Scottish Government
Riaghaltas na h-Alba
gov.scot

Scottish House Condition Survey: 2021 Key Findings

An Experimental Statistics Publication for Scotland

PEOPLE, COMMUNITIES AND PLACES

Acknowledgements

The Scottish Government acknowledges and thanks the 3,174 households across Scotland who gave their time to take part in the Scottish House Condition Survey social (telephone or video) interview and the follow-up (external-only) physical dwelling inspection in 2021.

This report was produced by the Fuel Poverty and House Condition Analysis team at the Scottish Government with support from Adam Krawczyk, the Scottish Household Survey team, the Office of the Chief Statistician and Data Officer and colleagues within the Housing, Homelessness and Regeneration Analysis unit.

Finally, special thanks to:

- Ipsos MORI: Chris Martin, Colin Hockaday, Stuart Stevenson, Murray Petrie and all the regional managers, the surveyors and the social interviewers.
- BRE: Chris Beer, Adele Beaumont and Ana Slater for their energy modelling and work on the physical survey.
- Alembic Research: Bill Sheldrick for his role in surveyor training and the energy prices survey.

Scottish House Condition Survey Team

Darren Knox, Zach Thompson and Eleni Iordanidou

Directorate for Tackling Child Poverty and Social Justice
Communities Analysis Division
Scottish Government

May 2023

Contents

Introduction

The statistics in this report are based on a national survey of the housing stock, the only one of its kind in Scotland, which is part of the Scottish Household Survey (SHS). Until 2011 it was carried out as a stand-alone survey, under the name the Scottish House Condition Survey (SHCS). Following the review of the large-scale Scottish population surveys, the SHCS was incorporated within the SHS in 2012 and became one of its modules. We continue to report the results from this module of the SHS under the name the SHCS.

The SHCS consists of an interview with householders and a physical inspection of the dwelling they occupy, which provides a picture of Scotland's occupied housing stock. It covers all types of households and dwellings across the country - whether owned or rented, flats or houses. The physical data about the dwelling is recorded by surveyors trained to collect detailed information on housing characteristics. This is combined with information about the household collected through the (usually) face-to-face social interview, covering a range of topics such as household characteristics, tenure, neighbourhood satisfaction, dwelling satisfaction, health status and income. The result is a unique and powerful data set for examining the condition and characteristics of Scotland's housing stock alongside the views and experience of the people living in those dwellings.

This is the seventeenth 'Key Findings' report since the SHCS changed to a continuous format in 2003 and the ninth since it was integrated within the SHS in 2012. (Note that the 2020 SHCS could not be completed due to Covid-19 restrictions.) Details on the methodology and design of the survey are provided in the Scottish Household Survey Methodology and Fieldwork Outcomes reports. The incorporation of the SHCS within the SHS in 2012 introduced some discontinuities in the methodology of the survey and may contribute to some observed change over time.

In 2009, the SHCS was designated as a National Statistics product by the UK Statistics Authority (UKSA) and in October 2020, following a compliance check by the Office for Statistics Regulation (OSR), it was confirmed that these statistics should continue to be designated as National Statistics. This demonstrates that the SHCS statistics are accurate, trustworthy, and compliant with the high standards required of National Statistics.

Due to Covid-19 restrictions the 2020 SHS and the 2021 SHS were undertaken using a push to telephone/video approach. It was not possible to resume the 2020

SHCS but the 2021 SHCS was undertaken using an external+ approach. For further details see the section on external+ data quality.

However, due to the change in approach for the 2021 SHCS, the results are not directly comparable with the National Statistics from previous waves of the survey.

As such, we have agreed with the OSR (see the letters between the OSR's Director General for Regulation and the Scottish Government's Chief Statistician) that the key findings should be published as Experimental Statistics representing a snapshot of the key attributes, energy efficiency and condition of the housing stock and fuel poverty levels in 2021. The results for 2021 should not be compared with those for previous or future years.

The 2022 SHCS returned to full in-home surveying in April 2022, and we expect to publish the key findings as National Statistics in January 2024.

The lack of SHCS data for 2020 and the enforced changes for 2021 cause issues with the production of local authority estimates from the SHCS, which requires three consecutive years of survey data to be combined to provide a three-year average.

For the 2021 external+ SHCS we cannot take the usual approach for two reasons. Firstly, there is no SHCS data for 2020 so we cannot produce a three-year average for 2019 to 2021. Secondly, the data from the 2021 external+ SHCS is not directly comparable with that for earlier years due to the methodological differences and it would not be appropriate to combine it with the data for 2019 (or earlier) to produce a multi-year average.

Therefore we will not be using the 2021 external+ SHCS to produce local authority estimates.

We won't be able to return to the usual approach for producing local authority estimates from the SHCS until the 2024 wave of the SHCS has completed. We will then be able to produce local authority estimates from the SHCS based on a three-year average for 2022 to 2024. We expect these estimates to be published in early 2026.

We appreciate there is a user demand for local authority estimates from the SHCS. So, until we can expect to get back to the usual approach in 2026, we will explore other options for providing local authority estimates and will update users in due course.

In 2021 there were 3,174 surveyed properties. Statistics published in this report are based on fieldwork undertaken mostly during 2021. Household interviews took place between April 2021 and March 2022 with 16% of the interviews taking place in the first quarter of 2022. Physical surveys took place between May 2021 and April 2022 with 21% of the surveys taking place in the first quarter of 2022 and early April.

Past methodological changes are described in each years' key findings report and associated methodology notes and, where relevant, in individual sections of this report. We always seek to improve and keep our methods and processes up to date and there may therefore be small changes to elements of data processing which do not impact significantly on the results. Details are provided in the respective technical sections.

The main change for 2021 is that the results are being presented in isolation and are not being compared with those for previous years. Furthermore, as it was not possible to collect information on internal disrepair, only the number of dwellings with urgent disrepair to critical elements has been reported as all other disrepair metrics include internal elements. Similarly, we are unable to report on the presence of damp and/or condensation and compliance with housing standards, e.g., the tolerable standard and the Scottish Housing Quality Standard (SHQS). The fuel poverty estimates presented in this report include changes to better align with the definition set out in the Fuel Poverty (Targets, Definition and Strategy)(Scotland) Act 2019 (e.g., incorporating the Fuel Poverty (Enhanced Heating) (Scotland) Regulations 2020) and methodological improvements (e.g., including the income of up to three other adults in addition to the highest income householder and/or their spouse). For further details see the section on fuel poverty.

Differences across characteristics are only highlighted in the commentary of this report if they are statistically significant. Values will be described as 'similar' if they are not significantly different. On occasion we also explicitly note that a difference is not statistically significant, particularly if it might appear large to the reader. This can occur if the statistic is based on a small sample size. Please see the technical notes and definitions for further details on confidence intervals, design effects and statistical significance.

The remainder of this report covers the following topics:

Key Attributes of the Scottish Housing Stock: this chapter describes key dwelling characteristics such as dwelling type, age of construction, main heating fuel and the characteristics of the households that occupy them.

Energy Efficiency: this chapter presents an analysis of the energy efficiency of the housing stock including presence and level of insulation.

Fuel Poverty: this chapter presents an analysis of the characteristics of households in fuel poverty and extreme fuel poverty. In addition to the issues with data quality due to the enforced change in approach for the 2021 SHCS, it should also be noted that the fuel poverty estimates presented in this report pre-date the increases in energy prices that occurred in 2022. We have separately undertaken fuel poverty scenario modelling[1] based on data from the 2019 SHCS to estimate the number of households in Scotland that are likely to now be in fuel poverty, by applying up to date increases in fuel prices, price caps and various government support interventions. From April 2023[2] with the price cap for the typical dual-fuel household paying by direct debit set at £2,500 under the Energy Price Guarantee and removal of the £400 Energy Bills Support Scheme we estimate that there will be 920,000 fuel poor households (37% of all households), of which 720,000 (29% of all households) will be in extreme fuel poverty.

Energy Perceptions: this chapter examines the householder's self-reported experience and satisfaction with their heating system and the extent to which they monitor their use of energy. This is analysed by the fuel poverty status of the household.

Housing Conditions: this part of the report provides information on the number of dwellings with urgent disrepair to critical elements and the external critical elements with disrepair. It also covers overcrowding and under-occupation, as defined by the bedroom standard.

External+ Data Quality: this part of the report details the external+ approach, potential sources of bias, the changes to sampling and weighting, the changes in the data collection mode, and the impact on data quality and key statistics from the SHCS.

[1] See the 'Updated Economic Context' section of the report Cost of Living (Tenant Protection) (Scotland) Act 2022: first report to the Scottish Parliament. https://www.gov.scot/publications/cost-living-tenant-protection-scotland-act-2022-first-report-scottish-parliament/

[2] See the response to the parliamentary question S6W-15551. https://www.parliament.scot/chamber-and-committees/questions-and-answers/question?ref=S6W-15551

Technical Notes and Definitions: the final part of the report provides information about the content of the survey and the definition of some of the key concepts used. Discussion on the statistical reliability of the estimates is also included.

1 Key Attributes of the Scottish Housing Stock

The Scottish House Condition Survey provides a snapshot of the Scottish housing stock in each survey year. This chapter sets out information on the basic attributes of occupied Scottish dwellings as captured in 2021. Subsequent chapters build on this and provide more details on energy efficiency, fuel poverty and external disrepair.

The following topics are included:

- the construction age and built form of Scottish domestic buildings
- the dwellings' location in relation to the gas network and the type of fuel used to heat them
- the relationship between the dwellings' attributes and household tenure and
- the composition of the households who occupy them.

When interpreting and using the results presented in this chapter, readers should be mindful of the impact the external+ approach used for the 2021 SHCS has had on data quality. This is discussed in detail in Chapter 6 of this report.

In particular, readers should note that calibration totals for construction age, built form and urban/rural location have been rolled forward from the 2019 survey. To account for non-response bias, survey responses are given calibration weights so that weighted totals agree with (usually) external calibration totals, e.g., the number of households by dwelling age. Calibration totals for the SHCS are usually derived from the dwelling descriptions and abbreviated dwelling descriptions. However, as it was not possible to undertake these in 2021, the calibration totals have been rolled forward from the 2019 SHCS. For further details see section 6.4.2 of this report.

Renters, families, and low-income households were under represented in the achieved sample for the 2021 SHCS. Calibration totals for household tenure were set by rolling forward estimates for owners and renters from the 2019 Scottish Survey Core Questions. This addressed the over representation of owners relative to renters.

However, calibration weighting cannot resolve all non-response bias in the 2021 SHCS. Families and low-income households remain under represented while other households (see section 1.4) and high income households remain over represented.

It is also likely that the results on dwelling size (floor area) presented in this chapter have been impacted by the change in the mode of data collection. For the 2021 external+ SHCS, surveyors were only able to take dwelling measurements externally, whereas previously they were able to take them internally if more convenient or necessary. It can be difficult to estimate the size of the floor area of some dwellings from an external-only inspection. It was noted that there was an increase in the number of cases where dwelling measurements were missing and had to be imputed using online tools such as Google Maps and Rightmove.

1.1 Dwelling Age and Type

The age of construction and the built form of a dwelling has consequences for energy performance, running costs and living conditions. For example, older dwellings built with solid stone walls are typically less effective at preventing heat transmittance between the inside and the outside of a building than properties that have been built using modern construction materials and that, since 1982, have been subject to increasingly rigorous minimum standards of energy efficiency and airtightness.

More information on the main dwelling types used in the SHCS is provided in section 7.6.1.

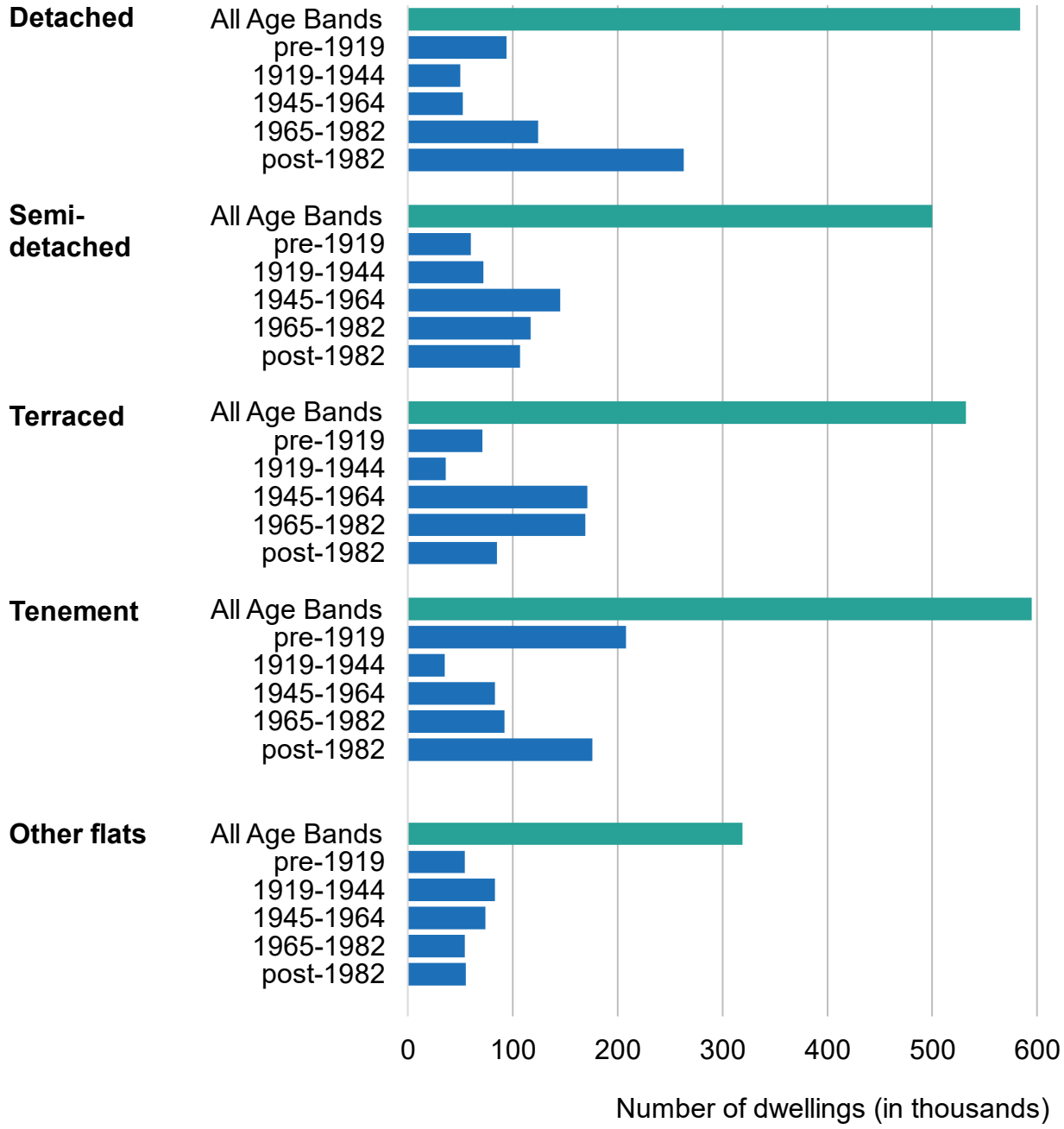
At the same time, types of dwellings can differ in terms of the size of the external surface area; dwellings with a smaller area of exposed wall, for example those that are shielded by adjacent properties, typically have lower levels of heat loss than in buildings with fewer sheltered sides.

The Scottish housing stock is diverse and varies across the country and between rural and urban areas. However, some common types can be recognised in Figure 1.1:

- Old (pre-1919) detached houses (4%; around 94,000) and tenement flats (8%; 208,000)
- More modern post-1982 detached houses (10%; 263,000) and tenements (7%; 176,000)
- Post-war terraced houses (14%; 340,000 built between 1945 and 1982)
- Semi-detached houses, common across all age bands and accounting for around 20% of the stock alone.

These six broad categories account for 63% of the overall housing stock (approximately 2.529 million occupied dwellings) however there is also variability within these groups. For example, among pre-1919 tenement flats, of the type common in Edinburgh and Glasgow, there is a wide range of sizes, layouts, and areas of exposure (for example in top floor flats the roof is exposed) which affects their energy efficiency and the living conditions experienced by the household.

Figure 1.1: Number of Occupied Scottish Dwellings by Age Band and Type, 2021



Data Source: Table KA1b in Key Attributes of the Scottish Housing Stock Tables

Table 1.1: Proportion of Occupied Dwellings by Age Band and Type, 2021 (Percentage of Whole Stock) [note 1]

Dwelling Age	Detached	Semi-detached	Terraced	Tenement	Other flats	All Dwellings
pre-1919	4%	2%	3%	8%	2%	19%
1919-1944	2%	3%	1%	1%	3%	11%
1945-1964	2%	6%	7%	3%	3%	21%
1965-1982	5%	5%	7%	4%	2%	22%
post-1982	10%	4%	3%	7%	2%	27%
All Age Bands	23%	20%	21%	24%	13%	100%
Sample size (number)	966	628	594	614	372	3,174

The category ‘other flats’ includes houses that have been converted to flats (41,000), towers / slabs (70,000) and so-called “4-in-a-block” flats (208,000).

- “4-in-a-block” flats were commonly built as social housing between 1919 and 1965 (63% of “4-in-a-block” flats fall in that age category).
- 85% of towers / slabs were built in the 1945 to 1982 period, again often as social housing.
- Converted flats are almost exclusively pre-1919 structures (87%), where a house has been divided into multiple residences.

1.1.1 Dwelling Size (Floor Area)

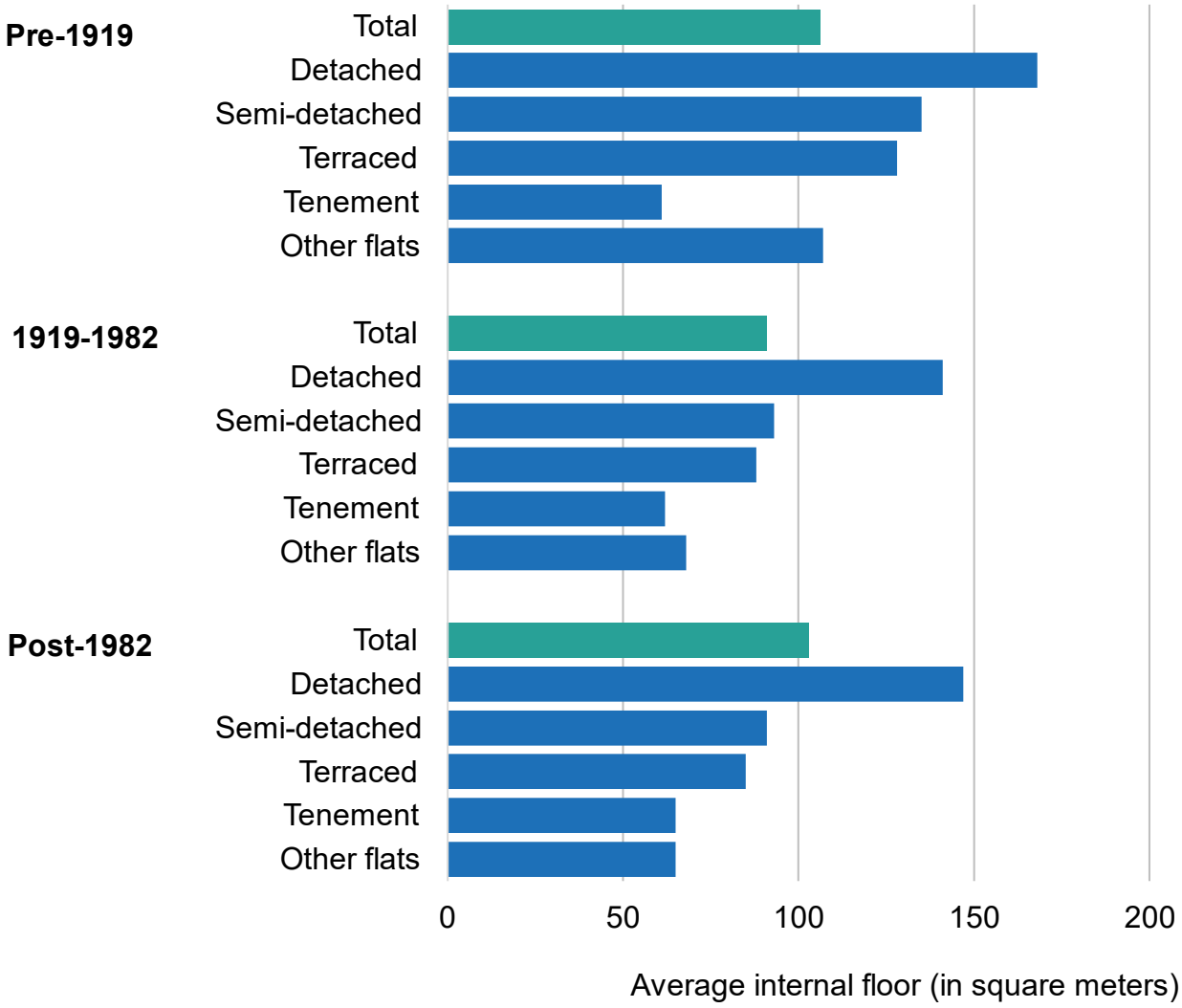
The size of the internal floor area has implications for the heating requirements of a dwelling. Larger dwellings require greater heat inputs and therefore cost more to heat. This has a direct impact on fuel poverty (see Chapter 3).

Pre-1919 dwellings tend to be larger than the other two age categories across dwelling types with the exception of tenements which on average are comparable in size to more recently built ones (Figure 1.2). Semi-detached houses built after 1919 are on average around three-quarters of the size of those built pre-1919. Terraced houses built after 1919 are around two thirds the size those built pre-1919.

The overall average for post-1982 dwellings is somewhat higher compared to those built between 1919 and 1982. This is largely driven by differences in detached houses, which are both larger in size and more common in the post-1982 stock (see Figure 1.2).

Rural dwellings are, on average, 38% larger than urban dwellings based on internal floor area, as shown in Table 1.2. The difference is smallest for dwellings built between 1919 and 1982 at 23%. Among pre-1919 and post-1982 dwellings, rural properties are around 50% larger.

Figure 1.2: Mean Floor Area (m^2) by Dwelling Type and Age, 2021



Data Source: Table KA3 in Key Attributes of the Scottish Housing Stock Tables

Table 1.2: Average Internal Floor Area (m^2) by Urban/Rural Location, 2021
[note 1] [note 2]

Dwelling Age	Urban Rural Location	Average Internal Floor Area (square meters)	Sample size (number)
Pre-1919	Urban	94	449
Pre-1919	Rural	141	215
Pre-1919	All Locations	105	664
1919-1982	Urban	88	1,277
1919-1982	Rural	108	291
1919-1982	All Locations	91	1,568
Post-1982	Urban	95	685
Post-1982	Rural	138	257
Post-1982	All Locations	103	942
All Age Bands	Urban	91	2,411
All Age Bands	Rural	126	763
All Age Bands	All Locations	97	3,174

1.2 Gas Grid Coverage and Rural/Urban Location

Approximately 12% of dwellings in Scotland are estimated to be outside the coverage of the gas grid. As shown in Table 1.3, the majority (92%) of urban dwellings are within the coverage of the gas grid, whereas 61% of those in rural areas are not.

Table 1.3: Gas Grid Coverage Overall and by Urban/Rural Location, 2021 [note 1] [note 2] [note 3]

Gas Grid Coverage	Urban	Rural	All locations
On Gas Grid	92%	39%	88%
Off Gas Grid	8%	61%	12%
Total	100%	100%	100%
Sample size (number)	2,411	763	3,174

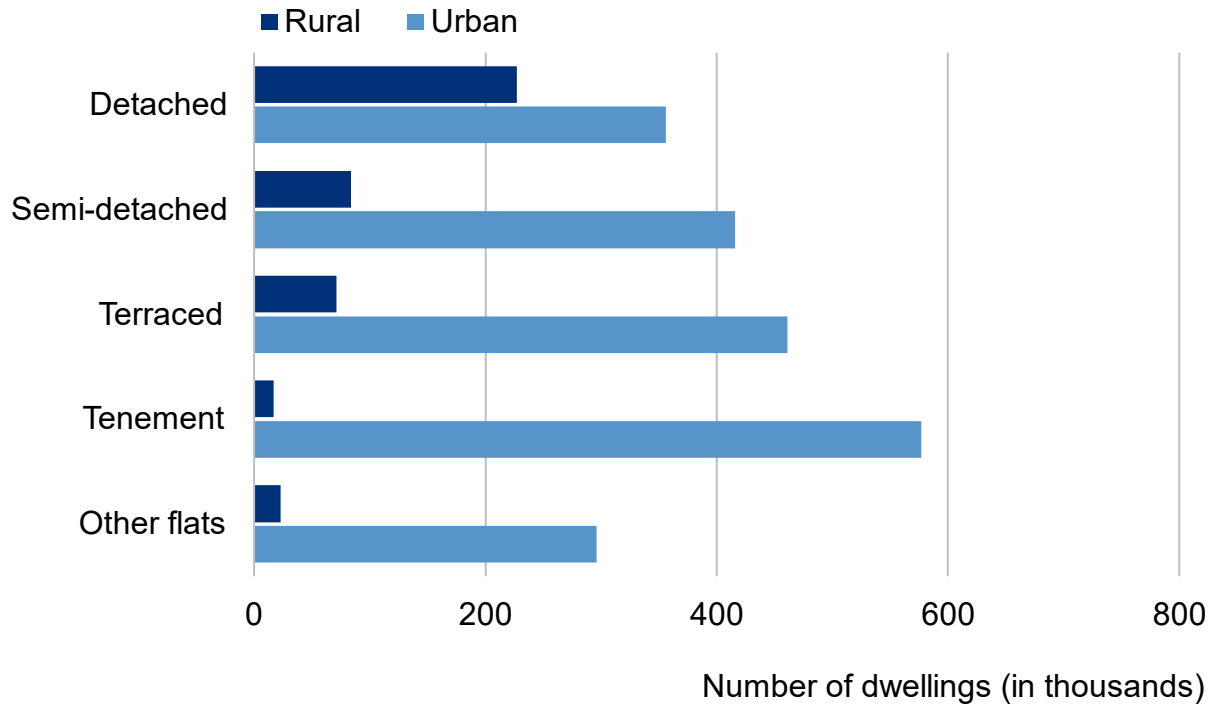
Gas grid coverage is determined on the basis of the distance of the dwelling from a low / medium / intermediate pressure gas distribution pipe. Based on the usual maximum distance for standard domestic connection (63 m), dwellings are classified as being “on” or “off” the grid. This does not reflect whether the dwelling is actually connected to the grid. For 2021 an improvement has been introduced whereby in addition to this definition a dwelling is also classified as “on” the grid if a mains gas connection has been recorded in the physical survey, irrespective of the distance to the gas distribution pipe. Further details on the method for estimating distance to the gas grid are available in section 7.6.4 of this report and in the SHCS Methodology Notes.

Connection to the gas grid allows households to use gas for heating and hot water. As gas is currently the cheapest of the major commercial fuels, gas grid access can be a significant determinant in the required cost of heating a home to a satisfactory temperature.

Figure 1.3 shows the number of dwellings in rural (423,000 households) and urban areas (2.106 million households) by property type. More than half (54%; 227,000 households) of all rural dwellings are detached, and 20% (84,000) are semi-detached. Only 9% of rural dwellings are flats; 40,000 in total.

The most common dwelling type in urban areas is the tenement flat (577,000), accounting for around 27% of urban housing. Around 59% of urban stock are detached, semi-detached and terraced houses, in total accounting for 1.2 million of the 2.1 million urban dwellings.

Figure 1.3: Dwelling Types in Rural and Urban Areas, 2021 [note 2]



Data Source: Table KA5b in Key Attributes of the Scottish Housing Stock Tables

1.3 Heating Fuel

This section examines the distribution of dwellings in terms of the primary heating fuel used and a range of other characteristics, such as age and type of dwelling. The relationship between the type of fuel used, the energy efficiency rating and fuel poverty will be explored further in later chapters.

Overwhelmingly the most common heating fuel is mains gas: 80% of Scottish households (around 2.0 million) use mains gas for heating, 11% use electricity and 6% use oil (see Table 1.4).

Around 314,000 households (12% of all households) were estimated to heat their homes with electricity, communal heating, or biomass.

Table 1.4: Primary heating fuel by sector, 2021 [note 1] [note 4]

Primary Heating Fuel	Owner Occupied	Private Rented	Social Sector	All Sectors
Mains gas	81%	71%	83%	80%
Electricity	8%	19%	13%	11%
Oil	8%	5%	1%	6%
Communal Heating	[low]	2%	3%	1%
LPG bulk or bottled	1%	1%	[c]	1%
Solid mineral fuel	1%	1%	[c]	1%
Biomass	1%	1%	0%	[low]
Total	100%	100%	100%	100%
Sample size (number)	2,100	423	651	3,174

Mains gas and electricity are the primary fuel types present in 96% of social housing with a further 3% (19,000 households) using some form of communal heating. Conversely, oil is rarely used to heat social housing, but is the primary heating fuel in 8% of owner-occupied dwellings and 5% of private rented dwellings.

Mains gas use is less prevalent in private rented households at 71% compared to 81% in owner occupied dwellings and 83% in social housing.

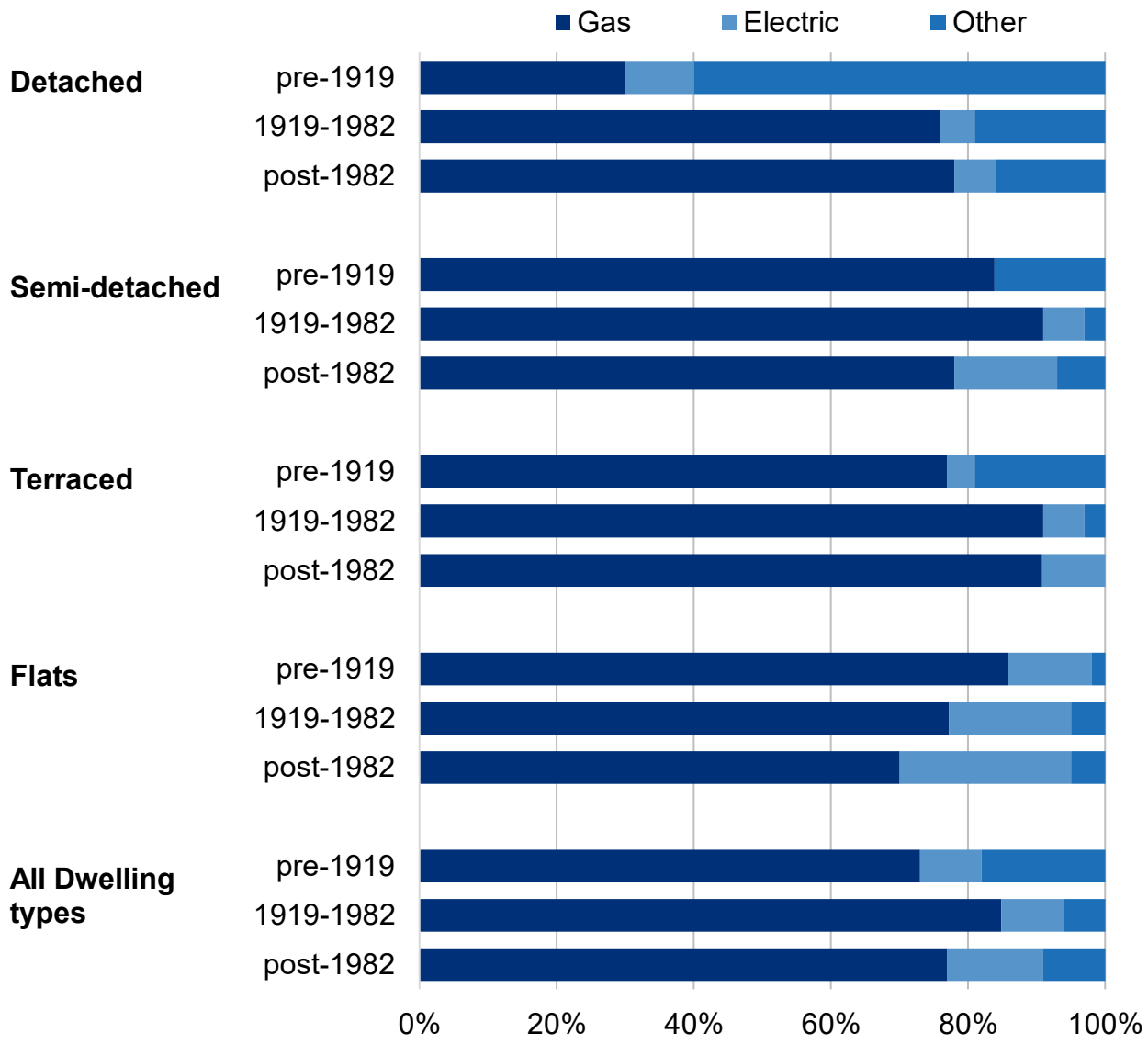
Owner occupier households were less likely to use electricity as their primary fuel type at 8% compared to 19% of private rented dwellings and 13% of social sector dwellings.

