

Appendix 3 - Analysis

1. Overview of Shetland's buildings

This section provides an overview of the building stock in Shetland. 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 Shetland has been used to benchmark key property statistics against overall national statistics found in the Scottish House Condition Survey, 2021.¹

1.1. Domestic buildings

Property age and construction type for domestic buildings

There are a range of different construction types, property types and ages in Shetland. Most of Shetland's properties are detached or semi-detached houses which are generally more expensive to retrofit per property due to the larger wall areas and the different methods of install. This is in addition to the already higher costs of project delivery in a remote island area.

Timber frame is the most common type of home construction in Shetland (figure 1) and the methodology indicates that approximately half of all uninsulated buildings are timber frame. This suggests a potential opportunity to plan retrofits with multiple, similar properties in mind, however, even within the same construction type, there are differences meaning a common specification cannot be applied.

In Scotland, timber frame construction superseded cavity wall construction as the primary method of housebuilding in the early 1980s.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.

¹ Scottish Government (2021) [Scottish House Condition Survey: 2021 Key Findings](#)

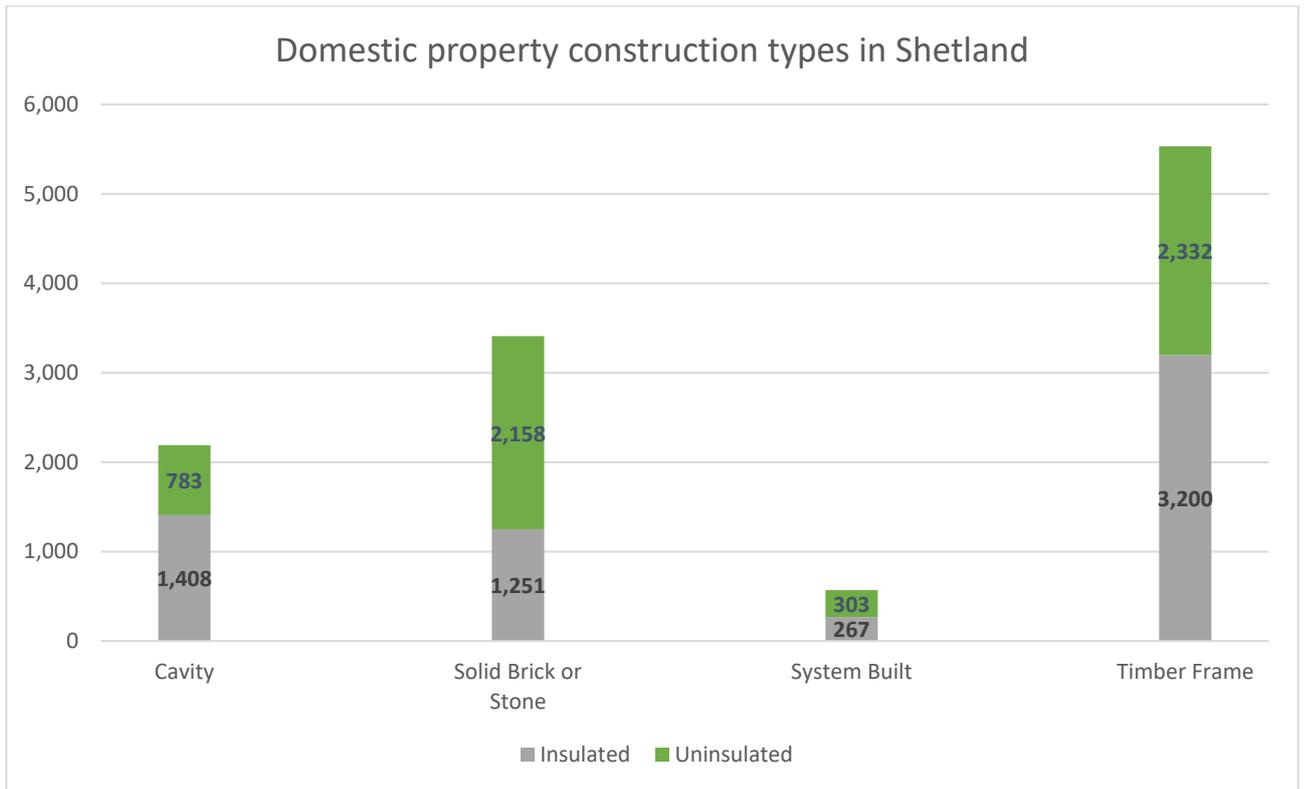


Figure 1: The four domestic property construction types in Shetland

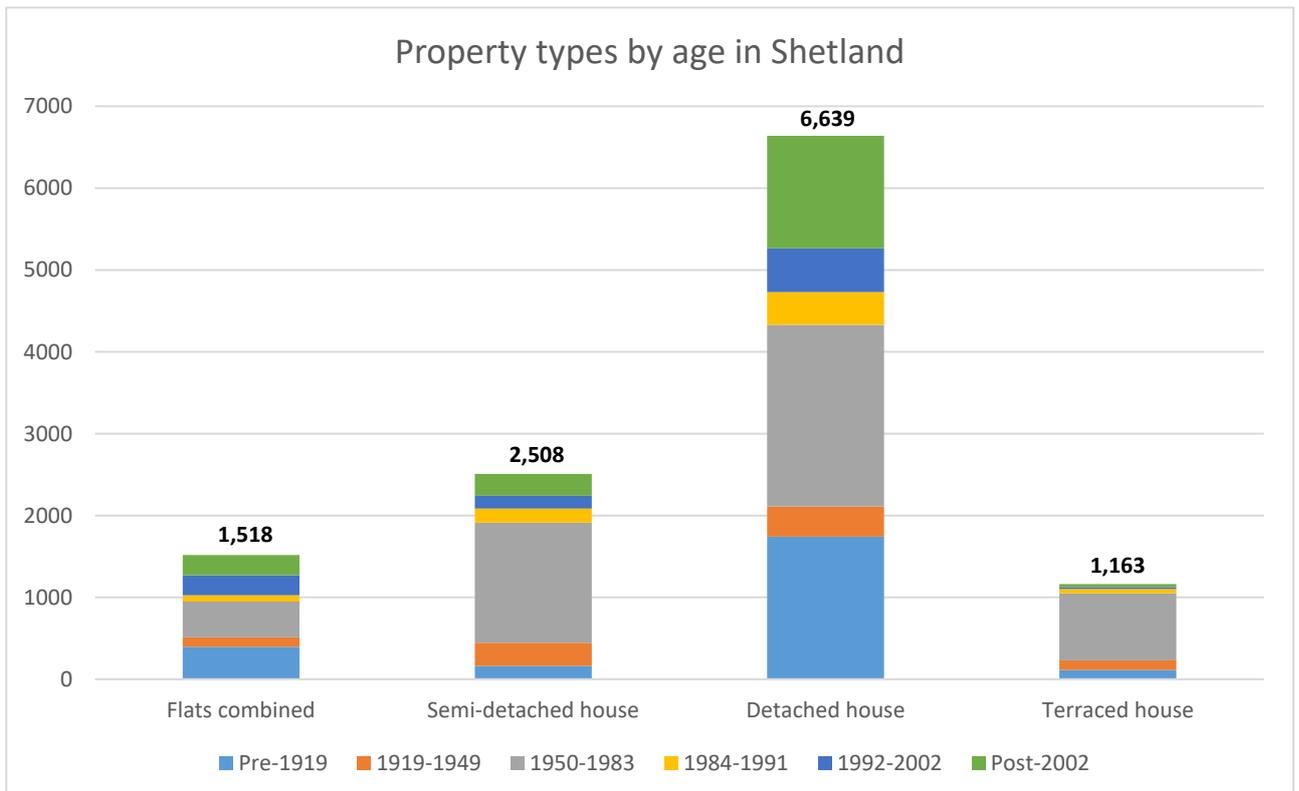


Figure 2: Property types by age in Shetland

Properties built before 1919 are likely to be of a solid wall construction (brick or stone), with timber floor and roof. Stone buildings are likely to have a high conservation value

and might be listed or within conservation areas. 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.

Within Shetland only around 7% of domestic properties are located within conservation areas, and less than 3% of buildings are listed (Figure 3).

