Department of Energy & Climate Change

ANNUAL FUEL POVERTY STATISTICS REPORT, 2016

England

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Executive Summary

Aim

The aim of this publication is to provide a comprehensive view of the latest statistical trends and analysis of fuel poverty in England. Fuel poverty in England is measured using the Low Income High Costs indicator, which considers a household to be fuel poor if:

- they have required fuel costs that are above average (the national median level);
- were they to spend that amount, they would be left with a residual income below the official poverty line.

Key findings

Headline figures

In 2014, the number of households in fuel poverty in England was estimated at 2.38 million, representing approximately 10.6 per cent of all English households. This is an increase from 2.35 million households in 2013 (a change of around 1.4 per cent).

The *average* fuel poverty gap (the amount needed to meet the fuel poverty threshold), fell by 2.1 per cent between 2013 (£379) and 2014 (£371). The *aggregate* fuel poverty gap across *all* fuel poor households also reduced over this period, from £890 million to £882 million (0.9 per cent).

The relative nature of the fuel poverty indicator makes it difficult to isolate accurately absolute reason for change. However, in summary:

- Some households close to the fuel poverty threshold have seen a lower than average increase in disposable income and, therefore, have been pushed into fuel poverty;
- Fuel prices have increased more than energy efficiency gains, leaving households with higher energy costs in 2014 compared to 2013. However, fuel poor households have seen *smaller* increases in energy costs than the overall population, which has reduced the fuel poverty gap.

Analysis of fuel poverty

FPEER: Progress towards the Fuel Poverty Energy Efficiency Rating (FPEER) target:

- In 2014, 6.8 per cent of fuel poor households were living in a property with an energy efficiency rating of Band *C* or above, compared to 1.5 per cent in 2010;

- There was an increase in the proportion of households in Band *E* and above (from 86.8 in 2013 to 88.4 per cent in 2014) and a continued reduction in fuel poor households in Bands *F* and *G*;
- Households with lower energy efficiency bands have a higher likelihood of being fuel poor.

Dwelling characteristics: A combination of features affects the levels of fuel poverty:

- Buildings constructed with *solid* walls have a higher prevalence of fuel poverty compared to those with *cavity* walls;
- Both older and larger buildings see higher levels of fuel poverty compared to new builds and smaller dwellings;
- Households with *no* boiler or a *non-condensing* boiler have higher levels of fuel poverty compared to those with *condensing* boilers;
- The level and depth of fuel poverty is also greater for households *not* connected to the gas grid.

Location: Regional differences affect the level and depth of fuel poverty and are related to the age of the housing stock, climatic conditions and relative income levels across the country.

- The North East, Yorkshire and the Humber, West Midlands and the South West of England have the highest proportion of households in fuel poverty compared to the East and South East;
- Rural areas have a much higher proportion of households that are not connected to the gas grid, and therefore, a higher level and depth of fuel poverty.

Household characteristics: Fuel poverty varies across household characteristics due to differences in income, different energy requirements, or a combination of both.

- Households living in *private rented* houses have the highest prevalence of fuel poverty whereas *owner occupied* households have the lowest;
- *Single parent* households have the highest levels of fuel poverty and households consisting of only those *aged 75 and over* have the lowest prevalence;
- *Unemployed* households have higher levels of fuel poverty;
- Households paying for fuel by *pre-payment* meters have the highest levels of fuel poverty for both gas and electricity; however, they have the lowest fuel poverty gap.

Projections

Fuel poverty levels are projected to decrease in 2015 and then increase slightly in 2016. The average fuel poverty gap is projected to decrease in 2015 and remain at this level in 2016.

Chapter 1: Introduction

In December 2014, the Government introduced a new statutory fuel poverty target for England. The target is to ensure that as many fuel poor homes as reasonably practicable achieve a minimum energy efficiency rating of a Band *C*[1], by 2030. To support the implementation of this target, the Government published 'Cutting the cost of keeping warm: a fuel poverty strategy for England'[2], in March 2015. The strategy also set out interim milestones to lift as many fuel poor homes in England as is reasonably practicable to Band *E* by 2020; and Band *D* by 2025, alongside a strategic approach to developing policy to make progress towards these targets.

A household is considered to be fuel poor if it has higher than typical energy costs and would be left with a disposable income below the poverty line if it spent the required money to meet those costs. It captures the fact that fuel poverty is distinct from general poverty: not all poor households are *fuel* poor, and some households would not normally be considered *poor* but could be pushed into fuel poverty if they have high energy costs. Fuel poverty is therefore an overlapping problem of households having a low income *and* facing high energy costs.

The Government remains interested in the amount of energy people need to consume to have a warm, well-lit home, with hot water for everyday use, and the running of appliances. We therefore measure fuel poverty based on *required* energy bills rather than *actual* spending. This ensures that we do not overlook those households who have low energy bills simply because they actively limit their use of energy at home, for example, by keeping their home cold.

1.1 Measuring Fuel Poverty in England

1.1.1 The Low Income High Costs (LIHC) indicator

Fuel poverty in England is measured using the Low Income High Costs (LIHC) indicator. Under the LIHC indicator, a household is considered to be fuel poor if:

[1] Energy efficiency ratings are banded from *G* (lowest) to *A* (highest).
[2] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/408644/cutting_the_cost_of_keeping_warm.pdf