84% of dwellings built between 1919 and 1982 use gas as their primary heating fuel (see Figure 1.4). In comparison, 77% of dwellings built after 1982 and 73% of dwellings built pre-1919 use gas. Older dwellings more commonly (18%) use other fuel types (such as oil) aside from gas or electricity than newer dwellings.

Primary heating fuel also varies by type of dwelling (see Figure 1.4). Households living in detached houses are least likely to use mains gas for heating; 70% of them do, compared to 80% of households for Scotland as a whole and 89% of those households living in terraced houses. This is due to the greater prevalence of alternative heating fuels amongst pre-1919 detached houses. 30% of pre-1919 detached houses use gas as their primary heating fuel, 10% use electricity, and around three fifths of them (60%) are reliant on an alternative fuel source for space heating and hot water. As shown in Figure 1.3 this is largely due to the higher proportion of detached dwellings in rural areas and Table 1.3 demonstrates that dwellings in rural areas are less likely to be within the coverage of the gas grid.

“Other” fuels (than gas or electricity) are most commonly used in detached houses. Flats have the highest levels of electricity (18%) as main heating fuel.

Figure 1.4: Primary Heating Fuel by Age and Type of Dwelling, 2021



Data Source: Table KA7a in Key Attributes of the Scottish Housing Stock Tables

Primary heating fuel varies by geographic location. 88% of dwellings in urban locations use mains gas as their primary heating fuel compared to 40% of those in rural locations. By contrast, there are higher rates of electricity and oil as primary heating fuel in rural locations, 19% and 30%, respectively, compared to urban locations where electricity is used in 9% and oil in 1% of dwellings (see Table 1.5).

Table 1.5: Primary Heating Fuel by Urban/Rural Location, 2021
[note 1] [note 2] [note 4]

Primary Heating Fuel	Urban	Rural	All Locations
Mains gas	88%	40%	80%
Electricity	9%	19%	11%
Oil	1%	30%	6%
Communal Heating	1%	[c]	1%
LPG bulk or bottled	[c]	6%	1%
Solid mineral fuel	[low]	2%	1%
Biomass	[low]	2%	[low]
Total	100%	100%	100%
Sample size (number)	2,411	763	3,174

1.4 Household Type

1. In this report we describe households in terms of three main types which are derived from the more detailed classification used in the Scottish Household Survey:

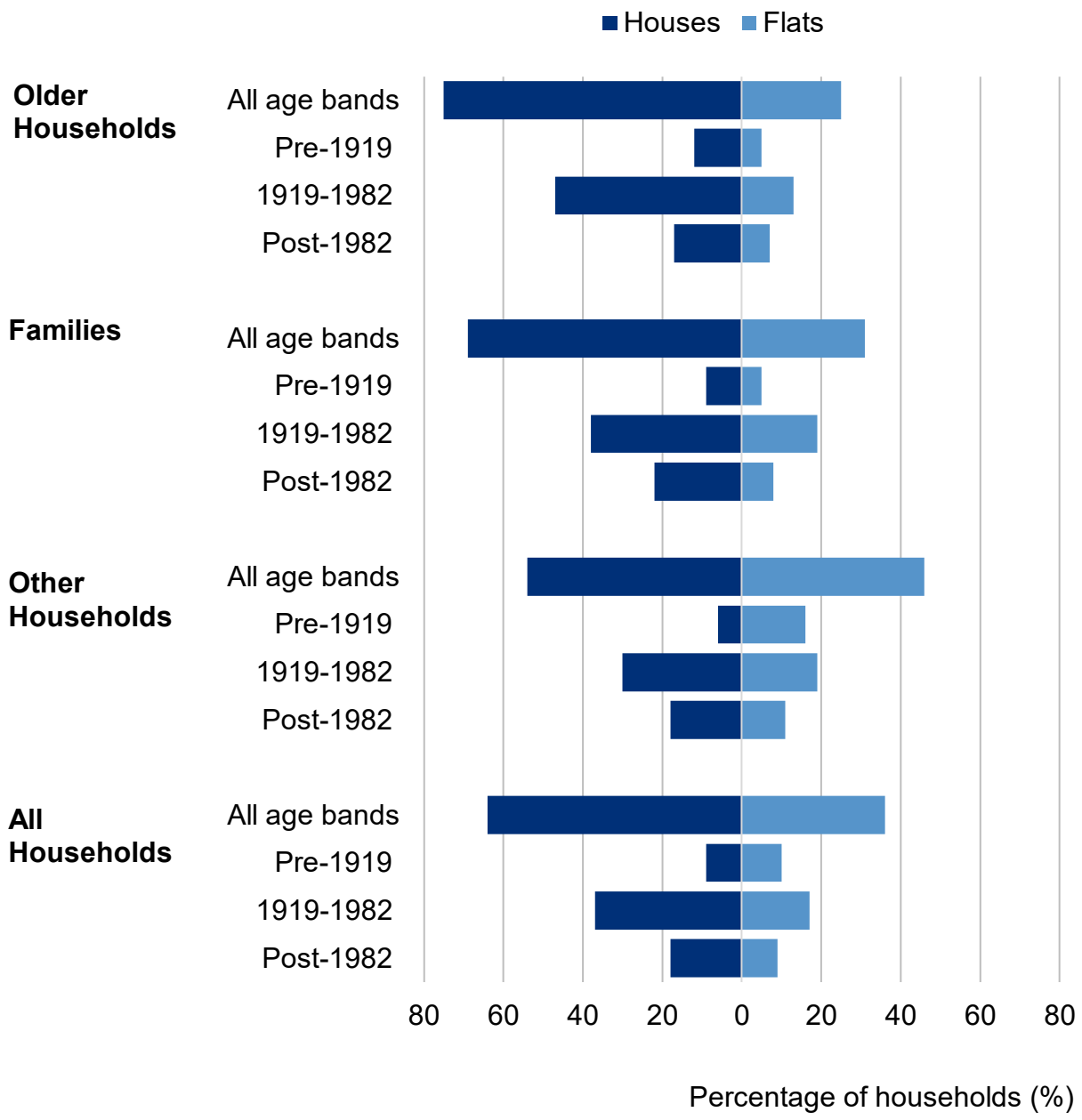
- **Families.** These are households which contain at least one child aged under 16. The resident adult(s) may be of any age.
- **Older households.** One- or two-member households which include at least one resident aged 65 or older.
- **Other households.** These are all other household types which are made up of adults only and have no resident children.

More details about the definitions are provided in section 7.6.2. This grouping was introduced in the 2015 Key Findings report and is different from the one used in previous reports, where the pensionable age for women was 60 and 65 for men. From 2015 onwards, 65 is adopted as the common age threshold for both men and women for older households reflecting the gradual increase in the state pension age for women.

There is a broad association between household types and the type of dwellings they occupy, as shown in Figure 1.5. While families and older households are more likely to live in houses (69% and 75% respectively), other households are more evenly split between houses and flats (54% and 46% respectively).

Families have the highest proportional occupancy of post-1982 houses: 22% of households with children live in post-1982 houses, compared with 17% of older households and 18% of other types of households. The highest occupancy of pre-1919 flats is observed among other types of households, 16%, compared to 5% for families and 5% for older households. 47% of older households live in dwellings built in 1919-1982, which is higher than the proportion of families (38%) and other households (30%) that live in such dwellings.

Figure 1.5: Households by Dwelling Type and Age Band, 2021



Data Source: Table KA9a in Key Attributes of the Scottish Housing Stock Tables

1.5 Tenure

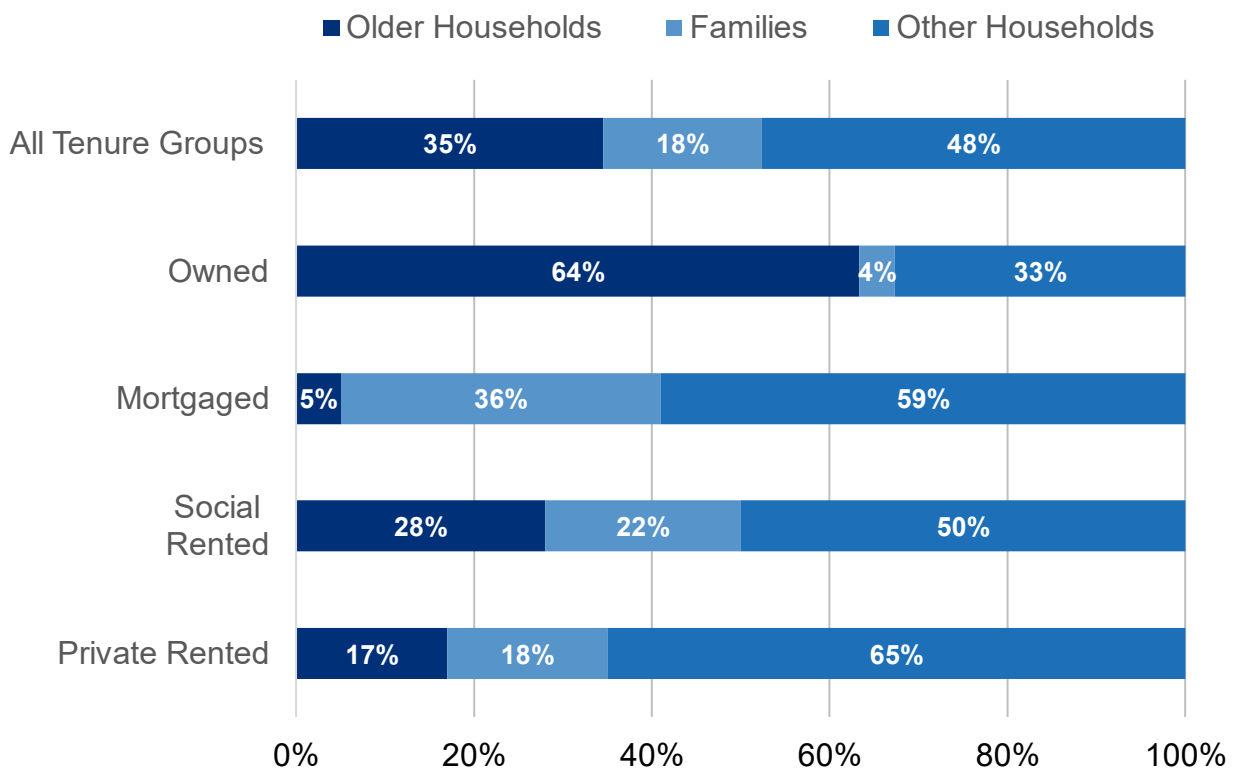
Statistics on tenure in the 2021 SHCS are based on the achieved sample of dwellings in the physical survey and are calibrated against figures rolled forward from the 2019 Scottish Survey Core Questions. For more information see Chapter 6 of this report. For estimates of the total number of dwellings by tenure, readers are referred to the Scottish Government Housing Statistics for Scotland publication which uses information from social landlords' returns which comprehensively cover the social housing sector and therefore provides more accurate estimates of the total stock.

In this section we explore data from the SHCS sample which provides more detailed information on the composition of each tenure type.

1.5.1 Household Type and Tenure

There are some clear differences in household type across tenure, as shown in Figure 1.6.

Figure 1.6: Proportion of Households in Each Tenure Group by Household Type, 2021



Data Source: Table KA10a in Key Attributes of the Scottish Housing Stock Tables

Owner occupiers with mortgages are predominantly families (36%) and other households (59%). The majority of those who own their properties outright are older households (64%) and other types of households (33%).

The majority of those who live in the private rented sector (PRS) belong to other households (65%) and only 17% are older households. Around a quarter of renters in social sector (22%) and 18% in private sector are households with children, which reflects their share in the national population.

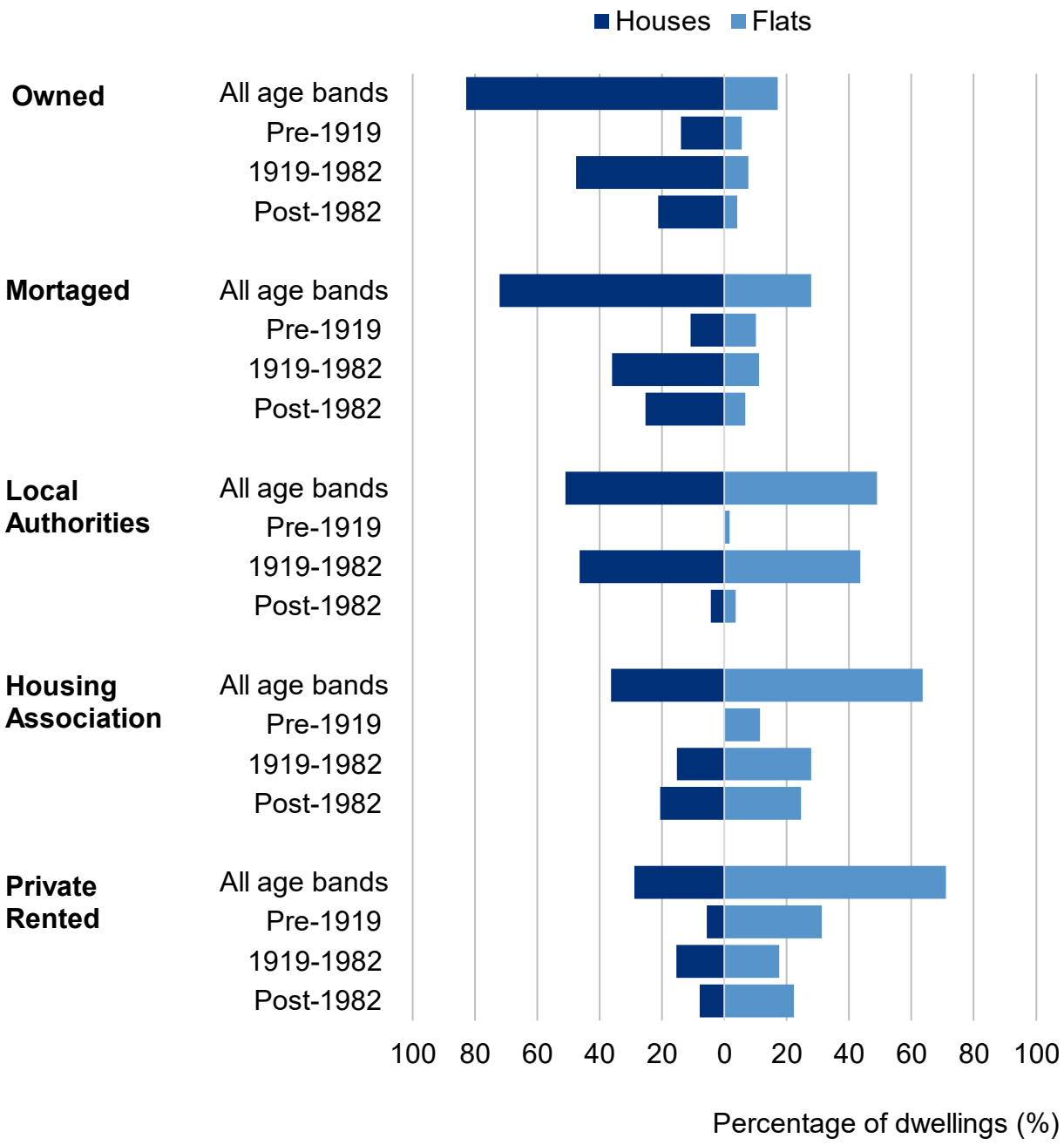
1.5.2 Dwelling Type and Tenure

Figure 1.7 shows that rented properties in the Housing Association (HA) and private rented sectors are more likely to be flats. Flats account for 64% of Housing Association (HA) stock and 71% of dwellings rented from private sector landlords.

Owner-occupied dwellings are more likely to be houses: 83% of dwellings owned outright and 72% of those with a mortgage, compared to 51% of dwellings owned by Local Authorities, 36% of Housing Association stock and 29% of private rented properties.

Almost all properties (90%) owned by Local Authorities were built between 1919 and 1982, while less than half (43%) of the Housing Associations stock was built in this period. Private rented sector dwellings are older, with 37% built before 1919, compared with 33% built between 1919 and 1982 (see Figure 1.7).

Figure 1.7: Proportion of Dwellings in Each Tenure Group by Age Band and Type of Dwelling, 2021



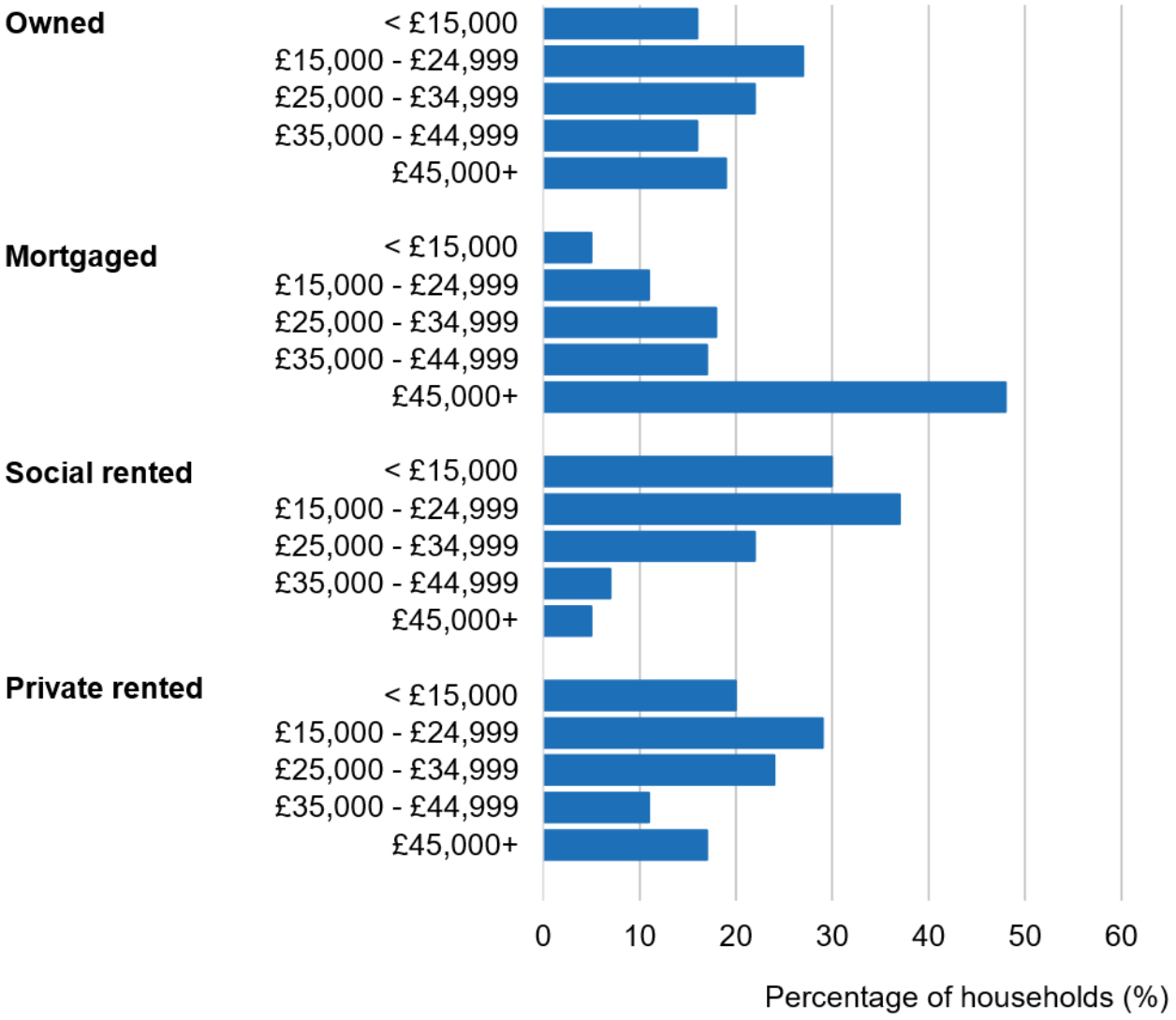
Data Source: Table KA11a in Key Attributes of the Scottish Housing Stock Tables

1.6 Household Income Band

As we might expect, income and tenure are closely correlated. For social sector residents the distribution is skewed towards lower income groups, as shown in Figure 1.8, while for households with mortgages the distribution is skewed towards the highest income group.

The distribution of households by income in the PRS is broadly similar to that for outright owner occupiers.

Figure 1.8 Households by Tenure Group and Annual Household Income Band, 2021



Data Source: Table KA12a in Key Attributes of the Scottish Housing Stock Tables

2 Energy Efficiency

The energy efficiency of a dwelling depends on its physical characteristics. Factors such as the age of construction, the dwelling type, the heating and hot water systems in use and the extent to which the building fabric is insulated, all affect energy efficiency.

Based on information about the characteristics of the dwelling collected in the SHCS physical survey, and using standard assumptions about the make-up and the behaviour of the occupying household, the energy consumption associated with the dwelling is modelled. This allows us to make comparisons of energy use, emissions and energy efficiency ratings between dwellings that are independent of occupant behaviour. Further details on the methodology underpinning these measures of energy efficiency are provided in the Methodology Notes.

In this chapter we report on:

- levels of insulation in Scottish dwellings (section 2.1);
- boiler efficiencies (section 2.2);
- Energy Efficiency Ratings (EER), also known as SAP ratings (section 2.3);
- modelled carbon dioxide (CO_2) emissions from dwellings (section 2.4); and
- Environmental Impact Ratings (EIR) (section 2.5).

When interpreting and using the results presented in this chapter, readers should be mindful of the impact the external+ approach used for the 2021 SHCS has had on data quality. This is discussed in detail in Chapter 6 of this report.

In particular, readers should note that the results on EERs/SAP ratings have likely been impacted by the change in the mode of data collection (and approach).

It is likely that EERs have been overestimated due to mode effects associated with the 2021 external+ SHCS. Surveyors were reliant on householders providing information via telephone that would normally be collected as part of the internal dwelling inspection. There appears to have been a particular problem resulting in an overestimate of the proportion of dwellings with 100% fixed low-energy lighting, which will then result in EERs being overestimated. It is likely that the non-response bias in the 2021 SHS and SHCS samples will also have contributed. For further details see section 6.5.3 of this report.

2.1 Insulation Measures

Installing or upgrading insulation is one of the most effective ways to improve the energy efficiency of a building. The Energy Saving Trust estimates that an un-insulated dwelling loses a third of all its heat through the walls and a further quarter through the roof. As a result, insulation can significantly reduce energy consumption and therefore lower heating bills, making it cheaper to enjoy satisfactory levels of thermal comfort. (see Chapter 3 on Fuel Poverty.)

Additional insulation is most commonly added to a property through the insulation of loft spaces and by adding insulating material to external walls.

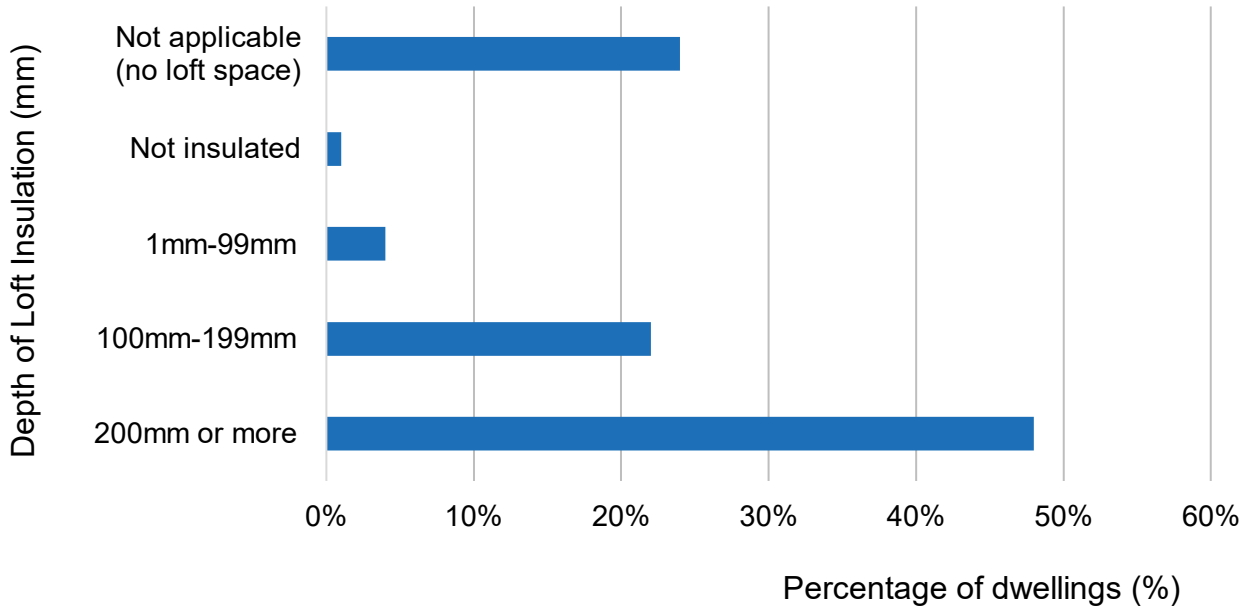
Key Points

- The majority of loft spaces are insulated. In 2021, loft insulation with a thickness of 100 mm or more had been installed in 94% of dwellings which had a loft.
- In 2021, 27% of lofts were insulated to a high depth of insulation (300 mm or more).
- The proportion of insulated cavity walls recorded by the SHCS was 72% in 2021.
- The proportion of solid wall dwellings with insulation was 17% in 2021.
- Levels of insulation (both loft and wall) are higher in the social sector than in the private sector. 55% of homes in the private sector have wall insulation compared to 70% in the social sector. In the private sector, 62% of lofts are insulated to a depth of 200 mm or more compared to 73% in the social sector.

2.1.1 Loft Insulation

In SHCS 2021, the proportion of dwellings without loft spaces was 24%.

Figure 2.1: Depth of Loft Insulation (all dwellings, including those with no loft space), 2021



Data Source: Table EE1 in Energy Efficiency Spreadsheet

The proportion of all applicable housing with no loft insulation was 1%, in 2021. 93% of dwellings with lofts were insulated to a depth of 100 mm or more and 64% of dwellings with lofts were insulated to a depth of 200 mm or more (see Table 2.1)

Table 2.1: Depth of Loft Insulation (where applicable), 2021
[note 1] [note 5]

Loft Insulation	Percentage of dwellings (%)	Number of dwellings (thousands)
Not insulated	1%	23
1mm-99mm	6%	107
100mm-199mm	29%	564
200mm or more	64%	1,221
All Dwellings	100%	1,915
Sample size (number)	2,518	

The percentage of lofts with a high depth of insulation (300 mm or more) was 27% in 2021. 26% of private sector dwellings had a high depth of loft insulation, lower than 35% of dwellings in the social sector (see Table 2.2).

As shown in Table 2.2 the depth of loft insulation is greater in social sector dwellings than private sector dwellings. In 2021, 93% of lofts in the private sector were insulated to a depth of 100 mm or more and 62% to a depth of at least 200 mm. In the social sector, 95% of dwellings had lofts insulated to a depth 100 mm or more, and 73% had at least 200 mm of loft insulation.

One of the reasons for the difference between private and social sector is that the Scottish Housing Quality Standard (SHQS), which was introduced in 2004, requires at least 100 mm of loft insulation.

Table 2.2: Depth of Loft Insulation, 2021 [note 1] [note 4] [note 6]

Loft Insulation	Private Sector	Social Sector	All Tenures
none	2%	[w]	1%
1mm - 99mm	6%	5%	6%
100mm - 199mm	31%	23%	30%
200mm - 299mm	36%	38%	37%
300mm or more	26%	35%	27%
Total	100%	100%	100%
Sample size (number)	2,090	428	2,518

As surveyors were unable to enter dwellings to inspect loft spaces for the presence and depth of insulation, households were sent a letter in advance of the surveyor appointment asking them to record the average depth of any loft insulation. This was then provided to surveyors by telephone. This may have impacted on the quality of this data. However it should be noted that the profile of the housing stock by depth of loft insulation, though not directly comparable, was similar to previous years (see Table DQ9 in the external+ data quality tables accompanying this report).

2.1.2 Wall Insulation

The presence of **cavity wall insulation (CWI)** added since built is becoming increasingly difficult for SHCS surveyors to identify as over time the injection holes age, fade or are covered up by later work. Contractors are also getting better at concealing their work. This may mean that the SHCS underestimates the number of homes which have had CWI installed (see also section 6.2.2.4 of the 2019 SHCS key findings report). Despite efforts to maintain the high quality of the SHCS physical survey fieldwork, some misclassifications may remain.

In Scotland around 60% of dwellings have external cavity walls and the remaining 40% have solid or other construction types of external wall. These "other" types include steel or timber-frame dwellings and dwellings made from pre-fabricated concrete. As the improvement of solid and other wall types generally requires more expensive interventions than CWI, this diverse group is addressed together in this chapter.

Table 2.3 shows the proportion of insulated dwellings by type of wall. Higher insulation levels in new buildings have been required by building standards since 1983 when the Building Standards (Scotland) Amendment Regulations 1982 came into force. These dwellings are therefore treated as insulated when built.

In 2021, 72% of cavity wall dwellings in Scotland were insulated (see Table 2.3).

Table 2.3: Wall Insulation by Wall Type, 2021 [note 1] [note 4] [note 6]

Insulation Status	Cavity Wall (%)	Solid/Other Wall (%)	All Wall Types (%)
Un-insulated	28%	83%	42%
Insulated	72%	17%	58%
Total	100%	100%	100%
Sample size (number)	2,330	843	3,174

Table 2.3 shows that 17% of dwellings with solid or other construction type walls had insulated walls in 2021.

The information in Table 2.4 is broken down by type of cavity wall into hard to treat cavities (HTTC) and standard cavity walls using the ECO definition as far as possible with the available data (further details are available in section 7.6.6).

HTTCs have certain attributes which make CWI more expensive, complex or inadvisable. Standard cavity walls have no such barriers. It should be noted that HTTCs may be underestimated in this report. The presence of rising or penetrating damp is used to identify HTTCs and no information on the presence of this was collected due to the enforced methodological changes for the 2021 SHCS (see Chapter 6).

Table 2.4: Wall Insulation by Wall Type and Tenure, 2021
[note 1] [note 4] [note 6]

Wall Type	Insulation Status	Wall/ Insulation Categories	Private Sector	Social Sector	All Tenures
Cavity	Un-insulated	HTTC wall	8%	10%	8%
Cavity	Un-insulated	Standard wall	21%	13%	19%
Cavity	Un-insulated	All	29%	24%	28%
Cavity	Insulated	CWI insulation	33%	39%	34%
Cavity	Insulated	Int/External insulation	4%	14%	7%
Cavity	Insulated	As built insulation	35%	24%	32%
Cavity	Insulated	All	71%	76%	72%
Cavity	All	All	100%	100%	100%
Solid/Other	Un-insulated	Pre-1919 wall	76%	36%	70%
Solid/Other	Un-insulated	Post-1919 wall	11%	26%	13%
Solid/Other	Un-insulated	All	87%	61%	83%
Solid/Other	Insulated	Retrofit insulation	11%	37%	14%
Solid/Other	Insulated	As built insulation	3%	1%	2%
Solid/Other	All Status	All	13%	39%	17%
Solid/Other	All	All	100%	100%	100%
All	Un-insulated	All	45%	30%	42%
All	Insulated	All	55%	70%	58%
All	All	All	100%	100%	100%
All	All	Sample size (number)	2,523	651	3,174

In the social sector, 76% of cavity wall dwellings and 39% of dwellings with solid and other wall types were found to be insulated in 2021. 70% of social housing overall had insulated walls.

In the private sector, 71% of cavity wall dwellings and 13% of solid and other wall dwellings, had insulation in 2021. Over half (55%) of all private sector dwellings had insulated walls.

Overall 72% of cavity wall dwellings in Scotland have wall insulation. 34% have had retrofit cavity wall insulation, which is generally the lowest cost improvement available; the remainder of insulated cavity walls were insulated as built (32%) or insulated in another way such as with internal and external wall insulation (7%).

Levels of insulation are higher in the social sector at 70% (all wall types) compared with 55% in the private sector. This is being driven by higher levels of insulated solid walls in the social sector (39%) compared to the private sector (13%). Within wall type, this tenure divide is also apparent for the more expensive insulation measures: internal / external insulation of cavity walls (14% of cavity wall dwellings in the social sector; 4% of private dwellings) and retrofit solid wall insulation measures (37% of solid wall dwellings in the social sector; 11% in the private sector).

2.2 Boilers

Key Points

- In 2021, 66% of gas and oil boilers met the minimum efficiencies specified by the current Building Standards.

The heating system is a key factor in the thermal efficiency of a dwelling. Around 88% of households use a gas or oil-fuelled boiler (see Table 1.4). Trends in boiler efficiency are closely related to developments in energy efficiency and building standards regulations:

- From 1998, minimum boiler efficiency standards were set by European Council Directive 92/42/EEC
- In 2007, Scottish Building Standards increased the efficiency requirements for all new and replacement boilers, details are available in the Domestic Building Services Compliance Guide for Scotland.

