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Scottish House Condition Survey: 2016 Key Findings

A National Statistics publication for Scotland

PEOPLE, COMMUNITIES AND PLACES

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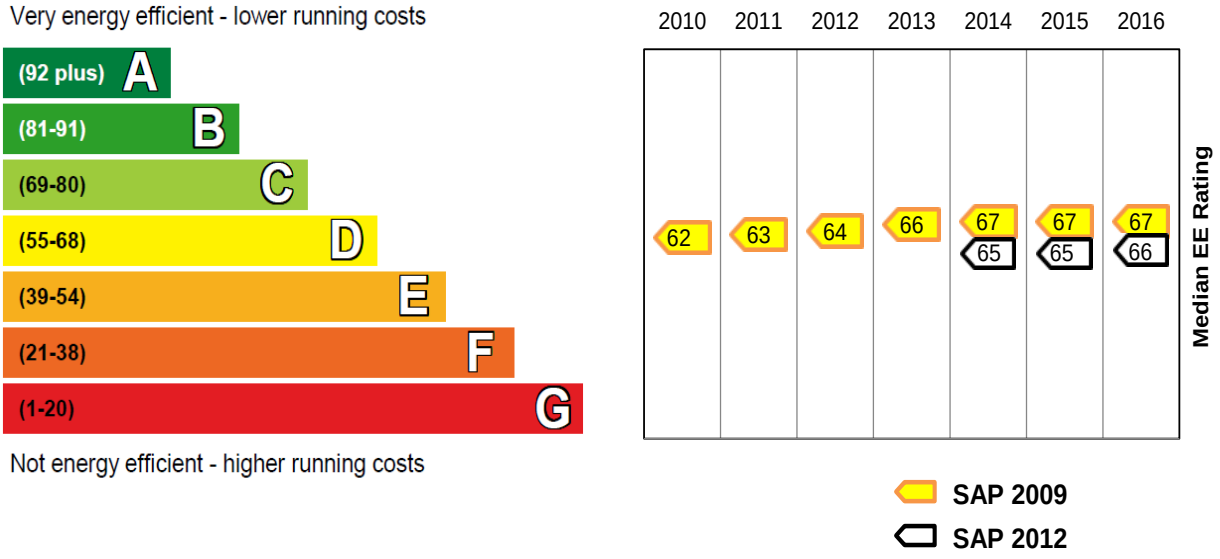
Key Findings Summary

Energy Efficiency and Carbon Emissions

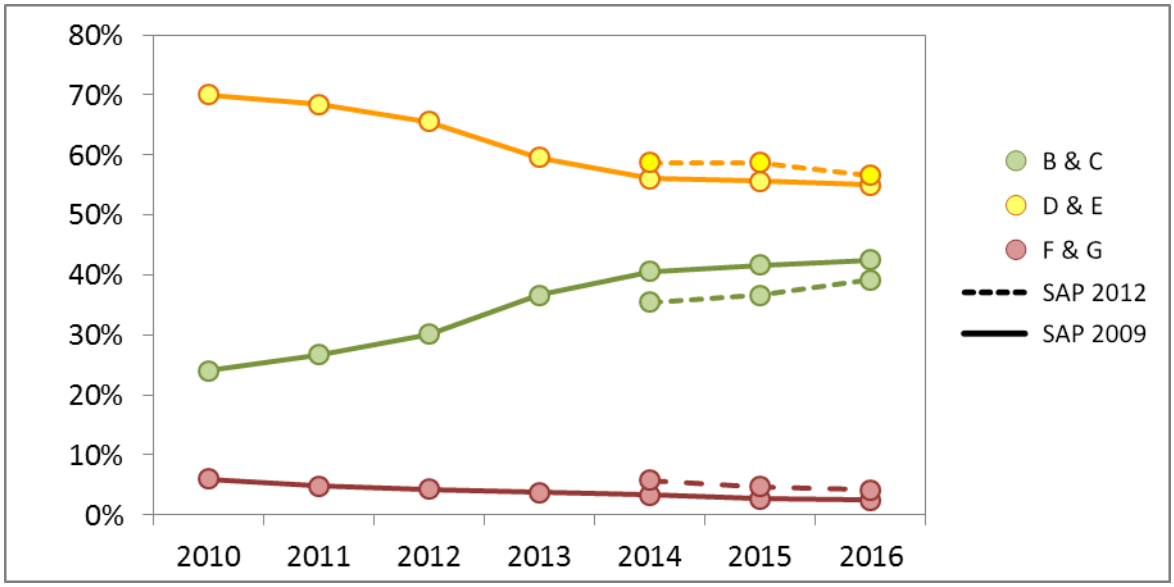
- In 2016, 39% of Scottish homes were rated as EPC band C or better and half had an **energy efficiency rating** of 66 or higher (**SAP 2012**). This is similar to 2015 but an increase from 35% in 2014, the first year in which data based on SAP 2012 is available.
- In the last year, the share of older properties (1919-1944) and properties built between 1965 and 1982 in band C or better increased by 8 percentage points to 31% and 37% respectively.

Median Energy Efficiency Rating Relative to EPC Band, SAP 2009 and SAP 2012



- Using **SAP 2009** continues to show improvement in the energy efficiency profile of housing. The share of the most energy efficient dwellings (rated C or better) increased from 24% in 2010 to 43% in 2016. In the same period, the proportion of properties in the lowest EPC bands (E, F or G) has almost halved, reducing from 27% to 14%.

Proportion of Scottish Homes by Grouped EPC Band, SAP 2009 and SAP 2012

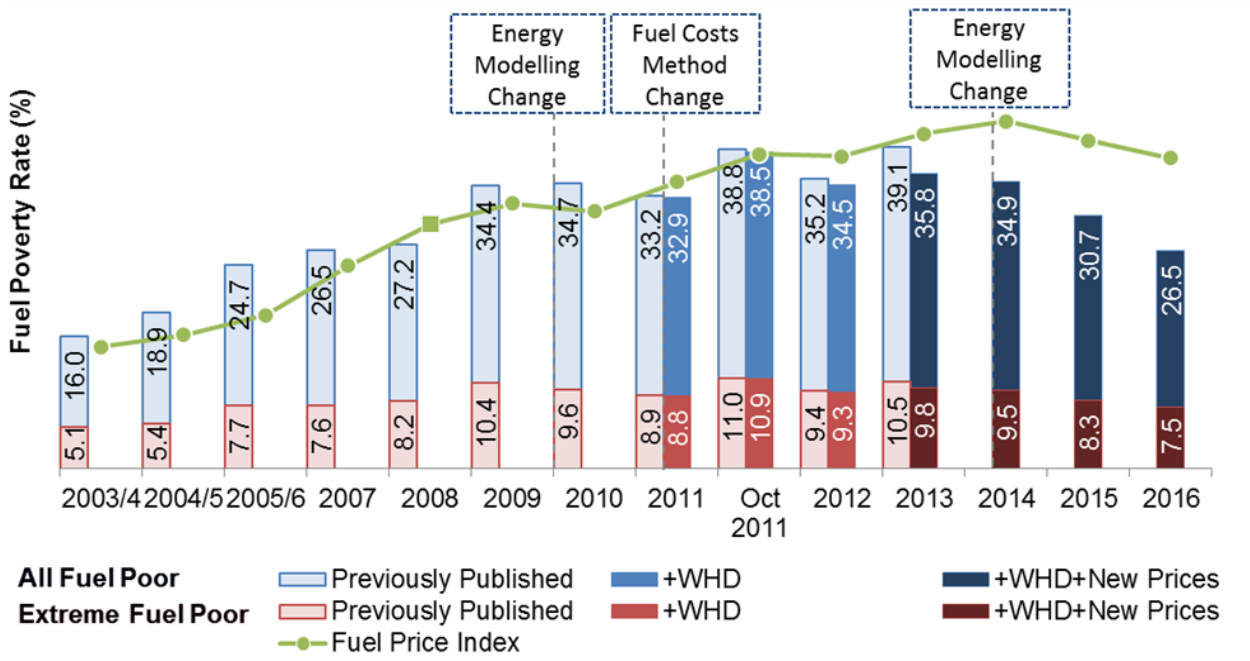


- The share of homes with **lofts** insulated to 100 mm or more was 94% in 2016 which is similar to 2015. This represents an increase of 12 percentage points on 2010 levels. 30% of lofts were insulated to a high standard of insulation (300 mm or more), a similar level to 2015 following significant increases from 5% in 2010.
- Levels of **wall insulation** remained similar in the last year, with 58% of walls having insulation in 2016. 15% of solid wall dwellings and 72% of cavity wall dwellings were insulated in 2016. Wall insulation measures continue to be delivered under energy efficiency programmes such as ECO and the SHCS data suggests that this is having an impact on the share of dwellings with wall insulation although sample size limitations mean that the difference since 2015 is not statistically significant. The data demonstrates a long-term trend of improvement in the insulation of cavity walls with the proportion increasing by 6 percentage points since 2012.
- In 2016, 52% of gas and oil **boilers** meet the minimum efficiencies specified by current Building Standards, an increase of 5 percentage points from 2015.
- 29% of dwellings had an **environmental impact rating** in band C or better in 2016 (SAP 2012). The mean rating was 59 which lies in band D.
- Based on modelled energy use the average Scottish home is estimated to produce 7.0 tonnes of **CO2** per year. Average modelled carbon emissions for all properties have decreased in the last year from 78 kg per square meter of floor area to 76 kg/m^2.

Fuel Poverty and Heating Satisfaction

- In 2016 **fuel poverty** declined by about 4 percentage points, equivalent to around 99,000 fewer households living in fuel poverty compared to 2015. 26.5% (or around 649,000) households were fuel poor and 7.5% (or 183,000 households) were living in extreme fuel poverty in 2016. This is the second consecutive annual decrease and the lowest rate recorded by the survey since 2005/06.

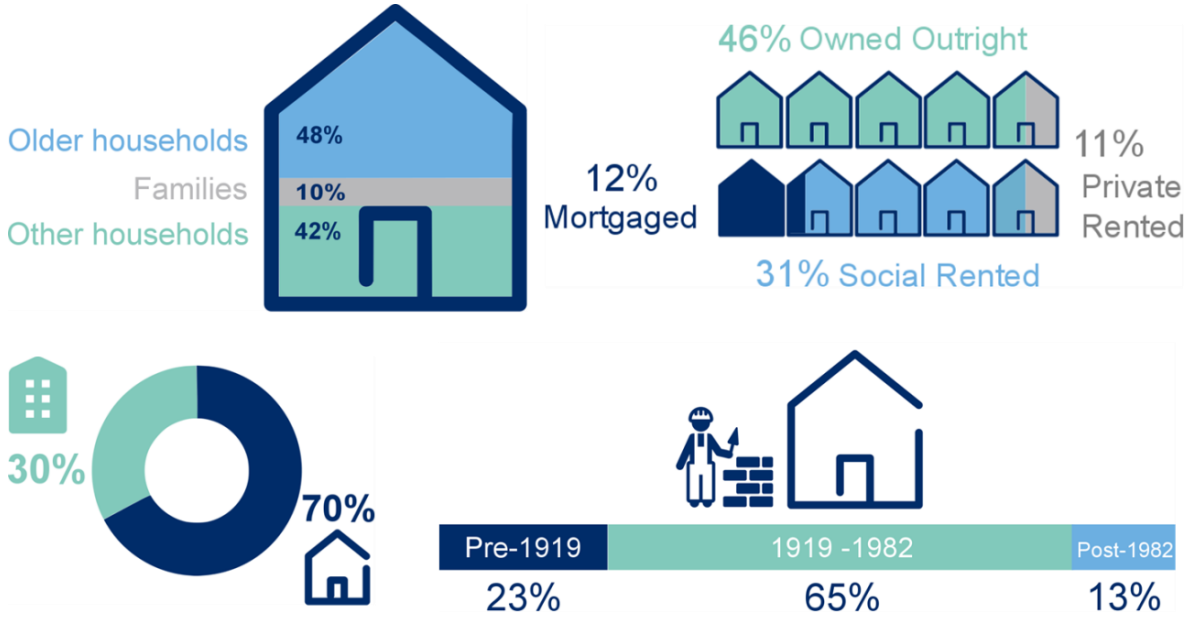
Proportion of Households in Fuel Poverty and Extreme Fuel Poverty, 2003/4-2016



- Almost two thirds (2.7 percentage points) of the reduction in fuel poverty rates between 2015 and 2016 can be attributed to the drop in the price of domestic fuels over this period. Around a third (1.5 points) can be attributed to improvements in the energy efficiency performance of the housing stock and the rest (0.1 points) can be explained by higher household incomes.
- Between 2015 and 2016 there has been a more noticeable decline in fuel poverty in the **private sector,** increasing the gap when compared to the **social sector**. Fuel poverty rates in the private sector have reduced from 30% to 25% while the rate in the social sector was similar to the previous year at 32% in 2016.

- Less than a quarter (23%) of households using **gas** as the primary heating fuel are fuel poor, down from 27% in 2015. This is likely to be at least in part due to the fall in gas prices accelerating compared to the previous year.
- Similarly, **urban** households have gained disproportionately in the last year with fuel poverty levels falling 6 points to 24%. Rural fuel poverty rates have remained similar to 2015 levels at 37% in 2016.

Composition of Fuel Poor Households, 2016



- Around 10% of fuel poor households are families with children, the rest being almost equally split between older households (48%) and other households without children (42%). Almost 6 out of 10 (58%) are owner occupiers and over two-thirds live in houses (70%).
- Almost half (47%) of fuel poor households have incomes above the poverty threshold, defined as £291 per week before housing costs for a couple without children. Fuel poverty rates have declined for households living above the income poverty threshold, from 20% in 2015 to 15% in 2016. The rate for households below the income poverty threshold has remained similar to 2015 levels at 78%.
- Fuel poor households are more likely to report difficulties staying warm in winter. 23% of them say that their heating keeps them warm in winter “only sometimes” (16%) or “never” (7%) compared to 16% of all other households. This pattern is similar to 2015 although the overall levels are lower. 6% of fuel poor households report that they cannot afford to heat their home.
- Overall, in the past year, there have been improvement in the share of householders reporting that their heating only sometimes (14%) or never

(4%) keeps them warm in winter. This is a reduction of 5 percentage points from 2015 and the lowest level recorded by the survey since 2007.

- The extent to which home energy use is monitored by householders remains unchanged since last year with 56% stating they monitor their energy use "very" or "fairly closely". However there has been an increase of 2 percentage points, to 10%, in households reporting that they own an energy monitoring device. Fuel poor households are no more likely to monitor their energy use than other households but they are less likely to own a monitoring device (6% compared to 11% for non-fuel poor households).

Housing Quality

- The level of disrepair reduced by 5 percentage points in the last year. In 2016, 68% of all dwellings had some degree of disrepair, however minor it may be, down from 73% in 2015. Disrepair to critical elements stood at 48% while 28% of dwellings had some instances of urgent disrepair and 6% had some extensive disrepair.
- Levels of damp and condensation remained similar to 2015. Around 9 out of 10 (89%) properties were free from any damp or condensation.
- Compliance with the tolerable standard in 2016 also remained similar to 2015: 2% (or 39,000) of all dwellings fell below the tolerable standard. This represents an improvement of 2 percentage points since 2012.
- Across the stock as a whole, Scottish Housing Quality Standard (SHQS) compliance remained at 2015 levels. In 2016, 45% of Scottish homes failed to meet the SHQS.
- The SHQS failure rate in the social sector was 38%, not allowing for abeyances and exemptions. This has fallen from 60% in 2010. 26% of properties did not meet the Energy Efficient criterion.
- SHCS surveyors may not always be able to identify the presence of cavity wall insulation. The overall SHQS failure rate in the social sector would be 26% if it is assumed that all social dwellings have insulated cavity walls where this is technically feasible.
- The majority of dwellings falling below the SHQS failed on a single criterion: this accounts for more than 8 out of 10 failures in the social sector. For 7 out of 10 social homes which failed the SHQS this was due to falling short on a single one of the standard's 55 elements.
- Overcrowding levels in Scotland remain unchanged: 3% of all households (67,000) were living in overcrowded accommodation in 2016.

1 Introduction

1. Statistics reported in this publication 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 2012 it was carried out as a stand-alone survey under the name Scottish House Condition Survey (SHCS). Following the review of the large-scale Scottish population surveys, the SHCS was incorporated within the SHS and became one of its modules. We continue to report the results from this module of the SHS under the name Scottish House Condition Survey.

2. The SHCS consists of an interview with householders and a physical inspection of the dwelling they occupy to provide 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 a face to face interview with the householder. The interview covers a range of topics such as household characteristics, tenure, neighbourhood satisfaction, dwelling satisfaction, health status, income, etc. The result is a powerful data set for examining the condition and characteristics of the dwellings alongside the views and experience of the people living in those dwellings.

3. This is the thirteenth 'Key Findings' report since the SHCS changed to a continuous format in 2003 and the fifth since it was integrated within the SHS. Details on the methodology and design of the survey are provided in the SHS Technical Report published on the Scottish Government website[1]. 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.

4. In 2016 there were 2,850 surveyed properties. Statistics published in this report are based on fieldwork undertaken during 2016. A small proportion (8%) of the household interviews took place in the first quarter of 2017.

[1] http://www.gov.scot/Topics/Statistics/16002/PublicationMethodology

5. In 2009, the SHCS was designated as a National Statistics product by the UK Statistics Authority (UKSA). This demonstrates that the SHCS statistics are accurate, trustworthy and compliant with the high standards required of National Statistics.

6. In 2013 and 2014, there were changes made to the methodology used to analyse energy performance of the housing stock. This affects comparability over time of statistics on energy efficiency, fuel poverty and carbon emissions from housing. Data presented in this report clearly highlights where methodology changes have occurred. Details of the impact of these methodology changes are published in the Key Findings reports and Methodology Notes for 2013[2] and 2014[3]. There have been no further changes to the energy modelling methodology and the current 2016 Key Findings report is based on the same methodology used in 2014 and 2015.

7. The 2014 Key Findings report also introduced some improvements to the method for determining the cost of the energy required to maintain an appropriate standard of heating and other energy use which underpins the fuel poverty estimates. Details on the nature of the changes and their impact are provided in the 2014 Methodology Notes[4] publication. The current report continues to use this improved method for setting the cost of the domestic energy requirement. However, it also introduces a further small improvement through the collection of information in the 2016 survey about pre-payment meters for energy supply. This has allowed us to improve the accuracy of fuel price information for these customers.

8. There are no other significant methodological changes in this year's report in comparison to the previous publication. We always seek to improve and keep up to date our methods and processes and there may be small changes to elements of data processing which do not impact significantly on the results. In such cases details are provided in the respective technical sections.

[2] 2013 SHCS Key Findings: http://www.gov.scot/Publications/2014/12/6903 and Methodology Notes: http://www.gov.scot/Topics/Statistics/SHCS/Downloads/MethodologyNotes2013

[3] 2014 SHCS Key Findings: http://www.gov.scot/Publications/2015/12/8460 and Methodology Notes: www.gov.scot/Topics/Statistics/SHCS/Downloads/Methodology2014

[4] Methodology Notes 2014: www.gov.scot/Topics/Statistics/SHCS/Downloads/Methodology2014

9. Differences between years or across characteristics are only highlighted in the commentary of this report if they are statistically significant. On occasion we also note where a difference is not statistically significant, particularly if it might appear large to the reader. Large differences which are not significant can occur if the statistic is based on a small sample size. Please see Chapter 7 for further details of confidence intervals, design effects and statistical significance.

10. The remainder of this report covers the following topics:

- Key Attributes of the Scottish Housing Stock: this chapter describes key characteristics of the housing stock such as the dwellings' type and age of construction, their location in relation to the gas grid, 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 number and characteristics of households in fuel poverty and extreme fuel poverty. It also examines the key drivers of fuel poverty and how they have changed over time.
- Perceptions and Experiences: this chapter examines householders' reports of their experience and satisfaction with heating and the extent to which they monitor their use of energy.
- Housing Conditions: this part of the report provides information on the number of dwellings in compliance with the tolerable standard and the Scottish Housing Quality Standard (SHQS). It also covers the presence of dampness, condensation and disrepair as well as some indicators of overcrowding and under-occupation.
- Technical Notes: the final chapter in 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.

2 Key Attributes of the Scottish Housing Stock

11. 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 2016. Subsequent chapters build on this and provide more details on energy efficiency, fuel poverty, housing quality and disrepair.

12. The following topics are included:

- the construction age and general types 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 makeup of the households who live in them.

2.1 Dwelling Age and Type

13. The age of construction and the built form of a dwelling has consequences for energy performance, the improvement potential, affordability and living conditions. For example, dwellings built since 1982 comply with standards for minimum levels of energy efficiency and airtightness.

14. More information on the main dwelling types used in the SHCS is provided in section 7.8.1.

15. At the same time, types of dwellings can differ in terms of the size of exposed areas: fewer exposed areas of wall, or shielding by dwellings above and below, lead to lower levels of heat loss than in buildings with fewer sheltered sides.

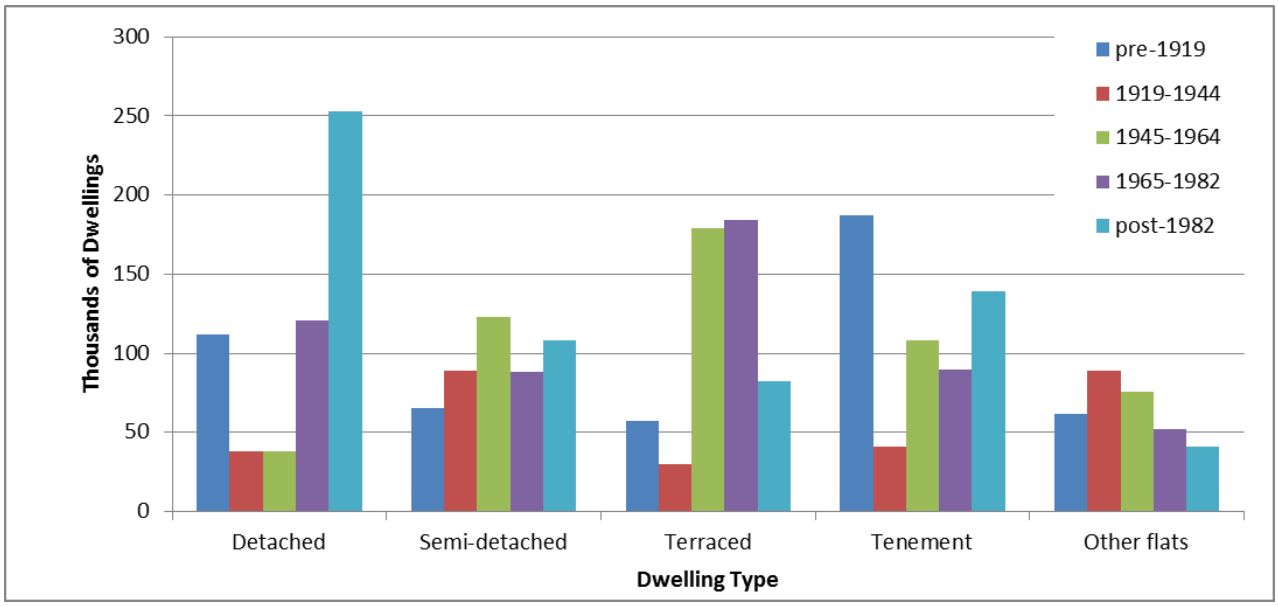
16. The Scottish housing stock is diverse and varies across the country and between rural and urban areas. However, some common types can be recognised in Figure 1:

- Old (pre-1919) detached houses (around 112,000) and tenement flats (187,000)
- More modern post-1982 detached houses (253,000) and tenements (139,000)

- Post-war terraced houses (363,000 built between 1945 and 1982)
- Semi-detached houses, common across all age bands and accounting for around 19% of the stock alone.

17. These six broad categories account for 62% of the overall housing stock. However, there is also a good deal of variability within these groups; even among pre-1919 tenement flats of the type common in Edinburgh and Glasgow, there is a wide range of sizes, shapes and areas of exposure (for example in top floor flats the roof is exposed) which affects their energy efficiency and the living conditions they provide.

Figure 1: Number of Occupied Scottish Dwellings by Age Band and Type, 2016



18. The proportion of the stock in each dwelling age band and type is provided in Table 1. Numbers of dwellings of each age group and type are shown in Table 2.

Table 1: Proportion of Occupied Dwellings by Age Band and Type, 2016 (Percentage of Whole Stock)

Age of dwelling	Type of Dwelling					
	Detached	Semi-detached	Terraced	Tenement	Other flats	Total
pre-1919	5%	3%	2%	8%	3%	**20%**
1919-1944	2%	4%	1%	2%	4%	**12%**
1945-1964	2%	5%	7%	4%	3%	**21%**
1965-1982	5%	4%	7%	4%	2%	**22%**
post-1982	10%	4%	3%	6%	2%	**25%**
Total	**23%**	**19%**	**22%**	**23%**	**13%**	**100%**
Sample size						*2,850*

Table 2: Number of Occupied Dwellings by Age Band and Type, 2016 (Thousands)

Age of dwelling	Type of Dwelling					
	Detached	Semi-detached	Terraced	Tenement	Other flats	Total
pre-1919	112	65	57	187	62	**483**
1919-1944	38	89	30	41	89	**287**
1945-1964	38	123	179	108	76	**525**
1965-1982	121	88	184	90	52	**535**
post-1982	253	108	82	139	41	**622**
Total	**561**	**473**	**532**	**566**	**320**	**2,452**
Sample size						*2,850*

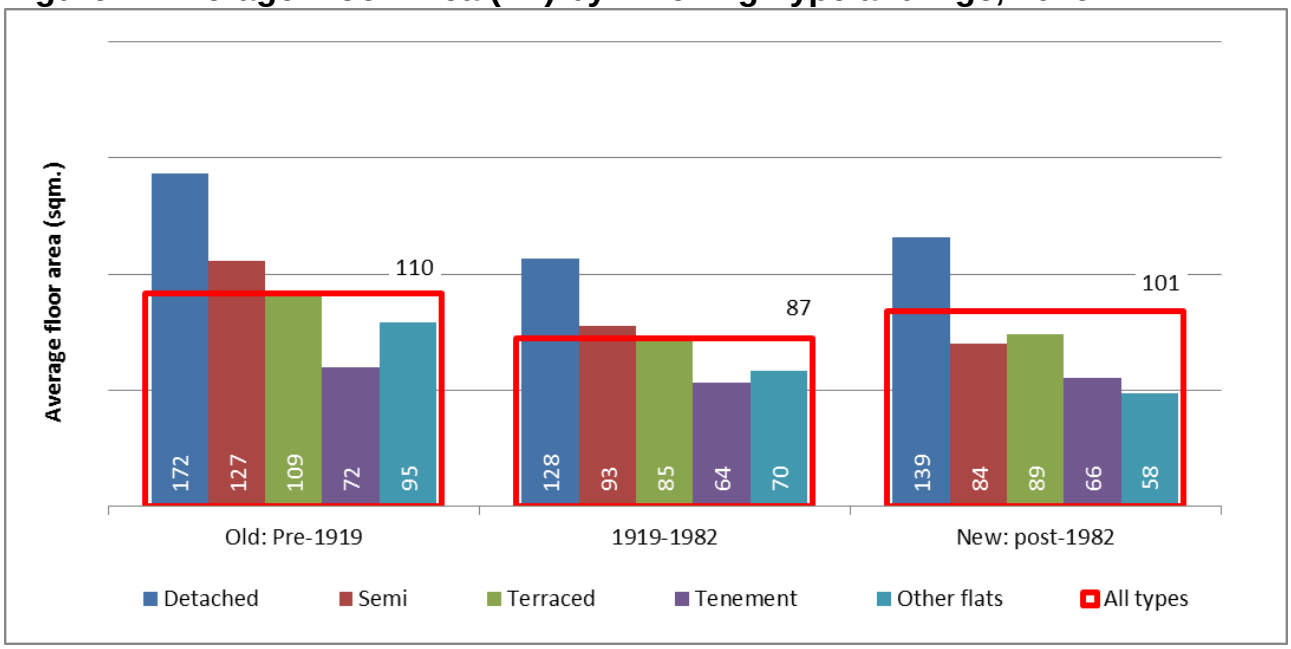
19. The category ‘other flats’ includes houses that have been converted to flats (32,000), towers / slabs (69,000) and so-called “4-in-a-block” flats (220,000).

- “4-in-a-block” flats were commonly built as social housing between 1919 and 1965 (67% of all flats of this type fall in that age category).
- 83% of towers / slabs were built in the 1945 to 1982 period, again often as social housing.
- Converted flats are almost exclusively pre-1919 structures (92%), where a house has been divided into multiple residences.

2.1.1 Dwelling Size (Floor Area)

20. 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 4).

Figure 2: Average Floor Area (m^2) by Dwelling Type and Age, 2016



21. Pre-1919 dwellings tend to be larger than the other two age categories and this applies across all dwelling types except tenement flats which on average are comparable in size to more recently built ones (Figure 2). Detached, semi-detached and terraced houses built after 1919 are on average around three-quarters of the size of those built pre-1919.

22. 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 Table 2).

23. Rural dwellings are 38% larger than urban dwellings on average based on internal floor area, as shown in Table 3. The difference is smallest for dwellings built between 1919 and 1982 at 18%. Among older dwellings, rural properties are around 42% larger, while among the post-1982 stock the difference is 47%.

Table 3: Average Internal Floor Area (m^2) by Urban/Rural Location, 2016

Dwelling Age	Location			Rural % larger
	Urban	Rural	All	
Pre-1919	99	141	110	42%
1919-1982	85	100	87	18%
Post-1982	93	137	101	47%
All Age Bands	89	123	95	38%

2.2 Gas Grid Coverage and Rural/Urban Location

24. Approximately 17% of dwellings in Scotland are estimated to be outside the coverage of the gas grid[5]. As shown in Table 4, the majority (93%) of urban dwellings are within the coverage of the gas grid, whereas over half (65%) of those in rural areas are not.