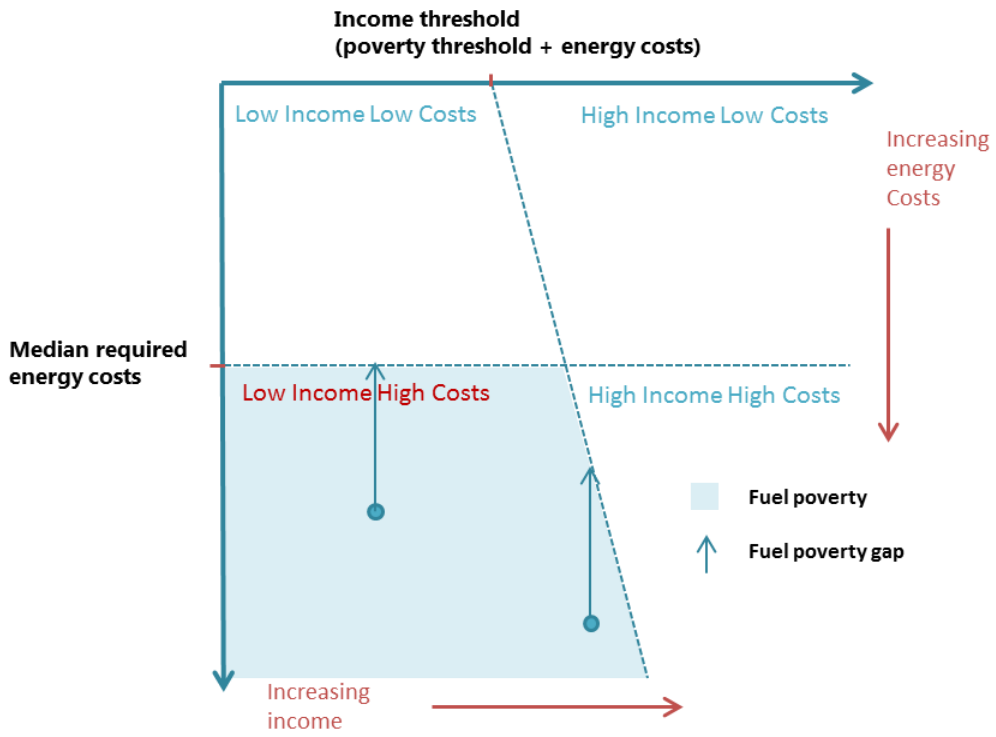
- they have required fuel costs that are above average (the national median level).
- were they to spend that amount, they would be left with a residual income below the official poverty line.

The Low Income High Costs model is a dual indicator, which allows us to measure not only the *extent* of the problem (how many fuel poor households there are), but also the *depth* of the problem (how badly affected each fuel poor household is). The depth of fuel poverty is calculated by taking account of the **fuel poverty gap**. This is a measure of the additional fuel costs faced by fuel poor households compared to the non-fuel poor household thresholds. This is explained in Figure 1.1, where the indicator consists of:

- the **number** of households that have both low incomes *and* high fuel costs (shown by the shaded area in the bottom left hand quadrant in Figure 1.1); and
- the **depth** of fuel poverty among these fuel poor households. This is measured through a **fuel poverty gap** (shown by the vertical arrows in Figure 1.1), which represents the difference between the required energy costs for each household and the nearest fuel poverty threshold.

The **fuel poverty gap** for each individual household is then aggregated across all fuel poor households to produce an overall **aggregate fuel poverty gap**, which gives a sense of the depth of fuel poverty at a national level.

Figure 1.1: Fuel poverty under the Low Income High Costs indicator



The fuel poor quadrant includes some households who may not traditionally be considered to be poor, but are pushed into fuel poverty by their high energy requirements (this is reflected in the gradient of the income threshold). While it is recognised that households in the top left hand quadrant have low incomes, they also have relatively low energy costs, and so are not considered to be *fuel* poor.

Households to the *right* of the income threshold have relatively higher incomes. Those in the top right quadrant have high incomes and low energy costs and are not fuel poor. Those in the bottom right hand quadrant have *high* energy costs but their relatively high incomes mean that they are not considered to be *fuel* poor.

KEY DEFINITIONS

Fuel Poverty
A household is considered to be fuel poor if: they have required fuel costs that are above average (the national median level); and, were they to spend that amount, they would be left with a residual income below the official poverty line.

Low Income High Costs Indicator
A dual indicator, which allows us to measure both the level (number of households) and depth (fuel poverty gap) of fuel poverty.

Fuel Poverty Gap
The difference in pounds between the required energy costs for *each* fuel poor household and the nearest fuel poverty threshold.

Average Fuel Poverty Gap
The average (mean) *fuel poverty gap* across *all* fuel poor households.

Aggregate Fuel Poverty Gap
The *fuel poverty gap* for each individual household is aggregated across *all* fuel poor households to produce a national total.

1.1.2 Understanding drivers of fuel poverty

The LIHC indicator is a relative measure, as it compares households to national income thresholds and the national median energy costs, thereby ensuring national trends are reflected in both of these indicators.

For any factor to affect the number of households in fuel poverty, it must change by a greater amount for those *in* fuel poverty, than for those *not* in fuel poverty. For example, a change in income will only have an impact on fuel poverty if households with low incomes and high fuel costs see relatively larger income changes (increases or decreases) compared to those who are not in fuel poverty.

Price changes have a more limited effect than income on the number of households in fuel poverty, as households are measured by the proportion by which their energy costs are greater or less than the average. When prices rise equally across all households, these proportions do not change. For example, if all prices were to rise by 10 per cent for *all* households, then a household that previously had costs that were five per cent above the median required energy threshold will still have costs that are approximately five per cent above the *new* median required energy cost – assuming all other factors remain the same. As a result, the fuel poverty status of the household will not change.

The depth of fuel poverty, on the other hand, is measured in pounds rather than proportions. In the example above, a 10 per cent rise in energy costs for all households will result in a greater increase, in pounds, of the energy costs of households above the median energy threshold. For example, if the median required energy costs are £1,000, then an increase of 10 per cent will result in a rise in the median to £1,100. A household with required energy costs above the median, say £1,500, will see an increase in their energy costs to £1,650. Their fuel poverty gap will therefore increase from £500 to £550. Annex A provides further worked examples of how the LIHC indicator works.

There are three key elements in determining whether a household is fuel poor:

- Household Income
- Household Energy Requirements
- Fuel Prices

1.1.3 Measuring household income

The Low Income High Costs indicator is based on modelled incomes calculated after housing costs have been taken into account, since money spent on housing costs cannot be spent on fuel. Mortgage and rent payments are deducted from the full income of each household to give an after housing cost (AHC) measure of income.

Once housing costs are deducted, incomes are then adjusted to reflect the fact that different household types will have different spending requirements (a process called ‘equivalisation’). For example, a single person on a given income will usually have more disposable income than a family of four on the same income. The equivalisation factors used for income calculations are the same as in the Department for Work and Pensions (DWP) Households Below Average Income (HBAI) statistics[3]. These equivalisation factors were devised by the Organisation for Economic Co-operation and Development (OECD), and are widely used across Europe, including by Eurostat.

[3] https://www.gov.uk/government/collections/households-below-average-income-hbai--2

KEY DEFINITIONS

After Housing Cost (AHC) Income
Total household income *minus* housing costs, such as mortgage and rent payments.

Household Energy Requirements
Modelled energy use based on dwelling and household characteristics.

Equivalisation
An adjustment factor to standardise spending and energy requirements across households.

Equivalised After Housing Costs (AHC) Income
After Housing Cost Income equivalised by household composition.

Equivalised Household Energy Requirements
Household energy requirements equivalised by the number of people in the house.

