.1 The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022 required all Scottish local authorities to prepare and publish a Local Heat and Energy Efficiency Strategy and Delivery Plan. An LHEES is a long-term plan for decarbonising heat in buildings and improving energy efficiency across an entire local authority area.

4.2 The LHEES sets out a strategic approach for improving the city's buildings by removing poor energy efficiency as one of the causes of fuel poverty and decarbonising heating systems in buildings. The development of the LHEES followed the Local Heat and Energy Efficiency Strategies and Delivery Plans Guidance (October 2022) and LHEES Methodology Version 4.0, published by the Scottish Government. The draft LHEES was submitted to the Scottish Government on the 21 December 2023 and the draft LHEES Delivery Plan was submitted to the Scottish Government on 1 February 2024

4.3 The LHEES document in Appendix 1 sets out the context and background for the strategy, including relevant policies and ongoing activities, as well as a detailed baseline analysis of Dundee's building stock. The LHEES then sets out Strategic Zones: geographical areas of

Dundee that highlight particular solutions, for example areas where heat pumps are assessed as being most viable, and particular challenges, for example areas with the poorest energy efficiency and fuel poverty.

4.4 The LHEES also identifies opportunities for areas where district heat networks could offer a solution to decarbonising heat: areas within the city with a higher heat density and therefore highest financial viability for the development of heat networks. These areas were presented to key stakeholders, including members of the Dundee Climate Leadership Group for discussion, and further analysed. After receiving feedback and conducting additional analysis, five potential zones were selected for closer examination. These zones have been identified as strategically important for the development of heat networks in Dundee and are classified as 'Priority Zones.' They are assigned the highest priority and incorporate additional contextual considerations such as fuel poverty, existing heat networks, feasibility studies, decarbonisation plans, site constraints such as major roads and wildlife corridors.

4.5 The LHEES is a city-wide strategy that covers all buildings in the city, not just the Council's estate. However, the Council's ability to compel third parties to decarbonise heating of buildings in their ownership is limited, therefore early interventions will focus on areas where the Council has the most control, particularly its own properties.

4.6 The LHEES document is accompanied by a web map, which contains a series of maps and layers to help navigate through the geographic areas and their characteristics which are referred to in the LHEES document. A link to the web map is below: https://experience.arcgis.com/experience/83d37bda417c4562a0c94b6a3aa08ddc/.

4.7 At the outset of creating the LHEES, stakeholders both within and outside the Council were identified with the aim of engaging and collaborating with them during the preparation and delivery of the LHEES. These stakeholders remained engaged throughout the development of the LHEES, and the LHEES Delivery Plan will outline further actions to sustain engagement and collaboration for the successful delivery of the LHEES.

4.8 The LHEES has implications for various parts of the Council, including Housing, Planning, Energy Management and Asset Management. To guide the development of the LHEES, a working group was established within the Council. This working group continues to meet and will provide input into the LHEES Delivery Plan.

4.9 A public consultation exercise was conducted between 13 February and 8 March 2024 to seek feedback on the draft LHEES and responses were captured using an online survey. In addition, an online public information event was held on 27 February to provide the public with the opportunity to ask questions or provide feedback in an informal manner.

4.10 Following the public consultation process, two amendments were made to the LHEES document in response to the feedback received. A summary report of the consultation responses is set out in Appendix 6 of the LHEES document.

4.11 It is proposed that an LHEES Governance Group is established, drawn from officers across a range of Council Services to ensure that collective actions and priorities in the LHEES are carried out efficiently. This group will report to the Council's Leadership Team and to the Climate, Environment and Biodiversity Committee every two years.

4.12 The Council will also work with the Dundee Climate Leadership Group and the Dundee Partnership to carry out collective actions and provide progress updates.

5 POLICY IMPLICATIONS

5.1 This report has been subject to an Integrated Impact Assessment to identify impacts on Equality & Diversity, Fairness & Poverty, Environment and Corporate Risk. Where an impact, positive

or negative, on one or more of these issues was identified, an appropriate senior manager has checked and agreed with this assessment. A copy of the Integrated Impact Assessment showing the impacts and accompanying benefits of/mitigating factors for them is set out in Appendix 4 of the LHEES document.

5.2 The LHEES has been prepared to fulfil the Council's statutory duties under The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022. The outputs from the Dundee LHEES also supports the Council in fulfilling its statutory duties under the Heat Networks (Scotland) Act 2021.

5.3 The Dundee LHEES aligns with the ambitions of the Dundee Climate Action Plan which aims to achieve citywide net zero greenhouse gas emissions by 2045, and the Council's Net Zero Transition Plan, which aims to achieve organisational net zero greenhouse gas emissions by 2038.

6 CONSULTATIONS

6.1 The Council Leadership Team and representatives from Finance and Legal have been consulted in the preparation of this report and are in agreement with its content.

7 BACKGROUND PAPERS

7.1 None.

Gregor Hamilton
Head of Planning and Economic Development

Author: Barbara Whiting

Robin Presswood
Executive Director of City Development

Dundee City Council
Dundee House
Dundee

RP/GH/BW/KM 12 April 2024

Dundee City Council
www.dundeecity.gov.uk
CHANGING FOR THE FUTURE

Dundee Local Heat and Energy Efficiency Strategy

April 2024

Foreword

As Dundee embarks on the transition to a net zero carbon energy system, the importance of local decision-making on how our homes, schools and offices are heated cannot be overstated. This first iteration of Dundee's Local Heat and Energy Efficiency Strategy sets out a pragmatic and collaborative approach which empowers us to take evidence-based action to decarbonise heat, improve the conditions of our existing housing stock, tackle fuel poverty and ensure a Just Transition.

Dundee's LHEES aligns with Scotland's national target of 75% reduction in greenhouse gas emissions by 2030, and ultimately net-zero emissions by 2045. As a Council, we are committed to becoming a net zero organisation by 2038 through our Net Zero Transition Plan. We believe that this strategic approach to decarbonising the City's buildings and heating systems will help us meet these targets by identifying the key actions that we need to take.

We also recognise that Dundee's LHEES is being published whilst major policies such as EESSH2 and the Heat in Buildings Bill are under review or consultation. LHEES must therefore be a living document, adaptable to technological advancements, policy shifts, and local dynamics, and we will be reviewing it at regular intervals.

LHEES is not a one-size-fits-all solution. Each locality in Dundee possesses its unique blend of geography, building types, energy infrastructure, and socioeconomic characteristics. It is within these intricacies that LHEES thrives, weaving together people, data, and technical analysis to drive decarbonisation in Dundee.

LHEES is a catalyst for action. It identifies near-term projects, providing the Council and other key stakeholders such as Housing Associations, homeowners, landlords and other public bodies with a foundation for prioritising heating system replacement and fabric retrofit of their properties. It encompasses the potential heat network zones and electricity network capacity or constraints, giving early signals to stakeholders to make informed decisions.

LHEES is not a solitary endeavour but thrives on collaboration. Dundee City Council has a long-standing culture of collaboration. Together with our stakeholders and communities, we are forging a path towards a sustainable energy future that ensures a Just Transition. Dundee's LHEES provides a data-driven, spatial plan and a roadmap that identifies the necessary changes to our buildings and heating systems. The development of heat networks and installation of heat pumps will require deeper collaboration with the public, private and third sectors, and with communities and the Council is committed to doing so. Heat networks also bring the potential for inward investment, economic opportunity, energy security and energy independence to the City.

Following our declaration of a climate emergency in 2019, Dundee's LHEES now provides us with the route map to shape our energy future. Let us embrace this opportunity together knowing that our collective efforts will ripple outward, creating jobs, making our homes warmer and healthier to live in, and tackling fuel poverty. Through LHEES we would like to invite stakeholders and communities to join a collaborative effort to transform our buildings, improve our health and well-being, reduce emissions, and create sustainable communities.

Councillor Heather Anderson,
Convenor – Climate, Environment and Biodiversity Committee

CHAPTER 1

Executive Summary

Globally, 2023 was the warmest year on record:

- Greenhouse gas emission levels continued to increase sea surface temperatures and rising sea levels reached record highs.
- Antarctic sea ice was the lowest on record.
- Extreme weather caused death and devastation[1].

Climate change impacts were also felt here in Scotland due to violent storms like Babet and Gerrit, and 2023 became Scotland's second warmest year on record[2].

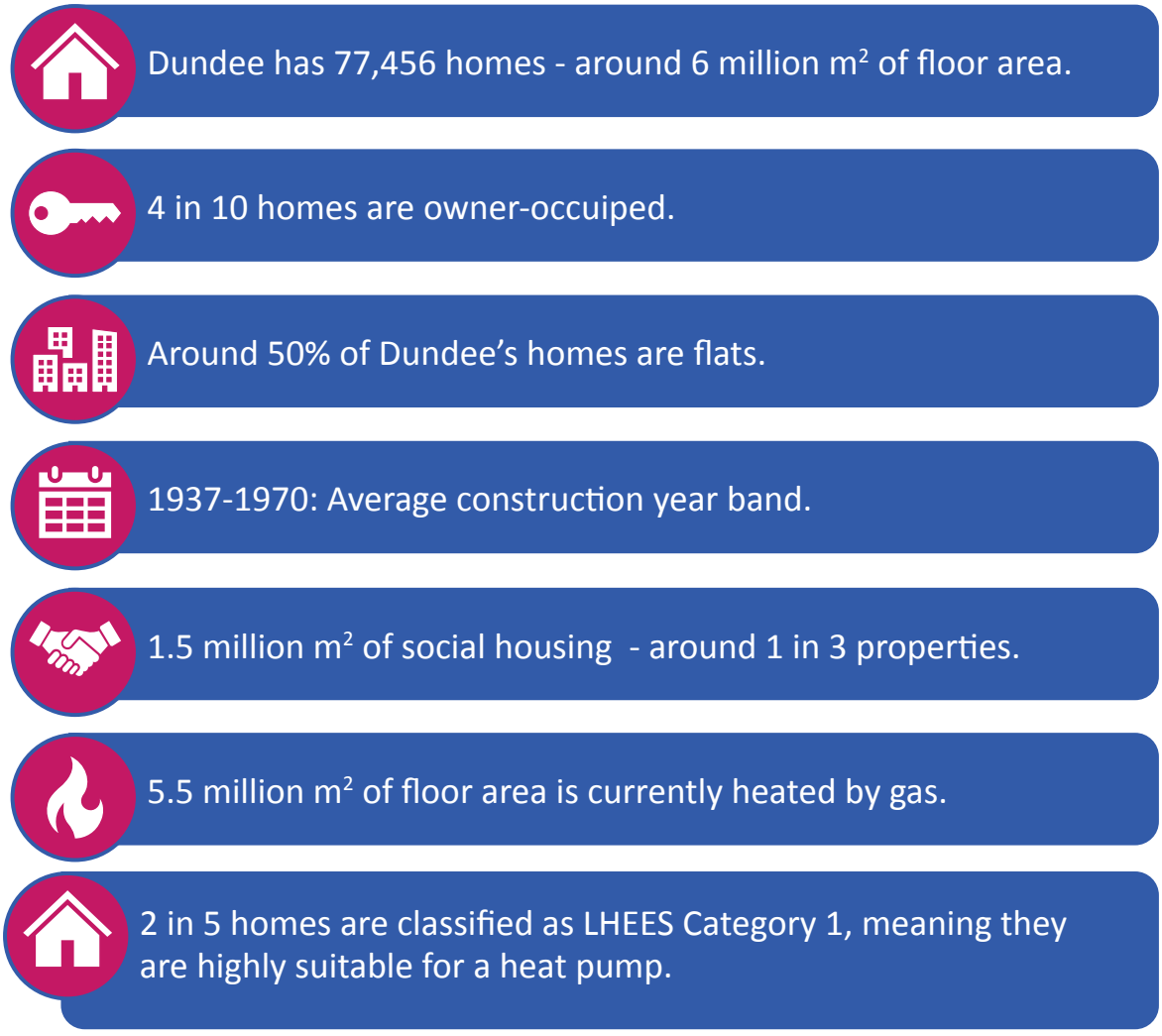
It is vital that we do everything in our power to tackle the global climate emergency and coincidentally, capture the new economic benefits of achieving Net Zero, with actions that create opportunities for deploying critical technologies such as heat networks. Our actions today will shape Dundee's climate journey for years to come.

Dundee's Local Heat and Energy Efficiency Strategy (LHEES) shows us a unique opportunity to reduce the City's greenhouse gas emissions significantly and ensure a Just Transition by creating jobs and economic opportunities for all parts of society. It also provides an opportunity to address existing inequalities such as fuel poverty whilst also ensuring local communities are more resilient, with local supply of low or zero carbon heat and efficient use of energy.

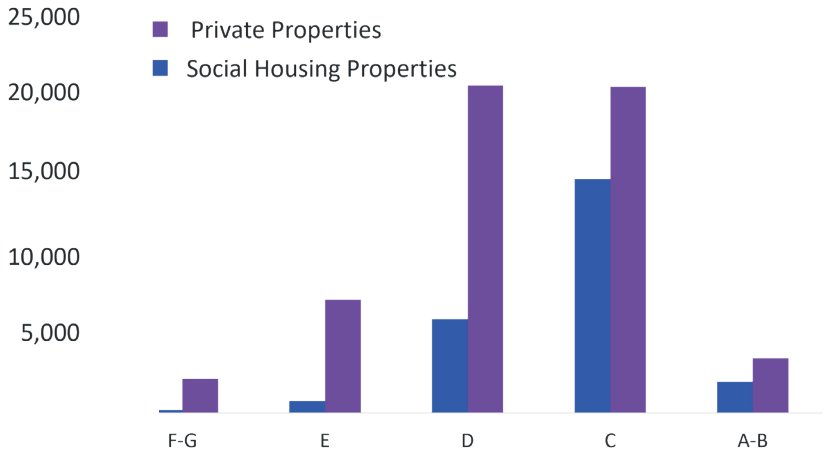
A Unique Local Challenge

Around 87% of Dundee's homes currently use natural gas for heating. They will need to find a renewable or low carbon alternative. The majority of Dundee's domestic buildings are flats and tenements, and the percentage of social housing is higher than the Scottish average. It is crucial that the 31% of households who are living in fuel poverty in the City are not left behind as heating systems in buildings are decarbonised.

The cost of upgrading Dundee's buildings is considerable, but action can bring significant benefits in jobs and economic opportunities. The Council alone will need at least £15 million per year for the next eight years to bring Council-owned social housing up to the EESSH 2[3] standard. The private housing sector will need £343 million to meet regulatory EPC[4] requirements by the end of 2028. These are serious challenges, but they bring important opportunities for the City's economy.



Almost 2 million m^2 of floor area will require substantial upgrades or alternative low carbon heat sources.



EPC Score

- By 2032 – All social housing properties require an EPC of B.
- By 2033 – All private properties require an EPC of C.

Around 19,000 properties with solid or brick wall construction, requiring external or internal wall insulation.

Approximately 8,000 properties are suitable for cavity wall insulation.

Approximately 5,000 properties currently have single or partial double glazing.

Around 6,500 properties with limited loft insulation.

Only 1 in 12 social housing properties currently meet the EESSH2 requirement.

About 21,500 (1.4 million m^2) social housing properties will need to be updated to meet this requirement by 2032.

Dundee's non-domestic stock comprises 5,919 addressable properties across 3,445 buildings - around 2.6 million m^2 of floor.

Larger properties require less heating energy relative to their size, whereas smaller properties consume relatively more energy, highlighting the energy optimisation potential.

Primary contributors to heat demand in Council-owned buildings are:

- Education.
- Offices.
- Public Facilities
  (sports centres, community centres & libraries).

Around 96% of non-domestic heat demand is attributed to non-Council-owned buildings, which reflects the challenges in decarbonising non-domestic properties.

A Great Economic Opportunity

Named as one the top twenty cities for inward investment in the UK in 2022[5], Dundee is a vibrant place with ambitions to be a greener, fairer and inclusive society. Dundee is Scotland's fourth largest City but, geographically, it is the smallest local authority area in Scotland. With its densely populated tenement blocks, Dundee is relatively compact and has several reliable sources of heat close to the City centre, such as the Baldovie Energy from Waste plant, Scottish Water's major sewage pipes, and the Tay River, a natural resource. This means the City provides plenty of opportunities for sustainable growth and offers the financial viability needed for heat networks.

Dundee has nineteen potential Heat Network Zones, with an estimated heat demand of 950GWh per year, which is 4% of the Scottish national demand.

LHEES has identified five Priority Zones for developing heat networks. The Priority Zones have a combined estimated heat demand of 554 GWh per year.

35% of Dundee's total annual heat demand is within the five Priority Zones.

Dundee's Five Heat Network Priority Zones

1 Priority Zone 1 – City Centre

- Densely populated with total heat demand of 310 GWh/year within approximately 2.9 sqKm, suggests financial viability.
- Strong waste heat opportunities from the Scottish Water sewage pipes.
- Large anchor loads including the University of Dundee and Abertay University.
- Existing council owned communal heating system and council owned non-domestic buildings in the area can act as a catalyst to start a heat network.

2 Priority Zone 2 – Baldovie

- MVV EfW eager to supply heat (10MW), with plans to expand to add additional EfW Plant and more heat supply capacity in the near future.
- Significant proportion of social housing in the area act as catalysts to kick-start heat network.

3 Priority Zone 3 – Caird Park

- Existing heat pump energy centre (using heat from the ground) with excess capacity.
- Large public sector anchor loads.
- Waste heat available and expansion over the golf course and to Baldovie.

4 Priority Zone 4 – Ninewells Hospital

- Large heat energy demand from the hospital, which is 25% owned by the University, and with energy assets privately managed.
- Surrounded by areas of deprivation and homes that would benefit from being connected to a heat network.

5 Priority Zone 5 – Lochee

- Existing council owned communal heating in the area can act as a catalyst to kick-start heat network.
- Waste heat available via SSEN substation and local supermarkets
- Potential anchor loads in public sector buildings e.g.schools, leisure centres etc.

Citywide support

The Dundee Climate Leadership Group (DCLG) is an executive partnership which provides active leadership on Dundee's net-zero challenge. It leverages expertise from across the City to engage and inspire collective ownership of climate solutions as well as a shared commitment to tackling climate change. This Group has provided guidance, support and feedback throughout the development of Dundee's LHEES.

A collective ambition

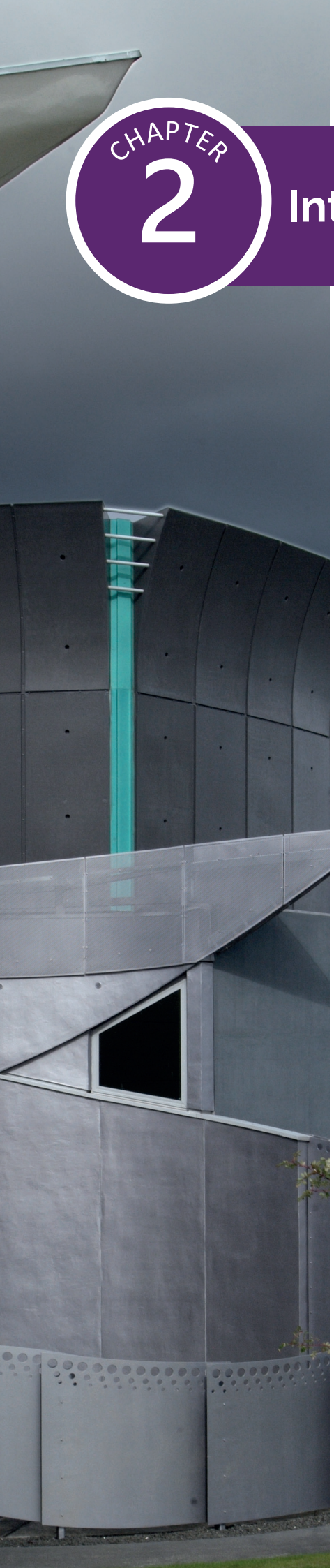
The Council fully supports the ambitious, world-leading climate targets set by the Scottish Government and appreciates the guidance and resources provided by Government to support the development of the City's LHEES. As 2045 approaches, however, the Council recognises the gap that continues to grow in the funding that Scotland's Local Authorities need if they are to develop their ambitious climate change responsibilities and targets. It is therefore critical that this funding gap is addressed.

Acknowledgements

The Council would like to thank colleagues in the following organisations who have supported the development of Dundee's LHEES and the wider process of Regional Energy System Optimisation Planning:

- SSEN for their partnership and provision of valuable resources to develop Dundee's LHEES.
- Arup for their advice and support throughout the journey.
- Advanced Infrastructure Trading Limited for providing their energy planning tool LAEP+.
- The Dundee Climate Change Leadership Group for their citywide support and engagement in developing the City's LHEES.
- Energy Saving Trust for their engagement and support in relation to the Home Analytics data and PEAT tool.
- The Improvement Service for providing a valuable platform in the form of the Local Authority Forum, to exchange ideas, share best practice and enable problem-solving during the development of LHEES.

Finally, the Council would like to thank the local citizens and the institutions and stakeholders who have contributed to the development of Dundee's LHEES.



CHAPTER 2

Introduction

Dundee City Council has created its first Local Heat and Energy Efficiency Strategy (LHEES).

The strategy presents a long-term plan for the City. It highlights key steps for reducing heating related carbon emissions, enhancing building energy efficiency, and addressing fuel poverty.

Dundee's LHEES also sets out areas called 'Heat Network Zones' (HNZs) that, from initial analysis, appear well suited to the building and operation of heat networks. Moreover, the strategy provides important evidence to support working together, getting the right policies in place, finding the money to pay for it all, and having the right data. This is to fulfil its obligations under the Heat Networks (Scotland) Act 2021[6].

The LHEES is in accordance with the Scottish Government's guidelines and methodology[7]. The aim is to comply with the Local Heat and Energy Efficiency Strategies (Scotland) Order 2022[8].

The Council will publish separately the Local Heat and Energy Efficiency Strategy Delivery Plan, which will detail how the Council plans to implement the key actions mentioned in this document. The Council will review and update this LHEES strategy and the LHEES Delivery Plan every five years.

2.1 Understanding this document

This document has 10 chapters.

Chapter 1, the Exec Summary, - The Executive Summary outlines the key facts, figures, findings, and actions. This chapter is useful for understanding the overview of the key information contained within this document.

Chapter 2, the Introduction, helps to explain what LHEES is and provides you with the structure of the LHEES Strategy document.

Chapter 3, sets out the national and local policy context that drives Dundee's LHEES. The national and local policies set priorities and targets that affect the Council in relation to LHEES.

Chapter 4, provides information on past and existing projects and strategies that are closely related to LHEES. These projects and strategies underpin the Council's strategic priorities and long-term vision for the City to be Net Zero by 2045.

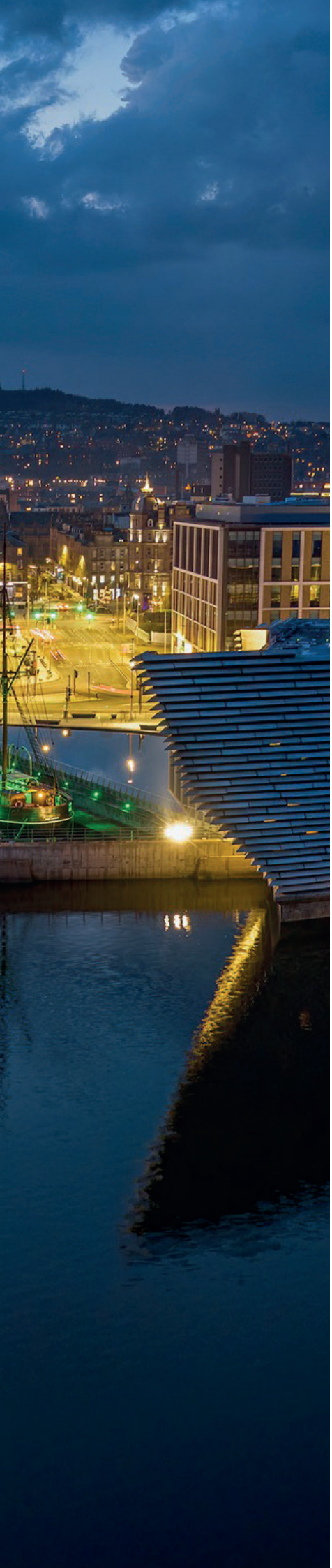
Chapter 5 and 6, present the findings from analysis of the domestic and non-domestic building stock in Dundee. The findings inform the development of the LHEES and LHEES delivery plan actions.

Chapter 7, identifies the delivery areas for initiatives that will improve energy efficiency of buildings and replace the existing fossil fuel heating systems with low and zero carbon (LZC) heating systems.

Chapter 8, identifies potential areas for developing heat networks in Dundee and outlines five areas that are strategically important for heat networks.

Chapter 9, outlines key opportunities that LHEES provides for the City. It also outlines technical, policy and financial challenges of delivering LHEES, challenges that together create a call to the Scottish Government and UK Government, the private sector, and public sector partners to work together with the Council to achieve our shared ambition of a fairer and Net Zero Dundee by 2045.

Chapter 10, presents the governance framework for Dundee's LHEES.



2.2 What is an LHEES?

Owing to the urgent need to address climate change[9, 10] the way Dundee produces energy is changing fast. Power plants that use coal are becoming less common, and new technologies are emerging that allow us to generate energy on a smaller scale.

People are also changing how they use energy. More and more people are generating their own energy with solar panels on their roofs and using it more efficiently via heat pumps.

Local Councils are not just large users of energy, they also have an important role in deciding how energy is produced and used in their areas. Each Scottish Council area is unique in its ability to produce and use energy, and this diversity and the changes in how we consume and generate energy present opportunities to address issues other than climate change, like fuel poverty and making our society more equal. Dundee's LHEES provides an important opportunity for all of us to contribute to and benefit from a local and systematic approach to the energy transition.

The idea of LHEES was first introduced by the Scottish Government in 2017. Since then, there have been three pilot programmes, with all 32 Scottish Councils taking part in at least one of them. The Heat in Buildings Strategy 2021[11] highlighted the importance of LHEES in the Scottish Government's plan to reduce carbon emissions from heating. In 2022, the Local Heat and Energy Efficiency Strategies (Scotland) Order[8] made it a legal requirement for Scottish Councils to have a LHEES. Dundee City Council took part in the first LHEES pilot from September 2017 to March 2018[12]. This pilot focused on the Lochee Local Community Planning Partnership Area

2.3 How is this LHEES structured?

The LHEES (Scotland) Order 2022[8] sets out two components for LHEES:

1. Strategy: sets a long-term vision for the City outlining priorities and actions for decarbonisation of heat and improvement of the energy efficiency of buildings.

2. Delivery Plan: outlines how the Council intends to deliver the key actions and priorities stated in the strategy.

The Scottish Government has created a guide and, 8-step method for creating LHEES. LHEES collects detailed information through research and map-based analysis to help make decisions at the local level.

2.4 What is this LHEES aiming to do?

LHEES has two core functions and six scopes, referred to as considerations in the guidance:

Core Function	Considerations	Description
Heat Decarbonisation	Off-gas buildings	Transitioning away from oil and LPG in off-gas properties.
	On-gas buildings	Transitioning away from natural gas in on-gas properties
	Heat networks	Identifying potential heat networks for decarbonisation of heat.
Energy Efficiency Improvement	Poor building energy efficiency	Identifying possible locations at a strategic and delivery level where poor building energy efficiency exists across the Local Authority area. Target measures to improve the energy efficiency.
	Poor building energy efficiency as a driver for fuel poverty	Identifying possible locations at a strategic and delivery level where poor building energy efficiency acts as main driver for fuel poverty. Target measures to remove poor energy efficiency as the cause of fuel poverty.
	Mixed-tenure, mixed-use and historic buildings	Identifying buildings of mixed-tenure or mixed-use, historic buildings, listed buildings, and conservation areas. Target measures to improve energy efficiency and decarbonise heating for these buildings.

2.5 Sharing LHEES with our colleagues and the public

At the start of creating the LHEES, stakeholders both within and outside the Council were identified. These stakeholders were engaged throughout the development of the LHEES. The LHEES affects many parts of the Council, like Housing, Planning, Energy Management, Asset Management, and Transport. A working group was created within the Council to help guide the creation of the LHEES. Even though the LHEES is created by the Council, it will be important to work with people and groups outside the Council to make it happen. Relevant external stakeholders have therefore been regularly engaged. This included workshops and meetings with the Dundee Climate Leadership Group[19], a senior level group that oversees actions to tackle climate change in the City. At each step of creating the LHEES a report was drafted and feedback was received from the relevant internal and external stakeholders involved. The final draft of the LHEES has also been subject to a public consultation exercise and a copy of the consultation report can be found in Appendix 6. More details about the stakeholders involved and our engagement with them can be found in Appendix 3.

2.6 What other areas will this LHEES impact?

This LHEES is the first such document for the Council, so it was important to consider the full extent of its implications for various areas of the Council and wider society. To help us understand this, an Integrated Impact Assessment (IIA) was undertaken which covered the implication of LHEES on the following areas:

- Equality & Diversity.
- Fairness & Poverty.
- Environment.
- Corporate Risk.

The IIA considers changes or actions that will be needed to prevent any unintended negative effects from carrying out the LHEES over the next five years. The IIA report is included in Appendix 4. The following Scottish authorities were consulted to understand whether a Strategic Environmental Assessment (SEA) was required:

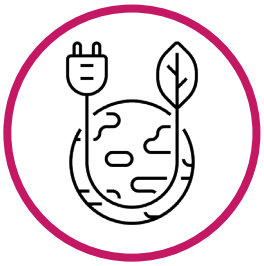
- NatureScot
- Scottish Environment Protection Agency (SEPA)
- Historic Environment Scotland

It was agreed that an SEA was not needed for the LHEES.

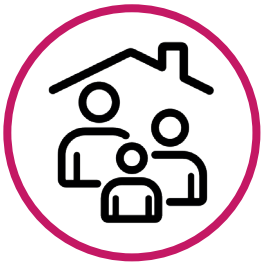
CHAPTER 3

How does LHEES align with other policies and strategies?

LHEES is part of our commitment to two key national policy targets:



Net Zero by 2045.



As far as reasonably possible no household in Scotland in fuel poverty by 2040.

There are also important commitments flowing down from UK laws such as the Climate Change Act 2008[13], and international policies like the Paris Agreement[14], which influence local climate change and they have an influence over local climate change and energy related policy such as LHEES.

This section focuses on the Dundee and Scottish national policy context relevant to LHEES. A full list of pertinent policies and their priorities, targets and related time periods is attached in Appendix 1.

3.1 National Policy Context

In response to the Paris Agreement, the Scottish Government introduced the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019[15]. This law sets a goal for Scotland to have zero net emissions by 2045, and interim targets of 75% emissions reduction by 2030 and 90% by 2040. This means that by 2045, the amount of greenhouse gas Scotland produces and the amount it removes from the atmosphere should be equal.

The Department for Energy Security & Net Zero has divided emission sources into nine sectors[16]. The LHEES mainly focuses on reducing emissions from buildings.

There are many ways to reduce greenhouse gas emissions from buildings. For example, Dundee can stop using fossil fuels, use low and zero carbon technologies, use energy more efficiently, and make buildings more energy efficient. The Heat in Buildings Strategy[11] has set targets to improve the energy efficiency of buildings.

- All Scottish homes need to reach EPC band C by 2033.
- Emissions from heat in buildings need to reduce 68% by 2030 compared to 2020.

These targets are available in Appendix 1. The Heat in Buildings Strategy also outlines how buildings in Scotland will reach the 2045 targets. It has identified certain technologies that will help us reach these targets:

- Energy efficiency improvements in all buildings (e.g. insulation in roofs, walls and floors, and improving windows).
- Heat pumps in off-gas buildings, and in on-gas buildings, where cost effective.
- Low and zero emission heat networks.

This version of the LHEES focuses on these technologies and identifies areas and buildings in Dundee that are suitable for these technologies. The Council also acknowledges the role of low carbon hydrogen and is working closely with SGN to understand its future potential. At this stage, however, there is not enough evidence to consider hydrogen as a way of making residential buildings in Dundee carbon-free.

The Heat Networks Scotland Act 2021[6] is another important law that will drive the creation of heat networks in Scotland. It requires Councils to identify Heat Network Zones (HNZ) within their areas, and this can be done initially in the creation of a LHEES. The Act sets a goal for the combined supply of thermal energy met by heat networks to reach 6 TWh of output by 2030. Further close collaboration by the Council with the Scottish Government and others will be required to understand how Dundee can contribute towards this goal.

The Energy Efficiency Standard for Social Housing post 2020[17] requires all social housing to reach certain energy efficiency rating by the end of December 2032. The target is EPC band B or as close as practically possible. Through the LHEES, there is close working with the Council's Housing team to gather evidence and support initiatives to meet this standard.

The Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019[18] set a goal for no more than 5% of households in Scotland to be in fuel poverty and no more than 1% to be in extreme fuel poverty by the end of 2040. The Council is taking steps to make sure that the LHEES helps to tackle fuel poverty in Dundee.

Even though the LHEES mainly focuses on buildings, it also affects other areas. For example, the National Planning Framework 4[19] states that Local Development Plans should consider the area's LHEES and potential areas for heat networks. The full list of national rules, targets and priorities relevant to LHEES is available in Appendix 1.