Table 4: Gas Grid Coverage Overall and by Urban/Rural Location, 2016

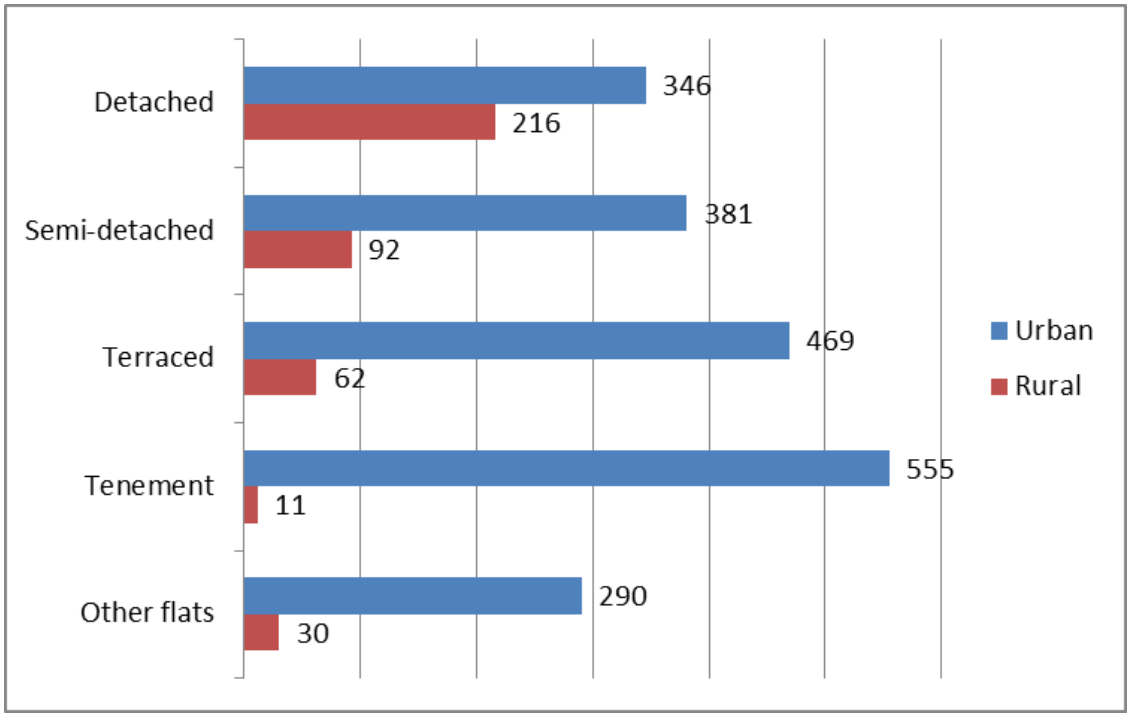
Gas Grid Coverage			Location			
			Urban		Rural	
	000s	%	000s	%	000s	%
On Gas Grid	2,046	83%	1,904	93%	142	35%
Off Gas Grid	406	17%	137	7%	269	65%
Total	2,452	100%	2,041	100%	411	100%
Sample size		*2,850*		*2,189*		*661*

25. Connection to the grid allows households to use gas for heating and hot water. Gas is currently the cheapest of the major commercial fuels, so gas grid access can have a strong effect on the cost of heating a home.

[5] 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. 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 available at: http://www.gov.scot/Topics/Statistics/SHCS/Downloads

26. Figure 3 shows the number of dwellings in rural and urban areas by type.

Figure 3: Dwelling Types in Rural and Urban Areas (000s), 2016



27. Just over half (216,000) of all rural dwellings are detached, and 22% (92,000) are semi-detached. Only 10% of rural dwellings are flats; 41,000 in total.

28. The most common dwelling type in urban areas is the tenement flat (555,000), accounting for around 27% of urban housing. Around 59% of urban stock is detached, semi-detached and terraced houses, in total accounting for almost 1.2 million of the 2 million urban dwellings.

2.3 Heating Fuel

29. The primary heating fuel affects the cost of heating and therefore the energy efficiency rating of the dwelling and the risk of the occupants experiencing fuel poverty.

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

31. Overwhelmingly the most common heating fuel is mains gas: 79% of Scottish households (around 1.9 million) use mains gas for heating, 11% use electricity and 6% use oil.

Table 5: Primary Heating Fuel, Households (000s) and %, for All Stock and by Sector, 2016

	All Stock		Private		Social	
Primary Heating Fuel	**000s**	**%**	**000s**	**%**	**000s**	**%**
Mains gas	1,929	79%	1,429	78%	500	80%
Electricity	282	11%	191	10%	91	15%
Oil	159	6%	158	9%	*	*
Communal Heating	35	1%	8	0%	27	4%
LPG bulk or bottled	20	1%	19	1%	*	*
Solid mineral fuel	14	1%	11	1%	*	*
Biomass	13	1%	13	1%	0	0%
Sample size		*2,850*		*2,134*		*716*

* denotes cases where attributes appear too rarely to provide an adequate basis for reporting. See section 7.1.6 for table conventions.

32. Gas and electricity are used in 95% of social housing and around 4% (27,000 households) use some form of communal heating. There is a greater diversity of fuels used in the private housing sector.

33. 83% of dwellings built between 1919 and 1982 use gas as their primary heating fuel. In comparison, 76% of dwellings built after 1982 use gas. Of the older dwellings, fewer use gas (70%) while other fuel types are more common (19%).

34. Primary heating fuel also varies by type of dwelling. As shown in Table 6, households living in detached houses are least likely to use mains gas for heating: around two thirds (67%) of them do, compared to almost four out of five (79%) households for Scotland as a whole. This is largely because less than a third (30%) of pre-1919 detached houses have gas as their primary heating fuel; 60% use some other fuel source and 10% use electricity. As shown in Figure 3 and Table 4 this is due to the higher proportion of detached dwellings in rural areas which are not within the coverage of the gas grid.

35. “Other” fuels are most commonly used in detached houses across all age groups. Flats have the highest levels of electricity as primary heating fuel, especially among post-1982 dwellings (25%).

Figure 4: Primary Heating Fuel by Age and Type of Dwelling, 2016 (per cent of dwellings in age/type category using fuel type)

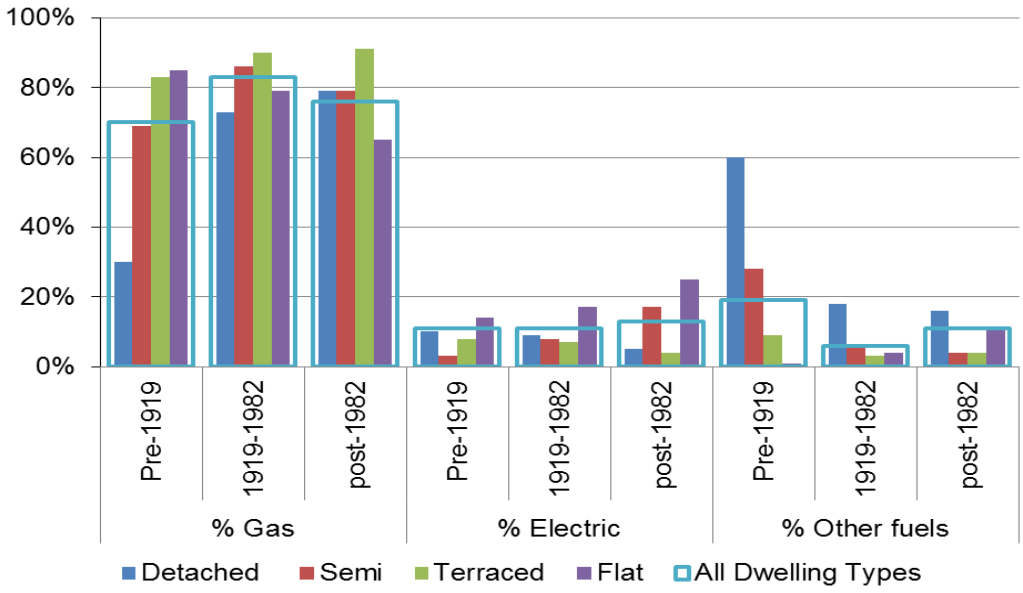


Table 6: Primary Heating Fuel by Age and Type of Dwelling, 2016

Dwelling Type	Dwelling Age	Primary Heating Fuel			*Sample size*
		Gas	Electric	Other	
All Dwelling types	**All age bands**	**79%**	**11%**	**10%**	***2,850***
	pre-1919	70%	11%	19%	*529*
	1919-1982	83%	11%	6%	*1,597*
	post-1982	76%	13%	11%	*724*
Detached	**All age bands**	**67%**	**8%**	**25%**	***767***
	pre-1919	30%	10%	60%	*160*
	1919-1982	73%	9%	18%	*281*
	post-1982	79%	5%	16%	*326*
Semi	**All age bands**	**82%**	**9%**	**9%**	***606***
	pre-1919	69%	3%	28%	*77*
	1919-1982	86%	8%	6%	*399*
	post-1982	79%	17%	4%	*130*
Terraced	**All age bands**	**90%**	**7%**	**4%**	***620***
	pre-1919	83%	8%	9%	*66*
	1919-1982	90%	7%	3%	*463*
	post-1982	91%	4%	4%	*91*
Flat	**All age bands**	**78%**	**18%**	**4%**	***857***
	pre-1919	85%	14%	1%	*226*
	1919-1982	79%	17%	4%	*454*
	post-1982	65%	25%	11%	*177*

2.4 Household Type

36. 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[6]:

    - **Families.** These are households which contain at least one child aged under 16. The resident adults 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.

37. More details about the definitions are provided in section 7.8.2. This grouping was introduced in the 2015 Key Findings report and is different from the one used in previous reports. For the 2015 and 2016 reports, 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.

38. There is a broad association between household types and the type of dwellings they occupy, as shown in Figure 5 and Table 7. While families and older households are more likely to live in houses (73% and 71% respectively), other households are more evenly split between houses and flats (55% and 45% respectively).

39. Families have the highest proportional occupancy of post-1982 houses: 26% of households with children live in post-1982 houses, compared with 16% of older households and 15% of other types of households. The highest occupancy of pre-1919 flats is observed among other types of households, 15%, compared to 6% for families and 6% for older households.

[6] Available at http://www.gov.scot/Publications/2017/09/9979/downloads

Figure 5: Proportion of Households in Each Dwelling Type and Age Band, 2016

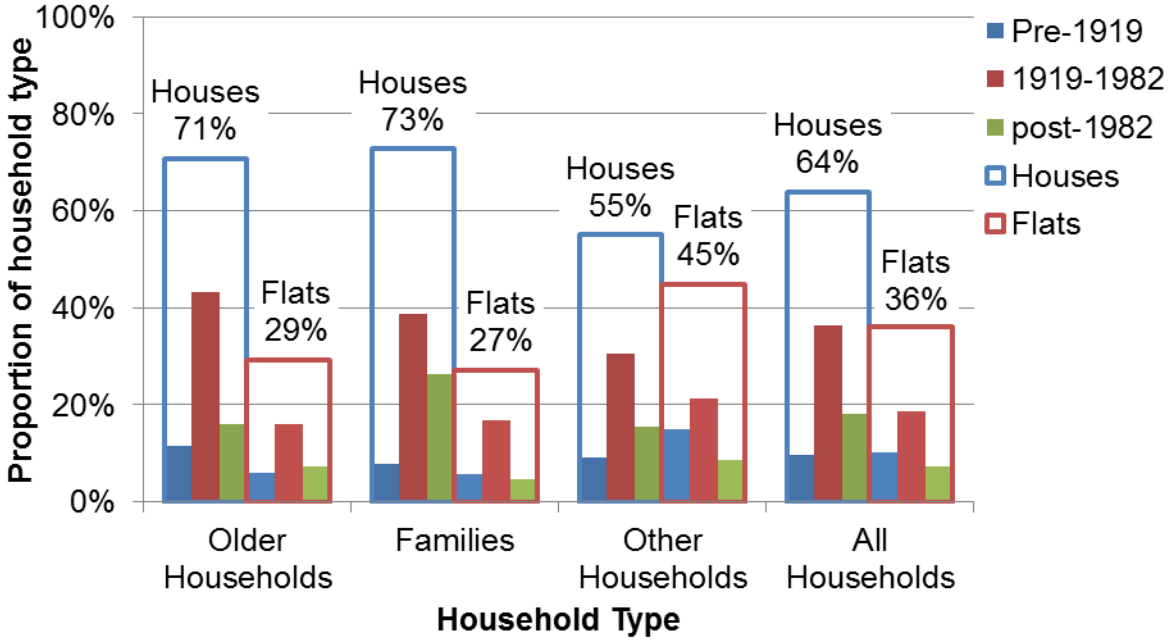


Table 7: Proportion of Households in Each Dwelling Type and Age Band, 2016

Dwelling Type and Age Band		Older Households	Families	Other Households	All Household Types
Houses	Pre-1919	11%	8%	9%	10%
	1919-1982	43%	39%	31%	36%
	Post-1982	16%	26%	15%	18%
	Subtotal	71%	73%	55%	64%
Flats	Pre-1919	6%	6%	15%	10%
	1919-1982	16%	17%	21%	19%
	Post-1982	7%	5%	9%	7%
	Subtotal	29%	27%	45%	36%
Total		100%	100%	100%	100%
Sample size		*920*	*634*	*1,296*	*2,850*

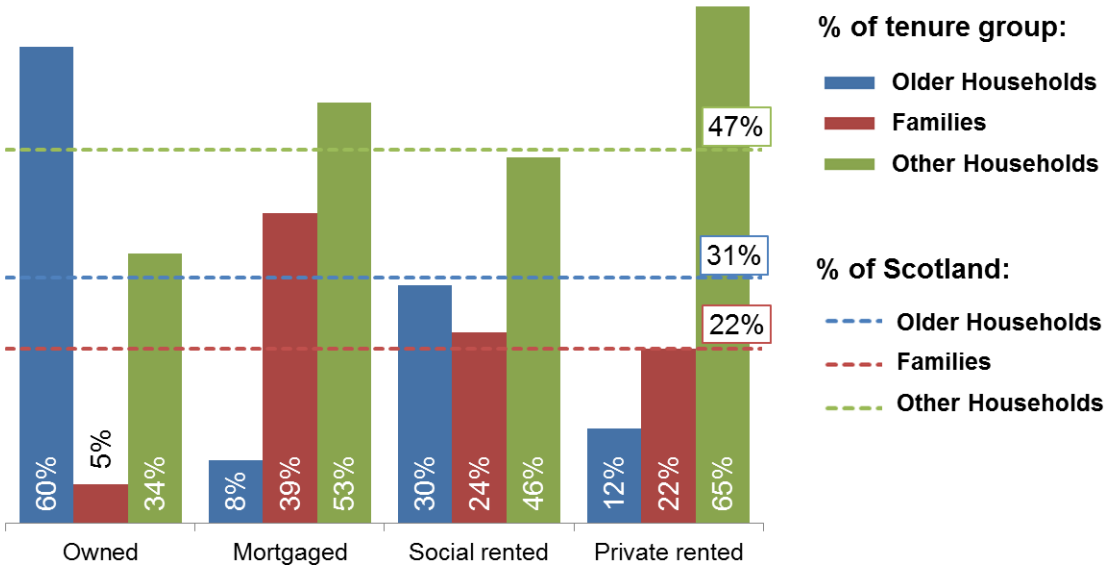
2.5 Tenure

40. Statistics on tenure in the SHCS are based on the achieved sample of dwellings in the physical survey and are not calibrated against figures produced as part of the Scottish Government Housing Statistics for Scotland[7] publication or the Scottish Household Survey publication (which is based on a larger sample and different weighting methodology). For estimates of the total number of dwellings by tenure, readers are referred to the Housing Statistics for Scotland publication which uses information from social landlords' returns covering the social housing sector comprehensively and therefore provides more accurate estimates of the total stock.

41. Data from the SHCS sample provides more detailed information on the composition of each tenure type. This is the topic we explore in this section.

2.5.1 Household Type and Tenure

Figure 6: Proportion of Households in Each Tenure Group by Household Type, 2016



Note: Dashed lines represent the proportion of household type in Scotland as a whole.

42. There are some clear differences in household type across tenure, as shown in Figure 6.

[7] Housing Statistics for Scotland http://www.gov.scot/Topics/Statistics/Browse/Housing-Regeneration/HSfS/KeyInfoTables

43. Owner occupiers with mortgages are predominantly families (39%) and other households (53%), while those who own their properties outright are dominated by older households (60%) and other types of households (34%).

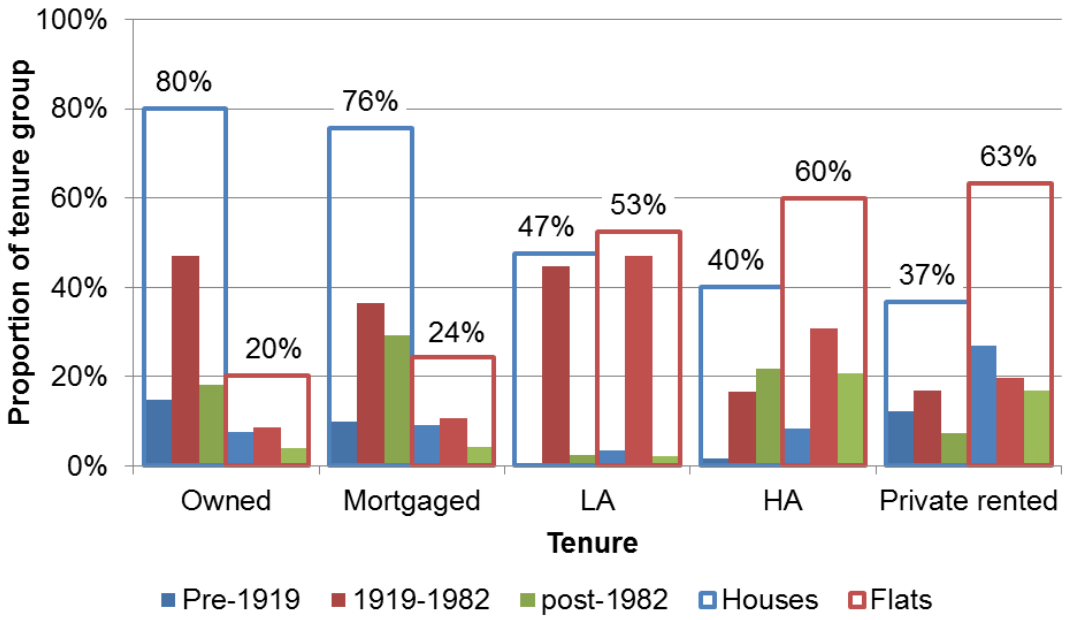
44. The majority of those who rent from private landlords (PRS) belong to other households (65%) and only 12% are older households. Almost a quarter of renters in both the private (24%) and the social sector (22%) are households with children, which reflects their share in the national population.

2.5.2 Dwelling Type and Tenure

45. Figure 7 shows that rented properties are more likely to be flats. Flats account for 53% of all Local Authority (LA) stock, 60% of Housing Association (HA) stock and 63% of dwellings rented from private sector landlords.

46. Owner-occupied dwellings are more likely to be houses: 80% of dwellings owned outright and 76% of those with a mortgage, compared to 47% of dwellings owned by Local Authorities, 40% of Housing Association stock and 37% of private rented properties are houses.

Figure 7: Proportion of Dwellings in Each Tenure Group by Age Band and Type of Dwelling, 2016



47. Almost all properties (92%) owned by Local Authorities were built between 1919 and 1982, while about half (48%) of the Housing Associations stock was built in this period and 42% are more recent. By contrast, 39% of private rented sector dwellings were built before 1919 (Table 8).

Table 8: Proportion of Dwellings in Each Tenure Group, by Age Band and Type of Dwelling, 2016

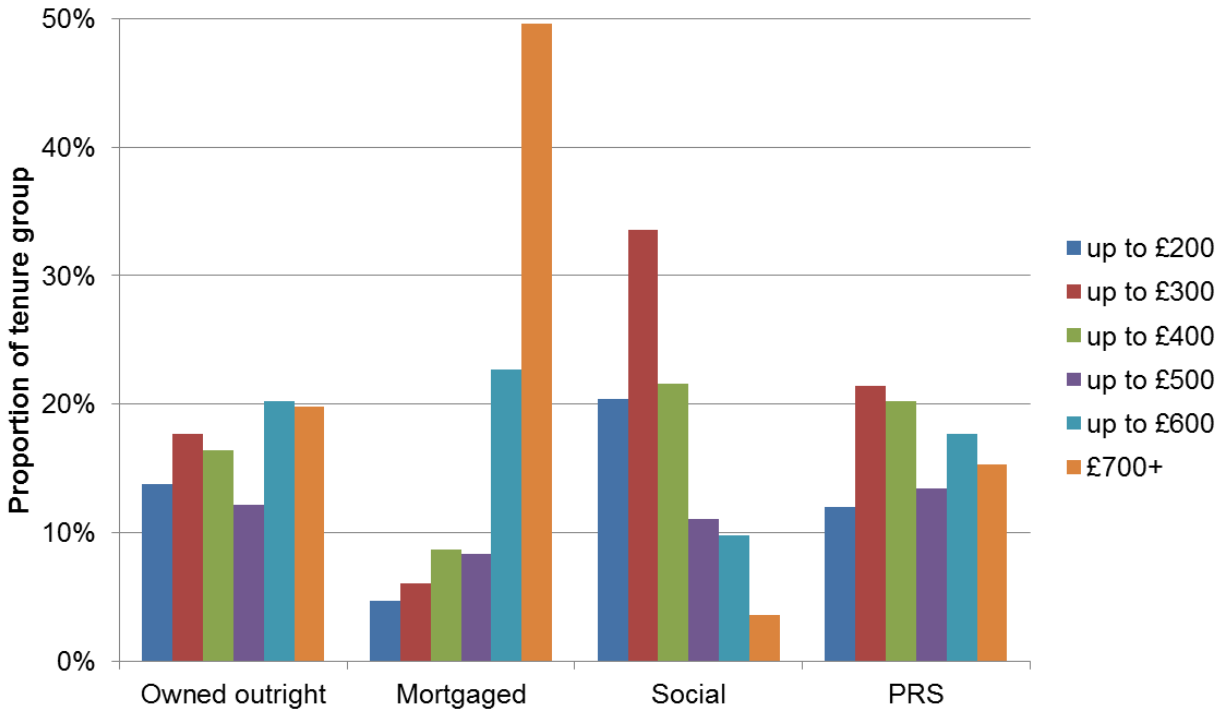
Dwelling Age and Type		Owned	Mort-gaged	LA	HA	Private rented
Houses	Pre-1919	15%	10%	0%	2%	12%
	1919-1982	47%	36%	45%	17%	17%
	Post-1982	18%	29%	3%	22%	7%
	Subtotal	80%	76%	48%	40%	37%
Flats	Pre-1919	8%	9%	4%	8%	27%
	1919-1982	9%	11%	47%	31%	20%
	Post-1982	4%	4%	2%	21%	17%
	Subtotal	20%	24%	53%	60%	63%
Total		100%	100%	100%	100%	100%
Sample size		*988*	*802*	*419*	*297*	*344*

2.6 Household Income Band

48. 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 8, while households with mortgages have the largest share of higher income groups.

49. The distribution of households by income in the private rented sector (PRS) is broadly similar to that for outright owner occupiers. It is generally wider than the social housing sector, including significant shares of both higher and lower income band households.

Figure 8: Proportion of Households in Each Tenure Group by Weekly Household Income Band, 2016



3 Energy Efficiency

50. 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.

51. 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[8].

52. In this chapter we report on analysis of:

- levels of insulation in Scottish dwellings (section 3.1);
- Energy Efficiency Ratings (EER), also known as SAP ratings (section 3.3);
- modelled CO2 emissions from dwellings (section 3.5); and
- Environmental Impact Ratings (section 3.6).

3.1 Insulation Measures

53. 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[9]. As a result, insulation can significantly increase thermal comfort and reduce heating bills.

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

[8] SHCS - Methodology Notes 2016 available at: http://www.gov.scot/Topics/Statistics/SHCS/Downloads

[9] EST: Roof and Loft Insulation http://www.energysavingtrust.org.uk/scotland/Insulation/Roof-and-loft-insulation
EST: Wall Insulation http://www.energysavingtrust.org.uk/domestic/cavity-wall and http://www.energysavingtrust.org.uk/domestic/solid-wall

- The majority of loft spaces are insulated. As of 2016, at least 100 mm of **loft insulation** is installed in an estimated 94% of lofts. This is an increase of 12 percentage points on 2010 levels.
- In 2016, 30% of lofts were insulated to a high standard of insulation (300 mm or more). This is similar to 2015 and follows significant increases from 5% in 2010.
- The proportion of **insulated cavity walls** recorded by the SHCS was 72% in 2016. This is similar to the previous year. In the longer term the share of insulated cavity walls has been increasing, with a 6 percentage points improvement since 2012.
- The proportion of **solid wall** dwellings with insulation was 15% in 2016 compared to 11% in 2015 although this difference is not significant.
- Levels of insulation (both loft and wall) are higher in the social sector than in the private sector. 53% of walls (all types) are insulated in the private sector compared to 71% in the social sector. 62% of lofts are insulated to 200 mm or more in the private sector compared to 78% in the social sector.

3.1.1 Loft Insulation

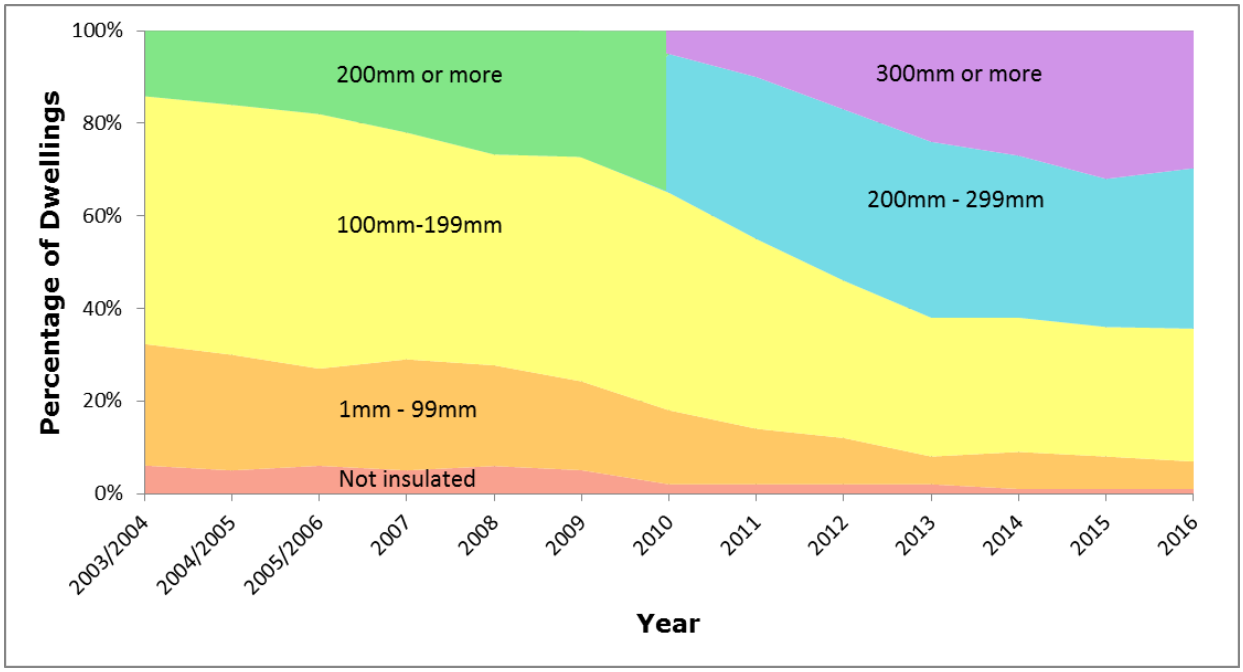
55. Since 2010, an overall improvement in loft insulation has occurred. The proportion of all housing with 100 mm or more of loft insulation has increased by 12 percentage points on 2010 levels with 94% of applicable dwellings insulated in 2016 (see Table 10), similar to the level in 2015. Most of this improvement occurred before 2013.

56. Figure 9 shows the level of loft insulation in all dwellings back to 2003/4. The number of dwellings with no loft insulation has fallen from 6% in 2003/4 to 1% in 2016. Most of this decline occurred before 2010. Since then improvement has slowed down, suggesting that there may be barriers preventing the installation of insulation in the relatively few remaining lofts.

57. Over the same period the thickness of loft insulation has increased significantly. In 2016, 65% of dwellings with lofts had insulation with a depth of 200 mm or more. Much of this increase has occurred since 2009, when 27% of lofts fell into this group and can largely be attributed to the installation of top up insulation. In 2016, 643,000 lofts had less than 200 mm of insulation.

58. The percentage of lofts with a high standard of insulation (300 mm or more) has remained similar to 2015, following significant increases. While only 5% of lofts were insulated to this standard in 2010 (the first year the SHCS captured this information), by 2016 this figure had increased to 30%. Whilst the rate for 2015 was 32%, the difference compared to 2016 is not statistically significant. Although there appears to have been a drop in the percentage of social sector lofts insulated to this standard, this difference is also not significant.

Figure 9: Depth of Loft Insulation (where applicable) 2003/04 - 2016



Note: A dwelling is classified as 'not applicable' for loft insulation if it has a flat roof or another dwelling above it (i.e. it is a mid- or ground-floor flat).

59. Between April 2008 and December 2012, the UK government Carbon Emissions Reduction Target (CERT) scheme delivered 410,937 loft insulation measures in Scotland[10].

60. Between January 2013 and December 2016 a further 52,853 loft insulation measures were delivered in Scotland by its successor scheme ECO[11].

61. In total, around 464,000 loft insulation measures have been installed under these government programs since 2008.

[10] CERT-Summary-Report-Q19-by-English-Regions-Scotland-Wales, HEED dB, Nov 2014. Access available through Energy Saving Trust.

[11] Scottish Government analysis of data provided by Ofgem of measures installed under ECO. Provisional figures.

Table 9: Depth of Loft Insulation (000s), 2010 to 2016

Loft Insulation	2016	2015	2014	2013	2012	2011	2010
none	9	19	15	27	31	32	42
1mm-99mm	109	125	143	113	185	225	279
100mm-199mm	525	518	528	534	617	745	822
Subtotal: <200mm	643	663	686	675	834	1,002	1,143
200mm or more	1,197	1,161	1,123	1,118	975	812	621
Not applicable	612	610	611	606	577	554	592
All Dwellings	2,452	2,434	2,420	2,399	2,386	2,368	2,357
Sample Size	2,850	2,754	2,682	2,723	2,787	3,219	3,114
Cumulative recorded loft insulations under government schemes (since April 2008)							
CERT (000s)					411	269	157
ECO (000s)	53	39	30	10			

62. As shown in Table 10 thickness of loft insulation is greater in social sector dwellings. In 2016, 93% of private housing lofts were insulated to 100 mm or more and 62% to at least 200 mm. In the social sector, 97% of dwellings had lofts insulated to 100 mm or more, and 78% had at least 200 mm of loft insulation.

Table 10: Depth of Loft Insulation (000s and %) by Tenure, 2015 and 2016[12]

		Private Sector		Social Sector		All Tenures	
Year	Loft Insulation	000s	%	000s	%	000s	%
2016	none	9	1%	-	-	9	1%
	1mm - 99mm	96	7%	13	3%	109	6%
	100mm+	1349	93%	373	97%	1722	94%
	100mm - 199mm	451	31%	74	19%	525	29%
	200mm - 299mm	477	33%	166	43%	643	35%
	300mm or more	421	29%	133	35%	555	30%
	Total	1455	100%	386	100%	1840	100%
2015	none	17	1%	2	0%	19	1%
	1mm - 99mm	113	8%	13	4%	125	7%
	100mm+	1332	91%	347	96%	1680	92%
	100mm - 199mm	442	30%	76	21%	518	28%
	200mm - 299mm	455	31%	121	33%	576	32%
	300mm or more	435	30%	150	41%	585	32%
	Total	1462	100%	362	100%	1824	100%
Samples	2016		1793		473		2266
	2015		1753		437		2190

[12] Dwellings without loft spaces are excluded.

63. One of the reasons for this difference between private and social sector is that the Scottish Housing Quality Standard (SHQS) requires at least 100 mm of loft insulation. The SHQS was introduced in 2004, and all social rented dwellings were required to meet this standard by 2015 (see section 6.2.2 for more information).

64. The difference in the proportion of lofts with at least 100 mm insulation between the private and the social sector has been reducing gradually, from 17 percentage points in 2003/04 (81% in the social and 64% in the private sector) to 4 percentage points in 2016 (97% in the social sector and 93% in the private sector).

3.1.2 Wall Insulation

65. The presence of **cavity wall insulation (CWI)** 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 disguising their work. This may mean that the SHCS under-estimates the number of homes which have had CWI installed (see also section 6.2.2). Despite efforts to maintain the high quality of the SHCS physical survey fieldwork, some misclassifications may remain.

