



Local Heat and Energy Efficiency Strategy

August 2024

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Executive summary

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

What is a Local Heat and Energy Efficiency Strategy?

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

Orkney Islands Council's LHEES will support the delivery of the Council's goals of improving energy efficiency, reducing fuel poverty, and decreasing carbon emissions through zero direct emissions heating systems. The Council will use the LHEES to coordinate and focus energy efficiency and heat decarbonisation work, including heat networks, across Orkney.

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

- The Council's existing goals and strategies
- Data analysis of the building stock
- Input from different stakeholder groups

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

Local authority's LHEES priorities

The Council has identified four priorities for the LHEES:

- Priority A: Making Orkney's homes energy efficient
- Priority B: Removing energy efficiency as a driver of fuel poverty
- Priority C: Improving carbon efficiency of non-domestic Council buildings
- Priority D: Exploring heat networks for non-domestic Council buildings

Heat and energy efficiency in Scotland

In 2018 the Intergovernmental Panel on Climate Change (IPCC) advised that in order to reach the 1.5°C target set in the Paris Climate Accord, the world needs to reach net zero carbon emissions by 2050. The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 then set an ambitious target for Scotland to reach net zero by 2045. Achieving net zero is crucial to mitigating the worst impacts of climate change and stabilising global temperatures.

The way we heat our homes, workplaces and other buildings is changing. Some improvements have been carried out to homes already under programmes such as Area Based Schemes and the Energy Company Obligation(ECO). The LHEES will support the Council and its community planning partners to scale up and align existing programmes, and to increase the scale and pace of retrofit and heat network development that is needed to meet the national target of net zero by 2045.

The Sustainable Development and Climate Change Strategy covers the actions the Council will take to tackle climate change. The Council's Corporate Plan, Connect, highlights the work required to develop local solutions to protect nature and to take action on climate change. The Local Housing Strategy outlines actions to make housing in Orkney more sustainable and improve energy efficiency, while ensuring that more of the energy used comes from low carbon and renewable sources.

Orkney housing stock

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

Domestic properties

- Domestic properties in Orkney have a wide range of construction types, with no single dominating archetype. 37% are solid brick or stone, 32% are timber frame, and 27% are cavity wall construction.
- Fuel poverty rates in Orkney are very high, at 31% according to the 2017-19 Scottish House Condition Survey, compared to the national average of 24% in the same period.
- Most homes are heated with electricity or oil.
- The Council owns only 7% of properties. To reach net zero, the Council will need to work with Orkney Housing Association Limited (OHAL), owner occupiers and private rent landlords.

Non-domestic properties

- Non-domestic properties use 25% of the energy used for heat across Orkney.
- The non-domestic properties with the highest heat demand are retail buildings, hotels, and storage and distribution buildings.
- Like domestic properties, almost all non-domestic properties are heated with either electricity or oil.
- The Council has explored several heat network options but has not yet identified any suitable opportunities. The Council is now exploring heat network options for non-domestic buildings owned by the Council.

Orkney Islands Council's heat networks

Heat networks have been identified as a low regret¹ decarbonisation option in the Scottish Government's Heat in Buildings Strategy. The Council has carried out data-driven analysis to highlight potential areas for future heat network development, including new build developments. The Council has identified four areas in which to explore potential heat networks:

- Central Kirkwall
- West Kirkwall
- Stromness
- Dounby

Beyond the page: making the LHEES Strategy a reality

This Strategy outlines a number of challenges which must be overcome in order to decarbonise buildings across Orkney. These include:

- Challenges associated with different tenure types (owner occupied, private rented, social housing, mixed tenure buildings)
- Orkney's exposed climate and geography
- High upfront capital cost of retrofitting and the high cost of surveying
- Orkney's unique mixture of bespoke property types
- Issues with funding timelines and requirements
- Skills gap and other local supply chain challenges for retrofit measures
- Poor data on non-domestic buildings
- Challenges for developing heat networks

Not all of these challenges can be addressed in the first iteration of LHEES, or the first Delivery Plan. For this reason, the LHEES will be an iterative Strategy. The regulatory landscape will change quickly over the next few years in order to drive progress in building decarbonisation in Scotland². The LHEES Strategy and Delivery Plan will both be reviewed annually, and if necessary revised to react to legislative and market changes and to benefit from new opportunities that arise.

¹ Low-regret decisions are actions that are cost-effective now and provide options and flexibility in the future, rather than limiting options.

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

What is a Local Heat and Energy Efficiency Strategy?

Purpose

Scottish local authorities have a statutory duty to develop a Local Heat and Energy Efficiency Strategy (LHEES) by 31st December 2023. This duty is described in the Local Heat and Energy Efficiency Strategies (Scotland) Order 2022.³

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

The purpose of this LHEES is to present the evidence base for identifying the necessary upgrades to buildings and local infrastructure required across Orkney by 2045, to fulfil the Scottish Government's objectives and local priorities related to heat in buildings. The interventions will occur at the building level and through the use of heat networks.

Orkney Islands Council's LHEES will support the delivery of the Council's goals of improving energy efficiency, reducing fuel poverty, and decreasing carbon emissions with zero direct emissions heating systems. The Council will use the LHEES to demonstrate and coordinate the wide variety of energy efficiency and decarbonised heating projects in Orkney and provide a vision for the energy transition across the area.

Structure

LHEES has a two-part structure, consisting of a Strategy and a Delivery Plan:

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

This document contains Orkney Islands Council's LHEES Strategy. The accompanying Delivery Plan can be found on the Council's website. Both documents will be reviewed and updated periodically to reflect progress towards net zero, new available technologies and funding, and changing priorities in the local authority.

LHEES guidance from Scottish Government

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

The considerations for heat decarbonisation are grouped around whether buildings are on- or off- the mains gas grid, and if they are in areas with the potential to develop heat networks. Considerations relating to energy efficiency and other outcomes focus on areas with poor building energy efficiency, such as no or low levels of insulation, and areas

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

where this is likely to contribute to high levels fuel poverty. This focus is to ensure that energy efficiency projects will reduce fuel poverty. Mixed-tenure, mixed-use, and historic buildings are included as separate considerations, as these are likely to require different approaches.

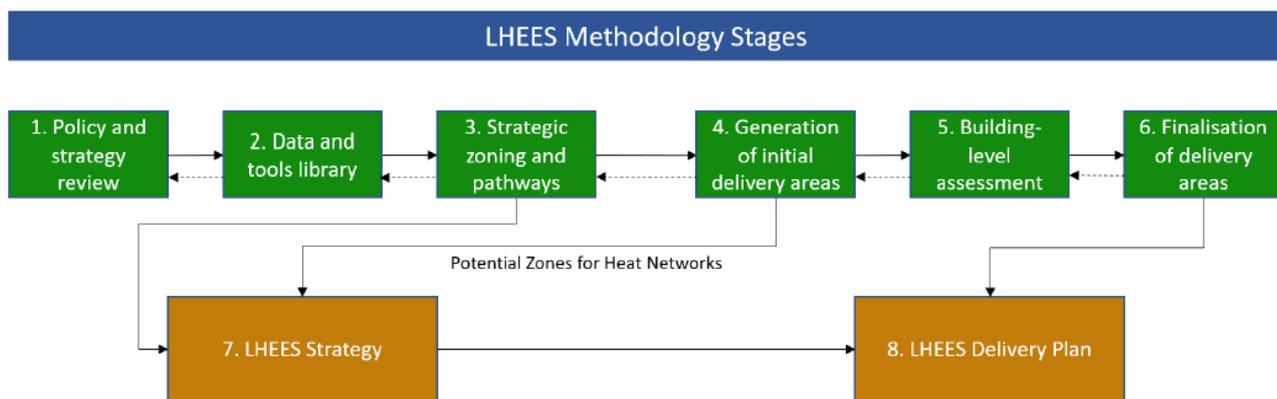
Table 1: Summary of the LHEES considerations

	No	LHEES Considerations	Description
Heat decarbonisation	1	Off-gas grid buildings	Transitioning from heating oil and LPG in off-gas areas
	2	On-gas grid	On-gas grid heat decarbonisation (not applicable for Orkney Islands Council)
	3	Heat networks	Decarbonisation with heat networks
Energy efficiency and other outcomes	4	Poor building energy efficiency	Poor building energy efficiency
	5	Poor building energy efficiency as a driver for fuel poverty	Poor building energy efficiency as a driver for fuel poverty
	6	Mixed-tenure, mixed-use and historic buildings	Mixed-tenure and mixed-use buildings, listed buildings and buildings in conservation areas

LHEES stages

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

Figure 1: Summary of LHEES Stages



The analysis in Stage 3 separates buildings into four categories, which are primarily based on their suitability for a heat pump retrofit. The categories are defined in the Scottish Government’s LHEES guidance and are based on indicators from the Home Analytics dataset. The table below provides a brief description of each category and the process for categorising all domestic properties.

Table 2: Domestic building categories and category indicators

Building category	Description	Indicators
Category 0	Currently have a low or zero direct emissions heating system, or heat network connection.	<ul style="list-style-type: none"> Properties with a heat pump (off-gas only) or communal heating as the main heating system
Category 1	“Heat pump ready” buildings that are well-suited to heat pump retrofit with minimal other changes.	<ul style="list-style-type: none"> Cannot be a category 0 property Not listed or in a conservation area Properties with insulated walls and double or triple glazed windows If the property has a loft, it must have at least 100mm of loft insulation Properties which are likely to have a wet heating system (i.e. mains gas, LPG, Oil or Biomass/solid fuels)
Category 2	Secondary potential for heat pump retrofit. Require some fabric and/or distribution systems upgrades.	<ul style="list-style-type: none"> Cannot be a category 0 or 1 property Properties that are cavity construction (either insulated or uninsulated), or any other construction type, with insulated walls There must be no risk of the property having a narrow uninsulated cavity Properties can be listed or in a conservation area
Category 3	Significant upgrades required	<ul style="list-style-type: none"> The subcategories below indicate the most viable decarbonisation technology. Heat pumps are the priority solution. The suitability of storage or direct

	to be heat pump ready.	<p>electric heating, and biomass are indicated by the characteristics listed below:</p> <ul style="list-style-type: none"> • • Category 3 – Heat pump • If the property is currently heated via an oil or LPG system • • Category 3 – Electricity (storage or direct) • Properties already using electricity as the main fuel type • Flats • Properties with double or triple glazed windows • Properties in urban areas (1, 2 or 3 in the 8-fold classification⁴) • • Category 3 – Biomass • Properties already using biomass as the main fuel type • Detached and semi-detached properties • Properties of a solid brick or stone construction type •
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How this LHEES was developed

Orkney Islands Council’s LHEES was developed in partnership with Changeworks, following the standard methodology published by Scottish Government [see Appendix D].

⁴ [Scottish Government Urban Rural Classification 2020](#)

Policies and progress to net zero

Local policies and projects

Orkney Islands Council has several policies relevant to energy efficiency, decarbonising heating, and fuel poverty. The policies and relevant targets are summarised in the table below:

Table 3: Summary of relevant local policies.

Name	Description
Local Housing Strategy (2024-2029, Draft)	<p>The five-year development plan for housing across the Council. Prioritises increasing the number of homes in Orkney and providing quality, warm homes.</p> <p>Targets:</p> <p>96% Council and 99% Orkney Housing Association (OHAL) compliance with the Social Housing Net Zero standard</p> <p>£4 million in HEES:ABS funding by 2026</p> <p>Maximise benefits of renewable energy developments to reduce fuel costs in Orkney</p> <p>Lobby UK Government for lower fuel tariffs in Orkney</p>
Council Plan (2023-2028)	<p>The five-year plan that provides a clear direction for the Council to deliver ambitions for community and businesses. The Council aims to invest in homes and ensure social and private housing is more energy efficient.</p> <p>Targets:</p> <p>90% of Council dwellings are energy efficiency by 2027/2028 (88% were in 2020/2021)</p>
Local Development Plan (2017)	<p>The vision and spatial strategy for the development of land in Orkney over the next 10-20 years. The Council supports the use of low carbon technologies to heat and power homes and intends to identify potential heat networks.</p>
Strategic Housing Investment Plan (2021-2026)	<p>The five-year development plan for affordable housing provision (updated yearly in line with Scottish Government guidance).</p> <p>Targets:</p> <p>To deliver 297 completed properties and further develop 38</p>

Orkney Sustainable Energy Strategy (2017-2025)	<p>The aims and actions to become a secure, sustainable, low carbon island economy.</p> <p>Targets:</p> <p>Less than 20% households in fuel poverty by 2030 and 0% by 2032</p> <p>50% decarbonised energy use by 2030</p> <p>300% renewably generated electricity</p> <p>600 sustainable energy jobs by 2030</p>
Orkney Hydrogen Strategy: The Hydrogen Islands (2019-2025)	<p>Identifies how hydrogen can best be applied to energy systems in Orkney. It is part of the Orkney Sustainable Energy Strategy.</p>
Carbon Management Programme (2016-2026)	<p>Sets carbon targets for various sectors. The Council intends to improve energy efficiency by improving insulation and heating systems in existing buildings and develop a programme promoting energy efficiency among staff in Council buildings.</p> <p>Targets:</p> <p>Total CO2 emissions in financial year 2025-2026 should be 42% of baseline year 2004-2005.</p>
Indicative Regional Spatial Strategy (2021)	<p>The strategic priorities for development planning in Orkney to 2050. Prioritises future housing that addresses fuel poverty and climate change. It also establishes an Islands Centre for Net Zero Carbon which will aim to accelerate the islands' transition to net zero carbon.</p>
Orkney Integration Joint Board: Joint Strategic Needs Assessment (2016)	<p>Describes partnership working between NHS Orkney and the Council for future health and wellbeing needs. Identifies fuel poverty as a significant health and wellbeing issue in Orkney.</p>

Heat and energy efficiency projects for Council-owned properties

Carbon Management

Orkney Islands Council has committed to continually improving its CO₂ emissions to meet the 42% baseline by the 2025-2026 financial year. This will be achieved by replacing oil and other fossil fuel heating systems in existing council-owned building with electrified alternatives such as heat pumps. Another aim is to improve the energy efficiency of its existing building stock over the next 20 years by upgrading and improving the insulation and heating systems of existing buildings. This target is line with the ambitious public sector targets detailed in Scotland's Climate Change Plan and Scotland's Heat in Buildings Strategy.

Energy efficiency standards for social housing

Orkney Islands Council has made significant investments to improving the energy efficiency of its housing stock. The Council met the Scottish Housing Quality Standard (SHQS) by the deadline of April 2015 through major investment.

Due to this investment, 93.5% of council-owned homes have an energy efficiency rating of EPC band C or above, meeting the first phase of the Energy Efficiency Standard for Social Housing (ESSH).

ESSH2 has been implemented since December 2020. It seeks to ensure social rented properties achieve the equivalent of EPC Band B or above where it is practically possible to do so. The original ESSH2 milestones of 2025 and 2032 are currently on hold while the standard is reviewed to ensure alignment with the 2045 net zero target. In accordance with the interim guidance on ESSH2⁵, Orkney Islands Council will undertake an individual building assessment when a property becomes void and take a fabric first approach (focussing on the building fabric before upgrading the heating system). Mechanical Ventilation with Heat Recovery (MVHR) systems will also be installed. These systems provide ventilation while recovering and reusing the heat in the air leaving the property. MVHR systems help maintain healthy air quality while saving energy on heating.

Currently, just under 20% of the Council's housing stock reaches the energy efficiency rating of band B required for ESSH2 compliance. This is higher than the national level of 7%. Analysis undertaken by the Council in 2022 showed that adopting a fabric first approach and installing MVHR systems in the remaining properties not currently meeting the Social Housing Net Zero Standard, would cost £25.2 million.

However, an independent review of the Housing Revenue Account suggests that it will cost even more to update the housing stock to meet the proposed energy efficiency standard (SHNZS). The Council will commission a comprehensive survey to establish up-to-date costs to meet these standards.

Carbon Trust

The Carbon Trust set out a range of projects aiming to reduce carbon emissions across all 32 local authorities⁶. Orkney Islands Council is now in its second 10-year programme, which is due to end in April 2026.

The current programme saw a total of 12 retrofits (including several schools, a community centre and a care home) which included a variety of measures such as:

- External wall insulation
- Ground source heat pump
- Loft insulation
- Re-roofing
- LED lighting replacement

These retrofits were a success and contributed to an annual carbon saving of 486 tonnes, all at less than £450 per tonne of carbon saved over the lifetime of the measures. Four

⁵ [Energy Efficiency Standard for Social Housing post 2020 \(ESSH2\) review: interim guidance for social landlords](#)

⁶ [Why Scotland's public sector needs to rise to the carbon challenge | The Carbon Trust](#)

larger projects (St Andrews Primary School; Kirkwall Care Home; St Margarets Hope Primary School; and Kirkwall Nursery) have since been added to the project list with the expectation of an additional 144 tonnes per annum saved.

Heat and energy efficiency projects across the area

Heat and Energy Efficient Scotland: Area Based Schemes (HEES: ABS)

HEES: ABS provides funding for privately owned homes across Scotland, administered by each council. In Orkney, funding increased through HEES: ABS from £785,102 in 2015 to over £1.7 million claimed in 2022/23. In 2023/24, funding totalled £1.86 million to install energy efficiency improvements in private sector housing.

In 2022/23:⁷

- The Council funded 239 energy improvements completed across 176 households.
- The Council offered grants of between £10,500 to £16,100 to households.
- EPC ratings for each household improved by an average of 11.7 points.
- On average, individual households saved £728 per year as a result of the energy improvements.
- 22% of homes referred to HEES: ABS were previously in the worst EPC Bands F or G.
- Energy improvements installed under the scheme have helped to save more than 108 tonnes of CO₂.

Since 2015, a total of 1,521 energy improvements have been completed across 1,184 households.

Orkney Housing Association Ltd. maintenance programme

Orkney Housing Association Ltd. (OHAL) received grant funding from the Scottish Government Social Housing Net Zero Fund to add an additional 49 properties into the 2023/2024 planned maintenance programme. Energy efficiency works will include:

- High efficiency, triple glazed windows
- Replacement high insulation doors
- Loft insulation top ups
- Hot water cylinder jackets

It is anticipated that all properties which receive retrofit works will move to EPC band B or C. OHAL plans to bid for additional funding from the Social Housing Net Zero Fund to enhance the 2024/2025 maintenance programme. Future projects include more fabric improvements and zero direct emissions heating systems such as high retention storage heaters for OHAL properties.

OHAL were unsuccessful in their February bid to improve 130 properties spread across their housing stock. As such, they are moving ahead with a reduced programme that affects 29 properties, with works including:

- High retention storage heaters

⁷ Warmworks (2023) [Energy Efficient Scotland: Area-Based Scheme \(Orkney\) Annual Report 2022/23](#)

- High efficiency, triple glazed windows
- Replacement high insulation doors
- Loft insulation top ups

Fuel poverty advice and assistance for Orkney Housing Association Limited tenants

Over the course of the last three years, OHAL has successfully bid for a total of £325,000 from various Scottish Government funding schemes. This has allowed OHAL to provide direct financial support to tenants for their energy costs. For example, in the financial year 2022/23, every OHAL tenant was able to access a £150 grant to assist with fuel costs. In addition to this, OHAL has a dedicated Energy Advice Officer who provides bespoke support to tenants experiencing fuel poverty and/or in need of support or advice.

The Orkney Partnership

The Orkney Partnership is made up of the Council and four partner agencies (NHS Orkney, Police Scotland, Highlands & Islands Enterprise, Scotland Fire and Rescue Service), collaborating with the community to accomplish its key priorities. One of the key priorities is sustainable development for the region, specifically tackling fuel poverty, transitioning to a greener economy, and meeting net zero by 2030.

These ambitions are set out and explained in The Orkney Community Plan 2023-2030. The partnership aims to increase the number of homes with sustainable and affordable forms of heating in the region. The target is to increase the number of homes built per annum with sustainable heating and improved insulation from 92 to 125 by 2030. This development will be undertaken through collaboration with the Council, housing associations, and private developers.