Building regulations in Scotland effectively require the installation of a condensing boiler[3] for gas and oil-fuelled heating in new builds or when boilers are replaced in any dwelling.

The minimum requirements applied in the assessment of whether a boiler is compliant with standards are: a minimum efficiency of 88% for condensing standard gas, oil and LPG boilers; for condensing combination boilers, 86% for oil, and 88% for gas and LPG; for ranges, back boiler and combined primary storage units (CPSUs), 75% when gas, and 80% when oil[4].

[3] This design has higher running efficiencies; a portion of the heat that would be lost through vented water vapour is recovered through condensation in a heat exchanger.

[4] For existing dwellings, there are occasions where it may not be practical to install a condensing boiler. The Condensing Boiler Installation Assessment Procedure Guide offers further guidance in this area. Where a non-condensing boiler is installed this may result in a boiler with poorer efficiency than that of a newly installed condensing boiler of the same fuel type.

Table 2.5: Gas and Oil Boiler Types, 2021 [note 1] [note 4]

Boiler Type	Percentage of dwellings (%)	Number of dwellings (thousands)
Post-1998 Boilers	96%	2,111
Condensing Boilers	80%	1,752
Standards Compliant Boilers	66%	1,444
Sample size (number)	2,661	

The proportion of households using gas or oil boilers for heating is available on Table KA6a in the Scottish Housing Stock tables.

In 2021 the survey found that 96% of the domestic gas and oil boilers in Scotland have been installed since 1998, when the European Boiler Efficiency Directive minimum standards came into effect (see Table 2.5).

Table 2.5 shows that 80% of gas and oil boilers were condensing boilers.

In 2021, 66% of gas and oil boilers met the minimum efficiencies specified by the current Building Standards (see Table 2.5).

As surveyors were unable to enter dwellings to record the make and model of the boiler, households were sent a letter in advance of the surveyor appointment asking them to make a note of this. This was then provided to surveyors by telephone. This may have impacted on the quality of this data. However it should be noted that the percentage of boilers by age and type and the percentage complaint with minimum standards, though not directly comparable, was similar to previous years (see Table DQ9 in the external+ data quality tables accompanying this report).

2.3 Energy Performance Certificates

Key Points

- In 2021, 52% of Scottish homes were rated as EPC band C or better under SAP 2012 (RdSAP v9.93).
- The proportion of properties in the lowest EPC bands (E, F or G) was 13% in 2021.
- The median energy efficiency rating was 70, corresponding to EPC band C.

Energy Performance Certificates (EPC) were introduced in January 2009 under the requirements of the EU Energy Performance Building Directive (EPBD). They provide energy efficiency and environmental impact ratings for buildings based on standardised usage. EPCs are required when a property is either sold or rented to a new tenant.

EPCs are generated through the use of a standard calculation methodology, known as Standard Assessment Procedure (SAP). SAP is the UK Government approved way of assessing the energy performance of a dwelling, taking into account the energy needed for space and water heating, ventilation and lighting and, where relevant, energy generated by renewables.

The Energy Efficiency Rating (EER) is expressed on a scale of 1-100 where a dwelling with a rating of 1 will have very poor energy efficiency and higher fuel bills, while 100 represents very high energy efficiency and lower fuel bills. Ratings can exceed 100 where the dwelling generates more energy than it uses.

Ratings are adjusted for floor area so that they are essentially independent of dwelling size for a given built form.

For Energy Performance Certificates EERs are presented over 7 bands, labelled A to G. Band A represents low energy cost and high energy efficiency, while band G denotes high energy cost (and low energy efficiency).

Energy Efficiency Ratings reported in this publication are calculated under the SAP 2012 methodology.

SAP is periodically reviewed by the UK government to ensure it remains fit for purpose and to address its continued application across an increasing range of carbon and energy reduction policy areas. SAP is used for assessment of new buildings whilst a 'reduced data' version of the methodology, RdSAP, is applied to assessment of existing buildings.

SHCS energy modelling for SAP 2012 in this report is based on RdSAP (v9.93) which was released on 19 November 2017 and contains revisions to the underlying assumptions used within the SAP calculations. The most notable update to the methodology in v9.93 was a change to the default U-values of cavity, solid and stone walls, built prior to 1976. Compared to v9.92, U-values for solid, insulated stone and uninsulated cavity walls have improved, whereas they have declined for insulated cavity walls. These U-values are used to calculate the rate of heat loss through the walls, which contributes to the overall thermal performance of the building fabric of the dwelling.

2.3.1 Energy Efficiency Rating, SAP 2012

This section examines the energy efficiency profile of the Scottish housing stock in 2021 under the SAP 2012 methodology (RdSAP v9.93).

Table 2.6 and Table 2.7 show the energy efficiency profile of the Scottish housing stock in 2021 under SAP 2012 (RdSAP v9.93).

Table 2.6: Average EER for 2021, SAP 2012 (RdSAP v9.93)

Energy Efficiency Rate (EER)	2021
Mean	67.9
Median	70
Sample size (number)	3,174

In 2021, the mean energy efficiency rating of the Scottish housing stock under SAP 2012 (RdSAP v9.93) was 67.9 and the median was 70 points, indicating that half of the housing stock has an energy efficiency rating of 70 or better (Table 2.6).

52% of all properties in 2021 were rated C or better under SAP 2012 (RdSAP v9.93) and 13% were in bands E, F or G (see Table 2.7).

Table 2.7: Distribution of the Scottish Housing Stock by EPC Band in 2021, SAP 2012 (RdSAP v9.93) [note 1] [note 4]

EPC Band	Percentage of dwellings (%)	Number of dwellings (thousands)
A (92-100)	[low]	2
B (81-91)	5%	121
C (69-80)	47%	1,185
D (55-68)	35%	896
E (39-54)	10%	248
F (21-38)	3%	66
G (1-20)	[low]	11
All EPC Bands	100%	2,529
Sample size (number)	3,174	

Table 2.8 shows the energy efficiency profile by broad tenure groups in 2021 using SAP 2012 (RdSAP v9.93). Figure 2.2 provides more details on the distribution of the least energy efficient properties by household characteristics.

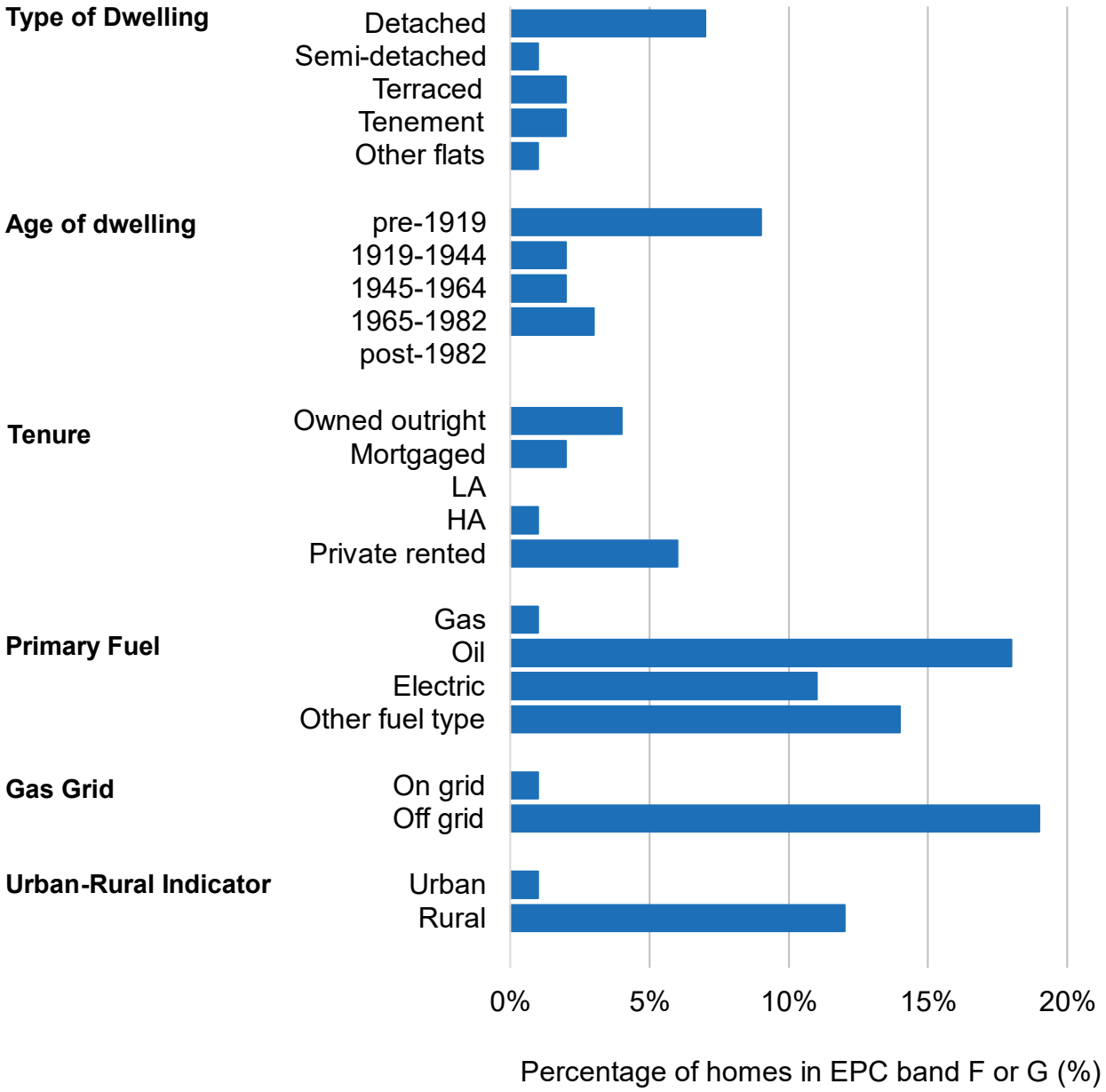
Table 2.8: Percentage of dwellings by EPC band and tenure in 2021 [note 1] [note 4]

EPC band	Owner occupied (%)	Private rented (%)	Social sector (%)	All Tenures (%)
A (92-100)	[low]	[w]	[low]	[low]
B (81-91)	4%	7%	6%	5%
C (69-80)	43%	44%	59%	47%
D (55-68)	38%	35%	28%	35%
E (39-54)	11%	9%	6%	10%
F (21-38)	3%	5%	1%	3%
G (1-20)	0%	1%	[w]	0%
Total	100%	100%	100%	100%
Sample size (number)	2,100	423	651	3,174

65% of social housing is in band C or better under SAP 2012 (RdSAP v9.93), compared to 51% in the private rented sector and to 47% in the owner-occupied sector. 7% of dwellings in the social sector are within EPC bands E, F or G, while 14% of owner occupied dwellings and 15% of the private rented sector are within these EPC bands. Housing in the social sector tends to be more energy efficient than the owner occupied or private rented sector. This could be driven by the Scottish Housing Quality Standard and the Energy Efficiency Standard for Social Housing which introduced minimum energy efficiency levels for that sector.

Figure 2.2 shows that the share of dwellings in the lowest energy efficiency bands (F and G) is particularly high for pre-1919 dwellings (9%), non-gas heated properties (between 11% for electric and 18% for oil), detached properties (7%), off gas grid properties (19%), rural areas (12%) and in the private rented stock (6%). Across Scotland as a whole, 3% of properties were in bands F or G in 2021.

Figure 2.2: Proportion of Homes in EPC Band F or G by Dwelling and Household Characteristics in 2021, SAP 2012 (RdSAP v9.93)
[note 2] [note 3]



Data Source: Tables EE10 and EE11 in Energy Efficiency Spreadsheet

More detailed breakdowns are shown in Table 2.9 by household characteristics and in Table 2.10 by dwelling characteristic.

Mean SAP 2012 (RdSAP v9.93) ratings ranged from 64.2 in dwellings owned outright to 71.4 in housing association dwellings, a statistically significant difference. Social housing as a whole is more energy efficient than the private sector, with a mean EER of 69.9 compared to 65.5 for private dwellings.

Older households (63.9) have lower average EER ratings than families (68.3) and other (adults without children) households (67.7).

Mean EER ratings ranged from 65.8 to 67.0 across income bands. Average EER ratings ranged from 63.1 to 67.5 across council tax bands with dwellings in higher council tax bands being less energy efficient.

Table 2.9: Mean EER and Broad EPC Band, by Household Characteristics in 2021, SAP 2012 (RdSAP v9.93)

Household Characteristics	Category	SAP 2012 Ratings Mean	EPC Band ABC (%)	EPC Band DE (%)	EPC Band FG (%)
Tenure	Owned outright	64.2	43%	53%	4%
Tenure	Mortgaged	67.6	54%	44%	2%
Tenure	LA	68.9	59%	41%	0%
Tenure	HA	71.4	75%	24%	1%
Tenure	Private rented	65.7	51%	44%	6%
Tenure (grouped)	Private Sector	65.5	48%	49%	4%
Tenure (grouped)	Social Sector	69.9	65%	34%	1%
Household Composition	Older Households	63.9	43%	52%	5%
Household Composition	Families	68.3	55%	44%	1%
Household Composition	Other Households	67.7	57%	40%	3%
Annual Income	< £15,000	65.8	48%	48%	4%
Annual Income	£15,000- £24,999	66.4	54%	43%	3%
Annual Income	£25,000- £34,999	67.0	53%	45%	2%
Annual Income	£35,000- £44,999	66.9	50%	48%	3%
Annual Income	£45,000+	66.7	52%	45%	3%
Council Tax Band	Band A	67.5	59%	38%	2%
Council Tax Band	Band B	66.2	50%	47%	3%
Council Tax Band	Band C	67.1	53%	46%	2%
Council Tax Band	Band D	67.4	55%	41%	4%
Council Tax Band	Band E	65.7	47%	50%	3%
Council Tax Band	Band F	66.7	48%	51%	1%
Council Tax Band	Band G & H	63.1	42%	51%	7%
All households	All households	66.5	52%	45%	3%

Sample sizes are available on Table EE10 in Energy Efficiency Spreadsheet

Table 2.10 shows that there is a strong association between dwelling characteristics and energy efficiency rating. Across dwelling types, detached properties have the lowest energy efficiency ratings on average (mean EER 62.8) while flats have the highest ratings (70.3 for tenements and 68.7 for other flats).

The **oldest, pre-1919**, properties are the least energy efficient (mean EER of 58.9 and 30% rated C or better) while those built after 1982 have the highest energy efficiency ratings (mean EER of 73.2, with 79% in band C or better).

Primary heating fuel is a key determinant of the energy efficiency of the dwelling. Properties heated by mains gas have an average rating of 68.9 and 58% are in band C or better. Dwellings heated by other fuels (including electric and oil) have considerably lower ratings. The average energy efficiency rating for oil heated properties is 50.9 (corresponding to EPC band E) and only 8% are in band C or better. For electric heated dwellings the average energy efficiency rating was 58.6 and 32% are in band C or better.

Proximity to the **gas grid** has a similar effect on the energy efficiency rating (average SAP rating 68.0 for dwellings near the gas grid, higher than the 59.4 for off grid dwellings).

As dwelling characteristics associated with lower energy efficiency are disproportionately represented in **rural areas**, the average energy efficiency profile of rural properties is lower than that for **urban areas**. Table 2.10 shows that the mean SAP 2012 (RdSAP v9.93) rating is 68.3 for dwellings in urban areas, higher than the 57.7 for dwellings in rural areas, where 29% of dwellings are in band C or better.

Table 1: Mean EER and Broad EPC Band, by Dwelling Characteristics in 2021, SAP 2012 (RdSAP v9.93) [note 2] [note 4]

Dwelling Characteristics	Category	SAP 2012 Ratings Mean	EPC Band ABC (%)	EPC Band DE (%)	EPC Band FG (%)
Dwelling Type	Detached	62.8	43%	49%	7%
Dwelling Type	Semi-detached	65.5	41%	58%	1%
Dwelling Type	Terraced	66.1	46%	53%	2%
Dwelling Type	Tenement	70.3	69%	29%	2%
Dwelling Type	Other flats	68.7	64%	35%	1%
Dwelling Age	pre-1919	58.9	30%	61%	9%
Dwelling Age	1919-1944	64.9	40%	58%	2%
Dwelling Age	1945-1964	65.8	43%	55%	2%
Dwelling Age	1965-1982	66.4	50%	47%	3%
Dwelling Age	post-1982	73.2	79%	20%	[low]
Primary Heating Fuel	Gas	68.9	58%	42%	1%
Primary Heating Fuel	Oil	50.9	8%	73%	18%
Primary Heating Fuel	Electric	58.6	32%	56%	11%
Primary Heating Fuel	Other fuel type	60.1	44%	42%	14%
Urban-Rural Indicator	Urban	68.3	56%	42%	1%
Urban-Rural Indicator	Rural	57.7	29%	60%	12%
Gas Grid	On grid	68.0	54%	45%	1%
Gas Grid	Off grid	59.4	38%	49%	13%
All dwellings	All dwellings	66.5	52%	45%	3%

Sample sizes are available on Table EE11 in Energy Efficiency Spreadsheet

The National Home Energy Ratings (NHER) system was the main methodology used in the SHCS to report on the energy efficiency of the housing stock prior to 2013. With the publication of the 2013 SHCS Key Findings Report the energy modelling methodology was updated and it is no longer possible to reproduce exactly the original NHER method, as the full documentation of this method is not publicly available. Further details can be found in the Methodology Notes to the 2013 SHCS report. However because of user interest (and because NHER scores were taken into account under the energy efficiency criterion of the SHQS) we provide an approximate NHER score by household and dwelling characteristics in Table EE12 and EE13 in the supplementary tables.

2.4 Carbon Emissions

Key Points

- Based on modelled energy use required to meet the SAP standard heating regime[5], the average Scottish home was estimated to produce 6.5 tonnes of carbon dioxide (CO_2) per year in 2021, which is approximately double the average carbon emissions per household as reported by Department for Energy Security and Net Zero (3.3 tonnes per year) in 2020, based on actual energy use. This suggests that households are not heating their homes to the SAP standard heating regime.
- Average modelled carbon emissions for all properties was 69 kg per square meter of floor area in 2021.

Carbon Emissions are the amount of greenhouse gas emissions, expressed as their carbon dioxide gas equivalent, vented to the atmosphere. Estimates of emissions from the residential sector which take into account actual energy consumption by households are reported annually by Department for Energy Security and Net Zero in the Local and Regional Carbon Dioxide (CO_2) Emissions Estimates. This methodology is consistent with the Greenhouse Gas Inventory (GHGI) which is the source for monitoring progress against the Scottish Government's climate change commitments.

In contrast, emissions reported from the SHCS are modelled on the assumption of a standard pattern of domestic energy consumption and do not reflect differences in consumption behaviour due to cost, preferences or changes in weather conditions. As such, they are distinct from the carbon emissions figures published by Department for Energy Security and Net Zero and compiled in GHG inventories.

Estimates in the Climate Change Plan: Third Report on Proposals and Policies (RPP3) are also not comparable to SHCS estimates. RPP3 figures for the residential sector relate to non-traded emissions only (i.e. exclude electricity which is covered by the EU Emissions Trading System) while SHCS estimates cover all fuel types.

[5] The standard heating regime is: 21°C in the living room (zone 1) and 18°C in other rooms (zone 2) for 9 hours a day during the week and 16 hours a day during the weekend.

This report is only concerned with the level and variations in modelled emissions from the Scottish housing stock. These estimates are produced through the use of BREDEM 2012-based models, in line with other statistics on energy efficiency and fuel poverty reported here. Information on the energy modelling is available in the Methodology Notes.

To derive emissions estimates, modelled energy demand is combined with carbon intensity factors as adopted for the 2012 edition of the SAP (see section 7.3). These are carbon dioxide (CO_2) equivalent figures which include the global warming impact of methane (CH_4) and nitrous oxide (N_2O) as well as carbon dioxide (CO_2).

2.4.1 Modelled Emissions by Dwelling Type and Age of Construction

The annual modelled emissions from a property reflect the energy use for the whole dwelling heated according to the SAP standard heating regime[6].

Table 2.11 shows that newer dwellings have lower modelled emissions than older ones on average as a result of their better thermal performance and higher energy efficiency (as shown in section 2.3). Post-1982 tenement and other flats have the lowest modelled emissions on average (3.3 and 3.4 tonnes per year, respectively).

[6] The standard heating regime is: 21°C in the living room (zone 1) and 18°C in other rooms (zone 2) for 9 hours a day during the week and 16 hours a day during the weekend.

Table 2.11: Modelled Annual Carbon Emissions by Dwelling Age and Type, 2021

Dwelling Age	Dwelling Type	Carbon Emissions (tonnes/ year)	Carbon Emissions (kg/sqm)	Sample Size (number)
Pre-1919	Detached	16.9	108	182
Pre-1919	Semi-detached	11.0	83	83
Pre-1919	Terraced	9.7	87	93
Pre-1919	Tenement	4.3	78	225
Pre-1919	Other flats	8.9	91	81
Pre-1919	All dwelling types	8.9	87	664
1919-1982	Detached	9.9	73	355
1919-1982	Semi-detached	6.4	71	398
1919-1982	Terraced	6.0	70	396
1919-1982	Tenement	4.1	68	200
1919-1982	Other flats	4.4	66	219
1919-1982	All dwelling types	6.2	70	1,568
Post-1982	Detached	7.8	55	429
Post-1982	Semi-detached	5.1	58	147
Post-1982	Terraced	4.4	57	105
Post-1982	Tenement	3.3	54	189
Post-1982	Other flats	3.4	56	72
Post-1982	All dwelling types	5.5	56	942
All Dwelling ages	Detached	10.1	71	966
All Dwelling ages	Semi-detached	6.6	70	628
All Dwelling ages	Terraced	6.3	70	594
All Dwelling ages	Tenement	3.9	67	614
All Dwelling ages	Other flats	5.0	68	372
All Dwelling ages	All dwelling types	6.5	69	3,174

Across all age bands, detached houses have the highest modelled emissions due to a larger share of exposed surfaces (between 7.8 tonnes per year for post-1982 dwellings to 16.9 tonnes per year for pre-1919 dwellings). As shown in section 1.3 of this report, they are also the most likely to use high carbon-intensity fuels such as oil and coal in place of mains gas.

Dwellings with larger floor areas generally have higher carbon emissions (see Table EE14 in the supplementary tables).

By dividing modelled emissions by total internal floor area we derive carbon dioxide (CO_2) emissions per square meter (kg/m^2). Controlling for floor area in this way (see Table 2.11) shows that pre-1919 detached (108 kg/m^2) houses have the highest modelled emissions per square meter. Post-1982 dwellings have the lowest emissions, particularly detached dwellings (55 kg/m^2), and tenements (54 kg/m^2).

2.4.2 Modelled Emissions by Tenure

Table 2.12 show how emissions differ across tenure in 2021. The highest emissions were observed for private rented dwellings (78 kg/m^2) and lowest for housing association dwellings (63 kg/m^2), with emissions from the other tenures falling in between those values.

Table 2: Average Modelled Emissions by Tenure, 2021

Tenure	Average Modelled Emissions (kg per square meter)	Sample Size (number)
Owner occupied	70	1,338
Mortgaged	67	762
LA	68	375
HA	63	276
Private rented	78	423
All Tenures	69	3,174

2.5 Environmental Impact Rating

The Environmental Impact Rating (EIR) represents the environmental impact of a dwelling in terms of carbon emissions associated with fuels used for heating, hot water, lighting and ventilation. Ratings are adjusted for floor area so they are independent of dwelling size for a given built form. Emissions for this measure are calculated using the SAP methodology.

EIRs for 2021 have been described in this report based on SAP 2012 under RdSAP v9.93.

As shown in Table 2.13, 38% of dwellings had EIRs in band C or above. The mean rating was 63 and the median was 65, both of which fall in band D. 6% of dwellings had EIRs in band F or G.

Table 3: EIR Bands in the Scottish Housing Stock, 2021 SAP 2012 (RdSAP v9.93)

EIR Band	Percentage of dwellings (%)	Number of dwellings (thousands)
A - B (81+)	7%	170
C (69-80)	31%	786
D (55-68)	39%	984
E (39-54)	17%	430
F (21-38)	5%	134
G (1-20)	1%	26
All EIR Bands	100%	2,530
Mean	63	
Median	65	
Sample size (number)	3,174	

Table 2.14 shows how EIRs vary across different type of dwellings. As expected dwellings built post-1982 have (higher) better EIRs than other dwellings, with 67% rated band C or better and only 1% in the bottom two bands (F and G). Flats have a lower environmental impact (higher EIR) than houses, as do gas heated properties compared to those heating using oil or electricity.

Oil heating systems and houses are more common in rural areas, leading to higher environmental impacts (lower EIRs) for rural dwellings.

Table 2.144: SAP 2012 (RdSAP v9.93): Mean EIR and Broad EIR Band, by Dwelling Characteristics, 2021 [note 2] [note 3]

Dwelling Characteristics	Category	EIR (Mean)	EIR Band ABC (%)	EIR Band DE (%)	EIR Band FG (%)
Dwelling Type	Detached	57.3	26%	60%	14%
Dwelling Type	Semi-detached	60.8	24%	71%	5%
Dwelling Type	Terraced	61.6	29%	66%	5%
Dwelling Type	Tenement	68.9	61%	36%	3%
Dwelling Type	Other flats	65.9	52%	45%	4%
Dwelling Type (grouped)	House	59.8	26%	65%	8%
Dwelling Type (grouped)	Flat	67.9	58%	39%	3%
Dwelling Age	pre-1919	53.6	23%	59%	18%
Dwelling Age	1919-1944	60.6	26%	69%	5%
Dwelling Age	1945-1964	62.0	27%	70%	3%
Dwelling Age	1965-1982	62.4	32%	63%	6%
Dwelling Age	post-1982	70.9	67%	32%	1%
Primary Heating Fuel	Gas	65.9	43%	56%	1%
Primary Heating Fuel	Oil	42.1	2%	58%	40%
Primary Heating Fuel	Electric	49.9	15%	62%	23%
Primary Heating Fuel	Other fuel type	61.3	61%	17%	22%
Urban-Rural Indicator	Urban	64.8	41%	56%	3%
Urban-Rural Indicator	Rural	52.1	20%	58%	22%
Gas Grid	On grid	64.2	38%	59%	3%
Gas Grid	Off grid	55.2	35%	42%	24%
All dwellings	All dwellings	62.7	38%	56%	6%

Sample sizes are available on Table EE19 in Energy Efficiency Spreadsheet

3 Fuel Poverty

Key Points

- The figures presented in this report are a best estimate of fuel poverty and extreme fuel poverty rates from the 2021 External+ Scottish House Condition Survey (SHCS). These estimates are not comparable to those from previous waves of the SHCS due to the change in the mode of approach and data collection in 2021, as well as the bias in the 2021 sample. It is likely that fuel poverty rates are being underestimated due to the over representation of higher income households in the social survey and the mode effects due to the changes to the physical survey that are driving the increases in energy efficiency ratings. For further details see Chapter 6.
- Furthermore these estimates pre-date the large increases in energy prices that occurred in 2022[7].
- 495,000 households (19.6% of all households) were estimated to be in fuel poverty, of which 241,000 (9.5% of all households) were in extreme fuel poverty.
- The actual median fuel poverty gap for fuel poor households was £690.
- The median fuel poverty gap (adjusted for 2015 prices) for fuel poor households was £620.
- Overall rates of fuel poverty differed between the social (34%) and private sector (15%). Similarly households in the social sector were more likely to be in extreme fuel poverty (15%) compared to households in the private sector (8%).
- 41% of households using electricity as their primary heating fuel were fuel poor, higher than for households using gas (16%), oil (23%) and other fuel types (22%) as their primary heating fuel.

[7] We have undertaken fuel poverty scenario modelling based on data from the 2019 SHCS to estimate the number of households in Scotland that are likely to now be in fuel poverty, by applying up to date increases in fuel prices, price caps and various government support interventions. From April 2023 with the price cap for the typical dual-fuel household paying by direct debit set at £2,500 under the Energy Price Guarantee and removal of the £400 Energy Bills Support Scheme we estimate that there will be 920,000 fuel poor households (37% of all households), of which 720,000 (29% of all households) will be in extreme fuel poverty.

- A higher proportion of households with a pre-payment meter (PPM; electricity, gas or both) were in fuel poverty compared to those without a PPM; 33% compared to 17% respectively.
- Fuel poverty and extreme fuel poverty have a strong association with income, with rates increasing as annual household income decreases. For example 79% of households with an annual income less than £15,000 were in fuel poverty compared to 20% of households earning between £15,000 and £24,999 annually.
- For both fuel poor and extreme fuel poor households, the lowest rates of fuel poverty are associated with higher energy efficiency standards. 16% of dwellings rated EPC band C or better were fuel poor, compared to 43% in bands F or G.
- Although low income is associated with fuel poverty, it is not equivalent. 76% of fuel poor households were also income poor in 2021 whilst the other 24% would not be considered income poor.

3.1 Definition and Measurement of Fuel Poverty

Under the Housing (Scotland) Act 2001 (section 88), the Scottish Government was committed to eradicating fuel poverty as far as practicably possible by November 2016. In June 2016, the Minister for Local Government and Housing informed Parliament that, based on the advice received from experts, it was unlikely that the statutory fuel poverty target would be met. This was confirmed by 2016 and 2017 fuel poverty rates, under the old definition of fuel poverty, of 26.5% and 24.9% respectively.

The Fuel Poverty (Targets, Definition and Strategy)(Scotland) Bill was introduced to the Scottish Parliament on 26 June 2018 and the Fuel Poverty (Targets, Definition and Strategy)(Scotland) Act 2019 received Royal Assent on 18th July 2019. This includes a new definition of fuel poverty based on advice from an independent panel of experts and further scrutiny and amendment by the Scottish Parliament.

This was followed by The Fuel Poverty (Enhanced Heating) (Scotland) Regulations 2020 which received royal assent in February 2020 and defined the heating regimes to be used in the measurement of fuel poverty.

As set out in section 3 of the Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act, a household is in **fuel poverty** 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 remaining adjusted net income must be at least 90% of the UK Minimum Income Standard (MIS) to be considered an acceptable standard of living, with an additional amount added for households in remote rural, remote small town and island (RRRSTI) areas.

Extreme fuel poverty follows the same definition except that a household would have to spend more than 20% of its adjusted net income (after housing costs) on total fuel costs to maintain a satisfactory heating regime.

It is important to note that households in extreme fuel poverty are also considered to be in fuel poverty and consequently represent a subset of the total number of fuel poor households.

Where a household is in fuel poverty, the **fuel poverty gap** is the annual amount that would be required to move the household out of fuel poverty. This is either:

- the amount required so that the fuel costs necessary for the home are no longer more than 10% of the household's adjusted net income (after housing costs), or
- the amount required which, after deducting fuel costs, benefits received for a care need or disability[8] and childcare costs, means the household's remaining adjusted net income is sufficient to maintain an acceptable standard of living.

The figure taken to determine the gap for each household is the lower of the two options.

The Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019 also set targets to eradicate fuel poverty. The 2040 targets are that:

- no more than 5% of households in Scotland would be in fuel poverty
- no more than 1% of households in Scotland would be in extreme fuel poverty
- the median fuel poverty gap of households in Scotland in fuel poverty would be no more than £250 at 2015 prices (adjusted to take account of changes in the value of money).

The figures presented in this report are a best estimate of fuel poverty rates, extreme fuel poverty rates and the median fuel poverty gap under this definition of fuel poverty, using data collected through the 2021 External+ SHCS. It should be noted that these estimates are not comparable to those from previous waves of the SHCS due to the change in the mode of approach and data collection in 2021 as well as bias in the 2021 sample. For further details see Chapter 6. Furthermore these estimates pre-date the very high increases in energy prices that occurred in 2022.

[8] This includes amounts received for: Disability Living Allowance (DLA), Personal Independence Payments (PIP), Attendance Allowance (AA) and Severe Disablement Allowance (SDA)

The Fuel Poverty (Enhanced Heating) (Scotland) Regulations 2020 and Fuel Poverty (Additional Amount in respect of Remote Rural Area, Remote Small Town and Island Area) (Scotland) Regulations 2020 came into force on the 26th February 2020. These regulations set out the types of households to which the enhanced heating regimes are appropriate and specify a person who is to determine the uplifts to the UK MIS for households living in RRRSTI areas. The estimates in this report are the first set of fuel poverty estimates fully compatible with all of the elements of the new definition in the Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019 including the regulations above.

The estimates in this report include an uplift to the UK MIS for households living in RRRSTI areas, as determined by the Centre for Research in Social Policy, Loughborough University. The uplifts that were applied to the UK MIS for households in RRRSTI are based on those reported in The Cost of Remoteness: Reflecting higher living costs in remote rural Scotland. The uplifts range from 14% to 37% depending on household type and location. A full breakdown of the uplifts is shown in Table 3.1.