66. In Scotland around three quarters of dwellings have external cavity walls and the remaining one quarter 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. Because the improvement of solid and other wall types generally requires more expensive interventions than CWI, this diverse group is addressed together in this chapter.

67. Table 11 and Table 12 show the number and proportion of insulated dwellings by type of external wall. Higher insulation levels in new buildings have been required by building standards since 1982. These dwellings are therefore presumed insulated when built.

Table 11: Cavity Wall Insulation, 2012 to 2016[13]

	2016		2015		2014		2013		2012	
	000s	%	000s	%	000s	%	000s	%	000s	%
Not insulated	512	28%	525	29%	518	29%	554	31%	606	34%
Insulated	1,323	72%	1,286	71%	1,287	71%	1,218	69%	1,157	66%
Total	1,834	100%	1,811	100%	1,805	100%	1,772	100%	1,763	100%
Sample		*2,154*		*2,099*		*2,017*		*2,051*		*2,076*
Cumulative reduction in SHCS uninsulated since 2007										
000s	304		291		298		262		210	
Cumulative recorded cavity wall insulations under government schemes since 2007										
CERT									218	
ECO	82		72		54		19			

68. In 2016 72% of cavity wall dwellings in Scotland were insulated (Table 11), similar to 2015. We know from administrative data that 9,532 cavity wall dwellings were insulated during 2016 (through ECO). However, although the number of insulated cavity wall dwellings identified through the SHCS appears to have increased, this is not a statistically significant difference and reflects that this is a sample of all dwellings.

69. The longer term trend, which shows a decrease in the share of uninsulated cavity walls of 6 percentage points since 2012, is broadly consistent with administrative data on the number of cavity wall insulation measures installed under the UK Government Carbon Emissions Reduction Target (CERT) and the Energy Company Obligation (ECO). Between April 2008 and December 2012, the CERT scheme delivered around 227,000 wall insulation measures in Scotland[14] (218,000 cavity and 9,000 solid and other walls). Between January 2013 and December 2016 a further 81,743 cavity and 40,814 solid wall insulation measures were delivered in Scotland by the successor ECO scheme[15]. This equates to a total of around 350,000 wall insulation measures being installed under these two government programs by the end of 2016, including around 300,000 cavity wall insulation measures. This is almost identical to the cumulative reduction of 304,000 uninsulated cavity wall dwellings reported by the SHCS since 2007 (Table 11).

[13] Dwellings built post 1982 are presumed insulated when built

[14] CERT-Summary-Report-Q19-by-English-Regions-Scotland-Wales, HEED dB, Nov 2014. Access available through Energy Saving Trust.

[15] Scottish Government analysis of data provided by Ofgem of measures installed under ECO. Provisional figures.

70. Table 12 shows the levels of insulation in dwellings with **solid or other** construction type walls recorded by the survey in 2016. The results show that 15% of dwellings in this category had insulated walls. The difference with the level recorded in the previous year (11%) is not statistically significant. Only 696 dwellings with solid walls were surveyed in 2016 as part of the SHCS. This relatively small sample does not allow enough precision to capture the increase in solid wall insulation measures which we know from administrative data is taking place. Since the beginning of January 2013 at least 40,814 solid wall insulation measures were delivered in Scotland[16]; however the proportion of insulated solid wall dwellings recorded by the SHCS has stayed more or less constant with no significant differences between years.

71. Further information on insulation levels by wall type for the private and social housing stock is provided in Table 13.

Table 12: Wall Insulation of Solid and Other Wall Types, 2012 to 2016[17]

	2016		**2015**		**2014**		**2013**		**2012**	
	000s	%	000s	%	000s	%	000s	%	000s	%
Not insulated	524	85%	552	89%	528	86%	559	89%	557	89%
Insulated	94	15%	71	11%	85	14%	71	11%	66	11%
Total	617	100%	623	100%	613	100%	630	100%	623	100%
Sample		*696*		*655*		*663*		*674*		*711*
Cumulative recorded EWI installations under government schemes since 2007, thousands										
000s										
CERT									9	
ECO	41		30		19		4			

72. Around three quarters (76%) of cavity wall dwellings and around two-fifths (42%) of dwellings with other wall types in the social sector are estimated to have insulation in 2016. Over two-thirds (71%) of social housing overall had insulated walls.

73. Over two thirds (70%) of private sector cavity wall dwellings, and around one tenth (11%) of solid wall dwellings, had insulation in 2016. Just over half (53%) of all private sector dwellings had insulated walls.

[16] This is the number of SWI measures delivered under ECO.

[17] Dwellings built post 1982 are presumed insulated when built

74. The information in Table 13 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 on the definition are available in section 7.8.6.). HTTCs have certain attributes which make CWI more expensive, complex or simply inadvisable. Standard cavity walls have no such barriers.

75. Overall, the majority of work done to cavity walls has been CWI; 37% of cavity wall dwellings in Scotland have had retrofit cavity wall insulation, which is generally the lowest cost improvement available.

76. Levels of insulation are higher in the social sector at 71% (all wall types) compared with 53% in the private sector. 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 compared to 3% in the private) and retrofit solid wall insulation measures (39% of solid wall dwellings in the social sector compared to 8% in the private).

77. No statistically significant improvement in wall insulation levels is recorded in the survey in the last year for either the private or the social housing sector. Low sample numbers mean the apparent increase from 2015 in wall insulation amongst households in the social sector is within the margin of error.

Table 13: Insulation by Wall Type and Tenure, 2016 and Insulation of all Wall Types by Tenure, 2015 and 2016[18]

Wall and Insulation Type	Private Sector			Social Sector			Total		
	000s	%type	%all	000s	%type	%all	000s	%type	%all
2016									
Cavity									
Un-insulated	387	30%	21%	125	24%	20%	512	28%	21%
- HTTC	133	10%	7%	52	10%	8%	185	10%	8%
- Standard	254	19%	14%	73	14%	12%	327	18%	13%
Insulated	919	70%	50%	404	76%	65%	1,323	72%	54%
- CWI	460	35%	25%	218	41%	35%	678	37%	28%
- Int/External	37	3%	2%	72	14%	12%	109	6%	4%
- As built	421	32%	23%	114	22%	18%	536	29%	22%
Total	1,305	100%	71%	529	100%	85%	1,834	100%	75%
Sample Size		*1,533*			*621*			*2,154*	
Solid/Other									
Un-insulated	469	89%	26%	55	58%	9%	524	85%	21%
- Pre-1919	408	78%	22%	34	36%	5%	441	71%	18%
- Post-1919	61	12%	3%	21	22%	3%	82	13%	3%
Insulated	55	11%	3%	39	42%	6%	94	15%	4%
- Retrofit	43	8%	2%	37	39%	6%	80	13%	3%
- As built	12	2%	1%	*	*	*	14	2%	1%
Total	524	100%	29%	93	100%	15%	617	100%	25%
Sample Size		*601*			*95*			*696*	
All Wall Types									
Un-insulated	856		47%	180		29%	1,035		42%
Insulated	974		53%	443		71%	1,417		58%
Total	1,829		100%	622		100%	2,452		100%
Sample Size			*2,134*			*716*			*2,850*
2015: All Wall Types									
Un-insulated	877		48%	200		34%	1,077		44%
Insulated	968		52%	389		66%	1,357		56%
Total	1,845		100%	589		100%	2,434		100%
Sample Size			*2,095*			*659*			*2,754*

3.2 Boilers

In 2016, 52% of gas and oil **boilers** meet the minimum efficiencies specified by current Building Standards, an increase of 5 percentage points from 2015.

78. The heating system is a key factor in the thermal efficiency of a dwelling.

[18] Dwellings built post 1982 are presumed insulated when built

79. Around 86% of households use a gas or oil-fuelled boiler. 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[19]
    - In 2007, Scottish Building Standards increased the efficiency requirements for all new and replacement boilers[20]

80. Building regulations in Scotland effectively require the installation of a condensing boiler[21] for gas and oil-fuelled heating in new builds or when boilers are replaced.

81. The SHCS has recorded the age of the household's heating system since 2010 and contains sufficient data to derive the Seasonal Efficiency (SEDBUK) ratings of surveyed boilers in the 2012-2016 data collections. For these years we can track the energy efficiency improvement of gas and oil boilers associated with the rising standards of the regulatory framework.

82. The methodology by which boiler efficiency ratings are calculated changed in 2016 and the time series has been updated to reflect this. Additionally, the time series now accounts for the minimum efficiency required of new oil combination condensing boilers. The data presented in Table 14 on the percentage of boilers compliant with standards therefore does not match that published in previous reports. Further details on the methodology change can be found in section 7.6.

83. 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% gas and LPG; for ranges, back boiler and CPSUs, 75% when gas, and 80% when oil[22].

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[19] EU "Boiler Efficiency Directive" http://www.icqc.co.uk/userfiles/File/Directive_92_42.pdf

[20] Domestic Building Services Compliance Guide for Scotland http://www.gov.scot/Resource/0046/00460094.pdf

[21] 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.

[22] 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 results in a boiler with poorer efficiency than that of a newly installed condensing boiler of the same fuel type.

Table 14: Gas and Oil Boiler Improvements, 2007, 2010 & 2012-2016.

	2016	2015	2014	2013	2012	2010	2007
Households using gas or oil boilers for heating							
%	86%	85%	84%	84%	82%	83%	82%
000s	2,097	2,075	2,041	2,022	1,960	1,945	1,896
… of which							
% "New" boilers (post-1998)	91%	89%	85%	83%	81%	70%	
% condensing boilers	61%	56%	48%	43%	38%	22%	7%
% standards compliant boilers	52%	47%	41%	33%	30%		
Sample size (gas/oil boilers)	*2,356*	*2,259*	*2,195*	*2,219*	*2,222*	*2,488*	*2,410*

84. In 2016 the survey found that 91% of the domestic gas and oil boilers in Scotland had been installed since 1998, when the European Boiler Efficiency Directive minimum standards came into effect. The proportion installed in accordance with this directive has increased by 21 percentage points since 2010.

85. In 2016, over half (61%) of gas and oil boilers were condensing boilers. This represents a rapid increase of 39 percentage points since 2010.

86. In 2016, 52% of gas and oil boilers meet the minimum efficiencies specified by current Building Standards, an increase of 5 percentage points from 2015. As older boilers reach the end of their life and are replaced, we expect to see a continuation of this trend of improving efficiency.

3.3 Energy Performance Certificates

- In 2016, 39% of Scottish homes were rated as EPC band C or better under **SAP 2012**, up from 35% in 2014 (the first year in which data based on SAP 2012 is available).
- Under **SAP 2009**, which allows comparisons over a longer period, over two fifths of dwellings (43%) were rated C or better, up 19 percentage points since 2010. In the same period, the proportion of properties in the lowest EPC bands (E, F or G) has almost halved, reducing from 27% to 14%.

87. **Energy Performance Certificates (EPC)**[23] 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 standardized usage. EPCs are required when a property is either sold or rented to a new tenant.

[23] An example of the current EPC format can be seen at http://www.gov.scot/Topics/Built-Environment/Building/Building-standards/enerperfor/epcguidance

88. 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 building, taking into account the energy needed for space and water heating, ventilation and lighting and, where relevant, energy generated by renewables.

89. 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 high fuel bills, while 100 represents very high energy efficiency and low fuel bills. Ratings can exceed 100 where the dwelling generates more energy than it uses.

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

91. 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).

92. Energy Efficiency Ratings reported in this publication are calculated under two versions of SAP, the SAP 2009 methodology[24] and the most recent SAP 2012 methodology[25]. Using SAP 2009 enables us to examine the trend in the energy efficiency of the housing stock since 2010. SAP 2012 was first used in reporting data from the SHCS in the 2014 Key Findings report and therefore only three years of data are available.

3.3.1 Energy Efficiency Rating, SAP 2009

93. Table 15 shows the trend in mean EERs, which rose from 59.9 in 2010 to 65.1 in 2016. These ratings fall into band D. There was around a 1 point increase in the mean EER each year between 2010 and 2014. Improvement since then has been slower, with no significant difference between 2015 and 2016.

[24] BRE: The Government's Standard Assessment Procedure for Energy Rating of Dwellings, http://www.bre.co.uk/filelibrary/SAP/2009/SAP-2009_9-90.pdf

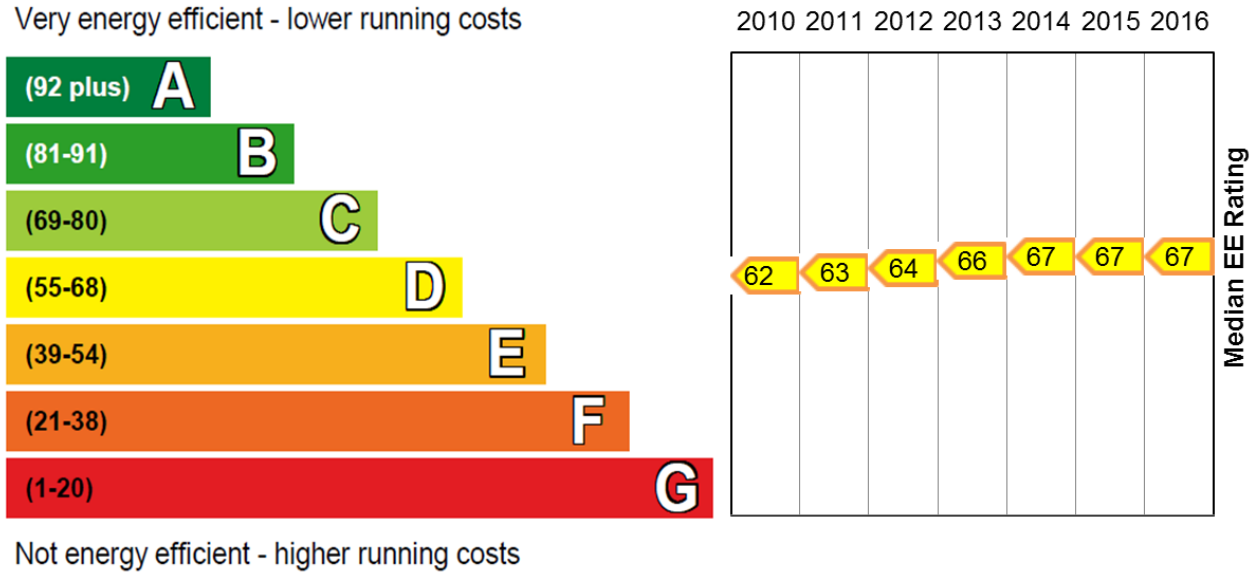
[25] http://www.bre.co.uk/filelibrary/SAP/2012/SAP-2012_9-92.pdf

Table 15: Average EER for 2010 – 2016, SAP 2009

		2016	2015	2014	2013	2012	2011	2010
EER	**Mean**	65.1	64.6	64.1	63.2	61.8	60.9	59.9
	Median	67	67	67	66	64	63	62
Sample		*2850*	*2754*	*2682*	*2725*	*2787*	*3219*	*3115*

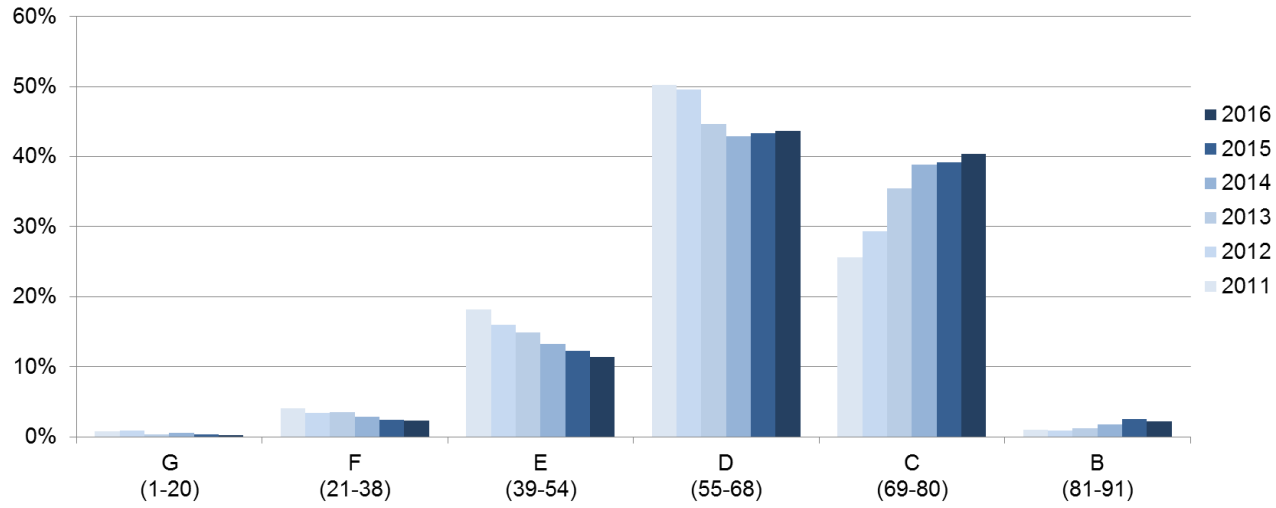
94. The median EE Rating has also improved over this period. In 2016 half of all Scottish dwellings were rated 67 or better, similar to the previous two years, an increase from 62 in 2010.

Figure 10: Median EER relative to EPC bands, SAP 2009, 2010-2016



95. The average figures reflect that Scottish housing is gradually moving up through the EPC bands (where A is the most energy efficient), as shown in Figure 11 and Table 16.

Figure 11: Distribution of the Scottish Housing Stock by EPC Band, SAP 2009, 2012-2016



Note: Values for this figure are provided in Table 16.

96. Just over two-fifths (43%) of the housing stock in 2016 had an EPC rating of C or better, up 19 points since 2010 (Table 16). Over the period 2010-2016, the proportion of properties in the lowest EPC bands, E, F and G, has dropped 13 percentage points: 27% of properties were rated E, F or G in 2010 compared with 14% in 2016.

Table 16: Distribution of the Scottish Housing Stock by EPC Band, SAP 2009, 2010-2016

EPC band	2016		2015		2014		2013		2012		2010	
	000s	%	000s	%	000s	%	000s	%	000s	%	000s	%
A (92-100)	-	-	-	-	-	-	-	-	-	-	-	-
B (81-91)	54	2%	62	3%	42	2%	29	1%	20	1%	18	1%
C (69-80)	989	40%	953	39%	939	39%	851	35%	699	29%	547	23%
D (55-68)	1,070	44%	1,055	43%	1,037	43%	1,072	45%	1,184	50%	1,157	49%
E (39-54)	279	11%	298	12%	321	13%	359	15%	381	16%	495	21%
F (21-38)	56	2%	59	2%	68	3%	84	3%	82	3%	127	5%
G (1-20)	5	0%	7	0%	14	1%	8	0%	21	1%	13	1%
Total	2,452	100%	2,434	100%	2,420	100%	2,402	100%	2,386	100%	2,368	100%
Sample		*2,850*		*2,754*		*2,682*		*2,725*		*2,787*		*3115*

No A-rated properties were sampled between 2010 and 2016.

3.3.2 Energy Efficiency Rating, SAP 2012

97. This section examines the energy efficiency profile of the Scottish housing stock in 2016 under the most recent SAP 2012[26] methodology.

98. SAP is periodically reviewed by the UK government to ensure it remains fit for purpose and to address 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.

99. On 7 December 2014, a new edition of RdSAP (version 9.92)[27] was implemented across the UK. In addition to introducing some technical updates and broadening of scope (for example, enabling assessment of 'park homes' as a dwelling type), the new edition includes updated UK carbon factors and fuel costs based upon recent research undertaken by BEIS.

100. Dwellings with main heating fuels other than mains gas (for example oil or coal) have systematically lower SAP ratings in SAP 2012 than in SAP 2009 and this is particularly true at the lower end of the SAP range. The main reason for this is that SAP fuel prices for these fuels have risen more than for mains gas. As a result, average energy efficiency ratings tend to be slightly lower under SAP 2012 compared to SAP 2009.

101. Tables 17 and 18 show the energy efficiency profile of the Scottish housing stock between 2014 and 2016 under SAP 2012. Figure 12 shows this alongside the longer term change as measured by SAP 2009.

Table 17: Average EER for 2014-2016, SAP 2012

		2016	2015	2014
EER	Mean	63.7	62.8	62.2
	Median	66	65	65
Sample		*2,850*	*2,754*	*2,682*

[26] www.bre.co.uk/sap2012

[27] http://www.nesltd.co.uk/news/rdsap-992-update

102. In 2016, the mean energy efficiency rating of the Scottish housing stock under SAP 2012 was 63.7 and the median was 66 points, indicating that half of the housing stock has an energy efficiency rating of 66 or better. The improvement in the mean rating between 2015 and 2016 is statistically significant.

103. Over a third (39%) of all properties were rated C or better, an increase from 35% in 2014. Less than a fifth (17%) were in bands E, F or G – a drop of four percentage points in the same period.

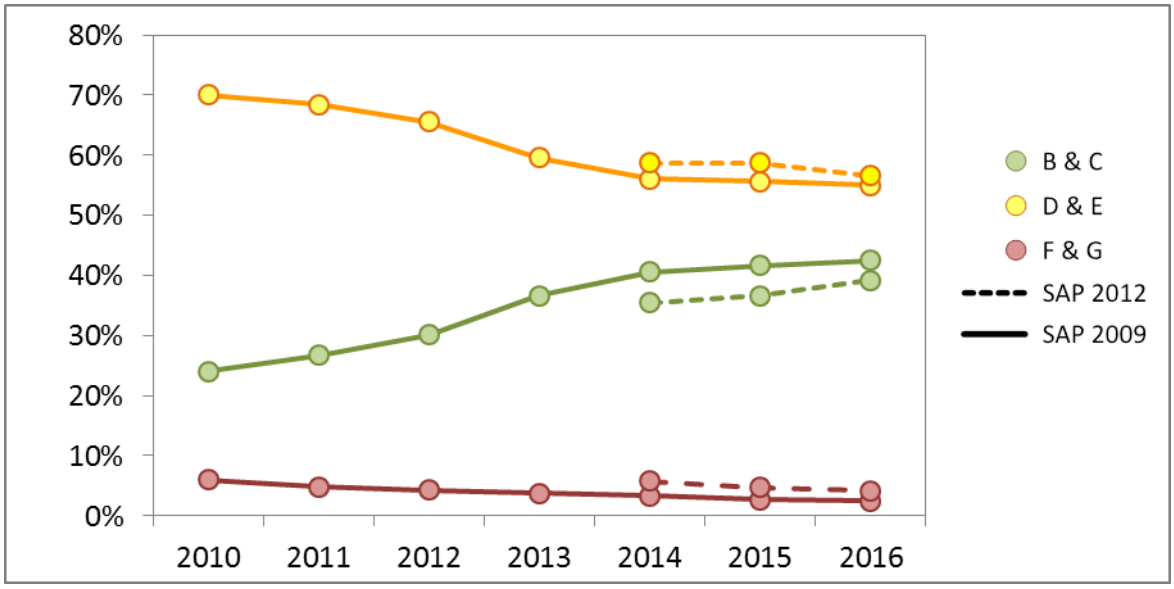
Table 18: Distribution of the Scottish Housing Stock by EPC Band, 2014 – 2016, SAP 2012

EPC Band	2016		2015		2014	
	000s	%	000s	%	000s	%
A (92-100)	-	-	-	-	-	-
B (81-91)	53	2%	53	2%	29	1%
C (69-80)	910	37%	837	34%	830	34%
D (55-68)	1,068	44%	1,061	44%	1,052	43%
E (39-54)	321	13%	368	15%	369	15%
F (21-38)	88	4%	94	4%	115	5%
G (1-20)	13	1%	20	1%	25	1%
Total	2,452	100%	2,434	100%	2,420	100%
Sample		*2,850*		*2,754*		*2,682*

No A-rated properties were sampled for 2014-2016.

104. Figure 12 shows a strong trend of improvement in the energy efficiency profile of the housing stock since 2010. The proportion of dwellings rated C or better increased from 24% to 43% of the stock (as measured under SAP 2009), equivalent to a 77% improvement in the share of the most energy efficient dwellings. The observed improvement in the last year, as measured by both SAP 2009 and SAP 2012 is within the margin of error for this survey.

Figure 12: **Grouped EPC Bands under SAP 2009 and SAP 2012, 2010-2016**



105. Table 19 shows the energy efficiency profile by broad tenure groups in 2016 using SAP 2012. Figure 13 provides more details on the distribution of the least energy efficiency properties by selected characteristics.

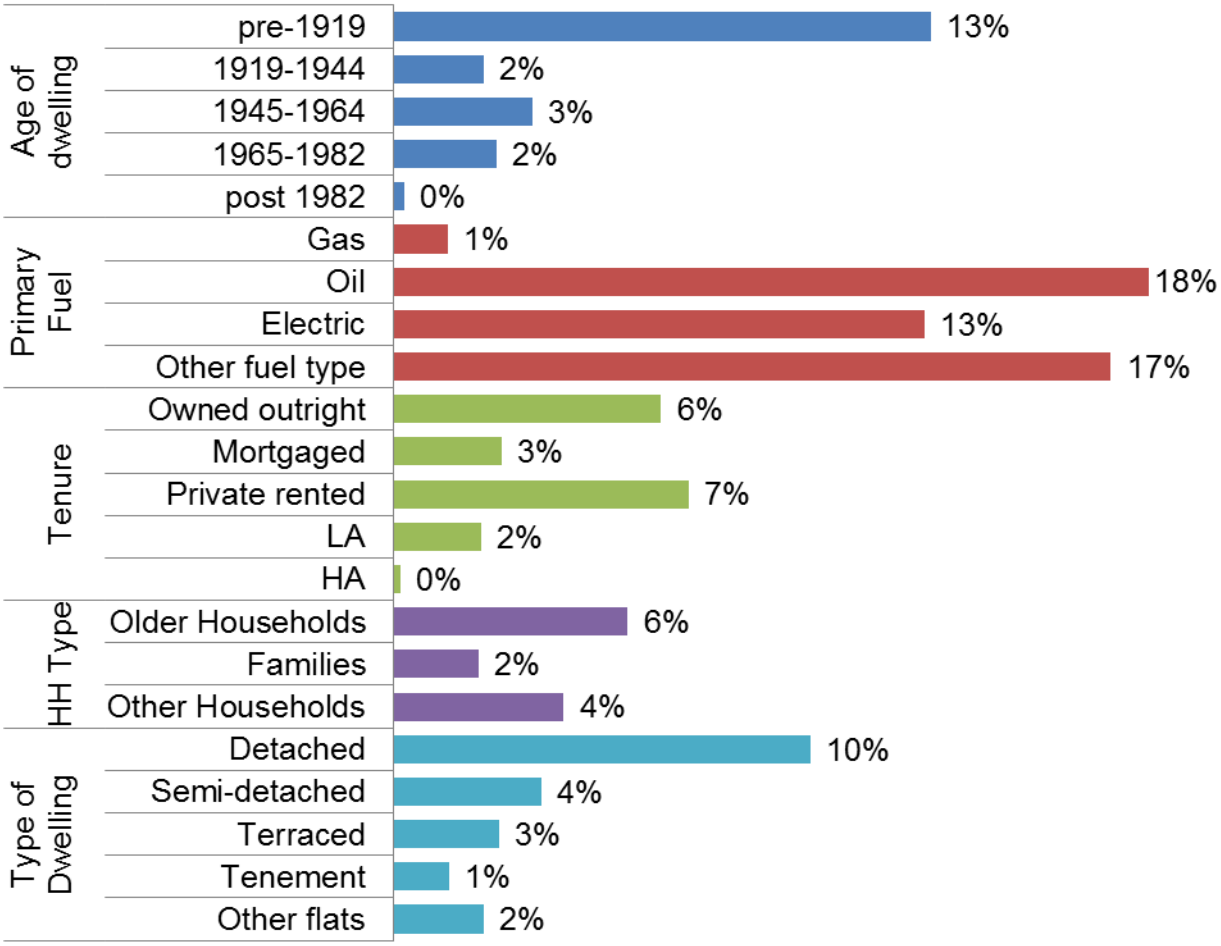
Table 19: EPC Band by Broad Tenure in 2016, SAP 2012

EPC Band	Owner occupied		Private rented		Social sector		All Tenures	
	000s	%	000s	%	000s	%	000s	%
A (92-100)	-	-	-	-	-	-	-	-
B (81-91)	27	2%	11	3%	15	2%	53	2%
C (69-80)	483	32%	113	34%	314	50%	910	37%
D (55-68)	701	47%	120	36%	247	40%	1,068	44%
E (39-54)	220	15%	62	19%	39	6%	321	13%
F (21-38)	60	4%	20	6%	8	1%	88	4%
G (1-20)	10	1%	3	1%	-	-	13	1%
Total	1,500	100%	329	100%	622	100%	2,452	100%
Sample		*1,790*		*344*		*716*		*2,850*

106. Over half (53%) of social housing is in band C or better under SAP 2012, compared to under two-fifths (38%) in the private rented sector. Eight per cent of dwellings in the social sector are in bands E, F or G, while 19% of owner occupied dwellings and 26% of the private rented sector are within these EPC bands.

107. The share of dwellings in the lowest energy efficiency bands (F and G) is particularly high for pre-1919 dwellings (13%), non-gas heated properties (between 13% and 18%), detached properties (10%) and in the private rented stock (7%) (Figure 13). The average for Scotland as a whole is 4%.

Figure 13: Proportion of Homes in Band F or G by Dwelling Age, Primary Heating Fuel, Tenure and Household and Dwelling Type in 2016, SAP 2012



Base figures are provided in Table 20 and Table 21.

108. More detailed breakdowns are shown in Table 20 (by household characteristics) and Table 21 (by dwelling attributes). The average EER for Housing Association dwellings is higher than other tenure groups, at 69.9. **Social housing** as a whole is more energy efficient than private sector dwellings, with a mean EER of 67.6 compared to 62.4 for private dwellings.

Table 20: Mean EER and Broad EPC Band, by Household Characteristics 2016, SAP 2012

	EE Rating		Band			Sample
	Mean	Differences from 2015[1]	BC	DE	FG	
Tenure						
Owned outright	60.8		28%	66%	6%	988
Mortgaged	64.6		41%	57%	3%	802
LA	65.8		45%	53%	2%	419
HA	69.9		63%	37%	0%	297
Private rented	61.5		38%	55%	7%	344
Private Sector	62.4		35%	60%	5%	2,134
Social Sector	67.6		53%	46%	1%	716
Household Composition						
Older Households	62.4		33%	61%	6%	920
Families	65.7	+1.6	45%	53%	2%	634
Other Households	63.6		40%	56%	4%	1,296
Weekly Household Income						
< £200	63.6		42%	53%	5%	355
£200-300	64.0		38%	59%	4%	506
£300-400	64.0		41%	54%	5%	436
£400-500	63.2		39%	56%	5%	312
£500-700	63.1	+1.7	35%	63%	3%	516
£700+	64.1	+1.5	42%	54%	4%	669
Council Tax Band						
Band A	64.2		42%	55%	3%	596
Band B	64.2	+1.9	40%	57%	4%	672
Band C	63.4		36%	59%	4%	423
Band D	63.1		38%	57%	5%	380
Band E	63.2		39%	57%	5%	393
Band F	64.7		41%	57%	2%	216
Band G & H	62.6		40%	52%	8%	163
Scotland	63.7	+0.9	39%	57%	4%	2850

[1] Differences provided where statistically significant.