1.1.4 Measuring household energy requirements

The fuel poverty definition of household energy requirements includes fuel for heating the home, heating water, lighting, appliance usage and cooking. In calculating a household's energy requirements, the energy costs are modelled, dependent on the following factors:

- The economic circumstances of householders (for example, if they are unemployed or retired they will be at home for longer periods of the day);
- the heating system and the type of fuel(s) used, and
- the dwelling characteristics.

This allows energy requirements to be standardised to ensure households maintain an adequate standard of warmth[4] based on their household composition and energy set-up. In reality, households may under or over-heat their home, relative to the recommended levels.

[4] An adequate standard of warmth is defined as 21ºC for the main living area and 18 ºC for other occupied rooms. Further detail can be found in the Methodology Handbook at: https://www.gov.uk/government/publications/fuel-poverty-statistics-methodology-handbook

1.1.5 Measuring fuel prices

Detailed fuel prices (from sources listed in 1.2.2) are allocated to each household in the data, based on reported fuel type, regional location and method of payment. This allows us to model the *unit* cost of energy for each household based on their energy set-up, and assign the appropriate standing charge.

In order to calculate fuel poverty, a household's required energy costs are calculated by: taking the number of units of energy consumed, multiplying by the cost of a unit of energy, and adding the required standing charge for each household.

Similar to incomes, fuel costs are then equivalised by the number of people in the household, to reflect the fact that different sizes of households will have different energy requirements. For example, a family of four will need to spend more on energy than a single person living in the same home.

1.1.6 Calculating fuel poverty

Fuel poverty is estimated by calculating each household's position relative to two thresholds (depicted in Figure 1.1). The first threshold, the median energy costs, is set by ranking households equivalised energy requirements and using the middle value of the dataset. The second threshold, After Housing Cost (AHC) income, is calculated in a similar way. Each household's required energy costs are deducted from their equivalised income. These are then ranked and 60 per cent of the median value is calculated. This is the income threshold. To be fuel poor, a household's required energy costs must be higher than the median energy threshold *and* their equivalised AHC income must be below the income threshold.

Due to the relative nature of the Low Income High Costs indicator, the number of households in fuel poverty and the depth of fuel poverty (fuel poverty gap and the aggregate fuel poverty gap), can be directly compared across different subgroups of the population, such as energy efficiency, dwelling characteristics, and socio-demographics / socio-economic household characteristics. Chapter 3 presents breakdowns of the 2014 fuel poverty statistics.

More detailed information and an explanation of how household income, energy requirements and fuel prices are calculated, is included in the Methodology Handbook[5] (see Chapters 3, 4 and 5, respectively).

[5] https://www.gov.uk/government/publications/fuel-poverty-statistics-methodology-handbook

1.2 Data Sources

1.2.1 The English Housing Survey (EHS)[6]

In England, fuel poverty is modelled using data from the English Housing Survey (EHS). The EHS is an annual national survey of people's housing circumstances, household income and the condition and energy efficiency of housing in England. It is commissioned by the Department for Communities and Local Government (DCLG), covers all tenures (private and social) and involves a detailed physical inspection of properties by professional surveyors.

The two key components of the English Housing Survey for fuel poverty modelling are:

- the interview survey with the householders living in the dwelling; and
- the physical survey (survey of the physical features and condition of the dwelling).

Each year, around 12,000 households take part in the interview survey which is carried out between 1 April and 31 March. Of these households, around half are selected for the follow-up physical survey, which involves a physical inspection of the property by professional surveyors.

To boost the sample size of the physical survey, two years' worth of EHS data (from the physical element) are combined. For the 2014 data, this covers the period between 1 April 2013 and 31 March 2015, and comprises 11,851 households. Therefore the annual fuel poverty data is a combination of two consecutive years' worth of data – 2013/14 and 2014/15. From this information, a detailed picture of household energy requirements can be modelled.

Headline results from the 2014 EHS were published on 18 February 2016[7]. Full data relating to the 2014 EHS, will be made available by DCLG later this year. As the EHS data (used to model fuel poverty) includes comprehensive information on the property each household occupies, and on the householders themselves, the data can provide great insight into the living conditions and energy efficiency features of different types of households.

1.2.2 Fuel prices data

The English Housing Survey does not collect information on fuel prices for households. Therefore, to estimate them for each household in the EHS, fuel price information is

[6] https://www.gov.uk/government/collections/english-housing-survey
[7] https://www.gov.uk/government/statistics/english-housing-survey-2014-to-2015-headline-report

modelled using data from other sources including: DECC Quarterly Energy Prices[8]; ONS Consumer Price Index[9]; and Sutherland Tables[10]. Further information on modelled fuel price data is available in the Methodology Handbook[11].

1.3 Methodological Updates

Changes to the BREDEM model

Since the last fuel poverty statistics publication, there have been no changes to the underlying methodology used to model household energy requirements using the Building Research Establishment Domestic Energy Model (BREDEM 2012 version 1.0, January 2015)[12].

Changes to the English Housing Survey (EHS)

In 2014, a small number of minor form changes to the EHS physical survey were incorporated into the fuel poverty energy modelling. These had a very small effect on the overall household energy requirements.

Changes to fuel prices data

In 2014, a sub-classification of the biofuel variable was made available in the Sutherland Tables[10], which provided more granular information for estimating biofuel prices in the fuel poverty calculations. More detail can be found in the Methodology Handbook[11].

Further information

The 2014 fuel poverty dataset, along with the 2014 English Housing Survey datasets will be made available later this year via the UK Data Archive:
http://data-archive.ac.uk/

Please note: users will need to register with the UK Data Archive website to access the data.