3.2 Local Policy Context

The Dundee Climate Action Plan[9] has set a goal for the City to have net zero emissions by 2045, the same as Scotland's national target. The plan is a City-wide effort that involves every part of society. This idea is central to the LHEES, which has been developed with the help of Scottish and Southern Electricity Networks (SSEN) and the Dundee Climate Leadership Group (DCLG)[20], which oversees climate actions in the City. The City Plan for Dundee 2022-2032[21] outlines what the Dundee Partnership and the community planning partners in Dundee want to improve for the people of Dundee. The plan focuses on three main areas:

1. Reducing inequality and poverty.
2. Improving the City's economy.
3. Tackling climate change.

The Dundee City Council Plan 2022-2027[2] supports the City Plan's main goals and identifies five priorities for the next five years:

1. Reduce child poverty and inequalities in incomes, education & health.
2. Tackle climate change and reach net zero carbon emissions by 2045.
3. Deliver inclusive economic growth (including community wealth building).
4. Build resilient and empowered communities.
5. Design a modern Council.

LHEES data suggests that there is a big challenge in tackling fuel poverty. 31% of households in Dundee are likely to be experiencing fuel poverty, and it is likely to be extreme fuel poverty for 21% of them. Both the City Plan and the Council Plan have recognised this challenge and are taking actions to reduce fuel poverty. The LHEES aims to help the City tackle climate change by making buildings carbon-free and improving the City's economy by investing in heat network projects. Effective ways to develop the City's economy without increasing greenhouse gas emissions will therefore be investigated.

Implementing the LHEES will also help improve the City's energy resilience and energy security by creating a case for City-wide heat networks that use local resources. The LHEES also aims to be modern, innovative and inclusive by making the strategy available online in a digital format.

The Dundee Local Development Plan 2019[23] is an important land use policy document that affects the LHEES and vice versa. The plan is part of the LHEES when deciding where to create delivery areas and Heat Network Zones. Factors like conservation areas, listed buildings, Ramsar sites, housing allocations, local nature reserves, and wildlife corridors have been considered during the LHEES process.

The Council has City-wide heat networks as a goal in its **District Heating Strategy 2018-2028**[24], which identified five potential heat demand clusters and a City-wide heat network connecting them. The LHEES will gather detailed evidence and help in updating this strategy.

In addition to the above, there are a number of local housing strategies and policies[25] which are relevant to LHEES. The LHEES is informed by the priorities and actions set out in these policies. A full list of local policies targets and priorities relevant to LHEES is available in Appendix 1.

3.3 What does this mean for LHEES?

General LHEES considerations are described in Section 2.4. Here, they are presented in relation to Dundee's local context:

Off-gas buildings

The LHEES baseline data suggests that 12% of properties are off-gas in Dundee. Some of these properties are supplied by communal heating systems. The LHEES will focus on initiatives to target these properties with energy efficiency improvements, individual heat pump installations and communal heating installations where the properties are not already connected to heat pumps.

On-gas buildings

87% of domestic properties are connected to the mains gas supply, suggesting a huge challenge in transitioning away from natural gas. The LHEES targets initially the properties with communal heating systems as well as social housing homes.

Heat Networks

The Scottish Government National Assessment[26] identified nineteen potential heat network zones within Dundee, with a total heat demand of 950 GWh within the identified zones (4% of the Scottish national demand). LHEES will support in identifying, prioritising and constructing heat networks in the City.

Poor building energy efficiency

According to the LHEES baseline analysis, 47% of domestic properties in Dundee are rated EPC D-G, which is lower than the national average (51%). LHEES adopts a 'fabric first' approach to ensure that the initiatives prioritise improving the energy efficiency of the fabric (e.g. windows, walls and roofs) of the buildings before connecting to heat networks or installing heat pumps.

Poor building energy efficiency as a driver for fuel poverty

The average probability of a household being in fuel poverty and extreme fuel poverty is 31% and 21%, respectively. This is higher than the Scottish average. Properties not connected to the gas network tend to exhibit a higher likelihood of both fuel poverty and extreme fuel poverty, therefore the LHEES will identify such buildings and target combined retrofit measures in order to remove poor energy efficiency as a cause of fuel poverty.

Mixed-tenure, mixed-use and historic buildings

LHEES baseline analysis suggests that around half of Dundee's domestic properties are situated within multi-dwelling buildings. Of these properties, approximately 70% are contained in buildings with more than one type of tenure (owned, rented, etc). Approximately 4% of domestic properties are classified as listed buildings. LHEES will target mixed tenure buildings for communal heating and whole house retrofit, starting in areas with high fuel poverty and a higher proportion of social housing stock. These properties are challenging but also pose an opportunity to kick-start community-level / large-scale retrofit projects which can be cost effective.

CHAPTER 4

Our LHEES journey

Dundee City Council has four living values[22]

1. **Be open and honest.**
2. **Be fair and inclusive.**
3. **Be innovative and transforming.**
4. **Be constantly learning.**

Our LHEES journey reflects these values. The Council has been open and honest about the opportunities and challenges of developing heat networks in Dundee. The Just Transition is about ensuring that the shift to a green economy supports poorer communities to benefit from this change and does not increase poverty.

The concept of a Just Transition is embedded across our projects and policies. Our partnership approach and the plan for digitising Dundee's LHEES is innovative. The Council is constantly learning from past projects. Below is a summary of key projects that are shaping our journey to Net Zero.

4.1 Pilot LHEES

The Council participated in a pilot project in the Lochee Local Community Planning Partnership Area. Lochee is situated towards the west of the City and includes a number of distinct community areas with Council, Registered Social Landlords and private housing as well as a District Centre, Retail and Leisure Park (Stack) and Industrial (Dunsinane) areas. Communal heating is currently serving Kirk Street, Lansdowne Gardens and Whorterbank Multi Storey Developments (MSDs).

The pilot project concluded that although a heat network would not be economically viable as a standalone development, it could be viable as part of a wider network within Dundee City Council's District Heating Strategy[11].

LHEES Pilot Project Study Area Boundary

Local Authority Boundary
Study Area Boundary

4.2 District Heating Strategy

Dundee City Councils' District Heating Strategy 2018-2028 sets out a long-term vision to support the City's growth and low carbon transition using decentralised energy. It provides evidence to support advancing district heating network schemes in Dundee, informing both policy and delivery. It identifies potential district heating networks and sets out a potential programme of network development and interconnections together with a deliverable action plan. The strategy will be updated using the LHEES outputs.

4.3 Existing Heat Networks in Dundee

Dundee already has several heat networks. Understanding these networks helps to shape the process of creating the LHEES.

4.3.1 Caird Park Heat Network

In 2019, the Council received £2.9 million from the Scottish Government to create a Low Carbon District Energy Hub at Caird Park, to the north of Dundee City Centre. The Council and Sport Scotland created a new Regional Performance Centre for Sport which includes a Low Carbon District Energy Hub (LCDEH). It uses low or zero carbon technologies and can be expanded to supply heat to more buildings in the future.

Finished in 2020, the LCDEH uses different technologies like heat pumps, gas combined heat & power (CHP), solar thermal, photovoltaics, and large thermal stores with gas boilers for peak demand and backup.

The main heating technology, three ground source heat pumps (GSHPs), have a total capacity of 600 kW, with 116 vertical boreholes, 200m deep and 12m apart installed in the park. The system extracts low grade heat from below ground and turns this into a higher-grade heat for buildings. Since the boreholes and pipes are underground, people can still enjoy the park.

4.3.2 Council-owned Communal Heat Networks

There are four gas-fired communal heat networks in Dundee that supply heat to ten Council-owned multi-storey developments (MSD), and some private sector buildings. The homes connected to these heat networks each have a heat meter, so residents only pay for the heat they use. There are also two communal heating schemes within two of the Council-owned sheltered housing complexes (Brington Place and Baluniefield). The heating systems at each of these networks also serve communal areas within the complexes. The residents pay a flat rate amount for heating with their rent.

Council owned communal Heat Networks

1. Dallfield scheme: This is made up of 4 MSD blocks; Dallfield Court, Tulloch Court, Bonnethill Court, Hilltown Court. The network is served by an energy centre at Tulloch Court and supplies heat to a total of 336 properties in 4 MSDs.
2. Whorterbank scheme: This is made up of 2 MSD blocks at Ancrum Court, Burnside Court. The network is served by an energy centre at Ancrum Court and supplies heat to a total of 168 properties in 2 MSDs.
3. Lansdowne scheme: This is made up of 2 MSD blocks at Lansdowne Court and Pitalpin Court. The network is served by an energy centre at Lansdowne Court and supplies heat to 168 properties in 2 MSDs.
4. Kirk Street scheme: This is made up of 2 MSD blocks at Adamson and Elders Court. The network is served by an energy centre at Elders Court and supplies heat to 240 properties in 2 MSDs plus 222 low-rise properties in Atholl Street, Kirk and Yeamans Lane. This scheme serves some private residents in low-rise buildings, but all residents in the MSDs are Council tenants.
5. Brington Place (30 Brington Place, flats 1 – 27)
6. Baluniefield (211A Balunie Drive, Flats 1 – 27)

4.3.3 University of Dundee Heat Networks

The University of Dundee has a heating system that can operate at different temperatures. One part of the system uses high temperature hot water (up to 100°C), and another uses cooler water (45-50°C). This system is powered by an energy centre that uses a CHP unit and gas boilers. This provides heat to about 40 buildings, including classrooms, research labs, and a dental hospital. Some parts of this heating system are up to 60 years old and urgently need replacing.

4.4 External Wall Insulation (EWI) projects

The Council's Housing Department continues to maximise the impact of the Home Energy Efficiency Programme Scotland – Area Based Schemes (HEEPS:ABS) now more commonly referred to as EES:ABS - (Energy Efficient Scotland: Area Based Schemes) funding by combining it with its own capital budget to insulate mixed tenure blocks of flats in Council estates with high levels of fuel poverty that are either solid wall or non-traditional construction. This has resulted in more than £50m total investment in EWI in the City since the inception of the EWI Programme in 2013, with more than 5,000 residents in Dundee seeing their properties thermally upgraded.

As this programme nears its end, attention turns to the homes that have cavity-walls. Most of this stock of just under 6,000 units had cavity-wall insulation installed (CWI) 40 years ago and this now needs to be upgraded. Decisions are still to be made about the best solution to upgrade the energy efficiency of these homes but it is likely to entail going beyond simply removing and replacing existing CWI and installing external wall insulation too. A pilot project to identify the best methods of doing so will start on site in early 2024. By insulating stock in this way - the fabric-first approach - it is readied for the later installation of decarbonised heat such as heat pumps which operate most efficiently in well-insulated, air-tight properties.

4.5 Non-Domestic Energy Efficiency (NDEE) projects

The Non-Domestic Energy Efficiency (NDEE) initiative is a procurement framework to find a delivery partner to identify, design, install and guarantee all proposed Energy Conservation Measures (ECMs).

This means the financial risk is transferred to the contractor.
Table 1 summarises outcomes from the work carried out under this framework. The previous three phases of the NDEE programme installed ECMs in 45 properties for a total cost of c.£7 million. This provides guaranteed annual savings of around £740,000 and reduces carbon emissions by nearly 2,300 tonnes of CO_2. The 20-year future value for each property was estimated to be over £1m. ECMs include replacing existing lights with new LED lighting & HVAC controls, upgrading boilers, improving ventilation, adding fabric insulation and installing solar PV arrays on roofs.

Table 1. Summary of NDEE project outcomes

NDEE Basket Number	Number of Properties	Investment Cost (£)	Annual Revenue Savings (£)	Annual Energy Savings (kWh)	Annual CO^2 Emission Savings (tonnes)
1	8	1,700,000	220,000	2,788,425	1,000
2	17	2,500,000	267,000	2,116,365	720
3	20	2,750,000	251,554	2,530,265	573
Total	45	6,950,000	738,554	7,435,055	2,293

4.6 Heat Network Feasibility Studies

The Heat Networks (Scotland) Act 2021[6] has set a goal for Scotland's heat networks to reach 2.6 TWh of output by 2027 and 6 TWh by 2030. The Heat in Buildings Strategy recognises[11] heat networks as a key strategic technology to reach Net Zero. The Council supports the development of new heat networks in the City[24] and have carried out several studies to see if this is possible.

4.6.1 Dundee Caird Park Heat Network Feasibility Study

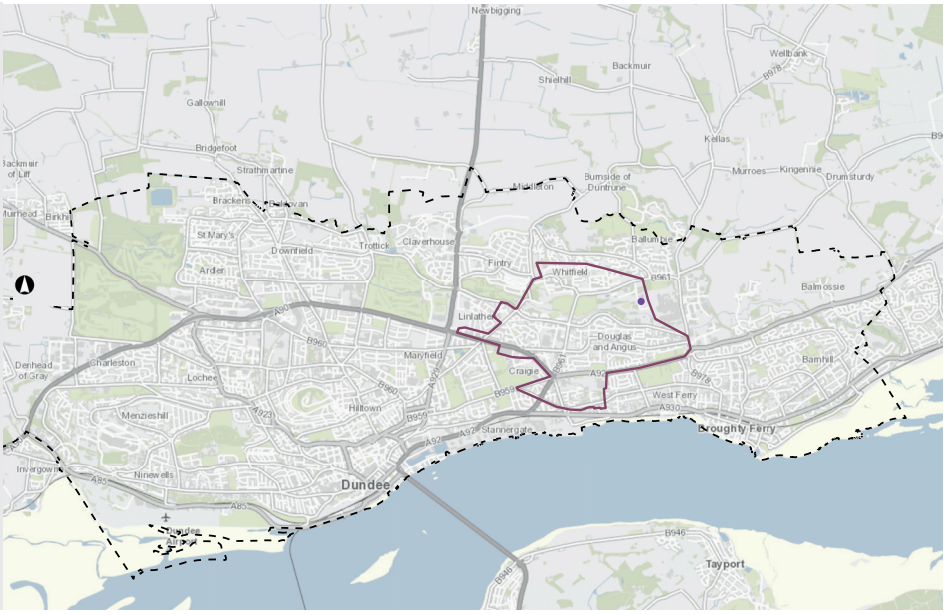
One study was done at Caird Park by the Buro Happold Cities Energy Team for Dundee City Council in April 2023. They found that it would be possible to improve performance by utilising the existing space in the Caird Park energy centre and extending the existing heat network to connect to a group of large buildings, including St. Paul's Secondary School, Ryze/ Soccerworld, Dick McTaggart Gymnastics Centre and Dundee and Angus College.

4.6.2 Baldovie District Heating Feasibility Study

Another study is being carried out on the 'Baldovie District Heating Network'. This study is being carried out by WSP UK Limited for MVV Environment Baldovie Ltd and Dundee City Council and is testing the possibility of using the existing MVV's Energy from Waste (EfW) plant as a source of heat to supply a heat network in the east of the city.

Baldovie Study Area

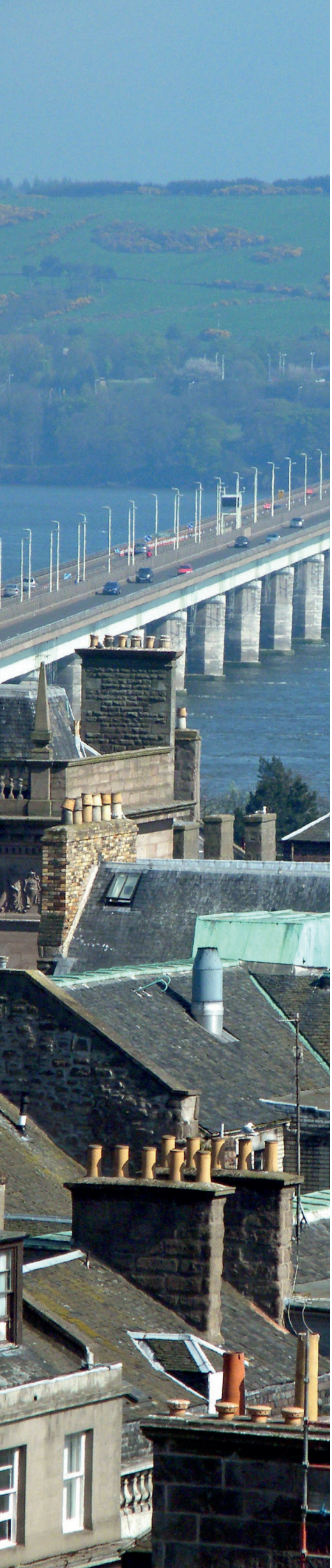
- Local Authority Boundary
- Baldovie Heat Network Study Area
- Baldovie EfW Plant



4.6.3 Abertay Energy Strategy & Heat Network Appraisal

Abertay University is looking to develop a heat network solution for the Abertay University campus as part of the main heating plant replacement to allow for optimised use of a low carbon heat source. The Masterplan exercise carried out by Abertay has identified Air Source Heat Pump (ASHP) and SHARC wastewater heat recovery utilising the Scottish Water sewer as two potential technologies suitable for the site.

The project has scope to accommodate more heat capacity on the University site than would be required by the University. This provides the opportunity of low carbon heat to nearby public buildings in the short term, and connection to a wider heat network within Dundee city centre in medium to long term.



4.7 Local Area Energy Plan

Local Area Energy Planning (LAEP) is a way to create and test different scenarios for the local energy system to meet local and national goals for zero net emissions. This means looking at things like electricity, heat, gas, the potential for hydrogen in the future, buildings and their systems, energy generation and storage, and providing energy for things like electric cars.

At the same time, the LAEP needs to consider a 'Just Transition' to make sure that the cost of lowering emissions does not fall on the people least able to afford it. Right now, LAEPs are something that Local Authorities in Scotland can choose to do. They often work with Electricity Distribution Network Operators (DNOs) to do this.

Dundee City Council is working with Scottish and Southern Electricity Networks (SSEN) to develop both a LAEP and the LHEES for the City. Dundee's LAEP is being developed at the same time as the LHEES and will be finished in summer 2024, after the LHEES is published.

The LAEP looks at options for reducing carbon emissions, while the LHEES mainly focuses on reducing heat emissions and improving energy efficiency to tackle fuel poverty. By working on the LHEES and LAEP together, it makes sure work is not duplicated and there is better alignment between the two.

4.8 RESOP / LENZA

Regional Energy Systems Optimisation Planning (RESOP)[27] is a project by SSEN, who have been working with Arup. They have been working with Arup, Advanced Infrastructure (AI) and Dundee City Council since 2022 to develop the LHEES and LAEP[28]. The RESOP team is using a digital tool called Local Area Energy Planner plus (LAEP+) to show the results of the LHEES and LAEP.

The project aims to digitise relevant energy data and to help Distribution Network Operators (DNOs) and Local Authorities (LAs) work together on local energy planning. In November 2023, RESOP was renamed as Local Energy Net Zero Accelerator (LENZA) and SSEN plans to use this platform in all its network areas.

Both the LAEP and LHEES will be shown in LENZA's digital tool, LAEP+. This will ensure the data flows smoothly and will help keep the strategy up to date. Having a digital LAEP will enable the Council to collaborate with stakeholders and test options for changes in the City's energy systems.

Once the options are presented in a final report, the digital LAEP will work as a live document that can be used for decision making around prioritising, sequencing, and developing projects for delivery. This new approach is hoped to keep Dundee's LHEES and LAEP up-to-date and speed up the energy transition in Dundee.

CHAPTER 5

Our homes right now

The LHEES methodology was used to determine a baseline for the homes in the Dundee City area. Energy Saving Trust's Home Analytics tool provided data for 77,456 homes in Dundee.

Home Analytics combines information from different places, like the Ordnance Survey, the EPC register, gas network data, and Council data. When there's missing or incomplete data for a property, Home Analytics uses statistical and geospatial modelling methods to fill in the gaps. These datasets were analysed and used to make graphs, tables, and maps, which created the baseline.

To create the baseline for Dundee's LHEES, the datasets were grouped together at both Local Authority and 'data zone' level. Data zones are geographic areas that are used to understand statistics about the population. They are intended to be small enough to represent communities, such as social characteristics and geographical constraints, but large enough to protect confidentiality. They are widely used in the public and private sector, for example to report Census information, and are used to inform local and national policy decisions.

Dundee is made up of 118 data zones. To develop Dundee's LHEES, the counts and characteristics of properties were aggregated by these data zones so that specific challenges and opportunities each area may face can be better understood. The data zones which had significant opportunities could then be prioritised for delivery.

For a full explanation of Data Zones and how Data Zones map to Wards, please see Appendix 2.

Taking into account all of these datasets and characteristics gave a better understanding of Dundee's homes, and for each data type in the Home Analytics dataset (such as type of heating system or single or double glazing), a confidence score was given to demonstrate the accuracy of the datasets and thus the LHEES analysis score was given to show how accurate the model is.

5.1 Where the Council gets data

For categorical values (like property tenure) in the Home Analytics dataset, the accuracy across all of Scotland ranges from 85% to 99%. The dataset also includes a confidence score for the continuous values modelled (like floor area). A score of 100% means that the value comes from existing records, while -100% means there's no existing data to inform the modelling. The average confidence rating for the continuous fields used in this analysis is 94% for floor area estimates and 97% for current energy efficiency (SAP) rating estimates. Of the 77,456 properties in the Home Analytics dataset, 52,668 (68%) are linked to an EPC record. This means any errors or inaccuracies in the EPC records will also be in the Home Analytics dataset.

The results from the Home Analytics model have been checked against other datasets, like the Scottish House Condition Survey. These checks have shown that at a national level, the distribution of variables in Home Analytics matches their distribution in reality. This suggests that while Home Analytics may not be able to give a completely accurate picture of individual property characteristics, it can give a comprehensive and representative overview of the homes across Dundee as a whole.

The assessment of fuel poverty is based on the Scottish Housing Condition Survey 2019, which is likely to be out of date, especially with the recent increases in the energy price cap. It is not within the scope of this LHEES to update the fuel poverty data, but the Council acknowledges that the fuel poverty rate in the City is likely to have increased.

5.2 Our findings about current homes

Dundee's homes have some unique features. There is a higher proportion of social housing and privately rented homes than the national average. There is also a higher proportion of flats and homes connected to mains gas. Dundee also has higher rates of fuel poverty compared to the national average. These features present some challenges and opportunities:

- Diverse tenure types will require a higher level of community involvement in retrofit projects.
- Homes in mixed tenure buildings will need incentives to encourage private landlords and homeowners to take part in retrofit projects.

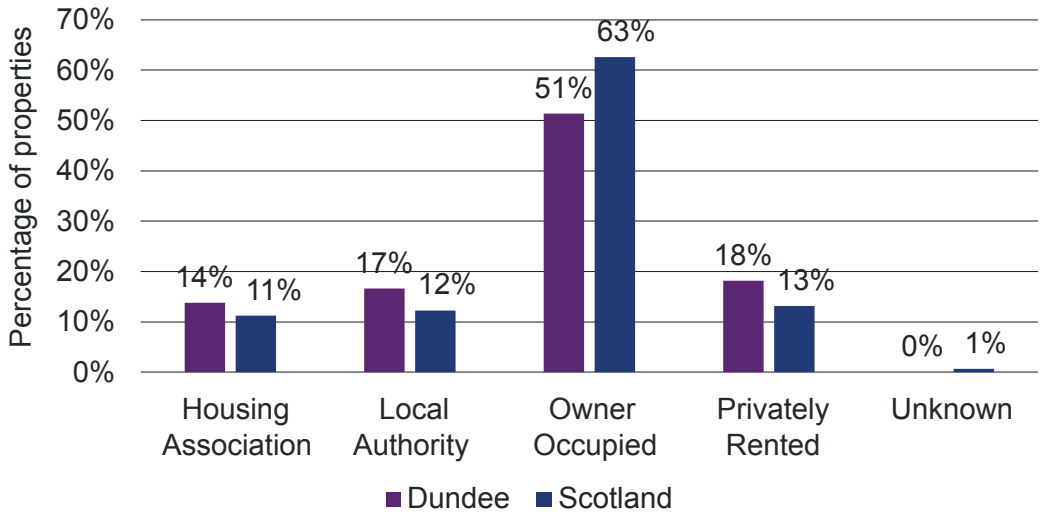
- Most homes are connected to mains gas, so transition to alternative heating systems should be done carefully to avoid increasing heating costs and making fuel poverty worse.

5.2.1 Property characteristics

The age of Dundee's homes is similar to the national average, with most homes built before 1984. Older homes are usually less energy-efficient and can be difficult to improve owing to their construction, design, and sometimes historical preservation considerations. But improving energy use in these homes offers a big opportunity to reduce carbon emissions and tackle fuel poverty.

The largest group of homes in Dundee was built between 1950 and 1983, which is similar to the national average. These homes often have insulated walls (70%), loft insulation (68%), and double glazing (92%), making them suitable for heat pump installation. Also, a lot of them are connected to the gas network, presenting a chance to reduce carbon by changing to electric heating.

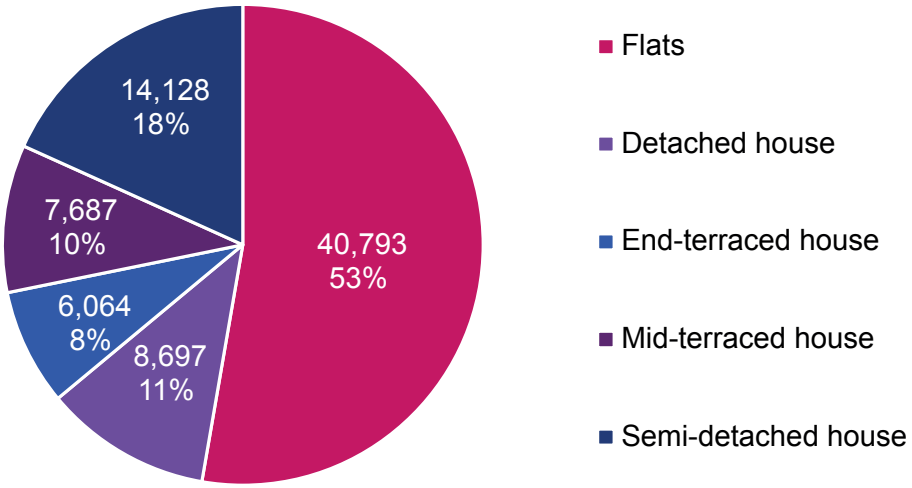
Figure 1. Domestic Property Tenure in Dundee



Most homes are owner occupied (51%), but there's a higher proportion of privately rented and social housing compared to the national average (see Figure 1). This diversity in tenure types presents challenges for carrying out energy efficiency initiatives. More community involvement and incentives to motivate landlords and occupants to take part in retrofitting projects may be required.

This also presents an opportunity as multiple sources of funding can be drawn together to design a community-scale project and reduce the cost of retrofit.

Figure 2. Domestic Property Types in Dundee



The majority of properties in Dundee are flats (53%) see Figure 2. The proportion of flats in Dundee is greater than the national average, largely due to its urban nature. Retrofitting flats can be challenging due to the involvement of multiple stakeholders, varied tenure types and limited space for new heating technologies. Fabric retrofit may be particularly challenging in older buildings. Flats also offer opportunities, however, such as changing to communal heating systems which are often more cost-efficient and energy-efficient than individual systems.

31% of flats in Dundee were built before 1919. Many of the flats in Dundee are older types of buildings known as tenements. These tenements are a feature of the architecture of the City, although the age of a building can impact the ability for external insulation to be added. Some of the unique features and challenges of Dundee's tenements include:

- They are typically built of solid stone, with no external or internal insulation. There is typically a lath and plaster finish on the internal wall. The mass of the stone provides some degree of thermal control: they tend to be slow to gain and slow to lose heat.

- They also typically have decorative feature plasterwork internally. Internal insulation would either involve the destruction of these original features and a reduction in floor area or require these to be replicated once insulation has been installed.
- Often there is opportunity to improve energy efficiency of tenements by upgrading the windows. The Council's best practice advice[60] is to repair rather than replace. Existing sash and case windows can be upgraded to modern standards of efficiency through draft stripping seals, upgrading existing glazing, using shutters or heavy lined curtains and introducing secondary glazing.
- Tenements are typically row on row, though some have small communal gardens, often forming quadrangles. The visual impact of new heating technologies such as air source heat pumps is an important consideration in design.

5.2.2 How Dundee currently heats its homes

Decarbonising heat is one of the hardest parts of the Net Zero transition. It requires a combination of new technologies, community engagement, and support from laws and policies. The LHEES helps to determine the opportunities and challenges for decarbonising heat while also identifying where more legislation and collaboration is needed. In Dundee, only 12% of homes are not connected to the gas network (off-gas), which is lower than the national average of 19%. This shows that Dundee faces a big challenge in moving away from natural gas.

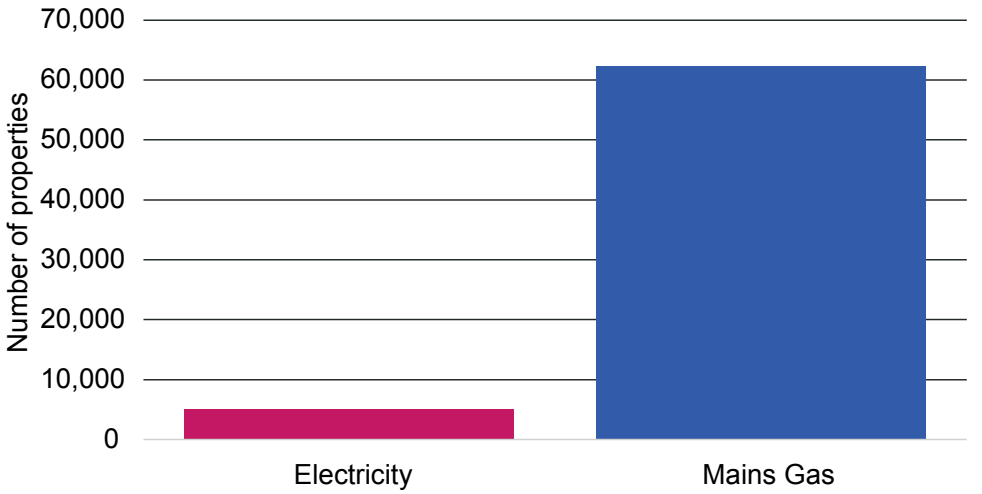
87% of domestic properties are connected to the mains gas supply.

12% of properties are off-gas.

Among homes connected to natural gas (known as on-gas), 92% use the mains gas for heating, while 8% use electricity (Figure 3). Very few homes in Dundee use other sources like LPG, oil, or biomass/solid fuels. To achieve net-zero carbon emissions, there’s a need to replace natural gas boilers that produce carbon with alternative heating solutions.

This will likely involve the electrification of heat (such as using heat pumps) in the short-to-medium term and connecting to heat networks in the medium-to-long term.

Figure 3. On- gas Domestic Properties by Main Fuel Type in Dundee



Most (93%) of the homes in Dundee that are off-gas are currently heated using electricity. These homes can be prioritised for alternative more efficient low and zero carbon heating technologies to reduce heating costs compared to direct electric heating systems. About half of the homes that are on-gas are highly suitable for heat pump retrofits (Category 1, see section 7.1.3). However, about one third fall into Category 3, requiring substantial upgrades or alternative low or zero carbon heat sources.

Only 1% of off-gas homes are immediately suitable for heat pumps, and 64% require moderate upgrades. Private off-gas homes, in particular, face challenges due to the need for fabric upgrades and the absence of regulation.

5.2.3 How energy efficient are Dundee's homes?

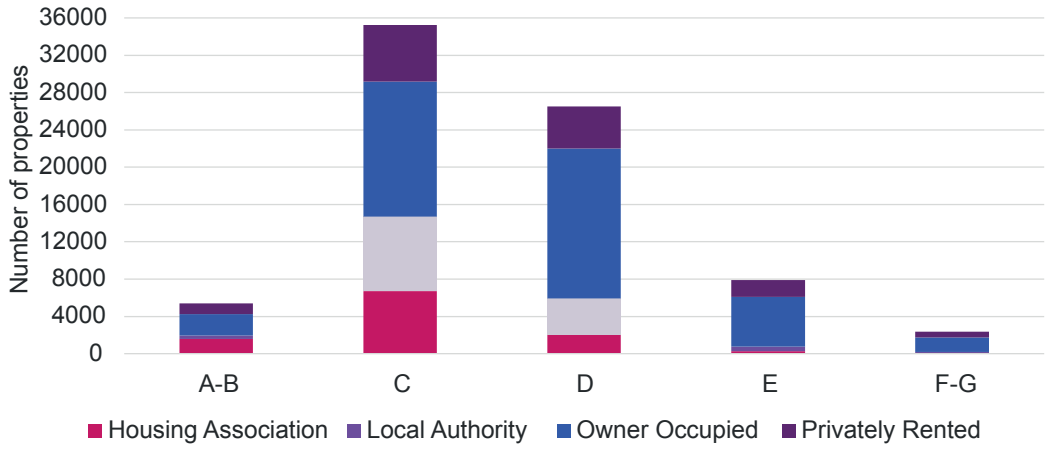
Making buildings more energy efficient is one of the City's top priorities. This is because it not only reduces carbon emissions, but also has several other benefits:

- It helps reduce fuel poverty by lowering energy bills.
- It's a long-term solution that saves energy resources by needing less energy to run a home.