109. The association between dwelling characteristics and energy efficiency rating, as shown in Table 21, is strong. Across **dwelling types**, detached properties have the lowest energy efficiency profile on average (mean EER 59.9) while flats have the highest rating (67.7 for tenements and 66.6 for other flats).

110. The **oldest, pre-1919**, properties are least energy efficient (mean EER of 55.1 and only 16% rated C or better) while those built after 1982 have the highest energy efficiency ratings (mean of 71.0 and 69% in band C or better). The other age categories are comparable in terms of their energy efficiency profile.

Table 21: SAP 2012: Mean EER, Differences from 2015 and Broad EPC Band, by Dwelling Characteristics, 2016

	EE Rating		Band			
	Mean	Differences from 2015[1]	BC	DE	FG	*Sample*
Dwelling Type						
Detached	59.9		30%	60%	10%	*767*
Semi	61.2		27%	69%	4%	*606*
Terraced	64.0		35%	63%	3%	*620*
Tenement	67.7		56%	42%	1%	*506*
Other flats	66.6		50%	48%	2%	*351*
Age of dwelling						
pre-1919	55.1		16%	71%	13%	*529*
1919-1944	63.0	+1.9	31%	66%	2%	*330*
1945-1964	63.0		31%	66%	3%	*640*
1965-1982	64.0	+1.6	37%	60%	2%	*627*
post-1982	71.0		69%	31%	0%	*724*
Primary Heating Fuel						
Gas	65.9		44%	55%	1%	*2,099*
Oil	50.5		6%	75%	18%	*266*
Electric	56.8		26%	61%	13%	*397*
Other	60.0		47%	36%	17%	*88*
Location						
urban	65.5	+0.9	43%	55%	2%	*2,189*
rural	54.7		21%	62%	17%	*661*
Gas Grid						
On	65.2	+0.8	41%	57%	2%	*2,181*
Off	56.2		30%	53%	17%	*669*
Scotland	63.7	+0.9	39%	57%	4%	*2,850*

[1] Differences provided where statistically significant.

111. **Primary heating fuel** is a key determinant of the energy efficiency of the dwelling. Properties heated by mains gas have an average rating of 65.9 and 44% are in band C or better. Dwellings heated by other fuels (including electric and oil) have a considerably lower rating. The average energy efficiency rating for oil heated properties is 50.5 (making the average dwelling in this group E rated) and only 6% are in band C or better. Proximity to the gas grid has a similar effect on the energy efficiency rating. As dwelling characteristics associated with lower energy efficiency are disproportionately represented in rural areas, the average energy efficiency profile of rural properties tends to be lower than that for urban.

112. Improvements since 2015 which pass the statistical significance test include a 1.9 points gain in the mean SAP score for 1919-1944 dwellings and a 1.6 points gain for 1965-1982 dwellings. These improvements are reflected in the proportion of dwellings rated band B or C, which increased by eight percentage points since 2015 for both age categories. Smaller, but still significant improvements in the mean SAP score were measured for urban dwellings, and those on the gas grid. However, the corresponding increase of B and C rated dwellings for these categories was within the margin of error.

3.4 National Home Energy Ratings (NHER)

113. 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. However because of user interest and because NHER scores are taken into account under the energy efficiency criterion of the SHQS, we provide an approximate NHER score. Further details on how this emulated NHER score compares to previously published NHER figures can be found in the Methodology Notes to the 2013 SHCS report[28].

114. Table 22 presents banded NHER scores and mean values for selected categories of dwellings and household types for 2016.

[28] SHCS - Methodology Notes 2013 available at http://www.gov.scot/Topics/Statistics/SHCS/Downloads/MethodologyNotes2013

Table 22: NHER Scores and Banded Ratings by Selected Dwelling and Household Characteristics, 2016

		NHER band			
	Mean	Good	Moderate	Poor	**Sample**
Scotland	7.5	75%	24%	1%	2,850
Dwelling Type (grouped)					
Detached	7.0	66%	32%	2%	767
Semi-detached	7.0	67%	32%	1%	606
Terraced	7.4	78%	21%	1%	620
Tenement	8.2	82%	17%	1%	506
Other flats	7.9	84%	16%	0%	351
Age of dwelling					
pre-1919	6.4	52%	45%	3%	529
1919-1944	7.3	71%	28%	1%	330
1945-1964	7.3	73%	25%	1%	640
1965-1982	7.4	76%	24%	0%	627
post 1982	8.6	94%	6%	0%	724
Primary Heating Fuel					
Gas	7.8	82%	18%	0%	2,099
Oil	6.1	42%	56%	2%	266
Electric	6.2	45%	49%	6%	397
Other fuel type	7.6	66%	30%	4%	88
Tenure					
Owned outright	7.0	68%	31%	1%	988
Mortgaged	7.6	76%	23%	0%	802
LA	7.7	83%	16%	1%	419
HA	8.5	92%	8%	0%	297
Private rented	7.3	67%	31%	2%	344
Private Sector	7.3	71%	28%	1%	2,134
Social Sector	8.1	86%	13%	1%	716
Household Composition					
Older Households	7.3	73%	26%	1%	920
Families	7.7	80%	20%	0%	634
Other Households	7.5	74%	25%	1%	1,296

3.5 Carbon Emissions

Based on modelled energy use, the average Scottish home is estimated to produce 7.0 tonnes of **CO_2** per year. Average modelled carbon emissions for all properties have continued to decrease in the last year from 78 kg per square meter of floor area to 76 kg/m^2. Over the past year, there has been a reduction of 15% for post-1982 terraces from 67 kg/m^2 to 57 kg/m^2.

115. **Carbon Emissions** are the amount of carbon dioxide gas vented to the atmosphere. Estimates of emissions from the residential sector which take into account actual energy consumption by households are reported by BEIS at Local Authority and Scotland level annually[29]. 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.

116. 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 preferences or changes in weather conditions. As such, they are distinct from the carbon emissions figures published by BEIS and compiled in GHG inventories. Table 23 shows modelled emissions from the SHCS and provides a comparison with the estimates published by BEIS for the period 2010-2015.

117. In 2012, cooler temperatures led to an increase in domestic energy use and an increase in CO_2 emissions from the domestic sector overall. This was reflected in the estimates of emissions levels from the domestic sector reported by BEIS. At the same time, modelled SHCS emissions per household fell by 1.4%, reflecting the improved energy efficiency of the sector in this period and the greater potential to reduce CO2 emissions. The SHCS estimates are not designed to capture the increased demand for heating due to colder weather in any particular year.

[29] Local and Regional CO2 Emissions Estimates, BEIS: https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-2015

Table 23: Carbon Emissions and Modelled Emissions in Scottish Housing, 2010-2016

		2010	2011	2012	2013	2014*	2015*	2016*
Carbon Emissions[1]: BEIS Domestic sector	Total (Mtonnes)	13.7	12.0	12.8	12.3	10.3	9.9	
	per HH (tonnes)[2]	5.8	5.0	5.4	5.1	4.3	4.1	
	% change per HH	6.1%	-13.0%	6.2%	-4.3%	-16.6%	-5.2%	
Modelled emissions: SHCS	Total ("Mt")	18.6	18.2	18.1	17.4	17.9	17.7	17.2
	per HH ("t")	7.9	7.7	7.6	7.3	7.4	7.3	7.0
	% change per HH	-	-2.6%	-1.4%	-3.6%	1.1%	-1.8%	-3.0%

[1] Local and Regional CO2 Emissions Estimates, BEIS. Data reflects revisions made in the most recent publication. https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-2015

[2] Number of households (HHs) sourced from National Records of Scotland, Estimates of Households and Dwellings, 2016: https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/households/household-estimates/2016

* Modelled emissions figures for 2014 to 2016 are not fully comparable to previous years

118. Estimates in the Second Report on Proposals and Policies (RPP2)[30] or in the Draft Climate Change Plan[31] are also not comparable to SHCS estimates. RPP2 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.

119. 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.

120. 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 CO_2 equivalent figures which include the global warming impact of CH_4 and N_2O as well as CO_2.

[30] RPP2 available at: http://www.gov.scot/Topics/Environment/climatechange/scotlands-action/lowcarbon/meetingthetargets

[31] http://www.gov.scot/Resource/0051/00513102.pdf

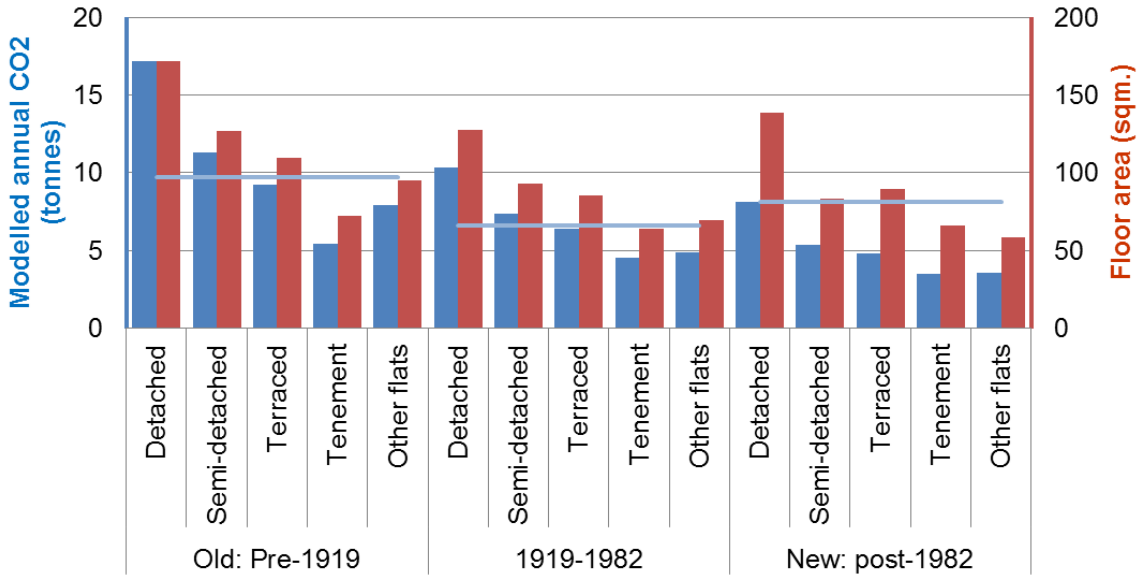
121. The change in the underlying BREDEM 2012 model, first implemented in the reporting of 2014 data, has meant that carbon emissions for 2014-2016 are not estimated on a consistent basis with those for 2010-2013. Further details on this change are given in the Methodology Notes to the 2014 Key Findings report[32].

3.5.1 Modelled Emissions by Dwelling Type and Age of Construction

122. The annual modelled emissions from a property reflect the energy use for the whole dwelling heated according to the standard heating regime. As shown in Figure 14, dwellings with larger floor area generally have higher carbon emissions.

123. 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 3.3). Post-1982 flats have the lowest modelled emissions on average; less than 4 tonnes per year (Table 24).

Figure 14: Average Floor Area and Average Modelled Annual Emissions by Age and Type of Dwelling, 2016



Note: Floor areas for these subgroups are provided in section 2.1.1. Modelled carbon emissions figures are provided in Table 24.
The pale blue line indicates the average modelled emissions from the dwelling age group.

[32] SHCS Methodology Notes 2014 available at www.gov.scot/Topics/Statistics/SHCS/Downloads/Methodology2014

Table 24: Average Modelled Annual Carbon Emissions (tonnes per year) by Dwelling Age and Type, 2016

	Dwelling Age			
Dwelling Type	Pre-1919	1919-1982	Post-1982	All
Detached	17.2	10.3	8.2	10.7
Semi-detached	11.3	7.4	5.4	7.5
Terraced	9.2	6.4	4.8	6.4
Tenement	5.4	4.5	3.5	4.6
Other flats	7.9	4.8	3.6	5.3
All dwelling types	9.7	6.6	5.9	7.0

124. Across all age bands, detached houses have the highest modelled emissions due to a larger share of exposed surfaces. As shown in section 2.3, they are also the most likely to use high carbon-intensity fuels such as oil and coal in place of mains gas.

125. By dividing modelled emissions by total internal floor area we derive emissions per square meter (kg/m^2). Controlling for floor area in this way shows that pre-1919 detached houses have the highest modelled emissions per sq. m (106 kg/m²), as shown in Table 25. Post-1982 terraces (57 kg/m^2), tenements (56 kg/m^2) and other flats (65 kg/m^2) have the lowest emissions.

Table 25: Average Modelled Emissions per Square Meter of Floor Area (kg/m^2) by Age and Type of Dwelling, 2016

Dwelling Age		**Pre-1919**	**1919-1982**	**Post-1982**	**All Ages**
Type	Detached	106	85	61	79
	Semi	96	81	67	80
	Terraced	92	76	57	75
	Tenement	82	72	56	71
	Other flats	86	70	65	73
All types		91	77	61	76

3.5.2 Modelled Emissions by Tenure

126. Although data for 2014-2016 is not directly comparable to prior years, the data suggests that there is a longer term trend of declining emissions. Average modelled carbon emissions reduced from 92 kg/m^2 in 2010 to 80 kg/m^2 in 2013. Based on the updated carbon emissions methodology, there was then a further decrease from 80 kg/m^2 in 2014 to 76 kg/m^2 in 2016.

127. Figure 15 and Table 26 show how emissions differ across tenure for the period 2010 - 2016. The pattern of differences across tenure types has remained similar to previous years, with highest rates of emissions observed for the PRS (86 kg/m^2) and lowest for the HA sector (66 kg/m^2) and the remaining types of tenure with similar values in between.

128. Changes to the tenure definitions and the revised carbon emissions methodology mean that figures for 2014-2016 by tenure are not fully comparable to earlier years and most differences between years are not statistically significant. However, in the mortgaged sector average modelled emissions reduced from 78 kg/m^2 to 73 kg/m^2 and in housing association dwellings emissions fell from 71 kg/m^2 to 66 kg/m^2 between 2014 and 2016.

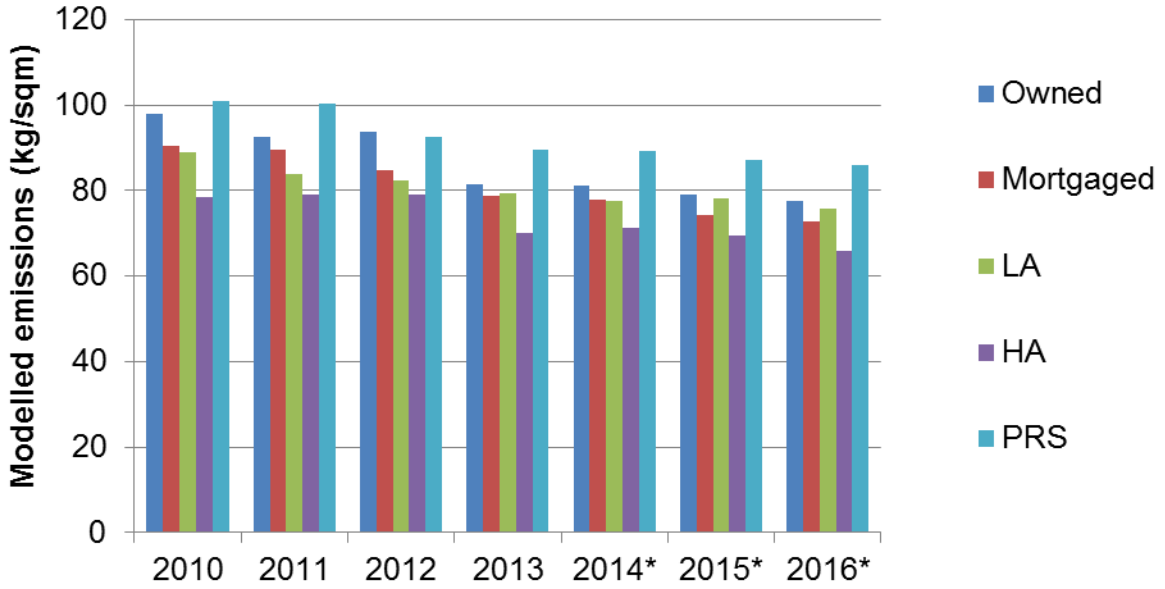
Table 26: Average Modelled Emissions per Square Meter by Tenure, 2010-2016*

	2016*	2015*	2014*	2013	2012	2011	2010
Owned outright	78	79	81	81	94	92	98
Mortgaged	73	74	78	79	85	90	90
LA/Other public	76	78	77	79	82	84	89
HA/co-op	66	70	71	70	79	79	79
PRS	86	87	89	90	93	100	101
All Tenures	76	78	80	80	88	90	92

Note: Data for 2010 to 2013 does not include households living rent free.

* Figures for 2014-2016 are therefore not fully comparable to previous years.

Figure 15: Modelled Emission per square meter (kg/m^2) by Tenure, 2010-2016*



Note: * Data for 2010 to 2013 does not include households living rent free. Figures for 2014-2016 are therefore not fully comparable to previous years.

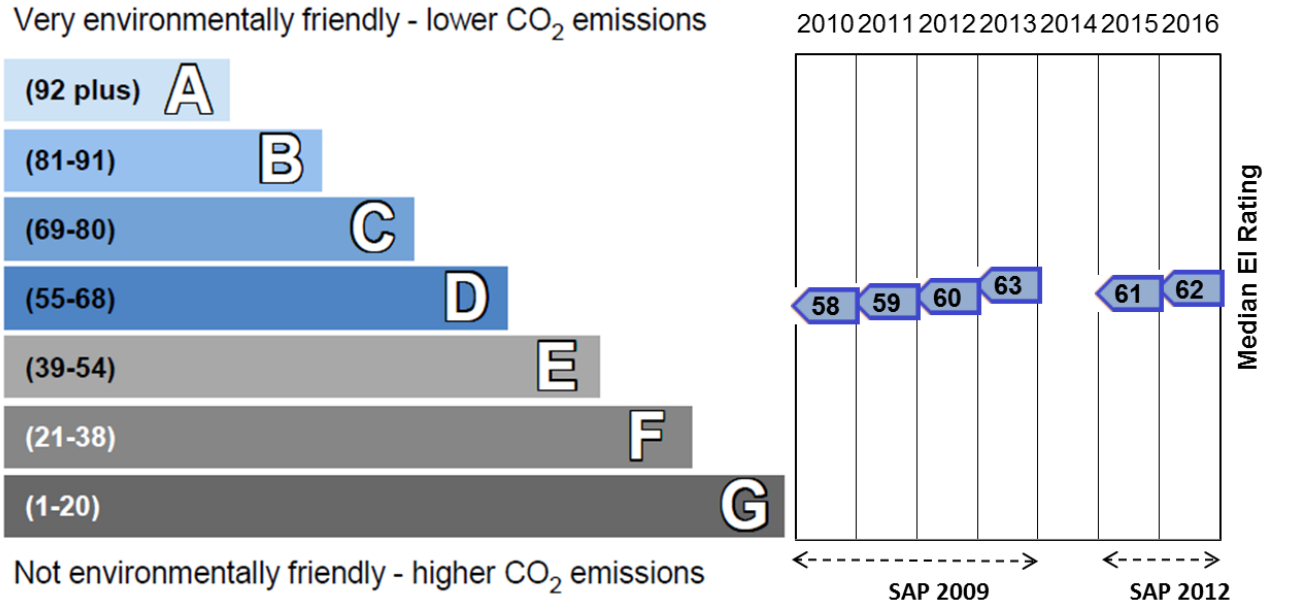
3.6 Environmental Impact Rating

129. 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 SAP methodology.

130. EI ratings for 2015 and 2016, produced on the basis of SAP 2012, are not fully comparable to those for the period 2010-2013, which were produced on the basis of SAP 2009.

131. Figure 16 illustrates the trend in the median EIR between 2010 and 2016. This indicates that the environmental impact of Scottish housing is falling over time.

Figure 16: Median EIR relative to Band, 2010-2013 (SAP 2009) and 2015-2016 (SAP 2012)



132. As shown in Table 27 the proportion of dwellings with EI ratings in band C or better in 2016 was 29%. The mean rating was 59 which falls in band D.

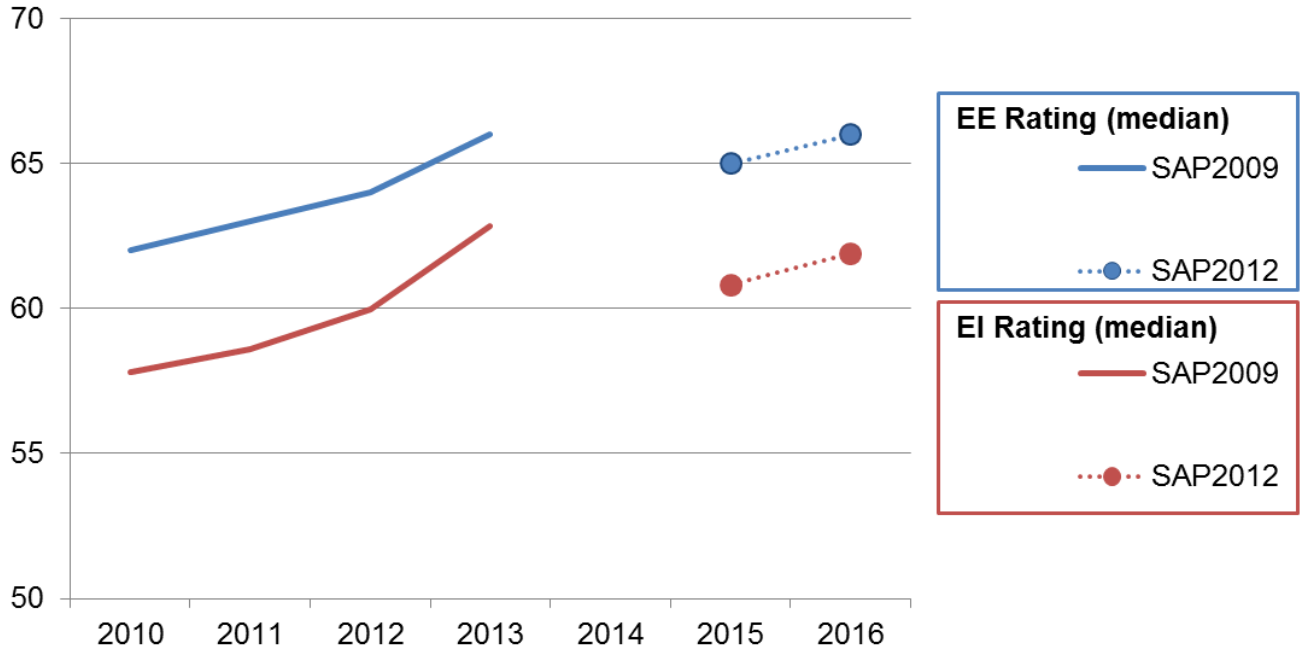
133. In 2016, 10% of dwellings were rated F or G in terms of their environmental impact.

Table 27: EIR Bands in the Scottish Housing Stock, 2010-2013 and 2015-2016

EPC Band	2016		2015		2013		2012		2011		2010	
	000s	%	000s	%	000s	%	000s	%	000s	%	000s	%
A - B (81+)	96	4%	102	4%	79	3%	71	3%	52	2%	55	2%
C (69-80)	613	25%	554	23%	683	29%	524	22%	468	20%	424	18%
D (55-68)	947	39%	926	38%	895	37%	888	37%	873	37%	857	37%
E (39-54)	558	23%	576	24%	509	21%	587	25%	623	27%	615	26%
F (21-38)	200	8%	221	9%	197	8%	248	10%	270	12%	297	13%
G (1-20)	39	2%	55	2%	38	2%	64	3%	64	3%	81	4%
Total	2,452	100%	2,434	100%	2,402	100%	2,383	100%	2,349	100%	2,330	100%
Mean		59		58		60		57		56		55
Median		62		61		63		60		59		58
Sample		*2,850*		*2,754*		*2,725*		*2,783*		*3,191*		*3,073*

134. Figure 17 illustrates that the energy efficiency and the environmental impact rating for the median Scottish dwelling have changed in parallel since 2010.

Figure 17: Trend in Median EE and EI Ratings, 2010-2013 and 2015-2016



135. Table 28 shows how EI ratings vary across different type of dwellings. As expected dwellings built more recently have better environmental impact ratings with 55% rated C or better and only 2% in the bottom two bands (F and G). Flats have lower environmental impact than houses, as do gas heated properties compared to those using oil or electricity.

136. Oil heating systems and houses are more common in rural areas, leading to lower overall environmental impact ratings for rural dwellings.

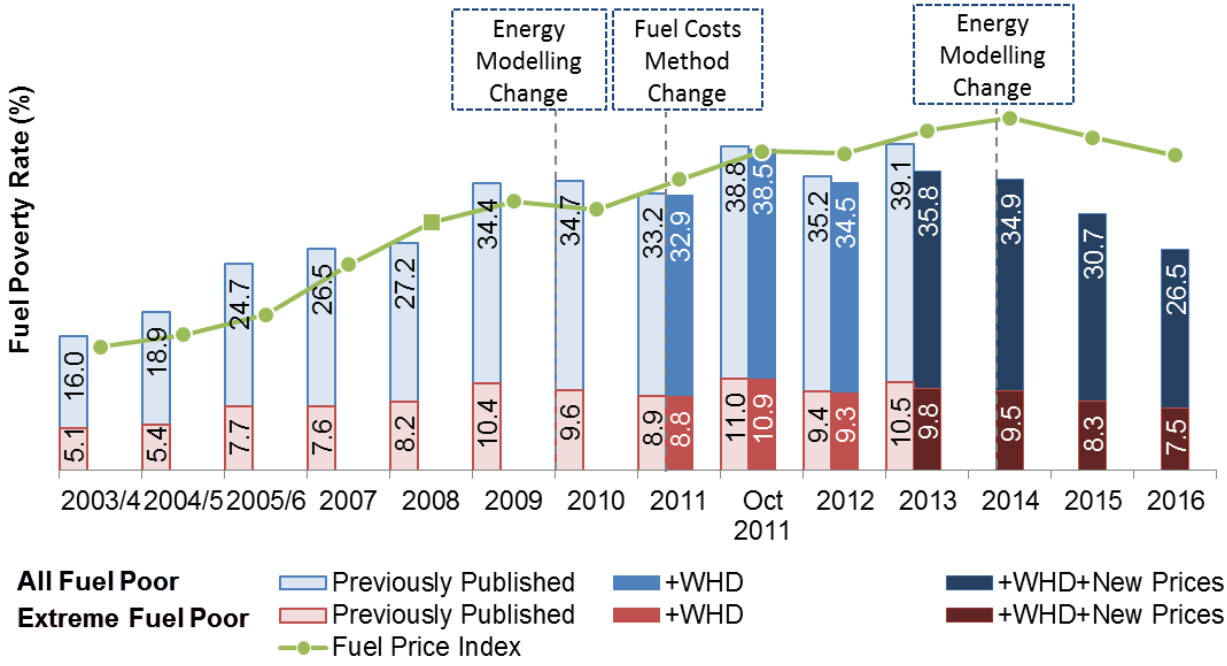
Table 28: Mean EIR and Broad EIR Band, by Dwelling Characteristics, 2016

	Environmental Impact Rating	EI Band			*Sample*
	Mean	ABC	DE	FG	
Dwelling Type					
Detached	53.5	17%	65%	18%	767
Semi-detached	55.8	17%	71%	12%	606
Terraced	59.5	24%	69%	7%	620
Tenement	65.4	50%	46%	4%	506
Other flats	62.9	38%	56%	6%	351
Age of Dwelling					
pre-1919	49.0	13%	62%	25%	529
1919-1944	58.4	22%	71%	6%	330
1945-1964	58.4	23%	69%	8%	640
1965-1982	59.2	23%	69%	9%	627
post-1982	68.2	55%	43%	2%	724
Primary Heating Fuel					
Gas	62.5	33%	64%	3%	2,099
Oil	41.6	2%	57%	41%	266
Electric	45.7	10%	54%	36%	397
Other fuel type	62.8	68%	9%	23%	88
Urban-Rural Indicator					
Urban	61.5	32%	63%	5%	2,189
Rural	47.8	16%	53%	5%	661
Gas Grid					
On	61.0	29%	65%	5%	2,181
Off	50.4	27%	41%	32%	669
Scotland	59.2	29%	61%	10%	2,850

4 Fuel Poverty

- In 2016 **fuel poverty** declined by 4.3 percentage points compared to 2015: 26.5% or 649,000 households were fuel poor, and 7.5% or 183,000 households were living in extreme fuel poverty (Table 29). This is a reduction of 99,000 households compared to 2015 when 30.7% or 748,000 households were fuel poor.
- Almost two thirds (2.7 percentage points) of the reduction in fuel poverty rates between 2015 and 2016 can be attributed to the drop in the price of domestic fuels over this period. Around a third (1.5 points) can be attributed to improvements in the energy efficiency performance of the housing stock and the rest (0.1 points) can be explained by higher household incomes.
- Between 2015 and 2016 there has been a more noticeable decline in fuel poverty in the **private sector,** increasing the gap when compared to the **social sector**. Fuel poverty rates in the private sector have reduced from 30% to 25% while the rate in the social sector has remained at around 32%.

Figure 18: Fuel Poverty and Extreme Fuel Poverty since 2003/4



Note: Energy requirement underpinning fuel poverty estimate modelled on the following basis: 2003/4 – 2009: BREDEM – 12; 2010 – 2013: BREDEM 2012 v.1.0; from 2014 onwards: BREDEM 2012 v.1.1.

4.1 Definition and Measurement of Fuel Poverty

137. As set out in the Scottish Fuel Poverty Statement, a household is in **fuel poverty** if, in order to maintain a satisfactory heating regime, it would be required to spend more than 10% of its income on all household fuel use[33].

138. Under the 2001 Housing (Scotland) Act (section 88), the Scottish Government was committed to eradicating fuel poverty as far as practicably possible by November 2016[34]. 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.

139. The Scottish Government is currently consulting on a new Fuel Poverty Strategy for Scotland, including a proposed new definition of fuel poverty based on advice from an independent panel of experts. The data presented in this report is based on the current definition.

140. We expect to begin reporting on the proposed new definition in the next Annual Report based on data from the 2017 survey. However, data from the 2018 SHCS will be required before complete estimates can be included covering all the elements of the new definition.

141. **Extreme fuel poverty** indicates that a household would have to spend more than 20% of its income to maintain a satisfactory heating regime.

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

- For “vulnerable” households[35], 23°C in the living room (zone 1) and 18°C in other rooms (zone 2), for 16 hours in every 24.
- For other households, 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.

[33] Scottish Fuel Poverty Statement 2002, http://www.gov.scot/Resource/Doc/46951/0031675.pdf

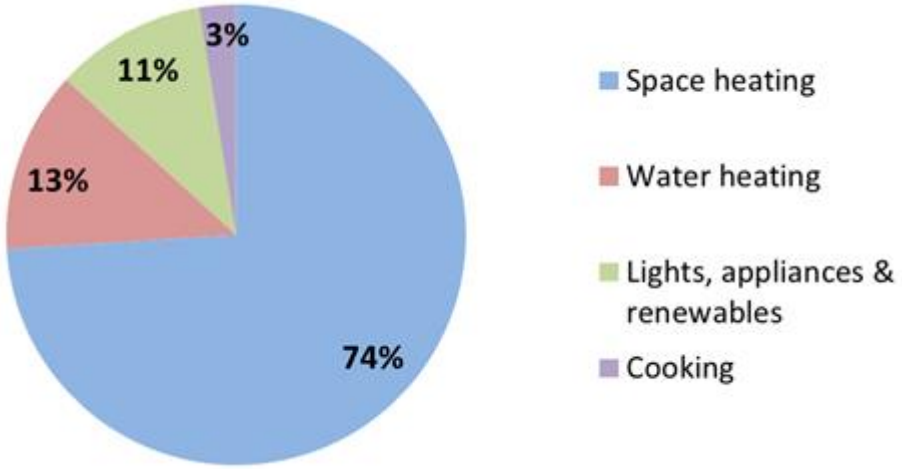
[34] Scottish Government's Fuel Poverty Policy, http://www.gov.scot/Topics/Built-Environment/Housing/warmhomes/fuelpoverty

[35] Vulnerable households are those where at least one resident is aged 60 or over, or suffers long term sickness or disability.