Energy Company Obligation (ECO)

The Energy Company Obligation (ECO) was first introduced in 2013 and places legal obligations on energy suppliers to deliver energy efficiency measures to domestic premises. The scheme is a UK Government energy efficiency scheme that supports private tenure households on low incomes and vulnerable households. The aims of the scheme are to improve the least energy efficient homes and help to meet the UK Government's fuel poverty and net zero commitments. Local authorities are invited to participate in these schemes.

Previously in Orkney, ECO funding was included in Area Based Schemes' projects. However, the recent iteration of the scheme (ECO4) does not permit blended funding. The Council is considering a separate project to make use of the funds.

Regional projects

Islands Centre for Net Zero

The ICNZ is a ten-year UK and Scottish Government funded project supporting Orkney, Shetland and the Outer Hebrides in reducing their greenhouse gas emissions. The project has £16.5 million to provide:

- Research and demonstration funding and resource

- Direct community resources so that communities can develop their own localised decarbonisation projects
- Capital funding directly for projects that can actively decarbonise the islands
- Resources to identify further funding opportunities

The project is currently in its second funding year and has established a secure Data Exchange on UrbanTide's uSmart platform, and data governance protocols. Early conversations have been held between ICNZ and the three local authorities to explore how the ICNZ Data Exchange can support LHEES and the councils' Delivery Plans.

The project team are also developing demonstrations, including a domestic decarbonisation project in the Outer Hebrides, which is expected to have replicability for Orkney properties.

Scottish Government Policy

The following section discusses the most relevant policies from Scottish Government. For a full list of policies, see Appendix A.

In 2018, the Intergovernmental Panel on Climate Change (IPCC) advised that to reach the 1.5°C target set in the Paris Climate Accord, the world needs to reach net zero carbon emissions by 2050.

Achieving net zero is crucial to mitigating the impacts of climate change and worsening the consequences of climate change. With the way we heat our homes, workplaces and other buildings making up the third-largest cause of carbon emissions in Scotland, it is vital the nation decarbonises its buildings. This is done through implementing measures to improve the energy efficiency of domestic and non-domestic buildings, as well as transitioning to zero direct emissions heating systems.

Several national policies are relevant to driving LHEES, particularly the Heat in Buildings Strategy, the Heat Network Act, and the Fuel Poverty Act. These policies are described below, followed by a table with all relevant national policies.

Heat in Buildings Strategy

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

In the Heat in Buildings Strategy, the Scottish Government committed to the development of a Heat in Buildings Bill to provide the regulatory framework for zero emissions heating and energy efficiency.

In November 2023, the Scottish Government launched a consultation on the Heat in Buildings Bill, which proposes a minimum energy efficiency standard for private landlords

by the end of 2028, and for owner-occupiers by 2033. It also proposes a ban on polluting heating systems in all buildings by 2045.

Social Housing Net Zero Standard

The Scottish Government has established targets to improve the energy efficiency of social housing. Previously, these targets have been set through the Energy Efficiency Standard for Social Housing (EESH). EESH2 guidance required all social housing to meet an energy efficiency rating of EPC band B by 2032. EESH2 has been under review to realign the standard with net zero targets and the 2032 milestone has been put on hold.

In November 2023, the Scottish Government launched a consultation on a new Social Housing Net Zero Standard which will replace EESH2. The proposed new standard includes setting a minimum fabric efficiency rating (different to current EPC ratings) and introducing a requirement to replace polluting heating systems with clean alternatives by a backstop date of 2045, with possible interim targets before then.

Heat Networks (Scotland) Act 2021

Heat networks supply multiple buildings with heat or cooling from a central source or sources. This avoids the need for individual boilers or electric heaters in every building.

The Heat Networks Act defines a heat network to mean either a district heat network or a communal heating system. It provides the legislative framework to both set up and regulate heat networks. The act requires local authorities to review areas that are potentially suitable for heat networks within their constituency. This LHEES will function as the main vehicle by which Orkney Islands Council will carry out this review.

Fuel Poverty (Scotland) Act 2019

The Fuel Poverty Act was passed by the Scottish Parliament in 2019. According to this Act, a fuel poor household spends at least 10% of their net income to pay for reasonable fuel needs after housing costs have been deducted. A household is extremely fuel poor if fuel costs are 20% or higher.

The first set of targets laid out in this legislation are that by 2030 no more than 15% of households in Scotland are in fuel poverty and no more than 5% are in extreme fuel poverty. Homes with a lower energy efficiency were identified as one of the key drivers of fuel poverty and the LHEES looks to address this pressing issue. By improving the energy efficiency of homes, a reduction in fuel costs can be expected. LHEES can therefore provide support to reducing fuel poverty by mitigating energy efficiency as a driver.

Energy Performance Certificate reform

To date, Scotland's energy efficiency targets have been articulated through Energy Performance Certificate (EPC) ratings. Recently, limitations of this approach have been highlighted.⁸ One limitation is that the EPC rating is a cost efficiency rating, where the cost of using the heating system is a factor in the rating. This makes the rating less useful for setting targets for the energy demand of buildings.

⁸ [Climate Change Committee - Reform of domestic EPC rating metrics to support Net Zero](#)

The Scottish Government has launched a consultation on EPC reform.⁹ It proposes to introduce a range of new metrics, including a fabric rating, which will specifically focus on the fabric performance in terms of heat loss. Recent consultations on minimum energy efficiency standards for buildings indicate that this rating may be used.

⁹ [Scottish Government - Energy Performance Certificate \(EPC\) reform: consultation](#)

Stakeholder engagement

In developing the LHEES, the Council has engaged with a variety of stakeholders on several topics related to the Strategy. The following subsections outline the levels of current and future engagement with various internal and external stakeholders; their interest in the development of the LHEES; their level of engagement; and the potential challenges that could be faced.

Interest and influence mapping

An Influence/Interest Matrix has been used to map key LHEES stakeholders across Orkney. This gives a clear picture of the level of engagement required for each stakeholder and quickly highlights who the high-priority stakeholders are.

The following engagement level is a recommended starting point for each tier, based on LHEES guidance from Zero Waste Scotland and Arup:

Tier 1: Part of project steering group. Ongoing engagement throughout the project at defined workshops e.g. identifying priorities and for delivery. Specific engagement plans developed as required. Includes:

- Tackling Household Affordable Warmth (THAW) Orkney
- Orkney Housing Association Limited (OHAL)
- Warmworks – managing agent of HEES:ABS and national operator of the Warmer Homes Scotland Scheme

Tier 2: Participate in workshops and engage with the project at key milestones (if required). Potentially one-to-one contact during data collection stage and one-to-one interviews to be held with these stakeholders to gain further insight and understanding of priorities and delivery contributions. Includes:

- Home Energy Scotland (HES)
- Aquatera
- Island Centre for Net Zero

Tier 3 and 4: Potentially participate in workshops and engage with the project at key milestones (ad hoc basis e.g. delivery planning). Receive a direct invite to public consultation. Includes:

- SSE
- Orkney Care & Repair
- Orkney Community Planning Partnership
- Orkney Renewable Energy Forum (OREF)
- Community Energy Scotland (CES)
- ReFlex Orkney
- Aspire Orkney

- Community Councils
- Development Trusts
- Orkney Builders
- R Clouston
- Kirkwall Business Improvement District (BID)
- Stromness Township Heritage Initiative (THI)

Engagement plans

Drafting the LHEES Strategy

Participation and consultation with stakeholders are essential to the development of the LHEES. The following outlines the initial stakeholder engagement work undertaken to date with Tier 1 stakeholders.

Warmworks

Since 2020, Warmworks has been the managing agent for Orkney Island Council's HEES:ABS projects and work to deliver energy efficiency measures for private tenure housing. Warmworks provided detailed data on the number of measures and households it has worked with during this time, as well as laid out the challenges faced. The main priorities are improving energy efficiency in homes and removing energy efficiency as a driver of fuel poverty.

THAW Orkney

THAW is a third sector organisation with the aim to reduce levels of fuel poverty and achieve affordable warmth in Orkney. It has provided information on the type of energy efficiency saving advice given to householders, as well as the funds available to help make homes retrofit ready. THAW's main priorities are improving energy efficiency in homes and removing energy efficiency as a driver of fuel poverty.

OHAL

OHAL functions as the only housing association in Orkney and currently manages 7% of housing in the region. Focusing on implementing tenant support, as well as by adopting a fabric first approach to retrofit, OHAL prioritises improving energy efficiency in homes and removing energy efficiency as a driver of fuel poverty.

Approval and public consultation process

After the draft of the Strategy was finalised, it went through the same consultation process as all Council policies:

Approval from senior management

Approval from Orkney Islands Council

Public consultation

Further stakeholder engagement plans

The Council is already conducting stakeholder engagement as part of the recently passed Local Housing Strategy. The Council anticipates that there will be workshops and working groups around energy efficiency, fuel poverty, and other topics later in 2024. The Council staff responsible for LHEES will be part of these engagement activities. Feedback from these sessions will be included in the ongoing development of the LHEES Strategy and Delivery Plans.

LHEES governance

The delivery plan will be updated on an annual basis, the following steps will be included:

- Assessment of current funding opportunities will be undertaken.
- Stakeholder group will be approached to update current progress and new opportunities, a short workshop may be used or a round of telephone calls / Team meetings
- Stakeholder group will be reviewed to update list and level of involvement.
- Current projects will be evaluated in terms of progress, impact, and cost.
- New projects developed over the year will be evaluated
- New data available will be used to update LHEES datasets. Where new data insights are available, these will be included in reporting and project development.
- Annual LHEES update report will be produced.

The completed report will be taken to the OIC Corporate Leadership Team. A briefing note will then be prepared and issued to the Councillors.

The LHEES Strategy document will be reviewed every five years. And the process will include the following steps:

- Update strategy review, what new legislation, national and local strategies will impact the LHEES
- Delivery Plan will be reviewed as annual programme above and the highlights will be discussed in the strategy document.
- Revised strategy will undergo a public consultation.

The completed strategy will be taken to the OIC Corporate Leadership Team. A report will then be prepared for the P&R committee, with final approval by Full Council. The updated Strategy and Action Plan will then be published.

Baselining: Heat and energy efficiency in the Council

This section provides an overview of the building stock in Orkney Islands Council at the time of writing. This baseline allows the Council to create an effective strategy and to measure progress towards targets and the ultimate target of net zero by 2045.

Age, dwelling type, wall construction, tenure, and heating fuel are key factors that impact energy performance, operational costs, and living conditions in buildings. Home Analytics data for Orkney Islands Council has been used to benchmark key property statistics against overall national statistics found in the 2021 Scottish House Condition Survey.¹⁰

Domestic buildings

Property age and construction type for domestic buildings

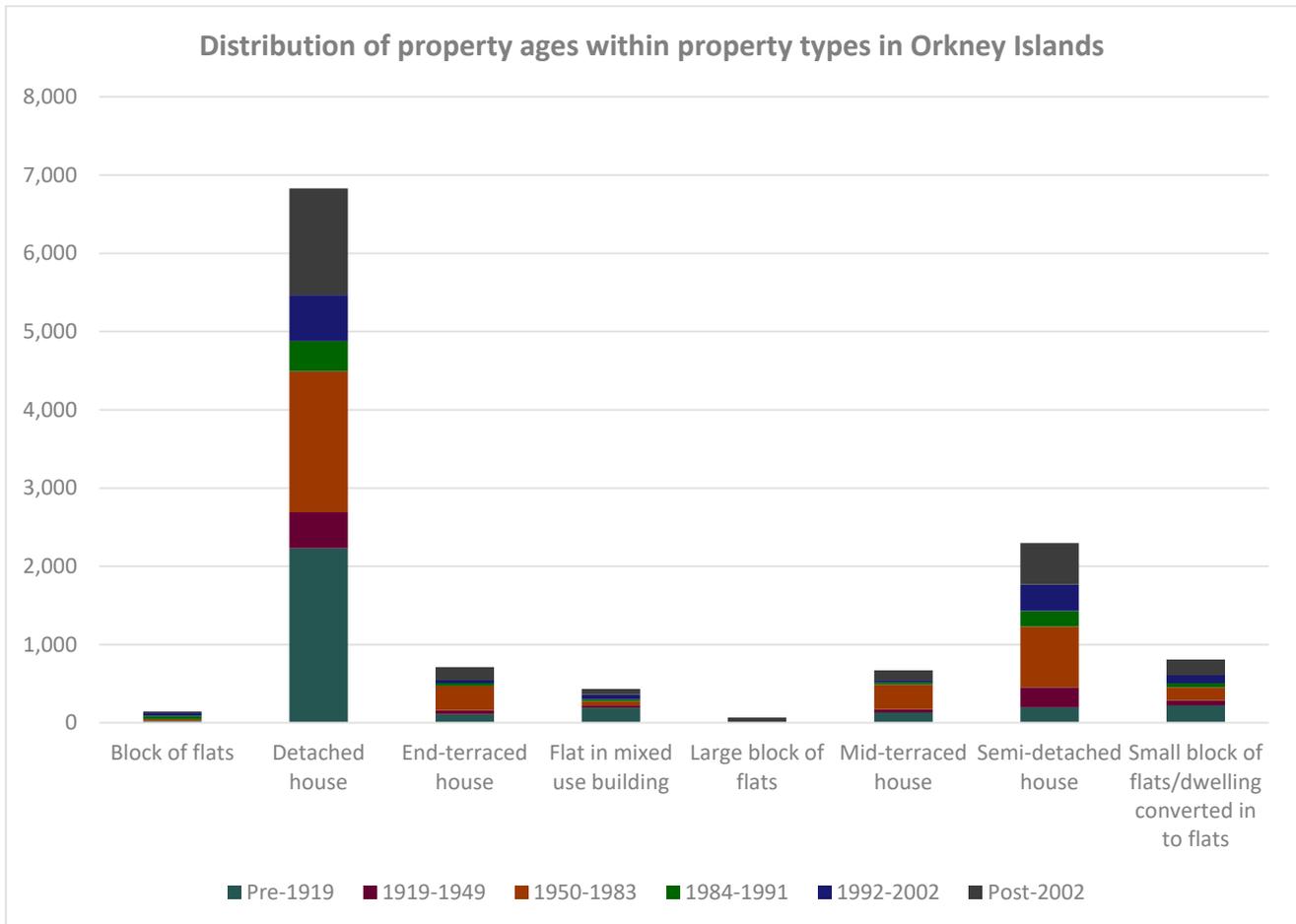
The majority of properties in Orkney Islands Council were built before 1950 and between 1984-1991. These properties are likely to require fabric measures to improve the level of insulation, due to the insulation standards in place at the time of their construction.

Table 4: Property ages per property type within Orkney Islands

Property Type	1919-1949	1950-1983	1984-1991	1992-2002	Post-2002	Pre-1919	Total
Detached house	2,232	460	1,800	387	586	1365	6,830
Semi-detached house	196	257	778	198	337	531	2,297
Mid-terraced house	131	41	317	27	27	126	669
Small block of flats/dwelling converted in to flats	219	69	165	53	102	200	808
Block of flats	23	0	21	45	40	17	146
End-terraced house	109	51	311	35	40	165	711
Large block of flats	0	0	0	1	0	65	66
Flat in mixed use building	191	27	58	26	59	71	432
Total	3,101	905	3,450	772	1,191	2,540	11,959

¹⁰ [Introduction - Scottish House Condition Survey: 2021 Key Findings - gov.scot \(www.gov.scot\)](https://www.gov.scot/resources/documents/2021/04/Introduction-to-Scottish-House-Condition-Survey-2021-Key-Findings.pdf)

Figure 2: Property types by age of building in Orkney Islands



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

The majority of properties in Orkney fall within two categories of construction: solid brick or stone (37% of total housing stock) and timber frame (32% of total housing stock) (Table 5). Additionally, 27% of total housing stock are of cavity construction, and 4% are system built. Within the total housing stock, 25% of properties are solid brick or stone and are uninsulated. Properties of the same construction category provide an efficient opportunity for retrofit, as fabric measures can be standardised and installed at a larger scale. However, as discussed below, there will be a range of different thermal performances within each archetype.

Properties built before 1919 are likely to be of a **solid wall construction**, from brick or stone, with timber floor and roof construction. Stone buildings are likely to have a high conservation value, and might be within conservations areas or listed. Retaining the facing stone in such buildings is often essential to the character of the area, however, it also presents unique retrofit challenges and is expensive. In Orkney, 25% of all domestic properties have uninsulated solid walls (see Table 5).

Cavity wall construction became more commonplace from the 1920s onwards and is still built today. Like traditional construction, cavity wall construction commonly uses timber for

floors and roofs. Walls are constructed in two layers, rather than a single leaf. In comparison to solid wall construction, unfilled cavity walls are almost twice as thermally efficient. Additionally, cavity wall constructed properties are much more likely to incorporate damp proof courses (DPCs) and Portland cement than traditionally constructed properties. More recent cavity wall constructed properties (post-1980) are likely to have partially filled cavities. In Orkney, 8% of domestic properties have uninsulated cavity walls (see *Table 5*).

In Scotland, **timber frame construction** superseded cavity wall construction as the primary method of housebuilding in the early 1980s. The proliferation of timber frame construction in Scotland has coincided with the incremental increase of insulation standards. Older properties may have minimal mineral wool insulation between timber studs whereas newer properties may have up to 140mm of phenolic foam or air tightness barriers. Increasing insulation standards have been the main driver in the increase in depth of the timber structure, with older properties having around 75mm timber studs in comparison to 140mm in modern buildings. In Orkney, 9% of domestic properties have uninsulated walls with a timber frame construction (see *Table 5*).

System-built usually refers to post-war, non-traditional construction housing that is not cavity wall constructed. It is generally found in mass social house building programmes of the period. Such housing is normally utilitarian in design with low conservation value. This is advantageous for potential external wall insulation interventions; however, these properties have a range of unique designs making standardised retrofit plans challenging. A very small percentage of domestic properties in Orkney are system-built (4%). Half of these have uninsulated walls (2% of all domestic properties) (see *Table 5*).

Table 5: Wall insulation by construction types of properties within Orkney Islands

Construction type	Number of properties		Number of properties with insulated walls		Number of properties with uninsulated walls	
	Count	% of total domestic properties	Count	% of total domestic properties	Count	% of total domestic properties
Cavity	3,279	27%	2,279	19%	1,000	8%
Solid brick or stone	4,441	37%	1,438	12%	3,003	25%
System built	414	4%	278	2%	136	2%
Timber frame	3,825	32%	2,800	23%	1,025	9%
Total	11,959	100%	6,795	56%	5,164	44%

Tenure of domestic buildings

Property tenure will have a direct impact on the pace and extent of retrofit installations across Orkney. Specific tenure-targeted policies such as ESSH2 for social housing have been proven to accelerate change. Conversely, the private sector has seen slower

progress due to property owners not seeing a strong return on capital investment without government stimulation.