- It helps with national energy security by making the country less reliant on imported energy.
- Improved building materials help make the City resilient to climate change. For example, installing external wall insulation, doors and windows helps buildings withstand extreme weather and the changing climate.
- Making buildings more energy efficient helps the City meet regulations and create new jobs.

The study suggests that 47% of homes in Dundee are rated EPC D-G, which is lower than the national average (51%) see Figure 4. Only 8% of social housing properties meet the EESSH2 standard with an EPC of A-B, meaning that 92% need changes to meet this standard.

Figure 4. Domestic Property EPC Bands by Tenure in Dundee



In Dundee, 44% of private homes meet the Heat and Buildings Strategy target with an EPC of A-C, leaving 56% needing some level of changes by 2033.

Private homes in Dundee are less energy efficient compared to social housing. 41% of Dundee's homes have uninsulated walls, similar to the national average. Most of these homes are privately owned. Of the homes with uninsulated walls, 61% have solid brick or stone construction, making insulation difficult. 7% of homes in Dundee have single or partial glazing, just under the national average. Most of these are privately owned. Around 8% of homes have limited loft insulation, with over half of them being owner-occupied. Social housing properties have a notably higher percentage in this category.

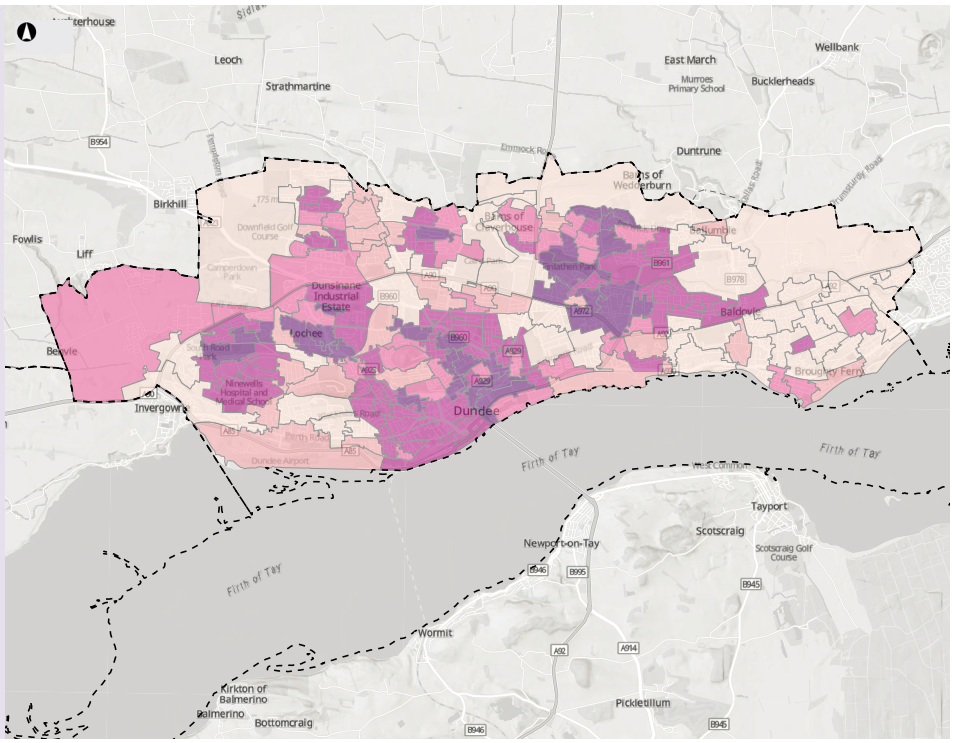
5.2.4 Fuel poverty

According to the Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019[18] fuel poverty is when a household spends more than 10% of the UK Minimum Income Standard (MIS)[17, 29], (after housing costs) on fuel costs to keep the home warm. Extreme fuel poverty is when a household spends more than 20% of the MIS on fuel costs.

The data suggests that the average chance of a Dundee household being in fuel poverty and extreme fuel poverty is 31% and 21% respectively. This is higher than the national average for fuel poverty in Scotland, which was 24% in 2019. It is important to note that this data is from 2019, and fuel poverty in Dundee is likely to have increased owing to rises in energy prices and the cost of living.

Probability of fuel poverty (%)
- 0% - 19%
- 20% - 26%
- 27% - 33%
- 34% - 39%
- 40% - 48%

This map spatially displays the probability of a property being in fuel poverty, aggregated to a data zone level. The data behind this map draws on the Home Analytics dataset (Version 3.8).



Probability of Fuel Poverty

Click to open interactive map online and select:

- Click ‘Domestic Baseline’ group.
- Select ‘Fuel Poverty’.
- Click ‘Probability of Fuel Poverty (%)’ layer on.

Homes not connected to the gas network tend to have a higher chance of both fuel poverty and extreme fuel poverty. Making these homes more energy efficient and reducing carbon emissions from heat therefore presents the opportunity to reduce fuel poverty by changing to more efficient heating systems. Among the different types of homes, flats have the highest average chance of experiencing fuel poverty.

5.2.5 Mixed tenure

About half of Dundee's homes are in buildings with more than one type of home ownership, like rented or owned homes. This is known as mixed tenure. Most of these mixed tenure buildings are flats, or large older buildings divided into flats, known as tenements. This can make it hard to make decisions about making changes to the whole building, as it involves lots of different people. Social housing or homes owned by the Council may have additional difficulties based on limited resources and different priorities.

5.2.6 Historic buildings

In Dundee, about 4% of homes are listed buildings. Most of these homes (85%) are privately owned. Making changes to listed buildings can be hard because of planning restrictions, high costs, and people's love for their historic character. About 14% of homes in Dundee are in conservation areas, with most (85%) being privately owned. To meet energy efficiency standards, retrofit in these areas needs careful attention to planning permissions and design rules.

CHAPTER 6

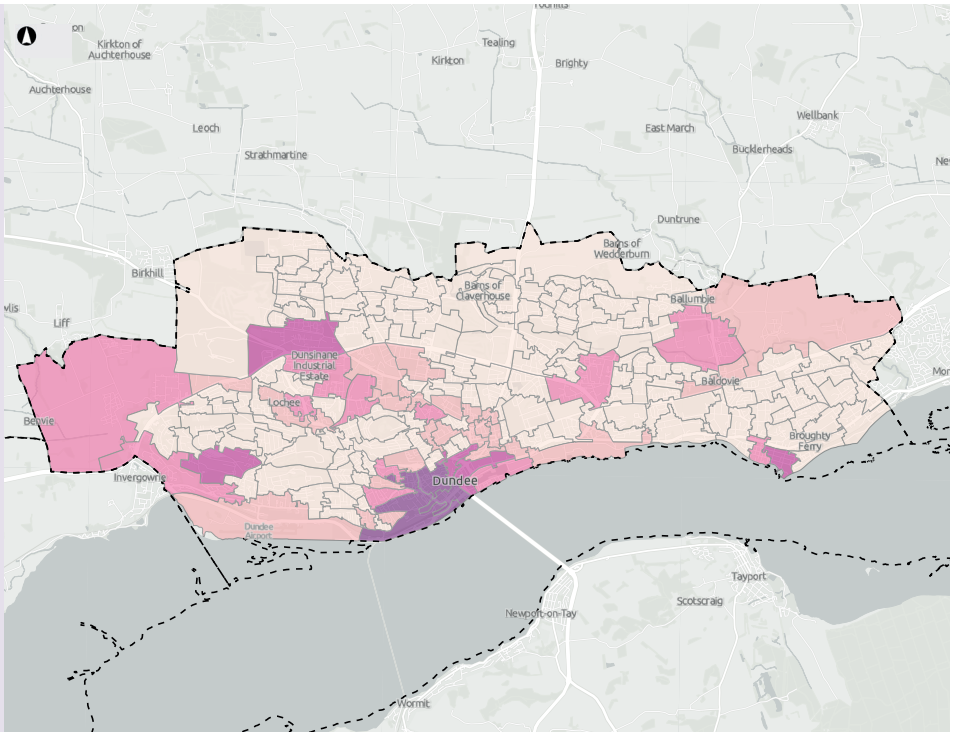
Our non-domestic buildings right now

While not required by the LHEES (Local Heat and Energy Efficiency Strategies) guidance, analysing non-domestic buildings like factories, offices and shops is important in understanding the potential for heat networks. There are currently 3,445 non-domestic buildings in Dundee.

Non-domestic property count

- 0 - 27
- 28 - 74
- 75 - 146
- 147 - 243
- 244 - 515

This map displays the count of non-domestic properties in Dundee, aggregated to a data zone level. The underlying data behind this draws from the Energy Saving Trust's Non-domestic Analytics dataset.



Non Domestic Property Count

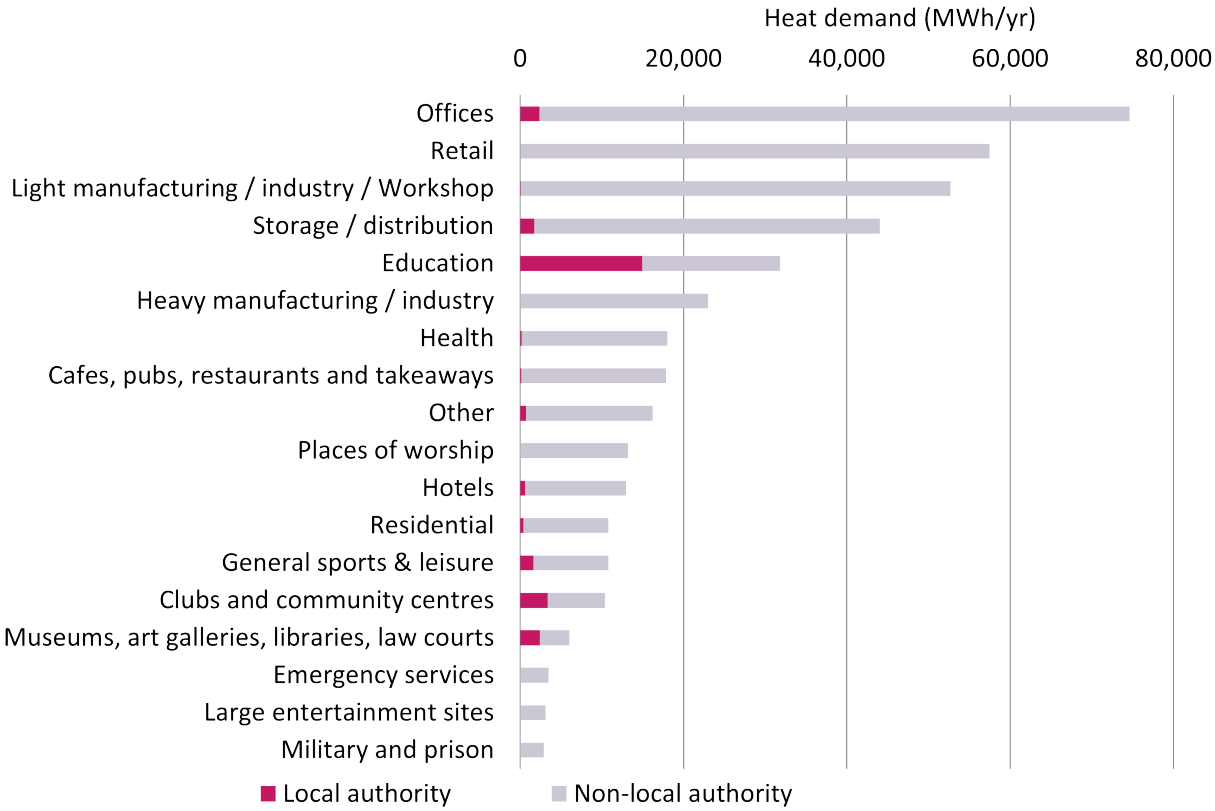
Click to open interactive map online and select:

- Click ‘Non- Domestic Baseline’ group.
- Select ‘Non-Domestic Property Count’

6.1 How the Council has analysed non-domestic buildings

The non-domestic building stock dataset was developed by SkenarioLabs[30] using multiple sources. Energy Saving Trust's Non-Domestic Analytics (NDA) dataset was used as the main source of data, which uses publicly available EPC data and statistically modelled values, to model baseline heat demand. The Council's property data was used to identify Council-owned properties. For all non-domestic properties, heating demands were modelled and estimated for space heating and hot water based on typology, building fabric, and façade area (see Figure 5). Typologies were estimated using Ordnance Survey classification descriptions, land use categories, and EPC property types where available.

Figure 5. Non-Domestic buildings and their approximate heat demand in Dundee



It is important to note that the non-domestic dataset from Energy Saving Trust is still being developed. It will be important to work with Energy Saving Trust, Scottish Government, and relevant partners to improve the reliability of this dataset in the future.

6.2 Our findings about current non-domestic buildings

6.2.1 Council-owned buildings

About 28.5 GWh/year of heat demand comes from Dundee City Council's own buildings (~7% of total non-domestic heat demand in Dundee). Most (52%) of this heat demand comes from educational buildings. This shows that the Council has limited control over the non-domestic heat demand in Dundee, highlighting the scale of the challenge to reduce carbon emissions from these buildings.

6.2.2 Private sector buildings

The buildings with the highest heat demand in Dundee tend to be privately owned, like offices, retail spaces, and industrial buildings. Getting accurate energy data for private sector buildings is usually more difficult than for public buildings. The private sector heat demand data used in this analysis relies heavily on statistical modelling and energy benchmarks. As a result, there is low confidence in the total heat demand and associated energy consumption.

Dundee City Council also has limited control over improving energy efficiency and reducing carbon emissions from heat in private sector buildings. Initial actions for the private sector may need to focus on working with private sector building owners and occupiers to:

1. Improve the accuracy of heat demand data for key buildings.
2. Share the LHEES Strategy findings and analysis.
3. Identify quick wins for improving energy efficiency and reducing carbon emissions from heat in the non-domestic building sector.

6.2.3 Offices

Dundee has about 1,451 office buildings, which make up the highest proportion of heat demand of any non-domestic buildings in the City. Offices make up 18% of the total yearly heating demand. Since offices are often rented, it can be hard to reduce their carbon emissions because it involves working with multiple stakeholders.

Efforts should look at more than just upgrading buildings and changing heating systems, as big savings can also come from adjusting building and temperature controls.

The Council owns about 2% of the office buildings, of which 45% are heated by natural gas. Council-owned offices can be a starting point for efforts to reduce carbon emissions in the office sector.

6.2.4 Retail

Retail buildings make up the majority (25%) of non-domestic properties in Dundee and have the second-highest heating demand after offices. Currently, 10% of retail sector heating comes from oil and 20% from natural gas.

The retail sector presents an opportunity to work with and support local small and medium-sized businesses (SMEs). Local SMEs may be more open to working together and benefit from support like funding for making their buildings more energy efficient compared to larger retail chains, which likely already have plans in place to reduce their carbon emissions. This could help speed up efforts to reduce carbon emissions in the sector.

6.2.5 Manufacturing and industry

Light industry and manufacturing make up 13% of non-domestic heat demand in Dundee, while heavy industry and manufacturing makes up less than 6%. However, this figure for heavy industry may be an underestimate, as certain process heat demands may not be fully captured in the dataset. The Council will explore how industries with high process heating needs can reduce their carbon emissions using alternative technologies.

6.2.6 Educational buildings

Dundee has over 230,000 m^2 of educational buildings with a combined heating demand of around 32 GWh/year (8% of total non-domestic heat demand). This makes education one of the top five building types with highest heat demand in the City.

Around 46% of this heat demand comes from educational buildings owned by the Council. This presents an opportunity for the Council to play a big role in reducing carbon emissions in this sector, especially focusing on reducing natural gas usage which accounts for 75% of heating in Council-owned educational buildings.

6.3 Shared ambition to decarbonise non-domestic buildings

Dundee also has two major university campuses - the University of Dundee and Abertay University. These institutions want to reduce their carbon emissions[31, 32]. The Council recognises that the universities along with other public sector organisations, such as NHS Tayside, are key potential partners for speeding up the move away from fossil fuel heating in Dundee.

The Council, the universities and other stakeholders represented on the Dundee Climate Leadership Group have set up an Energy Systems and Retrofit Working Group to explore ways to reduce carbon emissions across both domestic and non-domestic sectors. Through this group, the Council will continue to work with the universities and other key delivery partners to facilitate working together and sharing knowledge among property owners in key sectors, such as educational buildings, offices and retail, to identify strategies for reducing carbon emissions from heat and improving energy efficiency in these sectors.

CHAPTER 7

Strategic Zones

Strategic Zones were identified to understand the potential pathways to decarbonise buildings at a strategic level. The Council focused on identifying opportunities and challenges to achieve two main goals:

Decarbonising heating in homes.

Improving domestic energy efficiency to tackle fuel poverty.

7.1 How the Council identified and selected Strategic Zones

The Home Analytics dataset and the Portfolio Energy Analysis Tool (PEAT)[33] were used to identify and prioritise the Strategic Zones for the domestic sector. Information from a company called SkenarioLabs[30] was also used to investigate the non-domestic sector.

7.1.1 Portfolio Energy Analysis Tool (PEAT) – how the Council knows what changes to consider

PEAT is a tool made by Energy Saving Trust to model energy saving upgrades for individual homes, based on its Home Analytics dataset. The Council used the tool to understand what changes could be made to homes to ensure that they meet the national standards and targets set out in the Heat in Buildings Strategy and the Energy Efficiency Standards for Social Housing post 2020:

- Improve the energy efficiency of private homes to an EPC Band C or above.
- Improve the energy efficiency of social housing to an EPC Band B or above.

The PEAT tool helped the Council to understand the impact of energy-saving measures in homes, such as how much energy and CO_2 could be saved, and how much it could cost.

7.1.2 Scottish and Southern Electricity Networks (SSEN) data – how the Council knows what changes the electricity network can support

SSEN is electricity Distribution Network Operator (DNO) that distributes electricity in Dundee. SSEN provided information about its network and how much capacity it has. This included information about SSEN's primary substations and the areas they serve. This information was used to assess spare capacity in the network, by comparing peak electricity demand from 2021/2022 to SSEN's published substation capacities[34].

7.1.3 LHEES Property Categories – how the Council prioritises where to make changes

To determine if a home is suitable for a heat pump, the LHEES categories 0 – 3 were used. If a home requires a lot of work to be suitable for a heat pump, other types of heating systems that are low or zero emission, like biomass, might be more suitable.

0 Already has a low or zero emission heating system. Currently, this is limited to properties with heat pump installed and those connected to a heat network.

1 Considered highly suitable for a heat pump installation (i.e. a well-insulated property with a wet heating system).

2 Secondary potential for a heat pump installation (i.e. require moderate fabric upgrades and/ or the addition of a wet heating system).

3 Either tertiary potential for a heat pump installation (i.e. requires significant fabric upgrades) or more suited to other low or zero emission heating systems (i.e. heat network, direct electric or electric storage).

7.1.4 Data zones – how the Council grouped the data for analysis

Data zones are small areas used by the Scottish Government to group information geographically and usually contain between 500 and 1,000 households. Data zones tend to include households with similar social characteristics and consider physical boundaries. These data zones were used to group the information for the Council's LHEES analysis. See Appendix 2.

Strategic Zoning is the process of identifying opportunities in specific data zones. When exploring the capacity of electricity networks to support heat pumps, the spare capacity of the relevant substation was assigned to each building. These building level data were then aggregated to the data zone level using the average capacity for substations.

7.2 Decarbonising on-gas homes

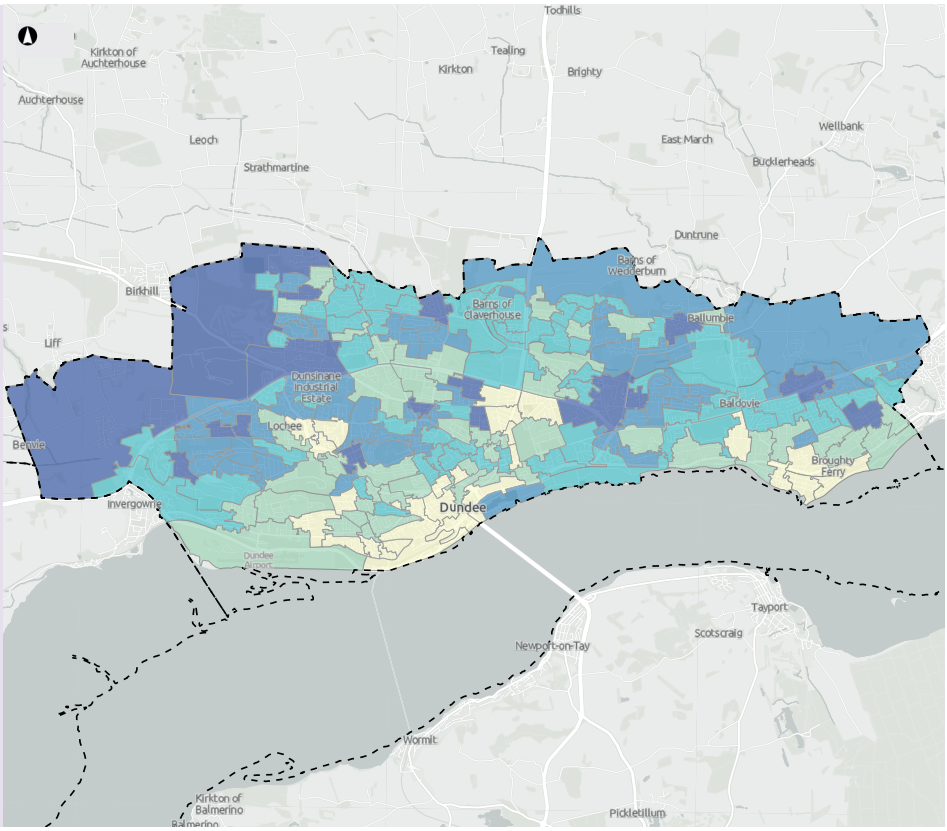
At the moment, 87% of the homes in Dundee are connected to the gas network. To reduce carbon emissions, natural gas boilers need to be replaced with greener options. The Council is looking at two main ways to do this, based on Scottish and UK policies[11, 35, 36]:

- Installing heat pumps.
- Connecting homes to heat networks.

The opportunity for heat networks in Dundee is explored in the Heat Network Zoning chapter. Homes that are connected to the gas network have been grouped into three categories. Category 1 homes are considered to be ready for heat decarbonisation now. Category 2 homes will require some changes before they can use decarbonised heating. Category 3 homes will require significant changes and have not been considered for heat decarbonisation in this iteration of the LHEES.

On-gas Cat 1 (property count)
0 - 50
51 - 132
133 - 224
225 - 333
334 - 565

This map spatially displays the count of domestic properties that are classified as Cat 1 On-gas, aggregated to a data zone level. Cat 1 On-gas is referred to as properties with immediate technical potential for heat pump retrofit (i.e. well insulated properties with a wet heating system, excluding any consideration of electricity network impacts or costs of any network upgrades). The process to determine a Cat 1 On-gas property draws on multiple data fields in the Home Analytics dataset (Version 3.8).



On-gas Cat 1 Property Count
Click to open interactive map online and select:

- Click the 'Strategic Zoning' group.
- Select 'Heat Decarbonisation'.
- Click the "On Gas Cat 1

7.2.1 Social housing

Most on-gas social housing is in Category 1. The top five areas (characterised by data zone - see Appendix 2) the most Category 1 social housing are:

1

- Linlathen and Midcraigie 04.
- Charleston 04.
- Ardler and St Marys 07.
- Menzieshill 06.
- Charleston 01.

These homes could use communal heating systems supplied by ground or air source heat pumps. In the future, they could connect to a heat network when heat networks are built in these areas. Some areas, like Ardler and St Marys 07 and Charleston 04, are not near a prioritised Heat Network Zone (HNZ) and comprise terraced, detached and semi-detached properties. These areas could use individual air source heat pumps. In some areas, like Lochee 03, Craigie and Craigiebank 05 and Douglas East 03, there are already communal heating systems. These systems currently use gas, but they could be changed to a clean or renewable heating technology. These areas are also within a prioritised HNZ, so the systems could connect to a heat network in the future.

There are also some areas with Category 2 social housing.
These areas are:

2

- Western Edge 03.
- Perth Road 03.
- Docks and Wellgate 01.
- Whitfield 02.
- Lochee 04.

Some of these areas, like Perth Road 03, have spare capacity in their local electricity network. Other areas, like Fairmuir 05, Lochee 05 and Fintry 06, are also within a prioritised HNZ. These areas present an opportunity for heat network development. Other areas, like Douglas West, Whitfield, Charleston and Barnhill 01, could make changes to their homes, such as fabric retrofit, to enable the use of individual heat pumps in the future.

7.2.2 Privately rented homes

The top five areas with the most on-gas Category 1 privately rented homes are:

1

1. Docks and Wellgate 01.
2. Western Edge 03.
3. Perth Road 06.
4. Craigie and Craigiebank 01.
5. Stobswell 07.

Some of these areas are within a prioritised HNZ, which means the homes could connect to a heat network in the future. However, Stobswell 07 is not within a prioritised HNZ. This area presents an opportunity to work with partners such as Energy Saving Trust and Heat and Energy Efficiency Scotland to provide guidance and support to private landlords. This could include information on exemptions, enforcement mechanisms, and available funding schemes. Some of these areas, like Docks and Wellgate 01 and Western Edge 03 also have lower electricity network capacity. It will therefore be important to engage with SSEN to understand better the electricity grid constraints in these areas. Perth Road 03, Perth Road 02, City Centre 05, Docks and Wellgate 04, and Westend 07 are the top five data zones with the most on-gas Category 2 private rented properties. It will be important to engage and foster partnerships with private landlords that own large estates in these areas.

7.2.3 Owner-occupied homes

The top five areas with the most on-gas Category 1 owner occupied homes are:

1

1. Western Edge 03.
2. Western Edge 01.
3. West Pitkerro 04.
4. West Pitkerro 01.
5. West Pitkerro 05.

A large proportion of on-gas owner-occupied homes are Category 1 (49%). Along with the installation of heat pumps, these areas could also benefit from using solar panels. There is an opportunity to work with these communities to help them understand the benefits of low and zero carbon heating systems.

Some areas, like Western Edge, West Pitkerro and Menziehill, have lower spare capacity in their local electricity network. Engaging with SSEN is important for community-scale heat electrification in these areas. Many homes in Broughty Ferry West 02, Broughty Ferry East 05, West Ferry 03, Balgay 04, and Western Edge 04 are Category 2. These homes would need to be made more energy efficient through fabric retrofit before they are suitable for decarbonised heating systems.

7.2.4 On-gas properties that are less suitable for heat pumps

The top five areas with the most on-gas Category 3 homes are:

3

1. Logie and Blackness 01.
2. Logie and Blackness 03.
3. Stobswell 05.
4. Broughty Ferry West 03.
5. The Glens 04.

These homes need significant changes before they would be suitable for heat pumps. Therefore, the focus should be on making these homes more energy efficient. Some of these areas (Logie and Blackness) are partially within a prioritised HNZ, so there is future potential to connect them to a heat network. Other areas, however, are not suitable and they present challenges in making heating more sustainable. Further research and community engagement is needed to find the best solutions.

7.3 Decarbonising off-gas homes

In Dundee, only 12% of homes are not connected to the gas network. Most of these off-gas homes are heated using electricity (93%), by using technologies such as direct electric heating systems. A lot of off-gas social housing is connected to communal heating systems. Some of these homes (about 1,200) get their heat from a central gas boiler (See Section 4. Our LHEES journey). Only 1% of homes that are off-gas are ready for heat pumps.

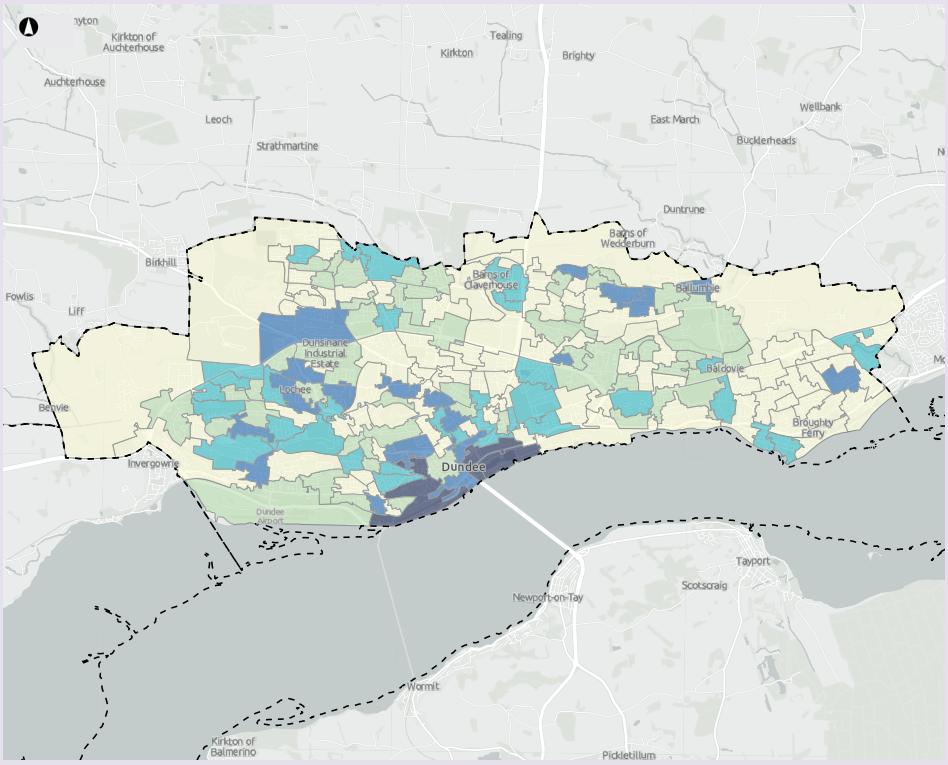
The areas with the most homes that are off-gas and Category 2 are:

2

1. Perth Road 03.
2. Docks and Wellgate 01.
3. Docks and Wellgate 04.
4. Whitfield 03.
5. Fairmuir 05.

Off-gas Cat 2 (property count)
- 0 - 13
- 14 - 34
- 35 - 69
- 70 - 194
- 195 - 367

This map spatially displays the count of domestic properties that are classified as Cat 2 Off-gas, aggregated to a data zone level. Cat 2 Off-gas is referred to as properties with secondary potential for heat pump retrofit (i.e. properties in need of moderate fabric / heat distribution system upgrade to be heat pump ready). The process to determine a Cat 2 Off-gas property draws on multiple data fields in the Home Analytics dataset (Version 3.8).



Off-gas Cat 2 Property Count

Click to open interactive map online and select:

- Click the ‘Strategic Zoning’ group.
- Select ‘Heat Decarbonisation’.
- Click the “Off Gas Cat 2 Property Count” layer on.

7.3.1 Social housing

The top five areas with the most off-gas Category 2 social homes are:

2

1. Docks and Wellgate 04.
2. Lochee 05.
3. Lochee 02.
4. City Centre 01.
5. Law 04.

Lochee 05 has a lot of Category 2 properties and spare capacity in the local electricity network. Homes in this area could use individual or communal heat pumps. This has the potential to lower energy bills by reducing the electricity used to heat homes.

City Centre 01 and Docks and Wellgate 04 are within the prioritised City Centre HNZ. Homes in these areas could connect to a heat network and also have opportunities to improve their energy efficiency through fabric retrofit. The homes in this HNZ could help kick-start the development of a heat network by providing heat demand which is under the control of social landlords.

Lochee 02 and Lochee 05 are partly in the prioritised Lochee HNZ. Other areas, like Linlathen and Midcraigie 04 and some of Whitfield have some off-gas Category 2 social housing and are also partly within the Baldovie HNZ.

Law 04 is not within a prioritised HNZ. Homes in this area could use individual or communal heat pumps once fabric retrofit has been carried out such as insulation upgrades.

7.3.2 Privately rented homes

Perth Road 03, Perth Road 05, City Centre 02, Docks and Wellgate 01 and Whitfield 01 have the most off-gas Category 2 private rented homes. These areas are also within a HNZ and thus support an opportunity to work with landlords to make these homes more energy efficient and ready to connect to a heat network.

7.3.3 Owner-occupied homes

Whitfield 03, Docks and Wellgate 01, Fairmuir 05, Linlathen and Midcraigie 03, and West Pitkerro 07 have the most off-gas owner-occupied Category 2 homes. Some of these areas are in or partially within a Priority HNZ.

Whitfield 3 is partly in the prioritised Baldovie HNZ. Fairmuir 05 and West Pitkerro 07 are not within a Priority HNZ.

Areas like Menzieshill, Charleston, Baxter Park and Barnhill have a lot of off-gas Category 2 homes and also have a low electricity network capacity. These areas present opportunities to encourage residents to use renewable energy technologies and for community energy projects to develop.

7.3.4 Off-gas properties that are less suitable for heat pumps

The areas with the most off-gas Category 3 homes are Perth Road 03, Docks and Wellgate 01, Docks and Wellgate 04, Whitfield 03, and Fairmuir 05. Most of these areas are within or near a prioritised HNZ, which means the homes could connect to a heat network zone in the future. However, the homes in these areas that use electricity for heating might need fabric retrofit or new heating systems before they can connect to a heat network.

7.4 Improving home energy efficiency to tackle fuel poverty in Dundee

Three indicators have been used to tell if a home has poor energy efficiency. These are: low loft insulation, uninsulated walls, and single glazed windows (see Table 2). The number of homes in Dundee with these indicators are similar to the Scottish national averages.