143. 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.

144. Figure 19 shows that in 2016, on average, around 74% of the modelled household energy demand was from space heating, 13% from water heating, 11% from lighting and appliance usage, and 3% was accounted for by cooking.

Figure 19: Mean Household Energy Consumption by End Use, 2016



Note: Figures do not add to 100% due to rounding

145. 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. The methodology for modelling the cost of energy use was updated for the 2014 Key Findings report and details were provided in the accompanying Methodology Notes[36].

[36] SHCS - Methodology Notes 2014 available at www.gov.scot/Topics/Statistics/SHCS/Downloads/Methodology2014

146. The current report continues to use this improved method for setting the cost of the domestic energy requirement. However, it also introduces a further small improvement through the collection of information in the 2016 survey about **pre-payment meters** for energy supply, which has allowed us to improve the accuracy of fuel price information for pre-payment users, who are more common among lower income groups which are at higher risk of fuel poverty. In 2016, 23% of households in Scotland had a pre-payment meter (mains gas, electricity, or both); an estimate of the impact on fuel poverty of this methodology change is presented in section 4.3.4.

147. The cost of the energy requirement includes an allowance for the bill rebate provided under the Warm Home Discount (WHD) scheme[37]. It no longer includes the £12 contribution of the Government Electricity Rebate (GER) as the scheme only ran for the previous two years (2014 and 2015)[38].

4.2 Fuel Poverty and Extreme Fuel Poverty

148. Between 2015 and 2016 the rate of fuel poverty declined by around 4 percentage points. In 2016 there were 649,000 fuel poor households representing 26.5% of all households. The number of fuel poor households fell by 99,000 compared to 2015 when 30.7%, or 748,000 households, were living in fuel poverty (Table 29).

149. This is the lowest rate recorded by the survey since 2005/6, and the same level as in 2007.

150. Around 183,000 households (or 7.5%) were living in extreme fuel poverty in 2016, compared to 203,000 households (or 8.3%) in the previous year.

[37] Eligible households receive a £140 discount on their electricity bills: https://www.gov.uk/the-warm-home-discount-scheme. 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).

[38] https://www.gov.uk/guidance/government-electricity-rebate

Table 29: Estimates of Fuel Poverty and Extreme Fuel Poverty since 2011

	Fuel Poverty		Extreme Fuel Poverty	
	000s	%	000s	%
2011	779	32.9%	209	8.8%
Oct 2011	911	38.5%	257	10.9%
2012	824	34.5%	222	9.3%
2013	860	35.8%	236	9.8%
2014	845	34.9%	229	9.5%
2015	748	30.7%	203	8.3%
2016	649	26.5%	183	7.5%

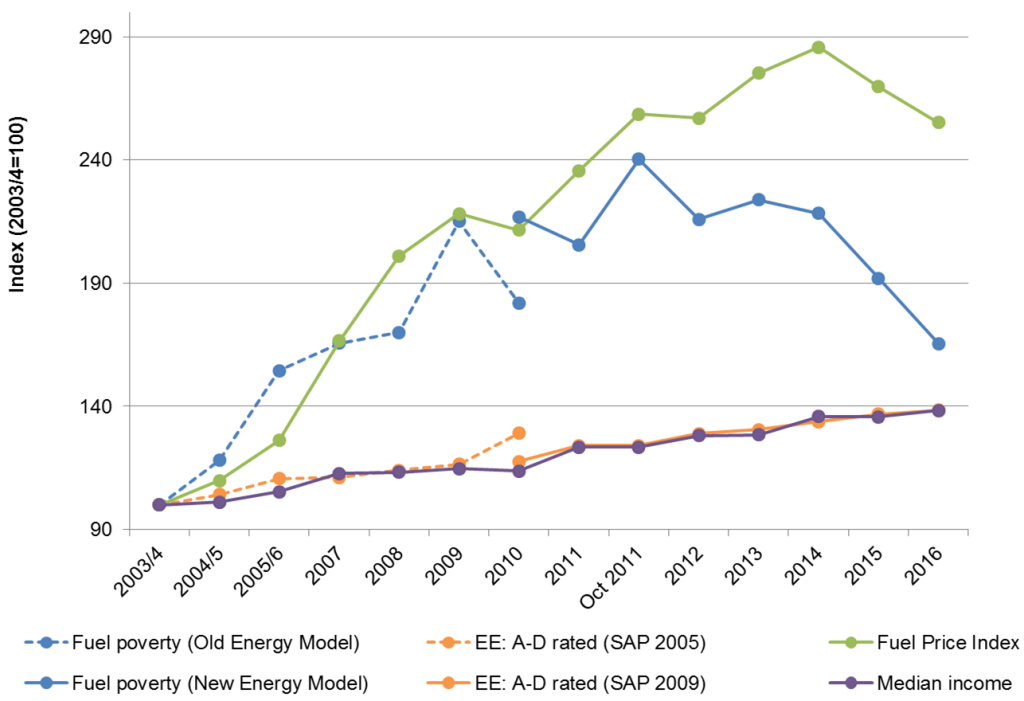
Note: There are some discontinuities in the underlying methods as follows: figures for 2011 and 2012 allow for WHD adjustment only; 2013 include WHD and price source adjustment; figures from 2014 onwards include WHD and price source adjustment and an updated BREDEM model; from 2016 a further improvement is included by assigning pre-payment metered fuel prices to the relevant households.

4.3 Drivers and Trends

151. Fuel poverty is affected by levels of household income, the price of fuel and the energy efficiency of housing. Fuel poverty under the existing definition is distinct from poverty in that, while low income is an important driver, it is not a prerequisite. As shown in Table 35, fuel poor households are found in all income bands. Around 10% of all fuel poor households had weekly income above £400 before housing cost, which places nearly all of these households in the top half of the income distribution (Table 35). Fuel poverty also depends on the condition of the home and the cost of energy for space and water heating, cooking, lighting and running appliances.

152. In Table 30 and Figure 20 we have constructed indexes to compare trends in the three key drivers of fuel poverty since 2003. Measures of energy efficiency and household incomes are derived from SHCS data. The fuel price index is constructed from BEIS quarterly prices as described in section 4.3.1. Prices and incomes are presented in nominal (cash) terms.

Figure 20: Trends in Fuel Price, Energy Efficiency and Median Income, 2003/4 to 2016



Note: All values indexed to 100 in 2003/4. Data for this chart are provided in Table 33. Fuel Price index constructed as described in section 4.4.1.
Fuel poverty energy requirement modelled on the following basis: 2003/4 – 2009: BREDEM – 12; 2010 – 2013: BREDEM 2012 v.1.0; 2014 and 2015: BREDEM 2012 v.1.1.
Fuel poverty costs as follows: 2011 and 2012 include WHD adjustment only; from 2013 onwards include WHD and price source adjustments; from 2016 a further improvement is included by assigning pre-payment metered fuel prices to the relevant households.

153. Since 2003 both the proportion of dwellings rated A-D and median household income have grown by 38%. Fuel prices have risen much faster, so that by 2016 they were around two and half times (155%) their level in 2003.

154. Until 2012 fuel price growth has outweighed gains from improving energy efficiency, such that the increase in fuel poverty broadly mirrored the growth in the fuel price index[39]. Between 2013 and 2014 the rate of fuel poverty did not increase in line with the rise in the average fuel price index, and there are a number of factors that may have contributed[40]. In the last two years, the decline in the price of fuel was reflected in a reduction in the fuel poverty rate.

[39] Allowing for the impact of the new fuel price methodology which contributes to the slower rate of growth in the estimated level of fuel poverty between 2012 and 2013 shown in Figure 20.

[40] There are several discontinuities in the methodology for estimating fuel poverty reflected in Figure 20 which may affect this comparison: the underlying energy model changed in 2010 and 2014, and the method of sourcing price information changed from 2013.

Table 30: Fuel Price, Energy Efficiency and Income Indices

Key Drivers of Fuel Poverty: Indices 2003/4=100								
Survey year	Fuel poverty		Fuel Price Index		EE: A-D rated		Median income	
	%	Ix	Ix	Rebased	%	Ix	£	Ix
2003/4	16.0	100	47	100	62%	100	16,000	100
2004/5	18.9	118	52	110	65%	104	16,000	101
2005/6	24.7	154	60	126	69%	111	17,000	105
2007	26.5	166	79	167	69%	111	18,000	113
2008	27.2	170	95	201	71%	114	18,000	113
2009	34.4	215	103	218	72%	116	18,000	115
2010	34.7	217	100	211	73%	118	18,000	114
2011	32.9	206	111	236	77%	124	20,000	123
Oct 2011	38.5	240	122	259	77%	124	20,000	123
2012	34.5	216	121	257	80%	129	20,000	128
2013	35.8	224	130	275	81%	130	20,000	128
2014	34.9	218	135	286	83%	134	22,000	136
2015	30.7	192	128	270	85%	137	22,000	136
2016	26.5	165	121	255	86%	138	22,000	138

Source: BEIS Quarterly Prices; SHCS.
Note: Fuel poverty rates shown on BREDEM-12 basis (old energy model) up to 2009 and on BREDEM 2012 basis (new energy model) from 2010.
EE ratings shown on SAP 2005 basis up to 2009 and on SAP 2009 basis from 2010.

4.3.1 Fuel Costs

155. Data published by the Department for Business, Energy and Industrial Strategy (BEIS) on the price of key fuels enables us to construct time series for the price of fuels for the average Scottish household over the longer term.

156. Using information from the SHCS about the fuels used for space and water heating we can weigh the national quarterly fuel price indices published by BEIS[41] and produce an average index value for the price of the heating fuel requirement for Scotland. The results are shown in Figure 21.

157. Since the majority of Scottish households heat their properties with gas (79%), the national average index follows the gas index closely. Between 2003 and 2014 the price of the fuel mix required by the average Scottish household almost trebled. In 2015 and 2016 the average index fell by 5.6% and 5.4%, respectively, primarily due to the falling price of oil and gas.

[41] BEIS Quarterly Energy Prices, Table 2.1.3, https://www.gov.uk/government/statistical-data-sets/monthly-domestic-energy-price-stastics

Figure 21: BEIS Fuel Price Indices and a Weighted Average for Scotland: 2003 to September 2017

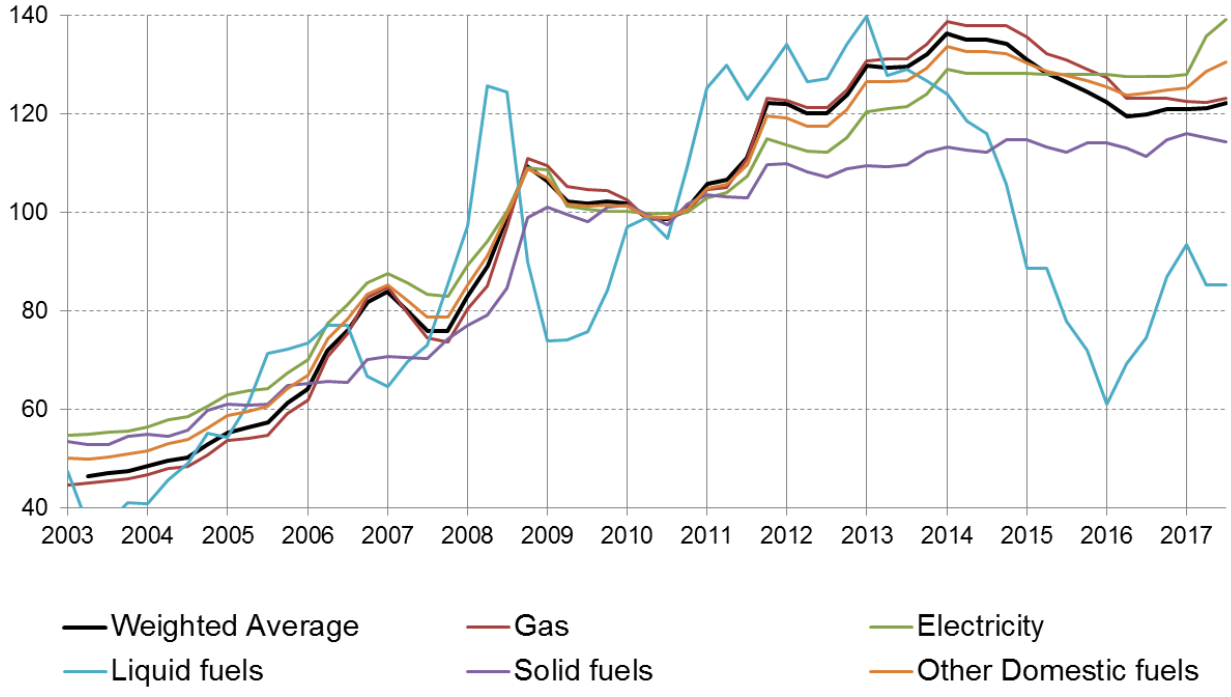


Table 31: BEIS Current Fuel Price Indices and a Weighted Average for Scotland: 2003/04 – September 2017

	Current fuel price indices					
Year	Gas	Electricity	Liquid fuels	Solid fuels	Other fuels	**Weighted Average**
2003/04	45.7	55.5	38.7	53.7	50.6	**47.3**
2004/05	50.1	60.0	51.0	57.7	55.4	**52.0**
2005/06	57.4	66.3	69.5	63.0	62.7	**59.7**
2007	78.1	84.9	73.2	71.4	81.2	**78.8**
2008	93.4	98.1	109.3	84.9	96.2	**95.1**
2009	105.9	102.6	77.0	100.0	102.9	**103.2**
2010	100.0	100.0	100.0	100.0	100.0	**100.0**
2011	110.9	107.3	126.6	104.8	110.0	**111.5**
Oct 2011	123.2	114.9	128.5	109.7	119.6	**122.3**
2012	122.5	113.4	130.5	108.6	118.7	**121.5**
2013	131.9	121.7	130.8	110.2	127.2	**130.2**
2014	138.2	128.5	116.0	113.2	132.8	**135.2**
2015	131.9	128.0	81.8	113.5	128.4	**127.6**
2016	124.1	127.7	72.9	113.3	124.6	**120.7**
to Sep 2017	122.6	134.3	88.0	115.2	128.1	**121.4**

BEIS Quarterly Energy Prices, Table 2.1.3. Indices supplied with 2010 = 100
https://www.gov.uk/government/statistical-data-sets/monthly-domestic-energy-price-stastics
Weighted average based on SHCS heating fuel use proportions, 2003/4 to 2016. 2017 proportions assumed unchanged from 2016.

158. BEIS has published fuel price data up to September 2017. As fuel use changes slowly, we assume that the fuel mix in Scotland in 2017 was the same as captured by the 2016 SHCS in order to extend the weighted average for Scotland into 2017. In the third quarter of 2017 the weighted average of heating fuels started to rise, mostly driven by increases in prices for electricity (up 5.2%) and liquid fuels (up 20.6%). This amounts to an approximately 0.6% increase in the composite price on average 2016 levels to September 2017 (Table 31).

4.3.2 Household Income

159. The SHCS is not designed to capture income comprehensively. Total household income is not recorded, only that of the highest income householder and their partner. Income is reported in nominal terms and is not equivalised to take into account that households of different size and composition need different levels of income to sustain the same living standard. Figures in this section therefore may not align with official statistics on household income and inequality.

160. In 2016, 50% of households earned £22,000 or more after tax, up from £21,600 in 2015. This median income has increased by 22% (around £3,900) in cash terms since 2010.

161. Between 2015 and 2016 there was a 1% nominal increase in mean income of the surveyed households (Table 32). This was not uniform across the distribution. There were decreases for the 2nd and 3rd bottom income deciles, and increases for most deciles in the top half of the distribution except for the highest decile where mean income remained broadly unchanged. The largest increase was observed in the lowest income decile.

Table 32: Mean Annual Income in Each Decile Group, SHCS 2015 and 2016

Income Decile	Year 2015	2016	Percentage change
1	£6,500	£6,800	5%
2	£11,200	£11,100	-1%
3	£14,000	£13,800	-2%
4	£16,800	£16,800	0%
5	£19,900	£19,900	0%
6	£23,700	£24,300	2%
7	£28,800	£29,200	1%
8	£34,900	£35,600	2%
9	£43,800	£44,700	2%
10	£68,400	£68,200	0%
All	£26,800	£27,000	1%
Median	£21,600	£22,000	2%

4.3.3 Housing Stock

162. As we have seen from the analysis in Chapter 3, on some measures the energy efficiency of the housing stock increased between 2015 and 2016. There were improvements in the energy efficiency profile of domestic gas and oil boilers, and the SAP ratings for older properties (1919-1944) and properties built between 1965 and 1982 as well as urban dwellings and those on the gas grid. As shown in Table 33, the mean modelled energy required to meet the fuel poverty heating regime for 2016 was 26,644 kWh, compared to 27,398 kWh for 2015, a reduction of 2.7%.

163. At the same time running costs have dropped more dramatically, by 7.7%, which reflects the additional contribution of the lower price of domestic fuels in 2016 compared to the previous year.

Table 33: Modelled Annual Energy Consumption and Running Costs, 2010-2016

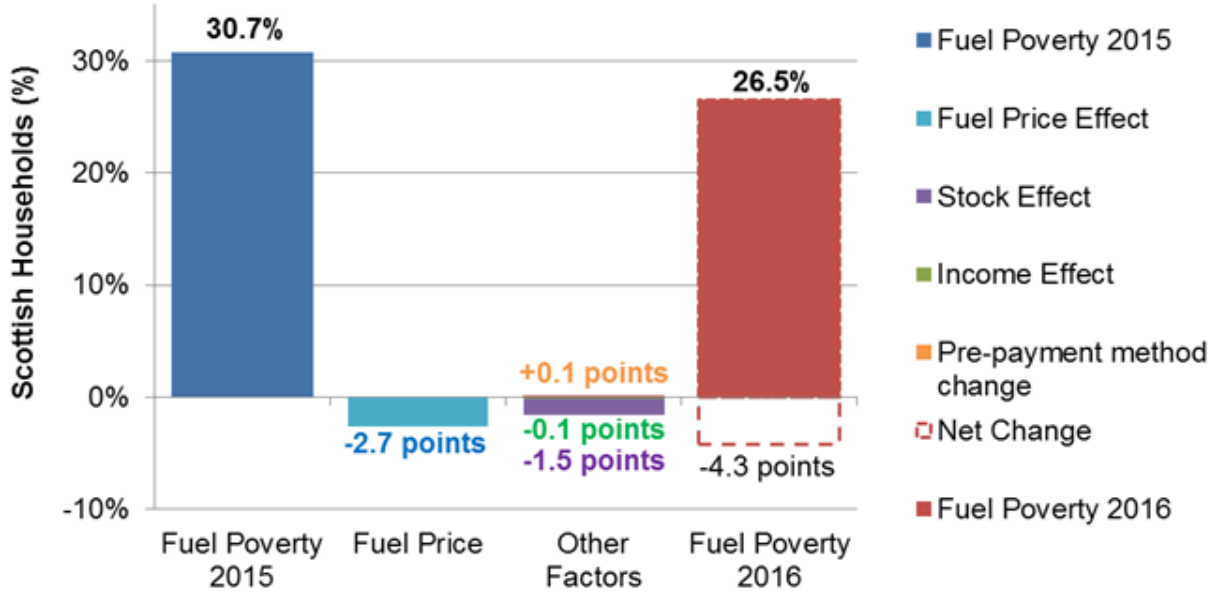
	Energy requirement		Running Costs	
Year	Mean (kWh)	Annual change	Mean (£)	Annual change
2010	29,752	-	1,531	-
2011	28,881	-2.9%	1,594	4.1%
2012	28,077	-2.8%	1,704	6.9%
2013	27,425	-2.3%	1,764	-
2014	27,609	-	1,826	-
2015	27,398	-0.8%	1,709	-6.4%
2016	26,644	-2.7%	1,577	-7.7%

Fuel poverty energy requirement modelled on the following basis: 2003/4 – 2009: BREDEM – 12; 2010 – 2013: BREDEM 2012 v.1.0; 2014 and 2015: BREDEM 2012 v.1.1. Fuel poverty costs as follows: 2011 and 2012 include WHD adjustment only; from 2013 onwards include WHD and price source adjustments; from 2016 a further improvement is included by assigning pre-payment metered fuel prices to the relevant households.

4.3.4 Impact on Fuel Poverty

164. To understand how the changes in the price of domestic fuels and the incomes of the households included in the SHCS sample interact with the performance of the housing stock, we carried out a micro-simulation which sought to isolate the impact of each set of factors on the level of fuel poverty recorded in 2016. The results are illustrated in Figure 22 and Table 34.

Figure 22. Contributions to Change in Fuel Poverty Rate Between 2015 and 2016



165. Between 2015 and 2016 fuel poverty fell by 4.3 percentage points The results from the micro-simulation analysis indicate that almost two thirds (2.7 percentage points) of this reduction could be attributed to the lower price of domestic fuels in 2016 compared to the previous year. The remainder was due to higher household incomes and improved energy efficiency performance of the housing stock, 0.1 and 1.5 percentage points respectively. Around a third of the overall reduction in fuel poverty can therefore be attributed to the energy efficiency performance of the housing stock[42].

166. The pre-payment method change has a very small effect, increasing the fuel poverty rate in 2016 by 0.1 percentage points. This is because the increase in fuel poverty for pre-payment users resulting from assigning pre-payment tariffs (which are higher than the overall weighted average of all payment methods) to these households is partly offset by the reduction in fuel poverty for non-prepayment users, for whom the weighted average of standard credit/direct debit tariffs is lower than the price averaged across the three payment methods. Whilst the effect may vary slightly for some sub-groups of households, overall it is very small.

[42] This captures also other sources of sampling variability between the 2015 and 2016 survey which may affect the energy demand in the sample of dwellings included in the SHCS.

167. The analysis which underpins these findings uses SHCS data from 2015 and 2016 to model hypothetical rates of fuel poverty under different scenarios, adding one change at a time. This included the following steps as shown in Table 34.

- First, 2016 fuel prices were applied to the 2015 survey sample to determine the effect of price change alone under 2015 levels of energy demand and household income.
- Next, the income of households in this sample was updated by the mean change observed for their decile group between 2015 and 2016. This demonstrated the additional effect of income on fuel poverty between 2015 and 2016.
- We then estimated the fuel poverty rate in 2016 before the pre-payment method change, to compare to the fuel poverty rate modelled at the previous step and therefore to estimate the effect of the improvement in the energy performance of the housing stock between 2015 and 2016.[43]
- The remaining difference from the observed rate for 2016 was attributed to the impact of the pre-payment method change.

Table 34. Steps in Attributing Change in the Fuel Poverty Rate Between 2015 and 2016

	Fuel Poverty Rate	Step Difference
Fuel Poverty 2015	**30.7%**	
- Step 1: Fuel price change	28.0%	-2.7 points
- Step 2: Income change	27.9%	-0.1 points
- Step 3: Attributed to energy efficiency change	26.4%	-1.5 points
- Step 4: Pre-payment method change		+0.1 points
Fuel Poverty 2016	**26.5%**	

[43] The sequence of steps in this method affects the size of the estimated impact. Where factors operate in the same direction any potential joined effect will be attributed to those assessed first. Because fuel price demonstrated the most dramatic change between 2015 and 2016, it is appropriate to assess its impact first.

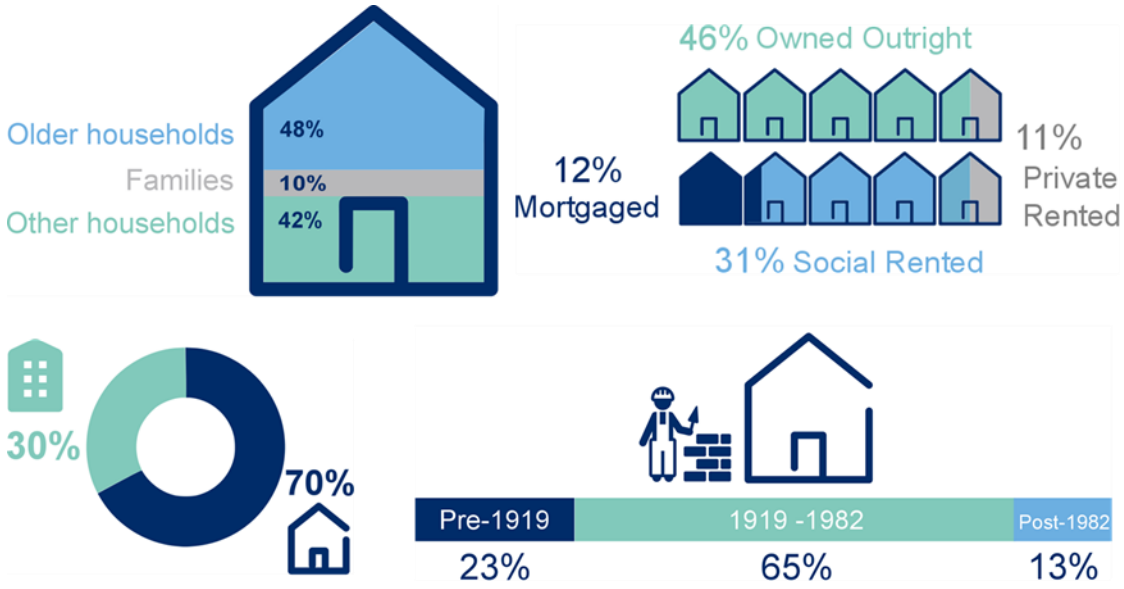
4.4 Characteristics of Fuel Poor Households

168. Figure 23 illustrates some of the key attributes of the fuel poor population in 2016. Around 10% of households living in fuel poverty are families with children. The remaining 90% are almost equally split between older one- or two-person households, on the one hand (48%), and all other types of households with adult residents (42%), on the other.

169. The large majority of fuel poor households are owner occupiers (58%), 31% are social housing residents and the remaining 11% rent in the private sector. 70% of fuel poor households live in houses – of which 24% are detached properties, 19% semi-detached, and 26% terraced – while the remaining 30% occupy flats.

170. Almost one quarter (23%) of the dwellings of fuel poor households were built before 1919, and 13% were built since 1982. The remaining 65% were constructed in the intervening years.

Figure 23: Composition of Fuel Poor Households by Selected Household and Dwelling Characteristics, 2016



4.4.1 Household Characteristics

171. Table 35 shows fuel poverty rates by a number of household characteristics for 2016 and in comparison to the previous year. Some of the highest and lowest rates of fuel poverty can be seen among **private sector** residents: 37% of outright owners but only 11% of those with a mortgage are assessed to be fuel poor. The fuel poverty rate for outright owners reduced from 45% in 2015 to 37% in 2016.

172. **Older households** make up a substantial part of those who own their property outright; they have generally lower income than working age households and their energy needs are assessed under an enhanced heating regime in accordance with the fuel poverty definition. The properties in which they live are often larger, requiring more energy to heat, and are more likely to be detached which leads to greater heat loss. Correspondingly, at 41%, older households have higher fuel poverty rates than other household types.

173. The **private housing sector** has a lower rate of fuel poverty compared to the social housing sector: 25% and 32% respectively. There was a more noticeable decline in fuel poverty in the private sector between 2015 and 2016, reversing the temporary reduction in the social-private gap we saw in the SHCS sample for 2015. In particular, the fuel poverty rate in the private rented sector has decreased from 33% in 2015 to 23% in 2016.

174. As in previous years, fuel poverty has a strong association with **income** and households in the lower income bands have the highest rates of fuel poverty: 87% for the bottom income band and 49% for the 2nd bottom band. Households with weekly income of £400-500 and £500-700, i.e. the 2nd and 3rd highest bands, saw some of the largest reductions in fuel poverty in 2016, down respectively 8 points and 5 points since 2015.

Table 35: Fuel Poverty Rates by Household Characteristics, 2016 and 2015

	2016			2015		
	000s	%	*Sample*	000s	%	*Sample*
Tenure						
Owned outright	296	37%	*963*	341	45%	*900*
Mortgaged	78	11%	*794*	97	13%	*800*
LA/ public	127	36%	*411*	129	38%	*377*
HA/co-op	73	27%	*287*	70	28%	*275*
PRS	74	23%	*330*	111	33%	*345*
Private	449	25%	*2,087*	549	30%	*2,045*
Social	200	32%	*698*	199	33%	*652*
Household type						
Older households	311	41%	*899*	321	45%	*823*
Families	66	12%	*628*	97	16%	*676*
Other households	272	24%	*1,258*	330	29%	*1,198*
Weekly Household Income						
< £200	263	87%	*349*	273	92%	*318*
£200-300	229	49%	*506*	244	56%	*475*
£300-400	94	24%	*436*	117	27%	*463*
£400-500	27	10%	*311*	50	18%	*322*
£500-700	28	6%	*516*	48	11%	*480*
£700+	7	1%	*667*	16	3%	*639*
Council Tax Band						
Band A	172	33%	*581*	169	36%	*537*
Band B	172	29%	*662*	173	31%	*633*
Band C	92	27%	*415*	136	33%	*460*
Band D	59	18%	*364*	90	27%	*361*
Band E	90	27%	*384*	107	31%	*371*
Band F	36	18%	*214*	40	23%	*195*
Band G – H	28	20%	*162*	30	23%	*133*
All Scotland	649	26.5%	*2,785*	748	30.7%	*2,697*

4.4.2 Dwelling Characteristics

175. Table 36 shows how the level of fuel poverty varies across dwelling characteristics.

176. The lowest rates of fuel poverty are associated with higher energy efficiency standards. 14% of households living in **post-1982** dwellings are fuel poor, similar to those living in properties **rated C or better**. Both of these categories have seen an improvement from 2015 in terms of fuel poverty levels. Gains in reducing fuel poverty have also taken place among those living in pre-1919 dwellings or dwellings rated band E.

177. Households using gas as **primary heating fuel** have seen the largest improvement in fuel poverty levels since 2015; 23% of these households are fuel poor, down from 27% in 2015. This is likely to be at least in part due to the fall in gas prices accelerating compared to the previous year. Consequently, the rates of fuel poverty for households within coverage of the **gas network** and for **urban** households have both decreased in 2016, to 25% and 24% respectively from 30% in 2015.

178. The fuel poverty rate for rural households remained at a similar level to the previous year (the difference between the rates of 37% in 2016 and 35% in 2015 is within the margin of error). Similarly, the rates of fuel poverty for households using oil as primary heating fuel and for those living off the gas grid are not significantly different from the levels achieved in the previous year.

179. Levels of fuel poverty among households using electricity as main heating fuel have remained among the highest, at 51%. Although the results suggest that this group may have also experienced some gains since 2015, the sample size is too small for the difference to be significant.