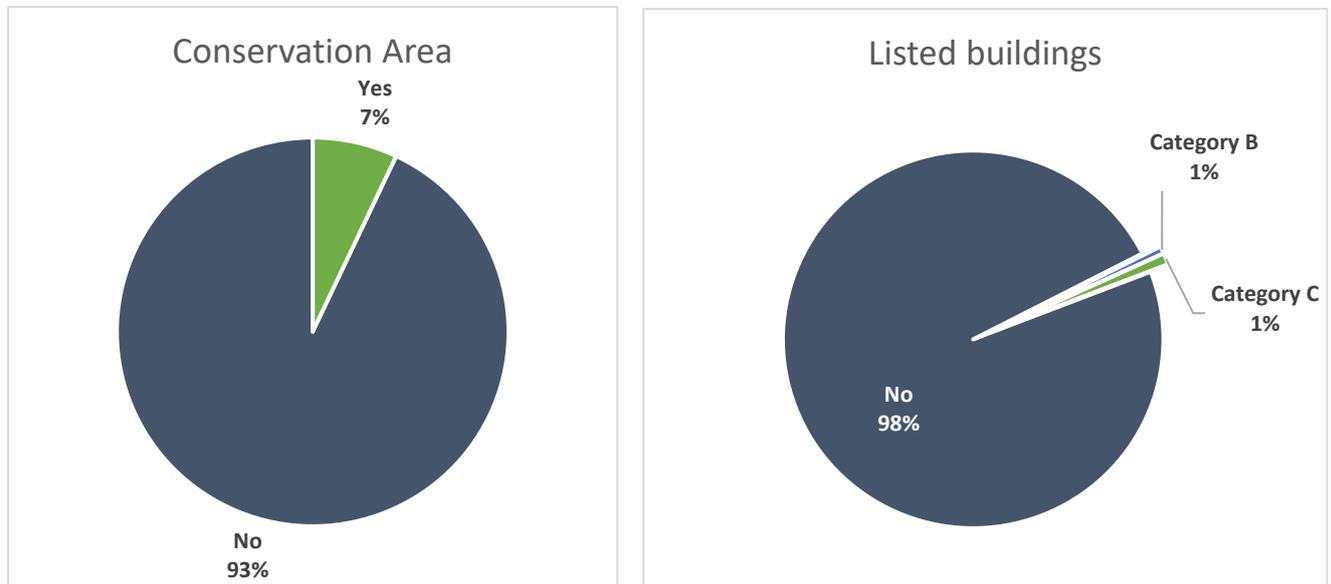


Figure 3: Conservation Areas and Listed Buildings

Cavity wall construction became more commonplace from the 1920s onwards and is still used today. Like traditional construction, cavity wall construction commonly uses timber for floor and roof. Walls are constructed with an inner and an outer leaf, and 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 properties (post-1980) are likely to have partially filled cavities.

System-built usually refers to post-war non-traditional construction housing that is not cavity wall constructed. It is generally found in mass social house building programmes of the period. Such housing is normally utilitarian in design with low conservation value. This is advantageous regarding potential external wall insulation interventions. However, these properties have a range of unique designs that make standardised retrofit interventions challenging.

Tenure of domestic buildings

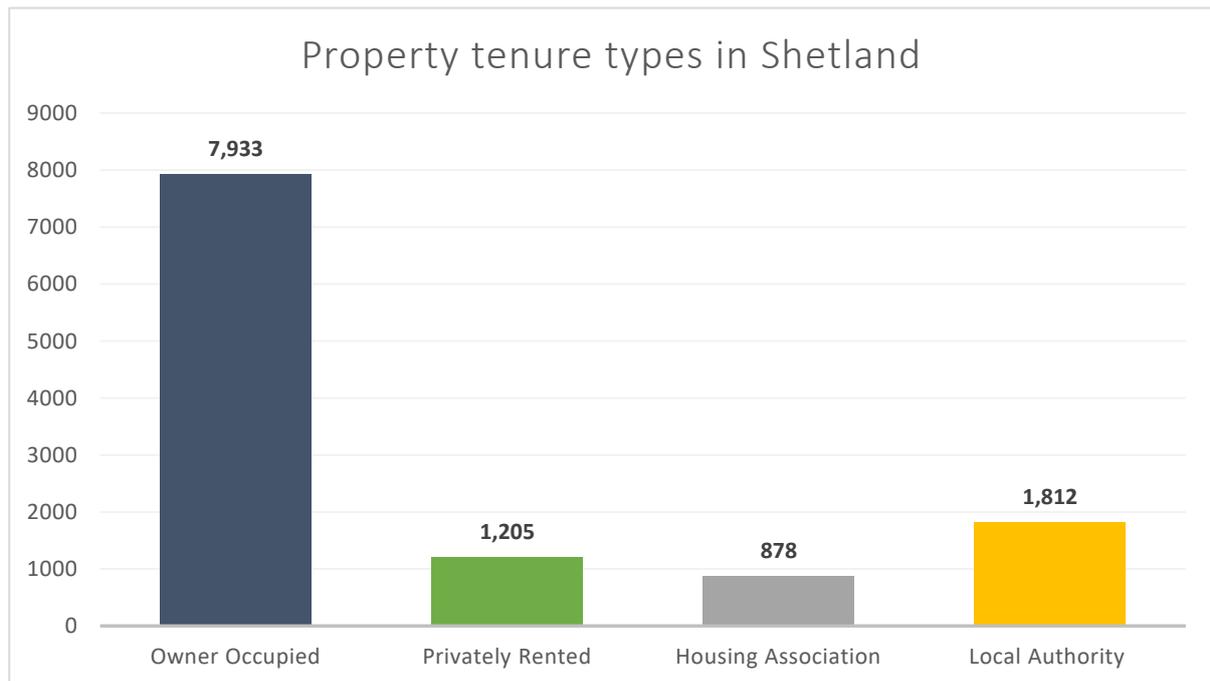


Figure 4: Property tenure types in Shetland

Approximately a quarter of the domestic properties in Shetland are social housing. For Council housing there has been very little direct government funding for any energy efficiency works or retrofit. Early ECO funding was open to applications from installers not by landlords. There is therefore a funding gap. Energy efficiency improvements are currently funded through rental income. This means social housing providers need to find a balance to ensure that the levels of investment in the housing stock does not impact negatively on the affordability of the rents charged.

The majority of properties (77%) are owner occupied or private rented.

Mixed tenure buildings provide an additional retrofit challenge due to multiple owners within the same property. As Figure 5 shows, only 4% of properties in Shetland are in mixed tenure buildings. This can delay or reduce the extent of retrofit projects due to different priorities or capital investment plans for the property owners.

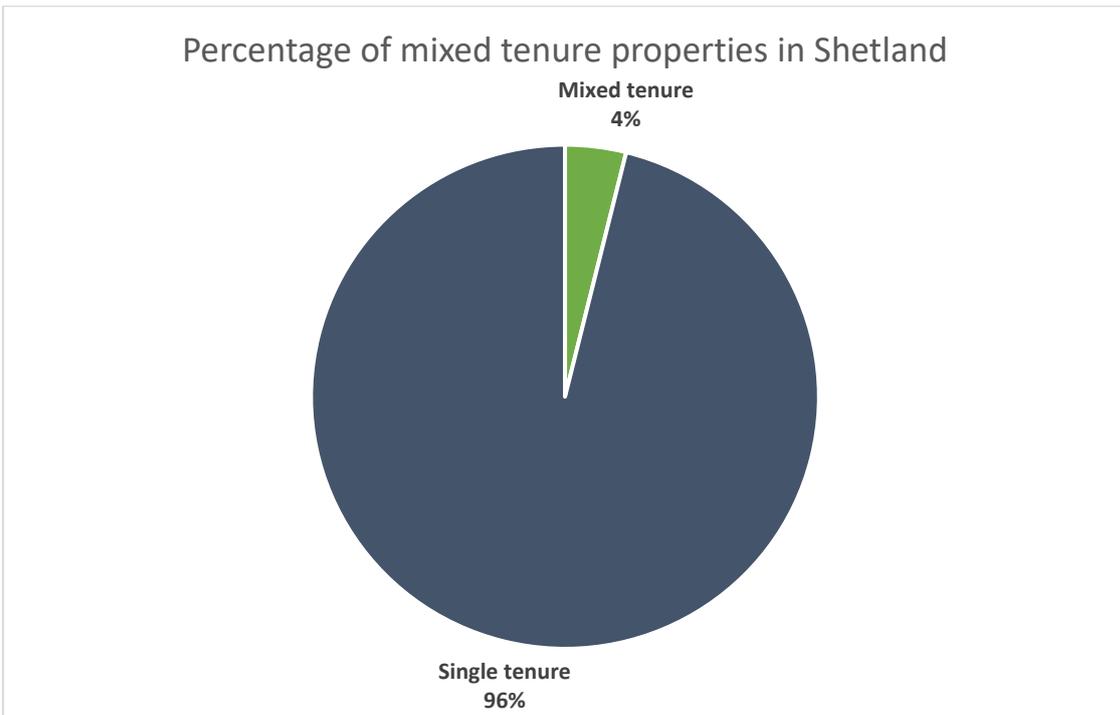


Figure 5: Percentage of mixed tenure properties in Shetland

Primary fuel and heating systems for domestic buildings

A household's primary fuel type is the fuel they rely on for the majority of their heating. Shetland's primary fuel type breakdown is very different from the Scottish average because there is no mains gas grid.