Table 2. Summary of NDEE project outcomes

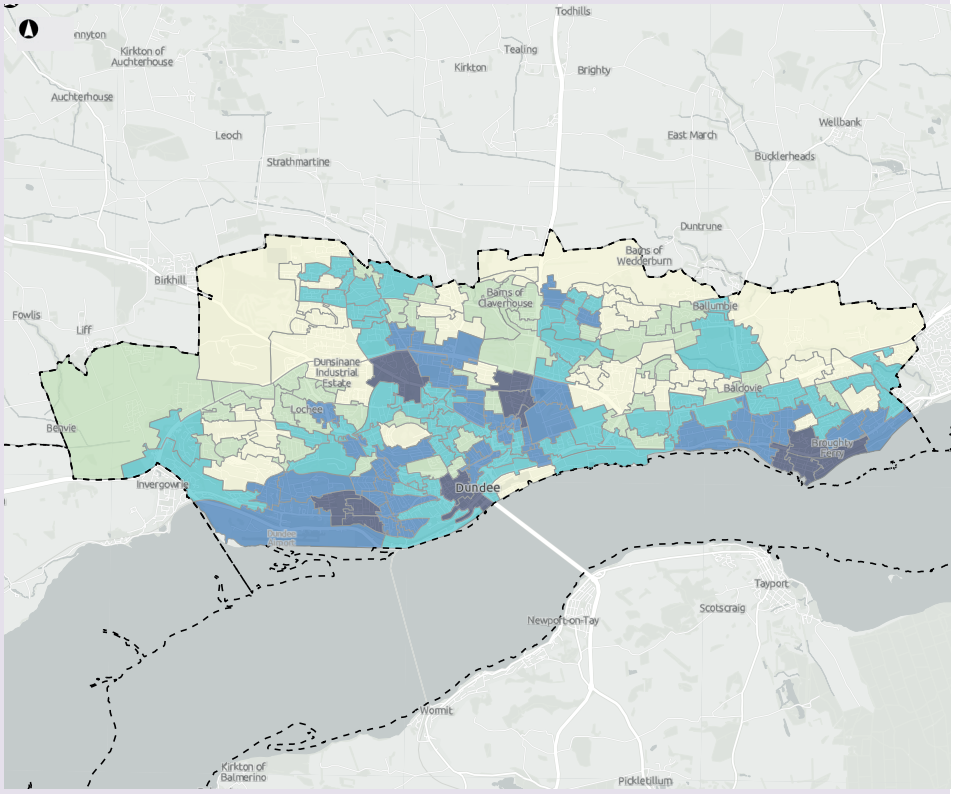
Energy efficiency indicator	Dundee	Scotland
Uninsulated walls	41% (31,431)	41%
Single/ partial glazing	7% (5,199)	8%
Low loft insulation (0-99mm)	8% (6,827)	9%

These three indicators were used to give each home in Dundee a score. The higher the score, the less energy efficient the home is. The areas with the highest scores are the City Centre, Baxter Park, West End, Broughty Ferry West, and Stobswell. These areas could be prioritised for deep energy efficiency retrofit measures.

Energy Efficiency (Mean Total Weighted Score)

- 0 - 7
- 7 - 14
- 15 - 24
- 25 - 34
- 35 - 62

This map spatially displays the Mean Total Weighted Score for energy efficiency for domestic properties, aggregated to a data zone level. Total Weighted Scores are calculated based on the selected Indicator percentages and the Weightings applied to create a score out of 100. The process to determine the Total Weighted Score draws on multiple data fields in the Home Analytics dataset (Version 3.8), these are wall insulation (uninsulated), loft insulation (as being 0-99mm) and glazing (single) and weights them equally to calculate the score.



Poor Energy Efficiency Mean total weighted score

Click to open interactive map online and select:

- Click the ‘Strategic Zoning’ group.
- Select ‘Energy Efficiency Improvement’.
- Click the “Poor Energy Efficiency Mean Total Weighted Score” layer on.

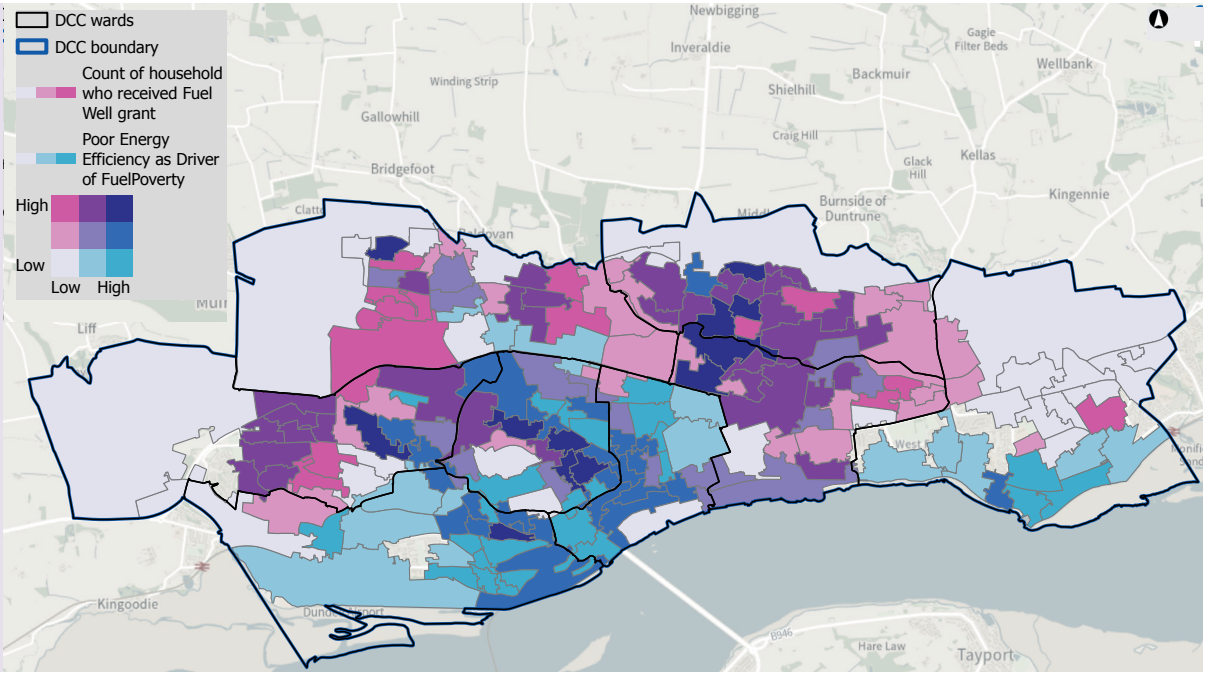
The Council also looked at which areas have the most households in fuel poverty, based on the internal Council Advice Services[37] data. The areas with both low energy efficiency and high rates of fuel poverty are around the City Centre, Midcraigie and Linlathen, Hilltown, Stobswell and Broughty Ferry West. This suggests that poor energy efficiency may be contributing to fuel poverty in these areas.

This analysis was compared with Council information about households that received help to pay energy bills in 2022/23 through Fuel Well grants. The areas with the most households getting help and the highest scores are:

- Linlathen and Midcraigie 01 and 02.
- Whitfield 05 and 09.
- Ardler and St Marys 08.
- Hilltown 02, 03 and 04.
- Lochee 05.
- Perth Road 06.

Only Perth Road 06 is within a Priority HNZ. The Linlathen and Midcraigie area is partly in the Baldovie Priority Heat Network Zone. The other areas are not within a Priority HNZ and are unlikely to connect to a heat network. This means there is an opportunity to focus on these areas for the installation of deep retrofit measures to improve the energy efficiency of the buildings and also reduce fuel poverty in the City.

Poor Energy Efficiency as Driver of Fuel Poverty and Fuel Well claimant



7.4.1 Improving the energy efficiency of social housing

The top five areas with social housing that has poor energy efficiency and where people are struggling to pay their bills are:

1. City Centre 05.
2. Stobswell 03.
3. Stobswell 02.
4. Broughty Ferry West 03.
5. Westend 05.

Further research needs to be undertaken in these areas to identify which streets would benefit most from energy efficiency retrofit to improve fuel poverty. These areas offer the potential to work with communities, Housing Associations, and the Third Sector to make the homes more energy efficient. Areas like Midcraigie and Linlathen, Hilltown have high levels of multiple deprivation[38]. Retrofit projects in these areas could have multiple benefits such as socio-economic benefits and improvements in health and well-being.

7.4.2 Improving energy efficiency of the privately rented homes

The top five areas with rented homes that have poor energy efficiency and high rates of fuel poverty are:

1. City Centre 05.
2. City Centre 01.
3. Westend 01.
4. City Centre 04.
5. City Centre 06.

All of these areas are within a Priority HNZ, which means the homes could connect to a heat network in the future. In the short term, these homes should be targeted for energy efficiency retrofit. Some of these areas are also within the Council's Conservation Areas which means that some of the homes are likely to be listed buildings.

It will therefore be important to collaborate with the Council's Planning team and Historic Environment Scotland before planning for and designing a programme of retrofitting homes.

7.4.3 Improving energy efficiency of owner-occupied homes

The top five areas with owner-occupied homes that have poor energy efficiency and where households are struggling to pay their bills are:

1. City Centre 05.
2. City Centre 06.
3. City Centre 04.
4. Perth Road 03.
5. Perth Road 02.

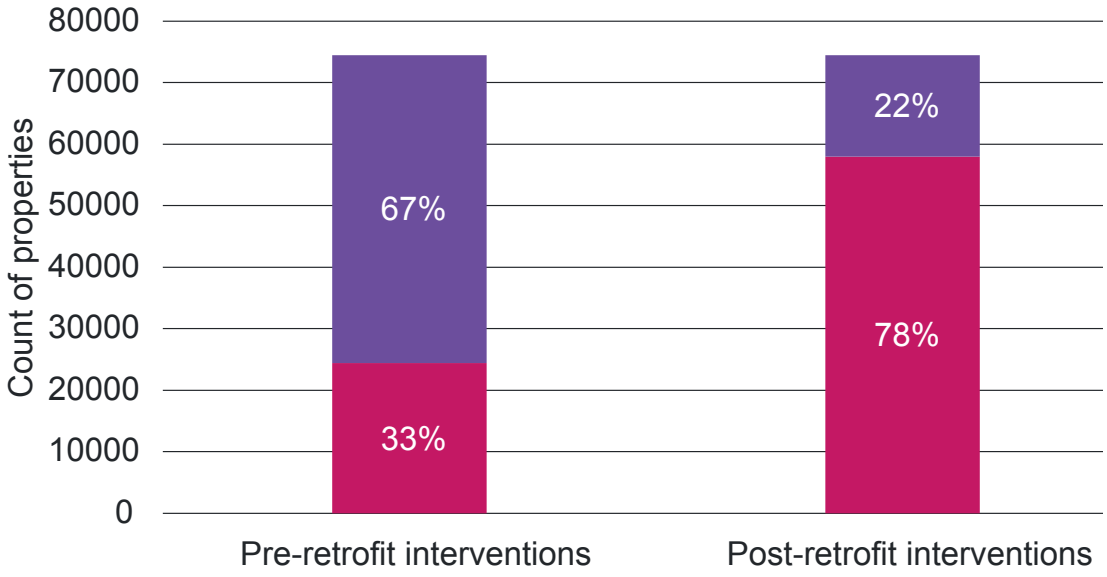
Similar to the private rented sector, these areas are also within a prioritised HNZ and within the Council's Conservation Areas. There is an opportunity to work with homeowners, landlords, and Historic Environment Scotland to identify the best fabric retrofit measures for these buildings.

7.5 What could Dundee achieve by making changes to buildings?

The PEAT tool was used to understand what changes could be made to homes in Dundee to make them more energy efficient and to decarbonise their heating. The Council used this tool to understand the scale of the challenge and the opportunity for meeting regulatory standards.

The PEAT tool recommended what changes would be needed to make privately owned and rented homes meet EPC band C standards and social housing meet EPC band B standards. High-level assumptions about property suitability and costs were used to produce these recommendations and this should be considered when interpreting the results.

Figure 6. PEAT Regulatory Standards Scenario outputs summary



The results show that 22% of homes will not meet EPC standards even with the recommended measures (see Figure 6). These measures were recommended by PEAT based on cost-effectiveness. Cost-effectiveness was determined using EST's 2021 (based on UK-averages) estimates for heating system efficiencies, fuel prices and savings. A lot of the homes that will not meet the standards even with retrofit interventions are social housing stock. This is because social housing has to meet higher standards (EPC band B).

Table 3. Summary of impacts of domestic retrofit interventions

	Energy saving from interventions (GWh pa)	Carbon saving from interventions (ktCO2e pa)	Total cost of interventions (£m)	Fuel bill saving from interventions (£m/ annum)
Social Housing (inc. DCC & Housing Association)	98.6	21.0	195.9	6.5
Owner-occupied	223.6	48.0	291.2	16.2
Privately Rented	34.0	7.4	51.8	4.1
Total	356.3	76.5	538.9	26.8

Table 3 shows a summary of the recommended changes for each tenure Type. The estimated total cost of these changes is £539 million.

Table 4. Summary of properties required to be retrofitted each year

	Number of domestic properties that currently do not meet regulatory standards	Total cost of interventions (£m)	Target year	Number of properties required to be retrofitted each year until target date
Social Housing (inc. DCC & Housing Association)	20,160	195.9	2032	2,520
Owner-occupied	23,395	291.2	2040	1,462
Privately Rented	6,449	51.8	2028	1,612

Table 4 sets out the number of properties required to be retrofitted each year in order to achieve the LHEES target years for completion by tenure type.

7.5.1 Targeting poor energy efficiency

In areas like Docks and Wellgate, Stobswell, Western Edge, and West Pitkerro, there are social homes that have poor energy efficiency and would be relatively low cost to meet regulatory standards. Improving energy efficiency in these areas could lead to benefits such as reduced fuel costs, improved comfort, and reduced fuel poverty.

In the City Centre and Perth Road, there are a lot of private homes that have poor energy efficiency and a relatively low cost to meet regulatory standards.

In the West End, Broughty Ferry, Baxter Park, and Fairmuir, there are a lot of private homes that have poor energy efficiency and a high cost of retrofit intervention. These areas could be engaged, through campaigns or work with community groups, to raise awareness of relevant funding schemes. This could include the Home Energy Scotland grant and loan or the Private Sector Landlord Loan.

7.5.2 Targeting fuel poverty reduction

In the City Centre, Perth Road, and Docks and Wellgate, there are a lot of homes where low-cost retrofit could help reduce fuel poverty. These areas also have the poorest energy efficiency score.

Targeting local authority owned properties in these areas could be a quick win for the Council because it would require relatively low financial investment compared to other areas.

7.5.3 Targeting carbon savings

In Law, Charleston, Hilltown, Whitfield 04, and Fintry 03, there are pockets of social housing where carbon emissions could be reduced for relatively little cost. Energy efficiency and heat decarbonisation retrofit projects could be targeted within these areas. When planning programmes of retrofitting, projects that might benefit from economies of scale by undertaking work on nearby homes should be prioritised. This approach could lead to cost efficiencies that will drive down the total costs associated with energy efficiency retrofit. To help identify and prioritise retrofitting projects, the Council will explore the PEAT analysis to understand what energy efficiency improvements have been recommended in these areas.

CHAPTER 8

Potential areas to invest in heat networks

A heat network is a distribution system that takes heat from a central source and delivers it to multiple domestic and non-domestic buildings.

The heat usually travels in the form of hot water through a network of insulated underground pipes[39, 40].

According to the Heat Networks (Scotland) Act 2021, a "heat network" can be a district heat network or a communal heating system.

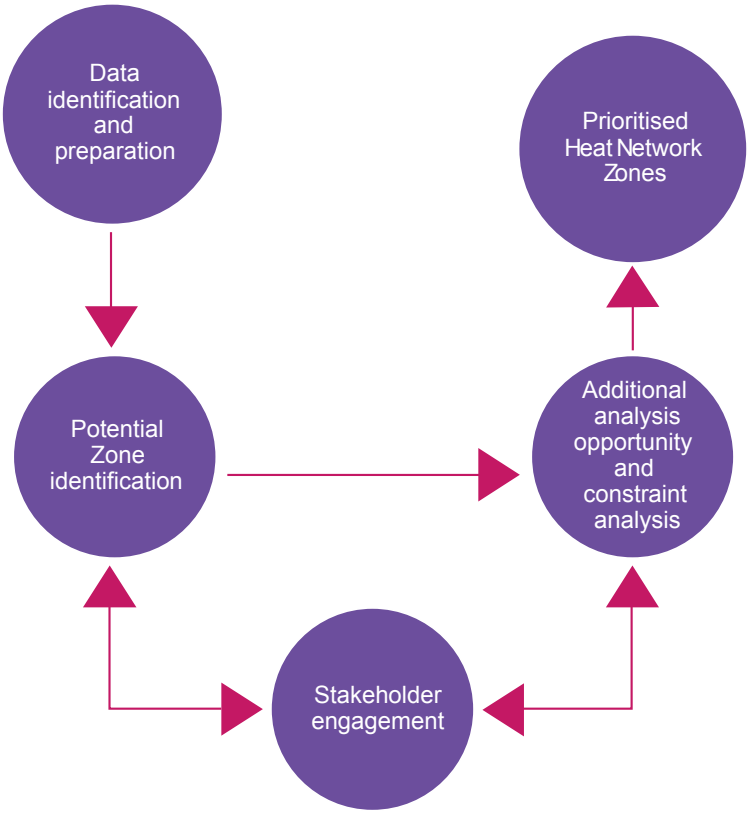
- A district heat network is a system that takes thermal energy from one or more sources and delivers it to more than one building.
- A communal heating system is a system that takes thermal energy from one or more sources and delivers it to different parts of the same building.

8.1 Why the Council Identifies Areas for Potential Heat Networks

At a national level, in the Scottish Government's Heat in Buildings Strategy[11] and other policies[35, 36, 41] , heat networks are recognised as one of the key systems to reduce carbon emissions from heating buildings. The Heat Networks (Scotland) Act 2021 has set a target for Scotland to supply 2.6 TWh of thermal energy through heat networks by 2027 and 6 TWh by 2030. In Dundee, the District Heating Strategy[25] also aims to develop heat networks in the City. The Heat Networks (Heat Network Zones and Building Assessment Reports) (Scotland) Regulations 2023[42] requires Scotland's Local Authorities to identify and designate Heat Network Zones in their area. The LHEES Guidance also requires areas to be identified that are particularly suitable for heat networks as part of LHEES. Identifying these LHEES Heat Network Zones will help the Council meet its duty to identify Heat Network Zones as part of the Heat Networks (Scotland) Act 2021.

8.2 How the Council Identifies Areas for Potential Heat Networks

The LHEES Stage 4 Heat Networks Detailed Practitioner Approach was used to understand which areas could be suitable for heat networks.



8.2.1 Finding and preparing our data

The Scotland Heat Map[43] dataset was used to see where heat networks could potentially be developed. The Home Analytics dataset from Energy Saving Trust was used to summarise the number of LHEES Category 3 homes and the heat demand from each tenure type within a HNZ. This dataset was also used to provide a summary of the total heat demand of properties in fuel poverty. Dundee's Fuel Well 3 support scheme data was used to inform this analysis. The Council also used Scottish Water Horizon's[44] dataset to see where in Dundee there is potential to use low carbon heat from the sewer system (see Table 5).

Table 5. Opportunities, constraints and infrastructure datasets mapped

Waste heat opportunities	Renewable heat opportunities
• Scottish Environment Protection Agency (SEPA) Waste Sites • SSEN Substations • Energy suppliers (Scottish Heat Map) • Waste heat (from CXC study) • MVV Waste Heat Plant site • Scottish Water Waste Water heat extraction opportunities	• Static water bodies (from Green Heat in Greenspaces analysis) • Strategic greenspaces (from Green Heat in Greenspaces analysis)

Infrastructure	Constraints	Other
• SSEN Substations • Major roads • Caird Park Heat Network	• Major roads • Water bodies	• Local development plan housing allocation • DCC non-domestic buildings • Conservation areas • Existing communal heat systems • Heat network feasibility studies

8.2.2 Identifying potential heat network locations

To understand the potential for heat networks in Dundee, the Council identified areas where there are multiple buildings with high heat demand that are close together.

A number of methods were used to do this:

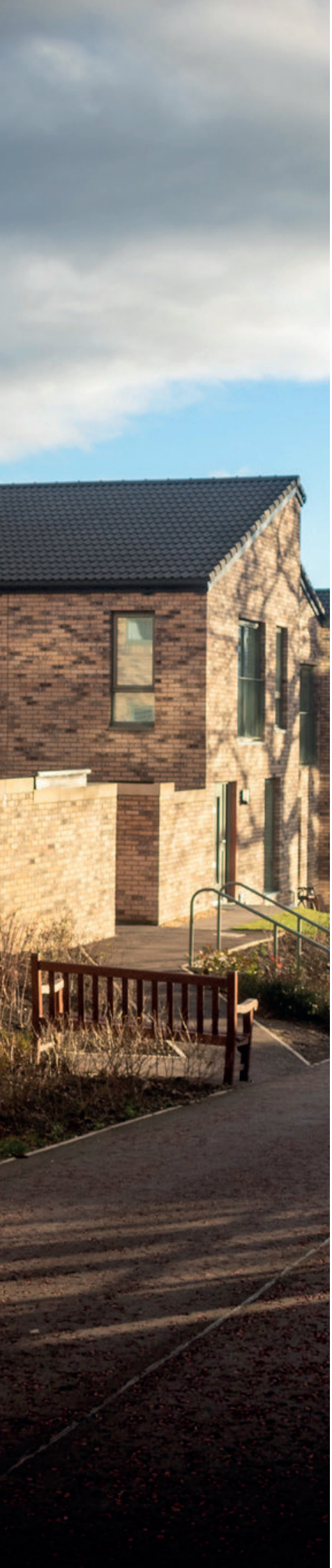
- **Anchor loads:** These are buildings with significant heat consumption over the year (>500 MWh/yr), which can be the starting point for a heat network.
- **Linear heat density metrics:** This is a way to measure how much heat is used in an area compared to the length of the heat network that would be needed to supply it. A higher linear heat density means that a lot of heat is used in a small area and indicates that a heat network is more likely to be financially viable.
- **Radii-buffering approach:** This is a way to identify areas that are close to the anchor loads and might be suitable for a heat network.

These methods were applied to identify areas in Dundee with the potential for development of heat networks, which were termed Potential Zones. Two linear heat density benchmarks (baseline and stringent - see Table 6) were used to match the zoning approach used in the Scottish Government's LHEES National Assessment in 2022[45].

Since Dundee is a dense urban area, a higher linear heat density threshold of 16,000 kWh/yr/m of heat pipe was also used. The Council used this higher threshold to identify areas where each meter of potential heat network pipe could supply at least 16,000 kWh of heat per year, making them the most likely areas to support a financially viable heat network.

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

	Linear heat density benchmark (kWh/year/m)	Anchor load threshold (MWh/year)	Minimum number of anchor loads per cluster
Baseline	4,000	500	2
Stringent	8,000	500	5
Additional	16,000	500	5



8.2.3 Stakeholder engagement

The prioritised Potential Zones were shared with Council officers, who ran a collaborative workshop with relevant external stakeholders interested in potentially developing heat networks in Dundee. These included significant property owners in Dundee (like The University of Dundee and Abertay University, NHS Tayside), utility providers and heat network operators, and consultants currently working on heat network feasibility studies in the area. Representatives from Zero Waste Scotland (ZWS), and the Scottish Government were also present. After the workshop, additional context and feedback from the stakeholders was used to shape further the boundaries of some of the Potential Zones. This was done to include important public buildings, existing heat network schemes, and current feasibility studies for proposed heat network projects. The finalised zones that were selected for reporting are referred to as Priority Zones.

8.2.4 Additional analysis

In addition to the summary statistics in the LHEES Methodology, the Council also used additional summary statistics to understand further the opportunities for heat networks in the Priority Zones. Home Analytics was used to summarised heat demand from social housing and count the number of homes with tertiary potential for heat pumps (LHEES Category 3) within each zone.

8.3 Opportunities for Heat Networks in Dundee

The analysis showed that there is a big opportunity for heat networks in Dundee, due to its compact urban nature.

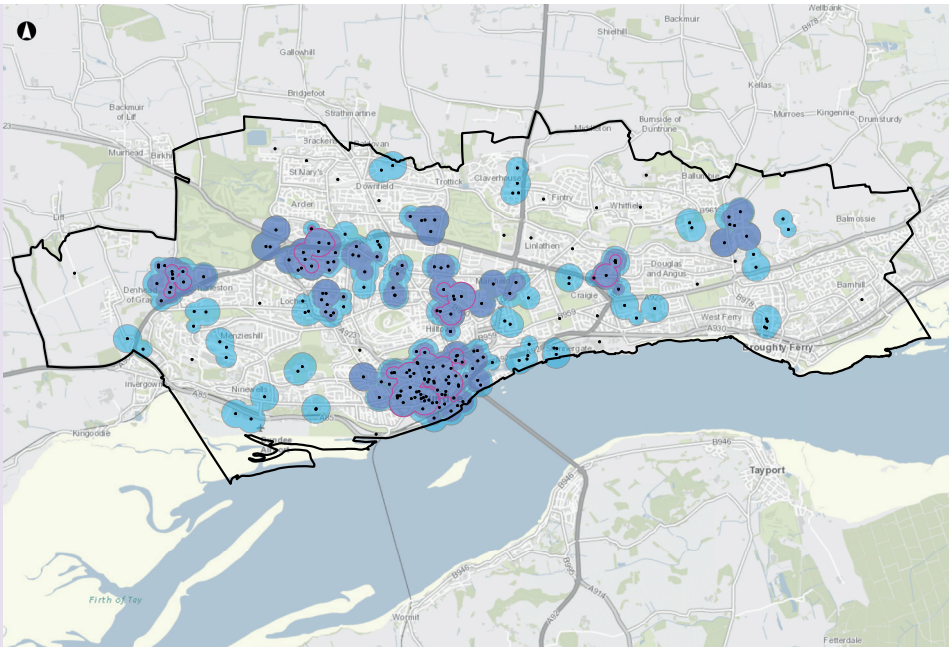
- Twenty-three Potential Zones were identified using the Baseline criteria, with a total heat demand of 767 GWh/year (about 48% of total heat demand in Dundee).
- Ten Potential Zones were identified using the Stringent criteria in Dundee, with a total heat demand from all properties within the zone of 538 GWh/year (about 34% of total heat demand in Dundee).

- AnchorLoad
- PrioritisedClusters_kwh16000 - Additional
- PrioritisedClusters_kwh8000 - Stringent
- PrioritisedClusters_kwh4000 - Baseline

Potential heat network zones in Dundee

Click to open interactive map online and select:

- Click 'Heat Network Zones'.
- Click on the "Prioritised Zones (Additional) and "Potential Zones" layers.



8.4 Our Priority Zones

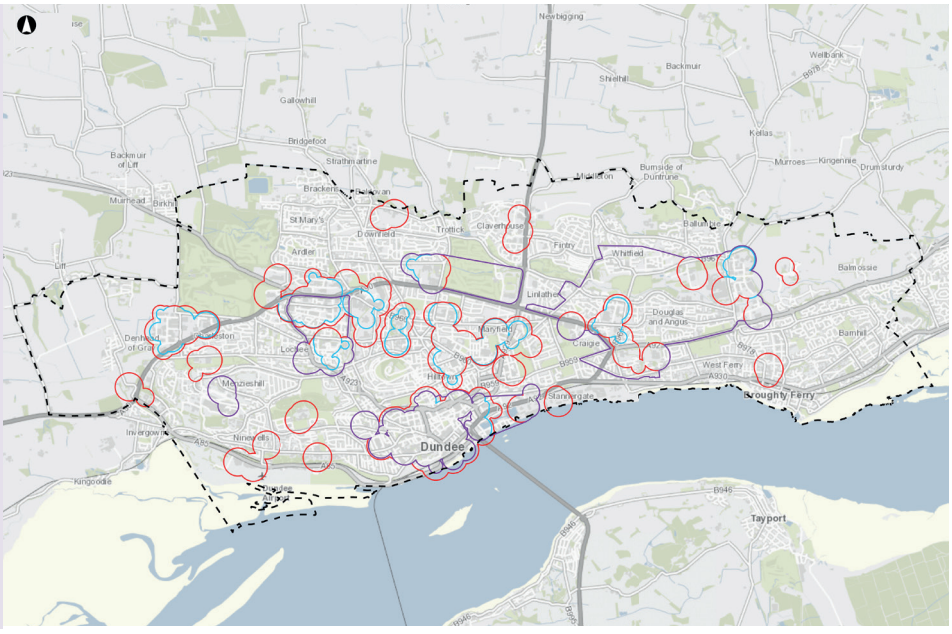
After receiving feedback from stakeholders and additional analysis, five Potential Zones were selected for closer analysis, in line with section 48 of the Heat Network (Scotland) Act[43]. These zones have been identified as strategically important for heat network development in Dundee and are classed as 'Priority Zones'. They are given the highest priority and incorporate additional contextual factors such as fuel poverty, existing heat networks, feasibility studies, and decarbonisation plans.

- Potential Zones (Baseline)
- Potential Zones (Stringent)
- Potential Zones (Prioritised)

Prioritised heat network zones in Dundee

Click to open interactive map online and select:

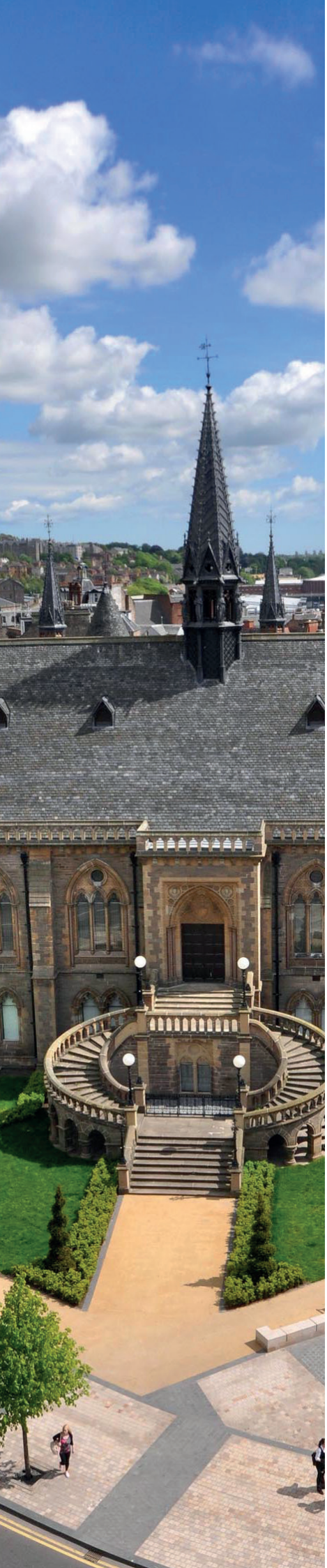
- Click 'Heat Network Zones'.
- Click on the "Prioritised Zones (Additional) and "Potential Zones" layers.



The properties in the Priority Zones use a total of 554 GWh/year of heat (35% of total demand in Dundee). Key factors that influenced which zones were chosen were LDP housing allocations, Scottish Water sewer pipes, Council owned properties, and existing heat networks. Maps have been developed for each Priority Zone showing heat demand, heat resources, and infrastructure constraints. A summary of the Priority Zones is shown in Table 7 below.

Table 7 Priority Zone Summary

Zone ID	Zone name	Count of anchor loads	Total heat demand (MWh/year)	Heat demand from non-domestic (MWh/year)	Count of houses in fuel poverty (DCC Fuel Well 3)	Heat demand from houses in fuel poverty MWh/year)	Count of social housing	Heat demand from social housing (MWh/year)
38	HNZ 1 - City Centre	81	310,609	234,497	92	1,824	666	12,694
35	HNZ 2 - Baldovie	26	158,349	70,273	562	8,291	2,539	35,310
34	HNZ 4 – Caird Park	6	17,192	10,837	31	427	118	1,359
17	HNZ 3 – Ninewells	3	7,042	4,756	18	207	47	671
36	HNZ 5 - Lochee	23	61,241	31,582	107	2,858	541	11,544
	Total	139	554,434	31,946	810	13,607	3,911	61,578



8.4.1 Priority Zone 1 – City Centre

A Priority Zone in Dundee City Centre was identified. This zone emerged using the Baseline, Stringent and Additional criteria, suggesting significant potential for an economically viable heat network. The zone includes over 81 anchor loads and has a total heat demand of about 310 GWh/year.

The University of Dundee and Abertay University are key public sector stakeholders in the zone. University of Dundee owns a lot of older buildings in the zone that use a lot of heat. The University of Dundee campus is currently heated by a private gas-heated network. There is an ambition, however, to switch to low-carbon heat sources through the University of Dundee's new renewable energy strategy.

Abertay University plans to build a heat network on its campus. Due to its central location and advanced project concepts the Abertay University heat network has a good potential to be a catalyst for the Heat Network development in Dundee City Centre. Therefore the Council is supportive of this plan and has established a close working relationship with Abertay University.