Table 36: Fuel Poverty by Dwelling Characteristics, 2016 and 2015

	2016			2015		
	000s	%	*Sample*	000s	%	*Sample*
Dwelling Type						
Detached	159	28%	*753*	188	35%	*678*
Semi	126	27%	*589*	155	32%	*586*
Terraced	168	31%	*614*	160	30%	*616*
Tenement	109	19%	*491*	153	27%	*490*
Other flats	87	27%	*338*	91	29%	*327*
Age of dwelling						
pre-1919	146	31%	*513*	190	39%	*476*
1919-1944	74	26%	*321*	86	32%	*314*
1945-1964	177	33%	*629*	170	32%	*595*
1965-1982	168	31%	*614*	184	33%	*632*
post-1982	84	14%	*708*	118	20%	*680*
Primary Heating Fuel						
Gas	442	23%	*2,051*	527	27%	*1,987*
Oil	41	26%	*260*	41	26%	*233*
Electric	143	51%	*389*	154	54%	*394*
Other	23	37%	*85*	21	36%	*78*
EPC Band (SAP 2012)						
B - C	137	14%	*1,006*	163	18%	*923*
D	313	29%	*1,207*	320	30%	*1,161*
E	133	42%	*417*	184	50%	*452*
F - G	66	66%	*155*	80	70%	*161*
Location						
urban	495	24%	*2,135*	603	30%	*2,098*
rural	154	37%	*650*	145	35%	*599*
SIMD: Most deprived 15%						
Yes	122	31%	*373*	115	31%	*364*
No	527	26%	*2,412*	633	31%	*2,333*
Gas Grid						
On	510	25%	*2,128*	607	30%	*2,090*
Off	139	34%	*657*	141	36%	*607*
All Scotland	649	26.5%	*2,785*	748	30.7%	*2,697*

Note: Fuel poverty rates for the 15% most deprived areas showed in this table use the most recent SIMD publication available for the time period of the SHCS sample; figures for 2016 are based on SIMD 2016 and the 2011 definition of Data Zones, whereas figures for 2015 are based on SIMD 2012 and the 2001 definition of Data Zones.

4.5 Fuel Poverty and Income Poverty

180. Although fuel poverty is correlated with low income, it is not equivalent to income poverty. This section updates previous analysis of how these two conditions relate in the household population under the current fuel poverty definition.

181. 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 15 March 2017 and relate to 2015/16.[44]

182. It is possible to use the SHCS to determine how fuel poverty and income poverty relate, although there are some caveats to this approach. One of the main caveats is that the SHCS does not collect the full range of household income data used to derive the official measure of poverty. For example, income information is only collected for the head of the household and their spouse/partner. As a result, the SHCS would underestimate the income of households with more than two earners, and therefore over-estimate levels of income poverty. To correct to some extent for this we make a corresponding adjustment to the equivalisation method used for producing official poverty statistics. It is therefore important to note that the results presented here do not reproduce exactly the official measure of fuel poverty and are only approximate.

183. A further caveat is that the latest published income poverty estimates relate to 2015/16. In order to derive a poverty threshold figure for 2016 we use the relationship between the SHCS and the FRS estimates of the median equivalised household income for the previous year, 2015. We adjust the 2016 SHCS median by the ratio between the two estimates observed in 2015 to obtain a 2016 poverty threshold. We estimate this as £291 per week before housing costs (BHC) for a couple without children.

184. As Table 37 shows around half of all fuel poor households would be considered poor in terms of their income (53% or 342,000) while the other half have incomes above the relative poverty threshold (47% or 307,000 households). This pattern is similar to 2015.

[44] Poverty and Income Inequality in Scotland: 2015/16

Table 37a: Estimated Number and Proportion of Households by Fuel Poverty and Income Poverty Status, SHCS 2015 and 2016

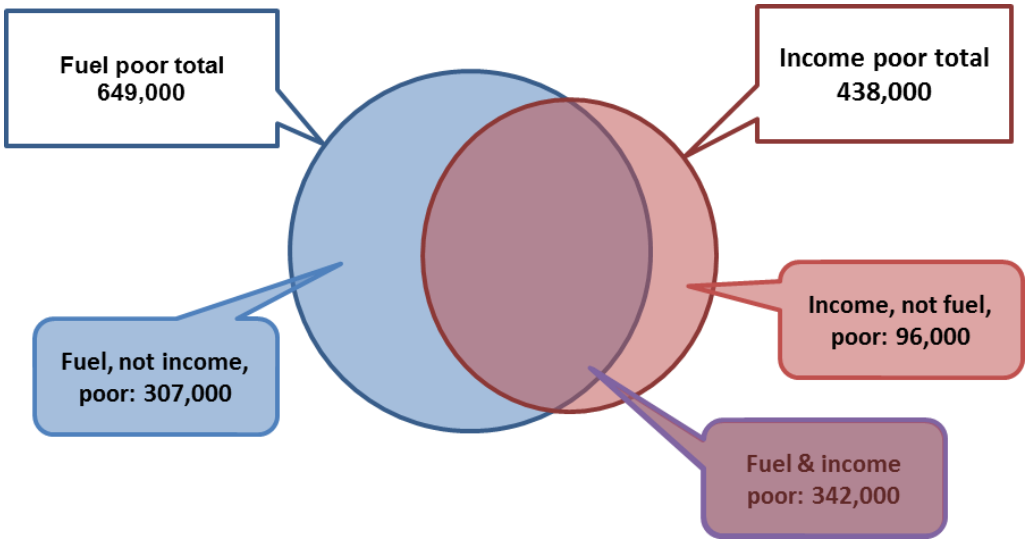
			Income Poor	Not Income Poor	All
2016	**Fuel Poor**	000s	342	307	649
		%	53%	47%	100%
	Not Fuel Poor	000s	96	1,707	1,803
		%	5%	95%	100%
	All	000s	438	2,014	2,452
2015	**Fuel Poor**	000s	359	389	748
		%	48%	52%	100%
	Not Fuel Poor	000s	87	1,599	1,686
		%	5%	95%	100%
	All	000s	446	1,988	2,434

Table 37b: Fuel Poverty Rate (%) by Income Poverty Status, SHCS 2015 and 2016

	2015	2016
Income Poor	80.4%	78.0%
Not Income Poor	19.6%	15.3%
All	30.7%	26.5%

185. Figure 24 sets out this information graphically. While those living in income poverty have a very high risk of experiencing fuel poverty (almost 8 out of 10 do, similar to 2015), the opposite is not necessarily true. Whilst there has been an overall reduction in fuel poverty between 2015 and 2016, this has mostly occurred for households which are not also income poor. Of the not income poor, 15% are fuel poor compared to 20% in 2015. The difference between the fuel poverty rate for those households that are income poor is not statistically significant.

Figure 24: Fuel Poor and Income Poor Households, SHCS 2016



186. Table 38 provides further information about the characteristics of the households who fall into the different sub-groups.

187. Households who are both income poor and fuel poor tend to live in more energy efficient dwellings. They are more likely to use gas for heating 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. These households are more likely to include families with children compared to other fuel poor households.

188. On the other hand, those who are not poor but experience fuel poverty have high likelihood of living in low energy efficiency properties, more than other fuel poor households and well in excess of the average for Scotland. Among these households the share of electricity use for heating is higher and the use of mains gas is lower. Such households are more likely to live in rural locations and include a higher share of older households compared to other fuel poor households and the rest of Scotland.

Table 38: Household and Dwelling Characteristics by Poverty and Fuel Poverty, 2016

		Fuel, not Income Poor	Fuel & Income Poor	All Fuel Poor	Income, not Fuel Poor	All Scotland
EPC Band (SAP 2012)						
B-C	000s	29	108	137	63	970
	col %	9%	32%	21%	66%	40%
D	000s	150	164	313	31	1,064
	col %	49%	48%	48%	32%	43%
E-G	000s	128	70	198	2	418
	col %	42%	20%	31%	2%	17%
Household Type						
Older	000s	158	153	311	26	765
	col %	51%	45%	48%	27%	31%
Families	000s	16	50	66	38	546
	col %	5%	15%	10%	39%	22%
Other	000s	133	138	272	33	1,141
	col %	43%	40%	42%	34%	47%
Urban-Rural						
Urban	000s	221	274	495	91	2,039
	col %	72%	80%	76%	95%	83%
Rural	000s	86	68	154	5	413
	col %	28%	20%	24%	5%	17%
Primary Heating Fuel						
Gas	000s	189	253	442	86	1,951
	col %	61%	74%	68%	90%	80%
Oil	000s	24	17	41	-	158
	col %	8%	5%	6%	0%	6%
Electric	000s	82	61	143	8	282
	col %	27%	18%	22%	8%	11%
Other fuels	000s	13	10	23	2	61
	col %	4%	3%	4%	2%	2%
Gas Grid						
On grid	000s	222	288	510	90	2,045
	col %	72%	84%	79%	93%	83%
Off grid	000s	85	54	139	6	407
	col %	28%	16%	21%	7%	17%
Sample size		*403*	*403*	*806*	*98*	*2,785*

5 Energy Perceptions

- Nearly a fifth of households find that their heating keeps them warm in winter only sometimes (14%) or never (4%). This is a reduction of 5 percentage points from 2015.
- 4% of households report that their homes were difficult to heat because they cannot afford to heat them, down from 6% in the previous year.
- Fuel poor households are more likely to have difficulties staying warm in winter and to report affordability problems; 23% of fuel poor say that their heating keeps them warm in winter “only sometimes” (16%) or “never” (6%), compared to 16% of all other households. This pattern is similar to 2015 although the overall levels are lower. 6% of fuel poor households report that they cannot afford to heat their home.
- The extent to which home energy use is monitored by householders remains unchanged since last year with 56% stating they monitor their energy use “very” or “fairly closely”.
- 10% of households report owning an energy monitoring device – a 2 percentage point increase on the previous year. Fuel poor households are no more likely to monitor their energy use than other households but they are less likely to own a monitoring device (6% compared to 11% for non-fuel poor households).

5.1 Heating Satisfaction

189. 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.

190. In 2016, 80% of householders reported that they were able to stay warm at home during the winter (Figure 23). This is an increase of 5 percentage points from 2015; 14% said that their heating keeps them warm only sometimes, a reduction from 18% in the previous year; and 4% report that their heating systems never keep them warm in winter, which is similar to 2015.

191. Of those reporting that their heating system keeps them warm in winter “only sometimes” or “never”, 25% report this to be “a serious problem”, 49% “a bit of a problem”, while 27% said it was “not very much” or “not a problem”. This distribution is similar to the results from the 2015 survey.

192. As shown in Figure 23 this means that, out of households who found their heating does not keep them warm in winter, 4% reported this to be “a serious problem” which is a similar level to 2015, and 9% said it was “a bit of a problem” which is a decrease of 3 percentage points from 11% in 2015.

Figure 25: Staying Warm in Winter, 2016

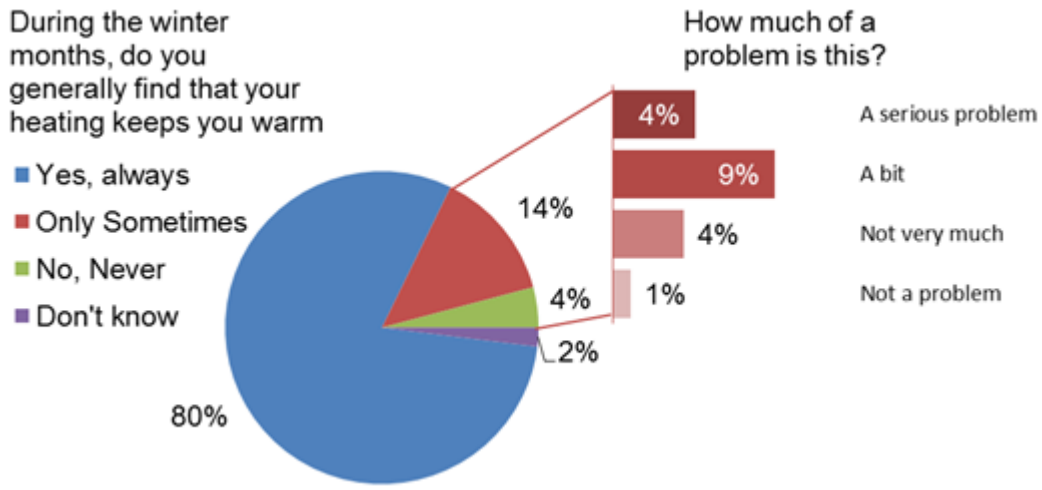
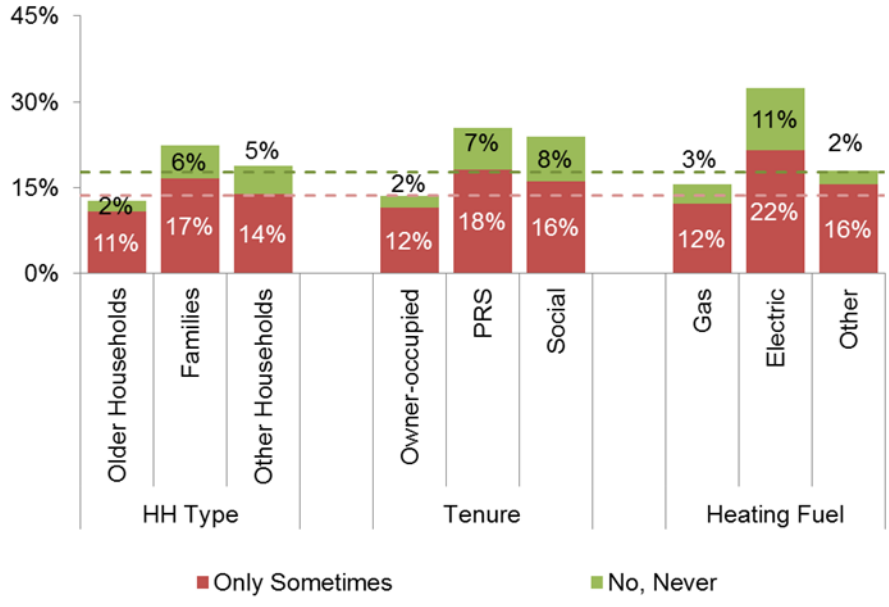


Figure 26: “Does Your Heating Keep You Warm Enough in the Winter?” by Household Type, Tenure and Primary Heating Fuel; SHCS 2016



Note: Dashed lines represent the Scotland levels shown in Figure 23.

193. Figure 24 shows respondents' views on how well their heating systems keep them warm in winter vary depending on household (HH) type, tenure and the primary heating fuel they use.

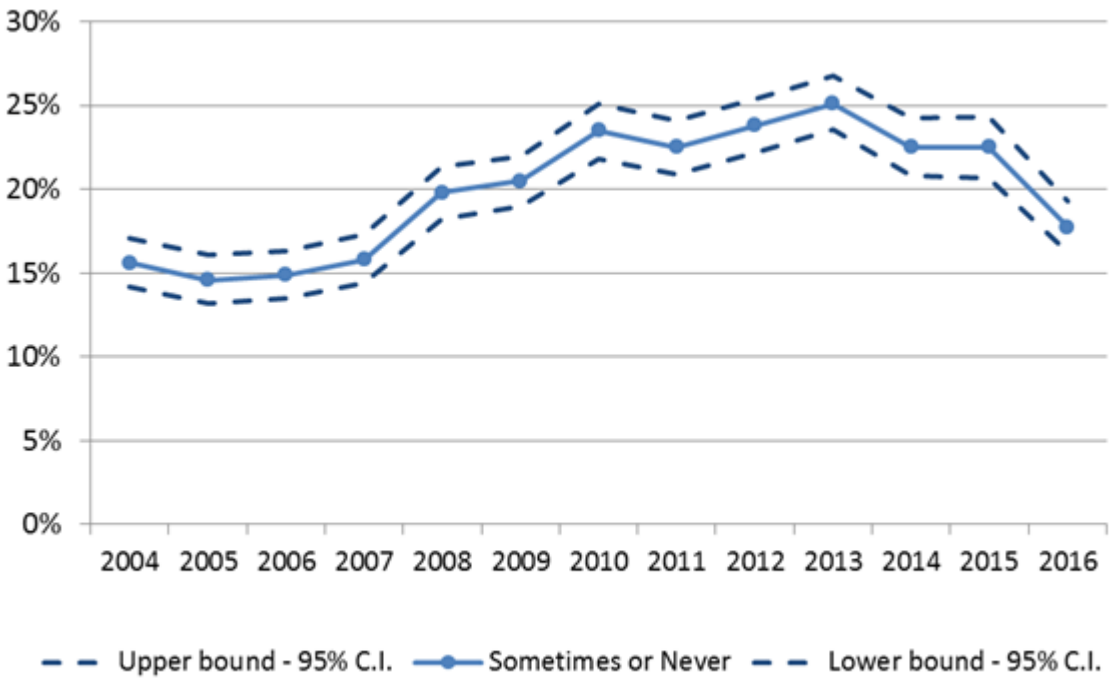
194. Pensioner households are less likely than other household types to report that their heating system doesn't always keep them warm in the winter; 13%, compared with 22% of families and 19% of other households.

195. Householders with electric heating have high propensity to report that their heating systems does not keep them warm in the winter (32%).

196. Social and private renters also have increased likelihood to report that their heating does not always keep them warm compared to owner occupiers. For social sector tenants this is in contrast to the relatively better energy efficiency of the dwellings they occupy compared to the housing stock overall (as shown in Table 19).

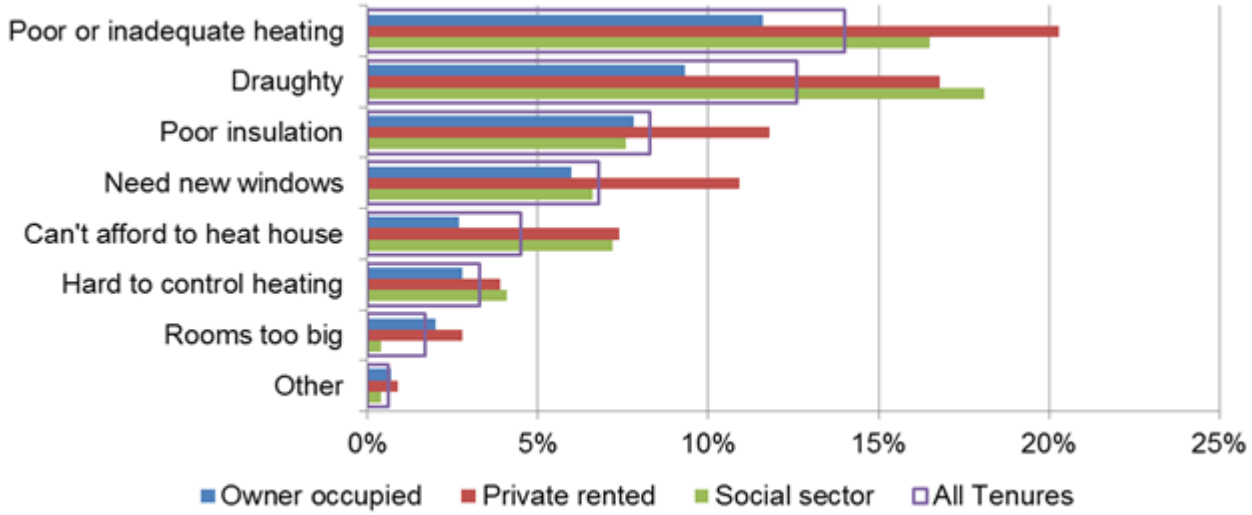
197. Figure 25 shows how the proportion of householders reporting that their heating does not always keep them warm has changed over time, allowing for the margin of error. The results indicate that in 2016 there was a significant decrease in this proportion, down to 18%, which is the lowest level since 2007.

Figure 27: "Does Your Heating Keep You Warm Enough in the Winter?", Proportion 'Sometimes' or 'Never Warm', 2004-2016



198. The reasons why people find their homes difficult to heat are shown in Figure 26 and Table 39. The most common reasons relate to poor energy performance of the dwellings: poor heating systems and draughts (14% and 13% respectively) followed by insulation and windows (8% and 7%). About 4% of all surveyed householders consider it unaffordable to achieve the indoor temperatures they want. This is higher among private and social renters (7% each) compared to owner occupiers (3%). On the whole private rented and social sector tenants are more likely than owner occupiers to report difficulties. 67% of all interviewed households did not report any problems heating their homes.

Figure 28: Reasons Heating Home is Difficult by Tenure, 2016 (% of households)



Note: responses have been grouped by theme, as described in section 7.8.5. More than one answer allowed so that the sum of responses can exceed 100%.

Table 39: Reasons Heating Home is Difficult by Tenure, 2016 (% of households)

	Owner occupied	Private rented	Social sector	All Tenures
None reported	**71%**	**57%**	**64%**	**67%**
Poor or inadequate heating	12%	20%	17%	14%
Draughty	9%	17%	18%	13%
Poor insulation	8%	12%	8%	8%
Need new windows	6%	11%	7%	7%
Can't afford to heat house	3%	7%	7%	4%
Hard to control heating	3%	4%	4%	3%
Rooms too big	2%	3%	0%	2%
Other	1%	1%	0%	1%
Sample size	*1,790*	*344*	*716*	*2,850*

Note: Respondents are permitted to select more than one response. For this reason the sum down a column can exceed 100%

199. Table 40 shows how fuel poor and non-fuel poor households compare in their views on winter heating and heating affordability. Fuel poor households are more likely to report that their heating keeps them warm in winter "only sometimes" or "never", 23% (down from 27% in 2015) compared to 16% of non-fuel poor households (down from 21% in 2015). For 16% of fuel poor households this is "a serious" or "a bit of a problem", higher than 12% for households who are not fuel poor.

Table 40: Staying Warm and Fuel Poverty, 2016 (% of households)

	Not Fuel Poor	Fuel Poor
During the winter months, do you generally find that your heating keeps you warm enough at home, or not?		
Yes, always	82%	76%
Only some of the time	13%	16%
No, never	3%	7%
Don't know	2%	2%
How much of a problem is this, if at all, to you?		
A serious problem	4%	7%
A bit of a problem	8%	10%
Affordability		
Cannot afford to heat house	4%	6%
Sample size	*1,979*	*806*

200. 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, 6% of fuel poor households say "cannot afford to heat my home" down from 9% in 2015. The proportion of non-fuel poor households who give this answer is 4%.

5.2 Monitoring Energy Use

201. Since 2008 the SHCS has asked respondents to what extent they monitor their energy use and whether or not they have energy monitoring devices.

202. The proportion of households who do not monitor their energy use has fallen from 31% in 2008 to 22% in 2012 and has remained around that level since (20-22%). In 2016 20% of respondents were not monitoring their energy use (Table 41).

203. At the same time the proportion of those who report monitoring their energy use "fairly" or "very closely" followed a similar pattern of improvement. As shown in Table 41, the proportion increased from 44% in 2008 to 54% in 2012 and has remained around that level since (54-57%), at 56% in 2016.

Table 41: Extent to which Energy Use is Monitored, 2008-2016 (% of households)

Extent Energy Use is Monitored…	Year								
	2016	2015	2014	2013	2012	2011	2010	2009	2008
Very closely	18%	16%	16%	17%	16%	14%	12%	13%	11%
Fairly closely	38%	41%	37%	38%	38%	33%	33%	34%	33%
Subtotal: Very or fairly closely	56%	57%	54%	56%	54%	47%	45%	47%	44%
Not very closely	23%	22%	24%	24%	24%	22%	23%	25%	24%
Not at all	20%	22%	22%	20%	22%	30%	32%	28%	31%
Don't know	1%	0%	1%	0%	0%	0%	0%	0%	1%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Sample size	*2,441*	*2,492*	*2,682*	*3,442*	*3,428*	*3,949*	*3,853*	*4,153*	*3,762*

204. In 2016 10% of households had energy monitoring devices, as shown in Table 42. This is the first statistically significant increase, of 2 percentage points, for the last five years.

Table 42: Households with Energy Use Monitoring Devices, 2008-2016

	% of households	*Sample Size*
2016	10%	*2,441*
2015	8%	*2,492*
2014	7%	*2,682*
2013	8%	*3,442*
2012	8%	*3,428*
2011	7%	*3,949*
2010	4%	*3,853*
2009	2%	*4,153*
2008	2%	*3,762*

205. Table 43 shows that fuel poor households are similar to others in the way they monitor their energy use: 57% report monitoring “very” or “fairly closely” compared to 56% of households who are not fuel poor. However they are less likely to have monitoring devices at home: 6% of fuel poor households compared to 11% of all other households. The rate for non-fuel poor households increased by 3 percentage points between 2015 and 2016.

Table 43: Monitoring Energy Use and Fuel Poverty, 2016 (% of households)

	Not Fuel Poor	Fuel Poor
To what extent do you monitor your use of energy in your property?		
Very closely	17%	19%
Fairly closely	39%	37%
Not very closely	24%	20%
Not at all	19%	22%
Don't know	*	*
Do you have an energy-use monitoring device in your home?		
Yes	11%	6%
Sample Size	*1,979*	*806*

6 Housing Conditions

6.1 Disrepair

- The level of disrepair declined 5 percentage points in the last year. In 2016, 68% of all dwellings had some degree of disrepair, however minor it may be, down from 73% in 2015. Disrepair to critical elements stood at 48%, 28% of dwellings had some instances of urgent disrepair, and in 6% of the housing stock some extensive disrepair was present. These also all represent improvement compared to 2015 and continue a longer-term trend of improvement.
- Levels of damp and condensation remained similar to 2015 levels. Around 9 out of 10 properties were free from any damp or condensation.

206. The SHCS measures disrepair for a wide range of building elements. This is reported in four broad categories:

    - **Any (or Basic) disrepair.** This is the minimum threshold of disrepair measured in the SHCS and relates to any damage where a building element requires some repair beyond routine maintenance. It is the most comprehensive category covering all types of disrepair, however minor, and encompasses all other types of disrepair (see Figure 29).
    - **Extensive disrepair.** To be described as extensive, the damage must cover at least a fifth (20%) or more of the building element area. This category is different from the severity of damage as described by the next two categories, urgent and critical, and can be applied to any of the other 3 categories of disrepair.
    - **Urgent disrepair.** This relates to cases requiring immediate repair to prevent further damage or health and safety risk to occupants. Urgency of disrepair is only assessed for external and common elements.
    - **Critical element disrepair.** This refers to disrepair to building elements central to weather-tightness, structural stability and preventing deterioration of the property. These elements are listed in section 7.8.7.3. There is some overlap in the building elements assessed under this category and those assessed for urgent disrepair. Not all disrepair to critical elements is necessarily considered urgent by the surveyor.

207. More detailed description of the categories of disrepair is given in section 7.8.7. Rates for each category for the period 2013-2016 are shown in Table 44.

208. The trend of improvements in levels of disrepair continued in 2016. 68% of all dwellings had some degree of disrepair, however minor it may be, down from 73% in 2015 and 81% in 2012. Disrepair to critical elements stood at 48%, 28% of dwellings had some urgent disrepair, and in 6% of the housing stock some extensive disrepair was present.

Table 44: Rates of Disrepair by Category, 2012-2016

Year	Any (Basic) Disrepair		Disrepair to Critical Elements	Urgent Disrepair	Extensive Disrepair
	No Disrepair	Some Disrepair			
2016	32%	68%	48%	28%	6%
2015	27%	73%	52%	33%	8%
2014	27%	73%	53%	32%	7%
2013	22%	78%	57%	36%	7%
2012	19%	81%	61%	39%	9%

209. It is fairly common for dwellings to display elements of disrepair in more than one category, as illustrated in Figure 27. For example, we imagine a house with several elements in disrepair of varying severity.

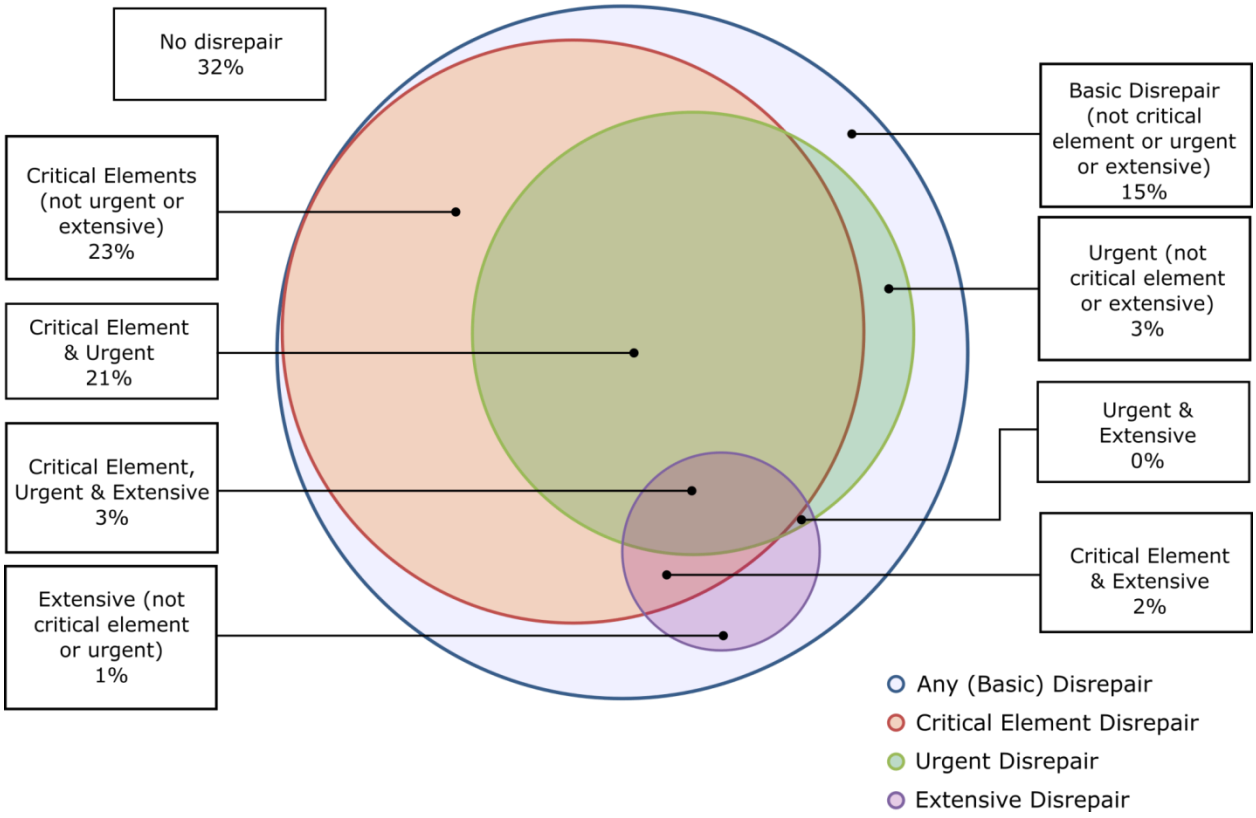
- There is a leaking tap in the bathroom.
- A large section of the render on an external wall has broken off.
- A small area of guttering is damaged, causing rain water to pour down an external wall surface.

210. Following the guidance in the SHCS surveyor handbook, the leaking tap is recorded in the survey as a minor repair. This alone is sufficient to place the house in the category **any (or basic) disrepair**.

211. The broken render on the external wall covers more than 20% of the wall area. The surveyor does not consider the repair urgent. However, the external wall finish is a critical element. This is therefore recorded as both an **extensive** disrepair and a disrepair to a **critical element**.

212. The surveyor has marked the guttering defect as requiring urgent repair, considering that the water pouring down the wall is likely to lead to further damage and compromise the weather-proofing of the building in the short term. Guttering is also one of the critical elements. As a result of this defect the dwelling has both **urgent** and **critical element** disrepair.