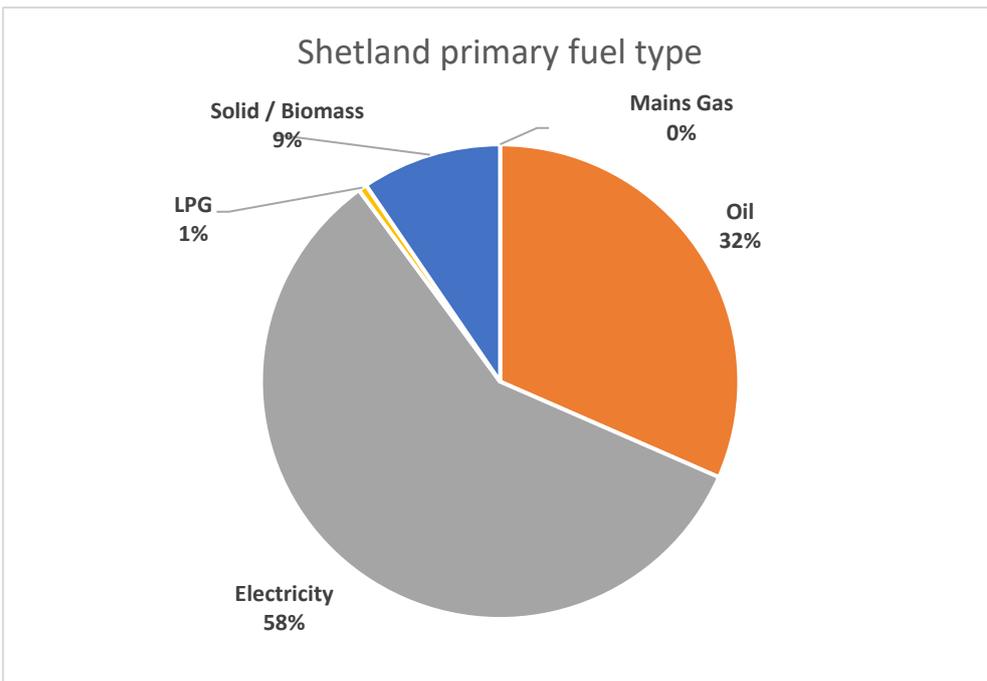


Figure 6: Primary fuel type breakdown for Shetland

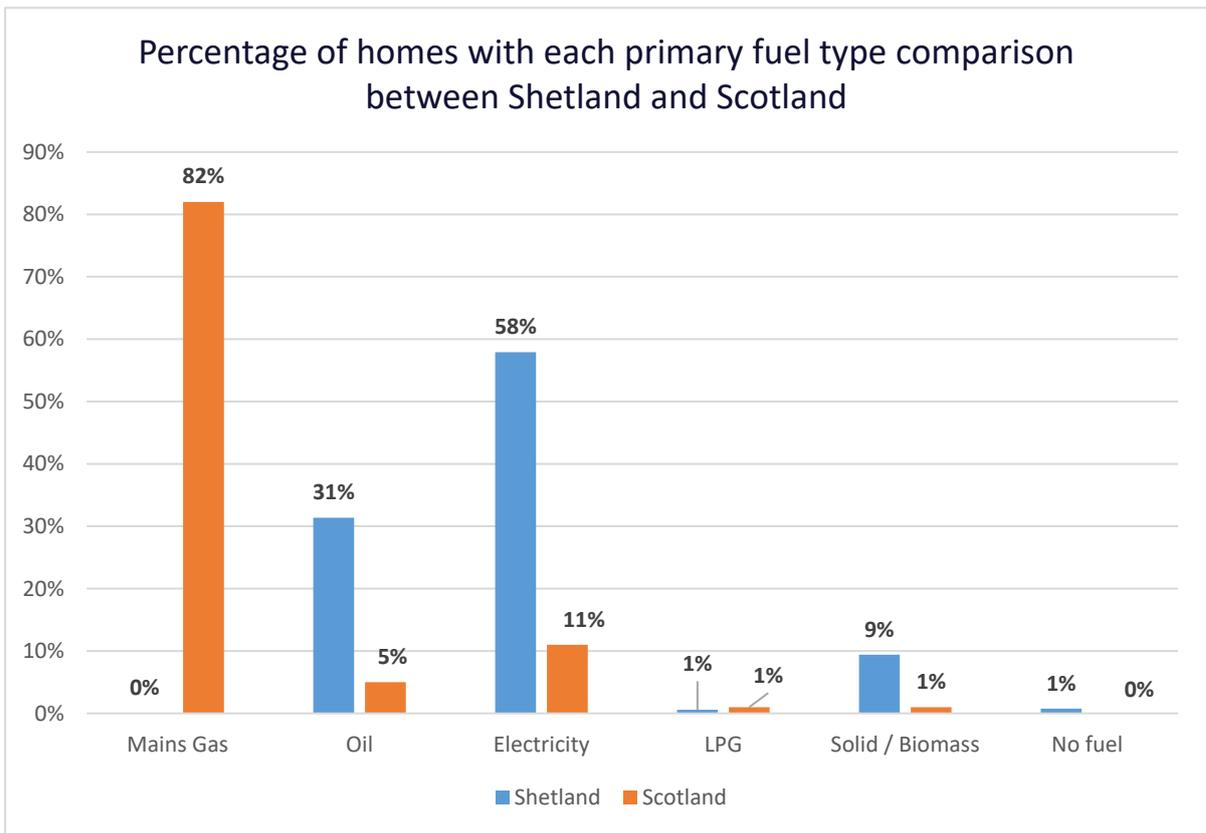


Figure 7: Percentage of homes with each primary fuel type, comparison between Shetland and Scotland

Properties with electric heating or that are connected to the district heating scheme are already classed as having zero direct emissions heating systems. This is almost 8,000 properties across Shetland.