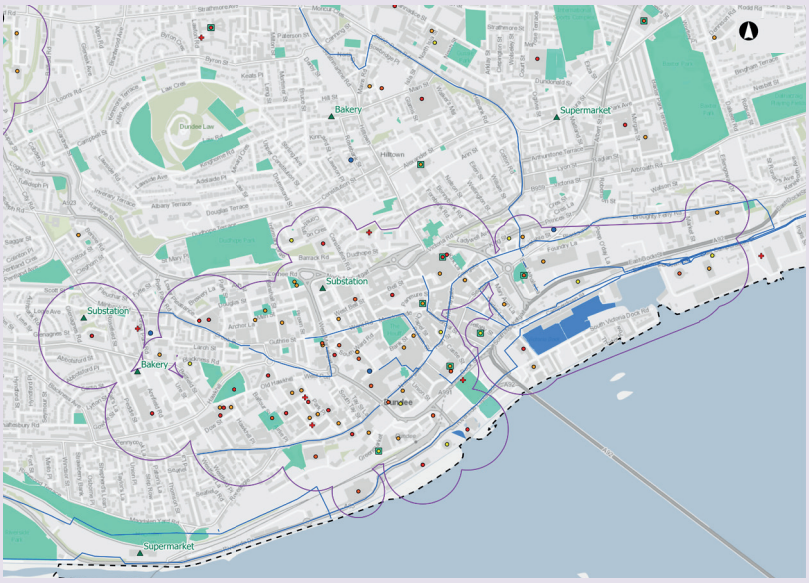
Other important stakeholders in the zone include Dundee and Angus College, Police Scotland, and the High School of Dundee. Engagement with these stakeholders is ongoing to explore interest in heat networks and explore collaboration to maximise decarbonisation efforts.

A big Scottish Water wastewater pipe runs through the zone. The zone has been extended to include another Baseline zone that contains the King George Pumping Station east of the zone. This could be a good, consistent source of waste heat for a future heat network. The River Tay also presents a potential source of heat to support a heat pump, but the feasibility of this must be tested as the Firth of Tay is designated as a Special Area of Conservation (SAC), which might limit the ability to abstract water and heat from the river. Other possible waste heat sources include a number of substation locations and a bakery. These could also be looked at in more detail.

Heat supply opportunities in Priority Zone 1 - City Centre

Click to open interactive map online and select:

- Click 'Heat Network Zones'.
- Click on the "Prioritised Zones (Additional) and "Potential Zones" layers.



The Council will do the following things in this Heat Network zone:

- Collaborate with public sector entities and private stakeholders to assess different delivery models, and investment options and opportunities.
- Engage with key public sector anchor loads in the City Centre to gauge heating requirements, existing decarbonisation plans, potential connection timelines and willingness to pay.
- Seek support from Scottish Government to obtain funding and carry out detailed spatial analysis and heat mapping with updated heat sources to identify priority sub-zones for potential initial network phases. Assess technical requirements and costs.
- Continue engagement with Scottish Water to collect relevant datasets to identify and quantify waste heat capture from wastewater pipes.
- Engage with the Scottish Environment Protection Agency (SEPA) to understand the River Tay's SAC status, and its implication on potential heat offtake.

8.4.2 Priority Zone 2 – Baldovie

The Baldovie zone has been identified as a Priority Zone. It contains three sub-zones that were identified using the heat demand density and anchor load criteria. The zone includes 26 anchor loads and has a total heat demand of about 158 GWh/year.

The zone is strategically important because of MVV Environment's energy-from-waste facility within the Baldovie Industrial Estate. The facility uses residual waste from Dundee City and Angus to generate electricity. A feasibility study is being carried out by consultant WSP to see if a district heat network could use the heat generated from the facility. The Priority Zone boundary has been adjusted to include the boundary that is being investigated for this study. The study area contains a lot of social housing and community buildings, as well as the Dundee and Angus College, and the site of a new school, Drumgeith Road Academy. 7% of domestic properties within the zone are getting support as part of the Dundee Fuel Well 3 programme.

The map below shows the extent of the Priority Zone. There is a concentration of industrial anchor loads located towards the eastern edge of the zone, in the West Pitkerro Industrial Estate. These are mostly privately owned, and initial engagement between property owners and WSP has been limited. This is likely because of the significant uncertainty about the maturity of heat network development in the area.

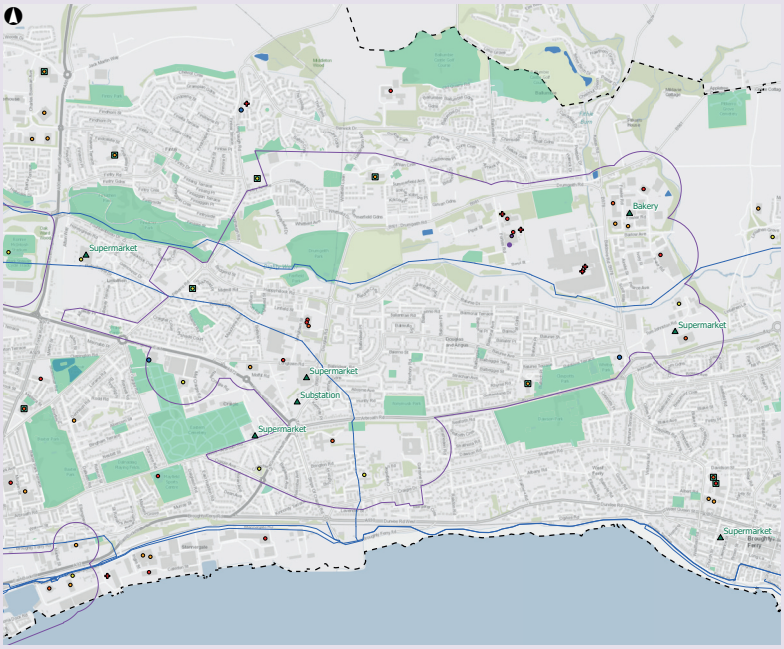
The initial development of a heat network in the zone will mainly depend on social housing, which makes up 22% of the total heat demand in the area. There are no other large public sector anchor loads, and a third of domestic properties in the zone are classified as social housing. A staged approach may be to first connect domestic buildings owned entirely by the Council, followed by buildings where the Council has majority ownership, and offering connections to private customers in the same buildings or streets as the Council buildings. Finally, there could be opportunities for further public and private sector integration, as well as network expansion beyond the zone. This could potentially include a joined-up network with Caird Park (Priority Zone 3) and expansion further south to include the site of the new Eden Project in Dundee, as well as the potential to incorporate with a waterfront Heat Network which uses the Tay River as a heat source.

However, the southern edge of the zone is intersected by Arbroath Road (A92) which may impose constraints on network routing and future extensions.

Heat supply opportunities in Priority Zone 2 – Baldovie

Click to open interactive map online and select:

- Click 'Heat Network Zones'.
- Click on the "Prioritised Zones (Additional) and "Potential Zones" layers.



Waste Water Pipe Heat Extraction Opportunities
Heat Network Development Opportunities
Local Authority Building
Renewable heat opportunities
Strategic Greenspace
Static Water Bodies

Waste Heat Opportunities
SEPA Waste Sites
CXC Waste Heat
SHEPD Substation Location
MVV Energy From Waste
SHM Energy Suppliers

Potential Zones (Prioritised)
Anchor Loads (kWh/ year heat demand)
507,785 - 563,000
563,000 - 954,000
954,000 - 1,348,000
1,348,000 - 3,805,000

The Council will do the following things for this zone:

- Review WSP's feasibility study to see if a network in the area could work. If the study shows that the network could be achievable, the Council will work with MVV Environmental Ltd to develop an Outline Business Case, potentially with help from the Heat Network Support Unit.
- Explore ways to work with housing associations and community groups in the area to include social housing in an initial phase of the district heating network. Further engage with non-Council owned load owners within the zone to see if they're interested and explore options to meet their heating or cooling needs through connection to a district heat network.
- Further engage with non-Council owned properties in West Pitkerro Industrial Estate to get better building data, find out if buildings could connect, understand if they're interested, and identify opportunities for waste heat sources.

8.4.3 Priority Zone 3 – Ninewells Hospital

Ninewells Hospital has been chosen as a Priority Zone because it is a public asset that uses a lot of heat and is a key anchor load for this area. It uses 7 GWh of heat a year, which means it presents a big opportunity to reduce carbon emissions through district heating integration.

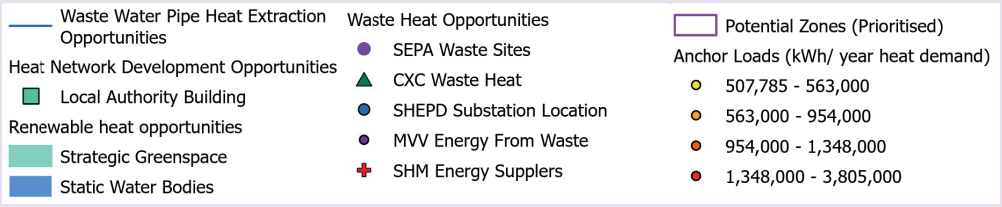
This zone is focused on the Ninewells Hospital campus, primarily owned by NHS Tayside, which is aiming to become a Net Zero organisation by 2040[46]. NHS Tayside's building energy use accounted for 77% of its total emission footprint in 2021-22, suggesting the emission reduction from major buildings such as Ninewells Hospital buildings is important for the 2040 target. Vital Energi currently looks after and manages the hospital's energy assets. The University of Dundee owns 25% of the overall hospital estate and some buildings on the campus, and is another important stakeholder in the area.

The zone is surrounded by an area with a high Scottish Index of Multiple Deprivation (SIMD) and 13% of homes within the zone currently receive support from Dundee City Council with energy bills. Expanding the zone to include homes around Ninewells could help reduce local fuel poverty while using the significant anchor demand at the hospital. There are also a number of other public sector loads within or near the zone, such as Menzieshill Nursery School and St Ninians RC Primary School.

Heat supply opportunities in Priority Zone 3 - Ninewells

Click to open interactive map online and select:

- Click 'Heat Network Zones'.
- Click on the "Prioritised Zones (Additional) and "Potential Zones" layers.



The Council will do the following things for this Priority Zone:

- Work with Vital Energi and NHS Tayside to understand more about the hospital's current energy system, contractual arrangements, and existing plans to reduce carbon emissions.
- Keep engaging with the University of Dundee to find out which sites they own that could be part of the network.
- Explore the chance to conduct more analysis of heat demand to identify groups of public buildings and residential areas that could be part of an expanded heat network zone.
- Look at the possibility of carrying out a feasibility assessment of a potential Heat Network extending beyond the Ninewells Estate

8.4.4 Priority Zone 4 – Caird Park

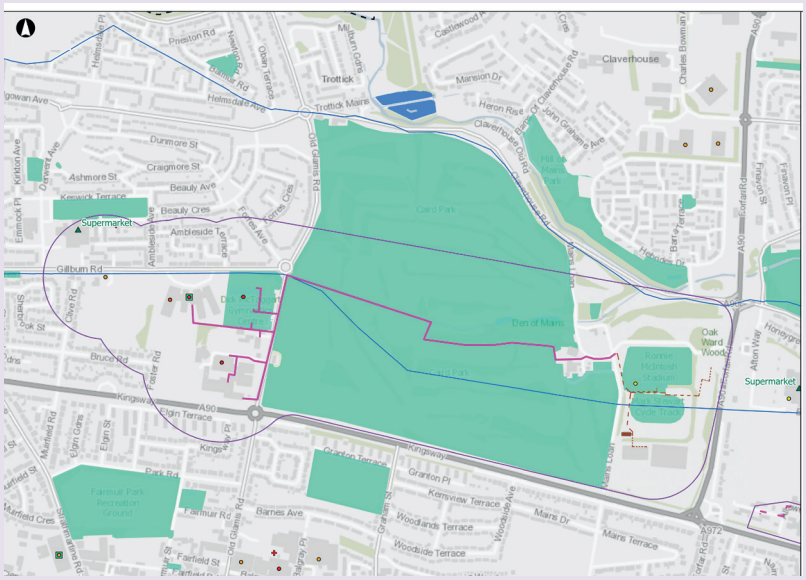
A Priority Zone west of Caird Park was identified. This zone includes seven anchor loads and uses about 17 GWh/year of heat. Important buildings owned by the Council and public sector include St Paul's Academy and Dundee & Angus College.

The zone was extended east to the other side of Caird Park to include an existing district heating network. This network is served by three closed-loop ground source heat pumps (GSHPs) at the Regional Performance Centre for Sport. The GSHPs are powered by electricity from a gas CHP unit and currently provide heat to three buildings on-site. There is extra capacity that could be used to heat more buildings near the site. A feasibility study to extend the existing network was carried out in 2023, as discussed in Section 4.6. The zone is also near Priority Zone 2 – Baldovie. This means there is a chance for a bigger network in the future. This could also mean more heat for homes in the area.

Heat supply opportunities in Priority Zone 4 - Caird Park

Click to open interactive map online and select:

- Click 'Heat Network Zones'.
- Click on the "Prioritised Zones (Additional) and "Potential Zones" layers.



Waste Water Pipe Heat Extraction Opportunities
Heat Network Development Opportunities
Local Authority Building
Renewable heat opportunities
Strategic Greenspace
Static Water Bodies
Waste Heat Opportunities
SEPA Waste Sites
CXC Waste Heat
SHEPD Substation Location
MVV Energy From Waste
SHM Energy Suppliers
Potential Zones (Prioritised)
Anchor Loads (kWh/ year heat demand)
507,785 - 563,000
563,000 - 954,000
954,000 - 1,348,000
1,348,000 - 3,805,000
Proposed Heat Network Extension
Existing Network Pipe
Proposed Pipe
Existing Energy Centre
Stage 3 Network

The Council will do the following things for this Priority Zone:

- Look at options to develop the Outline Business Case for a proposed extension of the existing heat network. This will look at project costs, benefits, and confirm stakeholder agreement with support from the HNSU.
- Engage further with Scottish Water to explore the potential of waste heat recovery at the site.
- Plan for the replacement of the existing gas CHP system with alternative clean energy sources to fully decarbonise the current network and meet the 2038 net-zero goals for public buildings.

- Engage with SSEN to understand how recommendations from the feasibility study around optimal network routing, decarbonisation options, and prioritised anchor loads can inform infrastructure development. The capacity will be scaled to match projected demand.

8.4.5 Priority Zone 5 – Lochee

Lochee has been identified as a strategic Priority Zone for heat networks owing to the needs of the community. Fuel poverty and socioeconomic deprivation in Lochee indicate potential for district heating to deliver substantial benefits to residents in this zone. It's made up of two zones that were identified using the Baseline criteria analysis. The boundary for the principal area was decided by the A923, A90, and Kings Cross Road, as crossing a major road is a significant infrastructure challenge for building heat networks. The most strategically important properties are enclosed within the boundary defined by these roads.

In 2018, an LHEES pilot study was undertaken on Lochee by the consultant Atkins. This study tested area-based approaches to tackling fuel poverty and reducing emissions in certain areas. They found that a lot of homes in the area are struggling to pay their energy bills because of poor energy efficiency, high energy costs, and households with low income struggling to pay for energy. Atkins suggested moving buildings off natural gas and using electricity instead to reduce carbon emissions. They looked at three possible heat networks which focused on including social housing anchor loads. Even though these were not financially viable at the time, Lochee was noted as being strategically important for long-term heat network development. The study showed the need for strategies that are coordinated and tailored to the local area to help people pay their energy bills and reduce emissions.

Anchor loads in the zone include public buildings like Lochee Swimming & Leisure Centre, Ancrum Road Primary School, St Mary's RC Primary School, and several Dundee City Council housing estates, including the Whorterbank Tower Blocks. Existing communal heating systems serve the Whorterbank, Kirk Street and Lansdowne Gardens estates. The southern end of the zone could be a good place for further heat network expansion, as there is an existing network, and there is a lot of Council owned or controlled housing in the area

After talking to stakeholders, the zone was extended north to include more housing blocks and the Dunsinane Industrial Estate. Even though these are currently private sector, they could provide essential anchor demand and enable integration of waste heat captured in the future, possibly from an electricity substation and supermarkets in the area.

Heat supply opportunities in Priority Zone 5 - Lochee

Click to open interactive map online and select:

- Click 'Heat Network Zones'.
- Click on the "Prioritised Zones (Additional) and "Potential Zones" layers.

Waste Water Pipe Heat Extraction Opportunities

Heat Network Development Opportunities

Local Authority Building

Renewable heat opportunities

Strategic Greenspace

Static Water Bodies

Waste Heat Opportunities

SEPA Waste Sites

CXC Waste Heat

SHEPD Substation Location

MVV Energy From Waste

SHM Energy Supplers

Potential Zones (Prioritised)

Anchor Loads (kWh/ year heat demand)

507,785 - 563,000

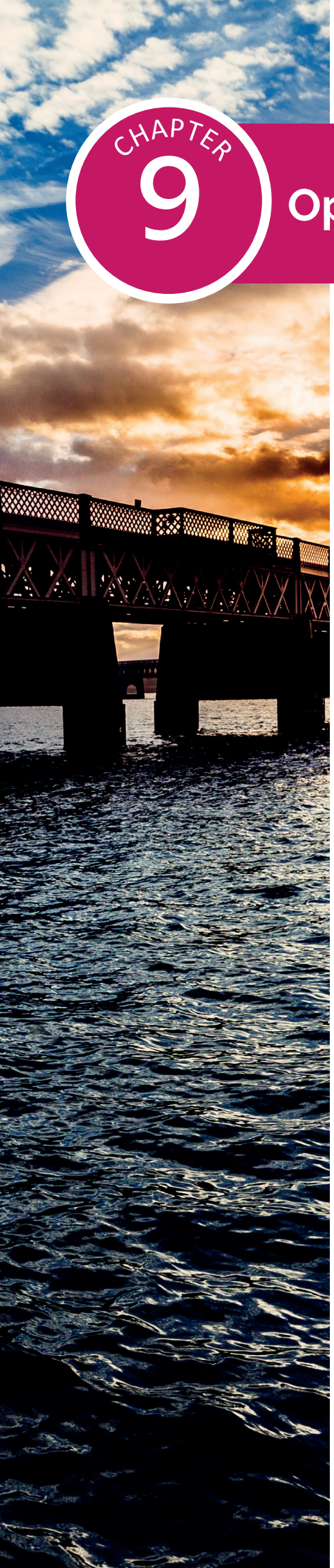
563,000 - 954,000

954,000 - 1,348,000

1,348,000 - 3,805,000

The Council will do the following things for this zone:

- Explore opportunities to update analysis using metered heat demand data from Dundee City-owned domestic properties to provide an accurate baseline.
- Engage with other key public sector anchor loads to supply heat demand data and update analysis.
- Explore options to carry out a feasibility study to see if the existing communal heat network in the area could be extended to include other key loads.
- Engage with local waste heat sources to assess the potential for waste heat offtake in the area.



CHAPTER 9

Opportunities and Challenges

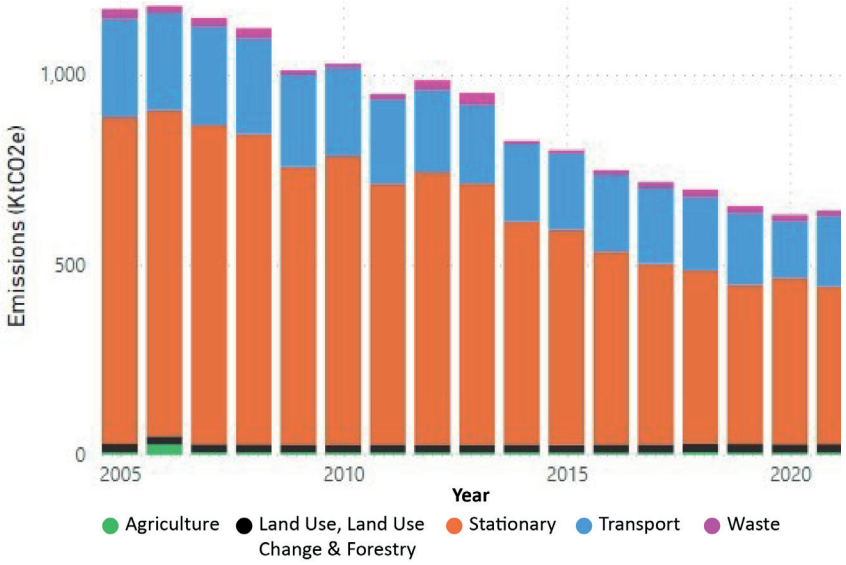
LHEES can help reduce emissions, tackle fuel poverty, and make sure the transition to cleaner energy is just and fair. It can also help the City by using a Community Wealth Building (CWB)[47] approach to grow the economy and tackle long-standing challenges and inequalities in our communities.

9.1 Opportunities and Challenges

9.1.1 Achieving Net Zero by 2045

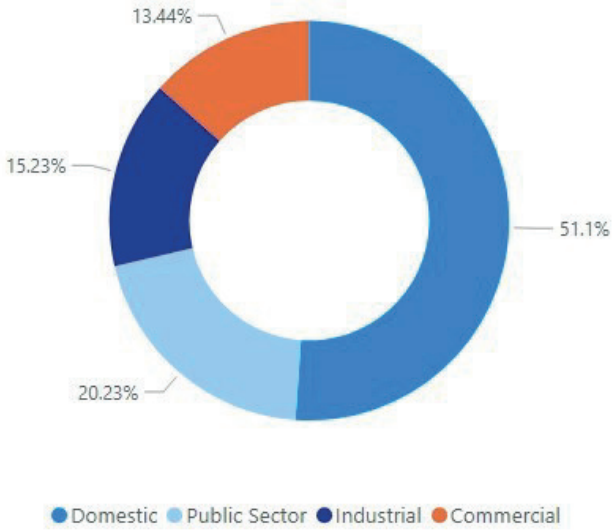
Dundee aims to reach Net Zero by 2045[9]. The City has already made progress and has been recognised globally as an 'A List' City by the charity CDP[48]. According to the Department of Energy Security and Net Zero's DESNZ figures[49], the City reduced its emissions by 45% in 2021 compared to 2005 (see Figure 7).

Figure 7. Dundee's GreenHouse Gas Emissions by Year and Broad Sector.



According to DESNZ, in 2021, 65% of emissions in Dundee came from the Stationary sector, which includes commercial, domestic, public and industrial buildings. Of these, the domestic sector accounted for 51% of emissions (see Figure 8).

Figure 8. Dundee's Greenhouse Gas Emissions from 'Stationary' Sectors ($KtCO_{2e}$/yr) - 2021.



By looking at ways to reduce emissions across the whole City, and focusing on the domestic sector, LHEES tackles the biggest challenge in terms of reducing the City's emissions. This means the delivery of LHEES provides a series of opportunities for the City to speed up the transition to Net Zero.

9.1.2 Tackling fuel poverty

Dundee has one of the highest rates of fuel poverty in Scotland. LHEES provides an opportunity to help with this challenge. LHEES has identified specific measures to be taken in specific areas of the City to make homes more energy efficient and reduce fuel poverty.

The solutions proposed by LHEES are longer term and focus mainly on reducing energy bills. It is important to note that there are also other factors such as household income and the cost of energy that need to be addressed to help people pay their energy bills. Nonetheless, the fabric retrofit approach is the most effective and lasting measure to tackle fuel poverty.

9.1.3 Just transition

A just transition in the LHEES context means meeting climate targets while ensuring that all of Dundee's communities and residents are included in the transition to a net-zero future. This means that the strategy must be as fair and inclusive as possible, creating decent work opportunities, and leaving no one behind[50].

Implementing the LHEES actions can ensure a fairer, greener Dundee where no household is left in fuel poverty. It includes vulnerable communities, and in particular fuel poor households, in the transition.

LHEES also creates opportunities for new jobs in Dundee's renewable and low carbon heating sector, helping to offset a decline in jobs linked to oil and gas.

Implementing LHEES will make the most of the economic benefits of Dundee's transition to Net Zero for its citizens.

There's a chance to ensure:

- A pipeline of skills for Net Zero jobs.
- A fair distribution of opportunities, benefits and risks, including consideration of community benefits, and how to adapt to the impacts of climate change.
- An inclusive and fair process via co-design with stakeholders and the public.

9.1.4 Community wealth building

Community Wealth Building is a people-centred approach to local economic development, which redirects wealth back into the local economy, and places control and benefits into the hands of local people. It recognises that the traditional model of wealth creation has not created a redistribution of wealth, rather the gap between rich and poor has widened. This has been particularly marked because of the Covid-19 pandemic and subsequent economic crisis. Where traditional public sector policy has focused on the redistribution of wealth after it is created, community wealth building focuses on mechanisms to ensure that wealth is shared as it is created.

The approach intends to harness the power and influence of large employers, referred to as anchor institutions. These are large employers with a strong local presence in an area that can exert sizeable influence through their commissioning and purchasing of goods and services, through their workforce and employment capacity, and by creative use of their facilities and land assets. These include the large public sector organisations such as councils, NHS health boards, universities, colleges and housing associations.

The five core principles or pillars of community wealth building which anchor organisations can use their influence are:

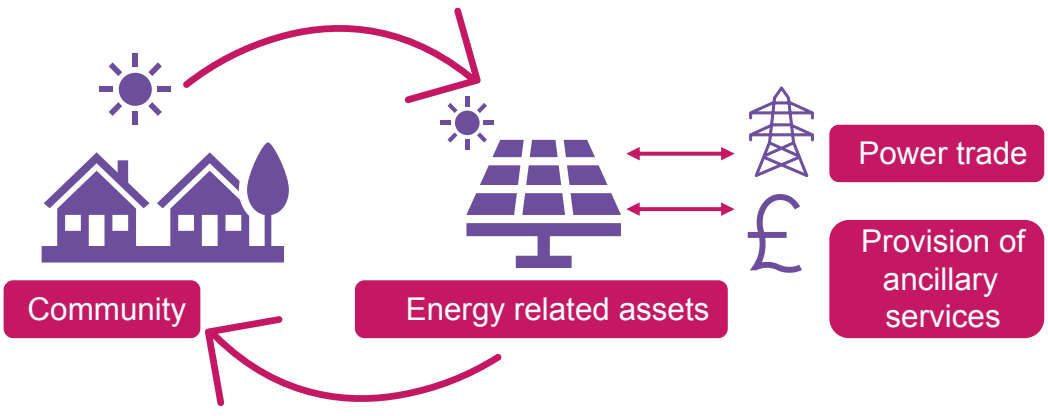
- **Spending** through progressive procurement including developing local supply chains of businesses likely to support local employment and keep wealth within communities.

- **Workforce** – including consideration of Fair Work and Just labour markets – how an organisation treats its staff and uses its position as a large employer to improve prospects for local people.
- **Shared Ownership of the Local Economy** – supporting and growing business models that are more financially generative for the local economy.
- **Land and Property** – looking at how organisations use their land and property assets to support local communities including exploring community use and ownership of properties.
- **Finance** – looking at how organisations use their financial power and seeking opportunities to invest ethically and potentially locally. Also, how can anchor organisations support personal finance.

Climate change can be seen as an overarching consideration because of its impact on the areas covered by the pillars.

Community Wealth Building considerations will impact elements of the LHEES including selecting procurement routes which maximise opportunities for local and generative business while ensuring Fair Work for staff involved in delivering projects; maximising opportunities for local and disadvantaged communities to access employment and training opportunities in relation to low carbon heating and energy efficiency measures; implementing the actions and opportunities set out in LHEES to enable more local communities and individuals to own, have a stake in, access and benefit from the retrofit projects, heat network projects and community renewables identified. Ethical investment consideration may also support LHEES in the future. (see Figure 9).

Figure 9. Simplified Community Ownership Model for Energy Systems - dervied from IRENA



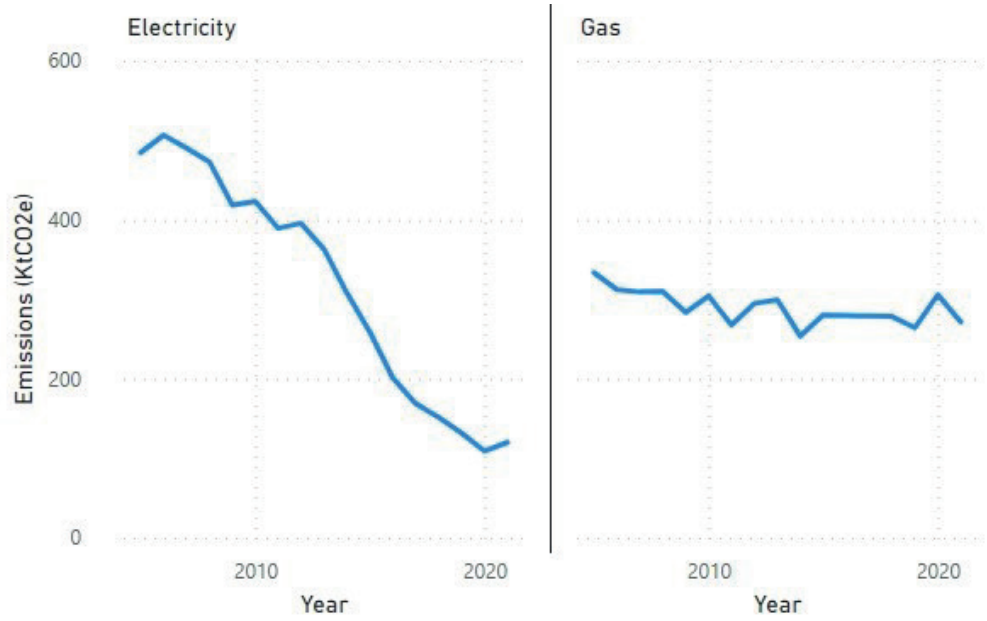
The many decades of experiences from Nordic countries such as Denmark suggest that effective running of heat networks inherently requires community involvement[51] to a certain degree. There are opportunities for collective ownership and management of energy-related assets such as heat network, energy storage, energy efficiency programmes and community electricity retail[52]. With careful consideration, community ownership can become valuable asset for income generation, energy cost reduction and local energy resilience.

9.2 Challenges

9.2.1 Heat decarbonisation

According to the DESNZ figures, most (56%) of Dundee's stationary sector carbon emissions come from using natural gas for heating and hot water. Electricity use is attributed to 29% of total emissions and other sources cause 6%. The data shows that while emissions from electricity use are rapidly decreasing, there is very little reduction in emissions from natural gas use in Dundee (see Figure 10). This is a significant challenge in terms of heat decarbonisation, as most of the heat in Dundee is currently generated using natural gas. Since most properties in Dundee are connected to mains gas, the Council must ensure that any transition to alternative, low carbon heating systems does not increase energy costs and worsen affordability issues, especially for social housing residents and areas of high deprivation.

Figure 10. Greenhouse Gas Emissions from Dundee's Stationary Sectors by Year for Electricity and Natural Gas.



9.2.2 Limitations of existing data

LHEES depends on the Home Analytics dataset. It is important to note that the accuracy of the Home Analytics data depends on the quality of the datasets that inform it. Among the 77,456 properties in the Home Analytics dataset, 52,668 (68%) are linked to an EPC record, which is the main source for much of the building information within the dataset. Any errors or inaccuracies in EPC records will be mirrored in this dataset. The Scottish Government has recognised that **the metrics and ratings EPCs currently use are not suitable to drive the improvements that are needed** in our homes and to move to zero direct emissions heating systems in our homes and buildings[5].

The Non-Domestic Analytics Dataset includes a number of well-known limitations, mainly the presence of historic Unique Property Reference Numbers (UPRN) and the inclusion of properties with no heat demand (such as car parks, tennis courts, and ATMs). The quality of this dataset needs to be improved significantly.

There's a lack of resource for collecting and managing local datasets. Additionally, while it's noted that existing datasets such as Home Analytics could be improved by working with the Energy Saving Trust, this means some changes in practice will be required and more resource to be put in place by the Council, especially for Housing and Asset Management teams.

Data management challenges were also encountered during the analysis for the LHEES, including complicated data sharing procedures and difficulties resolving GDPR issues for using local data. **The general lack of understanding and clear communication between partners (Scottish Government, Energy Saving Trust, Local Authority, DNO, Consultants) and information governance also proved to be one of the biggest challenges.**

9.2.3 Strategic challenges

During the development of LHEES, the Council found several policy gaps:

The Climate Change Committee recommended[54] a comprehensive home energy retrofit scheme in their report to the Scottish Parliament. This scheme would need long-term funding to give consumers and supply chains certainty. It would also need to support the installation of heat pumps and energy efficiency measures and provide incentives for upgrading blocks of flats.

There are significant policy gaps for energy efficiency in homes that are not fuel-poor, as funding sources are mainly focused on fuel poor households.

The combination of stop-start funding, labour and material costs, and regulation are barriers to the growth of supply chains for building-level energy efficiency measures. Other barriers include access to finance for measures[53].

There is a need for a programme that helps stimulate private investment and increases green finance options. This would help grow supply chains and increase public and business engagement with energy efficiency. It would also help build public understanding of clean heat technologies and encourage greater take-up of support[55].

Climate adaptation is not properly considered in existing housing and energy strategies[35]. The increasing frequency and intensity of extreme high temperatures is not being adequately considered in key housing and buildings strategies. However, implementing the currently proposed changes in building regulations to reduce overheating risk and improve ventilation would be a positive step towards addressing this.