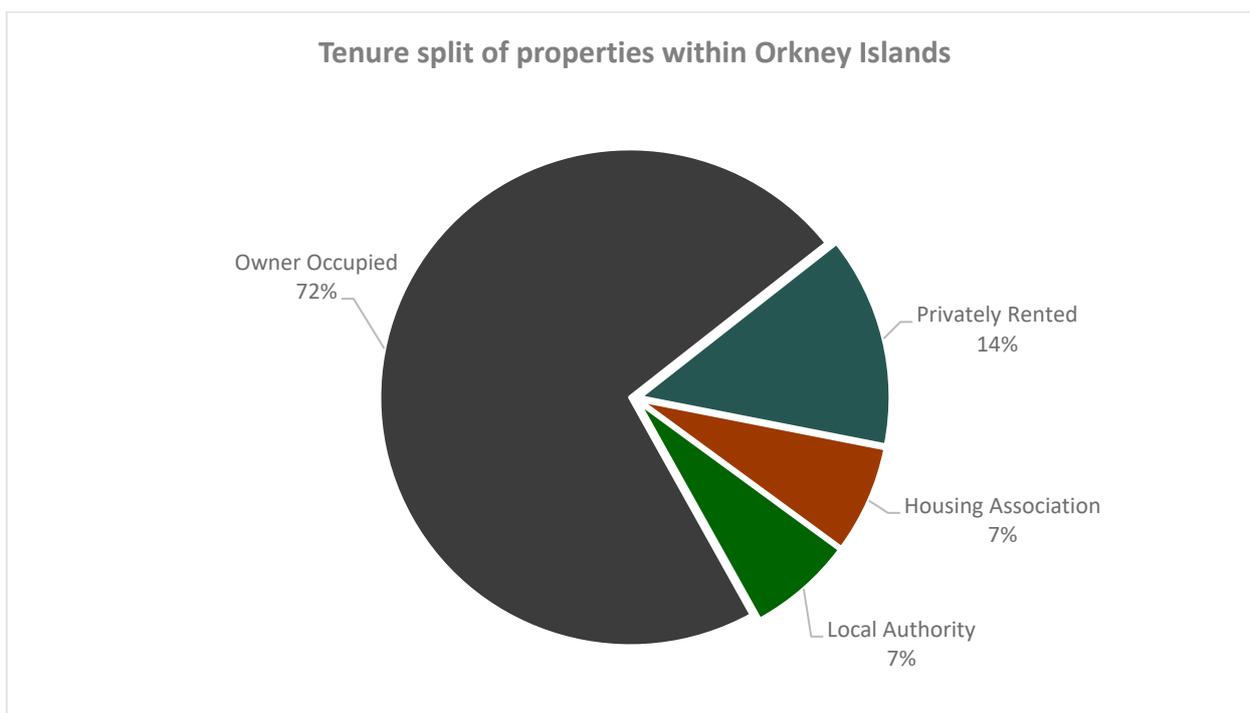
Approximately 14% of homes in Orkney are social housing (7% council-owned and 7% housing association-owned). While these properties are eligible for various government funding streams for retrofit, the existing funding is not often sufficient to meet the energy efficiency requirements while keeping rent affordable. This is a challenge for the social housing sector.

Most properties in Orkney are owner occupied (72%) and a smaller proportion are private rented (14%). Private tenure properties will require a different approach to retrofit and heating upgrades than the social housing sector.

Table 6: Tenure split of properties within Orkney Islands

Owner Occupied	Local Authority	Privately Rented	Housing Association
8,660 (72%)	817 (7%)	1,644 (14%)	838 (7%)

Figure 3: Pie chart of property tenure split within Orkney Islands

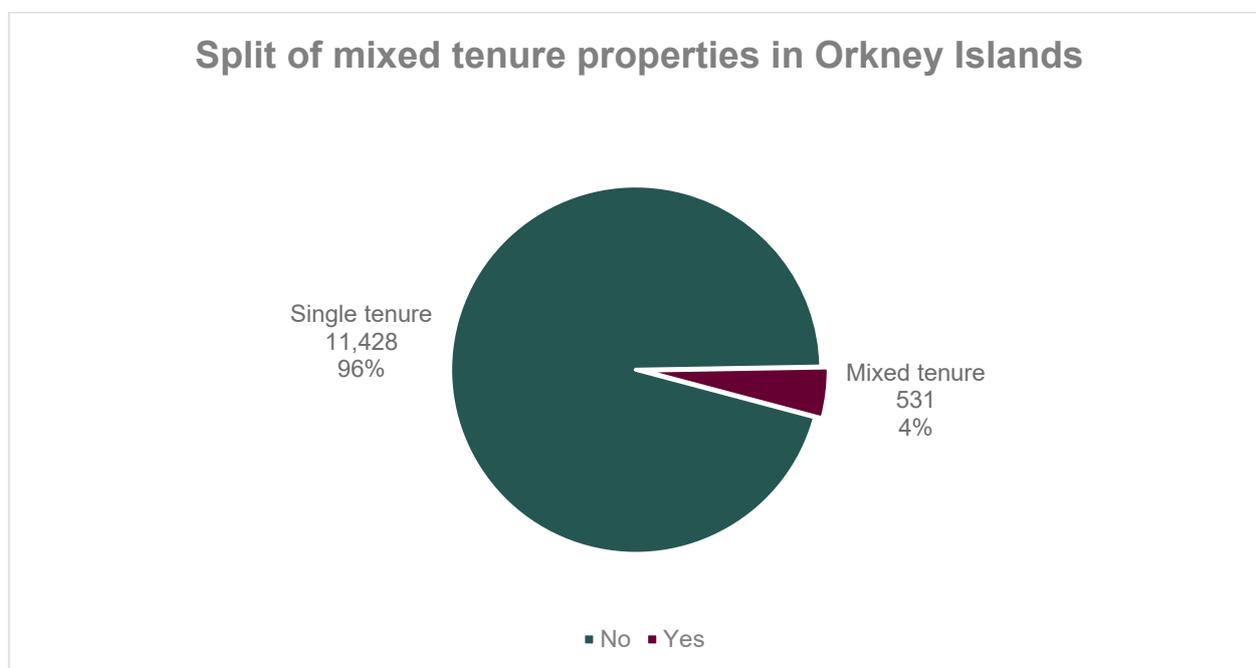


There are a small number of mixed tenure properties in Orkney (see Table 7). Mixed tenure provides an additional retrofit challenge due to multiple owners within the same property. In these buildings, there is a risk that retrofit plans are delayed or the extent of retrofit is reduced due to different priorities or capital investment plans for the property owners. Council-owned properties in mixed tenure buildings could be targeted first to develop a retrofit plan addressing challenges and opportunities.

Table 7: Mixed tenure properties in Orkney Islands

Single tenure	Mixed tenure
11,428 (96%)	531 (4%)

Figure 4: Pie chart of mixed tenure split within properties in Orkney Islands



Fuel poverty

Box 1: Data sources for understanding fuel poverty

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

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

Based on 2017-19 data from the Scottish House Condition Survey (SHCS) (see Box 1), Orkney’s fuel poverty rate¹¹ was 31%. This is above the Scottish average¹² in the same period, which was 24%. These statistics are the most up to date data on fuel poverty available at the local authority level.

Although there is no SHCS data available, it is likely that fuel poverty rates in Orkney now are far higher than 31%, as a result of the cost-of-living crisis and the sharp rise in energy costs. In 2022, the SHCS estimated that the national rate of fuel poverty had increased to 31% (Table 8).

Table 8 shows how Orkney Island’s fuel poverty rates have changed in the past decade. Across these years, average fuel poverty in Orkney Islands has been above the Scottish national level. However, due to a change in fuel poverty definition, this is likely to have been the cause for the significant differences observed between 2015-17 and 2016-18. Therefore, direct comparisons cannot be drawn with the statistics published prior to and after 2016-2018.

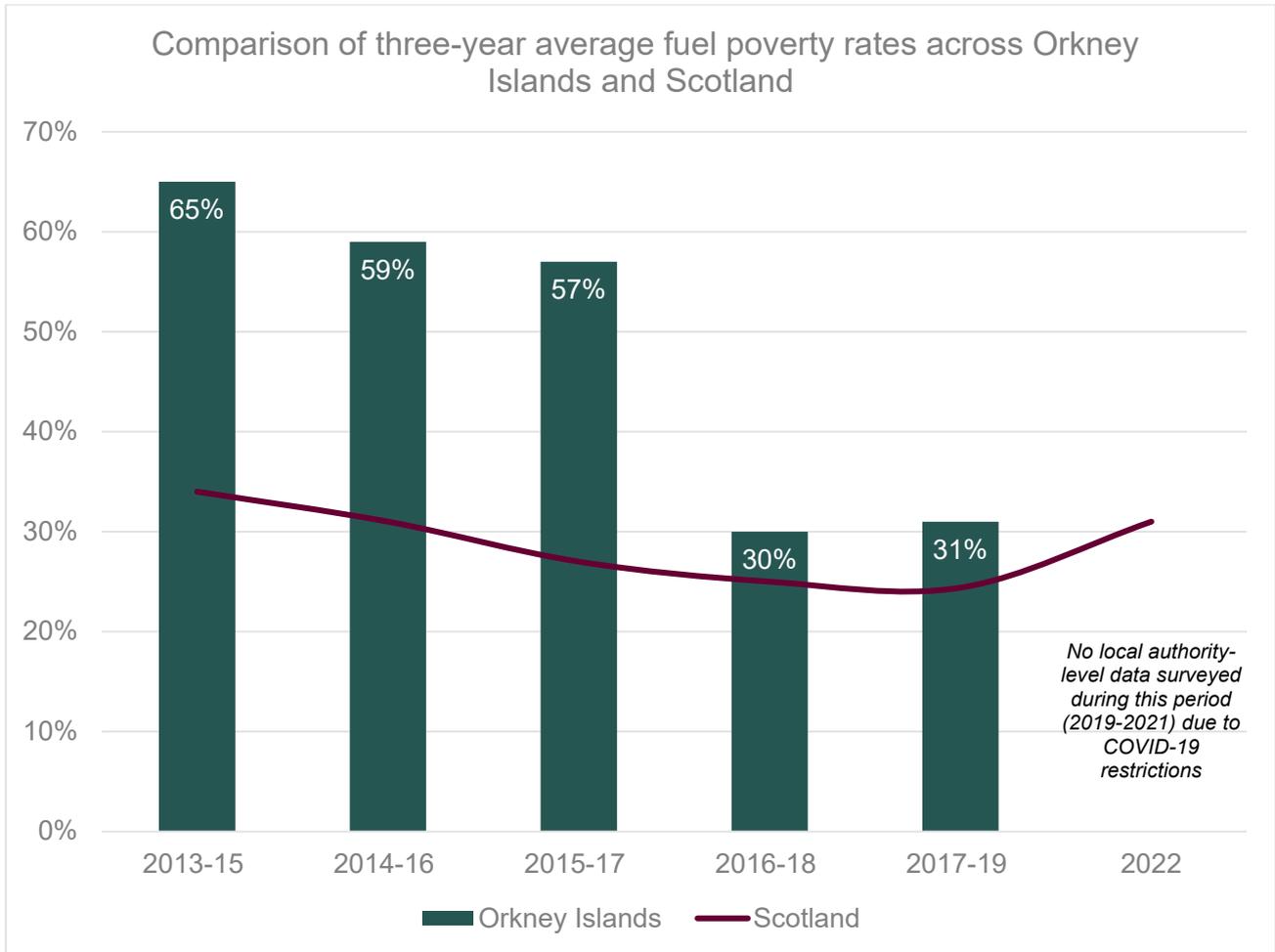
Table 8: Scottish House Condition Survey figures showing the three-year average fuel poverty rates across Orkney Islands and Scotland

Households	Old fuel poverty definition			New fuel poverty definition		
	2013-15	2014-16	2015-17	2016-18	2017-19	2019-22
Orkney Islands Council	65%	59%	57%	30%	31%	-
	7,000	6,000	6,000	-	-	-
Scotland	34%	31%	27%	25%	24%	31%

¹¹ Scottish Government (2022) Scottish House Condition Survey: Local Authority Analysis 2017-2019. Available at: <https://www.gov.scot/publications/scottish-house-condition-survey-local-authority-analysis-2017-2019/pages/6/> (Accessed: 15 July 2024).

¹² [Ibid.](#)

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



According to the Scottish index of Multiple Deprivation (see Box 1), no properties in Orkney Islands fall within SIMD deciles one and two (most deprived). However, this does not mean that deprivation does not exist. SIMD demonstrates that Orkney’s ferry-linked isles experience higher ongoing levels of deprivation with these areas found to be in the bottom 28% across Orkney’s 29 datazones.¹³

With a priority of alleviating fuel poverty, Orkney Islands Council has used the LHEES process to investigate areas where fuel poverty has contributed to poor energy efficiency, particularly in social housing and the private rented sectors. This is detailed in the Delivery Plan.

Primary fuel type for domestic buildings

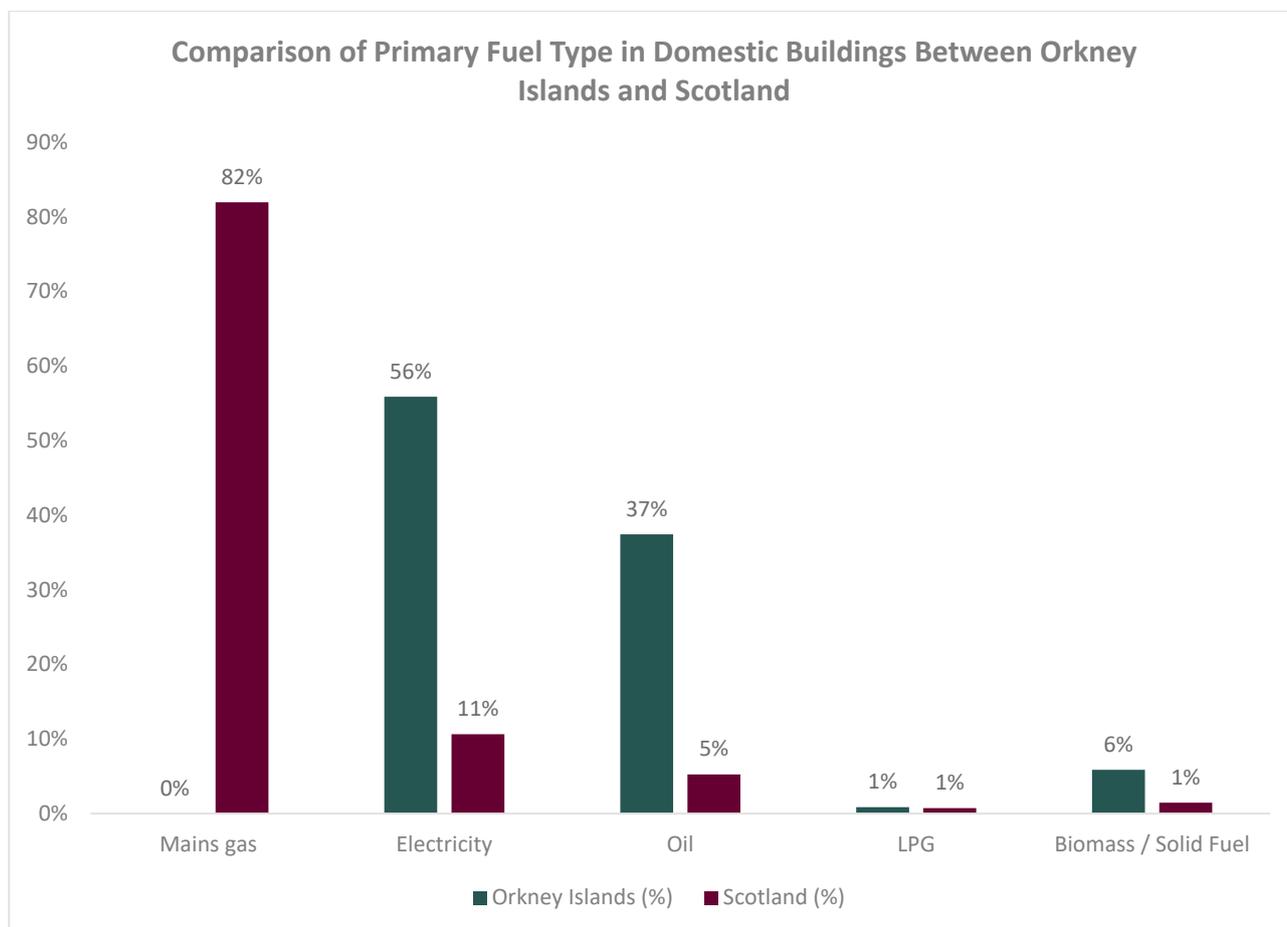
The primary fuel type for domestic buildings in Orkney is very different from the Scottish national average because the Orkney Islands have no mains gas network. The majority of properties use electricity as the primary fuel type which is approximately five times higher than the national average (Table 9). There are also a high number of domestic properties using heating oil (37%), approximately seven times the national average.

¹³ [Orkney Child Poverty Strategy 2022-2026](#)

Table 9: Primary fuel type statistics for domestic properties in Orkney Islands

Primary Fuel Type	Orkney Islands Council	Scotland
Mains gas	0 (0%)	2,016,000 (82%)
Electricity	6,646 (56%)	262,000 (11%)
Oil	4,453 (37%)	129,000 (5%)
LPG	103 (1%)	18,000 (1%)
Biomass / Solid Fuel	697 (6%)	36,000 (1%)

Figure 6: Primary fuel types across properties in Orkney Islands relative to the Scottish national average.



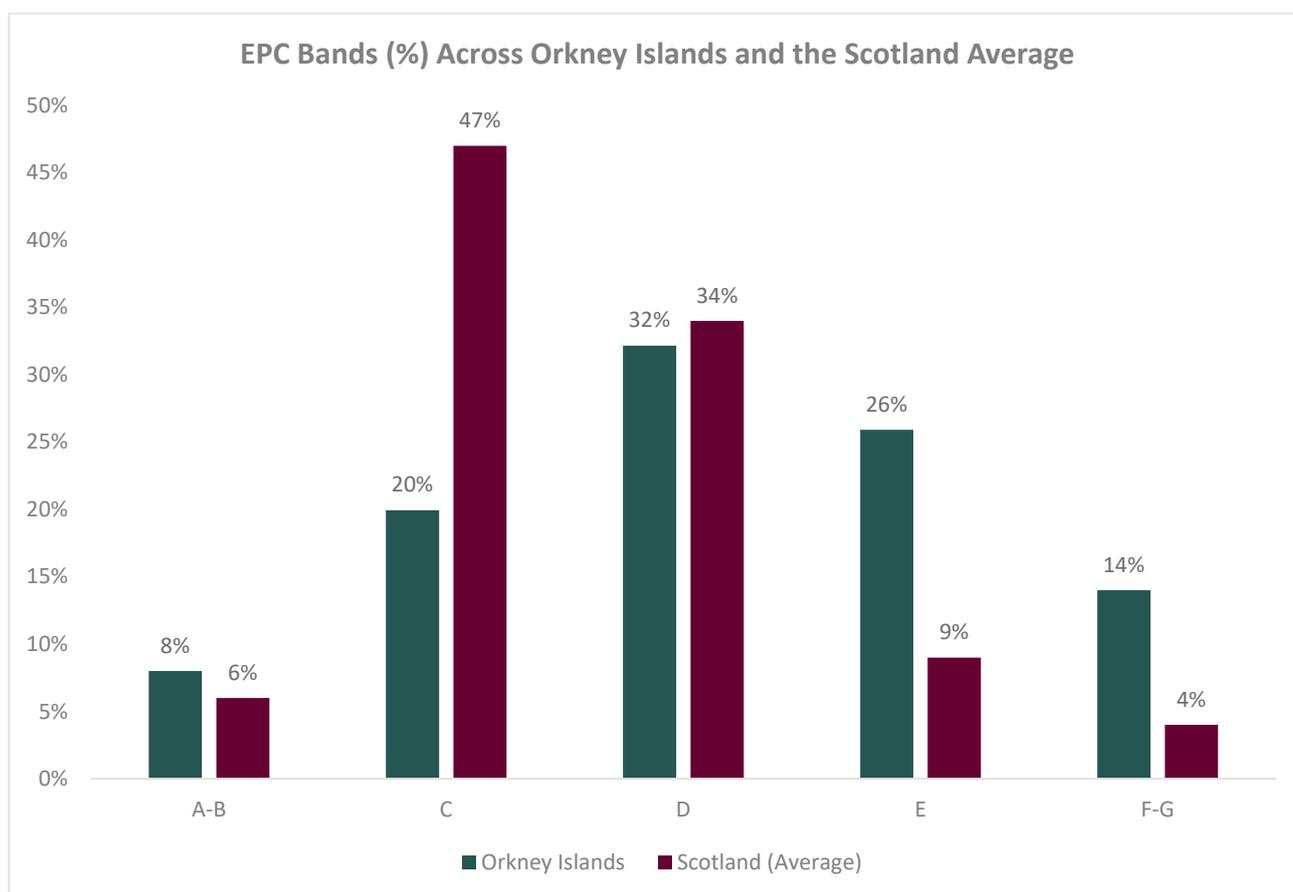
Energy Performance Certificate data for domestic buildings

Orkney has more properties across all tenures that are within EPC bands A-B (most energy efficient) compared to the Scottish national average (Table 10). Most properties within the local authority are within EPC band D. Orkney also has a far higher percentage of properties in bands E-G (least energy efficient), compared to the national average.