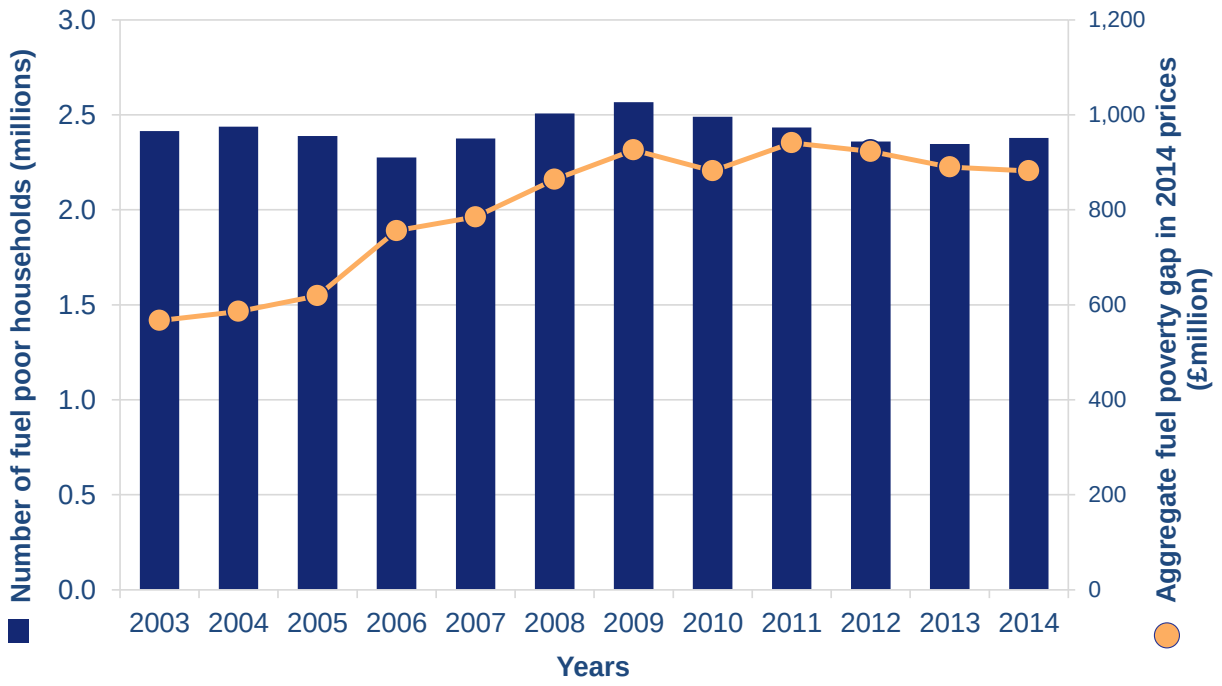
[8] https://www.gov.uk/government/collections/quarterly-energy-prices
[9] http://www.ons.gov.uk/economy/inflationandpriceindices/bulletins/consumerpriceinflation/previousReleases
[10] http://www.sutherlandtables.co.uk/
[11] https://www.gov.uk/government/publications/fuel-poverty-statistics-methodology-handbook
[12] http://www.bre.co.uk/filelibrary/bredem/BREDEM-2012-specification.pdf

Chapter 2: Headline Statistics: Fuel Poverty in England, 2014

2.1 Fuel Poverty in England Overview

In 2014, the number of households in fuel poverty in England was estimated at around 2.38 million, representing approximately 10.6 per cent of all English households. This is an increase from 2.35 million households in 2013 (a change of around 1.4 per cent). In contrast, the *average* fuel poverty gap[13] decreased by around 2.1 per cent in real terms, from £379 in 2013 to £371 in 2014. The *aggregate* fuel poverty gap also reduced over this period from £890 million to £882 million (0.9 per cent). This is in-line with the 2013 fuel poverty projections, which estimated a slight increase in the fuel poverty level for 2014, with the aggregate and average fuel poverty gaps remaining broadly flat or decreasing slightly in 2014. Figure 2.1 below shows the overall trend in fuel poverty in England between 2003 and 2014. As can be seen, fuel poverty levels and the aggregate fuel poverty gap do not necessarily follow the same trends over time.

Figure 2.1: Fuel poverty in England, 2003-2014



[13] Note: historic aggregate and average fuel poverty gaps are rebased to 2014 prices

As shown in Figure 2.1, the levels of fuel poverty during the early part of the millennium decreased, before rising during the economic down-turn, peaking at approximately 2.57 million in 2009 and then steadily declining through to 2013 before rising again in 2014.

The aggregate fuel poverty gap shows a slightly different trend; increasing throughout the period between 2003 and 2011 (dipping in 2010 before reaching its peak in 2011 at around £941million) and then steadily declining year-on-year through to 2014.

Table 2.1 provides the figures behind the fuel poverty measure over time.

Table 2.1: Fuel poverty in England, 2003-2014

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Fuel poor households (millions)	2.41	2.44	2.39	2.28	2.38	2.51	2.57	2.49	2.43	2.36	2.35	2.38
Percentage of fuel poor households (%)	11.6	11.6	11.3	10.7	11.1	11.7	11.9	11.5	11.1	10.8	10.4	10.6
Aggregate fuel poverty gap: 2014 prices (£ million)*	567	586	619	756	785	864	926	882	941	923	890	882
Average fuel poverty gap: 2014 prices (£)*	235	240	259	332	330	344	361	354	387	391	379	371

*Historic and aggregate fuel poverty gaps have been rebased to 2014 prices.

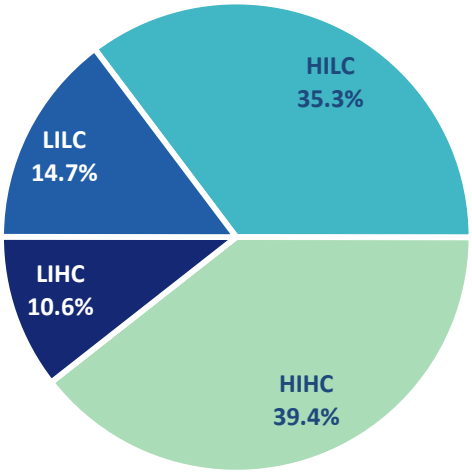
2.2 The Low Income High Costs Quadrant

Fuel poverty in England is measured under the Low Income High Costs indicator, which is defined in Section 1.1. Based on a combination of a household's income, energy requirements and energy prices, the indicator allows households to be grouped into one of the following four quadrants:

- Low Income High Costs (LIHC)
- Low Income Low Costs (LILC)
- High Income Low Costs (HILC)
- High Income High Costs (HIHC)

The Low Income High Costs quadrant provides an estimate of those who are in fuel poverty, with Figure 2.2 showing the distribution of the population across all four quadrants of the indicator.

Figure 2.2: Proportion of households in each quadrant of the fuel poverty indicator, 2014



2.3 The Drivers of Fuel Poverty

The fuel poverty status of a household depends on the interaction between three key factors: household incomes, household energy efficiency, and fuel prices. Due to the relative nature of the fuel poverty indicator, it is important to assess the above drivers in terms of the likely effect on the fuel poor population currently living on low incomes with high fuel costs, and the resulting depth of fuel poverty.