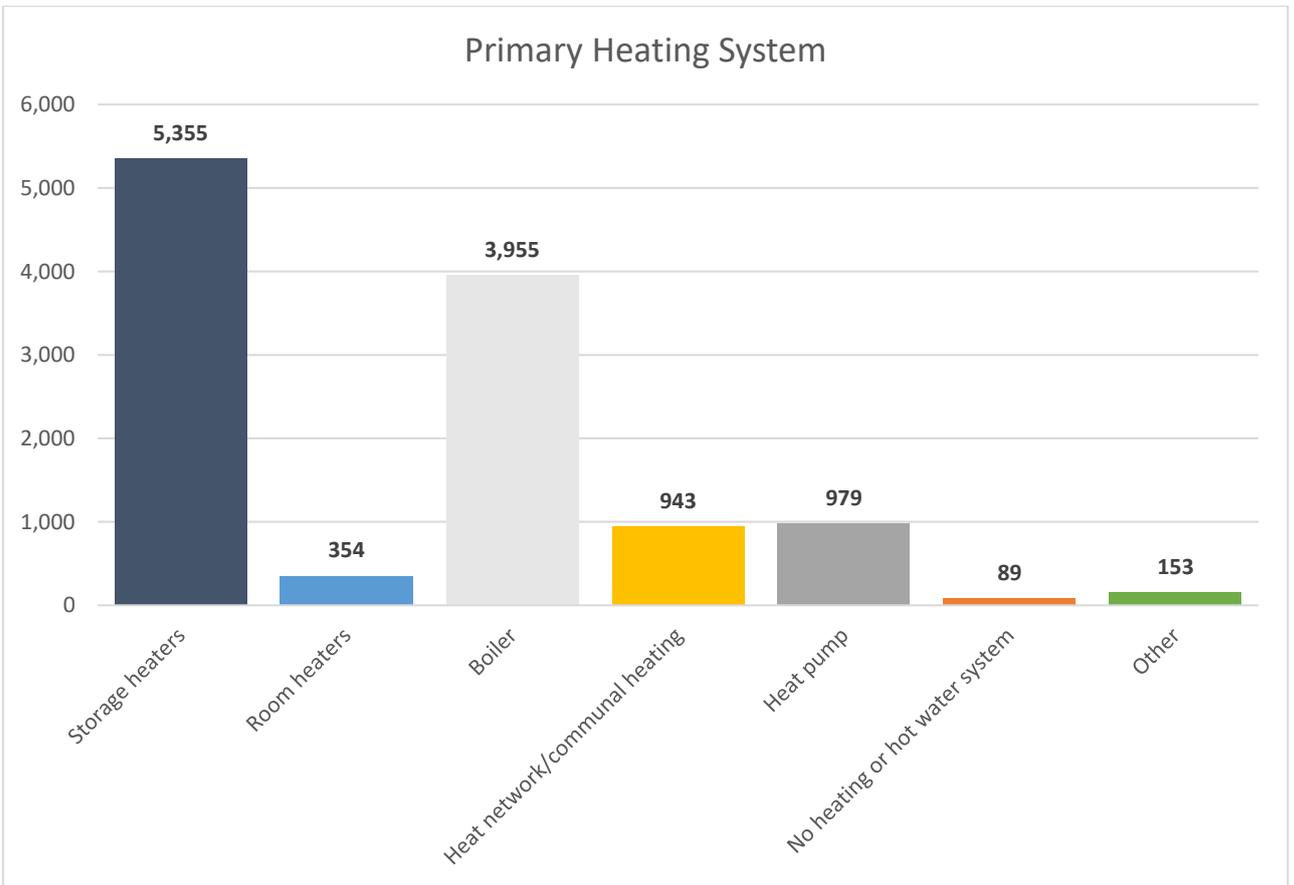


Figure 8: Number of households per primary heating system in Shetland

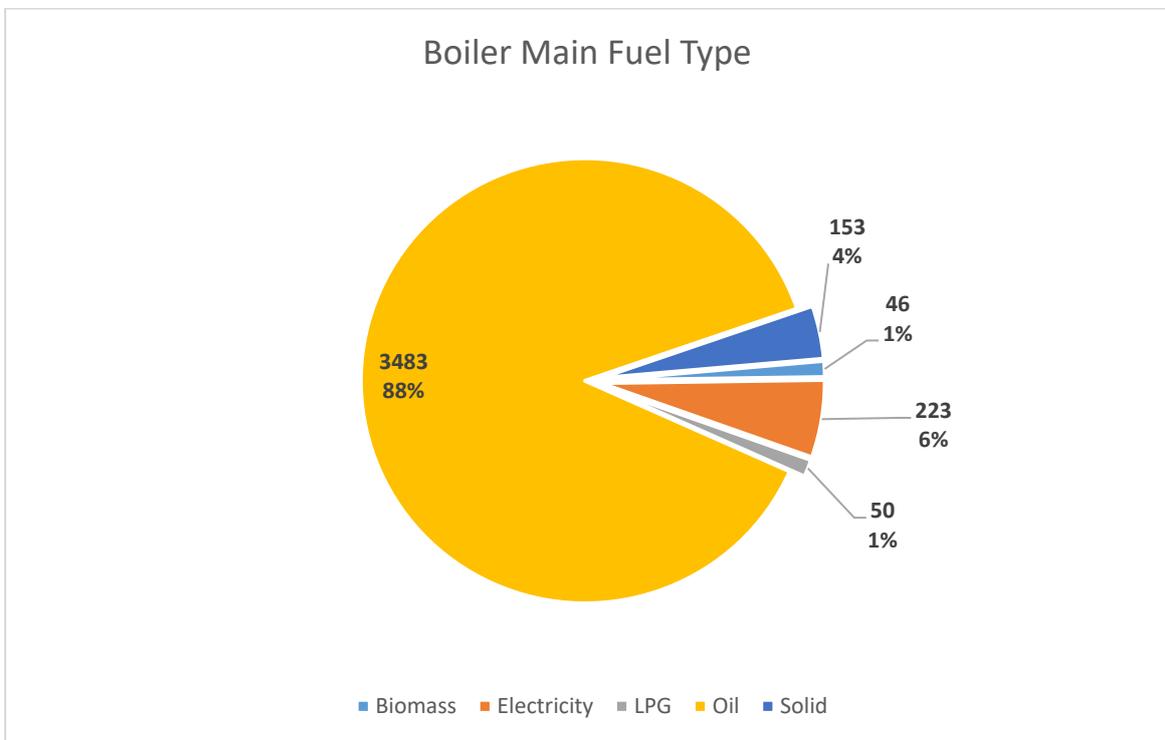


Figure 9. Breakdown of fuel type for the 3,955 households with a boiler as the primary heating system.

As Table 1 shows, the housing stock varies in terms of heat pump suitability across Shetland, with a high proportion shown to be heat pump ready (category 1). However, a similar number of properties (4,406) require significant investment before transitioning to heat pumps (category 3). There are less than a thousand homes that would only require some upgrades/investment to be ready for a heat pump (category 2).

However, the number of properties per heat pump suitability category is based on **high level data analysis**. It is intended to indicate the 'pathway to decarbonisation' for properties, but it is not definitive. Further work to survey individual properties would be needed to determine what works a property needs before installing a heat pump.

Category of heat pump readiness	Number of properties
Category 0: have a heat pump or connected to heat network	1,922
Category 1: heat pump ready	4,507
Category 2: require some upgrades	993
Category 3: require significant upgrades	4,406

Table 1: Number of properties in each category of heat pump suitability

Energy Performance Certificate data for domestic buildings

In Scotland, approximately 4% of properties are rated EPC Bands A or B. However, Shetland has a higher proportion of properties in this range. This indicates higher levels of retrofit or new home building and shows the impact of the Lerwick district heating scheme. At the same time, Shetland has a significantly higher proportion of properties rated Band E or below, which is likely to be due to a combination of expensive electric heating and poor building fabric efficiency.

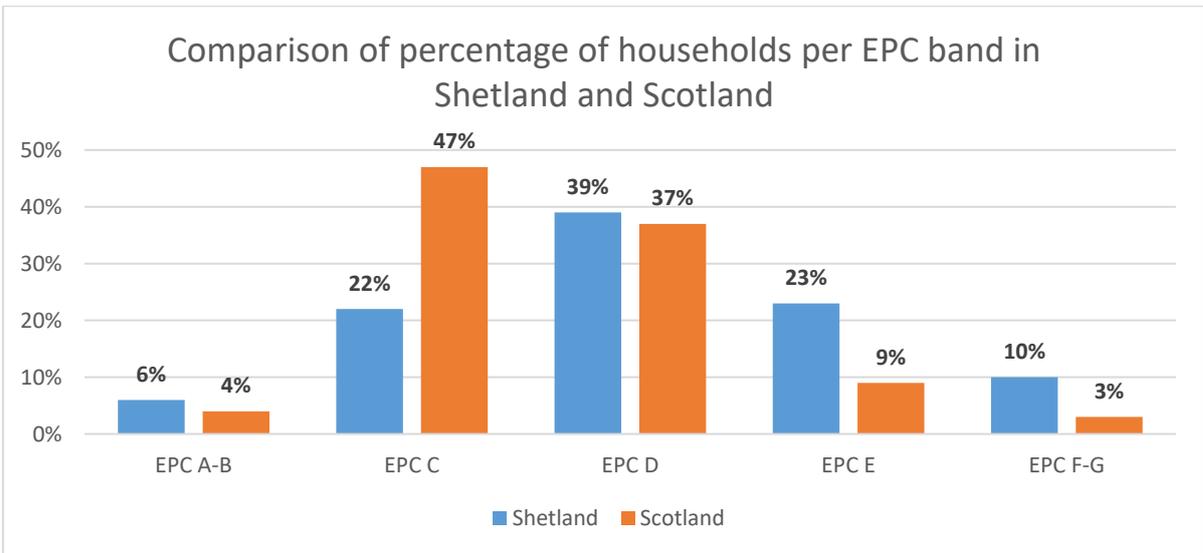


Figure 10: Comparison of percentage of households per EPC Band in Shetland and Scotland

Social housing properties in Shetland have higher average EPC ratings than both owner occupied and privately rented properties.

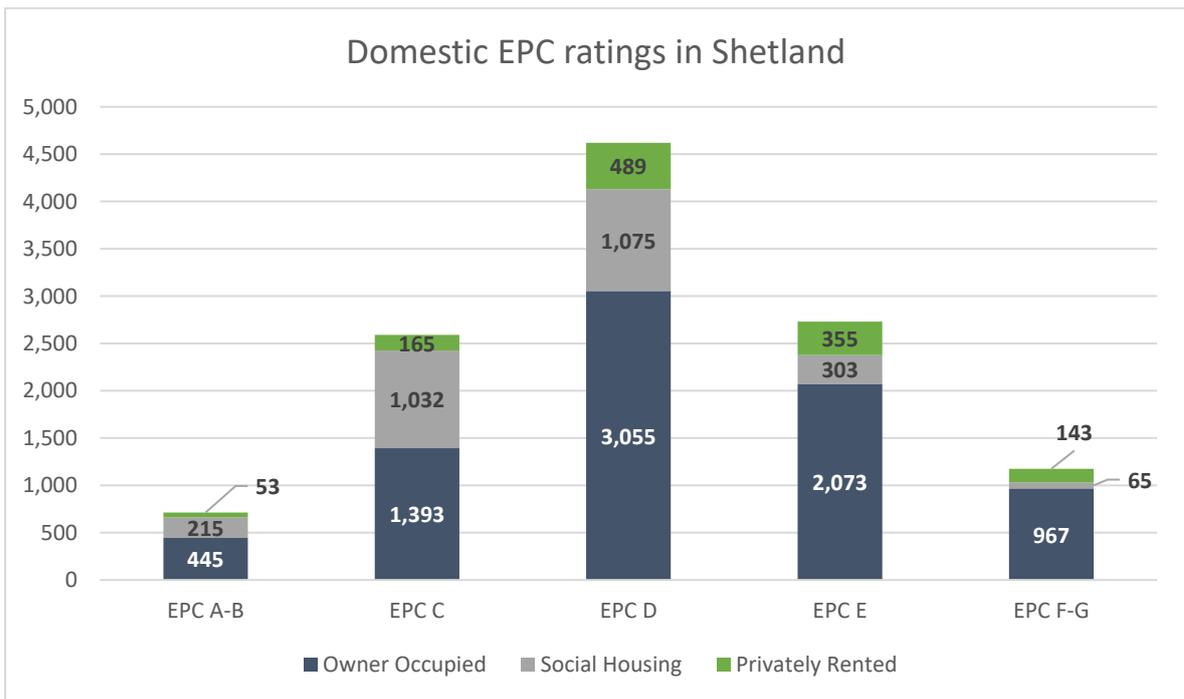


Figure 11: Domestic Property EPC ratings in Shetland

1.2. Non-domestic buildings

The data sets available for non-domestic buildings are less well developed for the non-domestic sector.