Table 10: EPC data for domestic properties in Orkney Islands and national averages¹⁴

	A-B (81-100)	C (69-80)	D (55-68)	E (39-54)	F-G (1-38)
Orkney Islands	8%	20%	32%	26%	14%
Scotland (Average)	6%	47%	34%	9%	4%

Figure 7: Distribution of EPC Bands across Orkney Islands compared to the Scottish national average



The social housing sector in particular has high levels of energy efficiency, with only 10% of properties in band E or F (Table 11). It is also the tenure type with the largest share of

¹⁴ [3 Energy Efficiency - Scottish house condition survey: 2019 key findings - gov.scot \(www.gov.scot\)](https://www.gov.scot/resources/consultations-petitions/html/2019/3-energy-efficiency-scottish-house-condition-survey-2019-key-findings)

properties in bands A-B. This indicates that policy drivers for the sector have been successful at driving energy efficiency improvements.

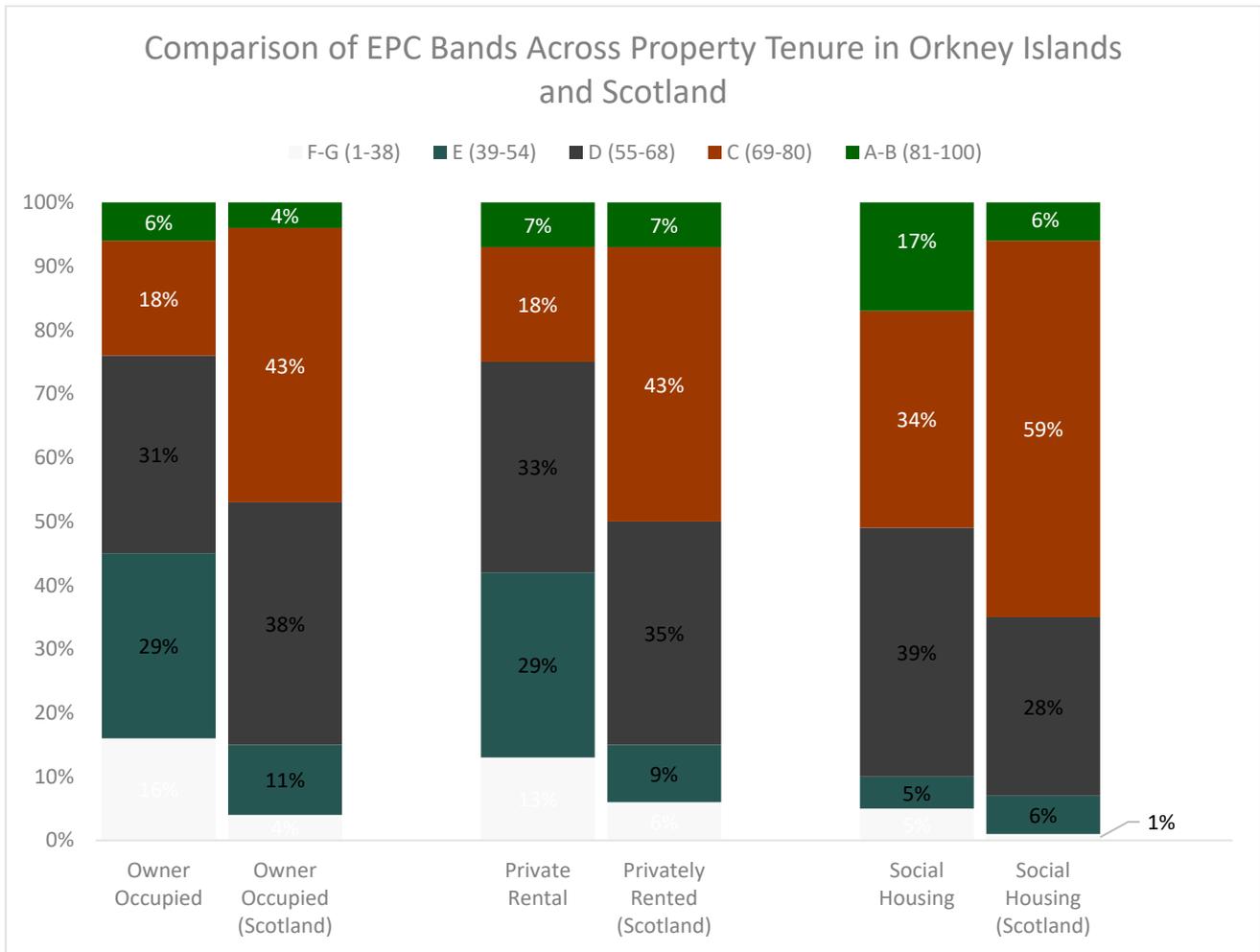
Owner-occupied properties have a wider distribution across EPC bands compared to the national average. This sector has fewer properties in band C compared to Scotland overall, but in turn more properties in both bands A-B (more energy efficient) and bands E (less energy efficient) (Table 11). Overall, most of the owner-occupied properties in Orkney (76%) are band D or below.

The private rented sector is similar to the owner-occupied sector. Most properties (75%) in this sector are in band D or below.

Table 11: EPC data for domestic properties in Orkney Islands

EPC Band	Owner Occupied		Private Rental		Social Housing	
	Orkney Islands Council	Scotland	Orkney Islands Council	Scotland	Orkney Islands Council	Scotland
A-B (81-100)	6%	4%	7%	7%	17%	6%
C (69-80)	18%	43%	18%	43%	34%	59%
D (55-68)	31%	38%	33%	35%	39%	28%
E (39-54)	29%	11%	29%	9%	5%	6%
F (1-38)	16%	4%	13%	6%	5%	1%

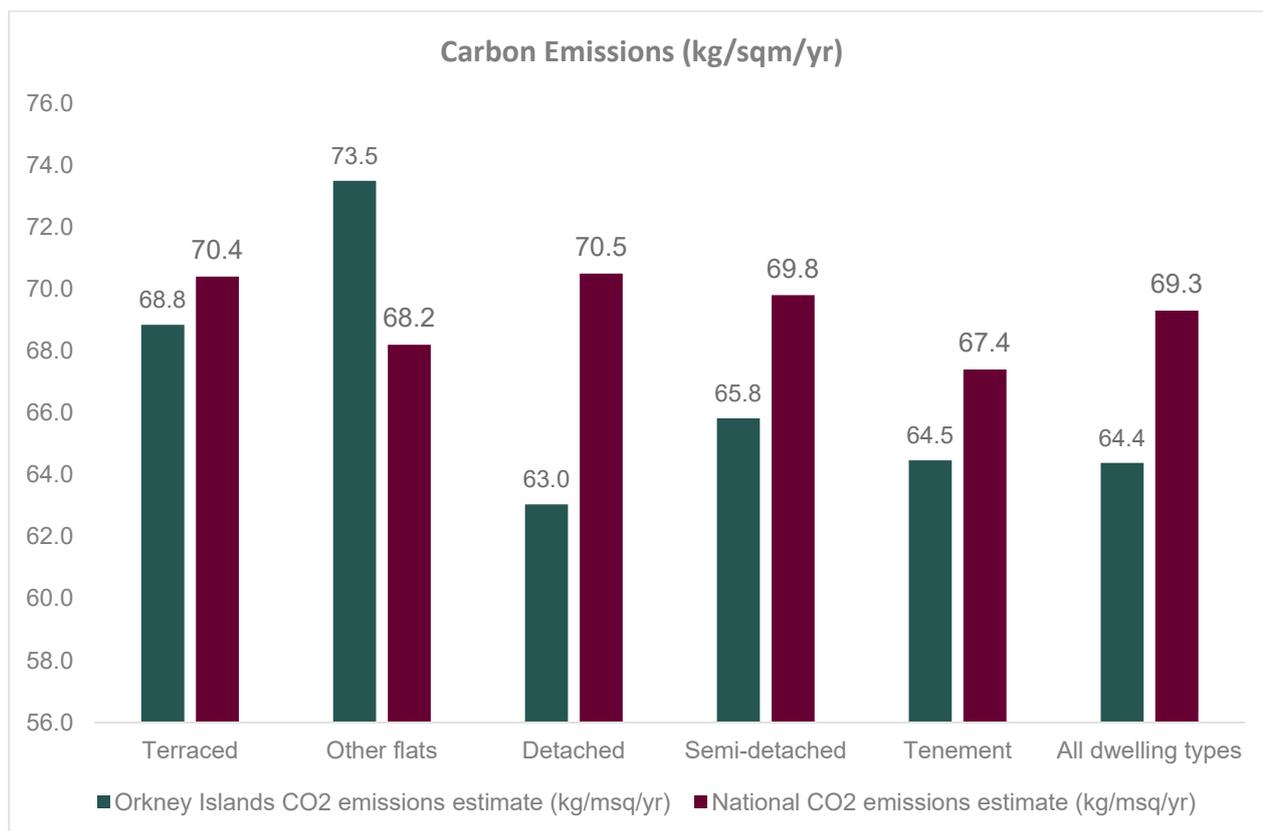
Figure 8: Split of EPC bands across all property tenures Orkney Islands relative to the Scottish national average



Carbon emissions from domestic buildings

Carbon emissions from buildings are often measured by kilograms of carbon emitted per square meter in the property. Carbon emissions across the Scottish national housing stock are relatively consistent between 67.4 kg/m² and 70.5kg/m² for all types of dwellings (Figure 9). In Orkney Islands, the estimated amount of carbon emitted per m² across all property types except 'other flats' is significantly lower than the national average (Figure 9). This is mainly because the majority of properties rely on electricity for heating, compared to the rest of Scotland where most homes rely on mains gas. Terraced housing and other flats have much higher emissions compared to detached, semi-detached and tenements in Orkney Islands.

Figure 9: Carbon emissions (kg/m²) for each dwelling type in Orkney Islands



Non-domestic buildings

Figure 10 provides a breakdown of the number of domestic and non-domestic buildings in Orkney Islands Council. There are 11,578 domestic buildings in Orkney Islands, amounting to 85% of the total building stock in Orkney. By comparison, non-domestic buildings make up only 15% of the total building stock, of which 12% are publicly owned. Non-domestic buildings include short term residential accommodation, offices, retail, hotels, industry, education and leisure facilities.

Heat demand

Despite making up only 15% of buildings, non-domestic buildings account for 25% of total heat demand across Orkney Islands (Table 12 and Table 13). This demonstrates that average heat demand is higher in non-domestic buildings than domestic. Due to their higher relative heat demand, non-domestic buildings have the potential to be used as anchor loads to improve the feasibility of heat networks by providing guaranteed demand.

Table 12: Total property count for domestic and non-domestic buildings in Orkney Islands

Non-domestic property count	Domestic property count	Total property count
2,098 (15%)	11,578 (85%)	13,676

Table 13: Total heat demand for domestic and non-domestic buildings in Orkney Islands

Non-domestic total heat demand (MWh/yr)	Domestic total heat demand (MWh/yr)	Total heat demand (MWh/yr)
67,575 (25%)	207,324 (75%)	274,899

Figure 10: Breakdown of domestic and non-domestic building counts and respective heat demands in Orkney Islands

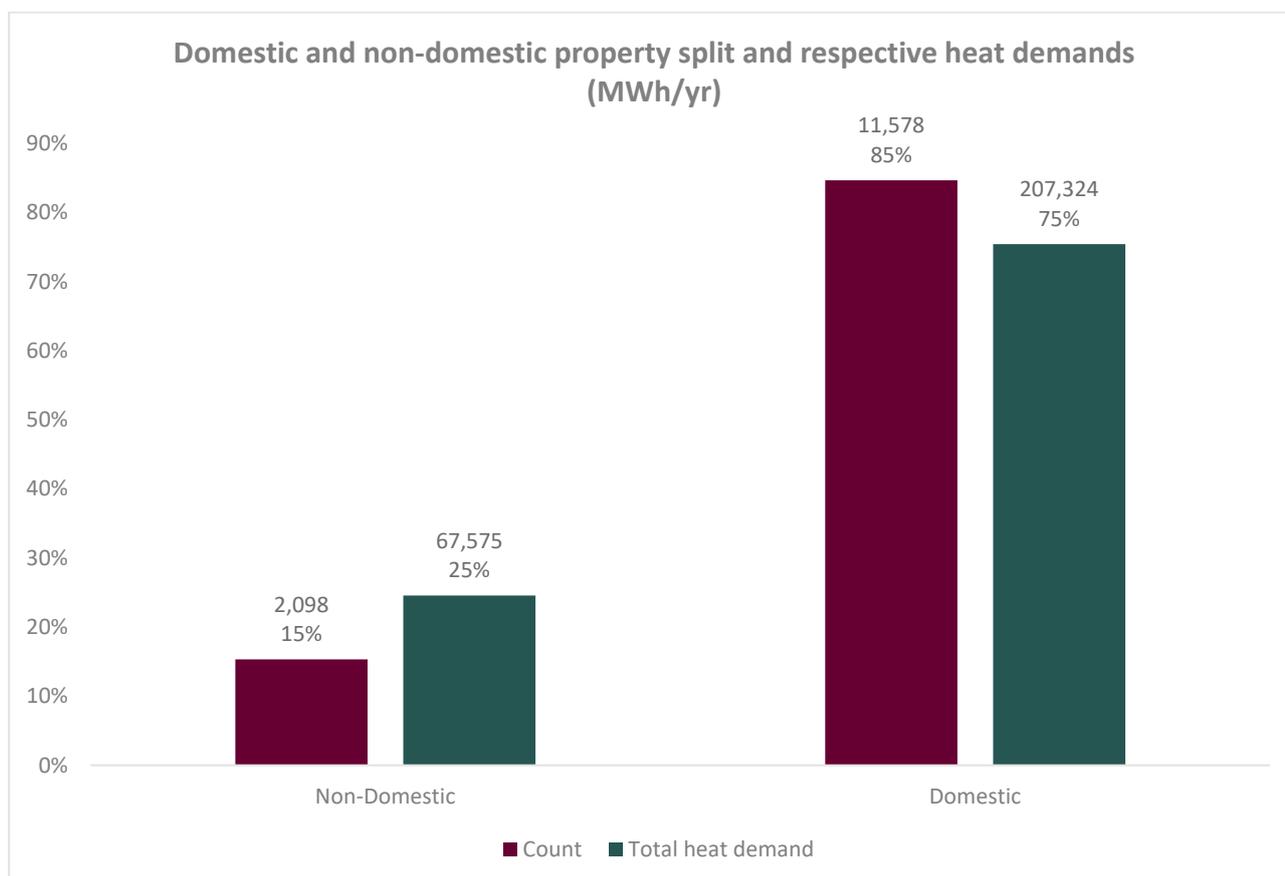


Figure 11 demonstrates that the relationship between number of properties and heat demand is not always directly proportional and is dependent on property end use. Non-domestic typologies such as hotels, residential uses¹⁵ and retail properties have higher average heating demands per property when compared to offices, education and industry.

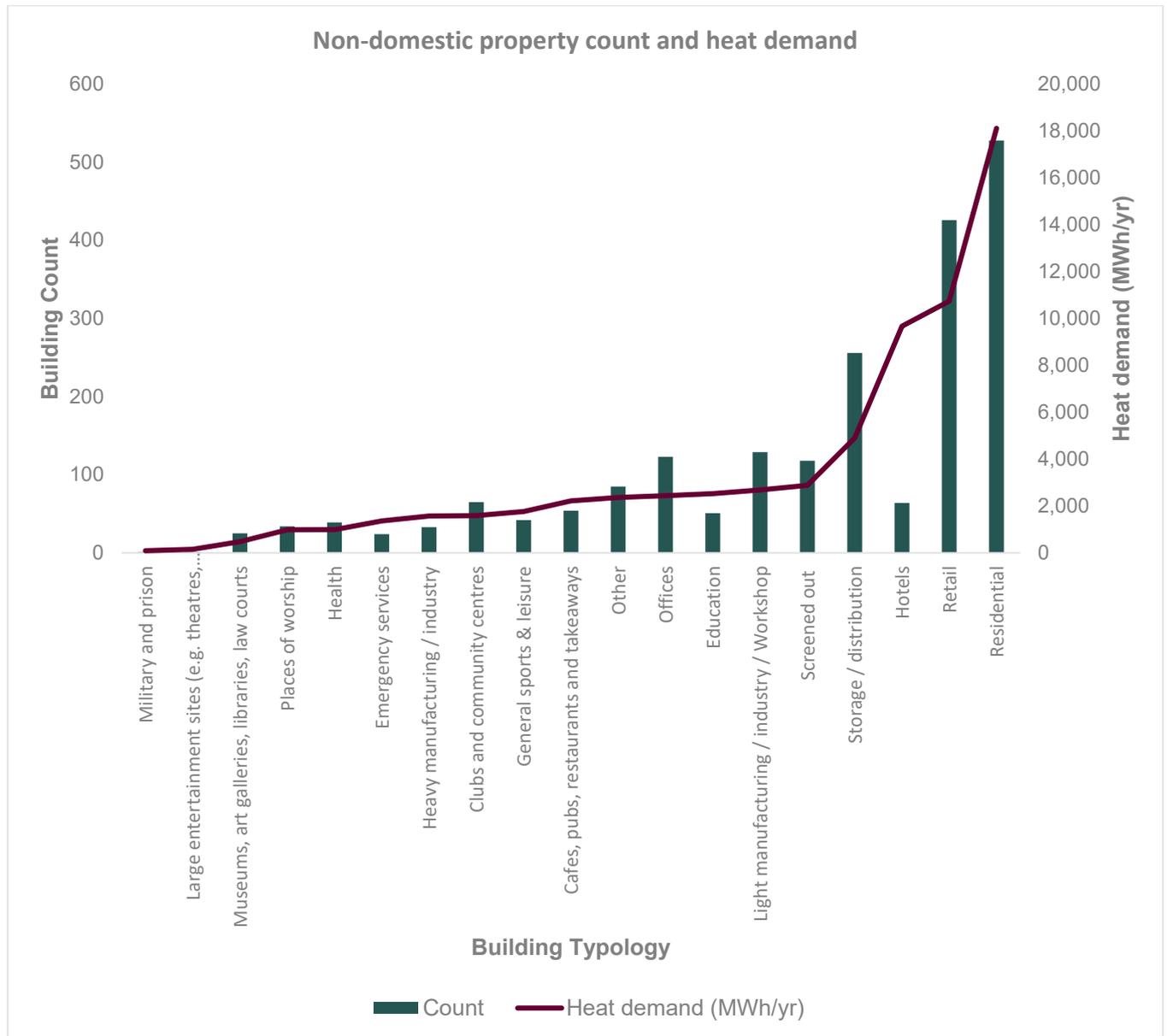
Comparatively across all property typologies, hotels have the highest heat demand of all non-domestic building typologies, accounting for 14% of non-domestic heat demand despite making up only 3% of non-domestic buildings. The category of hotels includes care homes, traditional hotels, hostels, guest houses and/or bed and breakfasts, which have very high heat demands.

Whilst offices make up 6% of total non-domestic buildings, they only contribute just under 4% of non-domestic heating demand. Similarly, although sports and leisure facilities

¹⁵ In the context of non-domestic buildings, residential use refers to short-term accommodation such as holiday lets.

generally have very high heating demands, there are only 42 buildings of this typology, contributing 2% of total non-domestic heating demand in Orkney Islands.

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



Primary fuel type in non-domestic buildings

Nearly 80% of non-domestic properties across Orkney Islands use electricity as their main fuel source, a total of 1,664 properties (Table 14).