2.3.1 Income

In 2014, median household incomes (full incomes before housing costs) continued to increase, rising from £24,560 in 2013 to £25,417 in 2014 (3.5 per cent). However, as the darker blue bars in Figure 2.3 show, income did not rise equally across all household income decile groups, with *smaller* rises seen for the *lower* income groups, and larger increases seen for the higher income groups.

Households in the lower income deciles, on average, see higher proportions in receipt of state benefit, tax credits and housing benefits. In contrast, incomes of households in the higher deciles are dominated by earnings, with the highest decile group dominated by working couples with no dependent children.

To calculate fuel poverty, housing costs are deducted from the full income of each household - this is referred to as the ‘After Housing Costs’ (AHC) income, since money spent on housing costs cannot be spent on fuel. In 2014, median housing costs continued to increase, rising in cash terms from £4,200 in 2013 to £4,440 in 2014 (around 5.7 per

cent). This makes households who own their homes outright (and so have no housing costs) relatively better off than those with rent or mortgage payments.

In 2014, once housing costs were deducted, median AHC income remained positive, rising by three per cent from £20,247 in 2013 to £20,856 in 2014. However, as can be seen in Figure 2.3, income decile 3 was disproportionately affected, seeing a *reduction* in AHC income compared to all other deciles.

Figure 2.3: Comparison of annual percentage change in median full income and AHC income by income deciles, 2013-2014

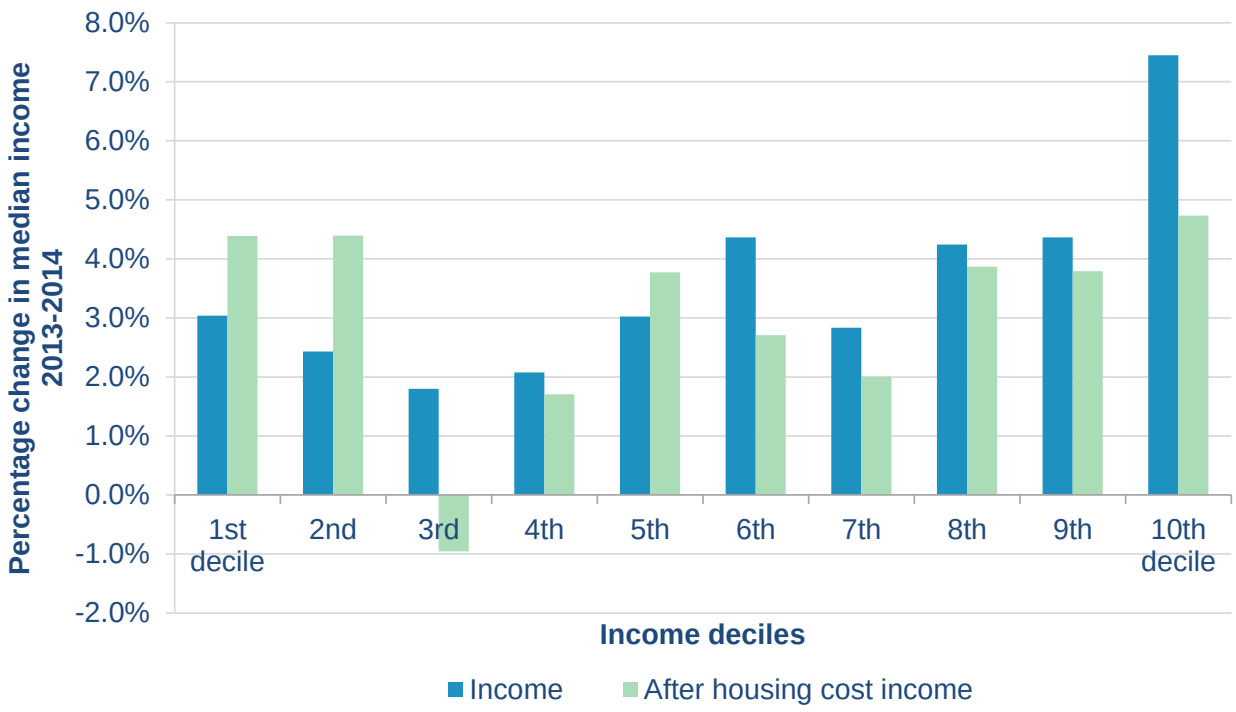
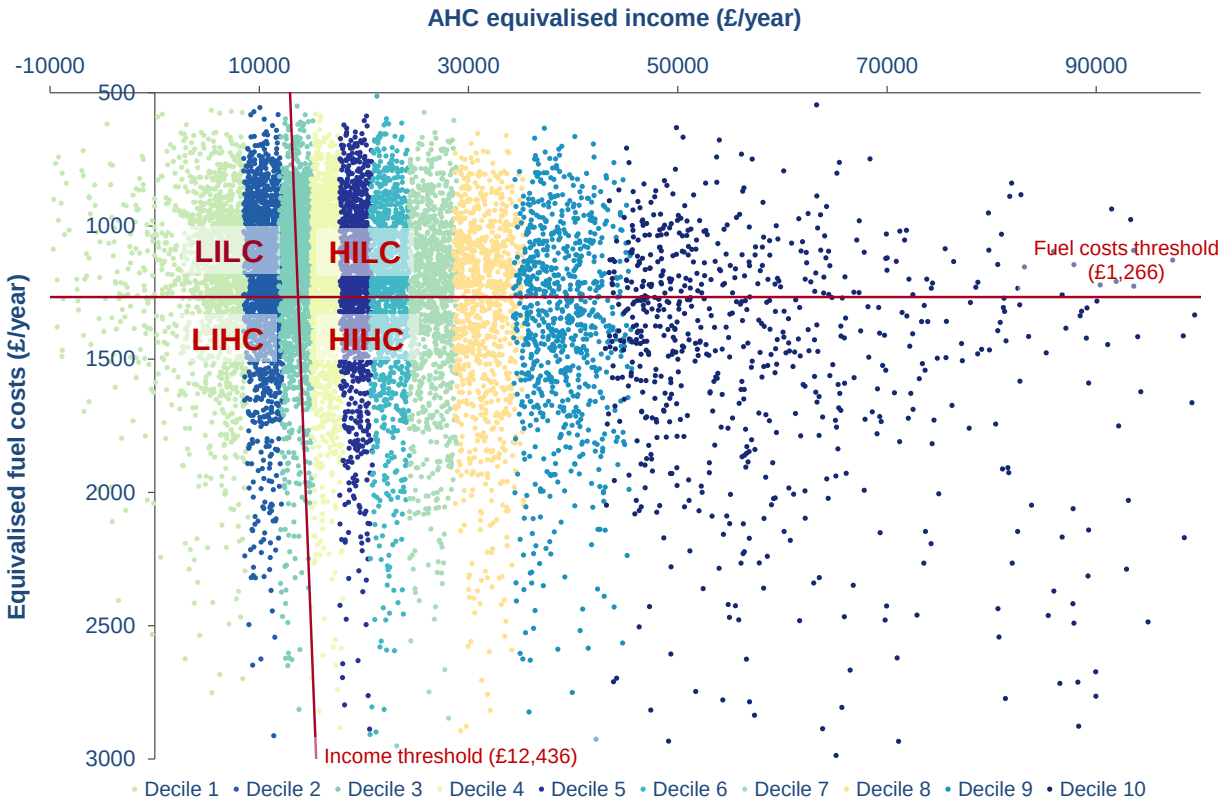