Table 2 below shows that non-domestic buildings in Shetland require significantly less heat than for domestic properties, equivalent to approximately 25% of the total heat demand.²

Non-domestic total heat demand (MWh/yr)	Domestic total heat demand (MWh/yr)	Total heat demand (MWh/yr)
68,781 (25%)	204,210 (75%)	272,991

Table 2: Total heat demand for domestic and non-domestic buildings in Shetland

The figure below demonstrates how the correlation between number of properties and heat demand is not always directly proportional and is dependent on property end use. Non-domestic properties such as hotels, leisure facilities, industry, education and community centres have larger average heating demands per property when compared to offices and retail premises.

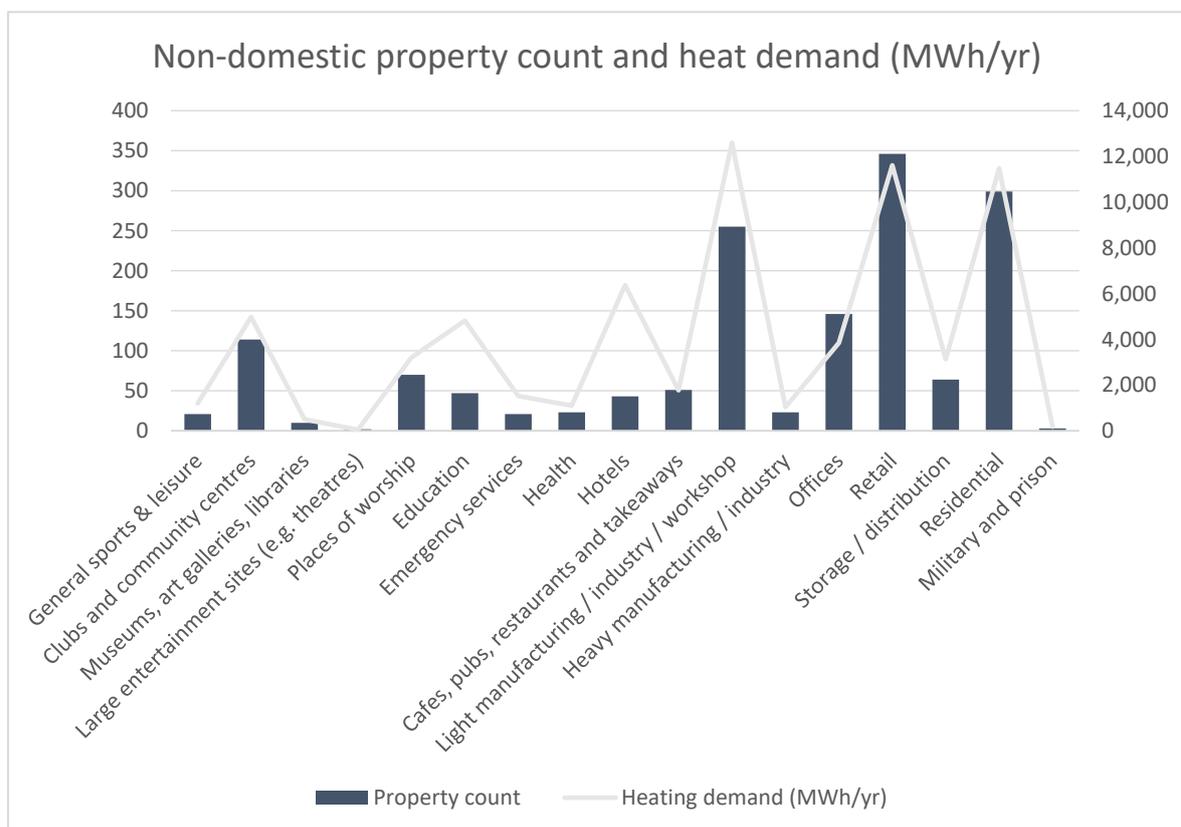


Figure 12: Non-domestic property count and heat demand

Between them, offices and retail premises make up 12% of the non-domestic properties within Shetland, while contributing to 9% of the total non-domestic heating demand requirements.

² This data is derived from the domestic and non-domestic baseline tools produced to inform this LHEES.

Conversely, hotels and education only represent 5% of the non-domestic properties while contributing to 14% of heat demand. Hotels must maintain continuous comfortable temperatures, which means these are high heat intensity buildings.

Primary fuel type in non-domestic buildings

Approximately 70% of non-domestic properties across Shetland use electricity as their main fuel source, a total of 1258 properties. 'Other' primary fuel types, which include district heating and biomass, are used in around 17% of properties. The remaining 14% of properties are served by fossil fuel boilers (mainly oil).

When analysing total heat demand, properties which use oil or other fuel sources have a higher average demand than those that use electricity.

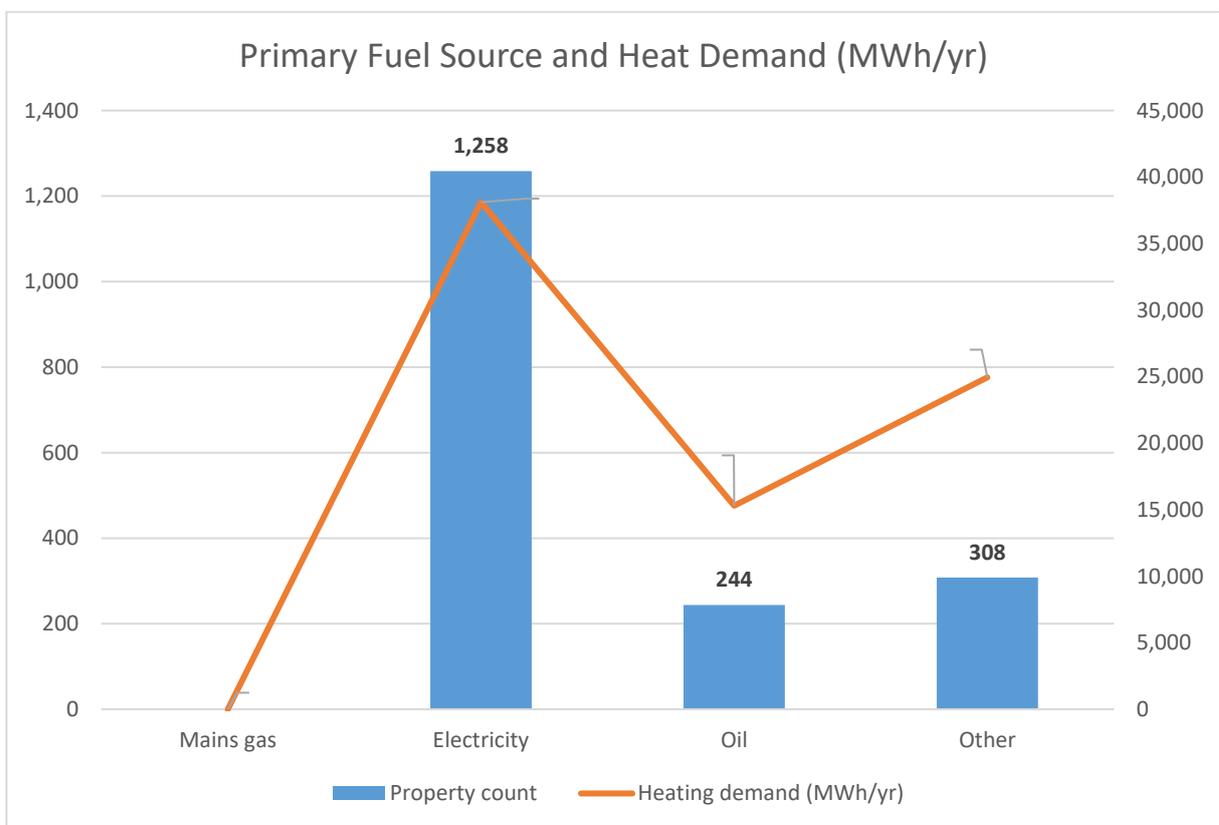


Figure 13: Primary fuel type and heat demand for all non-domestic properties within Shetland

2. Energy efficiency data (Home Analytics)

The map below shows the areas of Shetland with domestic properties with low levels of wall insulation. This is indicated by the level of uninsulated walls in each datazone. As shown in the map, the Data Zones with the highest levels of uninsulated walls (shown in dark blue) are: East and West Mainland, Fair Isle, North Mainland 01, North Mainland 03, Shetland South 01, Shetland South 02.