There is a lack of clear communication and understanding about what aspects of Net Zero the Scottish Government and Local Government are responsible for and how these will be coordinated. There should be a clearer shared understanding of roles and responsibilities which can be communicated across Local Government[56].

There is uncertainty about how the Scottish Government plans to deliver energy efficiency improvements and low-carbon heating in residential buildings, aligned with Scotland's ambitious targets[55].

The majority of local policies depend on Scottish Government policies and in turn, some of the Scottish Government policies depend on UK Government policies. UK Government policies tend to support a market-based approach, while Scottish Government policies are less so inclined and put Local Authorities at the forefront of Net Zero delivery. This causes a systematic problem for programme delivery. Therefore, the Scottish Government should also factor in the UK Government's market-based mechanism[55] for low-carbon heat.

9.2.4 Funding and resource

The funding from the Scottish Government and the UK Government does not match their combined Net Zero goals[53]. For example, the Council has spent £50 million on EWI projects since 2013, which suggests an average annual spend of £5 million on retrofit projects in the past 10 years. The PEAT analysis suggests that the Council needs at least 3 times more funding per year for the next eight years to bring Council-owned social housing up to the EESSH 2 standard.

It's estimated that the private sector will need £343 million to meet regulatory EPC requirements, with the private rented sector alone needing £51.8 million. If Dundee was to consider a high ambition scenario, the private rented sector alone will need £152.9 million to retrofit. **There's no clarity on how the private sector energy efficiency retrofit will be funded and how the Scottish government will support the Council in enforcing regulatory compliance in this sector.**

There's a lack of established functions within Local Government to plan and deliver projects across all tenures. Local Governments are also constrained by resources and therefore focus on the more immediate need to deliver basic services, and therefore the decarbonisation agenda often becomes less of a focus.

9.2.5 Technological challenge

There are limited options for what the Council can consider for heat decarbonisation, and owing to funding and resource constraints, the Council has limited ability to participate or organise locally tailored technological solutions and innovative projects such as Smart Local Energy Systems[57].

There's a lack of public awareness and buy-in for new technologies such as heat pumps and the Council is constrained by resources to organise tailored communications and campaigns or establish a local evidence base that supports the uptake of such technologies.

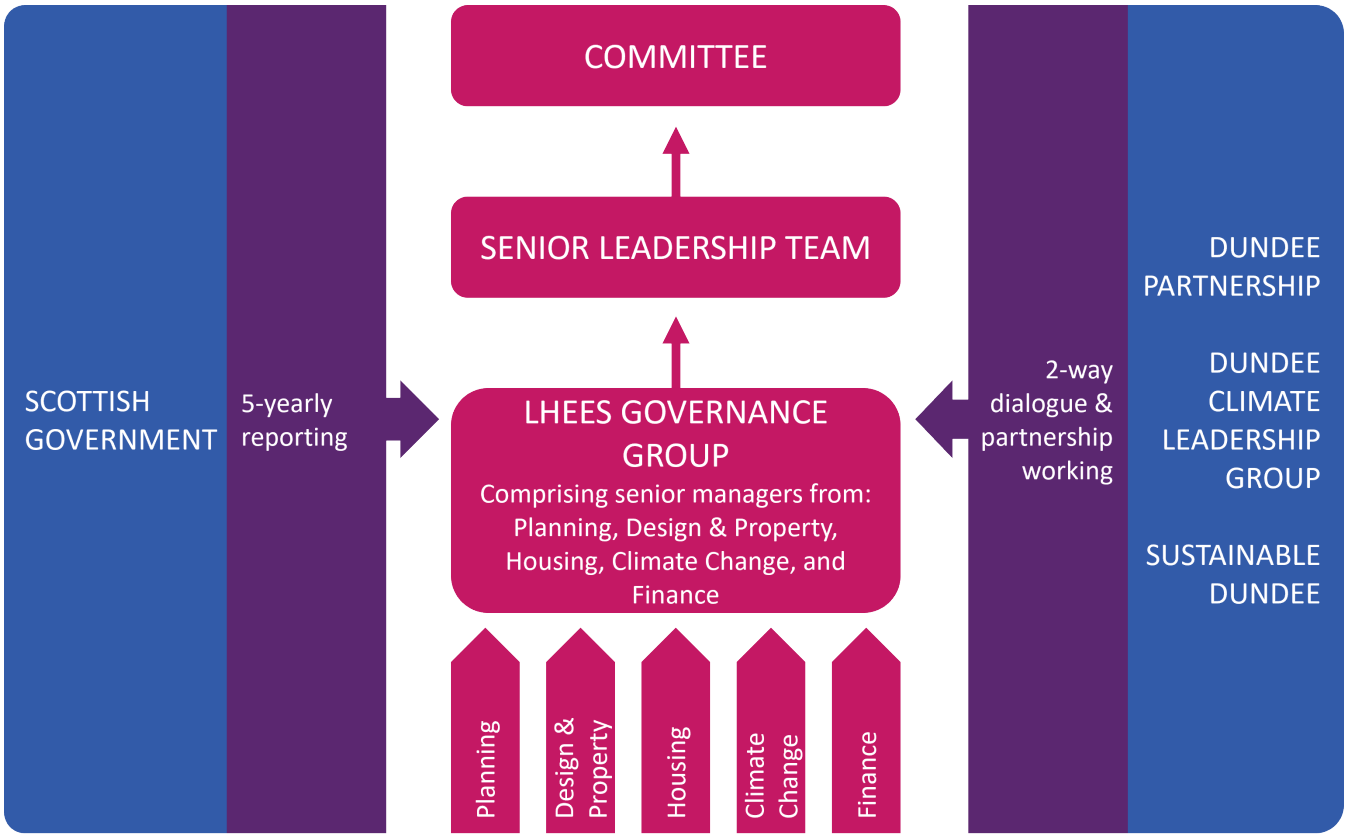
There's a lack of data on hydrogen and how it can impact on the future of Net Zero at a local level. The UK and Scottish national policies[58, 59] are high-level ambitions that do not provide sufficient evidence and data for Local Authorities to analyse the role of hydrogen in the Net Zero transition. There's also a lack of detailed evidence from the Gas Distribution Network, SGN on their plans and the viability of hydrogen at a local level. All of these factors mean that hydrogen is not considered in terms of a low regrets option, although it is acknowledged as a potentially important fuel for future decarbonisation.

CHAPTER 10

LHEES Governance

Setting up the right team to manage LHEES is important for making sure the collective actions and priorities in the strategy are carried out efficiently. So, the Council will set up a 'LHEES Governance Group'. This group will be made up of Managers from the Sustainability and Climate Change, Planning, Design and Property, Housing and, Finance teams within the Council. This group will report to the Council's Senior Leadership Team (CLT) and the CLT will report to the elected members (Committee). They will report every two years.

The Council will also work closely with the Dundee Partnership and Dundee Climate Leadership Group. They will work together to carry out actions, collect feedback and provide updates on LHEES. The Council will update the Scottish Government on the progress of LHEES every five years.



The LHEES guidance[7] requires LHEES to have a Monitoring and Evaluation framework as part of the Delivery Plan process. The LHEES Delivery Plan gives a summary of the priorities, targets and indicators that will be used to measure the progress of LHEES.

Glossary

Term or acronym	Definition or meaning
Air-tight property	A domestic or non-domestic building with low levels of unwanted air leakage in and out of the building, which can add to the need for more heating
Biomass heating	Typically, biomass heating boilers burn wood pellets, chips or logs to provide heating for rooms and hot water. Biomass stoves typically burn logs to heat a single room
Borehole	A deep hole bored into the ground used to extract water or through which to circulate a fluid to absorb heat from the ground, typically to provide heat to a heat pump
CO2, CO2e	Carbon dioxide, carbon dioxide equivalent. The latter is used to express a quantity of greenhouses gases other than carbon dioxide (such as methane) as the same quantity of carbon dioxide with the same global warming potential as the quantity of greenhouse gases.
Communal heating/ heat network	A system that takes heat energy from one or more sources and delivers it to different parts of the same building
The Council	Dundee City Council
Data zone	Small geographic areas used by the Scottish Government to group different types of information. They usually contain between 500 and 1,000 households and tend to include households with similar social characteristics and consider physical boundaries.
DCC	Dundee City Council
Decentralised energy	Energy (typically electricity) that is generated close to where it will be used, rather than at a power station and sent through the national grid
District heating	A system that takes heat energy from one or more sources and delivers it to more than one building
Distribution Network Operator (DNO)	A licensed company that owns and operates the network of cables, transformers and towers that bring electricity from the national transmission network to businesses and homes
Dundee Climate Leadership Group (DCLG)	An executive partnership which provides leadership on Dundee's net-zero challenges.
Energy centre	Typically a building that houses heat generation and sometimes power generation equipment, which is fed into a heat network or the local power grid
Energy Conservation Measures (ECMs)	Physical measures to improve the energy efficiency of electrical and heat systems or to reduce the need for energy, such as LED lighting, heating controls, improving ventilation, adding insulation and installing solar PV
Energy from Waste (EfW)	The process of generating electricity or heat energy from treating or processing waste
EPC	Energy Performance Certificate
Fabric first	Improving the energy efficiency of the fabric of a building (the walls, windows and roof) before changing energy systems for power and heating
Fuel poverty	A household is defined as being in fuel poverty when it spends more than 10% of the UK Minimum Income Standard (after housing costs) on fuel costs to keep the home warm. Extreme fuel poverty is when a household spends more than 20% of the MIS on fuel costs.
Gas combined heat & power (CHP)	Gas combined heat and power is the use of a gas powered heat engine or power station to generate electricity and heat at the same time
Ground source heat pump	A heat pump that uses heat from the ground as the primary source of heat
GWh	Gigawatt hour(s)
Heat decarbonisation	Reducing the carbon intensity of heating systems
Heat electrification	Changing from existing non-electrical forms of heating to heating that uses electricity. This could be via a heat pump or direct electric heating
Heat meter	Similar to an electricity meter, but used to measure the consumption of heat
Heat network	A distribution system that takes heat from a central source and delivers it to multiple domestic and non-domestic buildings. heat usually travels in the form of hot water through a network of insulated underground pipes
Heat Network Zone (HNZ)	
Heat pump	A heat generating device that uses technology like that found in a refrigerator or an air conditioner. It typically extracts heat from the surrounding air, water or the ground and uses electricity to increase the energy and temperature in the extracted heat, transfer this to water and pump the heating water to where it is needed.
HVAC	Heating, ventilation and air conditioning
Just Transition	Moving away from fossil fuels and changing the local, national and global economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind
kW, kWh, kWh/yr/m	Kilowatt, kilowatt hour(s), kilowatt hours per year per meter (of heating pipe)

Term or acronym	Definition or meaning
LAEP	Local Area Energy Plan
LAEP+	Advanced Infrastructure Trading Limited for providing their energy planning tool
LED	Light emitting diode – a form of very low energy lighting
LHEES	Local Heat and Energy Efficiency Strategy
Low and zero carbon (LZC) technology	Equipment such as PV panels and heat pumps, which are inherently energy efficient and either generate renewable energy or can operate using renewable energy
Low and zero emission	Low or no emissions of greenhouse gases associated with a process or system
LPG	Liquefied Petroleum Gas
Low-grade heat	In the context of LHEES this means typically low temperature heat
MVV	MVV Energie AG
Net Zero	The state where emissions of carbon dioxide due to human activities and removals of these gases are in balance over a given period
Non-traditional construction	Non-typical forms of building homes and other buildings
Off-gas buildings	Buildings not connected to the natural gas grid
On-gas buildings	Buildings connected to the natural gas grid
PEAT	Portfolio Energy Analysis Tool
PV	Photovoltaics
RESOP	Regional Energy System Optimisation and Planning – provided by the Energy Savings Trust
Ramsar site	A wetland of international importance designated under the Ramsar Convention
Retrofit	Typically the changing or addition of new technology or features to older systems – for LHEES this means changing things in building like insultation, lighting, windows and heating systems to improve energy efficiency and reduce carbon emissions
SGN	Scottish Gas Networks
Solar panels	Energy generating systems that use the sun's energy to generate electricity (photovoltaic or PV panels) or heat energy (solar thermal panels or tubes)
Solar thermal	See solar panels
Solid fuel	Typically coal
Solid wall	External walls of buildings that do not have a cavity or gap between two wall layers
SSEN	Scottish and Southern Electricity Networks
Stakeholder engagement	The process by which an organisation involves people (i.e. the stakeholders) who may be affected by the decisions it makes or can influence the implementation of its decisions
Static water bodies	Typically lakes and reservoirs
Strategic Environmental Assessment (SEA)	An assessment procedure that must be undertaken by a Local authority when assessing a plan or programme to which the procedure applies
Substation	Part of the electricity distribution system containing transformers to reduce higher voltage electricity to lower voltage for use in buildings
Thermal store	A system for storing excess heat generated from a heating system, which can be used at a later time
TWh	Terawatt hour
Waste heat	Heat that is produced by a machine, or other process that uses energy, as a byproduct of the process it is undertaking
Water source heat pump	A heat pump that uses heat from water (typically groundwater or river or reservoir water) as the primary heat source
Wet heating system	A heating system that typically uses water as the heat transfer medium, such as a radiator system in a house
Whole house retrofit	An extensive programme of retrofit across many aspects of a house – insulation, draught proofing, lighting, heating systems, renewable energy systems, etc.

Appendix 1: Policy & Strategy Review: National Level

Policy/Strategy etc	Description	Priorities/actions	Targets	Duration period
A fairer, greener Scotland Programme for Government 2021-22	The Programme for Government is published every year at the beginning of September and sets out the actions the government will take in the coming year and beyond. It includes the legislative programme for the next parliamentary year to drive forward change across all levels of society.	Establish a caring nation: setting out a new vision for health and social care Create a land of opportunity: supporting young people and promoting a fairer and more equal society Secure a net zero nation: ending Scotland's contribution to climate change, restoring nature and enhancing our climate resilience, in a just and fair way Create an economy that works for all of Scotland's people and places: putting sustainability, wellbeing and fair work at the heart of our economic transformation Living better: supporting thriving, resilient and diverse communities Establish Scotland in the world: championing democratic principles, at home and abroad	Relevant to LHEES: The Scottish Government is investing £2 billion across 2021-22 to 2025-26 in large-scale, low carbon infrastructure. Provide at least £1.8 billion over the course of this Parliament to make homes easier and greener to heat, and progress the commitment to decarbonise 1 million homes by 2030: the government will provide increased funding this year for home energy programmes and measures to reduce poor energy efficiency as a driver of fuel poverty, and £30 million for heat and energy efficiency projects in social housing. 110,000 energy efficient affordable homes by 2032 - at least 70% will be in the social rented sector and 10% in our remote, rural and island communities. All new homes delivered by registered social landlords and local authorities to be zero emission homes by 2026. The government are committed to decarbonising the heating of at least 1 million homes, and the equivalent of 50,000 non-domestic buildings, by 2030. Implement the first Just Transition Plan, for the energy sector, alongside a refreshed Energy Strategy. Invest £240 million in an Energy Transition Programme – funding industry to play a leading role in the development and deployment of new, low carbon technologies, and support the development of hydrogen and carbon capture and storage.	Annual

Policy/Strategy etc	Description	Priorities/actions	Targets	Duration period
Climate Change (Emissions Reduction Targets) (Scotland) Act 2019	Targets to reduce Scotland's emissions of all GHGs to net-zero.		Net-zero by 2045; 56% by 2020; 75% by 2030; 90% by 2040.	-2045
Climate Change Plan	Targets for emissions reduction by 3032.	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 nondomestic 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	66% reduction in emissions by 2032. 33% reduction in buildings between 2018 - 2032. By 2032 residential is expected to decrease by 23% and non-domestic by 53%.	2018-2032
Draft Hydrogen Action Plan	The draft Hydrogen Action Plan articulates the actions that will be taken over the next five years to support the development of a hydrogen economy to further efforts to reduce greenhouse gas emissions from Scotland's energy system while ensuring a just transition	To ensure Scotland is in the best possible position to achieve the ambition of 5GW of hydrogen capacity by 2030, over the next five years they will focus on the implementation of short-term actions to support meeting the following six key challenges: Scaling up hydrogen production in Scotland Facilitating the development of a domestic market Maximising the benefits of integrating hydrogen into the energy system Enabling the growth and transition of Scotland's supply chain and workforce Establishing and strengthening international partnerships and markets Strengthening innovation and research	Main target to achieve 5GW of hydrogen capacity by 2030. The Plan sets out 37 actions to achieve their vision, ambition and commitment.	Draft published in 2021
EESSH 1	The Standard aims to improve the energy efficiency of social housing in Scotland.		No eligible social property will be lower than an EPC C or D by end of Dec 2020.	-2020

Policy/Strategy etc	Description	Priorities/actions	Targets	Duration period
EESSH 2	The Standard aims to improve the energy efficiency of social housing in Scotland.		Proposed a target to maximise the number of homes in the social rented sector achieving EPC B by 2032.	-2032
Energy Efficient Scotland	20-year route map to define a set of actions aimed at making Scotland's buildings near zero carbon by 2050, in a way that is socially and economically feasible.	2 main objectives. Remove poor energy efficiency as a driver for fuel poverty. Reduce greenhouse gas emissions through more energy efficient buildings and the decarbonisation of heat supply.	By 2040 all Scottish homes achieve an EPC C, where technically and financially feasible. EES Route Map (Domestic) - 15% heat demand reduction by 2032 EES Route Map (Non-Domestic) - 20% heat demand reduction by 2032 EES Route Map (Domestic) - 35% heat from low carbon sources by 2032 EES Route Map (Non-Domestic) - 70% heat from low carbon sources by 2032	-2040
Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019	The Bill for this Act of the Scottish Parliament was passed by the Parliament on 11th June 2019 and received Royal Assent on 18th July 2019. The Act sets out targets relating to the eradication of fuel poverty, provides a revised definition of fuel poverty, provides an overview of the requirements and process for a fuel poverty strategy to be created and states the requirements for reporting on fuel poverty.		The target is that in the year 2030: no more than 15% of households in Scotland are in fuel poverty, no more than 5% of households in Scotland are in extreme fuel poverty, the median fuel poverty gap of households in Scotland in fuel poverty is no more than £350 adjusted in accordance with section 5(5) to take account of changes in the value of money. The target is that in the year 2035 no more than 10% of households in Scotland are in fuel poverty, no more than 3% of households in Scotland are in extreme fuel poverty, the median fuel poverty gap of households in Scotland in fuel poverty is no more than £300 adjusted in accordance with section 5(5) to take account of changes in the value of money. The target is that in the year 2040, as far as reasonably possible no household in Scotland is in fuel poverty and, in any event: 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, the median fuel poverty gap of households in Scotland in fuel poverty is no more than £250 adjusted in accordance with section 5(5) to take account of changes in the value of money.	2019-2040

Policy/Strategy etc	Description	Priorities/actions	Targets	Duration period
Fuel Poverty (Targets, Definition and Strategy) (Scotland) Bill	The Bill 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 to be in fuel poverty; no more than 1% of households in Scotland to be in extreme fuel poverty. By 2035: no more than 10% of households in Scotland to be in fuel poverty; no more than 3% of households in Scotland to be in extreme fuel poverty. By 2030: no more than 15% of households in Scotland to be in fuel poverty; no more than 5% of households in Scotland to be in extreme fuel poverty.	-2040
Heat in Buildings Strategy - achieving net zero emissions in Scotland's buildings	Sets out a vision for the future of heat in buildings, and the actions to be taken in the buildings sector to deliver the climate change commitments, maximise economic opportunities, and ensure a just transition, including helping address fuel poverty. Their vision is that by 2045, homes and buildings are cleaner, greener and easy to heat, with homes and buildings no longer contributing to climate change, as part of the wider just transition to net zero.	Sets out 111 actions and proposals that the Government will take to work towards their vision.	Central to delivering the vision is a programme of at least £1.8 billion investment over the course of this Parliament to make homes easier and greener to heat – progressing commitments both to decarbonise the heating in 1 million homes by 2030 and to remove poor energy efficiency as a driver of fuel poverty. As set out in the Programme for Government, they will provide increased funding this year for home energy programmes and measures to reduce poor energy efficiency as a driver of fuel poverty. They will allocate £200 million for heat and energy efficiency projects in social housing over this parliamentary term. The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 set legally binding targets for us to achieve net zero greenhouse gas emissions by 2045, with interim targets requiring a 75% reduction by 2030, and 90% by 2040. Our statutory fuel poverty targets are similarly ambitious requiring that in 2040 no more than 5% of households are fuel poor, no more than 1% are in extreme fuel poverty and the fuel poverty gap is no more than £250 (in 2015 prices).	2021-2045

Policy/Strategy etc	Description	Priorities/actions	Targets	Duration period
Heat Networks (Scotland) Act 2021	The Bill for this Act of the Scottish Parliament was passed by the Parliament on 23rd February 2021 and received Royal Assent on 30th March 2021. An Act of the Scottish Parliament to make provision for regulating the supply of thermal energy by a heat network, and for regulating the construction and operation of a heat network; to make provision about the powers of persons holding a heat networks licence; to make provision about conferring rights in heat network assets where a person ceases operating a heat network; to set targets relating to the supply of thermal energy by heat networks; to make provision about plans relating to increased use of heat networks; and for connected purposes.			2019-
Heat Policy Statement	The Heat Policy Statement 2015 (HPS) sets out how low carbon heat can reach more householders, business and communities and a clear framework for investment in the future of heat in Scotland.	The Statement sets out the future policy direction for addressing the three key aspects of the heat system: how they use it (heat demand and its reduction); how they distribute and store it (heat networks and heat storage); where the heat comes from (heat generation).	Level of ambition to achieve 1.5TWh of Scotland's heat demand to be delivered by district or communal heating and to have 40,000 homes connected by 2020.	Vision out to 2050.
Historic Environment Policy Scotland	HEPS is a non-statutory policy statement directing decision-making that should be taken into account whenever a decision will affect the historic environment.	HEPS outlines three policies on managing change to the historic environment: Decisions affecting the historic environment should ensure that its understanding and enjoyment as well as its benefits are secured for present and future generations. Plans, programmes, policies and strategies, and the allocation of resources, should be approached in a way that protects and promotes the historic environment. Changes to specific assets and their context should be managed in a way that protects the historic environment. Opportunities for enhancement should be identified where appropriate.		2019

Policy/Strategy etc	Description	Priorities/actions	Targets	Duration period
Hydrogen Policy Statement	Sets out vision for Scotland to become a leading hydrogen nation in the production of reliable, competitive, sustainable hydrogen, securing Scotland's future as a centre of international excellence as they establish the innovation, skills and supply chain to underpin an energy transition.	Support for the development of a low-cost hydrogen capability to meet an initial ambition of generating 5GW of renewable and low-carbon hydrogen by 2030.		2020
Just Transition Plan	The Scottish Government's initial response to the final report of the Just Transition Commission. It sets out our long-term vision for just transition and provides details on our National Just Transition Planning Framework.	It sets out our long-term vision for just transition and provides details on our National Just Transition Planning Framework. This report also outlines how Government will be held to account on the delivery of just transition – both in terms of how the Council are approaching the transition and how the Council are achieving outcomes that align with our vision for a fairer, greener Scotland.	By 2045, a just transition to net zero will have delivered a fairer, greener Scotland.	2021
National Planning Framework 3	The National Planning Framework (NPF) sets the context for development planning in Scotland and provides a framework for the spatial development of Scotland as a whole.	A successful sustainable place – supporting economic growth, regeneration and the creation of well-designed places A low carbon place – reducing carbon emissions and adapting to climate change A natural resilient place – helping to protect and enhance natural cultural assets and facilitating their sustainable use A connected place – supporting better transport and digital connectivity.		Scottish Government priorities for next 20-30 years.

Policy/Strategy etc	Description	Priorities/actions	Targets	Duration period
Programme for Government	The Programme for Government is published every year at the beginning of September and sets out the actions the government will take in the coming year and beyond.	Over the next Parliament to invest nearly £1.6 billion in transforming buildings to ensure that emissions from heating are eliminated by 2040 to remove poor energy efficiency as a driver of fuel poverty. The deal uplifts Heat and Energy efficiency spend from £112m in 2019/20 to £398m p.a. in 2025/26 and will include: Additional £55 million to support scale up of energy efficiency programmes At least £95 million to decarbonise the public sector estate Opening the £50 million Green Recovery Low Carbon Infrastructure Transition Programme (LCITP Up to £50 million to invest in significant energy efficiency improvements to the Royal Botanic Gardens in Edinburgh £25 million for zero carbon energy infrastructure and heat networks for residential and commercial premises along the river Clyde's path		Annual
National Planning Framework (NPF) 4	The amended Town and Country Planning (Scotland) Act 1997 directs that the National Planning Framework must contribute to a series of six outcomes: improving the health and wellbeing of our people; increasing the population of rural areas; meeting housing needs; improving equality and eliminating discrimination; meeting targets for emissions of greenhouse gases; and securing positive effects for biodiversity.	The amended Town and Country Planning (Scotland) Act 1997 directs that the National Planning Framework must contribute to a series of six outcomes: improving the health and wellbeing of our people; increasing the population of rural areas; meeting housing needs; improving equality and eliminating discrimination; meeting targets for emissions of greenhouse gases; and securing positive effects for biodiversity. A draft statement of the outcomes and how this draft has contributed to them is set out in Annex A. Part 1 – Sets out an overarching spatial strategy for Scotland out to 2045. This includes spatial principles and eighteen national developments (including for example energy and transport infrastructure, and green networks) across five regions of Scotland to support the planning and delivery of sustainable, liveable and productive places. This should be used to guide the preparation of regional spatial strategies and local development plans. Part 2 – Sets out policies for the development and use of land which are to be applied in the preparation of local development plans; local place plans; masterplans and briefs; and for determining the range of planning consents. This part should be taken as a whole, and all relevant policies should be applied to each application. Part 3 – Contains a series of annexes, including spatial planning priorities and the qualities of successful places		

Policy/Strategy etc	Description	Priorities/actions	Targets	Duration period
Scotland's Sustainable Housing Strategy	A draft statement of the outcomes and how this draft has contributed to them is set out in Annex A.	Delivery of the Home Energy Efficiency Programmes for Scotland (HEEPS); appropriate use of standards and regulation; market transformation.		2013
Scottish Energy Strategy	Part 1 – Sets out an overarching spatial strategy for Scotland out to 2045. This includes spatial principles and eighteen national developments (including for example energy and transport infrastructure, and green networks) across five regions of Scotland to support the planning and delivery of sustainable, liveable and productive places. This should be used to guide the preparation of regional spatial strategies and local development plans.	Its 3 core principles are to: take a whole-system view; provide an inclusive energy transition; and have a smarter local energy model.	By 2030, the equivalent of 50% of the energy for Scotland's heat, transport and electricity consumption to be supplied from renewable sources.	-2050
Tenements (Scotland) Act 2004	Part 2 – Sets out policies for the development and use of land which are to be applied in the preparation of local development plans; local place plans; masterplans and briefs; and for determining the range of planning consents. This part should be taken as a whole, and all relevant policies should be applied to each application.	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.		2004
The Planning (Listed Building Consent and Conservation Area Consent Procedure) (Scotland) Regulations 2015	Part 3 – Contains a series of annexes, including spatial planning priorities and the qualities of successful places			2015
Updated Climate Change Plan	This update to Scotland's 2018-2032 Climate Change Plan sets out the Scottish Government's pathway to their new targets set by the Climate Change Act 2019. It is a key strategic document on our green recovery from COVID-19.	See Heat in Buildings Strategy		2018-2032

Appendix 1: Policy & Strategy Review: Local Level

Strategy/ Policy/Plans	Description	Priorities/actions	Targets	Duration period
Dundee City Council Net Zero Transition Plan 2023-	The Dundee City Council Net Zero Transition Plan 2024-2030 sets out how the Council will become a net zero organisation by 2038. The strategic move positions Dundee City Council as a leader in the transition to a low-carbon and climate-resilient body. The plan is centred around lowering emissions from buildings, streetlighting, fleet, business & service travel, and waste produced by the Council.	The decarbonisation of heating in Council buildings has been highlighted in the Plan as the area of producing the greatest emission reductions, but as one of the biggest challenges for the city, it also depends on the continued support from UK and Scottish Governments to achieve targets.	By setting a target to become a net-zero organisation by 2038, Dundee City Council is sending a clear message that it is dedicated to creating a sustainable future for its residents and businesses	2024-2030
Dundee Local Development Plan 2019	The Local Development Plan sets out land use planning policy within the Dundee City Council area. The Local Development Plan seeks to promote and implement policies and proposals which help to deliver the aims of the TAYplan, Dundee Council Plan and Community Plan Vision to create a more sustainable, inclusive and vibrant city. The strategy and policies of the Local Development Plan promote sustainable economic growth and the development of a low carbon city with sustainable connections.	• Policy 1: High Quality Design and Placemaking - All development proposals should follow a design-led approach to sustainable, high quality placemaking. Development should contribute positively to the quality of the surrounding built and natural environment and should be planned and designed with reference to climate change mitigation and adaptation. • Policy 46: Delivery of Heat Networks - Proposals for new development should meet their heat demand through heat networks, by considering the feasibility to create or link into an existing energy centre and heat network or demonstrate the capability to progress towards this technology in the future. The development layout should be designed to be capable of connecting to the heat network or heat source and areas for pipe runs within the development should be safeguarded to enable future connectivity.	N/A	2019-2029
Dundee Local Housing Strategy 2019-2024	The Housing (Scotland) Act 2001 places a statutory duty on local authorities to prepare a Local Housing Strategy (LHS) supported by an assessment of housing need, demand and affordability. The Local Housing Strategy is the primary strategy for the provision of housing and associated services to address homelessness, meeting housing needs and tackling fuel poverty.	Aims of the LHS relevant to LHEES: • Improve housing quality. • Support people in their tenancies. • To improve standards of property and management in Dundee's private rented market. • To assist individuals to live independently in their communities • Ensure individuals can live independent, fulfilled, and healthy lives.	Built Environment and Climate Change Action Plan: • Increase percentage of Council houses that achieve Energy Efficiency Standard for Social Housing from 71.6% to 100% by 2023. • Increase total number or District Heating Schemes from 4 to 9 by 2023. • All electric storage heating systems replaced with gas wet systems or equivalent (from baseline of 98%).Visit every new DCC tenant to give advice on heating demonstration and signpost to other DCC services.	2019-2024
Dundee Strategic Housing Investment Plan 2022-2027	Dundee`s Strategic Housing Investment Plan (SHIP) 2022-27 sets out the priorities of the Council and its partners for the expenditure of the Scottish Government's Affordable Housing Supply Programme funding.	The Council will work with partners to ensure that all new build properties constructed within the investment programme will meet or surpass the current building regulations and that energy efficiency measures such as insulation, solar energy, wind power or other suitable measures are integrated. This will assist in reducing carbon emissions, address fuel poverty and ensure that tenants live in warm, affordable homes.	N/A	2022-2027

Strategy/ Policy/Plans	Description	Priorities/actions	Targets	Duration period
City Plan for Dundee 2017-2026	City Plan for Dundee 2017-2026 is Dundee's Local Outcome Improvement Plan. The vision of the plan is for Dundee: • To have a strong and sustainable city economy that will provide jobs for the people of Dundee, retain more graduates and make the city a magnet for new talent . • To offer real choice and opportunity in a city that has tackled the root causes of social and economic exclusion, creating a community which is healthy, safe, confident, educated and empowered. • To be a vibrant and attractive city with an excellent quality of life where people choose to love, learn, work and visit.	The City Plan sets out several strategic priorities with associated outcomes. The fifth strategic priority is "building stronger communities" and an outcome of this is to "improve housing quality, choice and affordability".	Targets for improvement relevant to LHEES: • Reduce percentage of households in fuel poverty to 24% by 2026 from a 2016 baseline of 37% • Increase percentage of electric vehicles in the city to 20% by 2026 from a 2016 baseline of <1%.	2017-2026
Dundee Climate Action Plan 2019	The Climate Action Plan represents the first set of actions in a long-term pathway to first surpass the Covenant of Mayor's target of 40% reduction in greenhouse gas emissions by 2030 and then to achieve net-zero greenhouse gas emissions by 2045 or sooner.	• E1: Adopt a Whole Life Costing approach to ensure new developments achieve greater operational sustainability. • E2: Complete fabric improvements to outstanding domestic Council (and ex-Council properties in mixed-tenure blocks) stock to achieve the Energy Efficiency Standard for Social Housing (EESSH) by 2020 and widen the range of technologies (including renewables) under consideration to allow compliance with the more exacting EESSH2 standard by 2032. • E3: Continue to deliver city-wide energy awareness campaign to improve energy efficiency behaviour in all households. • E4: Explore how the work of Energy Efficiency Advice Project (DEEAP) can be maintained and delivered. E5: Complete phase 1 of the Non-Domestic Energy Efficiency (NDEE) retrofit of Dundee City Council public buildings (Basket 1) before implementing subsequent phases (Baskets) annually until all prescribed measures are complete on all Council public buildings. • E6: Update the Council's Carbon Management Plan, identifying new targets in line with the Public Bodies Climate Change Duties (PBCCD) and Climate Action Plan targets. • E7: Replace all streetlights with energy efficient lighting systems by 2020 and explore opportunities for future smart intelligent lighting. • E8: Provide advice and support on resource efficiency and climate risk management for businesses in Dundee. • E9: Identify solar OV opportunities across Dundee for public and private buildings and ensure all civic buildings have renewables where technically feasible. • E10: Implement the Joint Initiative for Hydrogen Vehicles Across Europe (JIVE 2) hydrogen bus project, deploying 12 hydrogen fuel buses into operation in Dundee and creating a local fuel and maintenance station. • E11: Research opportunities to utilise local water bodies for renewables including local reservoirs, rivers and estuaries. • Action E13: Explore options to further improve efficiencies in the Council's existing Multistorey domestic district heating schemes. • E14: Deliver the Low Carbon District Energy Hub at the Regional Performance Centre for Sports as a catalyst project; proving industry/technology programmes and projects. • E15: Prepare an investment-ready business case that identifies district heating opportunities from the city's Energy from Waste Combined Heat and Power facility. • E16: Engage with stakeholders and wider industry to promote district heating in Dundee and work with technology providers to explore the potential for integrating alternative fuels as a source of low carbon heat. • E17: Investigate options to create a Dundee City Energy Services Company (ESCo) to help coordinate planning, funding, operations, and delivery of projects. • E18: Participate in the Scottish Governments pilot Local Heat and Energy Efficiency Strategy (LHEES) programme and respond to proposals to create a statutory framework for LHEES.	N/AW	2019-2045