Figure 2.4 shows the distribution, and in particular, the density of the population around both the income threshold (£12,436) and energy costs threshold (£1,266) of the fuel poverty indicator. This illustrates how only a small movement is needed to move households in or out of fuel poverty.

An increase in incomes across the LIHC group can move some households out of fuel poverty, especially if their income is close to the threshold *and* they receive an above average increase in income, or, they experience a large increase in income (such as new employment). Conversely, any fall in incomes for households in the HIHC group, who are close to the income threshold, can easily push them across into fuel poverty. As seen in Figure 2.3, income decile 3 saw a *reduction* in income, suggesting that for 2014, households just to the right of the income threshold have been pushed across into fuel poverty.

Figure 2.4: Distribution of households across the fuel poverty quadrant, 2014



As presented in Section 1.1.3, AHC incomes are equivalised to reflect each household's composition, which allows direct comparisons across the data. Between 2013 and 2014, average *equivalised* AHC incomes have increased across *all* quadrants of the indicator, as shown in Table 2.2. A rise in income would only tend to reduce the number in fuel poverty by itself if it were particularly concentrated in the low income groups. The rise in incomes here has been *lower* in the fuel poor quadrant than in the adjacent groups (HIHC, LILC), suggesting that these households are more likely have *remained* in fuel poverty.

Table 2.2: Median equivalised AHC income by fuel poverty quadrant, 2013-2014

	Median equivalised after housing costs income (£)		
	2013	2014	% change
Low Income High Costs	£9,895	£10,131	2.4%
Low Income Low Costs	£9,428	£9,751	3.4%
High Income Low Costs	£23,101	£23,665	2.4%
High Income High Costs	£26,399	£27,305	3.4%
Overall population[14]	£20,354	£20,729	1.8%

[14] Due to the relative nature of the indicator, the change for the overall total will not necessarily resemble that of component groups (an example of what is known as Simpson's Paradox).

Below average increases in both *AHC* income around the threshold *and* a lower rise in income generally for the LIHC group are key to understanding why the fuel poverty levels have increased.

2.3.2 Energy efficiency

The energy efficiency rating of a property is a key indicator of the condition of a dwelling and its energy saving potential. This is relevant to fuel poverty, as the higher a household's energy efficiency level, the lower the energy costs requirement should be for the dwelling, all else being equal. The standard definition for measuring the energy efficiency of the housing stock in England is described using the Standard Assessment Procedure (SAP) for the Energy Rating of Dwellings[15]. This methodology provides an energy efficiency rating between 1 (lowest) to 100 (highest).

KEY DEFINITION

SAP[16]
The Standard Assessment Procedure (SAP) is the methodology used by the Government to assess and compare the energy and environmental performance of dwellings, and provide an energy efficiency rating between 1 (lowest) to 100 (highest).

Table 2.3 shows the continued increase in the energy efficiency rating of the English housing stock over the past decade. 2014 saw a further one point increase in the median SAP value from 62.2 in 2013 to 63.2 in 2014.

Table 2.3: Median SAP energy efficiency ratings, 2003-2014

Year	Fuel poor households	Non-fuel poor households	All households (mean)
2003	40.6	50.8	49.3
2010	49.0	59.1	57.9
2011	50.6	60.3	59.2
2012	52.4	61.9	61.0
2013	54.3	63.0	62.2
2014	56.0	64.0	63.2

[15] It is based upon the predicted running costs of a dwelling per square metre of floor area (independent of occupancy) under a defined set of conditions. SAP ratings run from 1 (lowest level of energy cost efficiency) to 100 (highest level). These ratings can also be banded into A to G bands (with A being the highest).

The energy requirement used in the measurement of fuel poverty, and those used in SAP, are related but crucial differences exist. Most notably: SAP does *not* include any costs for appliances or cooking; is independent of both the number of people in the household and its geographic location; and also assumes all areas of the dwelling are heated.

Notwithstanding these differences, fuel poverty and energy efficiency are closely linked. When looking at energy efficiency improvements across the fuel poverty quadrant (Table 2.4), we can see that *high* energy cost households (LIHC, HIHC) have less efficient SAP ratings by an average of 12 points compared to *low* energy cost households (LILC, HILC). However, the percentage change increase in SAP between 2013 and 2014 was greatest for the fuel poor quadrant (LIHC), indicating a higher take up of energy efficiency measures by this group[16].

Improved energy efficiency would, other things being equal, reduce the fuel poverty gap. Since energy costs are also factored into the income dimension, improved energy efficiency could potentially reduce the number in fuel poverty too. However, as will be seen below, these factors can be outweighed by price effects on energy costs.

Table 2.4: Median SAP ratings by each quadrant of the fuel poverty indicator, 2013-14

	Median SAP score		
	2013	2014	% change
Low Income High Costs	54.3	56.0	3.2%
Low Income Low Costs	67.1	68.2	1.5%
High Income Low Costs	67.1	67.9	1.2%
High Income High Costs	55.4	56.5	2.0%
Overall population	62.2	63.2	1.6%