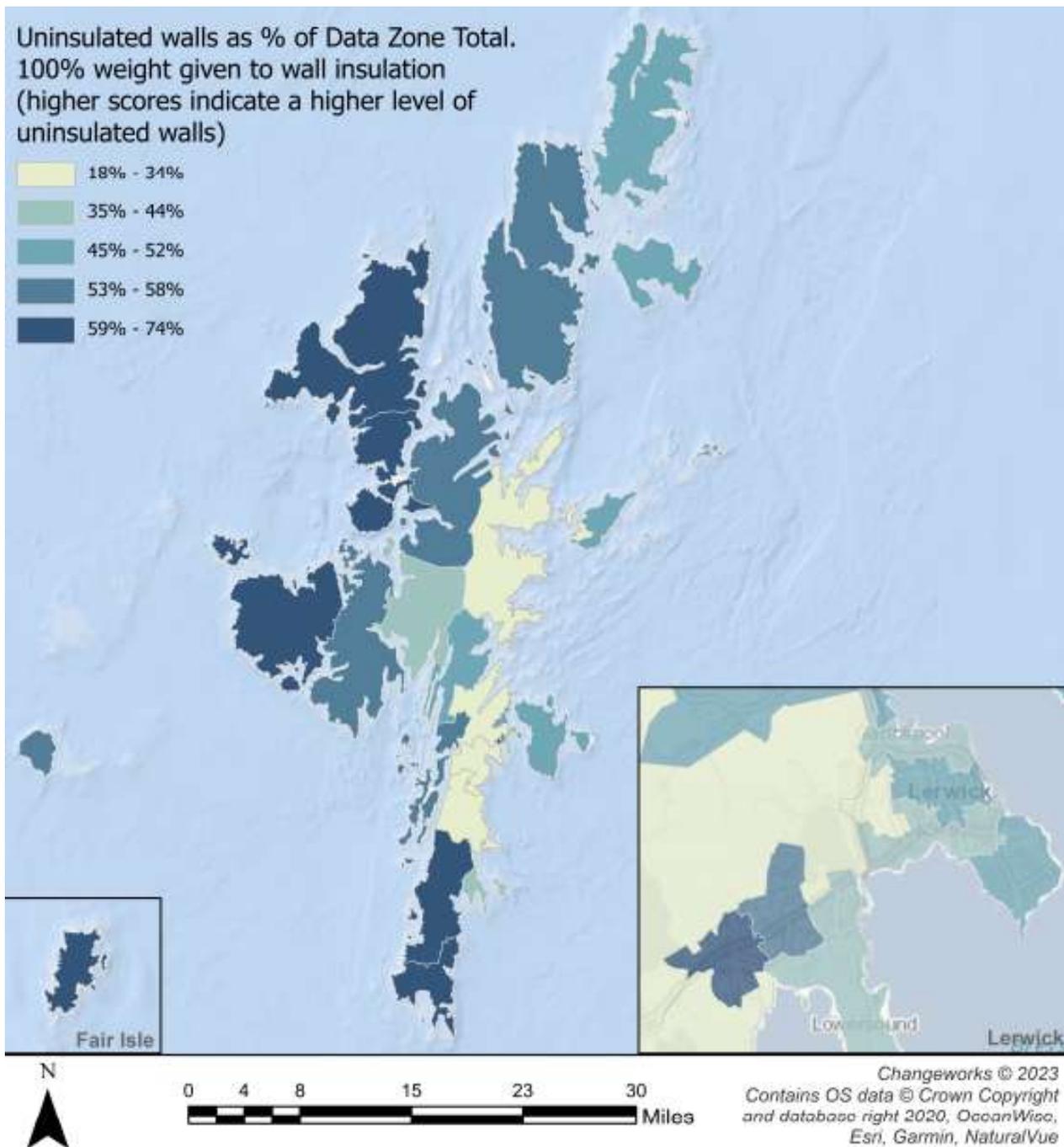


Figure 14: Map showing percentage of uninsulated walls by data zone in Shetland.

Based on Home Analytics data, half of all domestic properties in Shetland are uninsulated (figure 15). This equates to around 6,000 individual properties. This figure is highly questionable and. Due to the variety of property archetypes across Shetland, data from the Home Analytics dataset is far less accurate than it is for other parts of Scotland.

For homes that are currently insulated, further investigation will be required to determine whether the levels of insulation are compatible with a switch to a low carbon heating system.

93% of properties in Shetland have double glazing, according to current data from Home Analytics (Figure 15). Only 3% of properties have single or partial glazing. It is essential to consider ventilation when improving air tightness in properties.

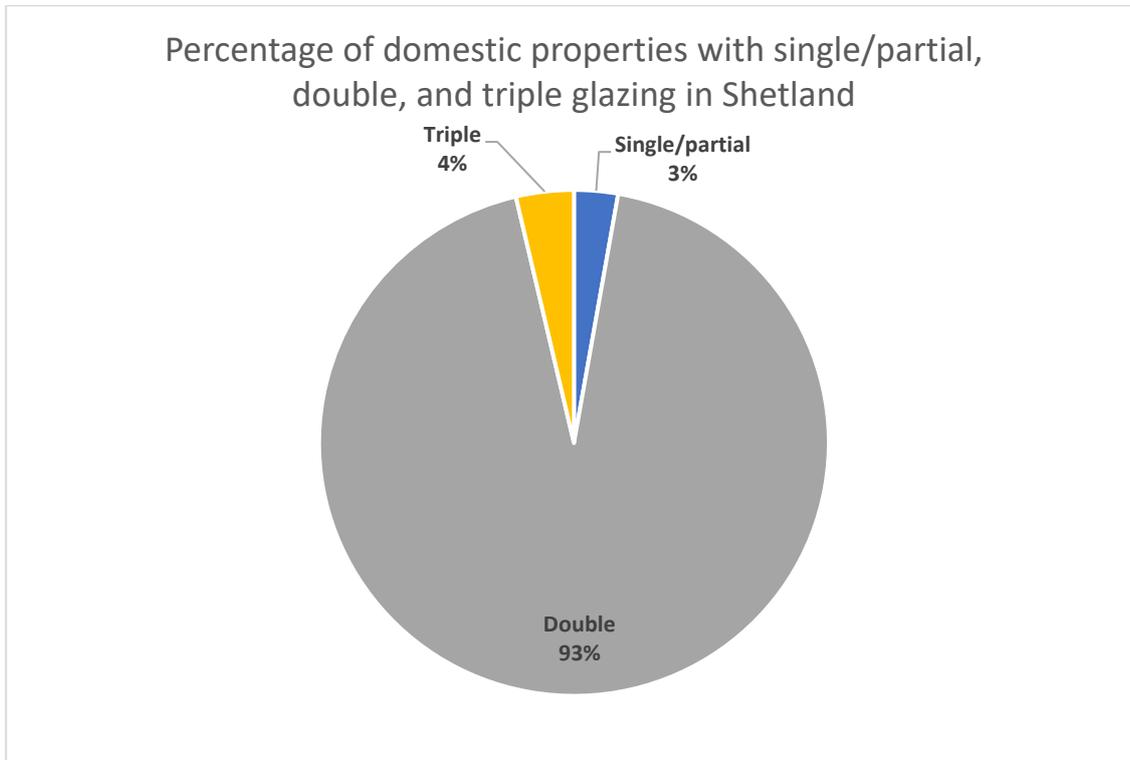


Figure 15 : Percentage of domestic properties with single/partial, double, and triple glazing in Shetland

Another key indicator of energy efficiency is the extent of loft insulation. Best practice recommends 250mm+ is installed³, meaning 57% of properties in Shetland currently meet this requirement (figure 16).

³ Building standards technical handbook 2019: domestic

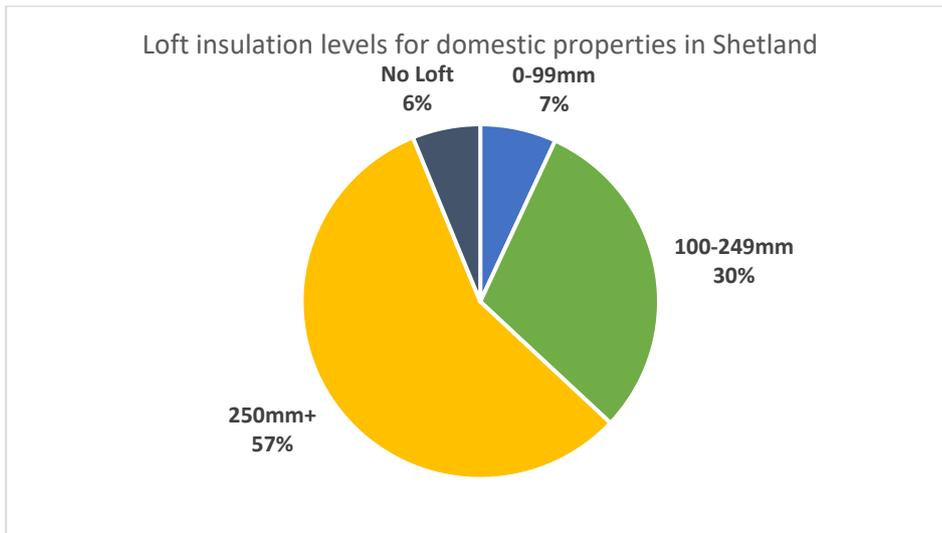


Figure 16: Loft insulation levels for domestic properties in Shetland

Challenging properties

Mixed use, mixed tenure, and listed buildings are often more difficult to retrofit.

Shetland has very few mixed use and mixed tenure buildings, with around 460 individual buildings. As a result, these property types will not form a core part of the Council's LHEES in the short term, however plans will be progressed to ensure property upgrades are made in line with net zero targets. Most of these properties are concentrated in Lerwick.