Table 14: Non-domestic property count by main fuel type

Electricity	Oil	Other
1,664 (80%)	409 (19%)	25 (1%)

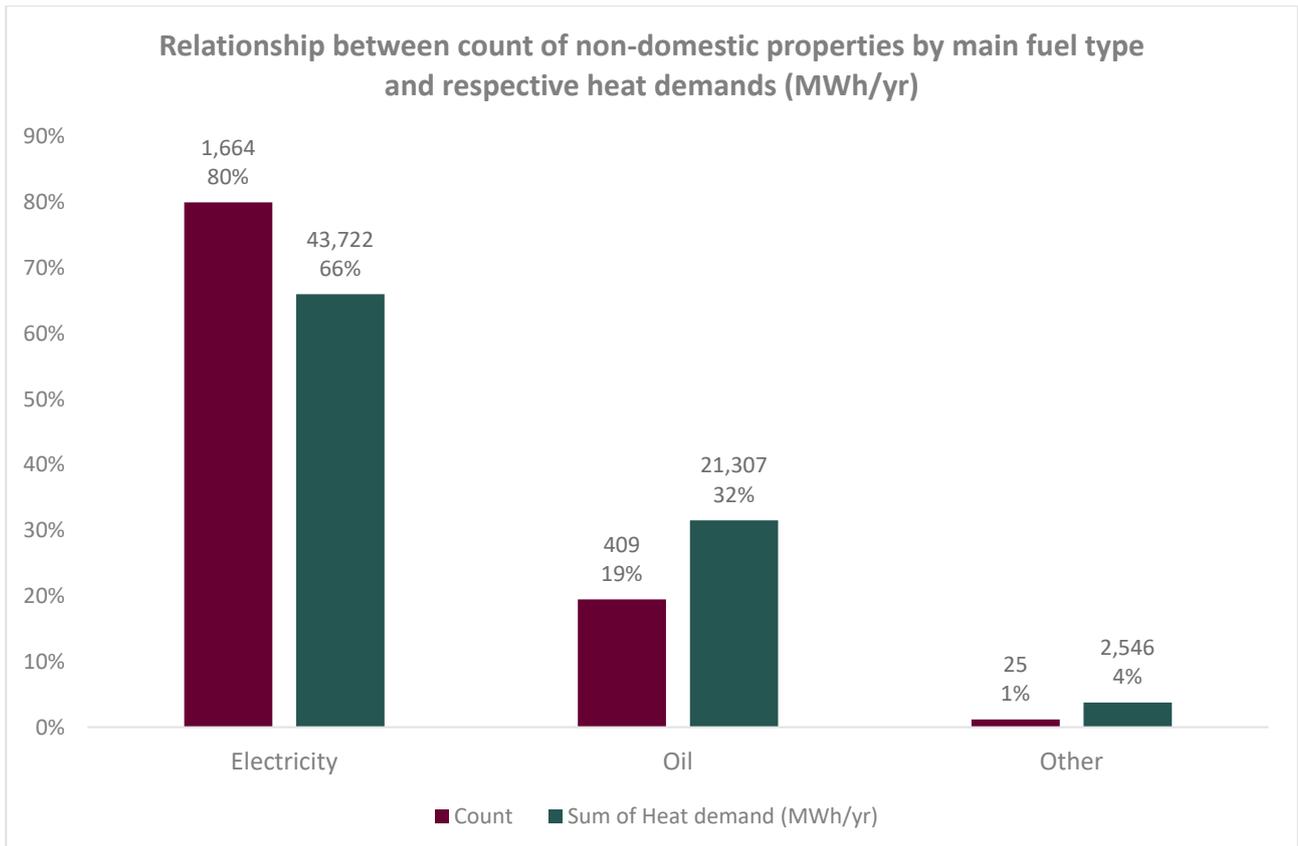
While only 19% of non-domestic buildings use oil as the primary fuel type, oil is used to meet 32% of total heat demand, providing 21,307 MWh/yr of heat (Table 15). This means

that properties which use oil as a main fuel type have a higher average demand than those that use electricity.

Table 15: Heat demand by main fuel type (MWh/yr)

Electricity	Oil	Other
43,722 (66%)	21,307 (32%)	2,546 (4%)

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



Heat networks

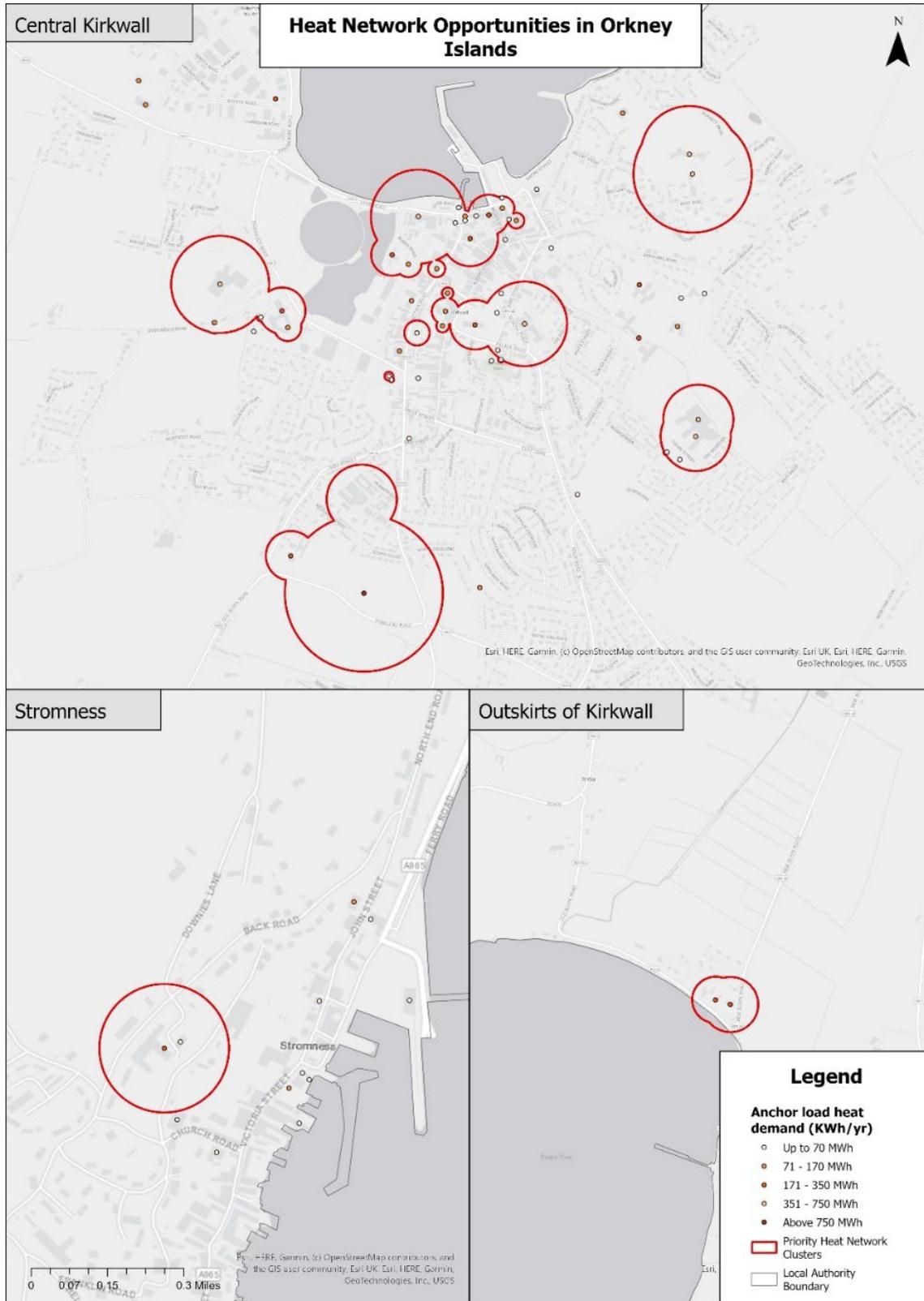
Heat networks are a key part of the transition to net zero in Scotland.

Previously, Orkney Islands Council explored initial feasibility of heat networks in the centre and outskirts of Kirkwall. The assessments conducted by an external consultant highlighted three potential network routes based on areas of high heat demand. One route explored the possibility of a heat network connecting the main council buildings in Kirkwall; the second following the first route and extending to public buildings identified by the Council; and the third following the first route and extending out through the Hatston Estate to the proposed Energy Centre to the west of the Industrial Estate. For all three routes, the return on investment was very low.

Based on LHEES analysis, there are 15 potential heat networks clusters of varying area size and heat demands located in Kirkwall and one in Stromness (Figure 13). These are

detailed in the Delivery Plan. Orkney Islands Council is seeking to explore the viability of connection opportunities between outputs from LHEES, prior and current assessments.

Figure 13: Heat network opportunities as derived from LHEES analysis



Priority A: Making Orkney's homes energy efficient

Summary of Priority A: Making Orkney's homes energy efficient

- The Council is focussed on improving energy efficiency for all tenures of homes.
- The Council has a **'fabric first'** approach meaning that improvements to the building's walls, roof, floors, doors, and windows should be considered before installing new heating systems.
- Warmworks delivers Area Based Scheme funding, on behalf of the Council, to improve energy efficiency for **owner occupied and private rented homes**.
- In accordance with Scottish Government legislation, **almost all social housing** run by the Council and OHAL **is EPC band C and above**.
- There is **upcoming legislation** that **will increase the energy efficiency standards for social housing**. Once this is announced, the Council and OHAL will move forward with developing specific plans to further improve energy efficiency.
- **Relevant policies:** Local Housing Strategy (2024-2029, Draft), Council Plan (2023-2028), Strategic Housing Investment Plan (2021-2026), Carbon Management Programme (2016-2026), Energy Efficiency Standard for Social Housing, upcoming Scottish Government Heat in Buildings Bill and Social Housing Net Zero Standard

Overview

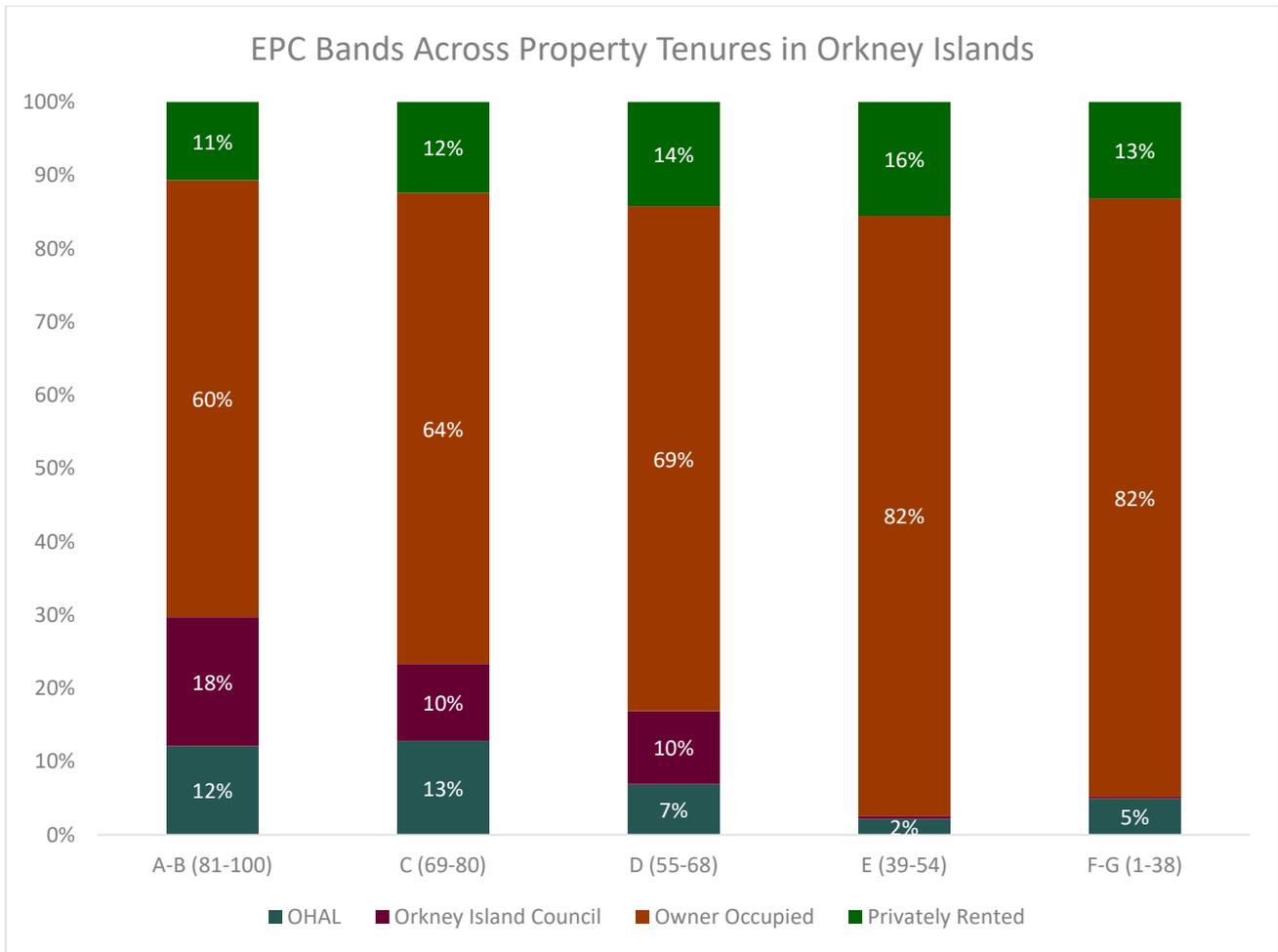
Making Orkney's homes energy efficient is a key priority for Orkney Islands Council. The approach the Council takes to improve energy efficiency depends on the tenure of the building.

The majority of homes (72%) in Orkney are owner occupied. A further 14% are privately rented. The Scottish Government's upcoming Heat in Buildings Standard is likely to include a minimum energy efficiency standard for owner occupied and privately rented homes.

Owner occupiers and private landlords can access funding through the Heat and Energy Efficient Scotland: Area Based Scheme, delivered by Warmworks. Social housing properties are owned and managed by either the Council or Orkney Housing Association Limited (OHAL). These properties are required to meet different standards and are eligible for different types of funding from Scottish Government to improve energy efficiency. There are also certain energy efficiency requirements for new social housing properties being built by the Council and OHAL.

The majority of homes with poor energy efficiency (EPC band D and below) are owner occupied and privately rented (see Figure 14).

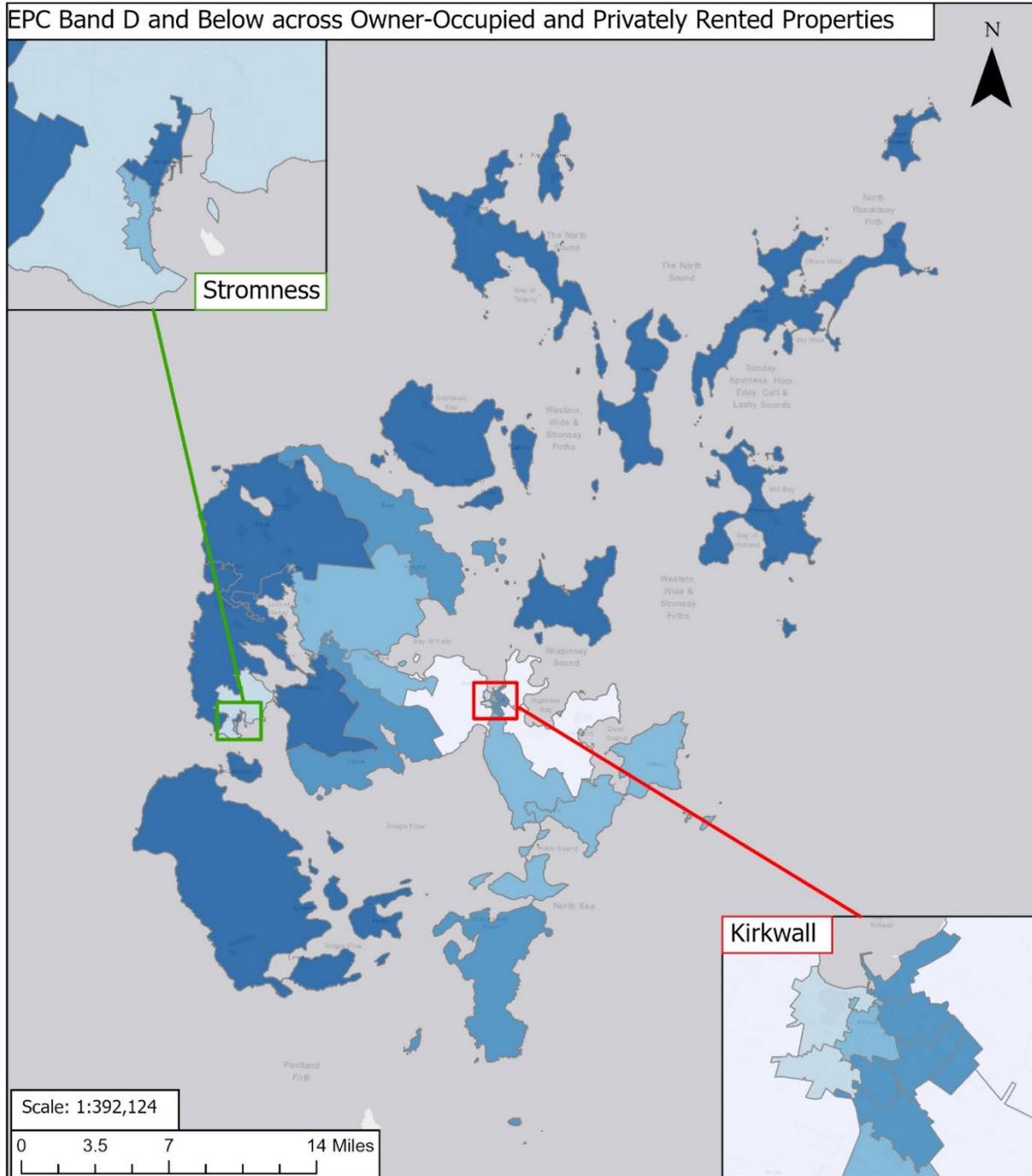
Figure 14: EPC Bands across all property tenures in Orkney Islands



Owner occupied & privately rented homes

As outlined in Section 4.1, there is a lot of work to be done to make owner occupied and privately rented homes more energy efficient in Orkney. **Error! Reference source not found.** Figure 15 shows the distribution of owner-occupied and privately rented homes that are EPC band D and below across Orkney.

Figure 15. Strategic zoning of Owner-occupied and Privately Rented properties of EPC Band D and below



This map spatially displays the percentage of owner-occupied and privately-rented domestic properties of EPC Band D and below across each datazone. The EPC percentage is represented as a proportion of the total dwelling count for each datazone.

Note: Data zones are a statistical geography that are designed to meet constraints on population thresholds (between 500 and 1,000 household residents), to nest within Intermediate Zones, and to build up from aggregates of Census Output Areas.

Legend

EPC Band D and Below

- Less than 45%
- 45% - 55%
- 56% - 65%
- 66% - 75%
- Over 75%

Spatial Reference
Name: British National Grid

Changeworks © 2023. Esri, HERE, Garmin, USGS, Esri UK, Esri, HERE, Garmin, USGS, Esri, HERE

Heat and Energy Efficient Scotland: Area Based Scheme

The Scottish Government provides funding to every local authority to improve energy efficiency in owner occupied and privately rented homes in areas with high levels of fuel poverty. This funding is called **Heat and Energy Efficient Scotland: Area Based Schemes** (HEES:ABS). A grant of up to £10,500 – £16,100 was made available per customer in 2022/23, with a higher grant award available in certain circumstances.¹⁶ The main aim of HEES:ABS is to upgrade homes to at least EPC band C.

Local authorities determine how the scheme is delivered, informed by requirements from Scottish Government. In Orkney, the scheme is run by a managing agent called Warmworks. Warmworks oversee delivery of the funding from start to finish, to install measures such as insulation and new, efficient storage heating. In many local authorities, the scheme is targeted at specific geographic areas with higher rates of fuel poverty. However, in Orkney the scheme is open to people living everywhere who meet the criteria. Most homes in Orkney qualify for HEES:ABS, meaning they will some level of funding and Warmworks will manage the retrofit work.