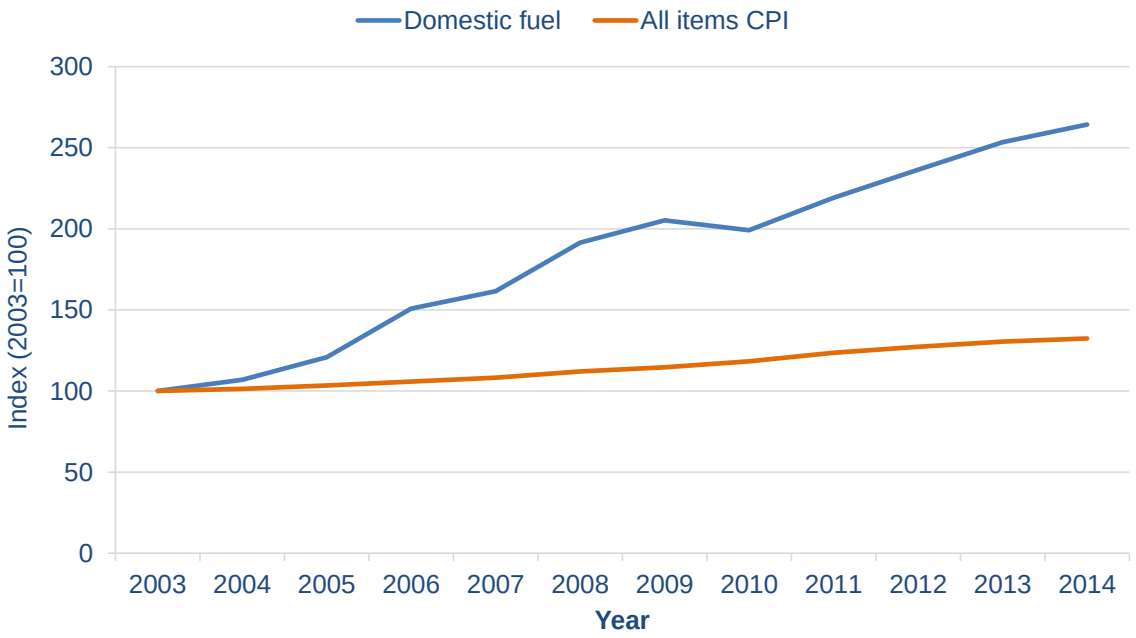
2.3.3 Prices

In 2014, domestic energy prices increased by approximately 4.3 per cent compared to 2013, continuing the predominantly upward trend over the past decade. As Figure 2.5 shows, 2010 marked the first calendar year in over a decade that domestic energy prices decreased from the previous year - despite a general rise in inflation over this period. However, from 2011 onwards, fuel prices have continued to rise in line with recent trends.

[16] Over the past decade, this trend has also seen a narrowing of the energy efficiency gap between low income and high income households, of around 2.2 percentage points.

The impact of rising fuel costs is a likely increase in household energy costs, all else being equal. For LILC households close to the energy costs threshold (see Figure 2.4), this is likely to push them down into fuel poverty (i.e. the LIHC quadrant).

Figure 2.5: Domestic energy prices and the Consumer Price Index (cash terms), 2003-2014

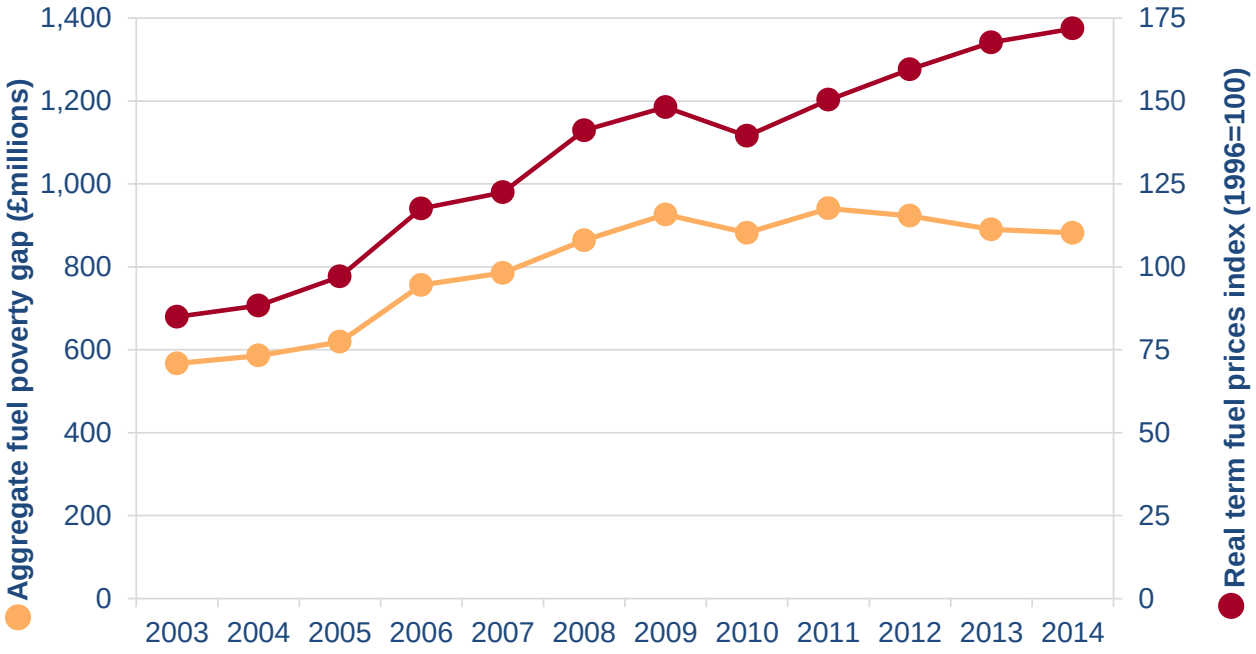


There is a relatively strong correlation between fuel prices in real terms and the depth of fuel poverty, as shown by the aggregate fuel poverty gap in Figure 2.6. As prices increased steadily between 2003 and 2009, the fuel poverty gap also increased; and when prices fell sharply in 2010, the aggregate fuel poverty gap showed a corresponding reduction.

However, over the past three years, this trend has started to diverge. Despite a rise in real term fuel prices between 2012 and 2014, the *aggregate* fuel poverty gap has shown a steady decline. This is largely due to rising incomes among the low income group, especially in the lowest income decile, which has helped to temper any increase in fuel costs. The same relationship exists for the *average* fuel poverty gap.

In relation to Figure 2.6, it should be noted that fuel poverty data is a combination of two consecutive years (i.e. 2013 and 2014 data). This means that the effects of price changes are staggered over a two year period. Therefore, when considering changes in fuel poverty from one year to the next, it is useful to consider national price changes in each of the last two years.

Figure 2.6: Aggregate fuel poverty gap and real term fuel prices, 2003-2014



2.3.4 Household energy requirements

To calculate fuel poverty, a household's required energy costs are calculated by multiplying the cost of a unit of energy (plus standing charges) by the estimated number of units of energy required for each household. This is then equivalised (see Section 1.1.3) to reflect each household's composition, which allows direct comparisons across the data.