Strategy/Policy/ Plans	Description	Priorities/actions	Targets	Duration period
Dundee Health and Social Care Strategic and Commissioning Plan 2019-2022	The Plan describes the Dundee Health and Social Care Partnership's strategic priorities for the next three years and the key actions required to deliver an ambitious vision for the city. The Plan sets out 4 strategic priorities for targeting resources: 1. Health inequalities 2. Early intervention prevention 3. Localities and engaging with communities 4. Models of support/pathways of care	Alongside partners, the Dundee Health and Social Care Partnership will work towards achieving its priorities by: • Supporting communities to address the impact inequality has on the health and wellbeing or our citizens • Investing in early intervention and prevention approaches that are designed to prevent health and social care needs escalating, including prioritising such approaches to those people who are at most significant risk of poor health	N/A	2019-2022
Dundee Capital Investment Strategy 2018-2028	The Capital Investment Strategy sits centrally within the Council's future planning activities and in doing so has to reflect the demands of each strategy to ensure positive outcomes are achieved at the right time for the maximum benefit to the city. The Capital Investment Strategy identifies projects within the following themes: • Work and enterprise • Children and families • Health, care and wellbeing • Community safety and justice • Building strong communities • Service provision	• New schools' design, construction and operation will be environmentally and energy efficient; contributing directly to delivering the year-on-year reductions in greenhouse gas emissions introduced by the Climate Change (Scotland) Act 2009 and providing a rich context for learning for children and young people about sustainability now and in the future. • The Council will invest in energy efficient LED lighting throughout the city as well as investing in new electrical networks and supporting infrastructure. • The Council prioritises Scottish Housing Quality Standard (SHQS) and Energy Efficiency Standard in Social Housing (EESSH). To deliver EESSH the Council works closely with the Scottish Government to maximise funding from the Home Energy Efficiency Programme for Scotland (HEEPs) to deliver external wall insultation (EWI) to provide thermal insulation to mixed tenure properties. • The City Council, in conjunction with the Dundee Partnership, seeks to develop a 'Sustainable Energy and Climate Action Plan' (SECAP) for the city as part of the global Covenant of Mayors movement which will provide the leadership, commitment and planning necessary for the transition to a low carbon Dundee. • There is greater opportunity for expansion to create including gas-fired Combined Heat & Power (CHP) units, Heat Pumps (Air & Ground Source), Solar (Thermal and Photovoltaic), Biomass, Thermal, Battery Storage from intermittent renewable electricity generation plant, Hydrogen Generation using surplus energy from centres and heat recovered from industrial processes.	N/A	2018-2028
Dundee Council Plan 2022-2032	Dundee City Council fully endorses the shared vision for our city set out in the Dundee Partnership's City Plan 2022 – 2032. This reflects a consensus in the city which the Council can all work towards and is set out as follows: • Dundee will be a caring City which has tackled the root causes of poverty and delivered fairness in incomes, education and health. • Dundee will have a strong, creative, smart and sustainable City economy with jobs and opportunities for all. • Dundee will be a greener City, made up of strong communities where people feel empowered, safe and proud to live.	Providing housing which is affordable and efficient to heat Delivering significant reduction in CO2 emissions Reducing field poverty Increasing the number of district heating schemes Increasing ultra-low emission and electric vehicles Reduce percentage of all tenure households which are fuel poor Increase total number of District Heating Schemes	• Reduce DCC's corporate emissions (Carbon footprint) towards net zero tCO2e to 12,472 by 2032. • Reduce energy consumption in Council buildings tCO2 at 5% per annum.	2022-2032

Strategy/Policy/ Plans	Description	Priorities/actions	Targets	Duration period
- TOC to be reformatted to contain this	The District Heating Strategy aims to identify potential district heating networks in Dundee, including the short, medium and long-term strategic opportunities and the development of a long-term vision to support the City's growth and low carbon transition using decentralised energy. It provides an evidence base to advance district heating network schemes in Dundee, informing both policy and delivery. The Strategy has been prepared with assistance from Resource Efficient Scotland and Ramboll and informed by a range of stakeholders.	The Strategy aims to achieve the following objectives: • Deliver sustainable and affordable energy to reduce fuel poverty and energy costs. • Achieve reductions in the Council's CO2 emissions and contribute to the city's emissions reduction target of 40% by 2030. • Develop the city's heat network at a pace which is financially and practically viable and which improves economic efficiencies from assets. • Develop the knowledge and skills base to facilitate heat network delivery. • Foster collaborative partnerships and agreements for heat network delivery.	Short Term (2018-2020) • Deliver the Council's first non-domestic district heating scheme via the Low Carbon District Energy Hub at the Regional Performance Centre for Sport • Seek to secure funding for district heating projects through LCITP2 and ongoing SEEP programme and internal budgets. • Develop feasibility studies for district heating projects and networks within the Lochee Corridor and Dighty Corridor. • Encourage the delivery of district heating within the city through proposing new District Heating Planning Policy in the Local Development Plan 2. Medium Term (2020-2024) • Liaise with the Scottish Government to embed Local Heat and Energy Efficiency Strategies within national and local policy. • Deliver district heating projects and networks within the Lochee Corridor and Dighty Corridor subject to funding. • Support the expansion of a district heating network within the city centre in partnership with other local public and private stakeholders. • Work with public and private sector partners to explore district heating opportunities in and around Menzieshill and Coldside. • Seek to establish a Dundee City ESCo. Longer Term (2024-2028) Assess options on how district heating can be utilised in the development of integrated energy hubs with hydrogen provision for transport and fleet. Investigate possible connections between established district heating schemes to improve operational efficiencies. • Continue to support the expansion of a city centre district heating network in partnership with other local public and private stakeholders. • Explore alternative methods of heat generation to decarbonise district heating networks in line with emerging technologies.	2018-2028

Strategy/Policy/ Plans	Description	Priorities/actions	Targets	Duration period
Dundee Green Network	Following a period of public consultation, the Dundee Green Network document was approved for adoption as non-statutory planning guidance by the City Development Committee on 25 January 2016. The Council's adoption of the planning guidance gives it authorisation to be a material consideration in decision making. The document presents a series of Green Network maps.	Delivery Objective of Green Infrastructure: Improve the Quality of Place - Provide attractive and well-integrated green networks close to existing and proposed communities Development Principles to Protect, Connect and Enhance the Dundee Green Network: • Consider green infrastructure elements as an integral part of the design process. • Consider opportunities to integrate with the wider green network. • Design should consider individual site attributes, natural features and local character. • Provide a range of high-quality places appropriate to identified local need in Local Community Plans. • Green infrastructure design should aim to deliver on the number of qualities recognised in Scottish Government GI Guidance as inherent to successful places –welcoming, distinctive, safe and pleasant, easy to move around, resource efficient and adaptable. Delivery Objective of Green Infrastructure: Enable Climate Change Adaptation and Mitigation - Help the City adapt to flooding and extreme weather events Development Principles to Protect, Connect and Enhance the Dundee Green Network: • Consider green infrastructure elements as an integral part of the design process including green roofs, green walls, tree planting, SUDS and rain gardens • SUDS ponds and wetlands should be designed to respond to site topography, character and scale in accordance with best practice outlined in Dundee City Council SUDS Guidance. • SUDS design should encourage biodiversity and create a positive landscape setting for communities. RSPB Guidance on SUDS and the Wildfowl and Wetlands Trust Delivery Objective of Green Infrastructure: Facilitate people to lead healthier lives - Enable people to increase their activity levels by providing sport, recreation, play and community growing spaces which are accessible and integrated into the walking and cycling network. Development Principles to Protect, Connect and Enhance the Dundee Green Network: • Consider green infrastructure elements such as green corridors, footpaths and cycleways, allotments and recreational areas as an integral part of the design process. • Green infrastructure should meet identified local need in Local Community Plans. • Consider opportunities to integrate with the wider green network including the Core Path Network, greenways and the Green Circular. • Design should be inclusive, safe and welcoming and should encourage sense of community ownership. Delivery Objective of Green Infrastructure: Protect and enhance the City's green and blue assets - Protect and enhance the city's existing green and blue assets to allow habitats and biodiversity to co-exist and flourish in an environment that people live, work and play in Development Principles to Protect, Connect and Enhance the Dundee Green Network: • Consider the multifunctional principles of green infrastructure elements as an integral part of the design process • Consider opportunities to integrate with the wider green network. • Green infrastructure offers opportunities for new biodiversity friendly spaces. • Explore opportunities for interpretation to help raise awareness and understanding in the community. Please follow the link for useful information on incorporating Swift Bricks into buildings.	N/A	2016 -

Strategy/Policy/ Plans	Description	Priorities/actions	Targets	Duration period
Dundee Cycling Strategy	The Dundee Cycling Strategy sets out how Dundee City Council and its partners will seek to invest in measures to: • Create a strategic cycle network, improve the attractiveness of other streets to cycle and install associated cycle friendly infrastructure • Improve information on cycle routes and cycling opportunities • Enable more people to cycle • Encourage more people to cycle, and • Create a strong leadership and governance structure In order to overcome the main avoidable barriers to cycling in the city, which are that: • Road safety risks are perceived to be high • Cycle parking is not always available • Many people do not have access to bikes or training to ride confidently • Many people do not know that cycle routes are available for many journeys • Social norms lead many people to choose alternative modes In order to encourage more people to cycle more often in order to • Provide a more socially-inclusive transport system • Improve public health • Reduce air pollution • Reduce traffic congestion • Improve the economic vitality of the city centre and other neighbourhood centres • Promote Dundee as a place to visit and stay • Address climate change	N/A	N/A	2019 - This 2019 strategy document is a refresh of the original Dundee Cycling Strategy which was approved by the Council in June 2016. The original document stipulated that the strategy should be updated every three years.
Sustainable Transport Delivery Plan 2024-2034	The proposed Sustainable Transport Plan will be a ten-year plan to boost sustainable transport infrastructure in Dundee and link with wider initiatives across the region.	The delivery plan takes cognisance of potential grant funding sources in shaping the objectives and conforms with both the National Transport Strategy (NTS) and National Planning Framework (NPF4) which promotes the delivery of high quality, sustainable places that meet the transport needs of the city. This delivery plan will set out the city's keys objectives in the following modes of sustainable transport; • ACTIVE TRAVEL • PUBLIC TRANSPORT • MOBILITY AS A SERVICE AND SHARED TRANSPORT • LOW CARBON VEHICLE INFRASTRUCTURE	N/A	2024- 2034
Biodiversity Action Plan for Dundee	Vision for 2030: Working together to protect, enhance and raise awareness of biodiversity in Dundee for the benefit of all.	Vision to be achieved through the following actions: • Dundee City Council, in partnership with other organisations, continues to maintain and enhance a biodiverse, healthy and sustainable environment • By protecting, enhancing and incorporating quality green infrastructure into our urban setting the Council will improve biodiversity and help create an environment that is resilient to climate change. • Greenspaces are managed to preserve their wildlife value, as well as to enhance their contribution to the community and its inhabitants. • The wider community understands what biodiversity is, what it means to them and how they can contribute.	N/A	2020-2030

Strategy/Policy/ Plans	Description	Priorities/actions	Targets	Duration period
Drive Dundee Electric	Drive Dundee Electric is a campaign aimed at the residents and businesses of Dundee.	• Promote EV's and their benefits, the developments in Dundee and offer support and advice to anyone with queries, questions or doubts when considering adopting to electric vehicles. • Have previously been involved with expanding the councils EV fleet and influenced the growing amount of electric taxis in Dundee. • Install charging infrastructure in the city and surrounding regions. • Involved with relevant EV promotional events.	N/A	N/A
Dundee Waste and Recycling Strategy 2020 - 2025	This strategy provides an update on actions taken to implement national policy and meet legislative requirements in Dundee and sets out the strategic direction for the Council going forward. It provides a clear action plan to ensure that waste is managed more efficiently, ensuring that every recycling opportunity is taken over the next five years in order to work towards national recycling targets and once again becoming "Scotland's Recycling City".	Strategic Aim 1: Develop and implement Policy & Strategy Key outcomes: • Reduction in the number of households presenting multiple general waste bins for collection • Increased participation in recycling services • Decrease in volume of recyclables disposed of as general waste in Dundee • Reduction in contamination levels of recycling collections • Increased Re-Use tonnage • Decrease in single-use plastic waste • Reduction in side waste collected • Development of policies for side waste, contamination and bin provision • Implement local policies in line with national drivers Strategic Aim 2: Commit to communication & stakeholder management Key outcomes: • Decrease in number of routine queries and complaints received • Increased number of website & social media hits for information pages • Improved staff survey results regarding communication and information • Increased participation in recycling services • Recognise commercial customer needs whilst maintaining service efficiency • Regularly update stakeholders with progress reports • Proactively ensure that council staff are reminded of the importance of their role in developing and maintaining a quality service • Ensure best value for the council through contractor engagement Strategic Aim 3: Emphasise and promote behavioural change Key outcomes: • Reduced contamination in household recycling bins • Improved quality and volume of recyclate collected • Reduced fly tipping • Reduced littering • Increase in number of local businesses which Take Pride in their environment and help improve their local area Strategic Aim 4: Focus on performance improvement Key outcomes: • Optimise collection route efficiency • Review recycling provision annually • Review and revise waste data recording • Implement smart waste technology systems within the City • Increase recycling • Decrease contamination of recyclables • Decrease waste arisings	N/A Although energy from waste is mentioned in the Strategy (see the Additional Comments column), there are no related targets listed in the action plan.	2020-2025

Strategy/ Policy/Plans	Description	Priorities/actions	Targets	Duration period
Dundee Fairness Action Plan: Child Poverty Report	This document is the second Dundee Fairness and Local Child Poverty Report produced during the Covid-19 pandemic. The 2019/20 report was published in November 2020. This report provides an update on progress and developments in for the rest of 2020/21 and reflects on activity across the whole year where this information was not available previously. Together, these two reports give a comprehensive picture of the ever-growing ways that Dundee is attempting to reduce child and household poverty. The Report itself is contained within a larger document which has a letter from the Chief Executive to the Policy and Resources Committee.	Relevant to LHEES: • Reduce household costs, debt and fuel poverty	Actions relevant to LHEES: • Increase fuel debt write-off cases by 10% through Dundee Energy Efficiency Advice Project. • Increase take-up of warm home discounts by 7% through the Dundee Energy Efficiency Advice Project. • Develop district heating schemes in non-domestic sectors with a view to expanding into households when and where appropriate. • Increase the number of private sector landlords signing up to Homefinder Projects to improve standards. • Support to enable private tenants to making Repairing Standard referral to the First Tier Tribunal and Third-Party Referrals. • Increase the number of accredited private sector landlords by 5%. • Build 1000 new units of affordable housing from 2017 to 2021.	2019-2022

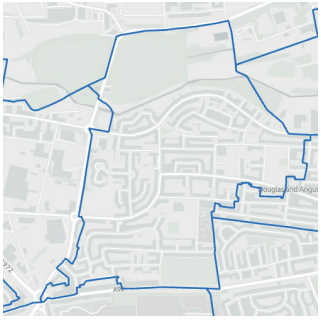
Appendix 2: Understanding Data Zones

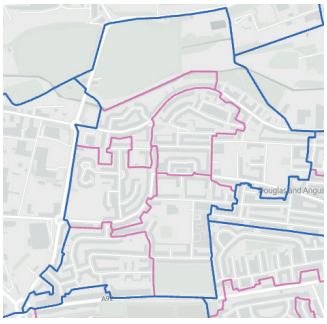
In Scotland, there are a number of geographic areas that are used to understand statistics about the population. These include intermediate zones and data zones.

Intermediate zones fit within Council boundaries and typically contain between 2,500 and 6,000 residents. Data zones are smaller than intermediate zones and contain between 500 and 1,000 residents. Data zones in Dundee are named after the intermediate zone they are within. For example, Westend – 01 is a data zone within the Westend intermediate zone. Data zones are intended to be small enough to represent communities, such as social characteristics and geographical constraints, but large enough to protect confidentiality. They are widely used in the public and private sector, for example to report Census information, and are used to inform local and national policy decisions.

To incorporate changes in the local area, such as new housing developments, data zone boundaries are reviewed every 10 years following a Census. The data zones boundaries used in this LHEES were based on the 2011 Census and published in 2014. The majority of the data zones will remain the same in the next update, which will be released following the 2022 Census.

Local authority	**Intermediate zone (blue)**	**Data zone (pink)**
Dundee	e.g. Westend	e.g. Westend - 01





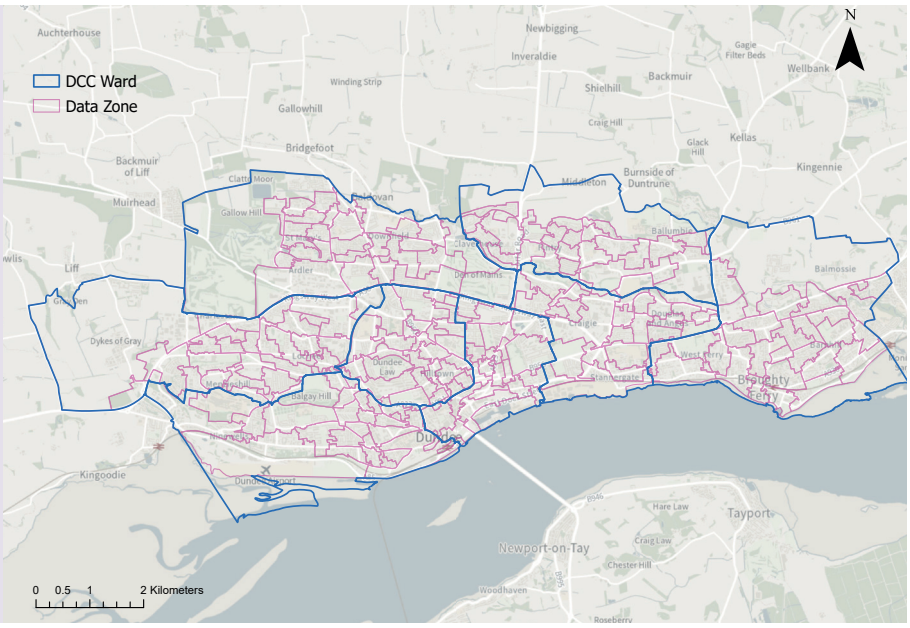
Data Zones in LHEES

Dundee is made up of 118 data zones. To develop Dundee's LHEES, the characteristics of properties within these data zones were mapped. An example of this is the probability of fuel poverty within each data zone. By understanding the characteristics of the properties within each zone, the specific challenges and opportunities each area may face can be better understood. Data zones that have significant opportunities could be prioritised for delivery.

The data zones in Dundee can be viewed using the Dundee LHEES web map. This web map can be used to identify the data zones referred to in the Strategy.

The following map and table show the data zones in the context of Wards. And the table shows the list of data zones within each ward. Please note that some data zones cross boundary of wards, therefore, may be in the list of two wards. For example, data zone 'West Pitkerro – 05 is listed in both North East ward and in The Ferry ward.

Data Zone in the context of Wards



Coldside

- Balgay - 02
- Caird Park - 03
- City Centre - 01
- City Centre - 02
- City Centre - 03
- City Centre - 04
- City Centre - 05
- Docks and Wellgate - 05
- Docks and Wellgate - 06
- Docks and Wellgate - 07
- Fairmuir - 02
- Fairmuir - 03
- Hilltown - 01
- Hilltown - 02
- Hilltown - 03
- Hilltown - 04
- Hilltown - 05
- Hilltown - 06
- Law - 01
- Law - 02
- Law - 03
- Law - 04
- Law - 05
- Law - 06
- Logie and Blackness - 06
- Stobswell - 02
- The Glens - 01
- The Glens - 02
- The Glens - 04
- The Glens - 05
- The Glens - 06

East End

- Caird Park - 01
- Craigie and Craigiebank - 01
- Craigie and Craigiebank - 02
- Craigie and Craigiebank - 03
- Craigie and Craigiebank - 04
- Craigie and Craigiebank - 05
- Craigie and Craigiebank - 06
- Douglas East - 01
- Douglas East - 02
- Douglas East - 03
- Douglas East - 04
- Douglas West - 01
- Douglas West - 02
- Douglas West - 03
- Douglas West - 04
- Douglas West - 05
- Douglas West - 06
- Linlathen and Midcraigie - 01
- Linlathen and Midcraigie - 02
- Linlathen and Midcraigie - 03
- Linlathen and Midcraigie - 04
- Linlathen and Midcraigie - 05
- Linlathen and Midcraigie - 06
- West Ferry - 01
- West Ferry - 02
- West Pitkerro - 06
- Whitfield - 04
- Whitfield - 05
- Whitfield - 06
- Whitfield - 07

Lochee

- Balgay - 02
- Balgay - 03
- Balgay - 04
- Balgay - 05
- Charleston - 01
- Charleston - 02
- Charleston - 03
- Lochee - 04
- Lochee - 05
- Lochee - 06
- Lochee - 07
- Menzieshill - 01
- Menzieshill - 02
- Menzieshill - 03

- Charleston - 04
- Charleston - 05
- Fairmuir - 04
- Fairmuir - 05
- Lochee - 01
- Lochee - 02
- Lochee - 03
- Menzieshill - 04
- Menzieshill - 05
- Menzieshill - 06
- Western Edge - 03
- Western Edge - 04
- Western Edge - 05

Maryfield

- Baxter Park - 01
- Baxter Park - 02
- Baxter Park - 03
- Baxter Park - 04
- Caird Park - 01
- City Centre - 05
- City Centre - 06
- Craigie and Craigiebank - 01
- Docks and Wellgate - 01
- Docks and Wellgate - 02
- Docks and Wellgate - 03
- Docks and Wellgate - 04
- Docks and Wellgate - 05
- Hilltown - 01
- Stobswell - 01
- Stobswell - 02
- Stobswell - 03
- Stobswell - 04
- Stobswell - 05
- Stobswell - 06
- Stobswell - 07
- The Glens - 01
- The Glens - 02
- The Glens - 03
- The Glens - 04
- The Glens - 05

North East

- Caird Park - 01
- Douglas West - 06
- Fintry - 01
- Fintry - 02
- Fintry - 03
- Fintry - 04
- Fintry - 05
- Fintry - 06
- Fintry - 07
- Fintry - 08
- Fintry - 09
- Linlathen and Midcraigie - 07
- West Pitkerro - 05
- West Pitkerro - 06
- West Pitkerro - 07
- West Pitkerro - 08
- Whitfield - 01
- Whitfield - 02
- Whitfield - 03
- Whitfield - 04
- Whitfield - 05
- Whitfield - 06
- Whitfield - 07
- Whitfield - 08
- Whitfield - 09

Strathmartine

- Ardler and St Marys - 01
- Ardler and St Marys - 02
- Ardler and St Marys - 03
- Ardler and St Marys - 04
- Ardler and St Marys - 05
- Downfield - 04
- Downfield - 05
- Downfield - 06
- Downfield - 07
- Fairmuir - 01

- Ardler and St Marys - 06
- Ardler and St Marys - 07
- Ardler and St Marys - 08
- Caird Park - 01
- Caird Park - 02
- Caird Park - 03
- Caird Park - 04
- Downfield - 01
- Downfield - 02
- Downfield - 03
- Fintry - 08
- Kirkton - 01
- Kirkton - 02
- Kirkton - 03
- Kirkton - 04
- Kirkton - 05
- Lochee - 05
- Western Edge - 01
- Western Edge - 02

The Ferry

- Barnhill - 01
- Barnhill - 02
- Barnhill - 03
- Barnhill - 04
- Barnhill - 05
- Barnhill - 06
- Broughty Ferry East - 01
- Broughty Ferry East - 02
- Broughty Ferry East - 03
- Broughty Ferry East - 04
- Broughty Ferry East - 05
- Broughty Ferry West - 01
- Broughty Ferry West - 02
- Broughty Ferry West - 03
- Broughty Ferry West - 04
- Broughty Ferry West - 05
- Broughty Ferry West - 06
- Craigie and Craigiebank - 04
- Craigie and Craigiebank - 06
- West Ferry - 02
- West Ferry - 03
- West Ferry - 04
- West Pitkerro - 01
- West Pitkerro - 02
- West Pitkerro - 03
- West Pitkerro - 04
- West Pitkerro - 05
- West Pitkerro - 06

West End

- Balgay - 01
- Balgay - 02
- Balgay - 03
- City Centre - 01
- City Centre - 02
- City Centre - 06
- Law - 01
- Lochee - 05
- Logie and Blackness - 01
- Logie and Blackness - 02
- Logie and Blackness - 03
- Logie and Blackness - 04
- Logie and Blackness - 05
- Menzieshill - 01
- Perth Road - 01
- Perth Road - 02
- Perth Road - 03
- Perth Road - 04
- Perth Road - 05
- Perth Road - 06
- Westend - 01
- Westend - 02
- Westend - 03
- Westend - 04
- Westend - 05
- Westend - 06
- Westend - 07
- Western Edge - 05

Appendix 3: Stakeholder Engagement Plan

LHEES Engagement Timeline

- Stakeholder engagement tasks
- One-to-one interviews
- Consultation period
- Inception meeting & RFI
- Workshop
- Complete
- Ongoing
- Upcoming

Stage 1: Key Activity

Stakeholder Mapping and Engagement Planning

Engage with the Council to identify, map and prioritise key stakeholders. Map stakeholder attendance against defined engagement activity.

Stakeholders: Council

Stage 4: Workshop

Heat Network Zoning

Interactive workshop to explore and discuss initial Delivery Areas and recommendations alongside the wider policy, strategy and delivery environment.

Stakeholders: Council + others from mapping

Stage 7+8: Online session

Consultation Period

Online awareness-raising and Q&A session to support public consultation.

Stakeholders: Council, wider public and community groups

Stage 3: 1-2-1 Meetings

Baseline Feedback

Work closely with the Council to visualise baseline information. The output report should be engaging and compatible with the Councils IT system.

Engage specifically on HN zoning, as per LHEES Guidance/Methodology.

Stakeholders: Council + others from mapping

Baseline report submission

Stage 6: Workshop

Baseline Feedback Presentation and Finalisation of Delivery Areas / Delivery actions

Overview of baseline feedback. Set out and ask for feedback on the finalised Delivery Areas (incorporating analysis to date). Explore key actions, enablers and challenges to support content for LHEES Strategy and Delivery Plan.

Stakeholders: Council + others from mapping

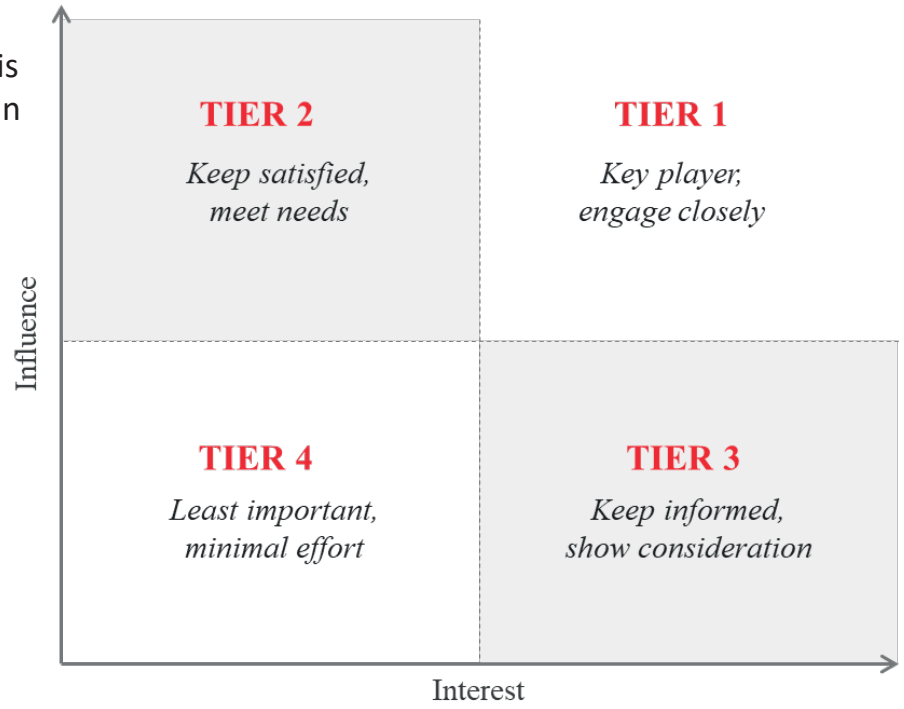
Approach

Stakeholder engagement is a critical activity for DCC in the development of their LHEES. Once the methodology for engagement was developed and workshops defined – stakeholders were mapped accordingly, and this is reviewed on an ongoing basis for the duration of the project – taking an iterative approach to stakeholder management.

Based on the likely level of interest and influence on the project, stakeholders were selected to attend key workshops throughout the LHEES strategy development. This was frequently revisited throughout the project to ensure all required stakeholders had been captured at the right points.

Workshops were specifically designed to be as interactive and collaborative as possible, to test key outputs from the analysis and strategy development and stakeholders were offered additional touchpoints if they wanted to provide feedback in a more direct and confidential format.

Once feedback was received from the stakeholder group, where appropriate it was incorporated into the strategy development (e.g. altering proposed heat network zones following workshop feedback).



Stakeholder Mapping and Engagement Planning

Stakeholder Engagement	Description
Activity Title	Stakeholder Mapping and Engagement Planning (Stage 1)
Type of Engagement	Meetings and workshop
Date	Ongoing
Purpose	Engage with the Council to identify, map and prioritise key stakeholders.
Output	Mapping and categorisation of tiers of stakeholders that can be updated and referred to throughout the project – defining how these stakeholders will contribute to the development of LHEES and what their interests are. An engagement plan for key stakeholders, with stakeholder attendance mapped against defined activity. Specific focus groups e.g. RSLs / social housing and heat network development / specific groups ad hoc (e.g. community groups, NHS); engagement with elected members (separate plan)
Methodology	LHEES
Stakeholders Involved	The Council and Arup
Notes	

Heat Network Zoning

Stakeholder Engagement	Description
Activity Title	Heat Network Zoning workshop
Type of Engagement	Workshop
Date	7th November
Purpose	To understand the role of Heat Network Zoning in LHEES and to support DCC to fulfil their duty to review heat network zoning (Heat Networks (Scotland) Act 202) To sense check the initial Prioritised Zones
Output	Arup to progress heat network zoning activity and summary material in accordance with the LHEES guidance and methodology – required for report issue 6th Nov
Methodology	LHEES Interactive workshop presenting prioritised zone and seek feedback from stakeholders
Stakeholders Involved	Council + Identified stakeholders (see excel) + Arup
Notes	

LHEES Baseline Feedback

Stakeholder Engagement	Description
Activity Title	Baseline Feedback (Stage 3/4) (to be combined with Delivery Initiatives)
Type of Engagement	Meetings – and presentation of baseline to stakeholders with Delivery Initatives workshop
Date	29 November
Purpose	Work closely with the Council and key stakeholders (TBC from mapping) to visualise baseline information to ensure outputs are in line with their views/ priorities/ knowledge.
Output	Any feedback can be incorporated into Delivery Plans
Methodology	LHEES
Stakeholders Involved	The Council, Arup and other stakeholders (TBC from mapping)
Notes	Likely 40 mins allowing for questions (ideally 30 mins)

Finalisation of Delivery Area Initiatives

Stakeholder Engagement	Description
Activity Title	Finalisation of Delivery Areas / Actions (Stage 7) (combined with Baseline Feedback)
Type of Engagement	Workshop
Date	29 November
Purpose	Set out and ask for feedback on the finalised Delivery Areas (incorporating analysis to date). Explore key actions, enablers and challenges to support content for LHEES Strategy and Delivery Plan.
Output	Finalisation of Delivery Areas, and within these, identifying potential projects and delivery activity to incorporate into future delivery plans.
Methodology	LHEES
Stakeholders Involved	Council + identified stakeholders
Notes	Delivery pathways from the optimisation modelling. Presentation of methodology (5-10) Miro (1 hour)

Online Awareness Session

Stakeholder Engagement	Description
Activity Title	Consultation Period
Type of Engagement	Online Awareness Session
Date	During public consultation period – likely February (TBC by council)
Purpose	Awareness-raising and a Q&A session to support public consultation. Arup support with materials if required.
Output	Recorded session for further use by the Council, if required.
Methodology	LHEES
Stakeholders Involved	Council, Wider public, Community groups (and Arup (if required))
Notes	

Appendix 4: Integrated Impact Assessment

Integrated Impact Assessment

Committee Report Number: 288-2023

Document Title: Dundee City Council Local Heat and Energy Efficiency Strategy

Document Type: Strategy

Description:

The Dundee Local Heat and Energy Efficiency Strategy (LHEES) sets out a long-term vision for the City outlining priorities and actions for decarbonisation of heat, improvement of the energy efficiency of buildings and tackling fuel poverty to fulfil its duty under the Local Heat and Energy Efficiency Strategies (Scotland) Order 2022, in line with the Scottish Government's guidance and methodology.