Table 3.1 Uplifts to MIS value for RRRSTI areas by household type

Household Type	Uplift if on mainland (%)	Uplift if on Island (%)	Base MIS value applied (£)
Couple with children	16%	16%	£29,630 - £41,500
Single working age	20%	14%	£10,870
Couple working age	21%	14%	£18,370
Single pensioner	31%	37%	£9,530
Couple Pensioner	21%	29%	£15,010

The UK MIS values used in this report are based on the full 107 MIS household budgets for detailed family types provided by Loughborough University[9] [10]. Under this approach each household receives a MIS value based on the characteristics of the household including the age of the adults and children, and if adults in the household are in a relationship. See the section on methodological changes for further details.

For statistics in this publication heating regimes are set based on the Fuel Poverty (Enhanced Heating) (Scotland) Regulations 2020, which specifies the households for which enhanced heating temperatures and/or hours are appropriate.

Enhanced heating temperatures are 23°C in the living room and 20°C in other rooms.

Standard heating temperatures are 21°C in the living room and 18°C in other rooms.

Enhanced heating hours are 16 hours a day during the week and at the weekend.

Standard heating hours are 9 hours a day during the week and 16 hours a day during the weekend.

A **satisfactory heating regime** is defined as follows.

Enhanced heating temperatures and enhanced heating hours (enhanced heating regime 1) are appropriate for households where the dwelling is frequently occupied during the morning or afternoon or both on weekdays by any member of the household when it is cold and any member of the household meets one or more of the following criteria: is aged 75 or over; has a long-term sickness or disability; or is in receipt of benefits received for a care need or disability.

Enhanced heating temperatures and standard heating hours (enhanced heating regime 2) are appropriate for households where the dwelling is not frequently occupied during the morning or afternoon or both on weekdays by any member of the household when it is cold and any member of the household meets one or more of the following criteria: is aged 75 or over; has a long-term sickness or disability; or is in receipt of benefits received for a care need or disability.

[9] A Minimum Income Standard for the United Kingdom in 2021 | JRF

[10] MIS budgets are updated annually based on a public consultation where groups are asked to identify goods and services that people need inside and outside the home to meet an acceptable living standard. New research is conducted yearly alternating between households without children and households with children. For a complete description of the MIS methodology see section 1 and 2 of the full report A Minimum Income Standard for the UK in 2022.

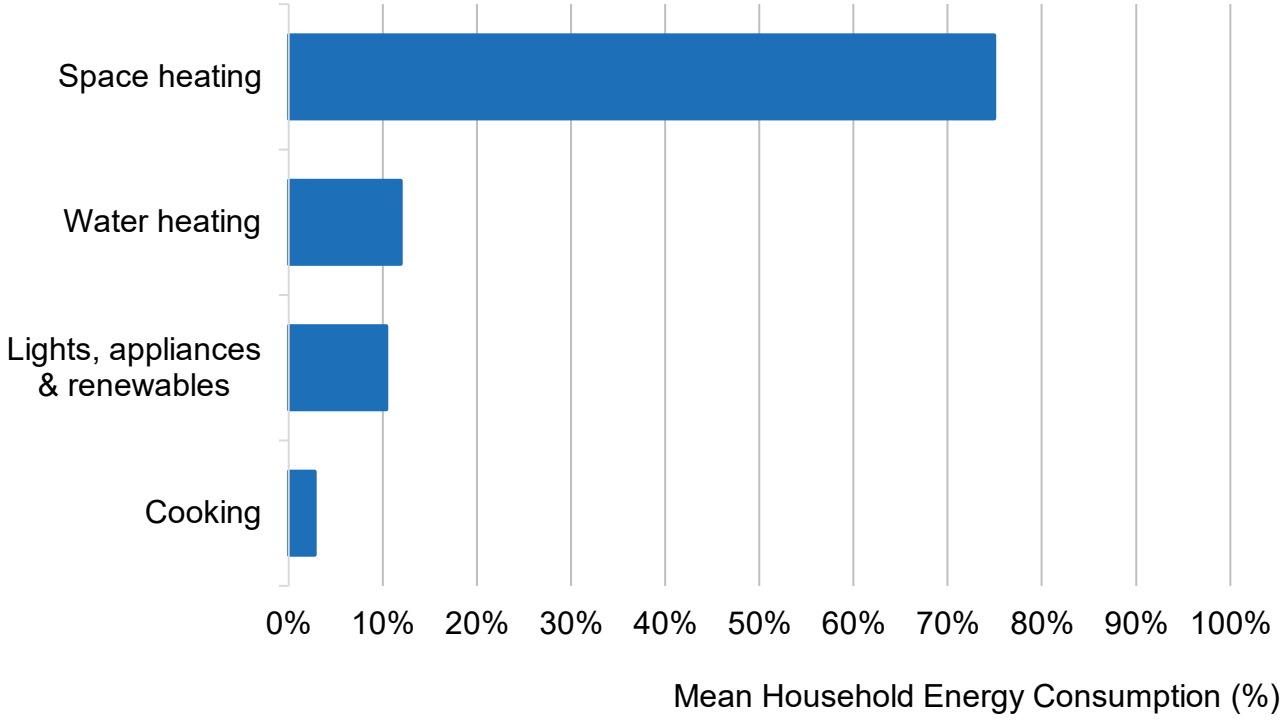
Standard heating temperatures and enhanced heating hours (enhanced heating regime 3) are appropriate for households where the dwelling is frequently occupied during the morning or afternoon or both on weekdays by any member of the household when it is cold and any member of a household has a child aged 5 years old or under and the household is not a household for which enhanced heating regimes 1 or 2 are appropriate.

For all other households, standard heating temperatures and standard heating hours (the standard heating regime) apply.

Although space heating is the largest component of the energy spend which underpins the fuel poverty estimate, there are other types of energy use that are also taken into account, such as water heating, lighting and appliance use, and cooking. All types of energy expenditure are estimated on the basis of a standard set of behavioural assumptions and do not reflect the actual energy use of the household, which may vary considerably depending on personal preference and priorities relative to other types of household expenditure.

Figure 3.1 shows that, on average, around 75% of the modelled household energy demand was from space heating, 12% from water heating, 10% from lighting and appliance usage, and 3% was accounted for by cooking.

Figure 3.1: Mean Modelled Household Energy Consumption by End Use



Data Source: Table FP1 in Fuel Poverty Tables

The **energy costs** of maintaining a satisfactory heating regime and other uses of energy are modelled using data from the physical inspection of dwellings and the household interview conducted as part of the SHCS, as well as information on consumer fuel prices. However readers should be mindful of the impact that the change in mode for the 2021 external+ SHCS has had on data quality in relation to the outputs from the energy modelling. This is discussed in detail in Chapter 6 of this report. The methodology for modelling the cost of energy use was updated for the 2014 Key Findings report and details were provided in the accompanying 2014 Methodology Notes.

The current report continues to use this improved method for setting the cost of the domestic energy requirement. A further small improvement introduced in the 2016 survey about **pre-payment meters** for energy supply is also continued, which has allowed us to improve the accuracy of fuel price information for pre-payment meter users, who are more common among lower income groups which are at higher risk of fuel poverty. In the 2021 External+ SHCS, 14% of households had a pre-payment meter (mains gas, electricity, or both).

In 2019, two further small improvements were introduced. Firstly, more detailed information on combi boilers have been included to improve the accuracy of calculations surrounding hot water losses.

Secondly, a household's lights and appliances are now assigned as using an off-peak tariff if an off-peak meter is present, even if there is no form of electric heating in the dwelling. Previously, where a household did not have a form of electric heating, the lights and appliances were assumed to use standard electricity. This change does not affect the energy consumption of a dwelling, only the fuel prices applied to the energy associated with lighting and appliance use. Figure 3.1 shows that, on average, around 10% of the modelled household energy demand was from lighting and appliance usage.

From 2021 onwards, the BRE Domestic Energy Model (BREDEM) used to model fuel poverty energy consumption and annual running costs used postcode district-level external weather data, whereas previously this was based on regional data. This means that colder more exposed households may require more energy to keep their homes warm, while households in more sheltered or warmer locations may need less. For further details see the Technical Notes and Definitions.

The cost of the energy requirement includes an allowance for the bill rebate provided under the Warm Home Discount (WHD) scheme[11]. It no longer includes the £12 contribution of the Government Electricity Rebate (GER) as the scheme only ran for two years (2014 and 2015).

3.2 Methodological changes to fuel poverty estimates

This report is the first to include fuel poverty estimates which fully meet the definition of fuel poverty as laid out in the Fuel Poverty (Targets, Definition and Strategy)(Scotland) Act 2019, the Fuel Poverty (Enhanced Heating) (Scotland) Regulations 2020 and Fuel Poverty (Additional Amount in respect of Remote Rural Area, Remote Small Town and Island Area) (Scotland) Regulations 2020. Due to this (and also due to the change in the mode of approach and data collection, as well as bias in the sample in 2021 - for further details see Chapter 6), the rates of fuel poverty in this publication are not comparable to the estimates for 2012 to 2019 in the 2019 SHCS key findings report.

Estimates of the household's necessary energy consumption and running costs are now based on the four heating regimes set out in the Fuel Poverty (Enhanced Heating) (Scotland) Regulations 2020. Previously households were placed on either the enhanced heating temperatures and hours regime or the standard regime, as described in section 4.1 of the 2019 SHCS key findings report.

The UK Minimum Income Standard (MIS) household budgets used are now based on the full 107 MIS household budgets produced by Loughborough University. Estimates from 2012-2019 used the 11 publicly available MIS budgets. Using the full 107 MIS budgets means that households are now given a MIS value more specific to their household characteristics.

Specifically this means that budgets now reflect the costs associated with children of different ages (babies aged 0-1; preschool children aged 2-4; primary school aged 5-11; and secondary school children aged 12-15) as well as differentiating between two adults living together in a relationship and two adults living together but not in a relationship.

[11] Eligible households receive a £140 discount on their electricity bills. Households qualify if they receive the guarantee credit element of pension credit (core group) or they are on a low income and meet their energy supplier's criteria (broader group).

For example under the previous methodology a household with two adults and two children would have an annual household budget of £23,500 whereas under the new methodology they would be given a budget ranging from £23,000 to £29,100 depending on the ages of children in the household.

The uplifts applied to MIS budgets for remote rural, remote small town and island (RRRSTI) areas now use the values provided in report The Cost of Remoteness: Reflecting higher living costs in remote rural Scotland. These range from 14% to 37% with differences between household types, mainland and island locations. Previous estimates used uplifts, based on the approach taken by the 2017 Scottish Fuel Poverty Definition Review Panel which used average data from the MIS for remote rural Scotland published by Highlands and Island Enterprise in 2013. In the 2019 SHCS the uplift for working age single or couple households was 15%, for pensioner single or couple households it was 19% and for family households it was 27.5% with no difference between island and mainland locations.

Childcare costs have been recorded in the survey since 2018. From 2021 childcare costs have been imputed when missing and are now included in the fuel poverty calculations.

Since 2018 the SHS has collected information on the income of up to three other adults in addition to the highest income householder and/or their spouse. For 2021, the income after housing costs used in the fuel poverty calculations includes the income of these other adults, whereas previously only the income the highest income householder and/or their spouse was included.

The housing costs used in the fuel poverty calculations for 2021 include imputed housing costs (when housing costs are missing) whereas previously these were assumed to be nil. Imputation is already carried out on the income data in the SHS when it is missing and from 2019[12] this has been extended to housing costs. Mortgage and rent payments were primarily imputed by hierarchical hot deck imputation, the method used for imputing many of the components of household income. For further details see the supporting document accompanying the 2019 SHS methodology and fieldwork outcomes report.

[12] Though housing costs were imputed when missing for the 2019 SHS, these were not available in time to include in fuel poverty calculations for 2019.

For future key findings reports from the SHCS, we will consider whether it would be appropriate to revise estimates of fuel poverty for 2019 to account for some of these methodological improvements, e.g. including the income of other adults, using the more detailed 107 MIS household budgets, better accounting for the uplifts to these for households in RRRSTI areas and including imputed housing costs (or accounting for missing housing costs).

3.3 Fuel Poverty and Extreme Fuel Poverty

An estimated 19.6% of all households were in fuel poverty, around 495,000 households (see Table 3.2).

Around 241,000 of these households (9.5% of all households) were living in extreme fuel poverty (see Table 3.2).

Table 3.2: Fuel Poverty and Extreme Fuel Poverty since levels and rates

Fuel Poverty and Extreme Fuel Poverty	2021
Fuel Poverty (%)	19.6%
Fuel Poverty (thousands)	495
Extreme Fuel Poverty (%)	9.5%
Extreme Fuel Poverty (thousands)	241
Sample size (number)	3,144

3.4 Fuel Poverty Gap

Where a household is in fuel poverty, the fuel poverty gap is the annual amount that would be required to move the household out of fuel poverty.The fuel poverty gap is presented as the median gap before adjustment and the median gap adjusted to 2015 prices. The median gap before adjustment presents the actual amount that fuel poor households require to move out of fuel poverty. The adjusted median gap figures have been presented in order to assess progress against the 2040 fuel poverty gap target. The adjustment has been made in alignment with the increases or decreases in the annual average consumer prices index (CPI) over the period from 2015 to the year which the figure relates to.

The 2021 External+ SHCS found that the median fuel poverty gap for fuel poor households was £690 (Table 3.3).

The median fuel poverty gap (adjusted for 2015 prices) for fuel poor households was £620.

Table 3.3: Median Fuel Poverty Gap of Fuel Poor Households, 2021

Fuel Poverty Gap Measurement	2021
Actual Median Fuel Poverty Gap (£)	£690
Median Fuel Poverty Gap (adjusted for 2015 prices) (£)	£620
Sample size (number)	629

3.5 Characteristics of Fuel Poor Households

Fuel poverty is affected by four key drivers: levels of household income, the price of fuel used to meet space and water heating requirements, the energy efficiency of housing, and the use of fuel in households[13]. The following sections present the fuel poverty rate broken down by three of these drivers (income, fuel used, energy efficiency) as well as other key household and dwelling characteristics.

3.5.1 Household Characteristics

Table 3.4 shows fuel poverty rates by a number of household characteristics.

Overall rates of fuel poverty differed between the social (34%) and private sector (15%). The highest rates of fuel poverty by tenure are found in the social sector where 37% of households renting from a local authority and 30% of households renting from a housing association are fuel poor. Similarly, 30% of private rented sector households are fuel poor. In comparison, only 9% of those with a mortgage and 14% of those who own outright are assessed to be fuel poor.

Fuel poverty has a strong **association** with income, and households in the lower **income bands** have the highest rates of fuel poverty: 79% for the bottom income band (less than £15,000 annually) and 20% for the 2nd bottom band (£15,000 - £24,999 annually). For comparison, the fuel poverty rate for households earning between £35,000 and £44,999 annually was found to be 1%.

Fuel poverty rates generally decrease as **council tax bands** increase from band A (38%) to band F (11%) and bands G to H (14%).

[13] The use of fuel in a household impacts on a household's lived experience of fuel poverty, but does not affect the measurement of fuel poverty which considers the energy required to meet a the households statutory heating regime as set out in section 3.1, not the actual amount of energy used.

Table 3.4: Fuel Poverty Rates by Household Characteristics, 2021

Household Characteristics	Category	Fuel Poor Households (%)	Fuel Poor Households (thousands)	Sample size (number)
Tenure	Owned outright	14%	136	1,327
Tenure	Mortgaged	9%	57	760
Tenure	LA	37%	127	371
Tenure	HA	30%	70	273
Tenure	Private rented	30%	105	413
Tenure (grouped)	Private Sector	15%	298	2,500
Tenure (grouped)	Social Sector	34%	197	644
Household Type	Older households	19%	170	1,157
Household Type	Families	17%	76	547
Household Type	Other households	21%	249	1,440
Annual Income	< £15,000	79%	341	509
Annual Income	£15,000 - £24,999	20%	132	787
Annual Income	£25,000 - £34,999	3%	18	633
Annual Income	£35,000 - £44,999	1%	2	456
Annual Income	£45,000+	1%	3	759
Council Tax Band	Band A	38%	174	510
Council Tax Band	Band B	22%	117	630
Council Tax Band	Band C	19%	81	511
Council Tax Band	Band D	14%	48	441
Council Tax Band	Band E	8%	30	523
Council Tax Band	Band F	11%	23	309
Council Tax Band	Band G – H	14%	22	220
All households	All households	20%	495	3,144

Table 3.5 shows how the level of fuel poverty varies across dwelling characteristics.

The lowest rates of fuel poverty are associated with higher energy efficiency standards. 16% of households living in dwellings rated EPC band C or better **were fuel poor** compared to 43% of households living in dwellings rated EPC band F or G. Similarly, dwellings constructed post 1982 have the lowest rates of fuel poverty at 12%.

Detached and semi-detached houses had the lowest rates of fuel poverty, at 14% and 13% respectively, despite having lower energy efficiency ratings than the national average (Table 2.10), likely reflecting higher household incomes. The fuel poverty rate for **rural** (23%) households was similar to the fuel poverty rate for **urban** (19%) households. However, the rate of fuel poverty for remote rural households (29%) is higher than for all other areas.

The rate of fuel poverty among households using **electricity** as primary heating fuel was 41%, higher than for households using gas (16%), oil (23%) and other fuel (22%) as their primary heating fuel. This reflects the higher per unit cost of electricity relative to gas, and oil.

A higher proportion of households in the 15% most deprived areas were in fuel poverty compared to other areas of Scotland; 30% compared to 18% respectively.

A higher proportion of households with a pre-payment meter (PPM; electricity, gas or both) were in fuel poverty compared to those without a PPM; 33% compared to 17% respectively.

Table 3.5: Fuel Poverty Rates by Dwelling Characteristics, 2021
[note 2] [note 3] [note 7]

Dwelling Characteristics	Category	Fuel Poor Dwellings (%)	Fuel Poor Dwellings (thousands)	Sample size (number)
Dwelling Type	Detached	14%	82	961
Dwelling Type	Semi-detached	13%	68	625
Dwelling Type	Terraced	22%	116	588
Dwelling Type	Tenement	25%	145	604
Dwelling Type	Other flats	26%	84	366
Dwelling Age	pre-1919	21%	103	651
Dwelling Age	1919-1944	17%	48	347
Dwelling Age	1945-1964	24%	128	562
Dwelling Age	1965-1982	24%	132	647
Dwelling Age	post-1982	12%	83	937
Heating Fuel	Gas	16%	339	2,387
Heating Fuel	Oil	23%	34	261
Heating Fuel	Electric	41%	109	418
Heating Fuel	Other	22%	13	78
EPC Band	A - C	16%	207	1,532
EPC Band	D	20%	183	1,115
EPC Band	E	29%	73	375
EPC Band	F - G	43%	33	122
Location	Large urban areas	19%	183	942
Location	Other urban areas	18%	157	1,007
Location	Accessible small towns	19%	41	297
Location	Remote small towns	25%	19	144
Location	Accessible rural	19%	53	395
Location	Remote rural	29%	42	359
Location (grouped)	Urban	19%	400	2,390
Location (grouped)	Rural	23%	95	754
Most deprived 15%	No	18%	383	2,797
Most deprived 15%	Yes	30%	112	347
Gas Grid Coverage	Off Gas Grid	19%	406	2,386
Gas Grid Coverage	On Gas Grid	21%	89	758
Pre-payment Meter	No	17%	377	2,754
Pre-payment Meter	Yes	33%	117	387
All dwellings	All dwellings	20%	495	3,144

3.6 Characteristics of Extreme Fuel Poor Households

3.6.1 Household Characteristics

Table 3.6 shows extreme fuel poverty rates by a number of household characteristics.

Overall rates of extreme fuel poverty were higher in the **social sector** (15%) than in the **private sector** (8%) in 2021.

As with fuel poverty overall, extreme fuel poverty has a strong **association** with **income**. Households in the lowest income band (<£15,000 annually) have the highest rate of extreme fuel poverty (48%) dropping to 1% for households in the £25,000 - £34,999 annual income band.

Table 3.6: Extreme Fuel Poverty Rates by Household Characteristics 2021 [note 4]

Household Characteristics	Category	Extreme Fuel Poor Households (%)	Extreme Fuel Poor Households (thousands)	Sample size (number)
Tenure	Owned outright	8%	74	1,327
Tenure	Mortgaged	5%	30	760
Tenure	LA	15%	51	371
Tenure	HA	15%	34	273
Tenure	Private rented	15%	52	413
Tenure (grouped)	Private Sector	8%	156	2,500
Tenure (grouped)	Social Sector	15%	84	644
Household Type	Older households	11%	97	1,157
Household Type	Families	7%	34	547
Household Type	Other households	9%	110	1,440
Annual Income	< £15,000	48%	205	509
Annual Income	£15,000 - £24,999	5%	32	787
Annual Income	£25,000 - £34,999	1%	3	633
Annual Income	£35,000 - £44,999	[c]	[c]	456
Annual Income	£45,000+	[c]	[c]	759
Council Tax Band	Band A	17%	79	510
Council Tax Band	Band B	11%	58	630
Council Tax Band	Band C	7%	31	511
Council Tax Band	Band D	7%	25	441
Council Tax Band	Band E	5%	17	523
Council Tax Band	Band F	6%	14	309
Council Tax Band	Band G – H	11%	17	220
All households	All households	10%	241	3,144

3.6.2 Dwelling Characteristics

Table 3.7 shows how the level of extreme fuel poverty varies across dwelling characteristics.

Levels of extreme fuel poverty among households using **electricity** as their primary heating fuel were higher, at 25%, than for households using any other fuel as their primary heating fuel. In addition, households using oil as their primary heating fuel have higher extreme fuel poverty rates than households using gas (14% compared to 7%).

The lower rates of extreme fuel poverty are associated with higher energy efficiency standards. Only 6% of households living in dwellings rated EPC C or better were in extreme fuel poverty.

The rates of extreme fuel poverty for households **outwith coverage of the** gas network (14%) are higher than for households **within coverage of the** gas network (9%).

Levels of extreme fuel poverty were higher in **rural areas** (15%) compared to **urban areas** (9%) in 2021. Fuel poverty rates were highest for remote rural households (21%) and lowest for other urban (8%) and accessible small towns (8%).

Table 3.7: Extreme Fuel Poverty by Dwelling Characteristics 2021
[note 2] [note 3] [note 7]

Dwelling Characteristics	Category	Extreme Fuel Poor Dwellings (%)	Extreme Fuel Poor Dwellings (thousands)	Sample size (number)
Dwelling Type	Detached	9%	54	961
Dwelling Type	Semi-detached	8%	39	625
Dwelling Type	Terraced	9%	47	588
Dwelling Type	Tenement	11%	67	604
Dwelling Type	Other flats	11%	34	366
Dwelling Age	pre-1919	12%	60	651
Dwelling Age	1919-1944	7%	21	347
Dwelling Age	1945-1964	11%	57	562
Dwelling Age	1965-1982	12%	66	647
Dwelling Age	post-1982	5%	37	937
Heating Fuel	Gas	7%	147	2,387
Heating Fuel	Oil	14%	20	261
Heating Fuel	Electric	25%	66	418
Heating Fuel	Other	12%	7	78
EPC Band	A - C	6%	82	1,532
EPC Band	D	9%	84	1,115
EPC Band	E	18%	45	375
EPC Band	F - G	39%	30	122
Location	Large urban areas	9%	82	942
Location	Other urban areas	8%	70	1,007
Location	Accessible small towns	8%	16	297
Location	Remote small towns	15%	11	144
Location	Accessible rural	12%	32	395
Location	Remote rural	21%	29	359
Location (grouped)	Urban	9%	179	228
Location (grouped)	Rural	15%	61	82
Most deprived 15%	No	9%	199	2,797
Most deprived 15%	Yes	11%	42	347
Gas Grid Coverage	Off Gas Grid	9%	180	2,386
Gas Grid Coverage	On Gas Grid	14%	60	758
Pre-payment Meter	No	9%	196	2,754
Pre-payment Meter	Yes	13%	45	387
All dwellings	All dwellings	10%	241	3,144

3.7 Fuel Poverty and Income Poverty

Although fuel poverty is correlated with low income, it is not equivalent to income poverty. This section provides an analysis of how fuel and income poverty relate in the household population.

According to the official poverty definition, individuals are considered to be in relative (income) poverty if their equivalised net household income is below 60 per cent of the median income in the same year. Official poverty estimates are calculated using the Department for Work and Pensions' (DWP) Family Resources Survey (FRS). The latest estimates for Scotland were published on 23 March 2023 and relate to 2019/22.

It is possible to use the SHCS to determine how fuel poverty and income poverty relate. The main caveat to note is that the SHS is not designed to capture income as comprehensively as other formal surveys of income, e.g. the FRS. Household income is collected in the SHS on a self-reported basis. Therefore figures in this section may not align with National Statistics on household income and inequality.

For 2021 we use the published equivalised income[14] after hosing costs poverty threshold from the Scottish data in the 2021/2022 FRS[15] of £300 per week.

As Table 3.8a shows, over three quarters of fuel poor households would be considered poor in terms of their income (76% or 378,000) while less than one quarter have incomes above the relative poverty threshold (24% or 117,000 households).

Table 3.8b shows the fuel poverty rate by income poverty status. 82% of income poor households were fuel poor.

[14] Income is equivalised to that of a couple with no children

[15] Table 13c

Table 3.8a: Estimated Number and Proportion of Households by Fuel Poverty and Income Poverty Status, SHCS 2021

Income Poverty Status	Fuel Poor (%)	Fuel Poor (thousands)	Not Fuel Poor (%)	Not Fuel Poor (thousands)
Income Poor	76%	378	4%	85
Not Income Poor	24%	117	96%	1,949
All	100%	495	100%	2,034
Sample size (number)	540		2,604	

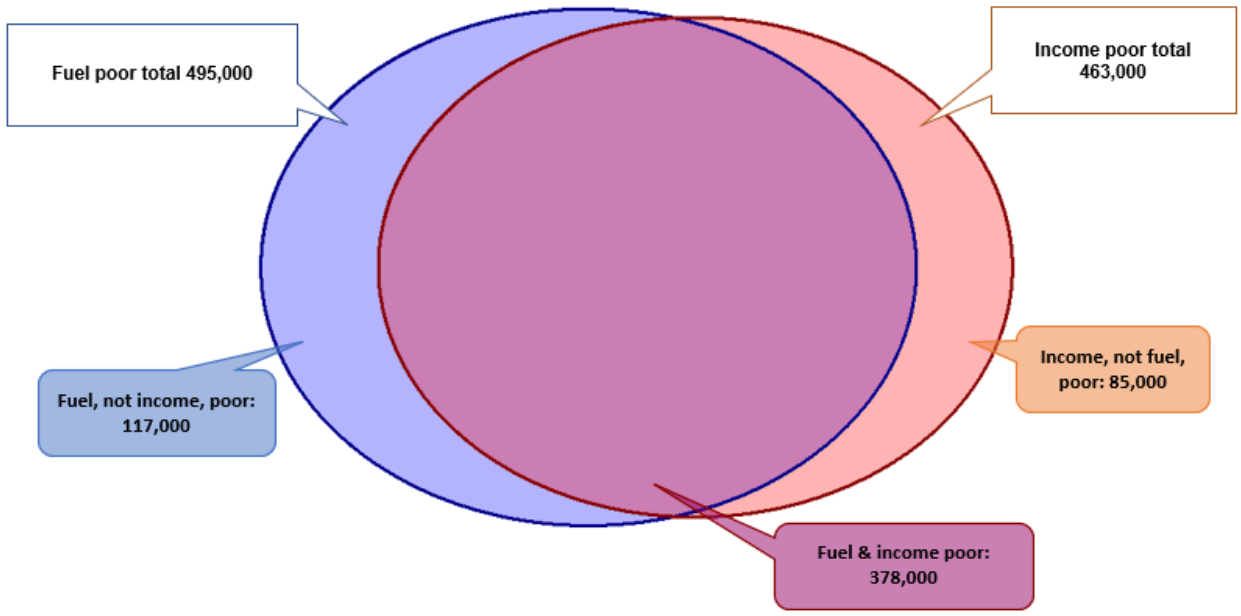
Table 3.8b: Fuel Poverty Rate (%) by Income Poverty Status, SHCS 2021

Income Poverty Status	Fuel Poverty Rate (%)	Sample size (number)
Income Poor	82%	540
Not Income Poor	6%	2,604
All	20%	3,144

Figure 3.2 is an Venn diagram which sets out this information graphically. As shown in the diagram the majority of fuel poor households (378,000) are also in income poverty. Conversely, 117,000 households are estimated to be fuel poor only (and not income poor), and 85,000 households are estimated to be income poor but not fuel poor.

This chart demonstrates, that while low income is associated with fuel poverty, it is not equivalent. Around 24% of fuel poor households (117,000 households) would not be considered income poor. Similarly, 18% of income poor households (85,000 households) would not be considered fuel poor.

Figure 3.2: Fuel Poor and Income Poor Households, SHCS 2021



Data Source: Table FP8 in Fuel Poverty Tables

Table 3.9 provides further information about the characteristics of the households who fall into the different sub-groups.

Households that are both income poor and fuel poor tend to live in more energy efficient dwellings than other fuel poor households, potentially because of high energy efficiency standards in the social rented sector. They are more likely to use gas for heating, live on the gas grid and live in urban locations compared to other fuel poor households. These characteristics point to low income as a key reason for their experience of fuel poverty.

Conversely, households who are not income poor but experience fuel poverty have a higher likelihood of living in low energy efficiency properties, using electricity for heating, and living in rural areas compared to fuel poor and income poor households and Scotland overall.

Table 3.9: Household and Dwelling Characteristics by Poverty and Fuel Poverty, 2021 [note 2] [note 3] [note 4]

Dwelling Characteristics	Category	Fuel Poor & Not Income Poor (%)	Fuel Poor & Income Poor (%)	All Fuel Poor (%)	Not Fuel Poor & Income Poor (%)	All Scotland (%)
EPC Band	A - C	24%	47%	42%	86%	52%
EPC Band	D	38%	37%	37%	14%	35%
EPC Band	E-G	38%	16%	21%	[c]	13%
Household Type	Older households	35%	34%	34%	30%	35%
Household Type	Families	15%	16%	15%	45%	18%
Household Type	Other households	49%	51%	50%	25%	47%
Location	Urban	73%	83%	81%	93%	83%
Location	Rural	27%	17%	19%	7%	17%
Heating Fuel	Gas	50%	74%	68%	95%	81%
Heating Fuel	Oil	10%	6%	7%	[w]	6%
Heating Fuel	Electric	37%	18%	22%	[w]	11%
Heating Fuel	Other	4%	2%	3%	[c]	2%
Gas Grid	Off Gas Grid	25%	13%	16%	1%	12%
Gas Grid	On Gas Grid	75%	87%	84%	99%	88%
All dwellings	Sample size (number)	179	450	629	90	3,144

4 Energy Perceptions

Key Points

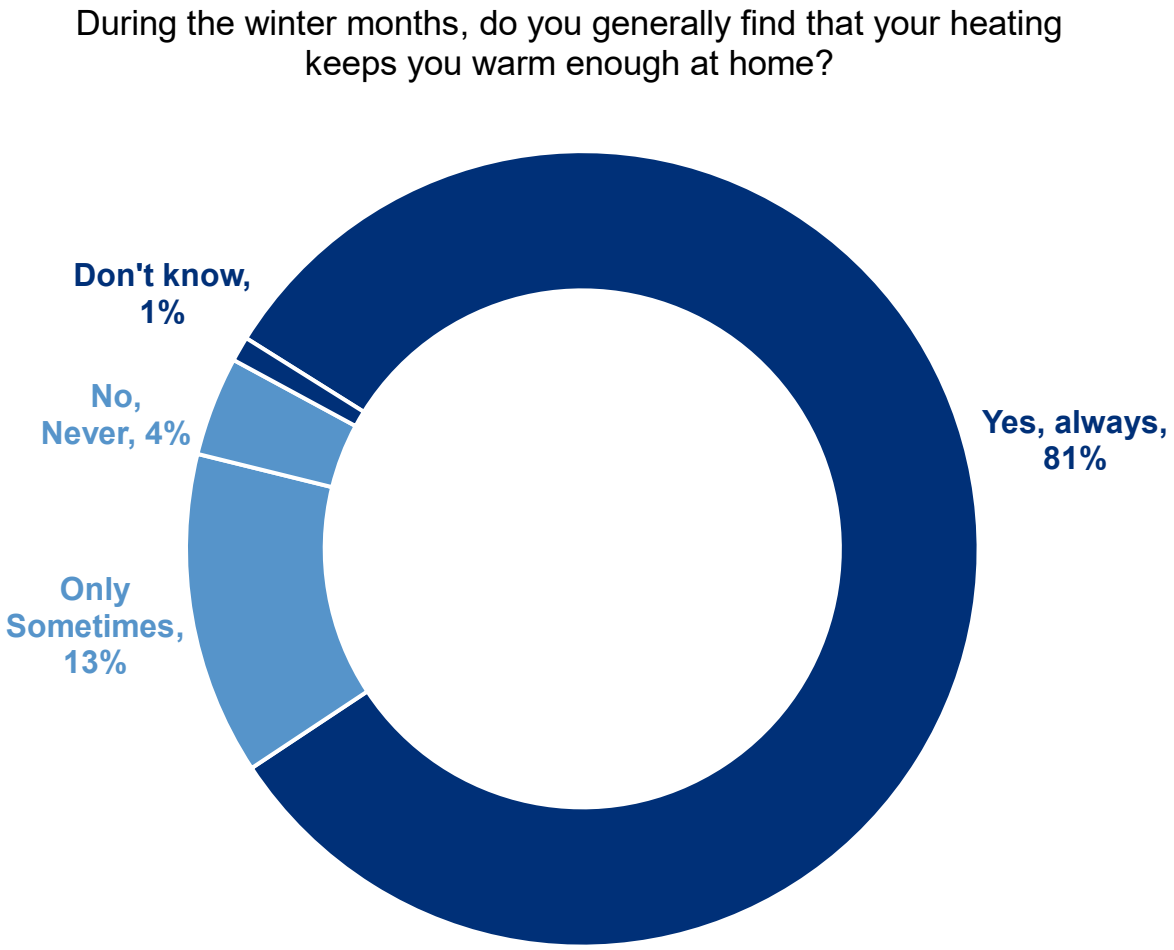
- 13% of households found that their heating keeps them warm in winter only sometimes and 4% find it never keeps them warm.
- 5% of households reported that their homes were difficult to heat because they cannot afford to heat them.
- Fuel poor households and extreme fuel poor households are more likely to have difficulties staying warm in winter and to report affordability problems; 24% of fuel poor and 27% of extreme fuel poor say that their heating keeps them warm in winter “only sometimes” or “never”, compared to 16% of non-fuel poor households.
- 9% of fuel poor and 10% of extreme fuel poor households report that they cannot afford to heat their home, higher than the 4% of non-fuel poor households.
- 61% of householders stated they monitor their energy use “very” or “fairly closely”. 40% of all households report owning an energy monitoring device.
- Fuel poor households (66%) were more likely to have reported monitoring their energy use “very” or “fairly closely” compared to non-fuel poor households (59%) in 2021.
- Conversely, both fuel poor (36%) and extreme fuel poor (34%) households were less likely to own a monitoring device compared to non-fuel poor (41%) households.