Appropriate energy measures depend on many factors, including if the building is listed or in a conservation area. 2% of properties are currently defined as listed and 7% located in conservation areas. There are restrictions on the kinds of energy efficiency measures suitable for installation in listed buildings and will need to be appraised and costed as part of bespoke retrofit plans for each of the hard-to-treat properties.

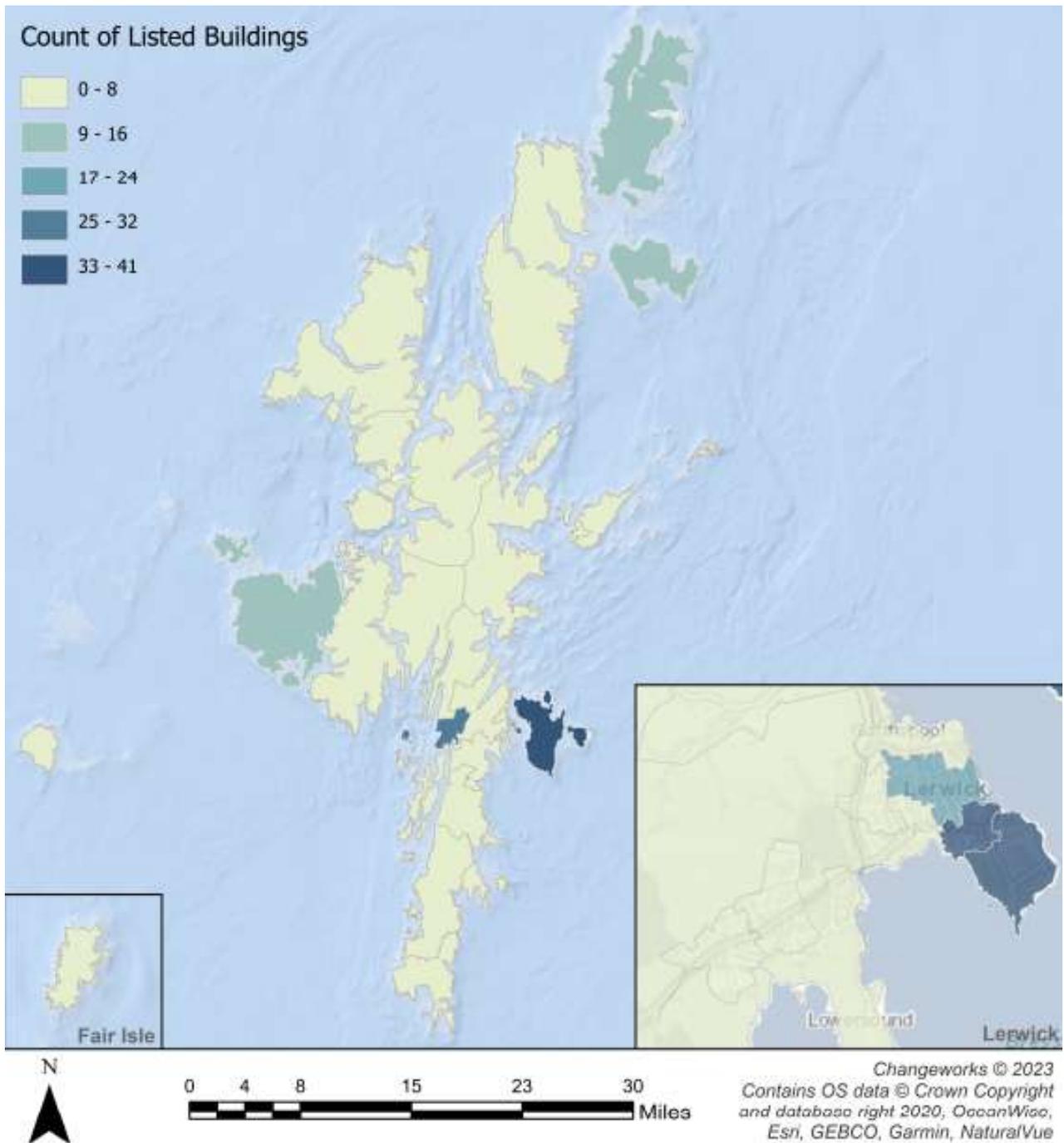


Figure 17: Map showing the density of listed buildings by Data Zone in Shetland.

3. Energy efficiency as a driver of fuel poverty

Analysis was carried out on how likely it was that households are in fuel poverty due to inefficient housing across Shetland. This map indicates that energy inefficient housing plays a larger role in fuel poverty in Lerwick, Sound, Scalloway, Unst, Northmavine, and Delting. This data is based on probability of fuel poverty and wall insulation levels and is often incomplete or estimated, especially in rural and remote areas such as Shetland.

However, as there are a number of factors impacting on fuel poverty such as energy costs and income levels. The methodology again is over simplified.

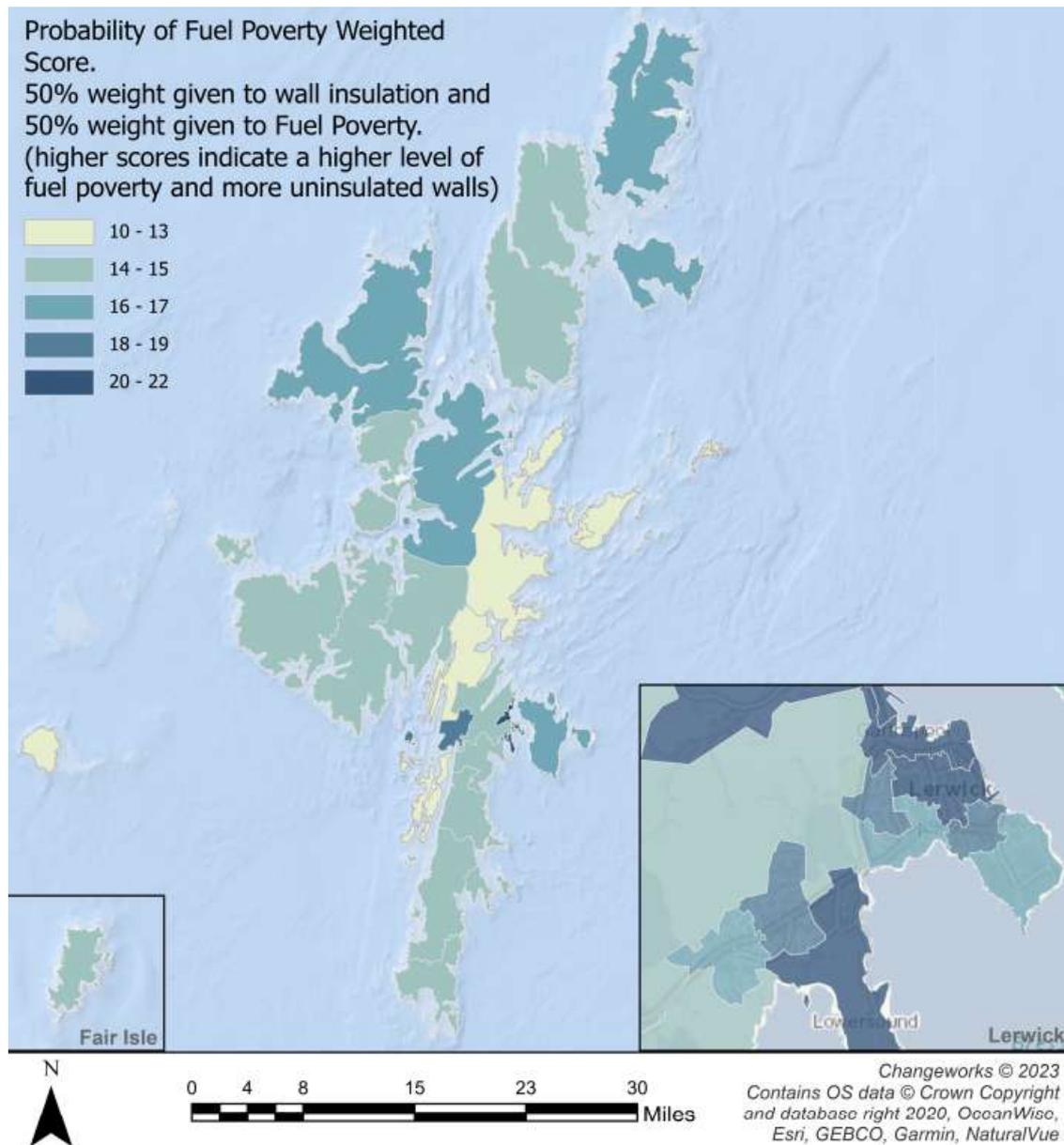


Figure 18: Map of energy efficiency as a driver for fuel poverty by Data Zone.