Most funding goes to owner occupiers. A very small percentage of HEES:ABS funding goes towards private rented homes because upgrades to heating systems are now required to be funded by landlords under minimum housing standards.

In 2024/25, the following measures will be offered by Warmworks:

- High heat retention storage heaters
- Interlinked fire alarms (first time offered)
- Internal and External wall insulation
- Loft top-up insulation
- Underfloor insulation
- Virgin loft insulation

HEES:ABS funding has increased a lot in the last ten years. In 2015/16, Orkney Islands Council received nearly £800,000 in HEES:ABS funding. In 2024/25, the Council will deliver £1.2 million worth of energy efficiency projects. The Council intend to lobby for additional funding, as the original bid was for £2.25 million.

The HEES:ABS scheme has made a significant impact on the energy efficiency of owner occupied and privately rented homes in Orkney. In 2023/24, the HEES:ABS scheme has funded 229 energy efficiency improvements in 172 households in Orkney. At the time of writing, the full annual report for 2023/24 is not available. However, in 2022/23 the scheme had the following additional impacts:

- Increased the energy efficiency of homes, the average SAP score (score on an EPC report) increase by **11.7 points**

¹⁶ Warmworks (2023) *Energy Efficient Scotland: Area-Based Scheme (Orkney) Annual Report 2022/23*, Available at: <https://www.warmworks.co.uk/wp-content/uploads/2023/10/Final-web-ready-version.pdf>

- Helped some of the least energy efficient homes in Orkney, as **22%** of homes referred to HEES:ABS **were in EPC bands F and G** (the worst ratings for energy efficiency)
- **Saved 108 tonnes of CO2** by improving energy efficiency and reducing emissions

THAW Flex Fund

THAW, Orkney's fuel poverty charity, also provides funding for owner occupied and private rented homes to make energy efficiency upgrades. Households must be in extreme fuel poverty (spending a minimum of 20% of their income on energy bills) to be eligible. See 6.2 for more information.

Council-owned social housing

The Council owns 7% of the total housing in Orkney. Improving the energy efficiency of the Council's housing is a key priority and allows the Council to lead by example in delivering retrofit.

Retrofitting existing homes to improve energy efficiency

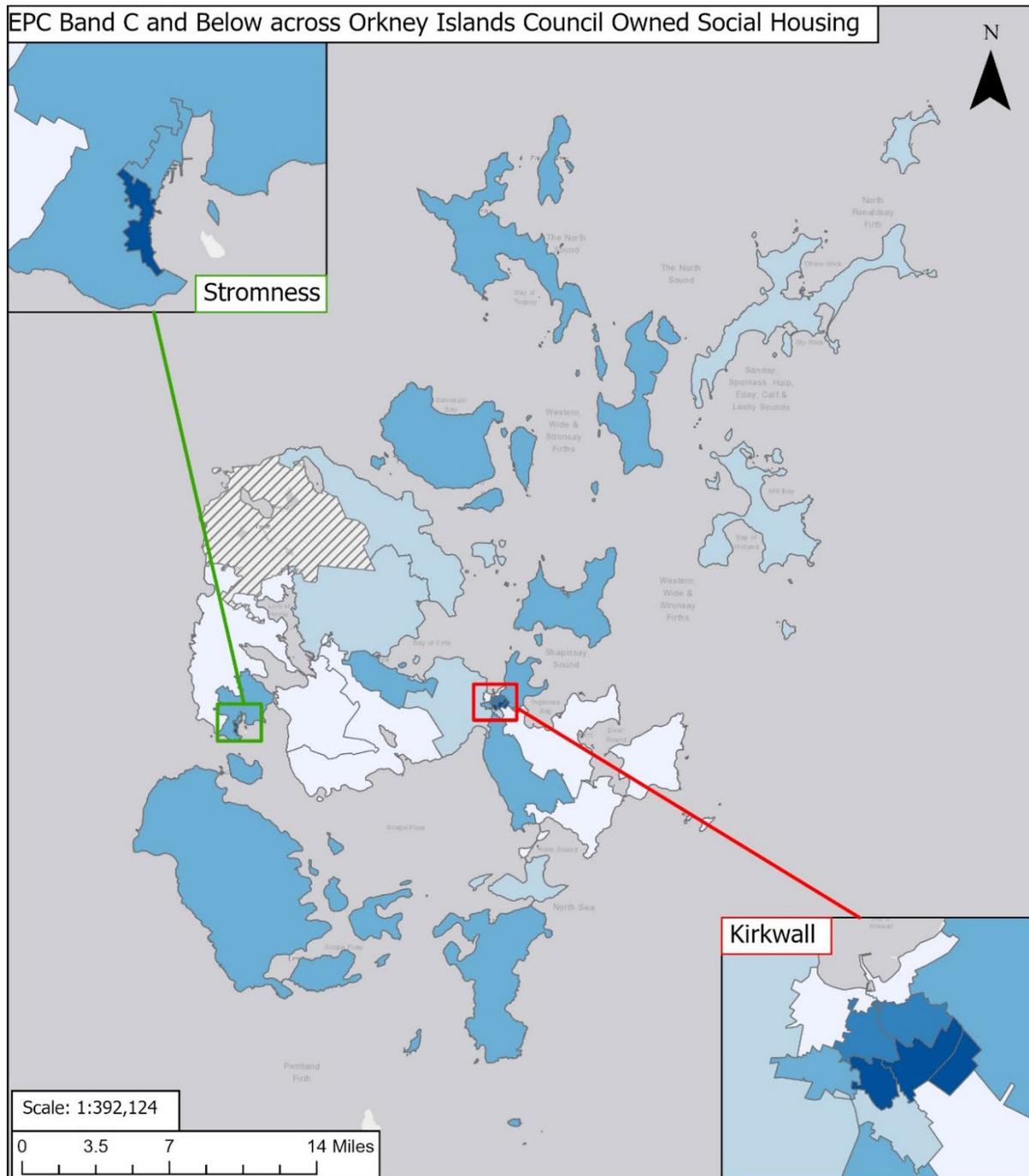
The Energy Efficiency Standard for Social Housing (ESSH) was introduced by the Scottish Government to improve the energy efficiency of social housing in Scotland. The ESSH standard requires social housing properties to be EPC band C or D at a minimum. A stricter standard called ESSH2 was brought in more recently for all properties to be EPC band B (or as close as possible). ESSH2 is currently on pause as it is undergoing review. The Scottish Government intends to replace ESSH2 soon with a new standard called the Social Housing Net Zero Standard (SHNZS). Due to uncertainties around current and future regulations, Orkney Islands Council is focussing all energy efficiency work to meet the ESSH standard until a new standard is published.

96% of Orkney Islands Council housing stock meets the current ESSH standard. Only 20 properties did not meet the standard due to various reasons described in the Local Housing Strategy.

The new standards are expected to be much more difficult to achieve. To prepare, the Council has been trialling approaches when properties become empty. For more information on these projects, see the Delivery Plan.

Figure 16 shows the areas where retrofit programmes for council-owned social housing will need to take place.

Figure 16. Strategic zoning of Orkney Islands Council owned social housing properties of EPC Band C and below



This map spatially displays the percentage of local-authority owned domestic properties of EPC Band C and below across each datazone. The EPC percentage is represented as a proportion of the total dwelling count for each datazone.

Note: Data zones are a statistical geography that are designed to meet constraints on population thresholds (between 500 and 1,000 household residents), to nest within Intermediate Zones, and to build up from aggregates of Census Output Areas.

Spatial Reference
 Name: British National Grid
 Changeworks © 2023. Esri, HERE, Garmin, USGS, Esri UK, Esri, HERE, Garmin, USGS, Esri, HERE

- Legend**
- EPC Band C and Below - Council-owned social housing buildings
 - Below 1%
 - 2% - 3%
 - 4% - 6%
 - 7% - 11%
 - Over 11%
 - No council-owned buildings

Energy efficiency standards for new homes

Based on an analysis of new social rented housing needs and the Council's Housing Revenue Account, **the Council has a target to build 14-15 new social rented homes every year** for the next ten years (140-150 by 2034). These homes need to meet a certain energy efficiency standard.

- Summarise specifications for energy efficiency in new build properties

Orkney Housing Association Limited (OHAL)-owned social housing

OHAL is the only housing association operating in Orkney. OHAL owns 7% of the housing in Orkney (half of the social housing)

Energy efficiency standards for new homes

OHAL's Business Plan sets a target for 20 new homes to be built every year. These homes will be built to the Scottish Government energy efficiency standard required for social housing.

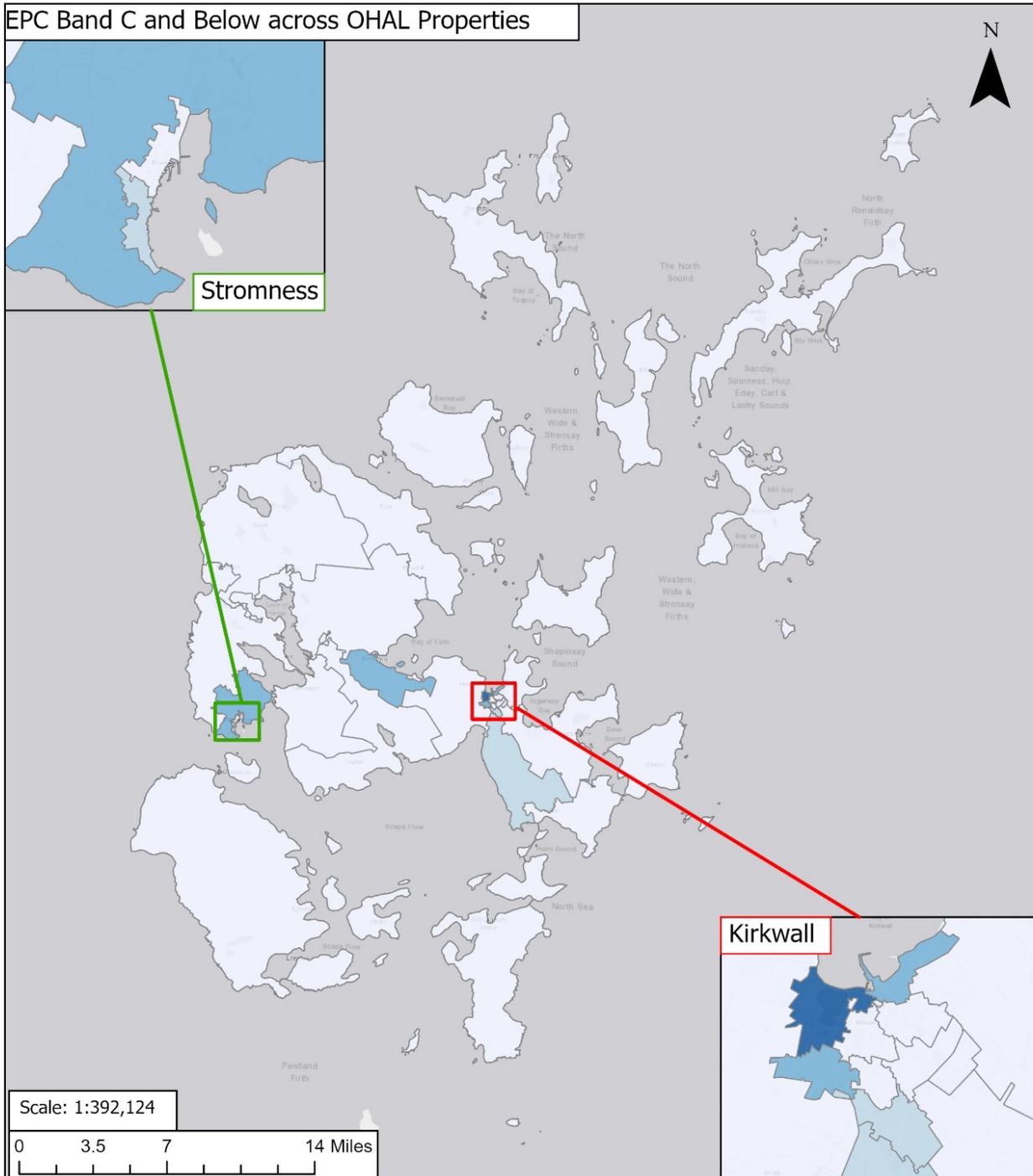
Retrofitting existing homes to improve energy efficiency

OHAL's approach to improving the energy efficiency of its housing stock involves tenant support and a fabric first approach—making the building itself more efficient so less energy is needed to heat a home.

97% of properties run by OHAL meet current EESSH standard. Only 13 properties fail these standards due to various reasons described in the Local Housing Strategy.

Figure 17 shows the areas where OHAL will need to target retrofit programmes for its properties.

Figure 17: Strategic zoning of housing association (OHAL) properties of EPC Band C and below



This map spatially displays the percentage of housing association (OHAL) owned properties of EPC Band C and below across each datazone. The EPC percentage is represented as a proportion of the total dwelling count for each datazone.

Note: Data zones are a statistical geography that are designed to meet constraints on population thresholds (between 500 and 1,000 household residents), to nest within Intermediate Zones, and to build up from aggregates of Census Output Areas.

Spatial Reference
Name: British National Grid

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Priority B: Alleviating fuel poverty

Summary of Priority B: Alleviating fuel poverty

- **Nearly every home in Orkney is at risk of fuel poverty**, if not already experiencing it.
- A large number of homes in Orkney are experiencing **extreme fuel poverty** and **fuel poverty rates are worse in more remote areas**, such as the Outer Isles.
- There are many causes of fuel poverty. **Energy efficiency** is one of the most straightforward ways that the Council and partners **can alleviate extreme fuel poverty** in Orkney.
- **Warmworks, THAW and OHAL all provide support for households in extreme fuel poverty** to improve energy efficiency.
- **Relevant policies:** Local Housing Strategy (2024-2029, Draft), Orkney Sustainable Energy Strategy (2017-2025), Regional Spatial Strategy (2011), Orkney Integration Joint Board: Joint Strategic Needs Assessment (2016), Fuel Poverty (Scotland) Act 2019

Fuel poverty in Orkney

A household is in fuel poverty if they cannot afford to heat their home to a reasonable and healthy temperature. There are many causes of fuel poverty. Across all of Scotland, the four main causes are:

- High fuel costs
- Poor energy efficiency in homes
- Low household income
- How energy is used in the home

In Orkney, these factors are made more extreme and there are additional causes that make fuel poverty more extreme than other parts of Scotland. Some of these additional causes are:

- Cold, wet and windy climate
- Higher fuel costs than other parts of Scotland (reliant on electricity, heating oil, or LPG)
- High cost of housing
- High cost of living
- High rates of underemployment (not having enough or consistent paid work) and unemployment
- Ageing demographics, as people in older age groups require a higher temperature at home to stay healthy and warm
- Limited access to support services because funding is limited, or support is dispersed across rural and remote areas

Nearly every household in Orkney is at risk of fuel poverty. According to the Scottish Government definition, a fuel poor household spends at least 10% of their net income to

pay for reasonable fuel needs after housing costs have been deducted. A household is extremely fuel poor if fuel costs are 20% or higher. The Scottish Housing Condition Survey reports that 31% of households in Orkney are in fuel poverty. However, this was from 2017-2019 before the energy crisis and does not include a number of important factors that have since impacted levels of fuel poverty.

The Scottish Housing Condition Survey is the only existing data that estimates fuel poverty rates for all of Orkney. However, local fuel poverty organisations and schemes can help to provide a fuller and more accurate picture.

The Area Based Scheme, run by Warmworks, provides grants to people in fuel poverty. Households are eligible if they qualify for the Warmer Homes Scotland scheme or if they are considered fuel poor after Warmworks conducts a fuel poverty assessment.¹⁷ According to Warmworks, nearly every household in Orkney would be considered fuel poor if they were assessed. This means nearly every household is likely to be eligible for HEES:ABS grant funding.

Extreme fuel poverty

In addition to high rates of fuel poverty overall, **Orkney has a high number of households who are experiencing extreme fuel poverty** (spending a fifth or more of their income on fuel, after housing costs).

80% of households who THAW supports are in extreme fuel poverty. **1 in 6 THAW clients would need to spend nearly all of their income to keep warm at home.** As a result of the high costs, 60% of THAW clients are not heating their home to a healthy or warm level.¹⁸

Fuel poverty on the Outer Isles

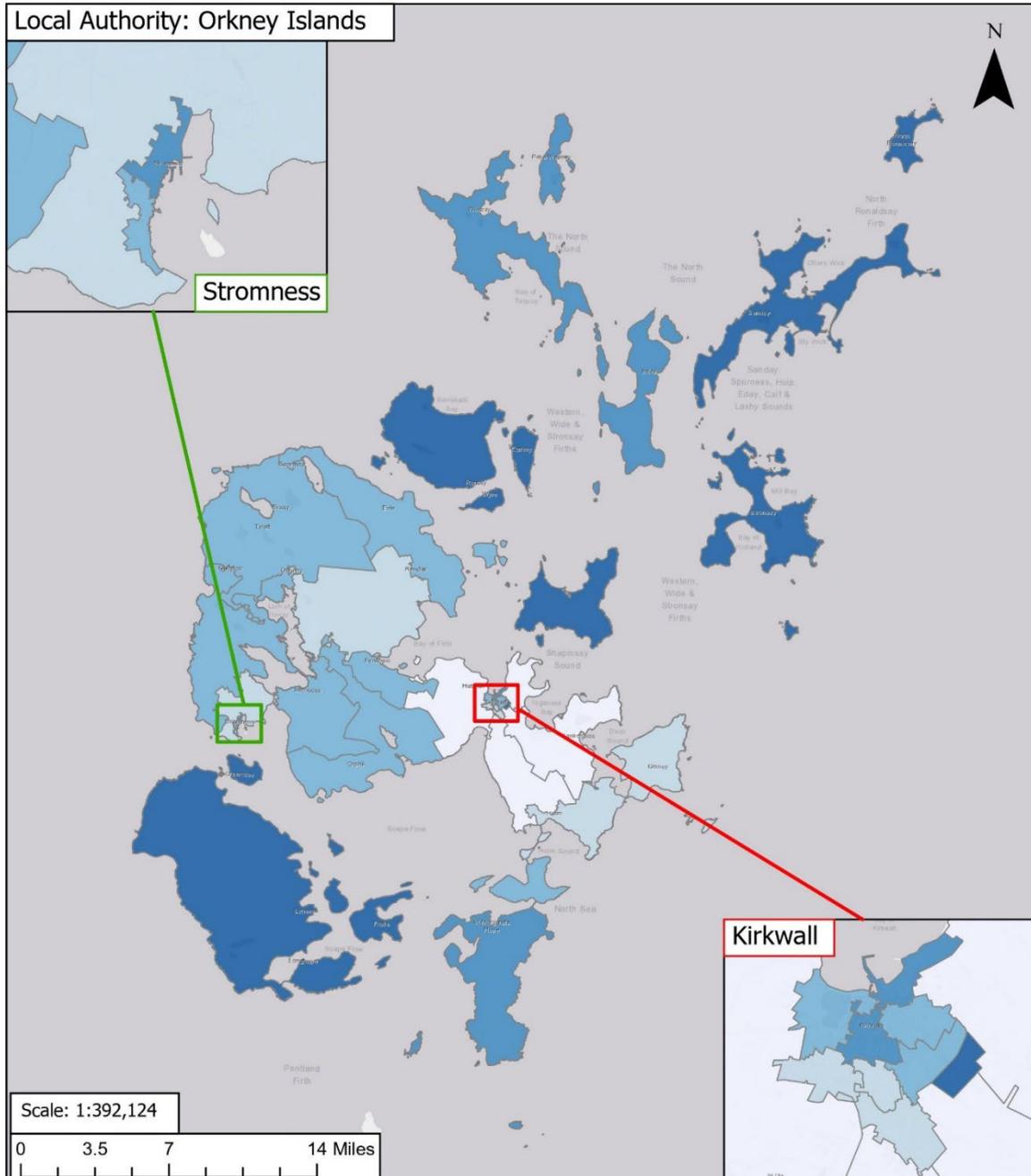
Fuel poverty is not evenly distributed in Orkney. Organisations like Warmworks and THAW that provide support across Orkney, report that **fuel poverty is more extreme on the Outer Isles** than it is on the Mainland. This is because the cost of living is higher, the climate is more exposed, and buildings are less energy efficient.