4.1 Heating Satisfaction

Respondents' views on their ability to keep warm in the winter and why this may be difficult is a useful context for understanding statistics on fuel poverty and energy efficiency in the home.

In 2021, 81% of householders reported that they were always able to stay warm at home during the winter (Figure 4.1), 13% said that their heating keeps them warm only sometimes, and 4% report that their heating systems never keep them warm in winter.

Figure 4.1: Staying Warm in Winter, 2021



Data Source: Table EP1 in Energy Perceptions Tables

As shown in Table 4.1, of those reporting that their heating system keeps them warm in winter “only sometimes” or “never”, 20% report this to be “a serious problem”, 51% “a bit of a problem”, while 29% said it was “not very much” or “not a problem”.

Table 4.1: Households whose heating does not keep them warm in winter

How much of a problem is it?	Percentage of dwellings (%)
A serious problem	20%
A bit	51%
Not very much	24%
Not a problem	5%
Total	100%
Sample size (number)	557

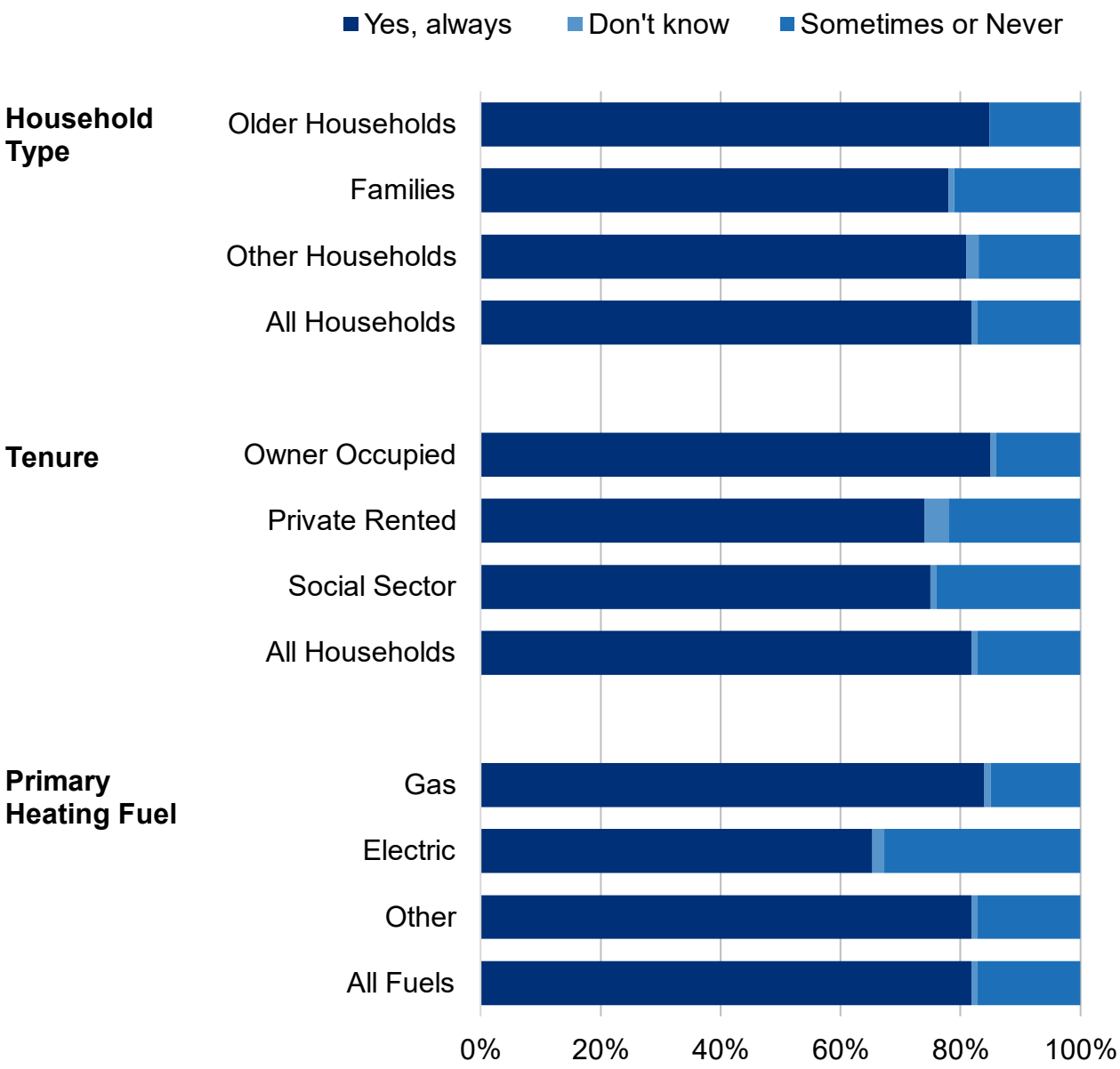
Figure 4.2 shows how respondents’ views on how well their heating systems keep them warm in winter varies depending on household type, tenure and the primary heating fuel they use.

Families were more likely than other and older households to report that their heating system doesn’t always keep them warm in the winter; 21% for families, compared to 17% and 17% for other and older households respectively.

Social and private renters were more likely to report that their heating does not always keep them warm compared to owner occupiers; 24% and 22%, for social and private renters respectively, compared to 14% for owner occupiers. For social sector tenants this contrasts with the relatively better energy efficiency of the dwellings they occupy compared to the housing stock overall (as shown in Table 2.8).

Households with electric heating were also more likely to report that their heating system does not keep them warm in the winter (33%) when compared to households heated with gas (15%).

Figure 4.2: "Does Your Heating Keep You Warm Enough in the Winter?" by Household Type, Tenure and Primary Heating Fuel; SHCS 2021



Data Source: Table EP2 in Energy Perceptions Tables

The reasons why people found their homes difficult to heat in 2021 are shown in Table 4.2. 64% of all households did not report any problems heating their homes. Private rented (42%) and social sector tenants (42%) were more likely than owner occupiers (32%) to report difficulties in 2021.

The most common reasons relate to poor energy performance of the dwellings: draughts (14%) and poor or inadequate heating systems (12%), followed by poor insulation and old windows (10% each).

5% of householders considered it unaffordable to achieve the indoor temperatures they want. This is higher among private and social renters (7% and 9% respectively) compared to owner occupiers (3%).

Table 4.2: Reasons Heating Home is Difficult by Tenure, 2021

Which of these things, if any, make it difficult to heat your home?	Owner Occupied	Private Rented	Social Sector	All Tenures
No problem reported	68%	58%	58%	64%
Draughty	12%	19%	19%	14%
Poor or inadequate heating	11%	18%	14%	12%
Poor insulation	10%	10%	11%	10%
Need new windows	8%	13%	12%	10%
Can't afford to heat house	3%	7%	9%	5%
Rooms too big	3%	4%	1%	3%
Hard to control heating	2%	6%	4%	3%
Other	1%	1%	1%	1%
Sample size (number)	2,100	423	651	3,174

Table 4.3 shows how fuel poor and non-fuel poor households compare in their views on winter heating and heating affordability in 2021, while Table 4.4 shows householders' views on how much of a problem it is if their heating does not keep them warm in winter.

Fuel poor and extreme fuel poor households[16] are more likely to report that their heating keeps them warm in winter "only sometimes" or "never", 24% and 27%, respectively, compared to 15% of non-fuel poor households. For those households who replied "only sometimes" or "never" 79% of fuel poor households and 82% of extreme fuel poor households this is "a serious" or "a bit of a problem", higher than 67% for households who are not fuel poor.

[16] Households in extreme fuel poverty are a subset of those in fuel poverty. Therefore, it should be noted that the estimates presented in Tables 4.3, 4.4, and 4.6 for fuel poor and extreme fuel poor households are not for two distinct mutually exclusive groups.

Fuel poor and extreme fuel poor households are also more likely to report affordability problems. When asked about the reasons why they find it difficult to keep their home warm, 9% of fuel poor households and 10% of extreme fuel poor households say “cannot afford to heat my home”, compared to 4% of non-fuel poor households (see table EP11 in ‘Energy Perceptions’ tables).

Table 4.3: Staying Warm and Fuel Poverty - “During the winter months, do you generally find that your heating keeps you warm enough at home?”

Answer	Not Fuel Poor	Fuel Poor	Extreme Fuel Poor
Yes, always	83%	74%	71%
Only Sometimes	12%	17%	18%
No, Never	3%	7%	9%
Don't know	1%	2%	2%
Sample size (number)	2,515	629	322

Table 4.4: Staying Warm and Fuel Poverty - “If your heating only keeps you warm sometimes or never how much of a problem is this?”

Answer	% of all Not Fuel Poor households	% of all Fuel Poor	% of all Not Extreme Fuel Poor households
A serious problem	18%	25%	31%
A bit of a problem	49%	54%	51%
Sample size (number)	359	153	86

For a full breakdown of these stats see Tables EP6 and EP7 in the accessible tables.

4.2 Monitoring Energy Use

The Scottish Household Survey asks respondents to what extent they monitor their energy use and whether or not they have energy monitoring devices.

As shown in Table 4.5, the proportion of households that do not monitor their energy use was 17%.

Conversely, the proportion of those who report monitoring their energy use “fairly” or “very closely” was 61%.

40% of households reported having energy monitoring devices. See Table EP9 and EP10 in the tables on energy perceptions accompanying this report as a supporting document.

Table 4.5: Extent to which Energy Use is Monitored, 2021 - “To what extent do you monitor your energy use in your property?” [note 4]

Answer	Percentage of dwellings (%)
Very closely	22%
Fairly closely	39%
Not very closely	23%
Not at all	17%
Don't know	[c]
Total	100%
Sample size (number)	3,174

Table 4.6 shows that a higher proportion of fuel poor (66%) households monitored their energy use “very” or “fairly closely” compared to non-fuel poor households (59%). Conversely both fuel poor households (36%) and extreme fuel poor (34%) households were less likely to have a monitoring device than and non-fuel poor (41%) (see table EP12 in ‘Energy Perceptions’ tables).

Table 4.6: Monitoring Energy Use and Fuel Poverty - “To what extent do you monitor your use of energy in your property?” [note 4]

Answer	Not Fuel Poor	Fuel Poor	Extreme Fuel Poor
Very closely	21%	24%	28%
Fairly closely	38%	42%	36%
Not very closely	23%	22%	23%
Not at all	18%	13%	13%
Don't know	[c]	[c]	[c]
Sample size (number)	2,515	629	322

5 Housing Conditions

The Scottish House Condition Survey (SHCS) usually involves a visual inspection of the inside and outside of the property. However, due to Covid-19 restrictions the 2021 SHCS was carried out by an external-only inspection, supplemented with alternative sources of data, e.g. from the Energy Performance Certificate (EPC), and the householder providing information to surveyors via telephone. No data was collected on internal aspects such as room repairs and aspects of housing standards.

For further details see the 2021 External+ SHCS questionnaire. Note that only questions enclosed in red boxes were included in the 2021 survey.

It is not, therefore, possible to report on the following:

- Internal disrepair and most disrepair to common elements
- Most rates of disrepair except urgent disrepair to critical elements
- The presence of damp, condensation or mould
- Compliance with the Tolerable Standard and the Scottish Housing Quality Standard

The topics that are included in this chapter are the following:

- Urgent disrepair to critical elements
- Type of disrepair to external critical elements
- Overcrowding and under-occupancy
- Overcrowding and under-occupancy perceptions

When interpreting and using the results presented in this chapter, readers should be mindful of the impact the external+ approach used for the 2021 SHCS has had on data quality. This is discussed in detail in Chapter 6 of this report.

Key Points

- 16% of dwellings had an urgent disrepair to critical elements.
- Although 47% of dwellings have some external disrepair to critical elements it tends to be at a relatively low level in each property, affecting on average (median) 2.5% of the relevant area.
- In 2021 around 68,000 (3%) households lived in overcrowded accommodation under the bedroom standard.
- Around 922,000 (36%) households had one bedroom in excess of the minimum requirement under the bedroom standard. A further 906,000 (36%) households had two or more bedrooms in excess.
- Social sector tenants are also slightly more likely (5%) to live in accommodation which is overcrowded according to the bedroom standard than those households living in the private sector (2%).
- Social sector tenants are more likely to live in accommodation which is at the level meeting (but not exceeding) the minimum requirements of the bedroom standard (46% compared to 19% in the private sector).
- Private sector households are more likely (44%) to have two or more bedrooms in excess of the minimum requirements compared to households in the social sector (9%).
- 24% of households living in homes meeting (but not exceeding) the bedroom standard felt their home had too few rooms, while 46% of households living in overcrowded homes felt that their home had just about the right number of rooms.

5.1 Disrepair

The SHCS measures disrepair for a wide range of different building elements ranging from aspects of roofs and walls to chimney stacks, internal rooms and common parts of shared buildings like access balconies and entry doors.

This is reported in two categories:

- **Critical elements.** This refers to disrepair to building elements central to weather-tightness, structural stability and preventing deterioration of the property, such as roof coverings or the structure of external walls. These elements are listed in section 7.6.7.1.
- **Non-critical elements.** This relates to any damage to a non-critical element (such as skirtings and internal wall finishes, staircases, boundary fences or attached garages) which requires some repair beyond routine maintenance.

Elements in both of the above categories can be assessed according to the severity of disrepair, as follows:

- **Urgent disrepair**. This relates only to external and common elements (a mixture of critical and non-critical). Urgent disrepair to these elements is recorded where immediate repair is required to prevent further deterioration to the building fabric or health and safety risks to occupants. Not all disrepair to critical elements is necessarily considered urgent by the surveyor. Internal room floor structures and floor finishes as well as internal walls and the presence of dry / wet rot are the only critical elements for which urgency is not applicable.
- **Extensive disrepair**. Damage which covers at least a fifth (20%) or more of the building element area. This can apply to any element whether critical or otherwise.

Disrepair which is not to a critical element, is not urgent or extensive, is referred to as basic. This is the minimum category of disrepair in the survey.

A more detailed description of the categories of disrepair is given in section 7.6.7.

It is fairly common for dwellings to display elements of disrepair in more than one category. The SHCS surveyor manual provides guidance for our surveyors on assessing the type and severity of disrepair for each element, for example:

- A leaking tap in the bathroom (disrepair to a non-critical element).

- A large section (covering over 20% of the area) of the render on an external wall has broken off but is not considered an urgent repair by the surveyor (extensive disrepair to a critical element).
- A small area of guttering is damaged, causing rain water to pour down an external wall surface. This is marked as urgent by the surveyor as it is likely to lead to further damage and compromise the weather-proofing of the building in the short term (urgent disrepair to a critical element).

The SHCS usually reports on various types of disrepair, e.g. any disrepair, disrepair to critical elements and urgent and/or extensive disrepair to critical elements. As most of these include internal elements, which were not assessed for the presence and extent of disrepair in the 2021 External+ SHCS, it is not possible to report on them. Urgent disrepair to critical elements is, however, an exception to this. As detailed in SHCS Methodology Notes, there are some internal elements that are critical, e.g. internal walls/partitions, floor structure and floor finish. However, urgency is only assessed for external and common[17] elements. Therefore, urgent disrepair to critical elements can be reported on.

5.1.1 Urgent Disrepair to Critical Elements

This section examines in more detail urgent disrepair to critical elements (which the survey found to affect 16% of dwellings) and its prevalence across tenure, dwelling age band and urban/rural location.

As shown in Table 5.1 the prevalence of urgent disrepair to critical elements is associated with age of construction, with dwellings built after 1964 less likely to have urgent disrepair to critical elements. Dwellings built in the period pre-1919 have a rate of urgent disrepair to critical elements of 25%. Rates of urgent disrepair to critical elements fall to 14% for dwellings built in the period 1965-1982 while those built after 1982 have a rate of 7%.

Rates of urgent disrepair to critical elements were higher in rural areas (19%) than urban areas (15%).

[17] The common elements that are considered critical elements are access decks and balustrades and doors, screens, windows and roof lights. These were assessed for the presence, extent and urgency of disrepair in the 2021 External+ SHCS.

Table 5.1: Urgent Disrepair to Critical Elements by Dwelling Age and Location, 2021 [note 2]

Dwelling Characteristics	Category	Dwellings with urgent disrepair to one or more critical elements (%)	Sample size (number)
Dwelling Age	pre-1919	25%	664
Dwelling Age	1919-1944	23%	349
Dwelling Age	1945-1964	18%	566
Dwelling Age	1965-1982	14%	653
Dwelling Age	post-1982	7%	942
Urban-Rural Indicator	Urban	15%	2,411
Urban-Rural Indicator	Rural	19%	763
All dwellings	All dwellings	16%	3,174

Levels of urgent disrepair to critical elements are similar for the private sector (16%) and the social sector (15%) considered as a whole (see Table 5.2).

As shown in Table 5.2, housing association dwellings tended to have amongst the lowest levels of urgent disrepair to critical elements (10%) in 2021. 15% of owner occupied dwellings had urgent disrepair to critical elements. Local authority (18%) and private rented sector (23%) properties have the highest levels of urgent disrepair to critical elements.

Table 5.2: Urgent Disrepair to Critical Elements by Tenure Group, 2021

Household Characteristics	Category	Dwellings with urgent disrepair to one or more critical elements (%)	Sample size (number)
Tenure	Owner occupied	15%	2,100
Tenure	LA	18%	375
Tenure	HA	10%	276
Tenure	Private rented	23%	423
Tenure (subtotal)	Private Sector	16%	2,523
Tenure (subtotal)	Social Sector	15%	651
All dwellings	All dwellings	16%	3,174

5.1.2 Type of Disrepair to External Critical Elements

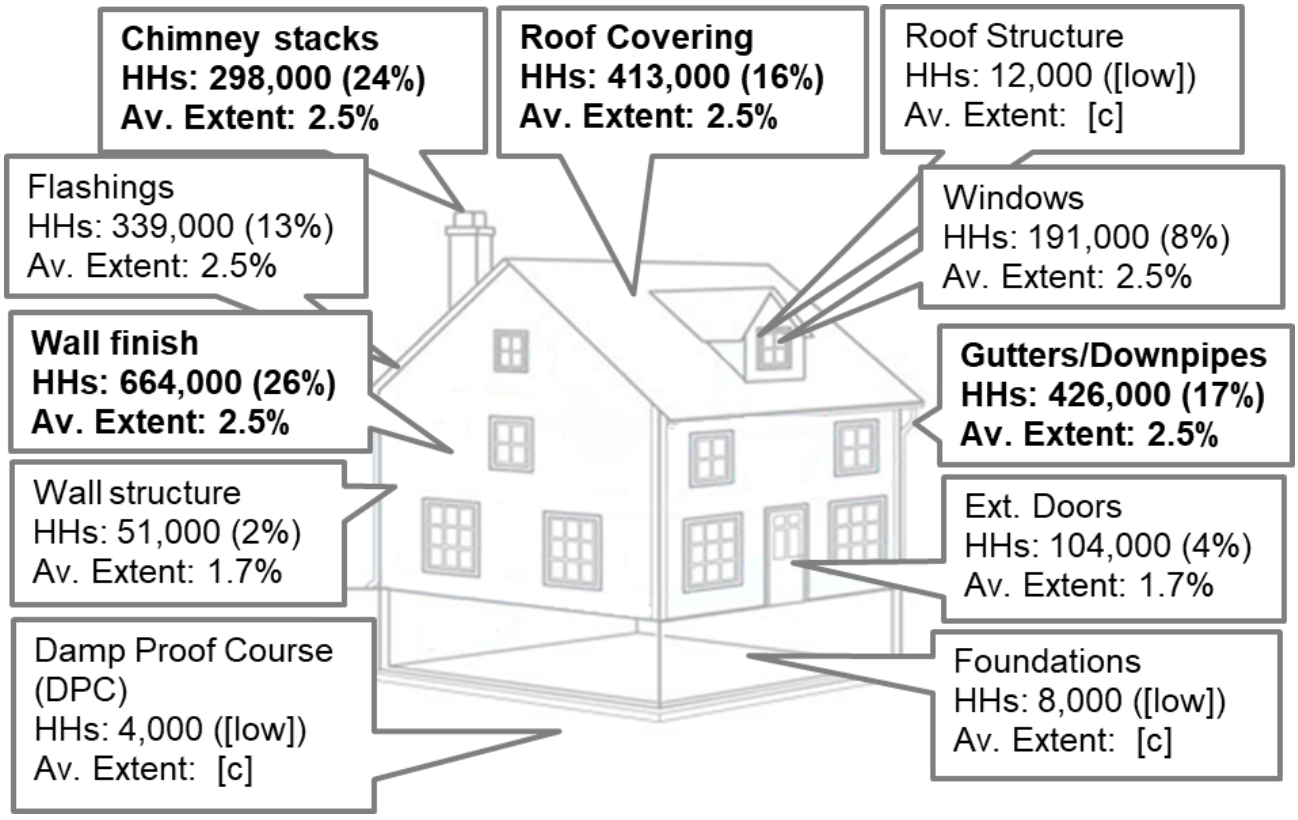
This section considers the presence of any disrepair to external critical elements, regardless of whether or not this is urgent.

As shown in Figure 5.1 although some disrepair to external critical elements is fairly common (47% of dwellings have some disrepair to an external critical element) it tends to be at a relatively low level in each property, affecting on average (median) 2.5% of the relevant area. A full list of elements in this category is provided in section 7.6.7.1 along with details of how the extent of disrepair is recorded in the survey for each and how an average extent is calculated.

Wall finish, gutters / downpipes and roof coverings are often affected. Around 26% of dwellings had some disrepair to wall finish, 17% had some disrepair to gutters / downpipes and 16% had some disrepair to roof coverings; however, in all three cases the average (median) disrepair covered around 2.5% of the area. Where stone pointing, render or harling on walls is damaged, moisture can seep into the structure of the walls and cause further damage. Similarly slipped roof tiles or slates can allow water to access the roof structure or the tops of internal walls.

Around a quarter (24%) of dwellings with chimneys showed some signs of disrepair. Unchecked this can lead to water ingress and eventually falling masonry.

Figure 1: The Number of Households (HHs) Affected and Average (Median) Extent of Disrepair to External Critical Elements [note 4]



Data Source: Table HC3 in Housing Conditions Tables

5.2 Overcrowding and Under-Occupancy

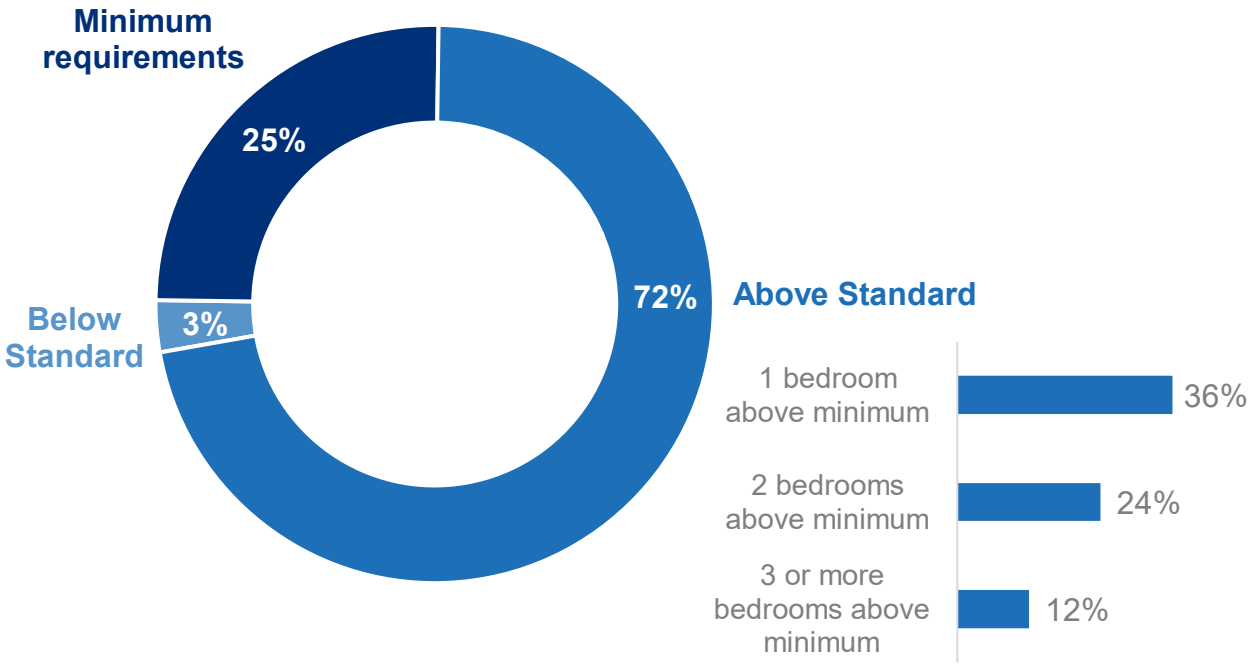
This section examines some key measures of whether households are living in overcrowded or under-occupied conditions. This is determined on the basis of the bedroom standard as defined in the Housing (Overcrowding) Bill 2003 taking into account the number of bedrooms available in the dwelling and the type of household that occupies it.

Minimum requirements for bedrooms under the bedroom standard should not be confused with criteria for the removal of the spare room subsidy. More information on the bedroom standard and the differences between the two is included in section 7.6.9.

Figure 5.2 and Table 5.3 show the headline occupancy measures. The proportion of households with at least one bedroom above the minimum standard was 72%, while the rate of overcrowded accommodation falling below the bedroom standard was 3%. The remaining 25% of households meet (but do not exceed) the minimum bedroom requirements.

Subsequent sections examine in more detail differences across household and dwelling characteristics.

Figure 5.2: Proportion of Dwellings which are Overcrowded, Meet the Minimum Standard, Exceed it by 1 Bedroom or Exceed by 2 or More Bedrooms, 2021



Data Source: Table HC4 in Housing Conditions Tables

5.2.1 Overcrowding

A dwelling is considered overcrowded if there are insufficient bedrooms to meet the occupants' requirements under the bedroom standard definition (see section 7.6.9).

Table 5: Overcrowding by Tenure, Dwelling Age, Type and Location, and Annual Household Income, 2021 [note 1] [note 2]

Household Characteristics	Category	Percentage of dwellings (%)	Number of dwellings (thousands)	Sample size (number)
Dwelling Type	Detached	[low]	2	966
Dwelling Type	Semi-detached	2%	10	628
Dwelling Type	Terraced	3%	17	597
Dwelling Type	Tenement	3%	19	614
Dwelling Type	Other flats	6%	19	372
Dwelling Age	pre-1919	1%	7	664
Dwelling Age	1919-1944	4%	12	349
Dwelling Age	1945-1964	4%	22	566
Dwelling Age	1965-1982	2%	13	653
Dwelling Age	post-1982	2%	14	942
Location	Urban	3%	64	2,411
Location	Rural	1%	4	762
Tenure	Owned outright	1%	10	1,338
Tenure	Mortgaged	3%	18	762
Tenure	LA	6%	21	375
Tenure	HA	4%	8	276
Tenure	Private rented	3%	11	423
Tenure (grouped)	Private Sector	2%	39	2,523
Tenure (grouped)	Social Sector	5%	29	651
Annual Income	< £15,000	3%	12	509
Annual Income	£15,000 -24,999	2%	12	787
Annual Income	£25,000 - £34,999	3%	15	633
Annual Income	£35,000 - £44,999	4%	14	456
Annual Income	£45,000+	2%	13	759
All households	All households	3%	68	3,174

Around 3% of households (68,000 households) were found to live in overcrowded accommodation (see Table 5.3). Social sector dwellings (5%) were more likely to be overcrowded than private sector dwellings (2%). Households who own their properties outright or live in rural areas had overcrowding rates below the national average.

5.2.2 Under-Occupancy

Around 922,000 households (36%) had one additional bedroom above the minimum under the bedroom standard and around 906,000 households (36%) had two or more bedrooms in excess of the minimum standard (see Table HC6 in Housing Conditions Tables).

Social and private rented sector tenants are more likely to live in accommodation which is at the level meeting (but not exceeding) the minimum requirements of the bedroom standard (Table 5.5); 46% of the social sector and 48% in the PRS, compared to 8% for those who own outright and 20% for those with a mortgage). In contrast, households in the social and private rented sectors are less likely to have two or more bedrooms in excess of the minimum requirements: 9% (social) and 14% (PRS) have two or more additional rooms, compared to 59% of those who own outright and 37% of those with a mortgage. The proportion of households with one bedroom in excess of minimum requirements is 35% for private sector and 41% for social sector.

Higher income households (£45,000 or more per year) are more likely to live in dwellings with two or more additional bedrooms (47%) than the national average (36%).

Under-occupied dwellings are least common amongst those built pre-1919, where only 65% have one or more bedrooms in excess of the standard, compared to dwellings built post-1982 where the rate is 75%. Similarly, detached houses have the highest rates of under-occupancy compared to other building types: 76% with two or more additional bedrooms. Tenements (7%) and other flats (11%) have the lowest rates with two or more additional bedrooms but are more likely to meet the minimum standard (49% and 36% respectively).

Under-occupation is more common in rural areas. 55% of rural dwellings have two or more bedrooms in excess of the minimum requirements under the bedroom standard, compared to 32% for urban properties. Conversely urban dwellings are more likely to meet the minimum standard (27%) than rural dwellings (14%).

Table 6: Above Minimum Standard, by Tenure, Dwelling Age, Type and Location, and Annual Household Income 2021 [note 1] [note 2]

Household Characteristics	Category	1 bedroom above minimum (%)	2+ bedroom above minimum (%)	Above minimum standard (%)
Dwelling Type	Detached	18%	76%	94%
Dwelling Type	Semi-detached	39%	42%	81%
Dwelling Type	Terraced	44%	32%	76%
Dwelling Type	Tenement	40%	7%	47%
Dwelling Type	Other flats	46%	11%	57%
Dwelling Age	pre-1919	29%	36%	65%
Dwelling Age	1919-1944	42%	34%	76%
Dwelling Age	1945-1964	42%	29%	71%
Dwelling Age	1965-1982	38%	36%	74%
Dwelling Age	post-1982	34%	41%	75%
Location	Urban	38%	32%	70%
Location	Rural	31%	55%	86%
Tenure	Owned outright	32%	59%	91%
Tenure	Mortgaged	40%	37%	77%
Tenure	LA	40%	10%	50%
Tenure	HA	41%	7%	48%
Tenure	Private rented	35%	14%	49%
Tenure (grouped)	Private Sector	35%	44%	79%
Tenure (grouped)	Social Sector	41%	9%	50%
Annual Income	< £15,000	43%	23%	66%
Annual Income	£15,000 -24,999	39%	30%	69%
Annual Income	£25,000 - £34,999	33%	34%	67%
Annual Income	£35,000 - £44,999	34%	45%	79%
Annual Income	£45,000+	35%	47%	82%
All households	All households	36%	36%	72%

Sample sizes and absolute numbers are available on Table HC6 in Housing Conditions Spreadsheet.