Scottish House Condition Survey Fuel Poverty Data

Box 1: Scottish House Condition Survey: Fuel Poverty Data

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

The LHEES methodology uses fuel poverty data from the most recent Scottish Housing Condition Survey (SHCS) 2017-19.⁴ However, this data was established before the energy and cost of living crisis. At that time, 30.9% of people in Shetland were classified as being in fuel poverty. This is one of the highest fuel poverty rates among Scottish local authorities and it is significantly above the national average of 24.8%. This alone highlights the significant challenge required to meet the national target of <5% by 2040, particularly given that this 30.9% figure is out of date and recent figures will be significantly higher.

More recent estimates of fuel poverty (2025) indicate that without the energy cap in place households would need to earn £42,000 to stay out of fuel poverty. It is estimated that 56% of households are in fuel poverty and half of these households (24%) are in extreme fuel poverty.⁵ Average household energy costs were estimated to be roughly double the UK average.

Households (% of total population)	2013-15	2014-16	2015-17	2016-18	2017-19	2019-22
	<i>Old fuel poverty definition.</i>			<i>New fuel poverty definition.</i>		
Shetland	25.7%	26.9%	24.4%	27.4%	30.9%	No data ⁶
Scotland	29.4%	27.4%	25.7%	24.8%	24.8%	31%

Table 3: Scottish House Condition Survey figures showing the three-year average fuel poverty rates across Shetland and Scotland

Due to the limitations of fuel poverty data from the SHCS, area-based data from the Scottish Index for Multiple Deprivation (SIMD) has also been used to assess fuel poverty within Shetland.

⁴ Scottish Government (2021) [Scottish House Condition Survey: Local Authority Analysis 2017-2019](#)

⁵ Shetland Islands Council (2023) [Shetland-forward](#)

⁶ The 2020 SHCS was suspended due to the Covid-19 pandemic, and methodological changes were introduced in 2021. The next three-year average estimates for local authorities are expected to be published in early 2026.

Scottish Index for Multiple Deprivation as a proxy for fuel poverty

Box 2: Scottish Index for Multiple Deprivation as a proxy for fuel poverty

The Scottish Index for Multiple Deprivation (SIMD) dataset has been used to assess fuel poverty within Shetland. SIMD is a standard tool for identifying areas with relatively high levels of deprivation and was published in 2020¹. The SIMD:

- Is a relative measure of deprivation across small areas in Scotland.
- Looks at multiple deprivation. SIMD looks at the extent to which an area is deprived across seven domains: income, employment, education, health, access to services, crime and housing.

SIMD data can be used to:

- Compare overall deprivation of small areas.
- Compare the seven domains of deprivation.
- Compare the proportion of small areas in a council region that are very deprived.
- Find areas where many people experience multiple deprivation.
- Find areas of greater need for support and intervention.

SIMD data is split into ten deciles covering the whole population, where one is most deprived and ten is least on the scale.

As Figure 20 shows, no properties in Shetland fall within SIMD deciles one and two (most deprived), with 6% falling in deciles three and four. The data itself suggests that households in Shetland do not face high levels of deprivation and have above average SIMD indicators compared to national averages. However, as noted above, SIMD data only includes one domain relevant to fuel poverty, which is income.

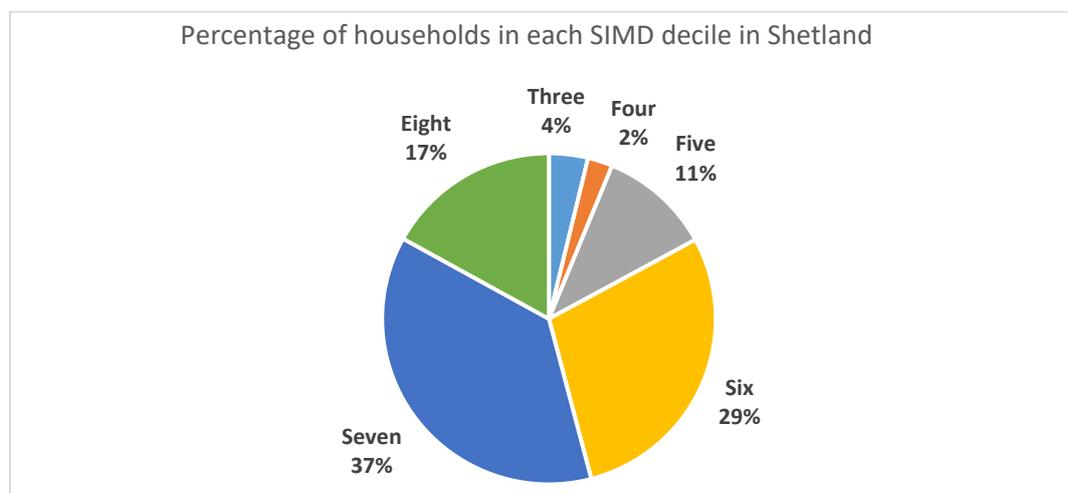


Figure 19: Percentage of households in each SIMD decile in Shetland

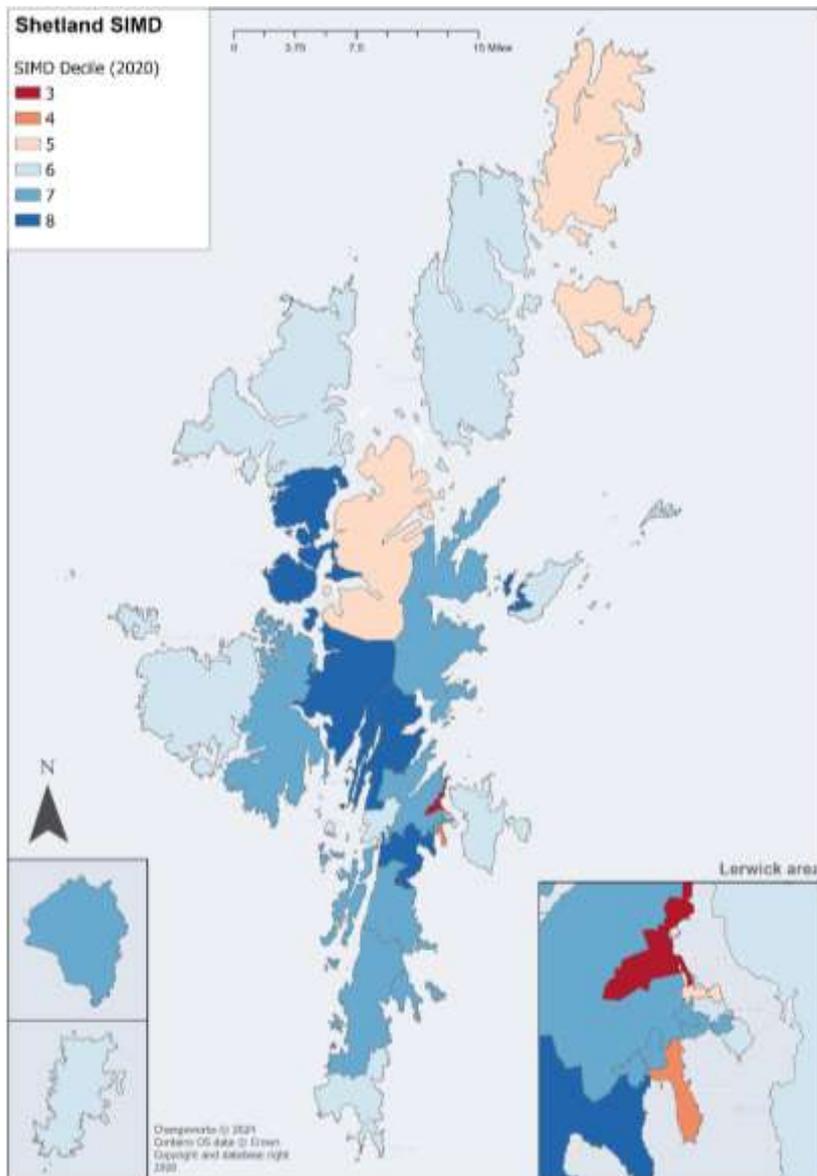


Figure 202: SIMD deciles in Shetland

Shetland Partnership Locality Profiles

The Shetland Partnership has developed Locality Profiles⁷, which provide detailed information on demographics, the economy, education, environment, health and housing at a local level. They are useful for a number of reasons including service redesign, local plans and maximising opportunities to seek external funding to support community development. These profiles indicate the following:

- Cost of living is 20-65% higher in Shetland than the UK average

⁷ Shetland Partnership (2023) [Shetland Locality Profile](#)

- Median income in Shetland is £34,251, 3% higher than the Scottish average (£33,095)
- 11.6% of children are living in poverty, almost half the Scottish average (20.8%)
- 8.8% of people in Shetland claim out of work benefits, almost half of the Scottish average (14.8%)

As the Locality Profiles are not combined into one indicator (compared to the SIMD), it is possible to give a better picture across the seven Shetland localities:

- The child poverty percentages range from 9.1% to 15.1%
- Cost of living figures outside of Lerwick/ Bressay ranges from 33% to 62% higher than UK average

Using SIMD data as a tool for identifying areas at high risk of fuel poverty highlights some specific areas of Shetland. However, the Locality Profiles, along with the known high rates of fuel poverty that exists in pockets in all community areas, indicate that all areas of Shetland need to be part of the consideration for programmes and projects designed to alleviate fuel poverty.