Changeworks analysed how likely it was that households are in fuel poverty due to inefficient housing across Orkney. This map indicates that energy inefficient housing plays a larger role in fuel poverty in the Outer Isles than the Mainland.

¹⁷ The Warmworks fuel poverty assessment looks at factors like amount spent on energy bills, income, Council Tax band, the building fabric of the home, and more.

¹⁸ THAW (2023) *Annual Review 2023*.

Figure 18: Strategic zoning map showing energy efficiency as a driver of fuel poverty in Orkney Islands.



This map spatially displays results from the Stage 3 analysis at Data Zone Level for the different LHEES Considerations. This map shows the weighted score of the likelihood of fuel poverty as a result of poor energy efficiency from Stage 3 of the LHEES Domestic Baseline Tool.

Fuel poverty risk and EE status both have a 50% weight in this map.

Note: Data zones are a statistical geography that are designed to meet constraints on population thresholds (between 500 and 1,000 household residents), to nest within Intermediate Zones, and to build up from aggregates of Census Output Areas.

Spatial Reference
Name: British National Grid
Changeworks © 2023. Esri UK, Esri, HERE, Garmin, USGS, Esri,

Legend

Fuel Poverty (weighted score, higher scores indicate a higher level of fuel poverty and more uninsulated walls)

- 0 - 28
- 29 - 34
- 35 - 39
- 40 - 46
- 47 - 60

Addressing fuel poverty by improving energy efficiency

The previous section provides an overview of the many causes of fuel poverty in Orkney. Some causes, such as climate and cost of fuel, are out of the control of the Council. However, some are within the responsibility of the Council. **Improving energy efficiency is one of the most straightforward ways to reduce extreme fuel poverty in Orkney.** This section outlines the various schemes and organisations addressing fuel poverty by making peoples' homes more energy efficient.

THAW Orkney

THAW Orkney is a fuel poverty charity in Orkney. It addresses fuel poverty through energy efficiency in two ways: energy efficiency advice and funding retrofit projects.

THAW energy advisors provide bespoke advice to householders about energy efficiency. This advice can help people use heating systems more efficiently, identify small draughtproofing projects to do at home, and more.

THAW have introduced a new type of grant called the Flex Fund. The Flex Fund provides between £250 to £2,000 to households in extreme fuel poverty. The funding can go towards repairing heating or hot water systems or providing additional funding alongside other schemes such as HEES:ABS. Projects are assessed on a case-by-case basis, but all projects support energy efficiency for households in extreme fuel poverty and provide funding in cases where national schemes such as HEES:ABS or Home Energy Scotland grants or loans may not.

HEES:ABS Extreme Fuel Poverty uplift

The Heat and Energy Efficient Scotland: Area Based Scheme, delivered by Warmworks, provides additional grant funding to households who are in extreme fuel poverty, which is assessed on a case-by-case basis by the Warmworks team. This is in addition to the extra HEES:ABS funding provided in Orkney as a rural remote/island area.

In 2022/23, households who received HEES:ABS funding saved an average of £728 on their energy bills annually because of the energy improvements installed.

Warmworks also has a Local Engagement Manager who works with other organisations to increase the number of households outside of the Mainland applying for funding. This is important because areas outside the Mainland, especially the Outer Isles, have higher levels of fuel poverty.

OHAL Energy Advisor

OHAL has a dedicated Energy Advice Officer who provides advice to tenants experiencing fuel poverty and/or need support or advice around their energy. The Energy Advice Officer can offer information specific to the tenant's situation to help them use energy more efficiently.

Priority C: Improving carbon efficiency in council buildings

Summary of Priority C: Improving carbon efficiency in council buildings

The Council has a responsibility to improve the energy efficiency of its operational and leased buildings. However, there is limited data on these buildings. 17% of the Council's operational buildings and 29% of the Council's leased buildings have EPCs. The Council will increase the carbon efficiency of these buildings, which means improving energy efficiency and changing heating systems away from fossil fuels, like oil or LPG.

- **Operational buildings:** There are a number of projects underway to improve the energy efficiency and replace heating systems in operational buildings.
- **Leased buildings:** The Council will collect more data on these buildings and explore ways to help tenants improve energy efficiency and upgrade heating systems.
- **Relevant policies:** Carbon Management Programme (2016-2026), Orkney Sustainable Energy Strategy (2017-2025)

Overview

The Council has a responsibility to improve the carbon efficiency of the buildings that it operates and leases. Measures to improve carbon efficiency include energy efficiency measures and decarbonising heating systems. A number of Council operated and leased buildings will need to replace their fossil fuel-based heating systems to meet the 2045 net zero target. There are also a number of energy efficiency measures that would improve these buildings.

The Council is already working on several projects to improve the carbon efficiency of their operational buildings. The biggest barrier to taking further action in this area is energy and building data. In order to understand and plan carbon efficiency projects, the Council must know more information about the buildings it owns and operates. The Council is interested in developing a tool to track EPC information live.

Operational buildings

The Council owns and operates 271 non-domestic operational sites across Orkney. Operational buildings include schools, council offices, sports centres and more. Only 17% of the Council's operational buildings currently have valid EPCs. The Council is legally bound to do EPCs for the remaining 83% of operational buildings without EPCs.

The 2016-2026 Carbon Management Programme identifies a list of projects on Council-owned operational buildings to improve carbon efficiency. These projects are:

- Hamnavoe house – replacement of existing care home with high efficiency building using zero direct emission Ground Source Heat Pump
- Stromness Swimming Pool, Thermal Upgrade and Heat Pump replacement of Boiler Plant
- Stronsay Junior High School, Thermal Upgrade and Heating Systems Upgrade

- Shapinsay Primary School, Thermal Upgrade and Heating System Upgrade
- Hatston Pier & Ferry Terminal, LED Lighting Upgrade
- South Pier, Stromness LED Lighting Upgrade
- Kirkwall Pier, Marina Breakwater LED Lighting Upgrade
- Papdale Primary School, Thermal Upgrade
- Pickaquoy Centre, LED Lighting
- Stromness Academy, Thermal Upgrade
- Hope Primary School, ASHP replacement of oil boiler plant
- Smiddybrae Care Home – GSHP replacement of oil boiler plant
- St Andrews Primary School – GSHP replacement of oil boiler plant

Further details on the progress of each project can be found in the LHEES Delivery Plan.

For the past 10-15years all major new build project in the county have employed renewable heating systems. With Ground, Air and Sea source heat pumps all being used to make best use of the renewable resources available.

Building fabric is of primary concern when addressing energy efficiency, high levels of insulation are specified for all building elements in our new build programme and where possible u-values will exceeds current building standards requirements. with the maritime climate of Orkney, building are frequently exposed to windy conditions, the Air Tightness of buildings is therefore very important. All new build properties are now tested to ensure air infiltration is low, the use of warm roofs has been adopted in new build projects to ensure continuous insulated envelope both at hand over and in later operational use.

Existing operational buildings have also benefited from building fabric upgrades including external and internal wall insulation, Triple glazing, Underfloor insulation and Air tightness Improvements.

Leased buildings

In addition to operational buildings, the Council also owns and leases 89 buildings in Orkney to other stakeholders. Examples of leased buildings include offices, storage and multi-use spaces including workshop and/or storage. In multi tenanted properties , the Council pay for the utility bills initially which the tenant is then recharged for.

The majority of leased properties are let on a full repairing lease which means the Council has less control over how these buildings are operated compared to operational buildings. Tenants are normally responsible for arranging their own utility contracts. They also have less access to data on the operational performance of these properties

The Council has EPCs for 29% of leased buildings in Orkney. It is a priority for the Council to do EPCs on the remaining leased buildings without EPCs. The Council is also interested in exploring options to improve energy efficiency of leased buildings.

Priority D: Exploring heat networks for Council buildings

Summary of Priority D: Exploring heat networks for Council buildings

The final priority for Orkney Islands Council is exploring heat networks for non-domestic Council buildings. Heat networks can provide reliable and decarbonised heating to buildings. The Council has the opportunity to explore the implementation of these heat networks for its non-domestic buildings due to them possessing large, reliable and long-term demands for heat.

- **Areas of interest:** Central Kirkwall, West Kirkwall, Stromness, and Dounby.
- As buildings in Orkney are not very densely built, **it will be difficult to make a heat network cost effective**. Further analysis is needed to see if any of the potential heat networks will be feasible.
- Each of the potential heat networks has been chosen because there is **at least one building owned by the Council that requires a replacement heating system** of either a heat network, heat pumps, or other electric heating system. A heat network may provide a cost-effective opportunity when comparing with other options.
- There is some **funding available** for heat networks, including the Central Energy Efficiency Fund and the Scottish Public Sector Energy Efficiency Loan Scheme.
- **Relevant policies:** Local Development Plan (2017), Heat Networks (Scotland) Act, upcoming Heat in Buildings Bill

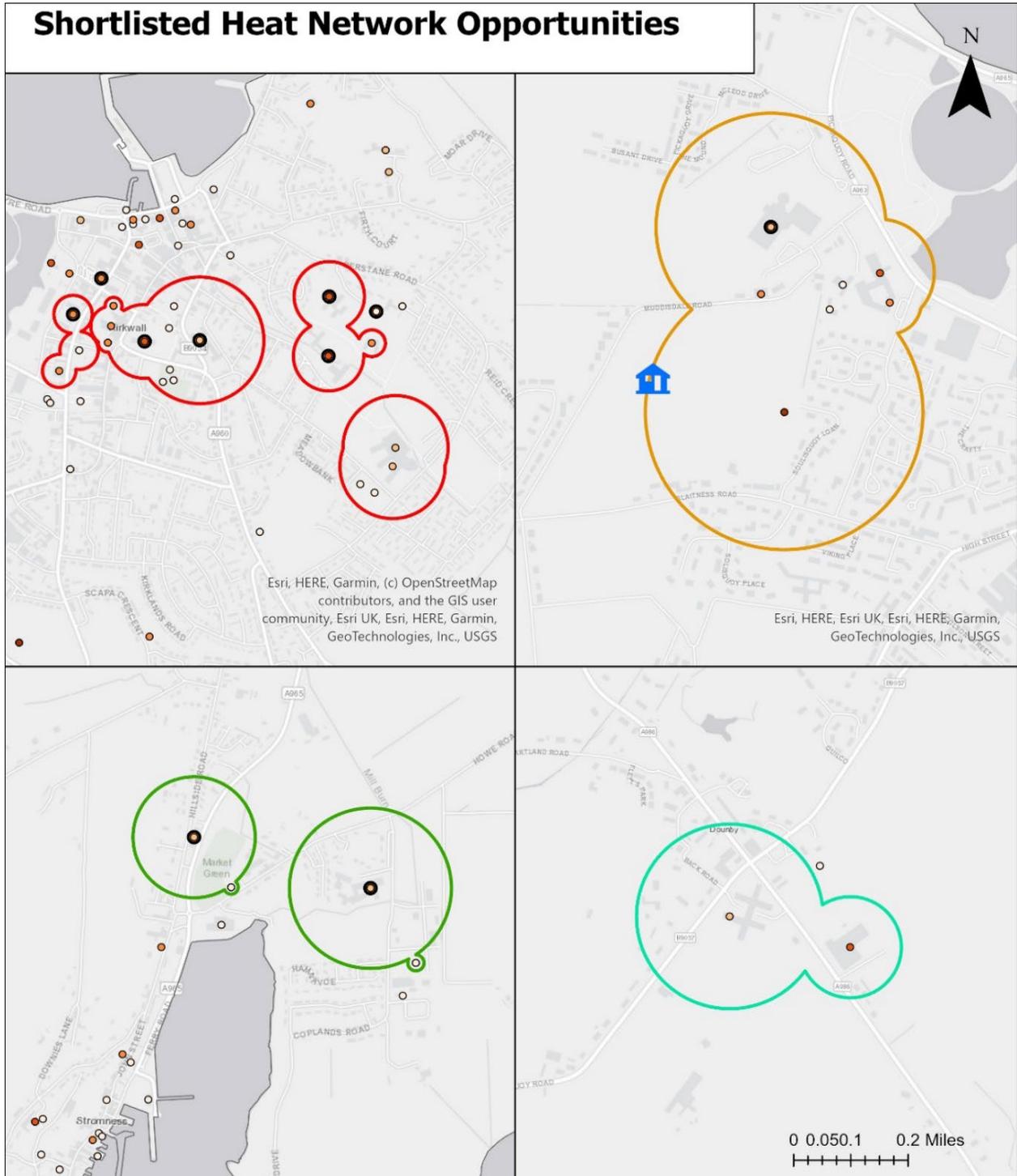
The Council has commissioned feasibility studies for several potential heat networks across Orkney. However, to date none have been identified as feasible or cost effective. This is due to a variety of reasons. The main reason is that heat networks need a large and consistent demand for heating to be feasible, which is difficult to provide from a dispersed building stock. For this reason, the Council is focussing on exploring heat network options for non-domestic buildings owned by the Council.

The Heat in Buildings Bill would require a ban on polluting heating systems in all buildings by 2045. Many non-domestic council buildings would need to transition to zero direct emission heating systems. Heat networks are one kind of permitted system under the bill.

Based on an initial analysis, the Council has identified potential heat networks in central Kirkwall, west Kirkwall, Stromness, and Dounby. The analysis done as part of this Strategy is intended to identify places where further feasibility studies should be conducted.

The map below identifies the four potential heat network zones in Orkney. The Council is investigating whether the individual heat networks can be connected together in each zone. For more information on each of the potential heat networks, see the LHEES Delivery Plan.

Figure 19: Shortlisted potential heat network zones in Orkney



Legend

- OIC New Housing Development
- Central Kirkwall Heat Network
- Stromness Heat Network

- West Kirkwall Heat Network
- Dounby Heat Network

Potential Anchor Loads

- Heatdemand_kWh_UPDATED
- Up to 70 MWh
 - 71 - 170 MWh

- 171 - 350 MWh
- 351 - 750 MWh
- Above 750 MWh
- Oil-fired council-owned buildings

Challenges

Challenges for domestic buildings

Owner occupied properties

In Orkney Islands Council, 72% of properties are owner-occupied. Of these, 24% are in EPC bands A-C, meeting the proposed 2033 requirements for energy efficiency.¹⁹ The remaining 76% will require improvements to the buildings fabric and/or heating system within the next 10 years.²⁰ Given that this deadline is several years away, owner-occupiers may lack motivation to take immediate action. The LHEES is part of the Council's efforts to create clear plans for the necessary changes across the entire building stock.

Private rented sector

In Orkney Islands Council, 14% of properties are privately rented. Almost half (49%), of these are in EPC bands D or below. Under the upcoming Heat in Buildings Bill, privately rented properties will likely be required to meet a minimum energy efficiency standard equivalent to EPC band C by 2028 (replacing the existing requirement of EPC band E by 2025). Funding exists to support landlords to improve the energy efficiency of their properties. However, there is limited funding for heating system upgrades.

There is a 'split incentive' for landlords to upgrade their properties to improve energy efficiency. This means that whilst the private landlord is responsible for paying the cost of energy efficiency upgrades, they do not gain the financial benefits from cheaper energy bills.

Social housing

In Orkney Islands Council, 14% of properties are social housing, with half of these being owned by the Council. As outlined in previous sections, a new energy efficiency standard is being developed for social housing. This will require Orkney Islands Council's and OHAL's social housing properties to undergo significant energy efficiency improvements. Social landlords will need assurance of long-term and adequate funding to fund projects and avoid rent increases, which would worsen fuel poverty.

Mixed tenure

In Orkney Islands Council, 4% of properties are in mixed tenure buildings. While this is a relatively small proportion, they present a challenge when it comes to retrofit and heat decarbonisation.

Mixed-tenure buildings are often slow to renovate because, for some measures such as external wall insulation, all occupants in the building must agree to the installation and pay towards funding the project. If one occupant does not have the funding available or does not agree to proceed with the project, there is a risk that the project will not go ahead.

¹⁹ [Delivering net zero for Scotland's buildings - Heat in Buildings Bill: consultation](#)

²⁰ This depends on how the targets will be measured. Future measurements (as described in Scottish EPC reform consultation) may set more ambitious targets specific to the fabric efficiency.

Exposed climate

Orkney is made up entirely of islands, leaving many of the households in the region located near the coastline at risk of exposure to the extreme weather. Over time this degradation can force homes into disrepair, most notably through leaky roofs and damp walls. Disrepair makes homes hard to heat and hard to treat/retrofit, because retrofit work can only begin following these often-costly repairs. THAW highlights the deterioration of housing due to weather as being one of the biggest barriers to retrofitting in Orkney. THAW has grants to fund repair works before retrofit projects, but funding is limited.

Geography

Orkney's population is sparse as it is spread across 20 permanently inhabited islands,²¹ meaning 66.5% of the population live in areas classified as remote rural.²² This results in just 22 people per km², which is significantly lower than the Scottish average of 70 per km².²³ This low density and rural setting can result in households becoming isolated and having far higher rates of heat loss compared to those in urban environments, which benefit from the shared warmth of neighbours in terraced housing or a block of flats. This exposed climate and high level of heat loss can leave Orkney residents requiring far longer periods of heating, at a far higher price, compared to the rest of Scotland. This extended heating season caused by the weather and geography illustrates why many Orkney householders are susceptible to the rural dimensions of fuel poverty, identified by the Scottish Rural Fuel Poverty Task Force in 2016.²⁴

High upfront capital costs

To reduce energy demand, many properties in Orkney require significant improvements to the building fabric to overcome the consequences of the region's geography and exposure to the climate. Additionally, a lot of homes needing similar improvements are not located near each other. The combined effect of travelling between islands and having a poor economy of scale means retrofit costs are often much higher for Orkney householders compared to the rest of Scotland. For more expensive measures, like external wall insulation, this can come with very high upfront costs and long-payback periods. This can pose a barrier for privately owned homes (owner-occupiers and private renters), if the owners do not have the funds to invest in energy efficiency improvements upfront.

Building archetypes and bespoke properties

Orkney has a high percentage of unique/custom-built building archetypes and extensions compared to other local authorities. Retrofitting custom-built properties can be challenging because each building is unique, and each home may have uncommon or varying wall and floor types.

²¹ Orkney Islands – Scotland.org ([Orkney Islands | Scotland.org](https://www.gov.scot/publications/scottish-government-urban-rural-classification-2020/pages/5/))

²² Scottish Government Urban Rural Classification (<https://www.gov.scot/publications/scottish-government-urban-rural-classification-2020/pages/5/>)

²³ Orkney Islands Key Statistics (<https://www.hie.co.uk/media/6343/orkneypluskeyplusstatisticsplus2019.pdf>)

²⁴ Delivering affordable warmth in rural Scotland: Action Plan ([Delivering affordable warmth in rural Scotland: action plan - gov.scot](https://www.gov.scot/publications/delivering-affordable-warmth-in-rural-scotland-action-plan-2019/pages/1/) (www.gov.scot))

Requiring an individual, bespoke solution for each home makes it challenging to hire contractors for multiple buildings at once. Any work on bespoke properties will be more expensive than large-scale retrofitting of similar homes at once.

Cost of professional surveying

Due to the diverse range of archetypes across the region, it is essential that every house in Orkney being retrofitted receives an assessment. This is so that the correct measures and retrofit design are undertaken, based on the building's data. This assessment can be costly and can be a barrier for many householders beginning their journey to improve their home's energy efficiency, especially when there is little funding available for assessments.

Councils often overcome this issue in high density, urban areas by extrapolating the data of common archetypes so a reasonably accurate picture of retrofit work needed. However, this will not be possible in Orkney because of its diverse archetypes and low-density areas. Any estimation of property data will be inaccurate, so individual assessments are necessary before starting retrofit work.