Table 5.5: Households Meeting the Minimum Bedroom Standard, by Tenure, Dwelling Age, Type and Location, and Annual Household Income 2021 [note 1]

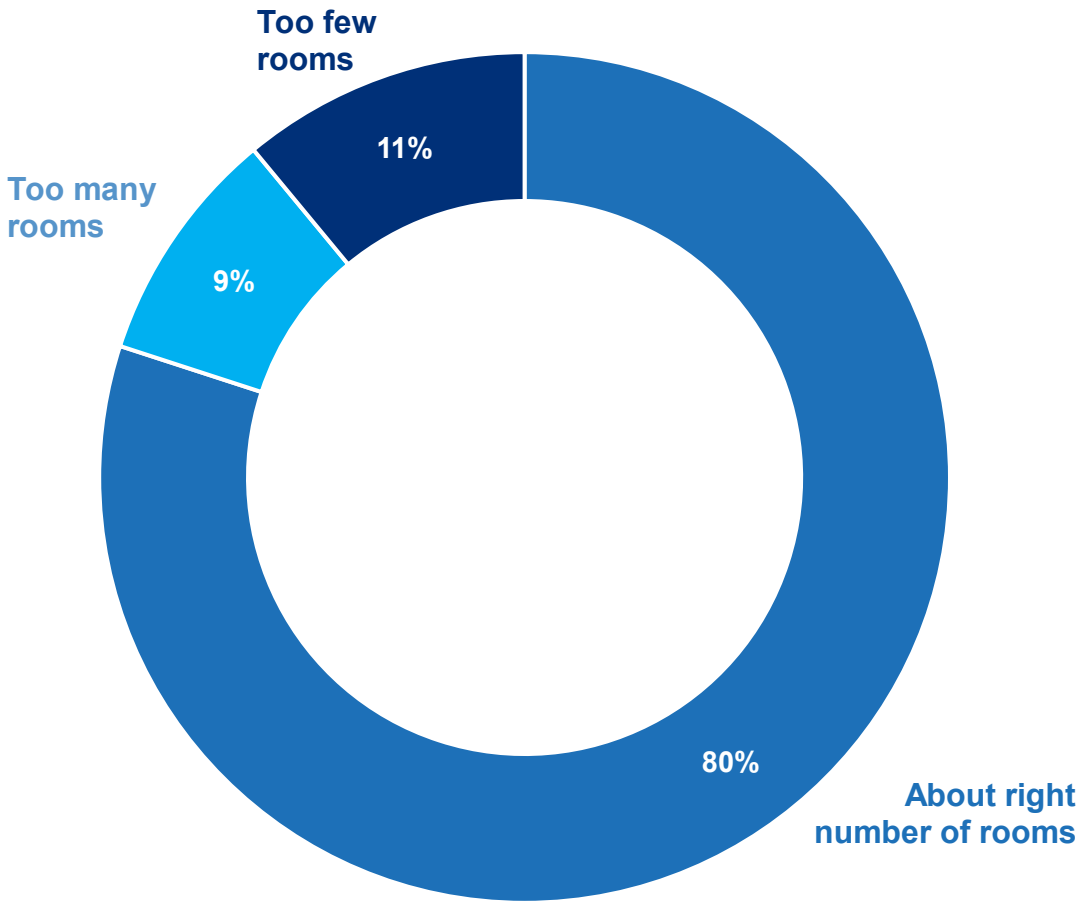
Household Characteristics	Category	Percentage of dwellings (%)	Number of dwellings (thousands)	Sample size (number)
Dwelling Type	Detached	6%	33	966
Dwelling Type	Semi-detached	17%	84	628
Dwelling Type	Terraced	20%	107	594
Dwelling Type	Tenement	49%	293	614
Dwelling Type	Other flats	36%	116	372
Dwelling Age	pre-1919	34%	165	664
Dwelling Age	1919-1944	20%	54	349
Dwelling Age	1945-1964	24%	128	566
Dwelling Age	1965-1982	24%	134	653
Dwelling Age	post-1982	22%	153	942
Location	Urban	27%	576	2,411
Location	Rural	14%	58	763
Tenure	Owned outright	8%	74	1,338
Tenure	Mortgaged	20%	122	762
Tenure	LA	44%	151	375
Tenure	HA	48%	112	276
Tenure	Private rented	48%	174	423
Tenure (grouped)	Private Sector	19%	371	2,523
Tenure (grouped)	Social Sector	46%	263	651
Annual Income	< £15,000	31%	133	509
Annual Income	£15,000 -24,999	29%	184	787
Annual Income	£25,000 - £34,999	30%	156	633
Annual Income	£35,000 - £44,999	17%	57	456
Annual Income	£45,000+	16%	91	759
All households	All households	25%	634	3,174

5.2.3 Overcrowding and Under-Occupancy Perceptions

The Scottish Household Survey asks householders about their views on the number of rooms in their house/flat. For the first time we are providing an analysis of the responses to this question and relating them to the household's compliance with the bedroom standard. It should be noted that the question does not ask specifically about the number of bedrooms in the house/flat.

80% of householders reported that their accommodation had about the right number of rooms, while 11% believed that they have too few rooms and 9% that they have too many rooms (see Figure 5.3).

Figure 5.3: Householders' perceptions about the number of rooms in their accommodation, 2021



Data Source: Table HC8 in Housing Conditions Tables

Table 5.6 shows that householders who owned their accommodation outright are less likely to believe that their house or flat has too few rooms (5%), than those who rent (ranging from 14% to 16%) or have a mortgage (15%). In private sector 10% of the householders feel that their accommodation has too many rooms and 10% that their accommodation has too few rooms. In the social sector 15% of the respondents feel that their accommodation has too few rooms while only 5% feel that they have too many rooms. 19% of householders who live in detached houses believe that their house has too many rooms, in comparison to 8% for both semi-detached and terraced houses, 2% for tenements and 3% for other flats. In rural locations 8% of the respondents feel that their accommodation has too few rooms and 13% feel that they have too many rooms, while for urban locations the proportions are 12% and 8% respectively. 14% of households with an annual income of £45,000 or more believe that their accommodation has too few rooms, while only 7% of households with an income less than £15,000 feel the same way.

Table 5.6: Householders' perceptions about the number of rooms in their accommodation, by dwelling and household characteristics, 2021
[note 1] [note 2]

Household Characteristics	Category	Too few bedrooms (%)	Too many bedrooms (%)	About right number of bedrooms (%)
Dwelling Type	Detached	5%	19%	76%
Dwelling Type	Semi-detached	10%	8%	82%
Dwelling Type	Terraced	12%	8%	80%
Dwelling Type	Tenement	15%	2%	82%
Dwelling Type	Other flats	16%	3%	80%
Dwelling Age	pre-1919	11%	9%	80%
Dwelling Age	1919-1944	11%	10%	79%
Dwelling Age	1945-1964	11%	10%	79%
Dwelling Age	1965-1982	11%	9%	80%
Dwelling Age	post-1982	12%	7%	82%
Location	Urban	12%	8%	80%
Location	Rural	8%	13%	79%
Tenure	Owned outright	5%	15%	81%
Tenure	Mortgaged	15%	7%	79%
Tenure	LA	16%	6%	77%
Tenure	HA	14%	3%	83%
Tenure	Private rented	16%	2%	81%
Tenure (grouped)	Private Sector	10%	10%	80%
Tenure (grouped)	Social Sector	15%	5%	80%
Annual Income	< £15,000	7%	9%	85%
Annual Income	£15,000 -24,999	10%	9%	81%
Annual Income	£25,000 - £34,999	14%	7%	79%
Annual Income	£35,000 - £44,999	10%	9%	81%
Annual Income	£45,000+	14%	9%	77%
All households	All households	11%	9%	80%

In 2021, 83% of respondents who live in a dwelling with 1 or more rooms above the bedroom standard feel that they have just the right number of rooms, 12% feel that they have too many and 5% feel that they have too few rooms (see Table 5.7).

Around three quarters (76%) of householders who live in accommodation meeting (but not exceeding) the bedroom standard feel that they have the right number of rooms and 24% feel that they have too few rooms (see Table 5.7).

Among householders who live in overcrowded accommodation under the bedroom standard, 46% feel that that they have just the right number of rooms and 54% feel that they have too few rooms.

Table 5.7: Householders' perceptions about the number of rooms in their accommodation, by bedroom standard, 2021 [note 4]

Householders' Perceptions	Overcrowded	At minimum standard	Undercrowded
too few rooms	54%	24%	5%
about the right number of room	46%	76%	83%
too many rooms	[w]	1%	12%
Total	100%	100%	100%
Sample size (number)	72	698	2,404

6 External+ Data Quality

Key Points

- Due to Covid-19 restrictions the 2021 Scottish Household Survey (SHS) was undertaken using a push to telephone/video approach and the 2021 Scottish House Condition Survey (SHCS), which is part of the SHS, was undertaken using an external+ approach.
- Households were invited to participate in the 2021 SHS by advanced letter. When households did not opt-in, interviewers were unable to knock on doors to encourage participation, but were able to attempt to make contact by telephone if the household was matched to a telephone number. Interviews were conducted via telephone/video. They are usually conducted by in-home face-to-face interviewing.
- If households then agreed to participate in the follow-up 2021 SHCS, a qualified surveyor would visit the dwelling to carry out an external-only inspection. Data on internal aspects of the dwelling required for energy modelling were obtained from the householder by telephone or (in a small number of cases[18]) from an Energy Performance Certificate.
- Due to the change in approach for the 2021 SHCS, the results are not directly comparable with the National Statistics from previous waves of the survey.
- As such, we are publishing the key findings as Experimental Statistics representing a snapshot of the key attributes, energy efficiency and condition of the housing stock and fuel poverty levels in 2021. The results for 2021 should not be compared with those for previous or future years.
- The enforced changes to the 2021 SHS have resulted in the profile of respondents changing and issues with representativeness, which also impact the 2021 SHCS. Similarly, the changes to 2021 SHCS have resulted in mode effects, particularly where surveyors have had to rely on householders providing information by telephone, e.g., on the extent of low-energy lighting or presence of secondary heating systems.

[18] There is no systematic way to determine when data from Energy Performance Certificates was used. This is based on anecdotal feedback from regional managers and surveyors.

- Calibration totals for household tenure and deprivation were added to the usual SHCS calibration model. These resolved some but not all of the issues with the representativeness of the sample.
- We have found families, low-income households, and households with pre-payment meters to be underrepresented after calibration weighting. Those who own outright are overrepresented.
- Key estimates from the SHCS are impacted by the representativeness of the sample and the mode effects. It is likely that the rates of fuel poverty, urgent disrepair to critical elements and households meeting (but not exceeding) the bedroom standard are being underestimated. It is likely that energy efficiency ratings and the percentage of dwellings exceeding the bedroom standard (by 2 or more bedrooms) are being over estimated.
- We do not propose adopting the external+ approach for future waves of the SHCS as it is not possible to collect all the data through external only inspections. If this approach were to be used again in the future, then consideration would have to be given as to how to achieve a more representative sample and how to address the mode effects due to relying on householders providing information on internal aspects of the dwelling rather than qualified surveyors obtaining this information through inspections.

6.1 External+ Approach

The Scottish House Condition Survey (SHCS) usually involves a visual inspection of the inside and outside of the property. However, due to Covid-19 restrictions the 2021 SHCS was carried out by an external-only inspection, supplemented with alternative sources of data, e.g., from the Energy Performance Certificate (EPC), and the householder providing information to surveyors via telephone.

The external+ approach was designed to provide as reliable as possible estimates of key statistics, including on fuel poverty, energy efficiency and external repairs, while maintaining no contact with the household. No data was collected on internal aspects such as room repairs and aspects of housing standards.

The 2021 external+ SHCS questionnaire was like that for previous years. However, only those questions within the red boxes were asked as part of the external+ survey.

The physical (SHCS) fieldwork took place in COVID protection levels 0, 1 and 2 only. Households in level 3+ areas were still invited to participate in the external+ physical survey, but the appointment was banked and carried out only once the area had returned to a lower protection level.

No summary surveys (dwelling descriptions and abbreviated dwelling descriptions) were collected.

6.2 Potential sources of bias compared to previous waves

The 2021 social survey adopted the push to telephone/video approach used in 2020. This approach is known to have introduced bias in the achieved sample compared to previous waves. This was documented in the Scottish Household Survey 2020: methodology and impact of change in mode report. One example of this is an over-representation of owner-occupied households and an under-representation of households in the rented sectors (prior to calibration weighting).

As the physical survey is a subsample of the social survey, any bias in the composition of the achieved sample for the social survey will inevitably impact on the composition of the achieved sample for the physical survey in a similar way.

Other biases may have been introduced due to the change in the mode of collection. This is unlikely to have impacted on the external aspects of the physical survey, e.g., external repairs. However, it is likely to have impacted on aspects of the physical survey which would have normally been collected as part of the internal inspection, e.g., the extent of low-energy lighting or presence of a secondary heating system, where surveyors would have been reliant on the householder providing this information via telephone or data from EPCs.

It is worth noting that not all households have a valid EPC and coverage varies by household and dwelling characteristics. For example, newer dwellings are more likely to have a valid EPC than older dwellings and households in the rented sector are more likely to have one than those that are owner occupied. As EPCs are valid for ten years the data can be up to ten years out of date, in the event of any energy efficiency improvements subsequently made to the dwelling.

We have no way of identifying when information from an EPC was used by surveyors. However, anecdotal evidence from surveyors suggests that this was rarely the case. Therefore, any bias due to the change of mode is likely to be mainly due to surveyors relying on householders self-reporting information via telephone that they would usually collect as part of the internal inspection of the dwelling.

6.3 Sampling

Usually around half of the households selected to participate in the social survey are asked to agree to a follow-up visit for the physical survey. Like the social survey, all assumptions underpinning the sampling approach had to be revised for the 2021 physical survey.

Pre-pandemic, sample targets were set using estimates of the conversion rate from the social survey to the physical survey by local authority. However, the 2020 push to telephone/video social survey (the approach that was also adopted in 2021) suggested that owner occupiers were more likely to take part than households in the private and social rented sectors. Therefore, rather than allocating an address to the physical survey before the social survey had been completed as had been done previously, sampling was done within the social survey interview after the household tenure had been established. The social survey interview script routed a certain proportion of households into the physical survey based on tenure and local authority, with the goal being to achieve a more representative sample of owner occupiers and renters and ensure the sample contained enough renters to allow disaggregation of key statistics by tenure.

Table 6.1: 2021 SHS sample by local authority

Local authority	Households sampled (SHS) first half	Households sampled (SHS) second half	Households sampled (SHS) All
Aberdeen City	990	2,521	3,511
Aberdeenshire	836	1,665	2,501
Angus	513	2,061	2,574
Argyll and Bute	501	1,698	2,199
City of Edinburgh	2,003	3,252	5,255
Clackmannanshire	666	1,399	2,065
Dumfries and Galloway	603	1,453	2,056
Dundee City	663	2,245	2,908
East Ayrshire	625	1,599	2,224
East Dunbartonshire	563	1,015	1,578
East Lothian	461	1,156	1,617
East Renfrewshire	622	1,221	1,843
Falkirk	745	1,539	2,284
Fife	1,334	3,602	4,936
Glasgow City	3,476	6,704	10,180
Highland	785	1,666	2,451
Inverclyde	908	1,329	2,237
Midlothian	529	2,076	2,605
Moray	485	1,120	1,605
Na h-Eileanan Siar	484	1,534	2,018
North Ayrshire	652	1,727	2,379
North Lanarkshire	1,427	4,249	5,676
Orkney Islands	407	1,304	1,711
Perth and Kinross	510	1,773	2,283
Renfrewshire	776	1,754	2,530
Scottish Borders	532	872	1,404
Shetland Islands	475	1,151	1,626
South Ayrshire	647	1,226	1,873
South Lanarkshire	1,317	3,684	5,001
Stirling	531	1,167	1,698
West Dunbartonshire	821	2,586	3,407
West Lothian	724	1,205	1,929
Scotland	26,611	63,553	90,164

Table 6.1 shows the 2021 SHS sample by local authority. It should be noted that the sample was considerably larger than previous years, reflecting the lower response rate associated with the push to telephone/video approach used for the 2021 social survey. A total of 9,952 social interviews were achieved, giving a response rate of 11%. Furthermore, the sample was drawn in two halves. Telephone matching was used for the first half of the sample but not the second. Telephone matching was found to improve the response rate (25% compared to 10%), hence the fact the first half of the sample was smaller than the second, but increase the non-response bias in the achieved sample. For further details see the section on survey response in the SHS 2021 methodology and fieldwork outcomes report.

Table 6.2: Proportion of social survey interviews routed into the 2021 external+ SHCS

Local authority	Owner occupiers first half	Owner occupiers second half	Renters first half	Renters second half
Aberdeen City	35.4%	24.6%	100%	28.4%
Aberdeenshire	35.7%	26.2%	100%	26.9%
Angus	45.3%	32.8%	100%	43.4%
Argyll and Bute	46.5%	35.4%	100%	38.8%
City of Edinburgh	36.4%	14.7%	100%	27.1%
Clackmannanshire	45.4%	14.8%	100%	54.8%
Dumfries and Galloway	42.3%	23.5%	100%	64.4%
Dundee City	44.8%	31.3%	100%	49.1%
East Ayrshire	45.6%	32.2%	100%	53.4%
East Dunbartonshire	46.9%	26.1%	100%	29.0%
East Lothian	47.5%	32.0%	100%	96.9%
East Renfrewshire	47.9%	39.2%	100%	65.0%
Falkirk	46.3%	22.3%	100%	64.9%
Fife	34.1%	16.0%	100%	24.6%
Glasgow City	37.3%	17.7%	100%	8.3%
Highland	35.3%	16.5%	100%	27.8%
Inverclyde	48.8%	16.1%	100%	18.2%
Midlothian	46.1%	39.5%	100%	63.9%
Moray	48.6%	19.7%	100%	32.3%
Na h-Eileanan Siar	45.4%	45.1%	100%	89.2%
North Ayrshire	47.4%	34.1%	100%	30.9%
North Lanarkshire	36.9%	27.7%	100%	14.1%
Orkney Islands	42.1%	34.9%	100%	39.2%
Perth and Kinross	44.5%	32.2%	100%	49.0%
Renfrewshire	43.8%	33.4%	100%	1.9%
Scottish Borders	48.8%	22.3%	100%	57.2%
Shetland Islands	41.6%	36.2%	100%	40.6%
South Ayrshire	48.0%	48.8%	100%	35.8%
South Lanarkshire	37.4%	29.7%	100%	16.2%
Stirling	45.5%	33.1%	100%	25.0%
West Dunbartonshire	46.2%	23.7%	100%	49.0%
West Lothian	44.6%	10.4%	100%	60.5%

As shown in Table 6.2, in the first half of the 2021 social survey all renters were routed into the SHCS and asked to agree to a surveyor visit. For owner occupiers, the sampling fraction differed by local authority, ranging from 34.1% in Fife to 48.8% in Scottish Borders. The sample fractions were revised for the second half of the 2021 sample based on updated projections of the likely number of respondents by local authority and tenure from the first half of the sample. For owner occupiers this ranged from 10.4% in West Lothian to 48.8% in South Ayrshire. For renters this ranged from 1.9% in Renfrewshire to 96.9% in East Lothian. The large variation in the sample fractions by local authority for the second half of the sample is because the number of owner occupiers and renters that would be interviewed from the first half of the sample had to be forecast. In some local authorities considerably more or less social survey interviews with those who rent were achieved than forecast.

6.4 Weighting

Weighting for the SHCS is done in two stages: a selection weighting stage to address the unequal selection probabilities followed by calibration weighting to correct for non-response bias.

6.4.1 Selection Weighting

Selection weights are inverse to the probability of being selected to participate in a survey. The SHCS sample is usually stratified by local authority, with smaller local authorities and those with historically lower response rates having higher sampling rates. The usual SHCS selection probability is the number of households in the sample divided by the NRS household estimate.

However, this approach had to be adapted for the 2021 external+ SHCS. This is because the selection probability depended on the local authority and household tenure, the latter obtained as part of the social survey interview.

To determine the SHCS selection probabilities we therefore needed to know the composition of the 2021 SHS sample by local authority and tenure and then compare this to estimates of the housing stock by local authority and tenure.

The tenure of households in the SHS sample is unknown prior to completion of the social survey interview. This information is collected as part of the social survey interview, and we do not have household-level administrative data on tenure. Therefore, this was estimated using estimates of the proportion of households by tenure for each local authority from the 2019 Scottish Survey Core Questions (SSCQ).

To estimate the SHCS 'subsample', the proportions in Table 6.2 were applied to our estimate of the SHS sample by local authority and tenure. This effectively provides an estimate of the number of households by local authority and tenure that would have been asked to participate in the physical survey had all households in the SHS sample participated, which we need to know to calculate the SHCS selection probabilities.

Finally, estimates of the housing stock by local authority and tenure were produced by apportioning NRS' 2021 household estimates by local authority using estimates of the proportion of households by tenure for each local authority from the 2019 SSCQ.

Table 6.3: Estimated selection probabilities for the 2021 external+ SHCS

Local authority	Owners	Renters
Aberdeen City	0.9%	1.6%
Aberdeenshire	0.6%	1.1%
Angus	1.7%	2.6%
Argyll and Bute	2.0%	2.7%
City of Edinburgh	0.5%	1.2%
Clackmannanshire	2.1%	6.0%
Dumfries and Galloway	0.8%	2.2%
Dundee City	1.4%	2.5%
East Ayrshire	1.4%	2.6%
East Dunbartonshire	1.1%	1.8%
East Lothian	1.2%	3.3%
East Renfrewshire	1.9%	3.5%
Falkirk	0.9%	2.4%
Fife	0.6%	1.3%
Glasgow City	0.8%	1.3%
Highland	0.5%	1.1%
Inverclyde	1.7%	3.0%
Midlothian	2.6%	4.5%
Moray	1.0%	1.9%
Na h-Eileanan Siar	7.1%	14.3%
North Ayrshire	1.4%	1.8%
North Lanarkshire	1.1%	1.3%
Orkney Islands	5.8%	8.5%
Perth and Kinross	1.1%	2.0%
Renfrewshire	1.1%	0.9%
Scottish Borders	0.8%	1.9%
Shetland Islands	5.8%	8.9%
South Ayrshire	1.7%	2.1%
South Lanarkshire	1.1%	1.3%
Stirling	1.6%	2.0%
West Dunbartonshire	2.3%	4.8%
West Lothian	0.6%	1.8%
Scotland	1.1%	1.9%

Table 6.3 shows the estimated selection probabilities for the 2021 external+ SHCS by local authority and tenure. For owner occupiers these ranged from 0.5% in City

of Edinburgh and Highland to 7.1% in Na h-Eileanan Siar. For renters these ranged from 0.9% in Renfrewshire to 14.3% in Na h-Eileanan Siar.

Though the SHS sample was drawn in two halves, with telephone matching used for the first half of the sample but not the second, results for 2021 are being presented by combining the two halves of the sample. Therefore, the selection probabilities have been averaged across the two halves of the sample.

6.4.2 Calibration Weighting

Calibration weighting corrects for non-response bias in surveys by weighting the achieved sample so that it is consistent with known external totals.

Table 6.4: Summary of calibration models considered

Calibration characteristic	Geography	Categories	Source	Included in model 1	Included in model 2
Number of households	Local authority	N/A	NRS household estimates	Yes	Yes
Dwelling age	Scotland	Pre-1919; 1919-1944; 1945-1964; 1965-1982; 1983-2002; and post 2002	2019 SHCS dwelling descriptions and abbreviated dwelling descriptions	Yes	Yes
Dwelling type	Scotland	Detached; semi-detached; terraced; tenement; and other flats	2019 SHCS dwelling descriptions and abbreviated dwelling descriptions	Yes	Yes
Urban-rural classification (2020)	Scotland	Six-fold classification	2019 SHCS	Yes	Yes
Household tenure	Scotland	Owner occupiers and renters	2019 Scottish Survey Core Questions	No	Yes
Scottish Index of Multiple Deprivation (2020)	Scotland	Most and least deprived quintiles	NRS small area household estimates	No	Yes

For the 2021 external+ SHCS, two calibration models were considered. These are summarised in Table 6.4. These models use the same approach to selection weighting described above. Model 1 uses the 'usual' SHCS calibration model and model 2 adds two additional calibration characteristics to this model, namely household tenure and Scottish Index of Multiple Deprivation (SIMD).

As described in section 6.5, calibration model 2 was found to resolve some of the issues with the representativeness of the sample better than calibration model 1. Therefore, the results from the 2021 SHCS presented in this report are weighted using calibration model 2.

The usual calibration weighting for the SHCS adjusts the selection weights so that the weighted achieved sample is consistent with

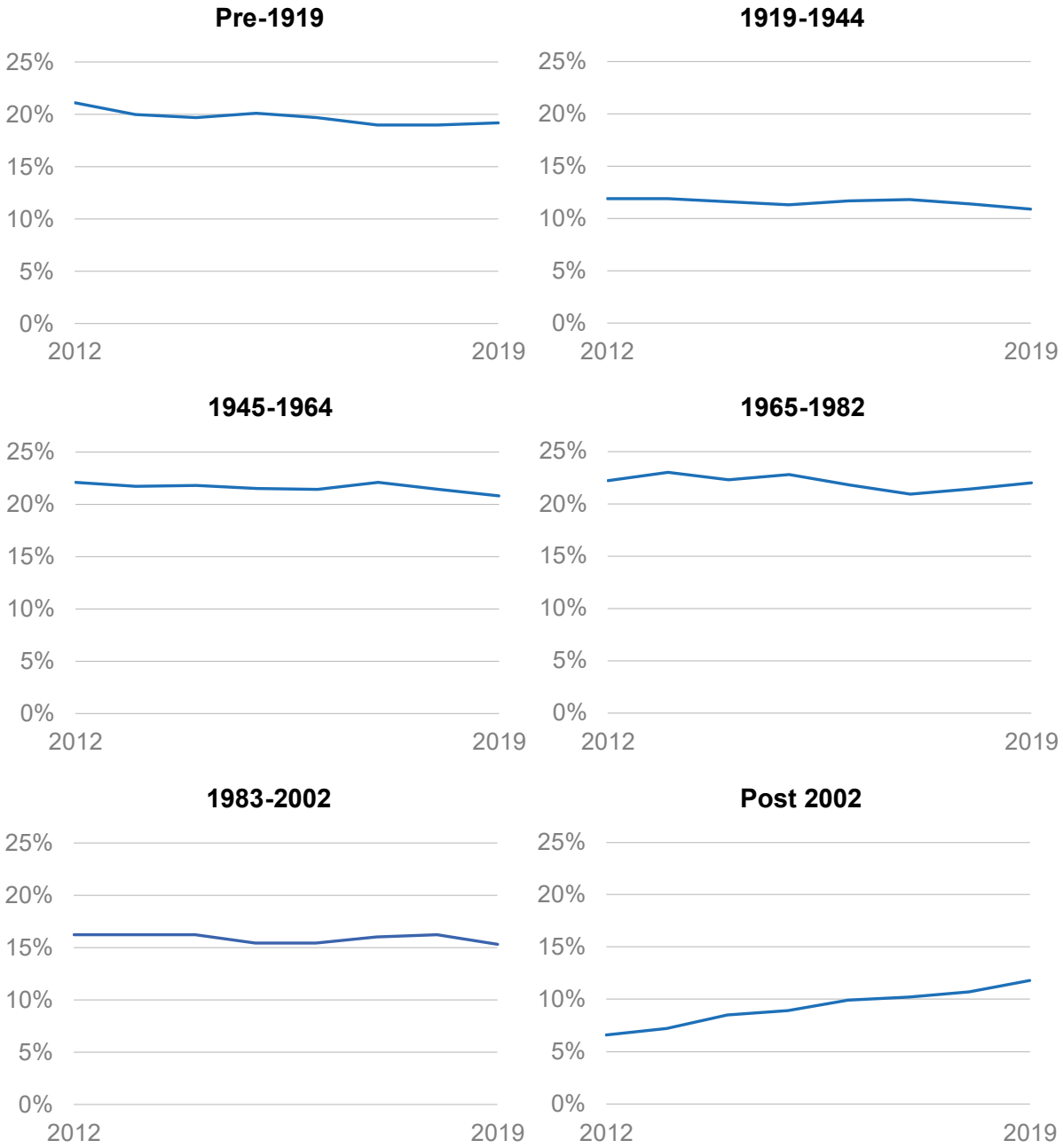
- The number of households in each local authority
- Dwelling age at Scotland level
- Dwelling type at Scotland level
- Urban-rural classification at Scotland level

NRS' household estimates are the source for the first of these and the others are sourced from the SHCS sample itself (the dwelling descriptions and abbreviated dwelling descriptions).

For almost all households in the SHCS sample, a dwelling description or abbreviated dwelling description is undertaken, even when a social survey interview or physical survey was not completed. These capture data on the dwelling age and type. Having weighted the sample to account for unequal selection probabilities, these then provide estimates of the composition of the housing stock by dwelling age and type from a large sample with minimal non-response bias and are used to set calibration totals for dwelling age and type. A similar process is used to set calibration totals for urban-rural classification, which can be determined from the address information in the sample file. For further details see the SHS 2019 methodology and fieldwork outcomes report.

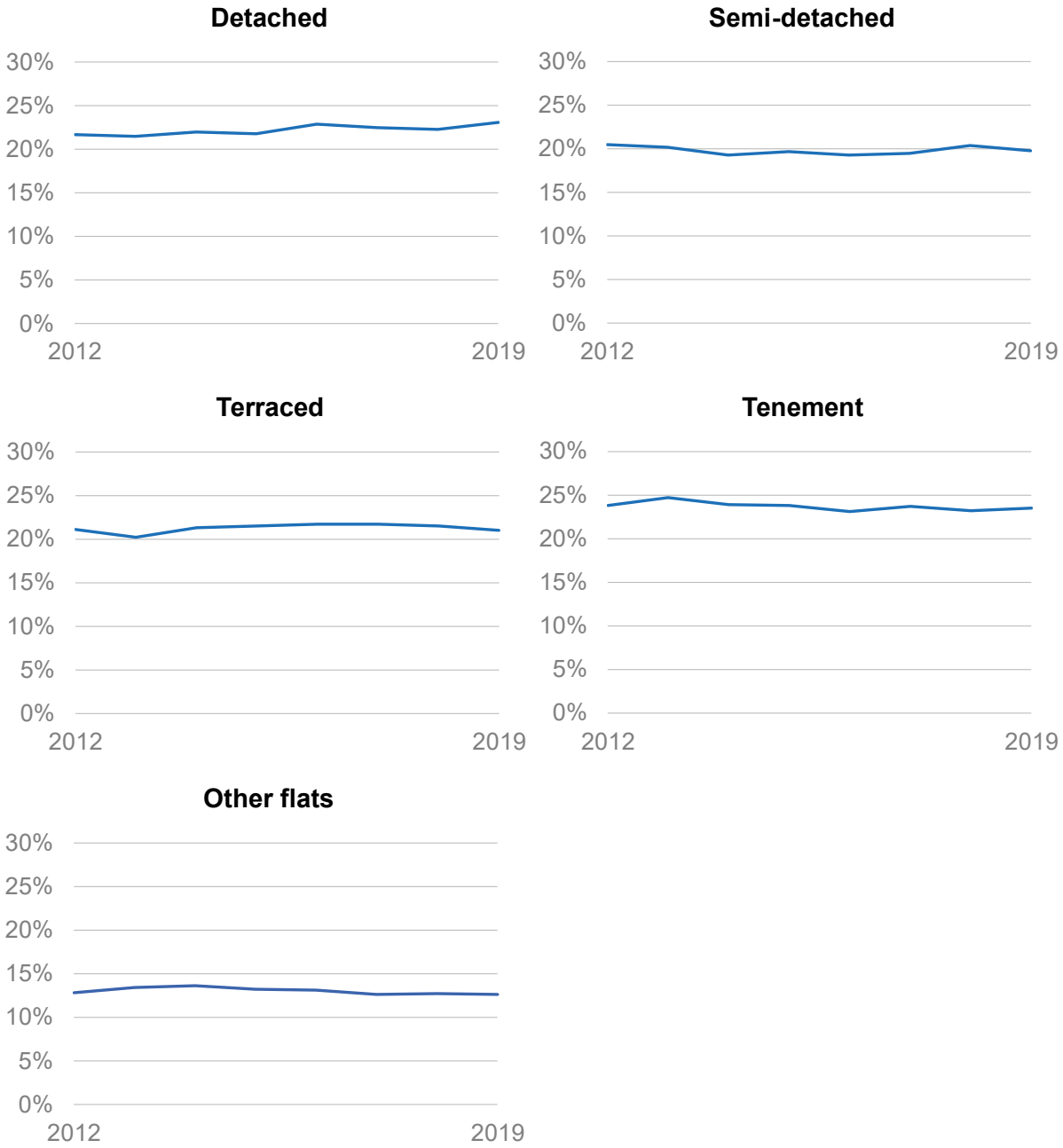
However, to minimise surveyor travel, dwelling descriptions and abbreviated dwelling descriptions were not undertaken as part of the 2021 external+ SHCS. This means that the calibration totals for dwelling age and type need to be rolled forward from the 2019 SHCS.