Intended Outcome:

The Dundee LHEES will outline priorities and actions for decarbonisation of heat and improvement of the energy efficiency of buildings to remove energy efficiency as a cause of fuel poverty.

Period Covered: 01/04/2024 to 31/03/2029

Monitoring:

The Dundee LHEES governance working group will set up monitoring protocols.

Lead Author:

Suraj Paneru , Senior Sustainability & Climate Change Officer , City Development,

suraj.paneru@dundeecity.gov.uk , 01382 434000,

Dundee House, 50 North Lindsay Street, Dundee DD1 1QE

Director Responsible:

Robin Presswood, Executive Director of City Development, City Development

city.development@dundeecity.gov.uk, 01382 433610

Dundee House, 50 North Lindsay Street, Dundee DD1 1QE

Equality, Diversity and Human Rights

Impacts & Implications

Age: No Impact

Disability: No Impact

Gender Reassignment: No Impact

Marriage & Civil Partnership: No Impact

Pregenancy & Maternity: No Impact

Race / Ethnicity: No Impact

Religion or Belief: No Impact

Sex: No Impact

Sexual Orientation: No Impact

Are any Human Rights not covered by the Equalities questions above impacted by this report?

No

Fairness & Poverty

Geographic Impacts & Implications

Strathmartine:	Positive
Lochee:	Positive
Coldside:	Positive
Maryfield:	Positive
North East:	Positive
East End:	Positive
The Ferry:	Positive
West End:	Positive

Positive Implications: There are steps in the Dundee LHEES that relate to tackling fuel poverty across the City through improved energy efficiency and adoption of low carbon energy. These steps consider and value a Just Transition to ensure climate change is tackled fairly, ensuring that a shift to a green economy does not increase poverty and supports disadvantaged communities.

Household Group Impacts and Implications

Looked After Children & Care Leavers: No Impact

Carers: No Impact

Household Group Impacts and Implications

Lone Parent Families: No Impact

Single Female Households with Children: No Impact

Greater number of children and/or young children: No Impact

Pensioners - single / couple: No Impact

Unskilled workers or unemployed: Positive

Implementing the Dundee LHEES has the potential to create local jobs and economic opportunities, green skills and employment opportunities. The delivery plan that will follow the Strategy will clearly specify the economic opportunities.

Serious & enduring mental health problems: No Impact

Homeless: No Impact

Drug and/or alcohol problems: No Impact

Offenders & Ex-offenders: No Impact

Socio Economic Disadvantage Impacts & Implications

Employment Status: Positive

With a focus on green skills and jobs, more people could potentially be taken out of unemployment. The embedded Just Transition principle in LHEES will ensure that the employment lost in the fossil fuel based sector is replaced by renewables and green jobs.

Education & Skills: Positive

The LHEES quantifies the scale of the works that need to be carried out in the City and identifies skills shortages in retrofit and Low Zero and Carbon Technology (LZCT) installation. The LHEES and Delivery Plan prioritises collaboration with schools, colleges and universities to develop the curriculum, educate and train more people in green skills such as renewables, building retrofit and Low Zero Carbon Technology installation. This will have a positive impact in education and skills.

Income: No Impact

Caring Responsibilities (including Childcare): No Impact

Affordability and accessibility of services: No Impact

Fuel Poverty: Positive

Tackling fuel poverty is one of the two main priorities of LHEES. There are measures in the LHEES that will help tackle fuel poverty through energy efficiency improvements of domestic buildings.

Cost of Living / Poverty Premium: Not Known

LHEES will not incur extra cost for individuals that are already in poverty.

Connectivity / Internet Access: No Impact

Income / Benefit Advice / Income MaximisationNo Impact

Employment Opportunities: Positive

Implementing the Dundee LHEES has the potential to create local jobs and economic opportunities in areas such as building retrofit, LZCT installation and renewables. The Delivery Plan that will follow the Strategy will clearly specify the economic opportunities.

Education: Positive

The Dundee LHEES will have actions to collaborate with the MSIP Green Skills Academy, Universities, Dundee & Angus College and local schools to develop the curriculum in areas of skills shortage, to educate, upskill and train people. There will be measures within the Delivery Plan to upskill those in the fossil fuel based sector and provide training to develop green skills to meet the demand for retrofitting measures and the installation of low carbon heating technologies.

Health: Positive

The Dundee LHEES recommends retrofit measures across the buildings in Dundee. Retrofitting buildings and, improving heating and ventilation conditions of buildings will have a positive impact on the health and wellbeing of its residents.

Life Expectancy: No Impact

Mental Health: No Impact

Overweight / Obesity: No Impact

Child Health: No Impact

Neighbourhood Satisfaction: No Impact

Transport: No Impact

Environment

Climate Change Impacts

Mitigating Greenhouse Gases: Positive

The Dundee LHEES will help tackle and reduce City wide energy emissions from the heating sector.

Adapting to the effects of climate change: Positive

The Dundee LHEES will help to reduce carbon emissions and increase the retrofitting of buildings, increasing their resiliency to a changing climate.

Resource Use Impacts

Energy efficiency & consumption: Positive

Improving the energy efficiency of buildings is one of the key considerations of LHEES. The Dundee LHEES will outline detailed opportunities to reduce energy use and improve energy efficiency of domestic and non- domestic buildings across all areas of the City.

Prevention, reduction, re-use, recovery or recycling of waste: Positive

The Strategy identifies opportunities to improve the conditions of buildings through fabric retrofit measures. As a co-benefit, this action will prolong the life of a buildings and help reduce waste from demolition. The fabric improvement of buildings also helps to re-purpose and re-use the existing building stock that is poor, vacant or derelict at the moment.

Sustainable Procurement: No Impact

Transport Impacts

Accessible transport provision: No Impact

Sustainable modes of transport: No Impact

Natural Environment Impacts

Air, land & water quality: Positive

With renewable and sustainable heating technologies, greenhouse gases and pollution will be reduced.

Biodiversity: No Impact

Open & green spaces: No Impact

Built Environment Impacts

Built Heritage: Positive

The Strategy takes into consideration the listed buildings and buildings within conservation areas while recommending fabric retrofit and heat decarbonisation measures.

Housing: Positive

The Strategy outlines measures to improve building fabric (i.e. wall, window, door) to increase energy efficiency. This will have co-benefits such as increased life of buildings, the opportunity to retrofit and re-use vacant or derelict buildings and improved housing conditions.

Is the proposal subject to a Strategic Environmental Assessment (SEA)?	No further action is required as it does not qualify as a Plan, Programme or Strategy as defined by the Environment Assessment (Scotland) Act 2005.

Corporate Risk

Corporate Risk Impacts

Political Reputational Risk: No Impact

Economic/Financial Sustainability / Security & Equipment: Positive

Potential to reduce energy costs of public properties. Although funding will be sought for measures, there may be an additional investment required by Dundee City Council to implement some measures.

Social Impact / Safety of Staff & Clients: No Impact

Technological / Business or Service Interruption: No Impact

Environmental: Positive

Positive impacts across the whole environment - improved air quality, pollution reduction, waste reduction and emissions reduction.

Legal / Statutory Obligations: Positive

The LHEES (Scotland) Order made it a legal requirement for Scottish Local Authorities to have an LHEES. This Order sets out two components for an LHEES: 1. Strategy and 2. Delivery Plan.

Organisational / Staffing & Competence: Positive

Opportunities for training, education and awareness.

Corporate Risk Implications & Mitigation:

The risk implications associated with the subject matter of this report are "business as normal" risks and any increase to the level of risk to the Council is minimal. This is due either to the risk being inherently low or as a result of the risk being transferred in full or in part to another party on a fair and equitable basis. The subject matter is routine and has happened many times before without significant impact.

Appendix 5: Funding Schemes

Scheme name	Measures Supported	Sectors Supported	Description	Funder	Managed by	Status	Match funding restrictions
District Heating Loan Fund	Capital funding support for district heat networks generated by renewable fuels. Technical support available.	Registered social landlords, local authorities, SMEs, and ESCOs.	Capital loans of up to £1M+ towards measures supporting the development of district heating /heat network projects. Interest rate typically 3.5%. Security not required (unsecured loans). Applications for loans above £500k are considered on a case-by-case basis. Repayable over 10-15 years. http://www.energysavingtrust.org.uk/scotland/grants-loans/district-heating-loan	Scottish Government	Energy Saving Trust	Currently open for expressions of interest.	
Energy Company Obligation (ECO4)	Insulation measures, district heating connection, renewables, heating installation and repair.	Lower income and vulnerable to cold domestic owner occupiers, private sector tenants and social tenants, depending on eligibility criteria	Government energy efficiency scheme in Great Britain designed to tackle fuel poverty and help reduce carbon emissions. Insulation and heating measures for: • Owner occupied households in an Affordable Warmth Group (AWG) of benefit and tax credit recipients or declared eligible under a flexible eligibility scheme by a local authority or energy supplier via routes approved by BEIS, and living in properties rated EPC D, E, F and G • Private renting households meeting the same eligibility criteria as owner-occupied households but living in properties rated E, F and G • Social housing tenants in properties with lodged EPC ratings of E, F or G • Non-fuel poor private sector households (for solid wall insulation and district heating connection) in properties linked to one ECO eligible property in a flat block or three ECO eligible in a street for housing. There is also an innovation stream, which will allow energy suppliers to support some innovative measures, for eligible households, which is also available to EPC D rated social housing. The measures available vary in each tenure (particularly for heating install and repairs) https://www.ofgem.gov.uk/environmental-and-social-schemes/energy-company-obligation-eco	Obligated energy suppliers	Ofgem	ECO4 grants running through to 31 March 2026.	Usually more than one measure will need to be installed and funded by ECO. ECO4 requires properties to reach minimum target ratings (EPC D for EPC F and G rated properties and EPC C for D and E rated properties). Funding for measures delivered under ECO4 must not be blended with funding from other government schemes or grants.

Scheme name	Measures Supported	Sectors Supported	Description	Funder	Managed by	Status	Match funding restrictions
Energy Efficient Scotland (EES): Area Based Scheme (ABS) (Formerly HEEPS: ABS)	Wall and roof insulation measures, other fabric insulation measures. There is also a funding stream for low carbon heat and micro-generation measures. Funding also available for special projects funding activity that is usually beyond the scope of ABS and WHS.	Qualifying owner occupiers and private sector tenants who meet criteria.	The Area-Based Scheme (ABS) aims to: • Target fuel-poor areas • Offer insulation measures • Low-carbon heating through heat pumps • Offer solar PV and battery storage Area Based Schemes delivered by local authorities and prioritising fuel poor areas (Council Tax band A-C usually). https://www.gov.scot/policies/home-energy-and-fuel-poverty/energy-saving-home-improvements/	Scottish Government	Often enquiries via Scottish Local Authorities (through Home Energy Scotland)	Currently Open.	The restriction in households receiving Warmer Homes Scotland support after receiving ABS support has been approved. However, ECO4 cannot fund any measure that is part funded through ABS and ABS funded measures cannot contribute to the ECO4 EPC minimum target requirements.
Energy Efficient Scotland: Area-Based Schemes Loan (through the Home Energy Scotland loan scheme)	Energy efficiency measures delivered through EES:ABS and associated repairs.	Qualifying owner occupiers and private sector tenants who meet criteria.	Interest free loan funding available to meet householder contributions for energy efficiency measures delivered through EES:ABS and for approved repairs necessary to allow measures to be installed. An admin fee is applied to all paid loans.	Scottish Government	Energy Saving Trust	In line with the general Home Energy Scotland loan scheme.	Only available in conjunction with EES:ABS support.
Energy Efficient Scotland: Warmer Homes Scotland (WHS)	Energy efficiency, heating, and renewable measures (subject to survey).	Qualifying owner occupiers and private sector tenants (with landlord's permission).	Funding and support provided dependent on an assessment of the home. Recommended suitable energy efficiency home improvements could include insulation and heating measures and, in some cases, renewables. All home improvements funded under this scheme must be delivered by Warmworks-approved installers. Further eligibility criteria can be found on Home Energy Scotland's website. Interest-free loans are available, subject to credit check and includes an administration fee. Access to funding will be denied for work that's already been carried out. https://www.homeenergyscotland.org/funding/warmer-homes-scotland/	Scottish Government	Home Energy Scotland /Energy Saving Trust for enquiries and referrals. Warmworks for measure installs.	A self-assessment tool can be submitted on Home Energy Scotland's website or alternatively, they can be contacted by phone.	Does not operate alongside cashback element of the HES loan scheme. WHS will not be able to partially fund individual measures in tandem with ECO.
Energy Industry Voluntary Redress Scheme	Home energy efficient measures, and provision of advise to consumers.	Registered Charities, Community Interest Companies, Co-operative Societies and Community Benefit Societies.	Aims to help people who are at most risk from cold homes and high energy bills. In certain circumstances, funding rounds may be linked to specific priorities such as a geographical focus or type of energy consumer. The minimum grant that can be requested is £20,000 and the maximum grant amount varies depending on the size of the fund available. The scheme only funds projects lasting up to two years, and can fund up to 100 per cent of the project cost, covering revenue and capital measures. https://energyredress.org.uk/	Payments from energy companies which have breached conditions.	Energy Saving Trust appointed by Ofgem	Administered until 2026.	Organisations will not be able to apply for funding through this scheme if they or their delivery partners have close links to energy companies in England, Scotland and Wales regulated by Ofgem. Cannot support delivery of ECO or other supplier obligations.

Scheme name	Measures Supported	Sectors Supported	Description	Funder	Managed by	Status	Match funding restrictions
Heat Network Fund	Heat networks including both district and communal heating.	All tenures and sectors. Open to applications from public and private sector organisations where there is a consortium lead and partners.	Scotland's Heat Network Fund (SHNF) is a £300 million capital grant scheme available to applicants from the public and private sector for projects at capital readiness that can clearly demonstrate a funding gap. Projects must be of a large scale and must be based in Scotland; deliver emissions reductions; and demonstrate a positive social and economic benefit for Scotland. For capital-ready projects, support may be offered in the form of financial assistance based on this funding gap, up to a maximum of 50% of the total eligible capital costs of a project where capital costs cover financial costs associated with the build and installation of an exemplar project. https://www.gov.scot/publications/heat-network-fund-application-guidance/	Scottish Government	Scottish Government	Fund remains open to applications until all funding has been assigned. Grant funding must be fully drawn down by March 2026.	ECO4 would not be able to match fund connections to networks.
Heat Network Support Unit	Support the growth of heat networks by working with the public sector.	Public sector.	The Heat Network Support Unit (HNSU) aims to support the growth of heat networks by working with the public sector to address key challenges and build capacity through advice, expertise, and financial support. Additionally, buildings capacity and expertise across the public (and private) sector in Scotland to develop and run successful heat networks. Grant funding offered towards: • Developing feasibility studies and Outline Business Cases • Procurement of technical, financial, and legal advisors https://www.heatnetworksupport.scot/	Scottish Government	The Heat Network Support Unit is part of the Scottish National Public Energy Agency and its Centre of Expertise.	Currently available.	
Home Energy Scotland (HES) Grant and Loan	Energy efficiency measures and renewables (from a specified list), energy storage and connections to a renewable-powered heat networks scheme.	Owner occupiers, self-builders	Grant funding for energy efficiency improvements for up to 75% of the combined cost of the improvements, and up to the maximum grant amount of £7,500, or £9,000 for households which qualify for a rural uplift. Grant funding for heat pumps is up to £7,500, or £9,000 for households which qualify for the rural uplift. £2,500 is available for high heat retention storage heaters, if taken as part of a package of measures. The remainder of funding requested can be taken up as an optional interest-free loan. The rural uplift is available to households in Remote Rural and Island areas, as well as off-gas Accessible Rural areas, as defined by the Urban Rural Classification. Loan repayment periods vary dependent on amount borrowed. Higher value loans can pay back over a period up to 12 years. https://www.homeenergyscotland.org/funding/grants-loans/	Scottish Government	Energy Saving Trust	Open – submit interest by contacting Home Energy Scotland. Operates on a first-come, first-served basis and subject to availability, or until end of the financial year.	May be able to combine Home Energy Scotland grants and loans with other schemes and incentives; eligibility is not indicative of eligibility for any other programmes of support. Contact HES for more info.

Scheme name	Measures Supported	Sectors Supported	Description	Funder	Managed by	Status	Match funding restrictions
Private Rented Sector Landlord Loan	Energy efficiency improvements and renewable systems.	Registered private sector landlords.	Only available for domestic dwellings in Scotland and are not used as a holiday or second home. Energy efficiency improvements: up to £15,000 can be borrowed per property. Maximum loan amounts available for each energy improvement varies. Renewable systems: up to £17,500 for a maximum of two home renewable systems per property plus an energy storage system up to a maximum of £6,000. Maximum loan amounts for each renewable system varies. Maximum repayment schedule of eight years. Loans subject to an administrative fee of 1.5 per cent of the total loan value, up to a maximum of £250. Landlords with 6 or more properties in their portfolio will be subject to interest at 3.5 per cent APR. Landlords with five or few properties do not pay interest. https://homeenergyscotland.org/funding/private-landlord-loans/	Scottish Government	Energy Saving Trust	Currently available.	Other Scottish Government loan schemes.
SALIX Finance - Scottish Public Sector Energy Efficiency Loan Scheme	Energy efficiency measures that result in financial and carbon savings.	Scottish public sector which are subject to the Public Bodies Duties in the Climate Change (Scotland) Act 2009.	This scheme offers zero-interest loans to the public sector to facilitate energy efficiency improvement projects that result in financial and carbon savings and contribute towards achieving their net-zero aspirations. The available funding allows Salix to offer up to 75% of the total compliant project value. Project criteria in Scotland offer up to a 12-year payback at a cost of £305 per tonne of carbon dioxide (£305/tCO2) over the lifetime of the project on all new loan agreements. https://www.salixfinance.co.uk/loans/scotland-loans	UK Government	SALIX	Applications approved on a first-come, first-served basis until all funding has been allocated.	SALIX funding up to 75%.
Scottish National Investment Bank	The Bank will provide long term capital to businesses and projects throughout Scotland to support the development of a fairer, more sustainable economy through three key missions: net zero, harnessing innovation and improving places.	Project proposals from all public and private sector applicants will be assessed.	The Bank invests in businesses, projects and communities that support the missions. How the Bank invests: • widely and diversely in projects that align with the missions and approaches every opportunity on an individual basis • in businesses and projects connected to Scotland, or businesses seeking to move to Scotland • typically in businesses and projects seeking more than £1m in investment support (debt or equity)	Scottish Government	Scottish National Investment Bank	Investment considered on a case-by-case basis.	The Bank is not a grant making body, so when it invests it does so commercially and seeks to ensure its capital is returned to it at the end of the investment term with additional income generated over the period of the investment from that capital being invested.
Smart Export Guarantee	Renewables (electricity producing only).	Wide range of sectors as long as applicants meet applicable eligibility criteria.	A government-backed initiative that allows sale of surplus low-carbon electricity from small-scale generators to energy companies. https://www.ofgem.gov.uk/environmental-programmes/smart-export-guarantee-seg/about-smart-export-guarantee-seg	Energy suppliers	Ofgem	Opened January 2020.	Generators must not be in receipt of an export from historic FIT schemes.

Scheme name	Measures Supported	Sectors Supported	Description	Funder	Managed by	Status	Match funding restrictions
Social Housing Net Zero Heat Fund	Renewable measures such as solar panels, battery storage and thermal storage. Energy efficiency measures including heat pumps, biomass boilers and connections to existing heat networks.	Registered social landlords and local authorities.	£200 million available up to 2026 to support social landlords across Scotland to install zero direct emissions heating systems and energy efficiency measures across their existing stock. https://www.gov.scot/publications/social-housing-net-zero-heat-fund--call-for-funding-applications/	Scottish Government	Scottish Government	The latest review point for applications was 14 February 2024, however, the scheme will be available up to 2026.	All financial support provided under the Social Housing Net Zero Fund will be in compliance with Subsidy Control obligations. Cannot to finance individual measures in collaboration with ECO or contribute to meeting the minimum rating requirements set by ECO.
Warm Home Discount – Industry Initiatives	Energy efficiency measures, thermal efficiency measures, energy efficient appliances or micro-generation to Scotland domestic customers.	Mostly owner occupiers	Certain energy providers offer the Warm Home Discount through the utilisation of third-party services, aiming to alleviate energy costs for customers. Indirect Warm Home Discounts are also known as Industry Initiatives. https://www.ofgem.gov.uk/environmental-and-social-schemes/warm-home-discount-whd https://www.ofgem.gov.uk/publications/final-warm-home-discount-supplier-guidance-version-1-scotland	Energy Suppliers	Ofgem	The scheme will run until March 2026. The scheme is split into scheme years. Scheme year 13 started on 1 April 2023 and will run until the 31 March 2024. Scheme years 14 and 15 will run from 1 April for a 12-month period.	Project dependent, should not be used to meet any other obligation, including but not limited to, ECO, BUS or HUG.

Information and links provided on available funding schemes is up to date as of March 2024.

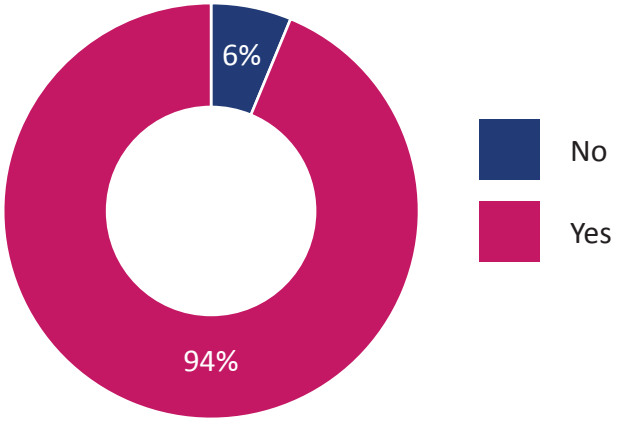
Appendix 6: Summary of the LHEES Consultation Responses

This report contains the key findings from the public consultation Dundee City Council carried out on the statutory Local Heat and Energy Efficiency Strategy between 13.2.24 – 8.3.24. The aim of the consultation was to give the citizens of Dundee and relevant stakeholders an opportunity to give feedback and input to the strategy.

Quantitative responses

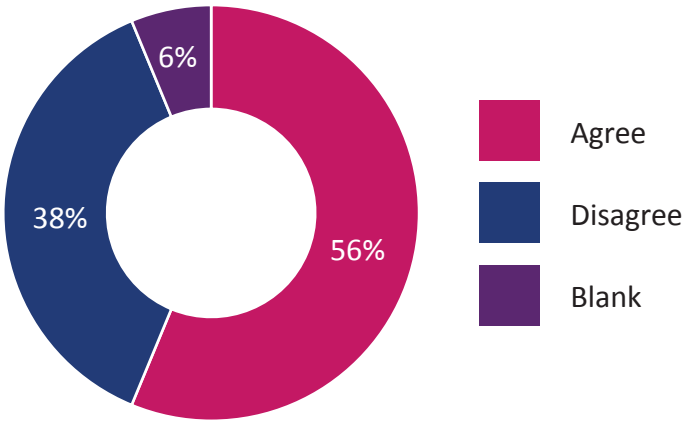
1. There were 44 responses to the consultation in total. Among them, 16 participants completed the full survey and the remaining 28 participants registered on the survey but didn't complete the survey questions. Since 28 participants didn't provide any of the information required for the survey questions, only 16 responses were used as valid responses.
2. 94% of respondents agreed that improving the energy efficiency of buildings should be a key priority for decarbonising Dundee. This suggests that the 'fabric first' approach taken by the LHEES strategy is endorsed by a large majority of respondents.

Do you agree that improving energy efficiency of the buildings should be a key priority for decarbonising Dundee?



3. When asked if people agreed that decarbonising heating systems, by installing renewables such as heat pumps in buildings, should be a key priority for Dundee, 69% said no and 31% said yes.
4. However, there was higher buy-in to the strategic zones that were designated as areas 'suitable for heat networks'. In addition, 50% of respondents agreed to the areas identified as strategic zones suitable for the deployment of heat pumps. Comparing these two answers, it can be concluded that people are less positive about heat pumps as a technology in individual properties but when it comes to the role of the technology in the decarbonisation of the city as whole, there is greater buy in.
5. People were asked about their awareness and understanding of heat pumps in general. The respondents who said they had "moderate experience /understanding" were particularly against heat pumps (89%), whereas the majority of people who said they had 'significant experience/understanding' were positive about the technology. This highlights that there is less buy-in for heat pumps and similar technologies in Dundee from people who may have heard, or have little experience of heat pumps but don't have a good understanding/experience of the technology. The LHEES delivery plan will address this challenge by proposing targeted campaigns, guidance and support on heat pumps and renewable heating technologies.
6. The majority of respondents (56%) agreed with the Heat Network Zones identified and prioritised in the LHEES. Among those who didn't agree, some suggested that the whole of the city should be considered for heat networks. This suggests that there is generally a higher buy-in for the technology in the city.

Do you agree or disagree with the identified Heat Network Zones?



7. 81% of the respondents agreed with the challenges identified in the LHEES while 62% agreed with the opportunities identified in the LHEES.
8. When asked if Dundee's LHEES could support a Just Transition, 75% agreed that it could.

Qualitative responses

During the consultation various qualitative feedback was collected via the consultation questionnaire, online drop-in session and stakeholder meetings. The responses below include all feedback gathered at various forums, not just the LHEES consultation survey.

General observation

9. Respondents were generally supportive of the LHEES plan but stressed the importance of getting the delivery right. There were concerns that the local authority may not be able to deliver the LHEES on its own and emphasis was placed on collaboration and partnership.

10. One respondent commented that “although long, and arduous, the document was clearly written and easy to understand. However, it lacked the required level of promotion to reach a widespread audience.”

Heat Networks

11. Respondents expressed concerns regarding ownership and practicalities of heat networks, including payments and monitoring of usage, and the mismatch of supply and demand across the city. To tackle this, it was suggested that taking a whole building approach, and taking into account additional considerations such as a building's exposure to the elements, building type/structure, population density of an area, and introducing a heat network within the business districts across the city should be adopted.

Energy Efficiency Retrofit

12. It was suggested that Quality Assurance standards such as PAS 2035 and PAS 2038 should be introduced to set minimum standard requirements of retrofit works. This should be supported by robust training and certification systems for Domestic Energy Assessors.

13. Potential opportunities suggested included conducting home/ building condition surveys followed up with advice; council tax discounts for energy efficient homes; and education, training and awareness building to help consumers understand the technology.

14. 14. It was suggested that the strategic priority should be placed on buildings which need the greatest support, irrespective of tenure.

Heat Pumps

15. Generally, respondents were not positive about heat pumps and raised concerns about cost, efficiency, and reliability of the technology. Respondents suggested that the key factor which discourages the uptake of the technology is the high installation cost compared to conventional gas boilers.

16. It was suggested that by taking a whole building approach and a fabric-first approach, heat pumps should be looked at as part of a package of solutions to support the energy transition. Beyond this, behavioural changes would lead to greater, meaningful change.

Other technologies

17. Respondents showed a good awareness of other potential technologies which the city could adopt, including the potential of marine sources such as wave, tidal and ocean thermal energy.

Just Transition

18. There was a sense from the qualitative responses that the transition to net zero will inevitably leave some members of society behind despite the drive for a Just Transition'.

Available incentives / support

19. Responders suggested that including the details and links to additional resources, such as the incentives mentioned in the LHEES would be beneficial.

20. People felt that current available energy efficiency retrofit incentives are not inclusive enough due to their limiting eligibility criteria. Respondents said that there was an exclusion in terms of support and eligibility for owner-occupied and private-rented homes.

Recommendation based on the consultation feedback

The following amendments are recommended to be made to the LHEES document based on the consultation responses:

Immediate Actions and amendments

1. Add a **'roadmap infographic to explain where we are now and where we want to be by 2045'**

Where: Section 7.5 What could Dundee achieve by making changes to buildings? (page 61 onwards).

What: A table with

1. Number of domestic properties that currently do not meet the statutory targets.
    a. Split by tenure.
2. Total cost required to install the measures recommended by PEAT.
    a. Split by tenure.
3. Timeline (target date).
    a. Target date for each tenure type as set out in LHEES Delivery Plan.
4. Number of properties required to be retrofitted each year till target date.
    a. Calculate the total number of years remaining from 2024 – target date and calculate the number of properties required to be retrofitted each year.

2. Add **details and links to additional resources, such as the incentives mentioned** in the LHEES.

Where:

Add in an Appendix in LHEES strategy document.

What:

1. Details and links to the available funding and resources / support.
    a. Split by domestic sector and non-domestic sector.

Future actions and amendments

3. Promote the LHEES Strategy and Delivery Plan across all areas and sectors in the city. Use additional methods of communication and promotion to reach a larger audience.
4. In the next iteration of LHEES, consider the feedback on heat network prioritisation. Consider using the following metrics in Heat Network Zone prioritisation process:
    a. building type/structure
    b. population density of an area
5. During the delivery of LHEES, design retrofit advice projects that include conducting home/building condition surveys first, then following up with advice. Note: current practice is generally energy advisors collect information from the residents/owners/landlords and suggest solutions or send a surveyor afterwards. This can lead to inefficient retrofit measures being installed.
6. Engage further with the stakeholders to make sure that Just Transition is embedded across the delivery of LHEES.

Endnotes

1 2023 shatters climate records, with major impacts

2 2023 was second warmest year on record for UK

3 Energy Efficiency Standard for Social Housing (EESSH)

4 Energy Performance Certificates - Costs estimated from analysis supporting Dundee's LHEES

5 Dundee in UK's top cities for foreign investment

6 Heat Networks (Scotland) Act 2021

7 Local heat and energy efficiency strategies and delivery plans: guidance

8 The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022

9 Dundee Climate Action Plan

10 The Global Climate Emergency - Scotland's Response

11 The Heat in Buildings Strategy achieving net zero emissions in Scotland's buildings 2021

12 Local Heat and Energy Efficiency Strategies (LHEES): phase 1 pilots - technical evaluation

13 The Climate Change Act 2008

14 The Paris Agreement

15 Climate Change (Emissions Reduction Targets) (Scotland) Act 2019

16 Introduction to UK's greenhouse gas inventory

17 The Energy Efficiency Standard for Social Housing post 2020 (EESSH2): guidance for social landlords

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

19 National Planning Framework 4

20 Dundee Climate Leadership Group

21 City Plan for Dundee 2022-2032

22 The Council Plan 2022 -2027

23 Dundee Local Development Plan 2019

24 District Heating Strategy 2018-2028

25 Housing Policy and Strategy

26 Scottish Government National Assessment

27 RESOP

28 Dundee Local Area Energy Plan

29 The Minimum Income Standard for the United Kingdom

30 SkenarioLabs

31 University of Dundee. Sustainability and journey to net zero

32 Abertay University. Sustainable Development Strategy

33 Low carbon heating in domestic buildings - technical feasibility: report

34 SSEN Long term development statements (LTDS)

35 The Climate Change Committee: Is Scotland climate ready? – 2022 Report to Scottish Parliament

36 Carbon Budget Delivery Plan

37 Council Advice Services

38 Scottish Index of Multiple Deprivation

39 What is a Heat Network?

40 Energy Security Bill factsheet: Heat networks regulation and zoning (updated 20 March 2023)

41 Draft Energy Strategy and Just Transition Plan

42 The Heat Networks (Heat Network Zones and Building Assessment Reports) (Scotland) Regulations 2023

43 Scotland Heat Map: information

44 Waste Water heat extraction opportunities

45 LHEES National Assessment in 2022

46 NHS Tayside. Annual Climate Emergency & Sustainability Report 2021/22

47 Community wealth building

48 Cities A List 2023

49 UK local authority and regional greenhouse gas emissions national statistics

50 What is just transition? And why is it important?

51 Danish Experiences on District Heating

52 International Renewable Energy Agency (IRENA). Community Ownership Models

53 Energy Performance Certificate (EPC) reform: consultation

54 The Climate Change Committee. 2023 Progress Report to Parliament

55 The Carbon Budget Delivery Plan

56 Scottish Emission Targets first five-yearly review & Progress in reducing emissions in Scotland – 2022 Report to Parliament

57 Smart Local Energy Systems and their role in achieving Net Zero

58 UK hydrogen strategy

59 Hydrogen action plan

60 Replacement Windows and Doors | Dundee City Council


Dundee
City Council
www.dundeecity.gov.uk
CHANGING
FOR THE FUTURE