Figure 29: Disrepair Categories, Proportions of Scotland's Housing Stock, 2016



6.1.1 Disrepair to Critical Elements

213. This section examines in more detail disrepair to critical elements and its prevalence across tenure, dwelling age band and location.

214. As shown in Table 44, in 2016 the proportion of dwellings which had some disrepair to a critical element(s) was 48%, a three percentage point drop from 2015. In some of these dwellings, accounting for 24% of the stock overall, there was also some urgent disrepair (Table 45). This represents a four percentage point drop compared to 2015.

215. Table 45 also shows the share of dwellings where in addition to urgent disrepair, some disrepair was assessed as extensive. This accounted for 3% of the housing stock, a two percentage point drop on 2015.

6.1.1.1 Dwelling age and location

216. The prevalence of disrepair to critical elements is associated with age of construction, with dwellings built after 1964 less likely to fall within this category. This is also evident where instances of critical disrepair co-exist with urgent or urgent and extensive disrepair, a pattern which has remained unchanged in the last year.

217. Urban and rural dwellings show similar rates in all categories of disrepair shown in Table 45. Urban dwellings have statistically significant reductions in rates of all disrepair categories between 2015 and 2016.

218. The biggest improvement in 2016 has been for older dwellings built between 1919 and 1944. Levels of critical disrepair decreased by 9 percentage points to 58% for these dwellings and levels of critical and urgent disrepair decreased by 13 percentage points to 27%.

Table 45: Disrepair to Critical Elements, Urgent and Extensive Disrepair by Dwelling Age and Location, 2015 and 2016

	Age of dwelling					Location		
	pre-1919	1919-1944	1945-1964	1965-1982	post 1982	Urban	Rural	Scotland
Dwellings with any Critical Disrepair								
2016	67%	58%	60%	48%	20%	48%	49%	48%
2015	68%	67%	60%	49%	26%	52%	51%	52%
Dwellings with Critical and Urgent disrepair								
2016	37%	27%	30%	22%	9%	24%	25%	24%
2015	39%	40%	35%	25%	10%	28%	27%	28%
Dwellings with Critical, Urgent & Extensive disrepair								
2016	5%	3%	5%	2%	1%	3%	2%	3%
2015	8%	7%	6%	3%	1%	5%	4%	5%

6.1.1.2 Tenure

219. Levels of critical disrepair are similar for the private and the social housing sector considered as a whole. Just under half of all dwellings (48% in the private and 49% in the social sector) have some disrepair to critical elements. Just under a quarter of dwellings have both critical and urgent disrepair (24% for both private and social sector) and a very small proportion (3% in the private and 4% in social sector) also have instances of extensive disrepair in addition to critical and urgent.

220. However, the sectors are not homogenous. Housing associations dwellings have the lowest levels of both critical and critical and urgent disrepair. They are followed by owner occupied dwellings, while LA properties and private rented properties have the highest levels of disrepair in these categories.

221. Scotland rates across all types of disrepair categories have undergone statistically significant reductions. The biggest changes between 2015 and 2016 is the reduction in dwellings in the LA sector with critical and urgent disrepair from 37% to 30%.

Table 46: Disrepair to Critical Elements, Urgent and Extensive Disrepair by Tenure Group, 2015 and 2016

	Tenure						
	Owner occupied	LA/Other Public	HA/Co-op	Private rented	Private Sector	Social Sector	Scotland
Dwellings with any Critical Disrepair							
2016	46%	57%	37%	60%	48%	49%	48%
2015	49%	62%	40%	61%	51%	53%	52%
Dwellings with Critical and Urgent disrepair							
2016	22%	30%	16%	31%	24%	24%	24%
2015	25%	37%	20%	37%	28%	30%	28%
Dwellings with Critical, Urgent & Extensive disrepair							
2016	2%	5%	3%	3%	3%	4%	3%
2015	5%	6%	2%	4%	5%	4%	5%

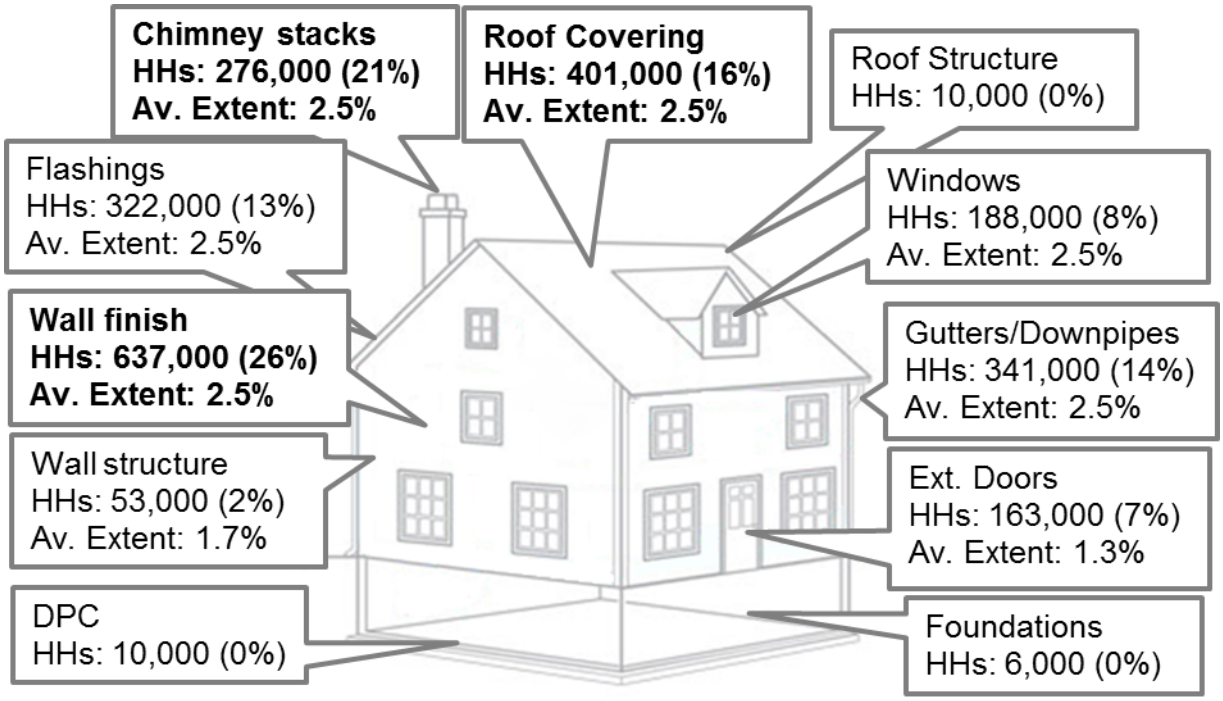
6.1.1.3 Type of Disrepair to Critical Elements

222. As shown in Figure 30, although some disrepair to critical elements is fairly common it tends to be at a relatively low level in each property, affecting on average no more than 3% of the relevant area. A full list of elements in this category is provided in section 7.8.7.3.

223. Wall finish and roof coverings are often affected. Around 26% of dwellings had some disrepair to wall finish and 16% had some disrepair to roof coverings; however, in both cases the disrepair covered no more than 2.5% of the area on average. 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.

224. Around 21% of dwellings with chimneys showed some signs of disrepair. Unchecked this can lead to water ingress and eventually falling masonry.

Figure 30: The Number of Households (HHs) Affected and Average (Median) Extent of Disrepair to External Critical Elements



** Av. Extent has been suppressed for some categories due to small sample sizes*

6.1.2 Damp and Condensation

225. The definitions of damp and condensation are provided in section 7.8.

226. Any condensation, rising or penetrating damp recorded in the SHCS can cover anything from a small damp patch or area of condensation on a single wall in one room (caused for example by ineffective ventilation whilst cooking) to prevalence throughout a dwelling, so does not indicate a serious housing quality issue in all cases.

227. The incidence of these defects in isolation and together is given in Table 47. Around 89% of all dwellings in 2016 were free from any form of condensation or damp. This is similar to both 2014 and 2015 levels.

228. In 2016 3.7% of the housing stock (around 91,000 dwellings) suffered from some degree of penetrating damp, a slight increase on 2015 (2.4%). There were a very small number of properties with rising damp in the survey sample, suggesting that their share in the housing stock is less than 1%.

229. Condensation was observed in 8.5% of the surveyed stock (equivalent to around 209,000 dwellings) which is similar to 2015 levels.

230. In 1% of dwellings (26,000) both condensation and some form of damp were recorded. This level has not changed significantly in the previous five years.

Table 47: Presence of Damp and/or Condensation in 2014-2016.

Defect	2016		2015		2014	
	000s	%	000s	%	000s	%
No Damp or Condensation	2,171	88.6%	2,179	89.5%	2,144	88.6%
Condensation	209	8.5%	214	8.8%	226	9.3%
Penetrating damp	91	3.7%	58	2.4%	67	2.8%
Rising damp	10	0.4%	3	0.1%	11	0.5%
Condensation and any damp	26	1.0%	20	0.8%	24	1.0%
Total	2,452		2,434		2,420	
Sample		*2,850*		*2,754*		*2,682*

6.2 Housing Quality Standards

- Levels of compliance with the tolerable standard in 2016 remained similar to 2015: 2% (or 39,000) of all dwellings fell below the Tolerable Standard. Longer term this represents an improvement of 2 percentage points since 2012.

- The Scottish Housing Quality Standard (SHQS) failure rate in the social sector was 38%, not allowing for abeyances and exemptions, no change from 2015. This has fallen from 60% in 2010. 26% of properties did not meet the Energy Efficient criterion.

- SHCS surveyors may not always be able to identify the presence of cavity wall insulation. The overall SHQS failure rate in the social sector would be 26% if it is assumed that all social dwellings have insulated cavity walls where this is technically feasible.

- The majority of dwellings falling below the SHQS failed on a single criterion; this accounted for more than 8 out of 10 failures in the social sector.

- For 7 out of 10 social homes failing the SHQS this was due to falling short on a single one of the 55 elements which make up the standard. Most frequently these were cavity wall insulation, pipe and tank insulation, presence of at least six electrical sockets in the kitchen, secure external doors, adequate food storage and secure front and rear access to dwellings in common block.

231. Two quality standards are set by the Scottish Government and monitored through the Scottish House Condition Survey.

232. The **Tolerable Standard** is a "condemnatory" standard. In other words, it is not reasonable to expect people to continue to live in a house that falls below it. For more information on the Tolerable Standard see section 7.8.9.

233. The **Scottish Housing Quality Standard (SHQS)** was introduced in February 2004[45]. It means social landlords must make sure their tenants' homes are in a good state of repair, energy efficient, healthy, safe and secure. A target was agreed that all social landlords must ensure that all their dwellings pass the SHQS by April 2015. Private owners and private landlords are currently under no obligation to bring their properties up to this standard. However SHCS collects the same data for all dwellings to allow comparison across the housing stock. Since 2012 this target has been incorporated in the Scottish Social Housing Charter and the performance of landlords has been monitored by the independent Scottish Housing Regulator (SHR).

234. For more information on the SHQS see section 7.8.10.

6.2.1 Tolerable Standard

235. The overall level of compliance with the tolerable standard remained similar to 2015. As shown in Table 48, 2% of all dwellings (or 39,000 dwellings) fell below the tolerable standard in 2016. However there is a longer term trend of improvement and 2016 levels represent a drop of 2 percentage points since 2012.

236. The share of dwellings below tolerable standard in the private sectors was 2%. This is similar to 2015 but around 2 points better than 2012 when 4% of all dwellings fell below tolerable standard.

237. There was no change since 2015 in the social sector where around 1% of dwellings were below tolerable standard.

238. The rate for the private rented sector in 2016 was 2% and has remained broadly at the same level for the last 6 years. However, while in 2015 we found that PRS dwellings were more likely to fall below tolerable standard than owner occupied dwellings or those in the social sector, this gap is no longer observed in the SHCS sample for 2016.

[45] For more information see letter and notes at: http://www.gov.scot/Publications/2004/02/18860/32772

239. The proportion of pre-1919 dwellings below tolerable standard has declined since 2013 by around 4 percentage points and stood at 4% in 2016. This however still exceeds the levels of BTS recorded for the most recently built dwellings (post 1965), at under 1%.

240. The tolerable standard consists of 12 criteria (listed in section 7.8.9), failure on one of which leads to a failure overall.

Table 48: Dwellings Below Tolerable Standard (BTS) by Tenure and Age Band, 2016

		Below Tolerable Standard			
		%	000s	% of BTS Stock	*Sample*
Whole Stock		2%	39	100%	*2,850*
Tenure	Owner-occupied	2%	25	63%	*1,790*
	Private-rented	2%	7	18%	*344*
	Subtotal: Private	*2%*	*31*	*81%*	*2,134*
	Social	1%	7	19%	*716*
Age of Dwelling	Pre-1919	4%	21	54%	*529*
	1919-1944	2%	7	18%	*330*
	1945-1964	1%	6	15%	*640*
	Post-1965	0%	5	13%	*1,351*

241. Dwellings most commonly fell below the tolerable standard because they:

- were not free from rising/penetrating damp (17,000 or 43% of BTS dwellings);
- were not satisfactorily insulated (9,000 or 24% of BTS dwellings);
- were not structurally stable (4,000 or 11% of BTS dwellings).
- had unsatisfactory provision for lighting, ventilation or heating (4,000 or 10% of BTS dwellings).

6.2.2 Scottish Housing Quality Standard (SHQS)

242. In this section we present the results of analysis of the SHCS with regards to compliance with the Scottish Housing Quality Standard (SHQS). The SHQS provides a common standard for assessing the condition of Scottish housing. For this reason, although the requirement to comply with SHQS applies only to social sector housing, we assess all tenures for comparison.

243. The SHQS is made up of 55 different elements grouped into 5 higher-level criteria: Tolerable Standard (A), Serious Disrepair (B), Energy Efficiency (C), Modern Facilities and Services (D) and Healthy, Safe and Secure (E)[46]. In the SHCS each of the 55 individual elements is assessed by surveyors trained to collect detailed information on housing characteristics. This information is subsequently aggregated by Scottish Government analysts into higher level measures for each of the 5 criteria and the standard overall.

244. Table 49 shows the overall results for the Scottish housing stock for 2016 and the previous 6 years. In 2016, 44.7% of all dwellings failed to meet the SHQS, no difference compared to 2015 but down from 61% in 2010. As in previous years, the highest failure rate was with respect to the Energy Efficient criterion (32.8%), followed by Healthy, Safe and Secure (12.4%) and Modern Facilities (8.6%). There were a very small number of dwellings which did not meet the BTS criterion (1.6%) or the Disrepair criterion (0.1%). Differences from 2015 on all criteria shown in Table 49 and overall are within the margin of error for this survey.

Table 49: Proportion of Dwellings Failing SHQS and Individual Criteria 2010-2016

	2016	2015[1]	2014[1]	2013	2012	2011	2010
SHQS	44.7%	45.4% (r)	47.5%	49.1%	54.0%	58.2%	61.0%
BTS	1.6%	1.7%	2.0%	3.0%	3.7%	3.0%	3.6%
Serious Disrepair	0.1%	0.1%	0.1%	0.2%	0.1%	0.5%	0.8%
Energy Efficient	32.8%	33.7% (r)	34.8%	36.3%	42.2%	46.0%	49.2%
Modern Facilities	8.6%	8.8%	11.1%	11.4%	11.9%	13.7%	15.6%
Healthy, Safe and Secure	12.4%	13.4%	13.8%	13.7%	16.1%	17.0%	16.6%

(r) These figures have been revised from the previous publication in order to correct for an error identified in compiling the failure rate for the Energy Efficient criterion relating to 2015, which also affect the overall SHQS failure rate for 2015.

Notes: 1. Figures for 2014-2016 are not fully comparable to previous years. For details see Technical Notes and Definitions

[46] Full guidance available at http://www.gov.scot/Topics/Built-Environment/Housing/16342/shqs

6.2.2.1 Compliance by Tenure, Dwelling Age and Location

245. Table 50 shows the number and proportion of properties failing the SHQS by selected characteristics.

246. The lowest failure rates are in the newest dwellings (post-1982, 20% fail) and in Housing Associations stock (29% fail). As previously shown (section 2.5.2), Housing Association dwellings are often newer than Local Authority stock and are built to a higher energy efficiency standard. The newest purpose-build social housing in Scotland is also likely to be designed to comply with SHQS.

247. The overall SHQS failure rate for social sector housing in 2016 stood at 38%. If it is assumed that all social dwellings have insulated cavity walls where this is technically feasible, the overall SHQS failure rate in the social sector would be 26% (see section 6.2.2.4). SHCS based measures do not make an allowance for abeyances and exemptions.

248. The 5 point reduction in the SHQS failure rate for older, pre-1919 properties is within the margin of error for this survey. The differences between 2015 and 2016 for urban areas and for rural areas are also within the margin of error.

Table 50: Number and Proportion of Dwellings Failing SHQS, 2015 and 2016

	2016			2015 (r)		
	000s	% fail	*Sample*	000s	% fail	*Sample*
All Scotland	1,097	45%	*2,850*	1,106	45%	*2,754*
Tenure						
Owned outright	406	51%	*988*	368	48%	*929*
Mortgaged	277	40%	*802*	323	44%	*811*
LA	159	45%	*419*	154	46%	*380*
HA/co-op	78	29%	*297*	76	30%	*279*
PRS	176	53%	*344*	184	54%	*355*
Private	859	47%	*2,134*	875	47%	*2,095*
Social	237	38%	*716*	230	39%	*659*
Dwelling Age						
pre-1919	238	49%	*529*	265	54%	*489*
1919-1944	165	57%	*330*	169	62%	*321*
1945-1964	279	53%	*640*	271	52%	*608*
1965-1982	293	55%	*627*	296	54%	*644*
post-1982	122	20%	*724*	104	18%	*692*
Location						
Urban	888	43%	*2,189*	906	45%	*2,147*
Rural	209	51%	*661*	200	48%	*607*

(r) Figures relating to 2015 have been revised from the previous publication in order to correct for an error identified in compiling the failure rate for the Energy Efficient criterion, also affecting the overall SHQS failure rate.

6.2.2.2 Individual SHQS Criteria

249. Table 51 shows the failure rates for each criterion of the SHQS for private and social sector housing since 2010. It demonstrates that there has been a consistent trend of improvement in both the private and the social sector. However the survey sample is not large enough to measure accurately year-on-year change in each instance. All differences between 2015 and 2016 shown in Table 51 are within the survey margin of error.

250. The SHCS estimates that 38% of social sector housing failed to meet the SHQS in 2016. This was predominantly due to the Energy Efficient criterion, 26% of properties failed on this measure. Nine per cent failed the Healthy, Safe and Secure criterion and 8% failed the Modern Facilities criterion. The share of those not meeting the BTS or the Disrepair criterion was negligible.

Table 51: SHQS Criteria Failure Rates by Tenure, 2010-2016

		2016[1]	2015[1]	2014[1]	2013	2012	2011	2010
All tenures	**SHQS Overall**	45%	45% (r)	47%	49%	54%	58%	61%
	Below Tolerable Standard	2%	2%	2%	3%	4%	3%	4%
	Serious Disrepair	0%	0%	0%	0%	0%	1%	1%
	Not Energy Efficient	33%	34% (r)	35%	36%	42%	46%	49%
	Lacking Modern Facilities/Services	9%	9%	11%	11%	12%	14%	16%
	Not Healthy, Safe or Secure	12%	13%	14%	14%	16%	17%	17%
Private	**SHQS Overall**	47%	47% (r)	48%	51%	55%	60%	61%
	Below Tolerable Standard	2%	2%	2%	3%	4%	4%	4%
	Serious Disrepair	0%	0%	0%	0%	0%	1%	1%
	Not Energy Efficient	35%	36% (r)	37%	39%	43%	49%	51%
	Lacking Modern Facilities/Services	9%	9%	11%	11%	11%	13%	13%
	Not Healthy, Safe or Secure	14%	14%	14%	14%	17%	17%	17%
Social	**SHQS Overall**	38%	39% (r)	45%	43%	52%	52%	60%
	Below Tolerable Standard	1%	1%	1%	3%	3%	1%	2%
	Serious Disrepair	-	-	0%	0%	0%	0%	0%
	Not Energy Efficient	26%	27% (r)	30%	28%	39%	37%	44%
	Lacking Modern Facilities/Services	8%	8%	12%	12%	15%	15%	22%
	Not Healthy, Safe or Secure	9%	10%	14%	13%	13%	15%	16%

(r) These figures have been revised from the previous publication in order to correct for an error identified in compiling the failure rate for the Energy Efficient criterion relating to 2015, which also affect the overall SHQS failure rate for 2015.

Notes: 1. Figures for 2014-2016 are not fully comparable to previous years.

6.2.2.3 Number of Criteria and Elements Failing

251. In the large majority of cases failure to meet the SHQS is due to a dwelling not passing one criterion or even a single element. As the standard incorporates 55 different elements, it is generally sufficient for a dwelling to fail on a single one of these in order to be considered not satisfying the higher level criterion requirement and the SHQS overall[47].

252. Table 52 and Table 53 present the distribution of dwellings for Scotland as a whole and social housing separately by number of criteria failed. The majority of failures in 2016 were due to a single criterion: 35% of dwellings in the whole stock and 33% of social sector dwellings failed the SHQS because of a single criterion. This constitutes respectively 79% (for all housing) and 85% (for social sector) of all dwellings falling below the SHQS. In 2010 the corresponding figure was 68% for both the social sector and the whole housing stock. Therefore over time, alongside the reduction in the overall failure rate, there has also been a reduction in the reasons why a dwelling does not meet the standard.

Table 52: Number and Proportion of Dwellings by Numbers of SHQS Criteria Failures, All Housing, 2010, 2013-2016

Number of Criteria Fail	2016		2015 (r)		2014		2013		2010	
	000s	Col %	000s	Col %	000s	Col %	000s	Col %	000s	Col %
None	1,355	55%	1,328	55%	1,271	53%	1,222	51%	920	39%
1	867	35%	843	35%	865	36%	880	37%	980	42%
2	202	8%	226	9%	227	9%	236	10%	352	15%
3+	28	1%	37	2%	58	2%	64	3%	106	4%
Total Dwellings	2,452	100%	2,434	100%	2,420	100%	2,402	100%	2,357	100%
Criteria Fails as % of All assessed	11%		12%		12%		13%		17%	
Sample size		*2,850*		*2,754*		*2,682*		*2,725*		*3,115*

(r) Figures relating to 2015 have been revised from the previous publication in order to correct for an error identified in compiling the failure rate for the Energy Efficient criterion, also affecting the overall SHQS failure rate.

[47] There is an exception to this principle with respect to 14 secondary building elements where failure on at least two is required for a building to be considered not meeting the standard overall. The full guidance is available at http://www.gov.scot/Topics/Built-Environment/Housing/16342/shqs

Table 53: Number and Proportion of Dwellings by Numbers of SHQS Criteria Failures, Social Dwellings, 2010-2016

Number of Criteria Failing	2016		2015 (r)		2014		2013		2010	
	000s	Col %	000s	Col %	000s	Col %	000s	Col %	000s	Col %
None	385	62%	359	61%	347	55%	344	57%	252	40%
1	202	33%	191	32%	216	34%	201	33%	257	41%
2	35	6%	35	6%	54	9%	51	8%	95	15%
3+	-	-	4	1%	10	2%	13	2%	29	5%
Total Dwellings	622	100%	589	100%	627	100%	608	100%	633	100%
Criteria Fails as % of All Assessed	9%		9%		11%		11%		17%	
Sample size		*716*		*659*		*673*		*662*		*798*

(r) Figures relating to 2015 have been revised from the previous publication in order to correct for an error identified in compiling the failure rate for the Energy Efficient criterion, also affecting the overall SHQS failure rate.

Table 54. Number and Proportion of Social Sector Dwellings by Number of SHQS Element Failures, and Most Common Single-Element Failures, 2016

Number of Element Failures	000s	% of All Dwellings	% of Failing Dwellings
None	385	62%	
1 element	170	27%	72%
… *of which*			
Cavity wall insulation (C31)	*77*		
Pipe and tank insulation (C33)	*19*		
At least six kitchen sockets (D39)	*12*		
Secure external doors (E53)	*10*		
Adequate food storage space (D40)	*10*		
Safe common front and rear doors (E55)	*7*		
2 elements	47	8%	20%
3 or more elements	20	3%	8%
Subtotal: dwellings failing the SHQS	237		100%
All social sector dwellings	622	100%	
Sample size		*716*	

253. Table 54 shows the distribution of social sector dwellings by the number of elements failed. Nearly three quarters (72%) of dwellings failing the SHQS did so because of a single element, and another fifth (20%) failed because of 2 elements. The elements most likely to cause failure (as there are no other reasons to fail the SHQS in these dwellings) are cavity wall insulation, pipe and tank insulation, presence of at least six electrical sockets in the kitchen, external doors to dwellings with adequate locks, presence of a minimum of $1m^3$ food storage in the kitchen, and secure front and rear access to dwellings in common block (Table 54).

6.2.2.4 SHQS Compliance and Cavity Wall Insulation

254. The SHQS target is incorporated into the Scottish Social Housing Charter and the independent Scottish Housing Regulator (SHR) is responsible for monitoring social landlords' progress towards the target. The latest SHQS progress update was published by the SHR in August 2017[48]. It reported that 94% of social homes met the SHQS in 2016/17.

255. There are some differences between the SHR and the SHCS survey in the way data for assessing the SHQS is collected and reported which make the headline compliance rates not immediately comparable. Abeyances and exemptions are not taken into account by the SHCS as it is not feasible to collect this kind of information in the survey.

256. One potential source of difference relates to the ability of the survey to detect the presence of cavity wall insulation (CWI) in all cases. According to feedback from social landlords, cavity wall insulation is installed as standard where there is a suitable cavity, and in most other cases external or internal insulation is considered (although this is not required for SHQS). This is because CWI is recognised throughout the sector as a relatively low cost measure with a high impact on energy efficiency.

[48] https://www.scottishhousingregulator.gov.uk/publications/national-report-scottish-social-housing-charter-headline-findings-201617

257. However, the survey still records uninsulated cavity wall properties, and to allow for the possibility that SHCS surveyors may not always be able to identify the presence of CWI we provide an alternative estimate of SHQS compliance (Table 55). This estimate assumes that all social dwellings have insulated cavity walls where this is technically appropriate. Where it is not appropriate we assume an exemption. Therefore this alternative measure of compliance assumes that no dwelling fails the SHQS for lack of CWI. Although this is an unlikely scenario, it illustrates the maximum impact that undercounting CWI in the survey could potentially be making on the measurement of SHQS compliance in the social sector.

Table 55 Number and Proportion of Dwellings in the Social Sector Failing the Energy Efficient Criterion and SHQS Overall, With and Without the Cavity Wall Insulation (CWI) Element, 2015 (revised) and 2016

		Dwellings Failing the Energy Efficient Criterion		Dwellings Failing the SHQS Overall	
		000s	**%**	**000s**	**%**
2016	inc. CWI element	159	26%	237	38%
	exc. CWI element	68	11%	160	26%
	Difference	-91	-15 pts	-77	-12 pts
2015(r)	inc. CWI element	159	27%	237	39%
	exc. CWI element	68	12%	160	26%
	Difference	-91	-15 pts	-77	-13 pts

258. In 2016, almost one fifth of social dwellings (17% or 107,000 dwellings) are recorded as failing the CWI element of the SHQS. Excluding this element from the compliance requirement leads to a 15 percentage point reduction in the energy efficiency element failure rate and a 12 percentage point reduction in SHQS failure. This amounts to around 77,000 fewer social sector dwellings failing the SHQS and an overall SHQS failure rate of 26%.

6.3 Overcrowding and Under-Occupancy

- In 2016 around 67,000 households lived in overcrowded accommodation (3%) under the bedroom standard.
- Around 912,000 (37%) households had one bedroom in excess of the minimum requirement under the bedroom standard. A further 777,000 (32%) households had two or more bedrooms in excess.
- Social sector tenants are more likely to live in accommodation which is at the level meeting the minimum requirements of the bedroom standard (52% compared to 20% in the private sector) but social and private tenants are as likely to live in overcrowded accommodation (3% respectively).

259. This section examines some key measures of whether households are living in overcrowded conditions or under-occupancy. This is determined on the basis of the bedroom standard as defined in the Housing (Overcrowding) Bill 2003[49] taking into account the number of bedrooms available in the dwelling and the type of the household that occupies it.

260. 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 7.8.8.

261. Figure 31 and Table 56 show how headline occupancy measures have changed over time. There was no significant change in these headline measures between 2015 and 2016. In 2016, the national rate of households with at least one bedroom above the minimum standard was 69%. The rate of overcrowding has stayed stable since 2009 (3%), and is lower than the peak observed in 2004/5 (4%).

262. Subsequent sections examine in more detail differences across household and dwelling characteristics for 2015 and the preceding year.

[49] Housing (Overcrowding) Bill 2003, section 2: http://www.publications.parliament.uk/pa/cm200203/cmbills/046/2003046.pdf

Figure 31: Proportion of Dwellings Which are Overcrowded, Meet the Minimum Standard, Exceed it by 1 Bedroom or Exceed by 2 or More Bedrooms, 2003/4-2016

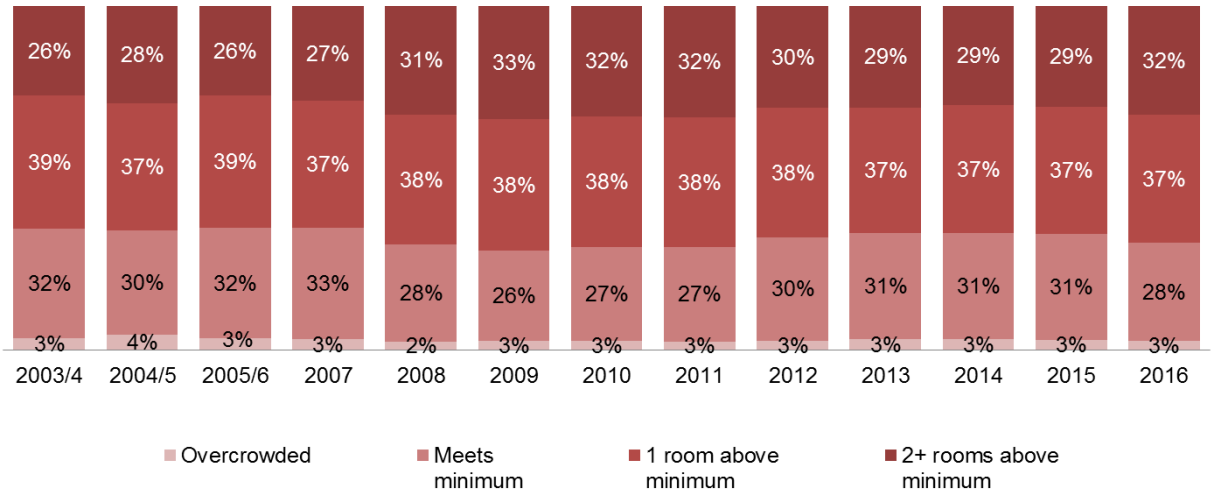


Table 56: Dwellings Which Are Below The Standard, Meet The Minimum Requirement, Or Exceed It By 1, 2 Or + bedrooms, 2010, 2015, 2016

	2016		2015		2010	
Bedroom Standard	000s	%	000s	%	000s	%
Below Standard	67	3%	70	3%	61	3%
Compliance: minimum requirements	695	28%	749	31%	644	27%
Above Standard	1,690	69%	1,615	66%	1,652	70%
1 bedroom above minimum	912	37%	900	37%	898	38%
2+ bedrooms above minimum	777	32%	715	29%	754	32%
2 bedrooms above minimum	560	23%	503	21%	543	23%
3 or more bedrooms above minimum	217	9%	211	9%	211	9%
Total	2,452	100%	2,434	100%	2,402	100%
Sample Size		*2,850*		*2,754*		*3,115*

6.3.1 Overcrowding

263. A dwelling is considered overcrowded if there are insufficient bedrooms to meet the occupants' requirements under the bedroom standard definition (see section 7.8.8).