Figure 6.1: Percentage of dwellings by age, 2012 to 2019



Data Source: Table DQ4 in External+ Data Quality Tables

Figure 6.2: Percentage of dwellings by type, 2012 to 2019

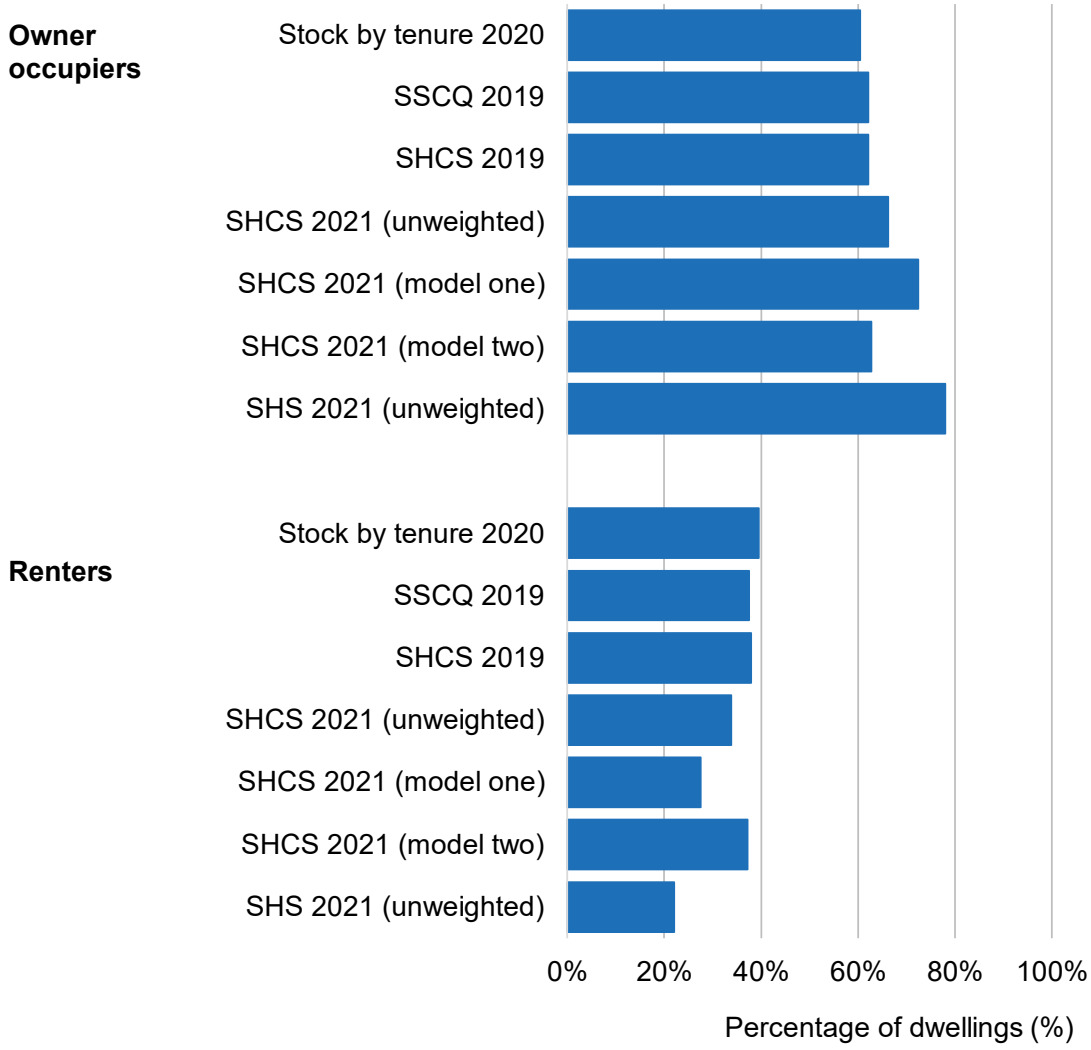


Data Source: Table DQ5 in External+ Data Quality Tables

Figure 6.1 shows how the composition of the housing stock has changed by dwelling age from 2012 to 2019. Figure 6.2 shows the same but for dwelling type. The composition of the housing stock by dwelling type has been stable between 2012 and 2019. However, there has been a five-percentage point increase in the proportion of post 2002 dwellings from 7% in 2012 to 12% in 2019, reflecting new build housing.

Though new house building was impacted by the coronavirus pandemic, National Statistics for 2020-21 show that 14,798 new build houses were completed in Scotland in 2020-21. Therefore, it is reasonable to expect that the proportion of post 2002 dwellings in the housing stock will have continued to increase between 2019 and 2021. As the calibration totals for dwelling age are being rolled forward from the 2019 SHCS, the results from the 2021 external+ SHCS will underestimate the proportion of post 2002 dwellings. Though not ideal, given the lack of alternative data we have judged this to be satisfactory for making the results from the 2021 external+ SHCS as representative of the housing stock as possible. But users should be mindful of this when interpreting results.

Figure 6.3: Percentage of dwellings by tenure



Data Source: Table DQ6 in External+ Data Quality Tables

Figure 6.3 shows estimates of the percentage of dwellings by tenure from various sources. The Scottish Government's statistics on housing stock by tenure are the most robust estimates.

The unweighted estimates from the 2021 external+ SHCS are closer to the stock by tenure estimates than the unweighted estimates from the 2021 SHS. (Recall that the push to telephone/video approach used for the 2021 SHS is known to result in owner occupiers being overrepresented relative to renters in the achieved sample.) However, this is mainly due to the approach to sampling that was taken for the 2021 external+ SHCS which meant that renters were more likely to be asked to participate than owner occupiers. Having accounted for the different selection probabilities, weighted estimates from the 2021 external+ SHCS using the 'usual' calibration model (model 1) are then closer to the unweighted estimates from the 2021 SHS and further from the stock by tenure estimates. Therefore, we considered a second calibration model which included household tenure.

For consistency with the approach to weighting taken for the social survey and due to the under-representation of households from the most deprived areas in the achieved sample for the 2021 external+ SHCS, we also included SIMD in this calibration model.

Again, for consistency with the approach to weighting taken for the social survey, the calibration totals for household tenure were derived by applying estimates from the 2019 SSCQ to NRS household estimates for 2021.

6.5 Impact on Data Quality

The impact of the changes to the 2021 SHCS on data quality are driven by the enforced changes to the social survey (SHS) which have impacted on the profile and representativeness of the achieved sample, and the enforced changes to the physical survey (SHCS) which have introduced mode effects. Key estimates from the SHCS, e.g., on fuel poverty and energy efficiency, have likely been impacted by a combination of both.

In this section we present estimates from the 2021 SHCS based on calibration models 1 and 2 and compare these with estimates from the 2019 SHCS. These comparisons are provided only to illustrate the impact the enforced changes to the 2021 social and physical surveys have had on data quality. As noted previously, the results from the 2021 SHCS are not directly comparable with the National Statistics from previous waves of the survey.

The estimates from the 2021 SHCS based on calibration model 2, which includes calibration totals for household tenure and deprivation, are found to resolve some of the issues with the representativeness of the sample and are generally more in line (but still not comparable) with those from the 2019 survey. Therefore, all results from the 2021 SHCS presented elsewhere in this report are weighted based on calibration model 2.

6.5.1 Profile and representativeness of the sample due to changes to the social survey

Figure 6.4 shows the composition of the weighted achieved SHCS sample by household tenure, household type and annual household income for 2019 and 2021. Estimates for 2021 are provided for calibration models 1 and 2.

It has been established that owner occupiers were overrepresented relative to renters in the achieved sample for the 2021 social survey. Figure 6.4 shows that if household tenure is not included in the calibration (model 1) then owner occupiers are also overrepresented relative to renters in the achieved sample for the 2021 SHCS. This is despite the 2021 SHCS over sampling renters - which then requires renters to be weighted down at the selection weighting stage.

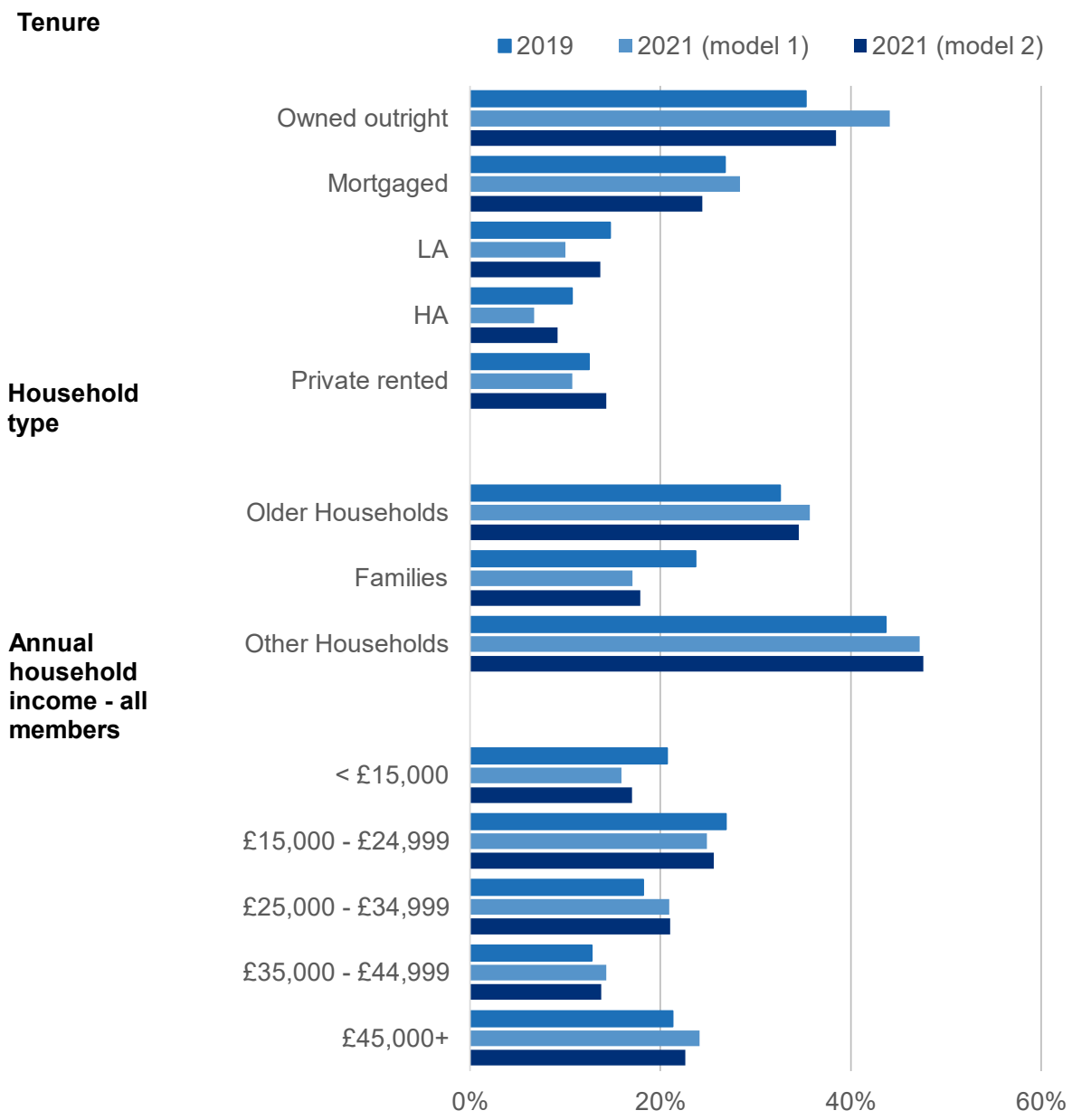
Including totals for the number of owner occupied and rented households in the calibration (model 2) enforces a representative balance between these in the sample. However, within these tenures there are still some large differences

compared to 2019. For example, those that own outright (38%) have increased by three percentage points compared to 2019 (35%).

Family households were underrepresented in the achieved sample for the 2021 SHS and older and other households were overrepresented. Figure 6.4 shows that this impacts on the SHCS subsample. Including household tenure and SIMD in the calibration (model 2) helps somewhat in addressing this, with the estimate for older households (35%) similar to that from 2019 (33%). However, families (18%) remain underrepresented compared to 2019 (24%) and other households (48%) remain overrepresented compared to 2019 (44%).

Similarly higher income households were overrepresented in the achieved sample for the 2021 SHS and Figure 6.4 shows that this is reflected in the 2021 SHCS. Again, this is addressed somewhat but not completely by including household tenure and SIMD in the calibration (model 2). For example, this brings the proportion of households with an income of £45,000 or more per year to 23% (compared to 24% for model 1) which is closer to the corresponding estimate for 2019 (21%). However, higher income households remain overrepresented and low-income households remain underrepresented compared to 2019.

Figure 6.4: Selected household characteristics, 2019 and 2021 using calibration models 1 and 2



Data Source: Table DQ7 in External+ Data Quality Tables

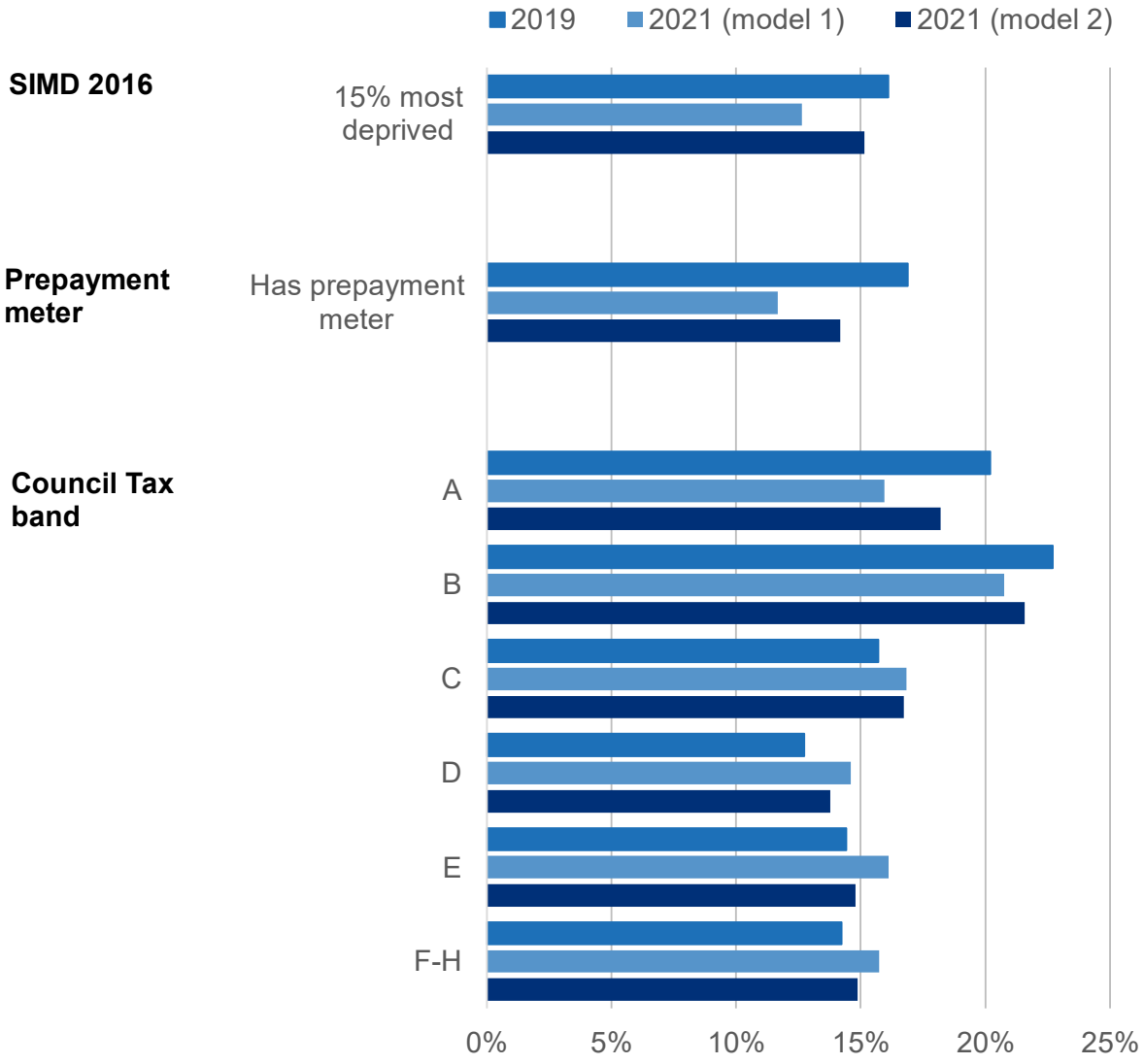
Figure 6.5 shows the composition of the achieved sample for the 2021 SHCS by selected dwelling characteristics for 2019 and 2021. Estimates for 2021 are provided for calibration models 1 and 2.

Dwellings in the most deprived areas were underrepresented in the 2021 SHS. Figure 6.5 shows that if SIMD is not included in the calibration (model 1) then dwellings in the 15% most deprived areas are also underrepresented in the 2021 SHCS. This is resolved by including SIMD in the calibration (model 2).

Dwellings with prepayment meters and the distribution of dwellings by Council Tax band are also better represented relative to the 2019 baseline by including household tenure and SIMD in the calibration (model 2). Though even under model 2, the estimate of dwellings with a prepayment meter in 2021 (14%) represents a decrease compared with 2019 (17%).

This is unlikely to represent a genuine change and is likely due to the over representation of higher income households in the 2021 SHS and SHCS. These households are less likely to have prepayment meters. The Department for Energy Security and Net Zero publish quarterly estimates of the regional variation in gas and electricity customer numbers by payment type. These estimates show that the proportion of customers in Scotland with prepayment standard electricity, economy 7 electricity and gas meters in 2021 is similar to 2019.

Figure 6.5: Selected dwelling characteristics, 2019 and 2021 using calibration models 1 and 2



Data Source: Table DQ8 in External+ Data Quality Tables

6.5.2 Mode effects due to changes to the physical survey

Figure 6.6 shows the proportion of dwellings for which all fixed lighting is low-energy lighting, the proportion of dwellings with a secondary heating system and the distribution of dwellings by total internal floor area for 2019 and 2021. Estimates for 2021 are provided for calibration models 1 and 2. It is apparent that neither calibration model brings the estimates noticeably more into line with the 2019 baselines.

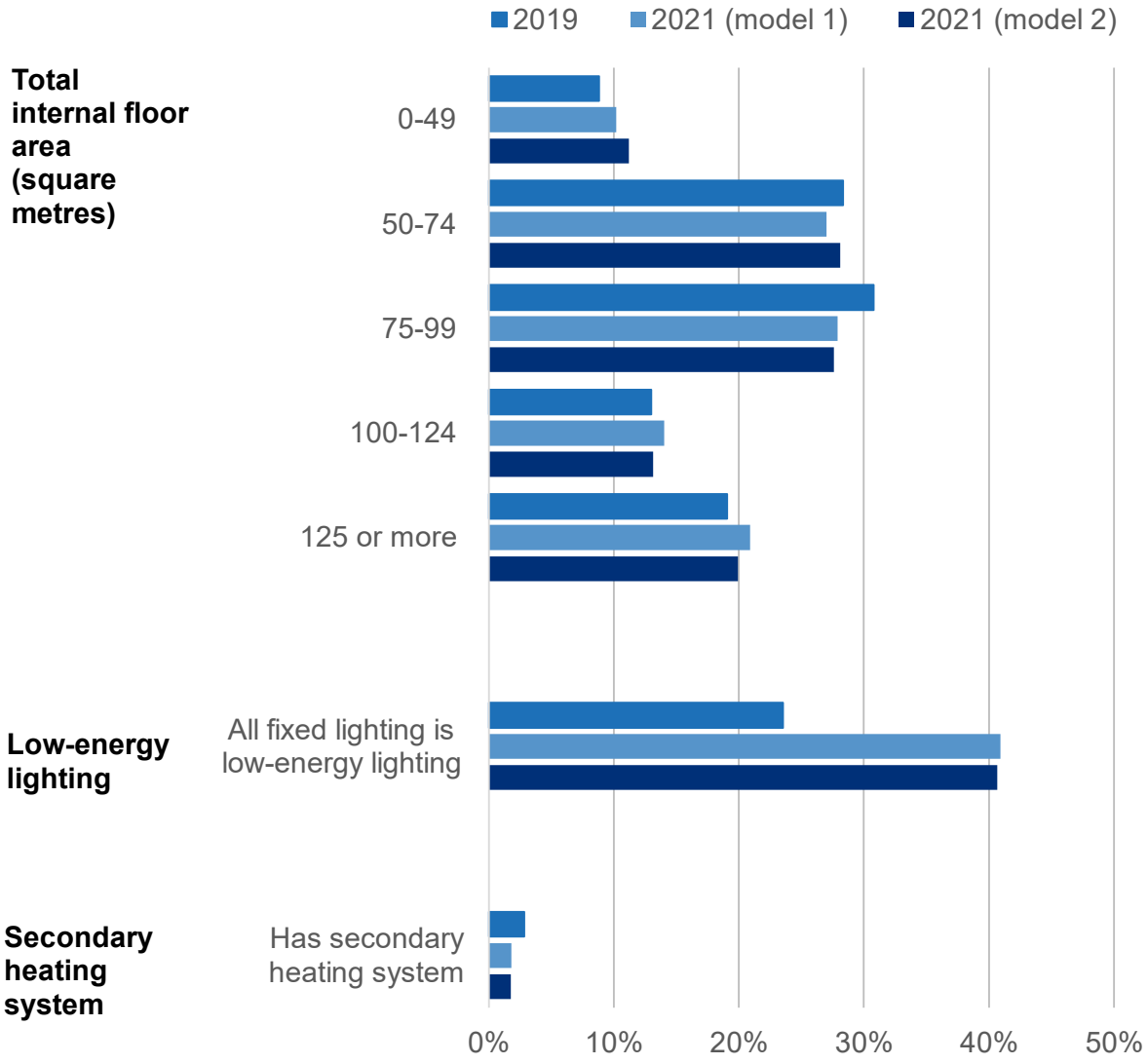
The proportion of dwellings for which all fixed lighting is low-energy lighting has increased by 17 percentage points to 41% in 2021 compared to 2019 (for calibration models 1 and 2). This is unlikely to represent a genuine change and is likely due to the mode of collection used for the 2021 external+ SHCS. This information was required to undertake the energy modelling and had to be collected. However, this is not something that surveyors would have been able to observe for themselves as they were not able to enter dwellings. In most cases surveyors would have been reliant on the householder providing this information via telephone. It is likely that householders have tended to overestimate the proportion of fixed lighting that is low-energy. BRE who undertook the energy modelling for the 2021 external+ SHCS reported a decrease in modelled energy consumption and costs associated with lighting, in part due to the increase in the number of dwellings for which all fixed lighting is low-energy lighting. This then impacts on energy efficiency ratings (and will also impact on estimates of fuel poverty annual running costs).

BRE have advised that an average-sized dwelling (total internal floor area of 89 meters squared) going from 0% to 100% low-energy (fixed) lighting would save around £50 per year which could add around 1 to 2.5 points to the SAP score, dependent on the initial SAP score.

A similar issue was reported in relation to a decrease in the proportion of dwellings with a secondary heating system (3% of dwellings in 2019 compared to 2% of dwellings in 2021) and a subsequent decrease in modelled energy consumption and costs associated with secondary space heating. Again, surveyors would have been reliant on the householder providing this information via telephone and it is likely that householders have tended to under report the presence of secondary heating systems.

Mode effects are also likely to have impacted total internal floor area calculations, which are a key component of the energy modelling. BRE reported that there were a few external+ surveys for which dwelling measurements were missing and had to be obtained from other sources, e.g., Google Maps and Rightmove. This is likely because surveyors had to record all dwelling measurements externally and this may have made it difficult to obtain measurements for non-standard dwellings.

Figure 6.6: Selected dwelling characteristics, 2019 and 2021 using calibration models 1 and 2



Data Source: Table DQ8 in External+ Data Quality Tables

6.5.3 Impact on Key Statistics

Figure 6.7 shows selected key statistics from the SHCS for 2019 and 2021. Estimates for 2021 are provided for calibration models 1 and 2.

For calibration models 1 and 2 there is a 7-percentage point increase in the proportion of dwellings with an EPC rating of band C or above to 52% in 2021 compared to 45% in 2019. This corresponds to an increase of around 190,000 households. This is unlikely to represent the true scale of any improvement in the energy efficiency of dwellings between 2019 and 2021. This increase is most likely

due to the mode effects associated with the 2021 external+ SHCS (particularly around the questions on the proportion of fixed low-energy lighting and secondary heating systems) and the subsequent impact on the outputs from the energy modelling (i.e., energy efficiency ratings) as well as the issues with the representativeness of the sample.

It should be noted that of the 1.02 million dwellings rated EPC band D in the 2019 SHCS, around 120,000 (5% of all dwellings) were one SAP point short of being rated EPC band C. This illustrates that any mode effects which result in even a small increase in energy efficiency ratings could have a big impact of the distribution of dwellings by EPC band.

In addition, it is likely that the non-response bias in the 2021 SHS and SHCS samples will have contributed. However, the effects of this are likely to work in opposite directions. For example, social renters and families are underrepresented and they tend to live in the most energy efficient dwellings. Higher income households are overrepresented and they tend to live in the most energy efficient dwellings.

Similarly, for both calibration models there are decreases in the proportion of households in fuel poverty and extreme fuel poverty compared to 2019, though the estimates from calibration model 2 are more in line with the 2019 baseline. The fuel poverty and extreme fuel poverty estimates for 2021 based on calibration model 2 represent decreases of 5 and 3 percentage points compared to 2019, respectively[19].

Fuel poverty has three main drivers: high energy prices, low income, and poor energy efficiency. We have established that higher income households have been overrepresented in social survey and that the mode effects due to the changes to the physical survey are increasing the modelled energy efficiency ratings for dwellings. We would expect these to drive fuel poverty rates down. According to the domestic energy price indices published by the Department for Energy Security and

[19] It should be noted that the fuel poverty estimates for 2019 and 2021 presented in this section are not directly comparable. As explained in the fuel poverty section of this report, we have incorporated methodological changes into our fuel poverty estimates for 2021 which are not reflected in the estimates for 2019. Had fuel poverty estimates for 2021 been produced on the same basis as the estimates for 2019, under calibration model 2 the fuel poverty rate would have been 21% and the extreme fuel poverty rate would have been 10%. (Under calibration model 1 the fuel poverty rate would have been 19% and the extreme fuel poverty rate would have been 9%.) Clearly the methodological changes incorporated into our fuel poverty estimates for 2021 do not alone account for the differences between 2019 and 2021.

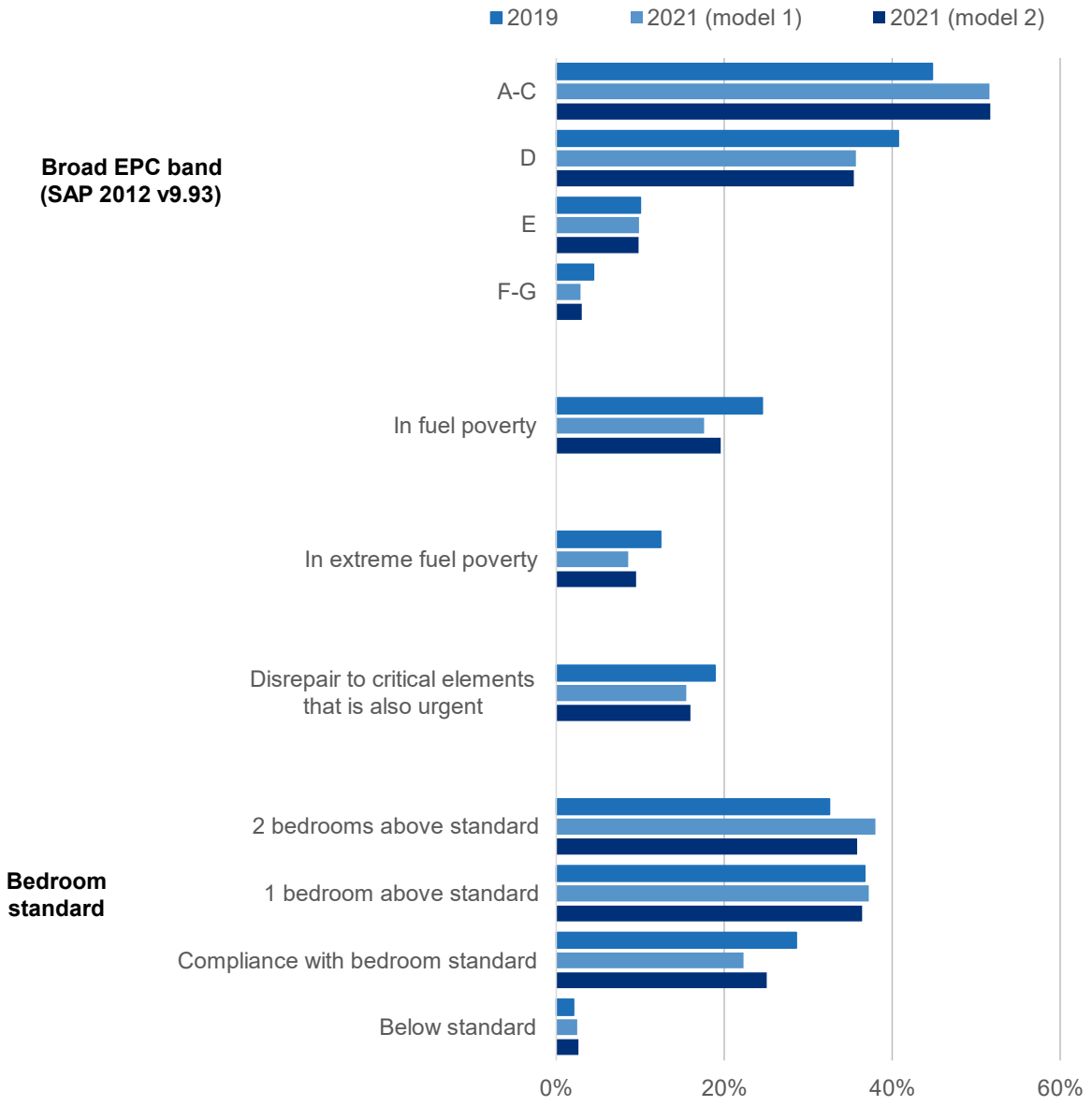
Net Zero, there was a modest decrease of 0.1% in the price of domestic fuels between 2019 and 2021. Within this there was a 9.8% decrease in the price of gas and a 6.8% increase in the price of electricity. Overall, we would expect energy prices to have had a neutral effect on fuel poverty rates between 2019 and 2021.

So clearly the decreases in the fuel poverty and extreme fuel poverty rates are not likely and are most likely due the over representation of higher income households in the social survey and the mode effects due to the changes to the physical survey that are driving the increases in energy efficiency ratings.

Figure 6.7 shows that there has been a 3-percentage point decrease in dwellings with urgent disrepair to critical elements in 2021 (calibration model 2) compared to 2019. This is unlikely to be a result of mode effects due to the changes to the physical survey. The urgency of disrepair is only assessed for external and common elements which would normally be assessed by surveyors from outside the dwelling. While a genuine improvement cannot be ruled out, it is more likely this is due to issues with the representativeness of the sample.

Figure 6.7 shows that there has been a decrease in the percentage of dwellings that meet (but do not exceed) the minimum requirements of the bedroom standard from 29% in 2019 to 25% in 2021 under calibration model 2 and 22% in 2021 under calibration model 1. Furthermore, under calibration models 1 and 2 there have been 5 and 3 percentage point increases, respectively, in the proportion of dwellings that exceed the bedroom standard by two or more bedrooms. It is most likely that these changes are due to the representativeness of the social survey. For example, we know that higher income households which are overrepresented in the social survey are more likely to live in accommodation which exceeds the bedroom standard by more than two bedrooms.

Figure 6.7: Selected key statistics, 2019 and 2021 using calibration models 1 and 2



Data Source: Table DQ9 in External+ Data Quality Tables

7 Technical Notes and Definitions

7.1 Survey Estimation

From 2012 the Scottish House Condition Survey (SHCS) has been a module of the Scottish Household Survey (SHS). In 2012, around a third (36%) of respondents to the SHS were invited to participate in a follow-up inspection by SHCS surveyors. This proportion has had to increase over time as the conversion rate from the social interview to the physical survey has decreased. Almost half of respondents (47%) to the 2019 SHS were invited to participate in the 2019 SHCS to ensure that the required number of physical surveys were achieved.

Due to the change in approach for 2021, respondents to the 2021 SHS were invited to participate in the 2021 external+ SHCS based on their response to the tenure question in the social interview, with renters having a higher probability of being invited to participate than owner occupiers. (For further details see the section of this report on external+ data quality.) A total of 3,980 households (40%) that responded to the 2021 SHS were invited to participate in the 2021 SHCS, with 3,174 going on to do so (a conversion rate of 80%). The proportion of SHS respondents asked to participate in the 2021 external+ SHCS was lower than previous years as the conversion rate was higher.

7.1.1 Sample Sizes and Gross Dwelling Numbers

In Table 7.1 we provide the achieved sample sizes in the social interview and physical dwelling inspection follow-up for all years of the annual SHCS to 2021.