Piecemeal funding

It can be difficult for the Council, OHAL, and other stakeholders to commit to large-scale retrofit projects because of the varied archetypes in the building stock and low density of buildings. As a result, the Council must instead apply for smaller scale projects which takes their diverse building stock and geography into account. However, this piecemeal funding structure can be very challenging and time consuming. It increases the overall cost of retrofit and uses up more of the Council's own resources through repeated tendering processes.

Funding restrictions

Most of the funding for energy efficiency and heat decarbonisation work in Orkney is provided by Scottish or UK Government. Due to this, the requirements for funding are often designed for the entire country rather than tailored to the needs of Orkney specifically. Warmworks and the Council work with funders to approve exceptions for Orkney. However, there are limits.

For example, national funding schemes do not offer as many grants for air-to-air heat pumps. In most of Scotland, these types of heat pumps are not necessarily the best choice because most households are switching from a wet system/gas boiler. In Orkney, many homes could benefit from an air-to-air heat pump as they are sometimes cheaper to install. However, there is limited grant funding available for these types of heat pumps.

Grid constraints

Switching all buildings to electricity from oil and LPG will put additional pressure on the electricity grid. The grid will need to be reinforced to enable large scale heat decarbonisation. This will need to be managed through engagement with the distribution network operator to ensure that LHEES delivery will be aligned with grid investment planning.

Skills gap

Apprenticeships can be a helpful tool to train more installers and increase the size of the decarbonisation workforce. However, opportunities are few because the cost to employers is so high. This is especially the case for rural areas, such as Orkney, where upskilling opportunities are limited.

Local supply chain

There are major shortfalls facing the retrofit and decarbonisation industry in trades such as plumbers, plasterers, electricians, HVAC (Heating, Ventilation, and Air Conditioning) specialists, surveyors and Retrofit Coordinators.²⁵ Investment is needed to encourage existing contractors to upskill, obtain necessary accreditations and train young workers to enter the retrofit and decarbonisation workforce.

Warmworks is currently working with installers to support the delivery of HEES:ABS. For example, Warmworks supports new electrical contractors with their accreditations so the local supply chain can deliver heat pumps for HEES:ABS.

The Just Transition Commission has stated that the market will not drive the change required, and systemic change must be driven by legislation and regulation from the Scottish Government.²⁶ Similarly, reforming public procurement mechanisms can create demand and support growth of local workforces. The Scottish Government has committed to a £100m Green Jobs Fund between 2021 and 2026, which will be used to support the development of sustainable and low-carbon products and services.

Challenges for non-domestic buildings

Poor data accuracy

More accurate fuel poverty data and updated EPC data is essential to making correct models in LHEES. In areas where updated information is difficult to retrieve, this can prevent effective delivery. Council-owned, non-domestic operational buildings are largely up-to-date. However, there is limited data on Council-owned buildings that have been leased out externally long-term. This is because EPCs are required when new leases are signed, but the leases are over long periods so many buildings do not have recent EPCs. This limits how much the Council can plan improvements, because it does not have an accurate picture of its leased buildings.

Data for non-domestic properties not owned by the council is difficult to obtain, the EPC register has very few entries due to the low turnover of properties. The Building Assessment Reports required to be completed as part of the heat networks assessment, may provide useful information in the absence of an EPC and efforts will be made to assist in the production of BAR's

²⁵ ClimateXChange (2022) [Clean Heat and Energy Efficiency Workforce Assessment](#)

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

Funding avenues

Most of the funding streams available are focused on domestic rather than non-domestic properties, due to the greater impact this will have on alleviating fuel poverty and reducing carbon emissions across the region. This will make it difficult to find funding options that are focused on improving the energy efficiency of Orkney Islands Council's non-domestic buildings.

Barriers to developing heat networks

Low heat density in Orkney

Orkney has a low population density, and buildings are generally dispersed. There are a small number of non-domestic council buildings with heat demand high enough to warrant the exploration of a heat network.

High use of Heat Pumps by commercial properties for heating

Housing tends to be electrically heated, moving to HN would require Wet Heating System to be installed

Anchor loads tend to be some distance from one another, again heat density.

Major non council loads already on Low Carbon heating (Balfour Hospital, Highland Park Distillery)

Opportunities for Orkney Islands Council

Decarbonising heat and improving energy efficiency provide a range of economic and development opportunities for communities, the Council, businesses, charities and individuals in Orkney.

Domestic retrofit opportunities

Supply chain development

The LHEES Delivery Plan will outline the substantial pipeline of work required to achieve the net zero targets in Orkney. A clear pipeline will help to improve the local availability of 'green skills' in Orkney, by encouraging the existing labour force to invest in upskilling young talent and provide them with opportunities. Warmworks is already working with installers to train and hire more labourers and plasterers to install more external wall insulation for the Area Based Scheme.

There is a shortage of electricians in Orkney which limits the number of heat pumps that can be installed. Warmworks has already supported contractors to complete their accreditations, and is working to boost the number of electricians in the region. This will ensure that the skills and capacity are in place to add heat pumps onto the list of HEES:ABS measures available to householders.

Addressing disrepair

Identifying house disrepair is one of the main barriers to undergoing retrofit works, either because of the exposure or old archetypes. THAW has developed the Flex Fund grant which offers between £250 to £2000 for households in extreme fuel poverty. The grant can go towards small-scale repairs, such as fixing leaky roofs or replacing outdated septic tanks, as well as clearing out homes. This support helps remove barriers for householders, particularly those who are vulnerable or live alone, by ensuring necessary work can be completed. The Flex Fund is unique because it provides funding for projects required to prepare a home for retrofit. It allows households to get additional grant funding, for instance from HEES:ABS, for larger projects.

Retrofit assessment upskilling

THAW is looking to train staff in a retrofit assessment qualification to offer detailed home assessments. This will enable THAW to carry out insulation repairs in the future, as a cost-effective way for householders to improve their energy efficiency. The development of THAW's home assessments could make retrofitting more accessible and enable widespread home assessments across the region.

This increase in accurate housing data could open the possibility of moving away from this piecemeal approach and instead to grouping similar archetypes and measures together more accurately. This would be crucial to enabling a greater economy of scale and reducing the cost of implementing energy efficiency measures across Orkney.

Area Based Scheme

The Area Based Scheme has been effective at improving energy efficiency and fuel poverty rates in Orkney. The scheme has grown from providing £800,000 worth of retrofit projects in 2015/16 to £1.7 million in 2022/23. HEES:ABS is one of the key drivers of

improving energy efficiency in private tenure properties across Orkney and this is expected to grow in the coming years. The scheme is led by the Council, with Warmworks as the managing agent.

16% of owner-occupiers and 13% of private tenants currently live in homes with an EPC band F or worse, which indicates very poor energy efficiency. In order to meet the challenge, the Council aims to increase their HEES:ABS funding to £4 million by 2026, pending Scottish Government approval, as detailed in the Local Housing Strategy. Expanding this funding provides many opportunities to help tackle this large proportion of private tenure households with poor energy efficiency, particularly those in more isolated areas who have previously been unable to get retrofit work done.

The 2024/25, HEES:ABS has broadened its measures to include high heat retention storage heaters and loft top-up insulation. Cavity wall insulation being considered (not currently offered) to provide an avenue for building archetypes that are unsuitable for external wall insulation, but could still benefit from fabric efficiency measures. Adding additional funding may make it possible to add more types of energy efficiency measures in the future.

A Local Engagement Manager has recently been hired to promote the scheme to smaller island communities, which often struggle to access services due to isolation. These communities are particularly vulnerable to extreme fuel poverty because of poorer housing stock and ongoing exposure to harsh weather conditions. Further growth of HEES:ABS could see more remote communities being targeted for larger-scale retrofitting projects. Householders in these communities would almost certainly be eligible for the extreme fuel poverty uplift, which grants additional funding towards the measures.

Stakeholder collaboration

Fuel poverty stakeholder collaboration

Fuel poverty is a pervasive challenge across all of Orkney, and many organisations across the area collaborate to support householders. Examples of collaboration include the Cost of Living Task Force, the Orkney Money Matters project and the Fuel Poverty Task Force.

One outcome of collaboration is a strong referral system between fuel poverty organisations, including the Council, Warmworks, and THAW. The network enables those suffering from fuel poverty to be referred to Warmworks, to access funding for energy efficiency measures. It also directs people to THAW, which offers energy efficiency advice and access to other grants and funds. This network has proven highly effective, demonstrating the success that continued collaboration among stakeholders can achieve in addressing Orkney Islands Council's LHEES priorities.

Next steps

Summary of context

Orkney Islands Council's LHEES sets out how to improve energy efficiency of domestic and non-domestic buildings, address fuel poverty through energy efficiency, and explore heat network options. This Strategy informs, and should be read alongside, the LHEES Delivery Plan.

The Strategy will support the Council and its community planning partners to scale-up and align existing programmes, and to increase the scale and pace of retrofit and heat network development, that is needed to meet the national target of net zero by 2045.

Overall, the content of Orkney Islands Council's LHEES has been informed primarily through a data-driven approach and by working with close partners of the Council. The Strategy outlines a number of challenges which need to be overcome in order to decarbonise Orkney Islands Council's buildings. It also highlights opportunities, including four potential heat networks.

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

Summary of priorities and actions

Orkney Islands Council identified the following priorities for heat and energy efficiency:

- Making Orkney's homes energy efficient
- Alleviating fuel poverty
- Improving carbon efficiency in Council buildings
- Exploring heat networks for Council buildings

LHEES Delivery Plan

The Council's LHEES Delivery Plan identifies tangible and specific actions in the next five years to achieve the four priorities set out in this Strategy. The actions are organised by tiers:

- Tier 1: actions that are immediate and/or already in progress
- Tier 2: actions to take in the next 1-2 years
- Tier 3: actions to take in the next 3-5 years

This document and the Delivery Plan will be reviewed regularly.

Glossary

Defining terms

Terms	Description
Baselining	Baselining is the purpose of understanding at local authority or strategic level, the current status of the buildings against the Priorities, Targets and Indicators set out in the Baseline tool.
Building-level Pathway	As part of LHEES Stage 5, a building-level pathway is the outcome of the assessment undertaken using PEAT. It provides the likely energy efficiency retrofit technologies, as well as the low carbon heating system (where applicable) to support building level decarbonisation.
Criteria	Criteria are the settings applied to the Indicators for each Priority in order to support Baselining, Strategic Zoning and the identification of Delivery Areas. An example of Criteria is a simple “no” applied to the indicator of “wall insulation (Y/N)” to identify properties with uninsulated walls. Another example is the definition of an “anchor load” within the Heat Networks analysis, which applies a minimum threshold to the “heat demand” Indicator. The LHEES methodology provides a set of default Criteria that local authorities may wish to use, with flexibility to update and augment these to support local needs or for more focused analysis linked to specific actions and project identification within the Delivery Plan.
Data - Alternative	Alternative data can overwrite the Core data to improve accuracy (national to local level of detail, e.g. local housing data to overwrite fields in Home Analytics).
Data - Core	Core data is the data that is essential to complete the minimum requirements of the LHEES analysis. Core data will come from national datasets e.g. Home Analytics or the Scotland Heat Map.
Data - Supplementary	Supplementary data allows inclusion of additional Indicators to inform specific, local priorities & targets; also, Supplementary data can be used in GIS investigation to complement the Core analysis carried out in any assessment. An example of Supplementary data would be the inclusion of low carbon heat supply information layers within a district heating analysis.
Data Zone	Data zones are groups output areas which have populations of around 500 to 1,000 residents.
Delivery Area	Delivery Areas (sometimes referred to as Delivery Level Areas) are a term used for all LHEES Priorities with the exception of Heat Networks. These Areas will be an

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

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

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

	<p>against a Target and/or progress towards a Priority. If multiple Indicators are used in strategic zoning or the identification of delivery areas, a Weighting can be applied based on the importance of each. The LHEES methodology sets out a core set of default Weightings for instances where multiple Indicators are suggested as a default setting. There is flexibility to update and augment these to support local needs or for more focused analysis linked to specific actions and project identification within the Delivery Plan.</p>
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Appendix

Acronyms and abbreviations

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

Appendix A: Additional national policy drivers

	Name	Description	Targets/aims
Climate Change	Climate Change (Emissions Reduction Targets) (Scotland) Act 2019	Targets to reduce Scotland's emissions of all GHGs to net-zero.	2045: Net zero GHG emissions 2020: 56%
	Update to the Climate Change Plan 2018–2032	Sets out a pathway to deliver Scotland's climate change targets, including ambitions for Scotland's buildings.	Multiple targets, including: 2030: At least 50% of building heated using zero emission systems
Housing	Heat in Buildings Strategy 2021	Sets out a pathway to reduce emissions from buildings and to remove poor energy performance as a driver for fuel poverty.	By 2030, majority of buildings should achieve EPC band C, and 1 million homes use zero emission heating
	Heat in Buildings Bill (currently at consultation stage)	Proposed new laws around minimum energy efficiency standards and prohibiting direct emissions heating systems.	Minimum energy efficiency standards to be met by: 2028 for Private landlords 2033 for owner-occupiers
	Social Housing Net Zero Standard	Proposed new energy efficiency standard that replaces EESSH2. Sets a minimum fabric efficiency rating for each home rented by social landlords. Under consultation.	2033: Fabric energy efficiency rating 2045: Clean heating in all socially rented homes
	Housing to 2040	Sets out the vision and route map for housing in Scotland to 2040.	Existing homes are adapted and retrofitted to improve their energy efficiency and decarbonise their heating
Energy	Heat Networks (Scotland) Act 2021	Requires local authorities to review whether one or more heat network in the local authority is suitable for construction.	Achieve a combined supply of thermal energy by heat networks of: 2030: 6 TWh

			2027: 2.6 TWh
	Heat Networks Delivery Plan	Sets out how provisions of the Heat Networks (Scotland) Act 2021 will contribute to increasing heat networks in Scotland.	The targets set out in the Heat Networks (Scotland) Act 2021.
Fuel Poverty	Fuel Poverty (Scotland) Act 2019	Defines fuel poverty and requires the creation of strategies to tackle fuel poverty.	2040: < 5% of households in fuel poverty, < 1% in extreme fuel poverty.
	National Planning Framework 4	Sets out Scotland's spatial principles, regional priorities, national developments, and national planning policy.	Multiple

Appendix B: Datasets used in the development of this LHEES

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

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

Appendix C: Datasets and Limitations of the LHEES approach

Home Analytics

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

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

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

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

Currently, fuel poverty data is calculated by the following:

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

Non-domestic Analytics

Non-domestic Analytics is a new data set developed by Energy Saving Trust on behalf of Scottish Government, to provide more property-level details about the non-domestic building stock in Scotland. The dataset brings together property details from a variety of data sources such as the Scottish EPC Register, Ordnance Survey, Scottish Assessors and

BEIS, to establish property attributes and energy profiles for each non-domestic building. Like Home Analytics, gaps in these records are imputed using a series of statistical models. The final database is therefore a combination of known and modelled records.

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

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

Scotland Heat Map (2020)

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

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

PEAT-OR tool

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

However, there are the following limitations:

- Individual measures cannot be isolated or removed, the tool will show all possible interventions. This means some impractical measures are proposed such as installing wind turbines
- Costs and Carbon savings are calculated for all possible measures, this means it is not possible to investigate the impact of individual measures
- Fuel cost data used within PEAT-OR was released at the start of July 2023, with fuel costs modifying frequently these costs are not totally accurate

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

Ordnance Survey

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

One Scotland Gazetteer

Central database for all addresses within an authority. Key to GIS elements of LHEES for identifying multi-tenure non-domestic properties.

Appendix D: LHEES stage descriptions

Stage 1: Policy and strategy review

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

Stage 2: Data and tools library

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

Stage 3: Strategic zoning and pathways

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

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

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

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

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

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

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

Stage 4: Generation of initial Delivery Areas

Stage 4 is informed by the LHEES Strategy and analysis from Stages 1-3. The purpose of Stage 4 is to support the Council’s decision making by generating initial Delivery Areas for each of the LHEES Considerations. This Stage uses GIS to generate initial Delivery Areas at a higher granularity than LHEES Stage 3, to enable the Council to understand specific locations of potential Delivery Areas within a Strategic Zone or across the whole local authority. The level of granularity is advised at 250m² to reflect an appropriately sized delivery area without the risk of identifying individual properties.

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

Stage 5: Building-level pathway assessment

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

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

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

Stage 6: Finalisation of Delivery Areas

During this stage, Strategic Zones, initial Delivery Areas and any building-level assessment were considered alongside the detail included as part of the policy and strategy review and

all stakeholder engagement undertaken. The outcomes from this stage are documented in the Stage 8 Delivery Plan.

Appendix E: Deviations from standard LHEES methodology

LHEES Consideration	Standard methodology	Deviation from standard LHEES method
Off-Gas Grid Buildings	<p>Categories 0, 1, 2 and 3 properties determined according to the following factors:</p> <ul style="list-style-type: none"> Unlisted property Not in a conservation area Wall insulation Double/triple glazed windows Wet system replacement (except electric and no heating/hot water systems) Loft insulation prediction (99mm +) 	<p>Only wall insulation is considered in determining Category 1 properties for all heating types (boilers, room heaters, storage heaters, no heating/hot water systems).</p> <p>Additionally identified solar PV suitability for category 1 properties.</p>
On-Gas Grid Buildings	<p>Categories 0, 1, 2 and 3 properties determined according to the following factors:</p> <ul style="list-style-type: none"> Unlisted property Not in a conservation area Wall insulation Double/triple glazed windows Wet system replacement (except electric and no heating/hot water systems) Loft insulation prediction (99mm +) 	<p>Only wall insulation is considered in determining Category 1 properties for all heating types (boilers, room heaters, storage heaters, no heating/hot water systems).</p> <p>Additionally identified solar PV suitability for Category 1 properties.</p>
Poor Building Energy Efficiency	<p>Energy efficiency score is determined by wall insulation status, loft insulation status and double glazing.</p>	<p>As most programmes and projects are wall insulation focused, the weighted Energy Efficiency map only includes wall insulation potential, not glazing and loft.</p>
Poor Building Energy Efficiency and Fuel Poverty	<p>Energy efficiency and Fuel Poverty score is determined by wall insulation status, loft insulation status and double glazing and Fuel Poverty.</p>	<p>As most programmes and projects are wall insulation focused, the weighted Energy Efficiency and Fuel Poverty map only includes wall insulation potential, not glazing and loft.</p>

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

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

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

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

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

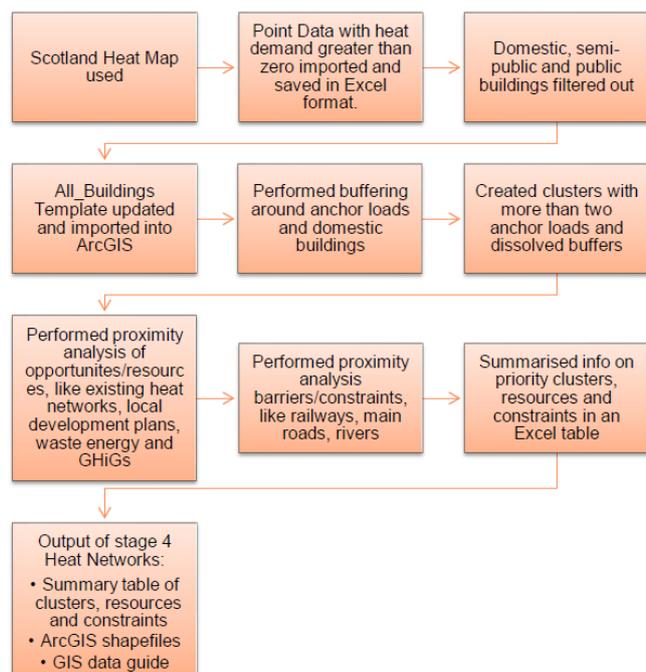


Figure 20: Summary of Scottish Government heat network methodology for LHEES