264. Around 3%, or 67,000 households, lived in overcrowded accommodation in 2016. There was no difference overall between social and private sector dwellings in overcrowding, both also having a rate of 3%. However, there was a 4 percentage point drop in overcrowded households who rent from their local authority, compared to 2015 (from 6% to 1%).

Table 57: Overcrowding by Tenure and Housing Type, Dwelling Age Band, Income Band and Location, 2015 and 2016

	Overcrowded under Bedroom Standard					
	2016			2015		
	000s	%	*Sample*	000s	%	*Sample*
Tenure						
Owned	9	1%	*988*	7	1%	*929*
Mortgaged	15	2%	*802*	18	2%	*811*
LA	5	1%	*419*	19	6%	*380*
HA	15	6%	*297*	10	4%	*279*
PRS	23	7%	*344*	16	5%	*355*
Private	48	3%	*2,134*	41	2%	*2,095*
Social	20	3%	*716*	29	5%	*659*
Age of dwelling						
pre-1919	9	2%	*529*	18	4%	*489*
1919-1944	8	3%	*330*	*	*	*321*
1945-1964	14	3%	*640*	24	5%	*608*
1965-1982	14	3%	*627*	12	2%	*644*
post-1982	22	4%	*724*	12	2%	*692*
Dwelling Type						
Detached	*	*	*767*	*	*	*692*
Semi-detached	9	2%	*606*	12	3%	*594*
Terraced	18	3%	*620*	13	3%	*626*
Tenement	24	4%	*506*	30	5%	*506*
Other flats	14	4%	*351*	11	3%	*336*
Weekly Household Income						
< £200	5	2%	*355*	11	4%	*328*
£200-300	10	2%	*506*	9	2%	*475*
£300-400	16	4%	*436*	20	5%	*463*
£400-500	4	2%	*312*	4	2%	*322*
£500-700	11	3%	*516*	13	3%	*480*
£700+	14	2%	*669*	10	2%	*640*
Location						
urban	58	3%	*2,189*	63	3%	*2,147*
rural	9	2%	*661*	7	2%	*607*
Scotland	67	3%	2,850	70	3%	*2,754*

265. Households who own their properties outright and those in the local authority sector had below the average national overcrowding rate.

6.3.2 Under-Occupancy

266. In 2016 around 912,000 (37%) had one additional bedroom above the minimum under the bedroom standard. 777,000 (32%) households had two or more bedrooms in excess of the minimum standard.

267. In 2016, there were both differences and similarities between residents in private housing and the social housing sector for different measures of under-occupancy. Social sector tenants are more likely to live in accommodation which is at the level meeting the minimum requirements of the bedroom standard (52% compared to 20% in the private sector). In contrast, households in the social housing sector are less likely to have two or more bedrooms in excess of the minimum requirements: 9% have two or more additional rooms, compared to 40% of private sector households. However, rates of social and private sector households with just one bedroom in excess of minimum requirements (36% and 38% respectively) are similar.

268. There are also differences within the private sector. Those households which own outright (52%) or are mortgaged (36%) are more likely to have at least 2 additional rooms than those renting in the private sector (16%).

269. Higher income households (£700+ per week) are more likely to live in dwellings with additional bedrooms. Of them, 46% have two or more additional bedrooms.

270. Under-occupied dwellings are more common among the oldest (pre-1919) and the newest properties (post-82), where 37% of both groups had two or more bedrooms in excess of the bedroom standard. Similarly, detached houses have the highest rates of under-occupancy compared to other building types: 65% with two or more additional bedrooms.

271. Under-occupation is more common in rural areas. 47% of rural dwellings have two or more bedrooms in excess of the minimum requirements under the bedroom standard, compared to 29% for urban properties; however rates for only one bedroom above the minimum standard are similar between rural and urban properties.

272. Changes from 2015 on the measures shown in Table 58 and Table 59 are mostly within the margin of error for this survey. An increase of eight percentage points in the proportion of housing association households with one bedroom above the minimum was recorded in 2016; this coincided with a 7 percentage point increase overall for households in the social sector with one bedroom above the minimum standard and an equivalent reduction in households in the social sector meeting the standard. These particular under-occupancy rates are similar to pre-2015 rates.

273. Longer term, the proportion of social dwellings with two or more additional bedrooms has dropped 4 percentage points, from 13% in 2011 to 9% in 2016. In the same period the proportion of social sector households at the minimum bedroom standard has increased from 46% to 59% in 2015 and then decreased to 52% in 2016.

Table 58: Above Minimum Standard, by Tenure, Dwelling Age, Type and Location, 2015 and 2016

	2016					2015				
	2+ additional		1 additional		*Sample*	2+ additional		1 additional		*Sample*
	000s	%	000s	%		000s	%	000s	%	
Tenure										
Owned	416	52%	299	37%	*988*	387	51%	294	39%	*929*
Mortgaged	253	36%	275	39%	*802*	242	33%	297	40%	*811*
LA	37	11%	131	37%	*419*	22	6%	107	32%	*380*
HA/co-op	17	6%	93	34%	*297*	17	7%	66	26%	*279*
PRS	54	16%	115	35%	*344*	47	14%	136	40%	*355*
Private	723	40%	689	38%	*2,134*	676	37%	727	39%	*2,095*
Social	54	9%	224	36%	*716*	39	7%	173	29%	*659*
Age of dwelling										
pre-1919	179	37%	129	27%	*529*	150	31%	149	31%	*489*
1919-1944	84	29%	124	43%	*330*	65	24%	129	47%	*321*
1945-1964	136	26%	230	44%	*640*	129	25%	202	39%	*608*
1965-1982	150	28%	208	39%	*627*	163	29%	199	36%	*644*
post-1982	229	37%	222	36%	*724*	208	35%	221	37%	*692*
Dwelling Type										
Detached	365	65%	161	29%	*767*	345	65%	146	27%	*692*
Semi	183	39%	182	38%	*606*	160	33%	196	41%	*594*
Terraced	147	28%	213	40%	*620*	140	27%	207	40%	*626*
Tenement	46	8%	210	37%	*506*	38	7%	203	35%	*506*
Other flats	36	11%	146	46%	*351*	32	10%	149	46%	*336*
Weekly Household Income										
< £200	74	24%	113	37%	*355*	70	24%	102	34%	*328*
£200-300	87	19%	183	40%	*506*	90	21%	159	38%	*475*
£300-400	107	28%	149	39%	*436*	98	23%	169	40%	*463*
£400-500	85	32%	89	34%	*312*	73	26%	98	36%	*322*
£500-700	149	35%	164	38%	*516*	123	29%	169	39%	*480*
£700+	261	46%	201	35%	*669*	250	46%	183	34%	*640*
Urban-rural indicator										
urban	585	29%	773	38%	*2,189*	526	26%	771	38%	*2,147*
rural	192	47%	140	34%	*661*	189	46%	129	31%	*607*
Scotland	777	32%	912	37%	*2,850*	715	29%	900	37%	*2,754*

Table 59: Households Meeting the Minimum Bedroom Standard, by Tenure, Dwelling Age, Type and Location, 2015 and 2016

	2016			2015		
	000s	%	*Sample*	000s	%	*Sample*
Tenure						
Owned	79	10%	*988*	387	10%	*929*
Mortgaged	154	22%	*802*	242	25%	*811*
LA	180	51%	*419*	22	56%	*380*
HA	145	54%	*297*	17	63%	*279*
PRS	137	42%	*344*	47	42%	*355*
Private	370	20%	*2,134*	676	22%	*2,095*
Social	325	52%	*716*	39	59%	*659*
Age of dwelling						
pre-1919	166	34%	*529*	150	35%	*489*
1919-1944	71	25%	*330*	65	28%	*321*
1945-1964	146	28%	*640*	129	32%	*608*
1965-1982	163	30%	*627*	163	33%	*644*
post-1982	149	24%	*724*	208	26%	*692*
Dwelling Type						
Detached	32	6%	*767*	345	7%	*692*
Semi-detached	99	21%	*606*	160	23%	*594*
Terraced	154	29%	*620*	140	31%	*626*
Tenement	286	51%	*506*	38	53%	*506*
Other flats	124	39%	*351*	32	41%	*336*
Weekly Household Income						
< £200	111	37%	*355*	70	38%	*328*
£200-300	172	38%	*506*	90	39%	*475*
£300-400	112	29%	*436*	98	32%	*463*
£400-500	86	33%	*312*	73	36%	*322*
£500-700	107	25%	*516*	123	29%	*480*
£700+	94	16%	*669*	250	18%	*640*
Location						
urban	625	31%	*2,189*	526	33%	*2,147*
rural	69	17%	*661*	189	21%	*607*
Scotland	695	28%	*2,850*	715	31%	*2,754*

7 Technical Notes and Definitions

7.1 Survey Estimation

274. From 2012 onwards the SHCS is a module of the Scottish Household Survey (SHS)[50]. In general, around one third of respondents to the SHS are invited to participate in a follow-up inspection by SHCS building surveyors. For 2016, this was increased to two-fifths of respondents to ensure that the required number of households for the physical survey sample was achieved.

7.1.1 Sample Sizes and Gross Dwelling Numbers

275. In Table 60 we provide the sample sizes in the social interview and physical dwelling inspection follow-up for all years of the annual SHCS to 2016.

Table 60: Achieved Samples for SHCS Streams of the Scottish Household Survey and Base Number of Occupied Dwellings by Survey Year, 2003/4-2016

Survey Year	Social Interview	Physical Survey	Households (000s)
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

[50] Scottish Household Survey Website: http://www.gov.scot/Topics/Statistics/16002

276. Table 60 also shows the total number of households 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[51] as part of their inter-censal household estimates publication.

277. The SHCS is a sample survey. All survey figures 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 sections 7.1.2 to 7.1.5.

278. 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 household are less likely to participate than others, bias is introduced into the survey data. Such errors have not been quantified in this report.

279. 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 5 or fewer cases, or where the base sample is below 30 have been suppressed.

280. 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 figures in Table 61. 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 stated confidence intervals in Table 61.

7.1.2 Confidence Intervals

281. 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.

282. Table 61 shows the 95% confidence limits for estimates of proportions based on sub-samples of various sizes before design effects are taken into account.

[51] NRS: Estimates of Households and Dwellings in Scotland, 2016, https://www.nrscotland.gov.uk/files//statistics/household-estimates/2016/house-est-16.pdf

Table 61: Approximate 95% Confidence Limits for Estimates Based on SHCS Sub-Samples of Various Sizes (Excluding Design Effects)

Sub-sample size (corresponding to 100%)	Estimate (lookup to nearest multiple of 5%)											
	1% or 99%	2% or 98%	5% or 95%	10% or 90%	15% or 85%	20% or 80%	25% or 75%	30% or 70%	35% or 65%	40% or 60%	45% or 55%	50%
	percentage points (+ / -)											
100	2.0	2.7	4.3	5.9	7.0	7.8	8.5	9.0	9.3	9.6	9.8	9.8
150	1.6	2.2	3.5	4.8	5.7	6.4	6.9	7.3	7.6	7.8	8.0	8.0
200	1.4	1.9	3.0	4.2	4.9	5.5	6.0	6.4	6.6	6.8	6.9	6.9
250	1.2	1.7	2.7	3.7	4.4	5.0	5.4	5.7	5.9	6.1	6.2	6.2
300	1.1	1.6	2.5	3.4	4.0	4.5	4.9	5.2	5.4	5.5	5.6	5.7
350	1.0	1.5	2.3	3.1	3.7	4.2	4.5	4.8	5.0	5.1	5.2	5.2
400	1.0	1.4	2.1	2.9	3.5	3.9	4.2	4.5	4.7	4.8	4.9	4.9
450	0.9	1.3	2.0	2.8	3.3	3.7	4.0	4.2	4.4	4.5	4.6	4.6
500	0.9	1.2	1.9	2.6	3.1	3.5	3.8	4.0	4.2	4.3	4.4	4.4
600	0.8	1.1	1.7	2.4	2.9	3.2	3.5	3.7	3.8	3.9	4.0	4.0
700	0.7	1.0	1.6	2.2	2.6	3.0	3.2	3.4	3.5	3.6	3.7	3.7
800	0.7	1.0	1.5	2.1	2.5	2.8	3.0	3.2	3.3	3.4	3.4	3.5
900	0.7	0.9	1.4	2.0	2.3	2.6	2.8	3.0	3.1	3.2	3.3	3.3
1,000	0.6	0.9	1.4	1.9	2.2	2.5	2.7	2.8	3.0	3.0	3.1	3.1
1,100	0.6	0.8	1.3	1.8	2.1	2.4	2.6	2.7	2.8	2.9	2.9	3.0
1,200	0.6	0.8	1.2	1.7	2.0	2.3	2.5	2.6	2.7	2.8	2.8	2.8
1,300	0.5	0.8	1.2	1.6	1.9	2.2	2.4	2.5	2.6	2.7	2.7	2.7
1,400	0.5	0.7	1.1	1.6	1.9	2.1	2.3	2.4	2.5	2.6	2.6	2.6
1,500	0.5	0.7	1.1	1.5	1.8	2.0	2.2	2.3	2.4	2.5	2.5	2.5
1,600	0.5	0.7	1.1	1.5	1.7	2.0	2.1	2.2	2.3	2.4	2.4	2.5
1,700	0.5	0.7	1.0	1.4	1.7	1.9	2.1	2.2	2.3	2.3	2.4	2.4
1,800	0.5	0.6	1.0	1.4	1.6	1.8	2.0	2.1	2.2	2.3	2.3	2.3
1,900	0.4	0.6	1.0	1.3	1.6	1.8	1.9	2.1	2.1	2.2	2.2	2.2
2,000	0.4	0.6	1.0	1.3	1.6	1.8	1.9	2.0	2.1	2.1	2.2	2.2
2,200	0.4	0.6	0.9	1.3	1.5	1.7	1.8	1.9	2.0	2.0	2.1	2.1
2,400	0.4	0.6	0.9	1.2	1.4	1.6	1.7	1.8	1.9	2.0	2.0	2.0
2,600	0.4	0.5	0.8	1.2	1.4	1.5	1.7	1.8	1.8	1.9	1.9	1.9
2,800	0.4	0.5	0.8	1.1	1.3	1.5	1.6	1.7	1.8	1.8	1.8	1.9
3,000	0.4	0.5	0.8	1.1	1.3	1.4	1.5	1.6	1.7	1.8	1.8	1.8
3,200	0.3	0.5	0.8	1.0	1.2	1.4	1.5	1.6	1.7	1.7	1.7	1.7
3,400	0.3	0.5	0.7	1.0	1.2	1.3	1.5	1.5	1.6	1.6	1.7	1.7
3,600	0.3	0.5	0.7	1.0	1.2	1.3	1.4	1.5	1.6	1.6	1.6	1.6
3,800	0.3	0.4	0.7	1.0	1.1	1.3	1.4	1.5	1.5	1.6	1.6	1.6
4,000	0.3	0.4	0.7	0.9	1.1	1.2	1.3	1.4	1.5	1.5	1.5	1.5

7.1.3 Design Effects

283. The design effect is the ratio between the variance (average deviation of a set of data points from their mean value) of a variable under the sampling method used (actual) and the variance computed under the assumption of simple random sampling (standard). In short, a design effect of 2 would mean doubling the size of the sample used (actual) in order 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 are affected by the design and complexity of the survey.

284. Generally speaking, 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 Shetland and Orkney. As a result, one would expect the design effect to be above 1 although only modestly so.

285. Table 62 shows the design effects for all the SHCS surveys since 2003/4. When using a mixture of the physical and social survey data, the physical survey design effect must be used. The design effects for the 2016 SHCS are 1.10 for the physical and 1.08 for the social surveys.

286. When producing estimates at Local Authority level, no design effect adjustment of standard errors is necessary because simple (actually equal interval) random sampling was carried out within each Local Authority.

Table 62: Design Effects for the Annual SHCS, 2003/4 to 2015[52]

	Design Effect	
Survey Year	Physical Weight	Social Weight
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	1.1
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

[52] An error in compiling this table in previous publications was identified. It relates to the 2012, 2013 and 2014 surveys. The error has been corrected in the current publication.

7.1.4 Example: Accounting for Sampling Variation

287. Both confidence intervals and the design effect must be accounted for when quoting confidence levels on a statistic. For example we may wish to find the confidence interval for the proportion of pre-1919 detached houses in Table 1.

288. The stated proportion is 5%. The sub-sample size for the group (the sample size of 100% of the group) is also provided in the table, which in this case is the full survey sample: n=2,850. Reading from Table 60 in the row labelled 2,800 (the closest value to our n value) in the column for 5% we find the confidence interval for this estimate is 0.8 percentage points.

289. To account for the design effect, we must multiply this value by the physical design effect value from Table 61 since this statistic relates to the physical properties of the dwelling. So the true confidence interval is 0.8 x 1.10 = 0.88 ≈ 0.9 percentage points. We can therefore be 95% confident that the true proportion of pre-1919 detached houses is between 4.1% and 5.9%.

7.1.5 Statistical Significance

290. 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.

291. Comparisons in this publication are tested at the 5 per cent level as described in section 7.1.2. Testing significance involves comparing the difference between two statistics (for example, the per cent of households rated as EPC band C or better in 2016 compared to 2015 or for the social sector compared to the private sector) with the 95 per cent confidence limits for each of the two estimates taken into account.

292. Our approach to testing statistical significance follows that described in Annex 3 of the Scottish Household Survey annual report[53].

[53] http://www.gov.scot/Topics/Statistics/16002/PublicationAnnual

7.1.6 Table Conventions

293. The following conventions are used in tables:

0 indicates value is rounded to 0.

- indicates no sample cases in this category

* indicates base sample too small to report (below 30 cases) or estimate representing 5 or fewer sampled households

294. Because of rounding, figures in tables and charts may not always add exactly.

7.2 Missing Tenure Information

295. 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 between 2014 and 2015, on the one hand, and previous years, on the other. For further details please refer to the respective earlier Key Findings reports.

7.3 Energy Models

296. Two different models are used to produce the energy efficiency outputs in this report. They are based on the same core methodology but have some different assumptions and calculations which affect the output values.

Table 63: Summary of Domestic Energy Models used on SHCS Data

Model	SAP	BREDEM 2012
Version	SAP 2009[54] SAP 2012[55] for 2014 and 2015 data	Version 1.0 for data up to 2013 Version 1.1 for data from 2014 onwards
Outputs	Energy Efficiency Rating Environmental Impact Rating	• Fuel poverty energy use • Carbon emissions • Fuel poverty running costs
Fuel Prices	SAP standard	Based on a range of sources[56]
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	As SAP, except for vulnerable households for fuel poverty related statistics, where: 23°C in the main living area and 18°C elsewhere; 16 hours per day
Climate	East Pennines	Based on geographical location
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

297. Carbon emissions are calculated on the basis of the standard heating regime, applying carbon intensity values to each type of fuel used. Emissions factors for the BREDEM 2012 model come from SAP 2012 and are provided in Table 64.

[54] BRE, "The Government's Standard Assessment Procedure for Energy Rating of Dwellings": http://www.bre.co.uk/filelibrary/SAP/2009/SAP-2009_9-90.pdf

[55] BRE, "The Government's Standard Assessment Procedure for Energy Rating of Dwellings, 2012 Edition", Table 12: http://www.bre.co.uk/filelibrary/SAP/2012/SAP-2012_9-92.pdf

[56] For more details see SHCS Methodology Notes 2014 www.gov.scot/Topics/Statistics/SHCS/Downloads/Methodology2014

Table 64: Carbon Intensity of Common Heating Fuels, SAP 2012

Fuel	kg CO2 per 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
- pellets	0.039
- chips	0.016
Electricity	0.519

7.4 Fuel prices for pre-payment meters

298. The 2016 SHCS collected information about the presence of pre-payment meters for energy supply. This allowed us to assign the appropriate fuel price which is higher than the overall weighted average of all payment methods.

7.5 Extent of Disrepair Correction

299. The methodology for deriving two measures of disrepair were revised in the 2013 Key Findings report: extensive disrepair (see section 6.5 of SHCS 2013 Key Findings report) and “serious disrepair” under the Scottish Housing Quality Standard. These revisions affected statistics up to 2013. Further details are available in the Methodology Notes to the 2013 Key Findings report[57]. This report contains no further revisions.

7.6 Boilers

300. 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 households’ heating systems was first produced by BRE 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.

[57] SHCS - Methodology Notes 2013 available at http://www.gov.scot/Topics/Statistics/SHCS/Downloads/MethodologyNotes2013

301. For the 2016 SHCS report, the full boiler efficiency dataset has been revised to ensure it is on a consistent basis across years and represents 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.

302. Furthermore, the thresholds used to test compliance for oil condensing boilers have been updated to reflect current minimum standards. The full time series presented in this report has been updated to reflect this.

7.7 Scottish Housing Quality Standard

303. 2015 data on compliance with the SHQS have been revised from the previous publication. An error was identified in the method used to compile the data for the failure rate of the Energy Efficiency criterion in that year. This also affects the overall SHQS failure rate for 2015.

7.8 Definitions of Categories in the Key Findings Report

7.8.1 Dwelling Types

304. 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 of 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.

7.8.2 Household Types

305. This report 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.

306. This classification is derived from the more detailed grouping used in the Scottish Household Survey[58] as set out in Table 64 below:

Table 65: Household Types Classification Used in the SHCS and the SHS Reports

SHCS	SHS
Families	A **single parent** household – contains one adult of any age and one or more children. A **small family** household – contains two adults of any age and one or two children. A **large family** household – contains two adults of any age and three or more children, or three or more adults of any age and one or more children.
Older households	A **single older** household - contains one adult of pensionable age and no children. An **older smaller** household – contains one adult of working age and one of pensionable age and no children, or two adults of pensionable age and no children.
Other households	A **single adult** household – contains one adult of working age and no children. A **small adult** household – contains two adults of working age and no children. A **large adult** household – contains three or more adults and no children

307. The pensionable age threshold used for the 2015 and 2016 SHCS Key Findings reports 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' are not fully comparable between 2015 and 2016 and previous years.

[58] http://www.gov.scot/Resource/0052/00525090.pdf

7.8.3 Urban Rural Classifications

308. The urban/rural classification in this report is the Scottish Government 2 fold Urban Rural Classification[59]. Dwellings in settlements with over 3,000 people are considered urban by this definition. Data for 2016 is based on 2011 data zones while data for earlier years is based on 2001 data zones.

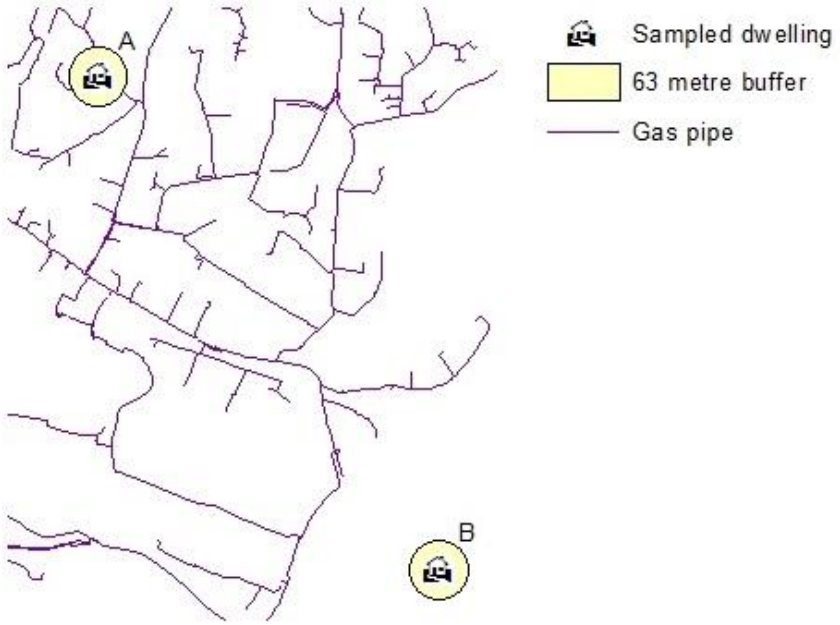
7.8.4 Gas Grid Coverage Derivation

309. Determining whether a dwelling is within the coverage of the gas grid is based on its proximity to gas distribution pipes. The current methodology for deriving gas grid coverage was first used for the 2013 Key Findings Report. A dwelling is considered to be “on the gas grid” if it is within 63m of a low/ medium/ intermediate pressure pipe, the usual maximum distance for a standard domestic connection.

310. Figure 32 shows how this is derived using GIS mapping. From the dwelling location information of surveyed properties, a 63m buffer is drawn. Where this buffer intersects a gas distribution pipe, the dwelling is said to be on the gas network. In the example, dwelling A is on the network, while dwelling B is not.

311. 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.

Figure 32: Gas Grid Derivation with GIS



[59] More details can be found at:
http://www.gov.scot/Topics/Statistics/About/Methodology/UrbanRuralClassification

7.8.5 Reasons Why Home Heating is Difficult

312. The full text of this question is: "Which of these things, if any, make it difficult to heat your home"[60]. Response categories have been grouped for reporting, as described in Table 66. Respondents were able to choose any combination of reasons why heating their home was difficult.

Table 66: Potential Responses to Question ht14

Group	Response Number	Response
Poor or inadequate heating	ht14_01	No Central Heating
	ht14_02	Not enough heaters/radiators
	ht14_03	Position of heaters/radiators
	ht14_04	Poor/need new heating system
	ht14_05	Radiators not large enough
	ht14_06	Heating not working
	ht14_07	Dislike storage heaters
	ht14_08	Inadequate heating
	ht14_10	Heating in part of house
	ht14_17	Can't afford to replace system
Hard to control heating	ht14_09	Difficult to control
	ht14_11	Hard to control heat
Need new windows	ht14_12	Need new windows
Poor insulation	ht14_13	Poor insulation
Draughty	ht14_14	Draughty
Rooms too big	ht14_15	Rooms too big
Can't afford to heat house	ht14_16	Can't afford to heat house
Other	ht14_18	Other
No answer	ht14_19	No answer

7.8.6 Hard to Treat Cavity Walls

313. In this report we use the ECO definition of HTTCs[61] to provide a breakdown of the remaining insulation potential of cavity wall dwellings in the Scottish housing stock (see Table 13).

314. 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.

[60] http://www.gov.scot/Topics/Statistics/16002/PublicationQuestionnaire , question ht14

[61] Change Works: Guide to insulating Hard to Treat Cavities (HTTC) http://www.changeworks.org.uk/sites/default/files/Guide_to_Insulating_Hard_to_Treat_Cavities_2014.pdf

- **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 hard to treat cavity walls.
- **Walls at risk of water penetration** i.e. walls requiring urgent repair to the wall finish and walls with penetrating damp[62].
- **Non-traditional building types** e.g. timber frame, metal-frame, prefabricated concrete.
- **Partially filled, narrow or uneven cavities** as well as cavities with failed CWI**.** The SHCS is not able to capture this information. As a result hard to treat cavity walls may be underestimated.
- Note that the presence of a conservatory alone does not cause a dwelling to be considered hard to treat under ECO.

7.8.7 Disrepair

315. This report uses our categories of disrepair to describe the state of disrepair of a dwelling.

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

317. Extent of disrepair is usually measured on a 5- or 10-point scale relating to the area of the element which is in disrepair.

7.8.7.1 Any (Basic) Disrepair

318. Any (Basic) disrepair is recorded where any element of the dwelling is found to have any level of disrepair, no matter how small.

7.8.7.2 Extensive Disrepair

319. Extensive disrepair is recorded where:

- Any building element has an overall disrepair score exceeding 20% by area
- 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

320. Extensive disrepair is calculated in order to identify those dwellings where any disrepair present is of a relatively greater severity.

[62] DECC: Review of number of cavity walls in Great Britain https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48433/5620-review-of-the-number-of-cavity-walls-in-great-brit.pdf ,

7.8.7.3 Disrepair to Critical Elements

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

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

- Roof covering;
- Roof structure;
- Chimney stacks;
- 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[63];
- Floor structure;
- Floor finish;
- Dry rot/wet rot.

7.8.7.4 Urgent Disrepair

323. 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.

324. Urgency of disrepair is only assessed for external and common elements.

7.8.7.5 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 as a result of leaking plumbing.
- **Rising damp** is the result of defective or missing damp proof coursing, leading to water leaching into the building fabric.

[63] This element has been incorrectly described in all previous SHCS reports as ‘party walls’

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

7.8.8 Bedroom Standard

325. 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[64].

326. 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 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;
- any further person who cannot be paired appropriately.

327. 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'[65]. 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.

7.8.9 Tolerable Standard

328. 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[66].

[64] Housing (Overcrowding) Bill 2003, section 2: http://www.publications.parliament.uk/pa/cm200203/cmbills/046/2003046.pdf Retrieved: 19/11/15

[65] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/229364/factsheet-hbsssc1.pdf Retrieved: 19/11/15

[66] A full definition and description of Local Authority duties as regards the Tolerable Standard can be found at: http://www.gov.scot/Publications/2009/03/25154751/3 Retrieved: 19/11/15

329. Additional criteria for electrical installations and thermal insulation were added by the 2006 Act[67]. These requirements came into force in April 2009 and were first reported by the SHCS in 2010. The change in definition caused the fail rate for the standard to increase from 0.7% in 2009 to 3.9% in 2010 in the full time series tables[68].

330. 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;
- 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 that are adequate and safe to use. The "electrical installation" is the electrical wiring and associated components and fittings, but excludes equipment and appliances;
- has satisfactory thermal insulation.

7.8.10 Scottish Housing Quality Standard

331. The Scottish Housing Quality Standard (SHQS) was announced by the Minister for Communities in February 2004[69]. 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 SHCS collects the same data for all dwellings to allow comparison across the housing stock.

[67] These amendments are published at: http://www.legislation.gov.uk/asp/2006/1/section/11 Retrieved: 19/11/15

[68] Full time series are provided at http://www.gov.scot/Resource/0044/00445920.xlsx Retrieved: 19/11/15

[69] For more information see letter and notes at: http://www.gov.scot/Publications/2004/02/18860/32772

332. 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;
- healthy, safe and secure.

333. A full list of assessed elements is available on the Scottish Government website[70]. Only one element of the SHQS is not assessed using SHCS data: no information is collected on external noise insulation[71].

334. Figures on SHQS failure rates for 2014 and 2015 are not entirely comparable to previous years published in this report. Because of missing tenure information a small number of dwellings (see section 7.2 for more detail), are excluded from tenure breakdowns in figures relating to years prior to 2014.

335. In addition, small changes to data processing relating to failure thresholds for the energy efficiency criterion[72], 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.

[70] http://www.gov.scot/Topics/Built-Environment/Housing/16342/shqs

[71] A summary list of elements by higher level criteria is available here: http://www.gov.scot/Resource/Doc/1125/0114870.pdf Retrieved: 19/11/15

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

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