Table 7.1: Achieved sample for the social interview and physical survey and the number of occupied dwellings by survey year, 2003/04 to 2021

Survey year	Social interview (achieved sample)	Physical survey (achieved sample)	Number of occupied dwellings (thousands)
2003/4	3,870	3,090	2,269
2004/5	3,783	3,093	2,301
2005/6	3,679	3,147	2,315
2007	3,867	3,033	2,314
2008	3,763	3,015	2,331
2009	4,153	3,346	2,344
2010	3,853	3,115	2,357
2011	3,949	3,219	2,368
2012	3,813	2,787	2,386
2013	3,780	2,725	2,402
2014	3,787	2,682	2,420
2015	4,083	2,754	2,434
2016	4,220	2,850	2,452
2017	5,049	3,002	2,464
2018	4,843	2,964	2,477
2019	4,843	2,997	2,496
2021	3,980	3,174	2,529

Table 7.1 also shows the total number of households (occupied dwellings) in Scotland for each survey year which provides the basis for grossing up the estimates of households and dwellings in this report. These figures are produced annually by the National Records of Scotland as part of their inter-censal household estimates publication.

The SHCS is a sample survey. All survey results are estimates of the true prevalence within the population and will contain some error associated with sampling variability. The likely size of such variability can be identified, by taking account of the size and design of the sample, as described in the subsections on confidence intervals, design effects and statistical significance.

In addition to sampling variability, there are other sources of uncertainty, such as those arising from incomplete responses or failure to secure participation in the survey from each sampled household. Where non-response is not random, i.e., some types of households are less likely to participate than others, bias is introduced into the survey data. Such errors have not been quantified in this report.

In general, the smaller the sample size, the greater the likelihood the estimate could be misleading, so more care must be taken when using smaller subsets of the survey sample for analysis. In this report estimates representing 2 or fewer cases, or where the base sample is below 30 have been suppressed.

Different types of estimates are subject to different levels of uncertainty associated with sampling and design. For example, estimates of change (i.e., figures relating to comparisons across survey years) are generally subject to greater sampling error than point-in-time estimates (i.e., figures relating to one survey year only) and such errors would be understated by the confidence intervals in Table 7.2. There is more uncertainty associated with complex measures, such as the fuel poverty rate and this is not quantified in this report or reflected by the confidence intervals in Table 7.2.

7.1.2 Confidence Intervals

By convention, a 95% confidence interval is used to quantify the variability of a sample estimate, under which there is a 1 in 20 chance that the true value will fall outside the given confidence interval.

Table 7.2 shows the 95% confidence limits for estimates of proportions based on sub-samples of various sizes before design effects are considered.

Table 7.2: 95% confidence limits for estimates based on sub-samples of various sizes (excluding design effects)

Sub-sample size	Estimate of 10% or 90%	Estimate of 20% or 80%	Estimate of 30% or 70%	Estimate of 40% or 60%	Estimate of 50%
100	5.9%	7.8%	9.0%	9.6%	9.8%
250	3.7%	5.0%	5.7%	6.1%	6.2%
500	2.6%	3.5%	4.0%	4.3%	4.4%
1,000	1.9%	2.5%	2.8%	3.0%	3.1%
1,500	1.5%	2.0%	2.3%	2.5%	2.5%
2,000	1.3%	1.8%	2.0%	2.1%	2.2%
3,000	1.1%	1.4%	1.6%	1.8%	1.8%

7.1.3 Design Effects

The design effect is the ratio between the variance (average squared deviation of a set of data points from their mean value) of a variable under the actual sampling method used and the variance computed under the assumption of simple random sampling. In short, a design effect of 2 would mean doubling the size of the sample used to obtain the same level of precision as with a simple random sample; a design effect of 0.5 implies the reverse. Design effect adjustments are necessary where standard errors (and confidence intervals) are affected by the design and complexity of the survey.

Disproportionate stratification and sampling with non-equal probabilities tends to increase standard errors, giving a design effect greater than 1. However, this can be controlled by deliberately over-sampling in stratum where the item of interest is either very rare or variable. The impact of non-response weighting on standard errors tends to be, although with exceptions, comparatively limited. The sampling design of the SHCS meets the criteria above in that disproportionate stratification is applied across the 32 local authority areas with over-sampling of remote rural areas - for example in Orkney Islands and Shetland Islands. As a result, one would expect the design effect to be above 1 although only modestly so.

Table 7.3 shows the design factors (the design factor is the square root of the design effect) for all the SHCS waves since 2003/04. When using a mixture of the physical and social survey data, the physical survey design factor must be used. The physical survey design factor for the 2021 SHCS is 1.12. It was not possible to produce social weights for the 2021 SHCS as there were no dwelling descriptions or abbreviated dwelling descriptions. Therefore, it is not possible to produce a social survey design factor.

Table 7.3: Design factors for the SHCS by survey year, 2003/04 to 2021

Survey year	Physical survey design factor	Social survey design factor
2003/04	1.14	1.13
2004/05	1.18	1.17
2005/06	1.14	1.14
2007	1.13	1.11
2008	1.11	1.11
2009	1.09	1.08
2010	1.11	1.10
2011	1.12	1.11
2012	1.09	1.08
2013	1.09	1.08
2014	1.09	1.08
2015	1.10	1.08
2016	1.10	1.08
2017	1.10	1.08
2018	1.11	1.08
2019	1.12	1.08
2021	1.12	[z]

In general, when producing estimates at a local authority level from the SHCS, no design effect adjustment of standard errors is necessary because simple (equal interval) random sampling is carried out within each local authority. However, if producing estimates at a local authority level using the 2021 SHCS, which is not recommended, the unequal selection probabilities for owner occupiers and renters would have to be accounted for.

7.1.4 Statistical Significance

Because the survey's estimates may be affected by sampling errors, apparent differences may not reflect real differences in the population. A difference is significant if it is so large that a difference of that size is unlikely to have occurred purely by chance.

Comparisons in this publication are tested at the 5 per cent level as described in the subsection on confidence intervals. Testing significance involves comparing the difference between two statistics (for example, the percentage of households rated as EPC band C or better for the social sector compared to the private sector) with the 95 per cent confidence limits for each of the two estimates considered.

Our approach to testing statistical significance follows that described in the Scottish Household Survey 2019 supporting document.

In the example above (see Table EE10 the supporting energy efficiency tables), the percentage of social sector households rated as EPC band C or better is 65% with a 95 per cent confidence interval of 4 percentage points, having accounted for the design factor of 1.12 in Table 7.3. The percentage of private sector households rated as EPC band C or better is 48% with a 95 per cent confidence interval of 2 percentage points. As the absolute difference between the estimates (17 percentage points) is greater than the square root of the sum of the squared confidence intervals (5 percentage points), we conclude that the difference between the estimates is statistically significant at the 5 per cent level.

7.1.5 Table Conventions

The following conventions are used in tables:

- [low] indicates a value is less than 0.5% or 500 households
- [w] indicates there are no sample cases
- [c] indicates that the base sample is too small to report (below 30 cases) or the estimate represents 2 or fewer sampled households
- [z] indicates that a value is unavailable as it is not applicable

These conventions are consistent with the guidance on using symbols and shorthand when publishing data tables on public sector websites.

7.2 Missing Tenure Information

Because of a routing error tenure information is not available for a small number of cases in the 2012 and 2013 surveys (46 in 2012, 42 in 2013). This was rectified for the 2014 fieldwork and the full sample has been used when reporting on tenure for subsequent years. This introduces some discontinuities in comparing statistics for the social (or the private) sector for 2014 onwards, on the one hand, and previous years, on the other. For further details please refer to the respective earlier key findings reports. Tables in key findings reports from the SHCS are clear whether data for 2011 and earlier are presented including or excluding rent free cases.

7.3 Energy Models

Two domestic energy models, summarised in Table 7.4, are used to produce the energy outputs in this report. They are based on the same core methodology but have some different assumptions and calculations affecting the output values.

Table 7.4: Summary of domestic energy models used on SHCS data

Model	SAP	BREDEM 2012
Version	• SAP 2009 • SAP 2012 (RdSAP 9.92) for 2014 to 2019 • SAP 2012 (RdSAP 9.93) from 2018 onwards	• Version 1.0 for data up to 2013 • Version 1.1 for data from 2014 onwards
Outputs	• Energy efficiency ratings • Environmental impact ratings	• Fuel poverty energy use and running costs • Carbon emissions
Fuel prices	SAP standard	Based on a range of sources. For more details see Table 1 in the section on Measuring Fuel Poverty in SHCS methodology notes 2019
Occupancy	Number of occupants derived based on total floor area of the dwelling	Actual number of occupants in the dwelling
Heating regime	21°C in the main living area and 18°C elsewhere; 9 hours per weekday and 16 hours at the weekend	• For carbon emissions, as SAP • For fuel poverty energy use/running costs for 2021 onwards, as described in paragraph 50 of the SHCS methodology notes 2019

		• For fuel poverty energy use/running costs for 2012 to 2019, as described in paragraph 48 of the SHCS methodology notes 2019
Climate	East Pennines	Based on geographical location. For fuel poverty energy use/running costs postcode district-level weather data is being used for 2021 onwards
Energy end-use included	• space heating • water heating • fixed lighting • gains from renewable energy technologies	As SAP but also energy used for: • cooking • running appliances

All energy efficiency and environmental impact rating related statistics for 2021 presented in this report are based on SAP 2012 (RdSAP 9.93).

Carbon emissions are calculated based on the standard heating regime, applying carbon intensity values to each fuel type used. Emissions factors for the BREDEM 2012 model come from SAP 2012 and are provided in Table 7.5.

Table 7.5: Carbon intensity of common heating fuels, SAP 2012

Fuel	Kilograms (kg) of carbon dioxide (CO2) per kilowatt hour (kWh)
Mains gas	0.216
LPG	0.241
Oil	0.298
Coal	0.394
Anthracite	0.394
Smokeless fuel	0.433
Wood - logs	0.019
Wood - pellets	0.039
Wood - chips	0.016
Electricity	0.519

From 2018 to 2019 SAP based energy variables under SAP 2012 RdSAP v9.92 and v9.93 were reported. For 2021 onwards energy variables under SAP 2012 RdSAP v9.92 are not available. Compared to v9.92, U-values for solid, insulated stone and uninsulated cavity walls improved, whereas they declined for insulated cavity walls. As a result, the mean SAP rating under v9.93 was 0.16 SAP points less than under v9.92 in 2019 and 0.17 points less in 2018.

Over the years improvements have been made to how the BREDEM 2012 model is used to produce energy outputs from the SHCS.

From 2016 the SHCS has collected information about the presence of pre-payment meters in dwellings which allows more accurate fuel prices to be assigned to these dwellings.

From 2019 more detailed information on combi boilers has been included to improve the accuracy of calculations surrounding hot water losses. As a result, the mean BREDEM 2012 modelled energy consumption is expected to increase by around 33 kWh per year.

Furthermore, from 2019 a household’s lights and appliances are assigned as using an off-peak tariff if an off-peak electricity meter is present, even if there is no form of electric heating in the dwelling. Previously, where a household did not have a form of electric heating, the lights and appliances were assumed to use standard electricity. This change does not affect the energy consumption of a dwelling, only the fuel prices applied to the energy associated with lighting and appliance use.

Climate factors such as external temperature, wind speed, latitude, mean global solar irradiance and height above sea level are determined by the area in which the dwelling is located. Prior to 2021, weather data for the nine Scottish regions in Table U6 in SAP 2012 was used. From 2021 more detailed postcode district weather data is being used from Table 172 of the Product Characteristic Database (PCDB).

The impact of using postcode district weather data has been measured using data from the 2015, 2016, 2017 and 2021 Scottish House Condition Surveys. It was found that many dwellings in the achieved sample were clustered in postcode districts where the average external temperature was higher and wind speed was lower than the regional averages previously used. As expected, a decrease in wind speed (which is most likely to be affected by local geography) combined with an increase in external temperature resulted in a decrease in mean energy consumption and mean annual running costs.

7.4 Fuel Poverty: income after housing costs

For the 2017 Scottish Household Survey (SHS), an updated set of questions collecting council tax information were incorporated and accounted for in fuel poverty analysis. Previously respondents were only asked to provide what they paid in council tax whether or not they received any deductions or reductions. The survey now distinguishes between reported council tax after any deductions or reductions, and full council tax. This reduces the risk of double counting Council Tax Reduction in household income in the former case.

For the 2018 SHS onwards, income data for up to three other adults in addition to the highest income householder and/or their spouse is collected. Prior to 2021, fuel poverty calculations have included only the income of the highest income householder and/or their spouse. For 2021 onwards the income of up to three other adults is included.

For the 2019 SHS onwards, housing costs are imputed when they are not provided. For 2021 onwards, imputed housing costs are used in fuel poverty calculations. Prior to 2019, when housing costs were not provided, they were assumed to be nil.

7.5 Boilers

Testing compliance of boilers with current Scottish Building Standards for domestic properties is carried out by comparing the boiler efficiency to minimum requirements. Data on the efficiency of household heating systems was first produced for the 2012 SHCS. However, there was a change to the methodology for the 2014 and 2015 SHCS which made an adjustment to the modelling to allow for the assumption that a poorly controlled system is, in effect, less efficient.

In the 2016 SHCS report, the full boiler efficiency dataset was revised to ensure it was on a consistent basis across years and represented the efficiency of the heating system before any adjustments for lack of controls. Efficiencies are taken directly from the Product Characteristics Database whenever possible and from the SAP default efficiencies for that system otherwise. This is therefore more representative of the actual boiler efficiency.

Furthermore, the thresholds used to test compliance for oil condensing boilers were also updated in 2016 to reflect current minimum standards. The full time series presented from 2017 onwards continues to reflect these changes.

7.6 Definitions of Categories in the Key Findings Report

7.6.1 Dwelling Types

The SHCS uses the following definitions of dwelling types:

- Detached house: a house that is free standing with no party walls
- Semi-detached house: a house that is only attached to one other dwelling, commercial premise etc. The two properties taken together should be detached from any other properties
- Terraced house: a house forming part of a row of three or more dwellings, commercial premises etc.
- Tenement flat: a dwelling within a common block of two or more floors (commonly up to five storeys but may be higher in certain circumstances) where some or all the flats have a shared or common vertical access. The selected dwelling need not share the access, but may be situated within the block with shared/common access (own door flat)
- 4-in-a-block: each flat in a block has its own independent access. Flats on the upper level have an internal or external stair
- Tower/slab: flats in a high rise (ten or more storeys) or flats where the common circulation is predominantly horizontal (maisonette, balcony, or gallery access)
- Flat from a conversion: flats resulting from the conversion of a house only. A flat converted from a non-residential building (e.g., a warehouse) is classified according to the above flat types

7.6.2 Household Types

The SHCS uses the following classification of household types:

- Families: households which contain at least one child aged under 16. Resident adults may be of any age
- Older households: small households made up of one or two residents, at least one of which is aged 65 or older
- Other households: these are all other households with adult residents (of any age) and no children

The pensionable age threshold used for SHCS key findings reports from 2015 onwards is 65 years for both men and women. Previous publications used 65 for men and 60 for women. Therefore, the categories ‘Older households’ and ‘Other households’ used from 2015 are not fully comparable with previous years.

7.6.3 Urban Rural Classifications

The urban/rural classification in SHCS key findings reports is the Scottish Government's 2-fold and 6-fold urban rural classification. Dwellings in settlements with over 3,000 people are considered urban by this definition. For 2021 onwards, the 2020 urban rural classification is used for reporting, calibration weighting and in fuel poverty calculations to identify households in remote rural, remote small town and island (RRRSTI) areas for which uplifts to the UK Minimum Income Standard are applicable.

The Scottish Government published the 2016 urban rural classification in 2017. However, to remain consistent with the classification underpinning survey weight derivations, the 2013/14 urban rural classification (2011 data zone edition) is used for reporting 2016 to 2019 data. Prior to 2016, 2001 data zones are used.

7.6.4 Gas Grid Coverage Derivation

Determining whether a dwelling is within the coverage of the gas grid is primarily based on its proximity to gas distribution pipes. A dwelling is "on the gas grid" if it is within 63 meters of a low, medium, or intermediate pressure pipe, the usual maximum distance for a standard domestic connection. This methodology was used for deriving gas grid coverage for the 2013 to 2019 SHCS key findings reports.

Figure 7.1: Gas grid derivation using GIS mapping

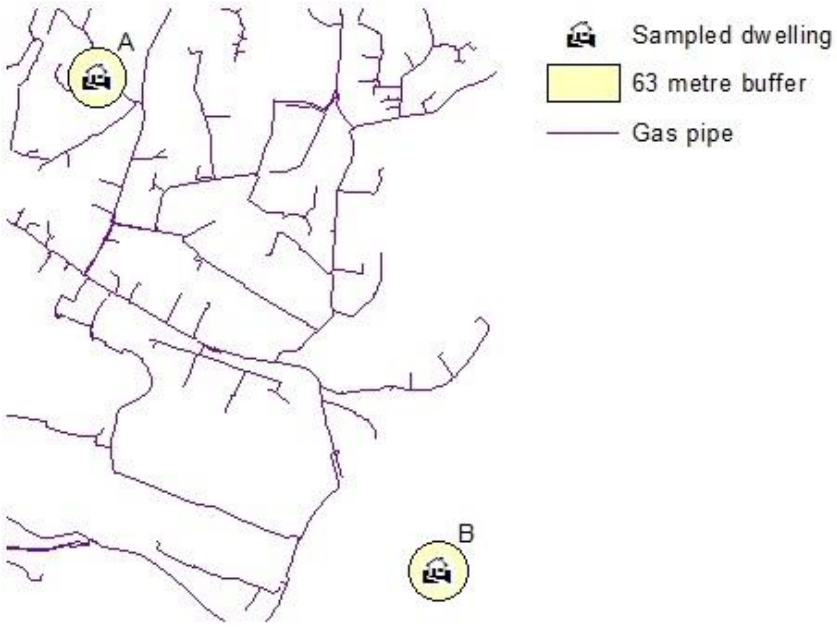


Figure 7.1 shows how this is derived using GIS mapping. From the dwelling location information of surveyed properties, a 63-meter buffer is drawn. Where this buffer intersects a gas distribution pipe, the dwelling is said to be on the gas grid. In the example in Figure 7.1, dwelling A is on the gas grid, while dwelling B is not.

The gas grid information used for this mapping is provided by SGN. It includes both the national gas network and the Scottish Independent Undertakings (SIUs), where gas is provided in areas remote from the national gas grid. It does not however include information on pipes owned and operated by Independent Gas Transporters (IGTs). Therefore, dwellings classified as off the gas grid by this method may be within 63 meters of an IGT operated gas distribution pipe and potentially have a connection to the gas grid. This methodology may therefore slightly undercount dwellings within the range of the gas grid.

The SHCS collects information on whether a dwelling has a mains gas connection. So, to account for the potential undercount of dwellings on the gas grid, from 2021 we have introduced an improvement to the gas grid coverage derivation whereby a dwelling categorised as being off the gas grid by the method described above but recorded as having a mains gas connection in the SHCS is re-categorised as being on the gas grid.

7.6.5 Reasons Why Home Heating is Difficult

Question HT14 in the Scottish Household Survey asks: “Which of these things, if any, make it difficult to heat your home”. There are 19 response categories and respondents can choose any combination of reasons why heating their home is difficult. Response categories are grouped for reporting in the energy perceptions section of the key findings reports from the SHCS.

“Poor or inadequate heating” corresponds to the response categories:

- No central heating
- Not enough heaters/radiators
- Position of heaters/radiators
- Poor system/need new system
- Radiators not big enough
- Heating not working
- Dislike storage heaters
- Inadequate heating
- Heating in part of house
- Can’t afford to replace system

“Hard to control heating” corresponds to the response categories:

- Difficult to control/regulate
- Hard to control heat

7.6.6 Hard to Treat Cavity Walls

Key findings reports from the SHCS use the Energy Company Obligation (ECO) definition of hard-to-treat cavity walls (HTTCs) to provide a breakdown of the remaining insulation potential of cavity wall dwellings in the Scottish housing stock.

Under this definition a cavity wall is considered hard-to-treat if:

- The building has three or more storeys. Dwelling spaces in lofts are not counted as storeys
- The building is severely exposed to wind-driven rain. The SHCS is not able to collect this information, which will lead to an underestimation of HTTCs

- Walls at risk of water penetration, i.e., walls requiring urgent repair to the wall finish and walls with penetrating damp[20]
- Non-traditional building types, e.g., timber frame, metal-frame, and prefabricated concrete
- Partially filled, narrow or uneven cavities as well as cavities with failed cavity wall insulation**.** The SHCS is not able to capture this information. As a result, HTTCs may be underestimated

Note that the presence of a conservatory alone does not cause a dwelling to be considered hard-to-treat under the ECO definition of HTTCs.

7.6.7 Disrepair

Key findings reports from the SHCS use different categories of disrepair to describe the state of disrepair of a dwelling.

A range of elements - both internal and external - are assessed for the extent of disrepair, the urgency of disrepair (relating to external and common elements only), and in some cases the residual life of the element.

In a small number of instances, surveyors may not be able to assess the state of repair of certain elements of a property. This results in a disrepair status of 'unobtainable' for the full property since we are unable to say for certain whether disrepair exists. This usually affects a small number of the properties surveyed. Tables and figures relating to disrepair describe where these properties have been counted for clarity in reporting.

7.6.7.1 Critical Elements

The critical elements are those whose condition is central to a dwelling being wind and weatherproof, structurally stable and safeguarded against further rapid deterioration. They are as follows:

- Roof covering
- Roof structure
- Chimney stacks

[20] It should be noted that no information on the presence of rising or penetrating damp was collected in the 2021 SHCS due to the enforced methodological changes. Therefore, HTTCs may be underestimated in outputs from 2021 SHCS.

- Flashings
- Roof gutters and downpipes
- External walls - finish
- External walls - structure
- Access decks and balustrades (common areas - flats only)
- Foundations
- Damp-proof course
- External doors and windows (dwelling only)
- Doors, screens, windows, and roof lights (common areas - flats only)
- Internal walls/partitions[21]
- Floor structure
- Floor finish
- Dry/wet rot

Disrepair to critical elements is recorded where there is any disrepair, no matter how small, to the critical elements of the dwelling.

7.6.7.2 Urgent Disrepair

Urgent disrepair is recorded where the SHCS surveyor deems that a dwelling has any disrepair which, if not rectified, would cause the fabric of the building to deteriorate further and/or place the health and safety of the occupier at risk.

Urgency of disrepair is only assessed for external and common elements. Internal room floor structures and finishes as well as internal walls/partitions and the presence of dry/wet rot are the only critical elements for which urgency is not applicable.

The presence of urgent disrepair to critical elements was first reported in the 2019 SHCS key findings report, for 2018 onwards.

[21] This element has been incorrectly described in key findings reports from the SHCS prior to 2019 as ‘party walls’.

7.6.7.3 Extensive Disrepair

Extent of disrepair is usually measured on a 5 or 10-point scale.

The 5-point scale is as follows: 0 (no disrepair); 1 (small repairs up to 5%); 2 (minor repairs 5% to less than 25%); 3 (medium repairs 25% to less than 60%); and 4 (renew 60% to 100%).

The 10-point scale is as follows: 0 (no disrepair); 55 (less than 5%); 1 (5 to 15%); 2 (15 to 25%); 3 (25 to 35%); 4 (35 to 45%); 5 (45% to 55%); 6 (55 to 65%); 7 (65 to 75%); 8 (75 to 85%); 9 (85 to 95%); and 10 (95% or more).

Extensive disrepair is calculated to identify those dwellings where any disrepair present is of a relatively greater severity. It is recorded where:

- any building element has an overall disrepair score exceeding 20% by area; or
- any building element assessed has a score of 'medium' or 'renew' on the 5-point repair scale (equivalent to an area of around 25% or more of the element); or
- dry/wet rot is recorded in two or more rooms.

The average extent of disrepair is calculated from the 5 and 10-point scales by taking the mid-point of the relevant band for the element. So, for example, a chimney stack assessed as band 4 on the 10-point scale would contribute 40% toward the average value. Similarly, a bathroom wash hand basin assessed as medium on the 5-point scale would contribute 42.5% to the average value. The presence of dry/wet rot contributes 50% to the average value. Thus, measures of average extent should be considered approximate.

7.6.8 Damp and Condensation

Penetrating damp is usually the result of a defect in the building fabric, such as damage to the walls or roof, water ingress due to damaged seals on doors or windows or damp because of leaking plumbing.

Rising damp is the result of defective or missing damp proof coursing, leading to water leaching into the building fabric.

Condensation is the build-up of moisture inside a dwelling, which may be the result of insufficient or ineffective ventilation.

7.6.9 Bedroom Standard

The bedroom standard is defined in the Housing (Overcrowding) Bill 2003 based on the number of bedrooms in a dwelling and the people in a household who can share a bedroom.

Each of the following groups or individuals requires a separate bedroom:

- any couple;
- a person aged 21 years or more;
- two people of the same sex[22] aged between 10 and 20;
- two children (whether of the same sex or not) under 10 years;
- two people of the same sex where one person is aged between 10 years and 20 years and the other is aged less than 10 years; and
- any further person who cannot be paired appropriately.

This definition is distinct from the rules introduced by the UK Government in April 2013 for the size of accommodation that Housing Benefit will cover for working age tenants renting in the social sector, known as the 'spare room subsidy'[23]. Applying the rules of the spare room subsidy requires information not collected in the SHCS. Statistics in this report relate to the bedroom standard only.

7.6.10 Tolerable Standard

The Tolerable Standard is a minimum standard for habitability introduced in the 1969 Housing (Scotland) Act, and updated by the 1987, 2001 and 2006 Acts and 2019 Order.

A dwelling meets the tolerable standard if it:

- is structurally stable
- is substantially free from rising or penetrating damp
- has satisfactory provision for lighting, ventilation and heating
- has an adequate piped supply of wholesome water available within the house

[22] The SHS collects data on gender and not sex therefore the number of bedrooms required are allocated based on self-reported gender. In addition, from 2018 onwards the question on gender was non-binary and included two additional responses: 'Identified in another way' and 'Refused'. Further details are provided in Annex 2 of the Scottish Household Survey Annual Report 2018.

[23] Department for Work and Pensions, Housing Benefit Spare Room Subsidy Changes Factsheet, Retrieved: 19/11/15.

- has a sink provided with a satisfactory supply of both hot and cold water within the house
- has a water closet or waterless closet available for the exclusive use of the occupants of the house and suitably located within the house
- has a fixed bath or shower and a wash-hand basin, each provided with a satisfactory supply of both hot and cold water and suitably located within the house
- has an effective system for the drainage and disposal of foul and surface water
- has satisfactory facilities for the cooking of food within the house
- has satisfactory access to all external doors and outbuildings
- has electrical installations[24] that are adequate and safe to use
- has satisfactory thermal insulation
- has satisfactory equipment for detecting fire and giving warning in the event of fire or suspected fire and
- has satisfactory equipment for giving warning if carbon monoxide is present in a concentration that is hazardous to health.

The criteria on electrical installations and thermal insulation were added by the Housing (Scotland) Act 2006. These requirements came into force in April 2009 and were first reported in the 2010 SHCS key findings report. The change in definition caused the fail rate for the tolerable standard to increase from 0.7% in 2009 to 3.9% in 2010.

The criteria on fire and carbon monoxide alarms were added by the Housing (Scotland) Act 1987 (Tolerable Standard) (Extension of Criterion) Order 2019. The Scottish Government has published guidance on these changes. These new standards came into to come into force on 1 February 2022 and are therefore not considered in this current report but will be included in the 2022 SHCS key findings reports onwards. For the first time in the 2022 SHCS, surveyors must consider the presence, type and condition of smoke, heat and carbon monoxide alarms in a house when deciding if the house meets the tolerable standard.

[24] The "electrical installation" is the electrical wiring and associated components and fittings but excludes equipment and appliances.

In general, fewer dwellings fail the tolerable standard based on the presence of rising or penetrating damp than experience this issue overall. This reflects the fact that low levels of penetrating damp would not give grounds for action under the tolerable standard. A dwelling will normally be below tolerable standard if a surveyor finds persistent visible penetrating damp that covers an area greater than approximately:

- 10% of the overall wall space in one habitable room; or
- 10% of the ceiling in one habitable room; or
- 20% of the overall wall space or ceiling in one or more other spaces in the dwelling.

7.6.11 Scottish Housing Quality Standard (SHQS)

The SHQS was announced by the Minister for Communities in February 2004. A target was agreed that all social landlords must ensure that all their dwellings pass the SHQS by 2015. Private owners and private landlords are currently under no obligation to bring their properties up to a standard which meets the SHQS. However, the SHCS collects the same data for all dwellings to allow comparison across the housing stock.

The SHQS is an aggregation of the results from 55 different elements grouped into 5 higher-level criteria, which in turn provide a single pass/fail classification for all dwellings. The 5 higher-level criteria specify that the dwelling must be:

- above the statutory tolerable standard;
- free from serious disrepair;
- energy efficient;
- with modern facilities and services; and
- healthy, safe, and secure.

A full list of assessed elements is available on the Scottish Government website. Only one element of the SHQS is not assessed using SHCS data: no information is collected on external noise insulation (element 43).

The data is assessed against the SHQS as it stood in the year the data relates to. So, for example, in 2019 dwellings were assessed against elements 31 to 35 (covering cavity wall insulation, loft insulation, water tank and pipe insulation, central heating and energy efficiency ratings based on NHER or SAP) in the energy efficiency criterion. However, from 1 January 2021 these were superseded by the Energy Efficiency Standard for Social Housing (EESSH). Similarly, from 1 February

2022, elements 11 and 44 were replaced by elements 11A and 11B to cover changes to the tolerable standard relating to smoke, heat and carbon monoxide alarms.

Figures on SHQS failure rates for 2014 onwards are not entirely comparable to previous years published in key findings reports from the SHCS. Because of missing tenure information, a small number of dwellings (see the subsection on missing tenure information for more detail) are excluded from tenure breakdowns in figures relating to years prior to 2014. In addition, small changes to data processing relating to failure thresholds for the energy efficiency criterion[25], as well as other minor data processing corrections were introduced in 2014. Although the effect of these corrections on the overall failure rates in the social sector was neutral, some discontinuities with previous years cannot be ruled out, especially when considering more detailed breakdowns.

[25] This relates to the SAP and NHER thresholds for element 35 and the thickness of hot water tank insulation for element 33.

8 Notes

[note 1]: All numbers are rounded to the nearest 1,000 and percentages are rounded to the nearest whole number. Because of rounding, figures in tables and charts may not always add exactly.

[note 2]: Urban/rural categories are based on the 2020 Scottish Government Urban/Rural classification to be consistent with survey weighting as described in Section 7.9.3.

[note 3]: Gas grid coverage is determined on the basis of the distance of the dwelling from a low / medium / intermediate pressure gas distribution pipe. Based on the usual maximum distance for standard domestic connection (63 m), dwellings are classified as being “on” or “off” the grid. This does not reflect whether the dwelling is actually connected to the grid. For 2021 an improvement has been introduced whereby a dwelling is classified as “on” the grid if a mains gas connection has been recorded in the physical survey. Further details on the method for estimating distance to the gas grid are available in section 7.8.4 of this report and in SHCS Methodology Notes.

[note 4]: Some tables in this report have cells with no data. When this is the case the cells are marked up with shorthand:

- [low] indicates a value is less than 0.5% or 500 households
- [w] indicates there are no sample cases
- [c] indicates that the base sample is too small to report (below 30 cases) or the estimate represents 2 or fewer sampled households
- [z] indicates that a value is unavailable as it is not applicable

These conventions are consistent with the guidance on using symbols and shorthand when publishing data tables on public sector websites.

[note 5]: Dwellings without loft spaces are excluded.

[note 6]: Dwellings built post-1983 are presumed insulated when built.

[note 7]: Based on the Scottish Index of Multiple Deprivation (SIMD) 2020.

An Experimental Statistics Publication for Scotland

Experimental statistics are a subset of newly developed or innovative official statistics undergoing evaluation. They are published to involve users and stakeholders in the assessment of their suitability and quality at an early stage.

Further information on experimental statistics is published by the Office for Statistics Regulation.

Correspondence and enquiries

For enquiries about this publication please contact:
Darren Knox,
Communities Analysis Division
e-mail: shcs@gov.scot

For general enquiries about Scottish Government statistics please contact:
Office of the Chief Statistician
Telephone: 0131 244 0442
e-mail: statistics.enquiries@gov.scot

How to access background or source data

The data collected for this publication:
☐ will be made available via the UK Data Service
☐ may be made available on request, subject to consideration of legal and ethical factors. Please contact shcs@gov.scot for further information.

Complaints and suggestions

If you are not satisfied with our service or have any comments or suggestions, please write to:

Chief Statistician
St Andrews House
Edinburgh
EH1 3DG
Telephone: (0131) 244 0302
e-mail: statistics.enquiries@gov.scot

If you would like to be consulted about statistical collections or receive notification of publications, please register your interest at www.gov.scot/scotstat

Details of forthcoming publications can be found at www.gov.scot/statistics

Crown Copyright