As shown in Table 2.5, required household energy costs (median equivalised fuel costs) increased for *all* quadrants of the fuel poverty indicator. Although energy efficiency across the housing stock was seen to improve (see Table 2.4), on average, this has been *cancelled out* by a larger increase in energy prices. Ultimately, this has led to a net increase in the overall energy cost per household in 2014.

Table 2.5: Median required fuel costs by fuel poverty quadrant, 2013-2014

	Median equivalised fuel costs (£)		
	2013	2014	% change
Low Income High Costs	£1,472	£1,485	0.9%
Low Income Low Costs	£1,031	£1,053	2.1%
High Income Low Costs	£1,055	£1,085	2.8%
High Income High Costs	£1,498	£1,523	1.7%
Overall population	£1,239	£1,266	2.2%

In 2014, the fuel poor group (LIHC) were least impacted by the energy cost increase. On average the fuel costs threshold rose by 2.2 per cent, compared to only a 0.9 per cent increase in energy costs for the LIHC group. This is *key* to understanding why the fuel poverty gap – the difference between this group's energy costs and the national median – has reduced.

2.4 The 2014 Fuel Poverty Indicator

The relative nature of the fuel poverty indicator makes it difficult to isolate accurately absolute reasons for change. In order for any factor to affect the level or depth of fuel poverty, the factor must change by a greater amount for those *in* fuel poverty, than for those *not* in fuel poverty. The fuel poverty gap has decreased at least in part because, as the last section showed, their energy costs have not risen as much as those in the other quadrants.

However, the rise in the number of households in fuel poverty suggests that some households who would previously have been classed as being *non*-fuel poor, have seen either decreases in their incomes, increases in their energy costs or a combination of both, which have pushed them over the fuel poverty thresholds.

The income results above showed that, although incomes increased for all quadrants, the rise for the Low Income High Costs group was relatively low. This was particularly true for those close to the threshold (income deciles 3 and 4) in the *High* Income High Energy costs group. This is likely to have led to them being reclassified in 2014 as *Low* Income High Costs households, increasing overall fuel poor numbers.

2.5 Fuel Poverty across the Devolved Nations

Fuel poverty is a devolved issue, with each nation in the UK having its own fuel poverty definition, of which Scotland and Wales have targets and set policies to tackle the issue. This is set out in brief below, alongside the latest available estimates produced by each devolved nation.

Scotland[17]

The Scottish Government uses a 10 per cent measure of fuel poverty, under which a household is considered fuel poor if it would need to spend more than 10 per cent of its income on adequate energy in the home (heating, hot water, lighting and cooking).

[17] http://www.gov.scot/Publications/2015/12/8460/0

The Scottish Government has a legal target to eradicate fuel poverty, as far as is reasonably practicable, by 2016. Scotland publishes its own report on the national level of fuel poverty. The Scottish House Condition Survey (SHCS) is used to model fuel poverty.

In 2014, 845,000 households (35 per cent of the total) were in fuel poverty. This compares to 860,000 households (36 per cent of the total) in 2013.

Wales[18]

Like Scotland, Wales use a 10 per cent indicator. However, their methodology differs from Scotland in relation to the heating assumptions used. Wales has a target to eradicate fuel poverty, as far as reasonably practicable, by 2018. In 2012 (the last year for which data is available), 386,000 households were classed as fuel poor (30 per cent of the total).

Updated fuel poverty estimates for Wales are due to be published later this year.

Northern Ireland[19]

Northern Ireland Northern Ireland use a 10 per cent indicator, but has no statutory target. Fuel poverty was last reported for Northern Ireland in 2011, estimating that 294,000 households were fuel poor (42 per cent of the total). The Executive is focussed on removing poor energy efficiency as a cause of fuel poverty.

Summary

Under a proxy 10 per cent measure, the English levels of fuel poverty for 2014 are estimated to be 11.6 per cent. However, for England, the formal measure of fuel poverty uses the Low Income High Costs definition, of which fuel poverty levels are officially estimated at 10.6 per cent.

As a result of both definition and methodological differences in fuel poverty for each devolved nation, the figures are non-additive (i.e. should not be combined) in relation to a UK total. More details of the devolved surveys and fuel poverty measures in each of the devolved nations can be found in Section 1.4 of the Methodology Handbook[20].

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[18] http://gov.wales/docs/caecd/research/130430-wales-fuel-poverty-projection-tool-2011-12-report-en.pdf
[19] http://www.nihe.gov.uk/index/corporate/housing_research/house_condition_survey.htm
[20] https://www.gov.uk/government/publications/fuel-poverty-statistics-methodology-handbook

Chapter 3: Further Analysis of Fuel Poverty in England, 2003-2014

The prevalence of fuel poverty in England varies by a number of dwelling and household characteristics. Many of these characteristics are inter-related and assigning causality to one factor alone is not possible. Therefore, while the analysis looks at individual characteristics, users should be aware of the inherent inter-correlations likely to exist between these characteristics.

The data behind this analysis is available in the fuel poverty detailed tables and trend tables online, which can be accessed at the following links:

https://www.gov.uk/government/statistics/fuel-poverty-detailed-tables-2014

https://www.gov.uk/government/statistics/fuel-poverty-trends-2003-2014

3.1 Energy Efficiency and Dwelling Characteristics

Energy efficiency is strongly linked to the energy costs incurred by households, which impacts the likelihood of being fuel poor. If households require a greater amount of energy to adequately run their houses, they will have higher fuel costs. Heating a household to an adequate level is dependent on the energy efficiency of the dwelling. As expected, households with a lower energy efficiency rating have a higher likelihood being fuel poor. However, some specific features of the dwelling will also affect the levels of fuel poverty. Overall, patterns in dwelling characteristics for 2014 are broadly similar to those seen in 2013.

Households constructed with *solid* walls have a higher prevalence of fuel poverty compared to those with *cavity* walls. Dwelling age is a good indicator of a property's wall construction, as older builds typically have solid walls. Fuel poverty levels follow this pattern; with a higher proportion of fuel poor living in older builds.

The level and depth of fuel poverty is also greater for households *not* connected to the gas grid. This is likely to be due to the higher costs associated with heating a home off the gas grid. Households classified as 'rural'[21] have a much higher proportion of households that are *not* connected to the gas grid, and therefore, a higher level and depth of fuel poverty.

[21] See page 39 for definition.

3.1.1 Fuel Poverty Energy Efficiency Rating

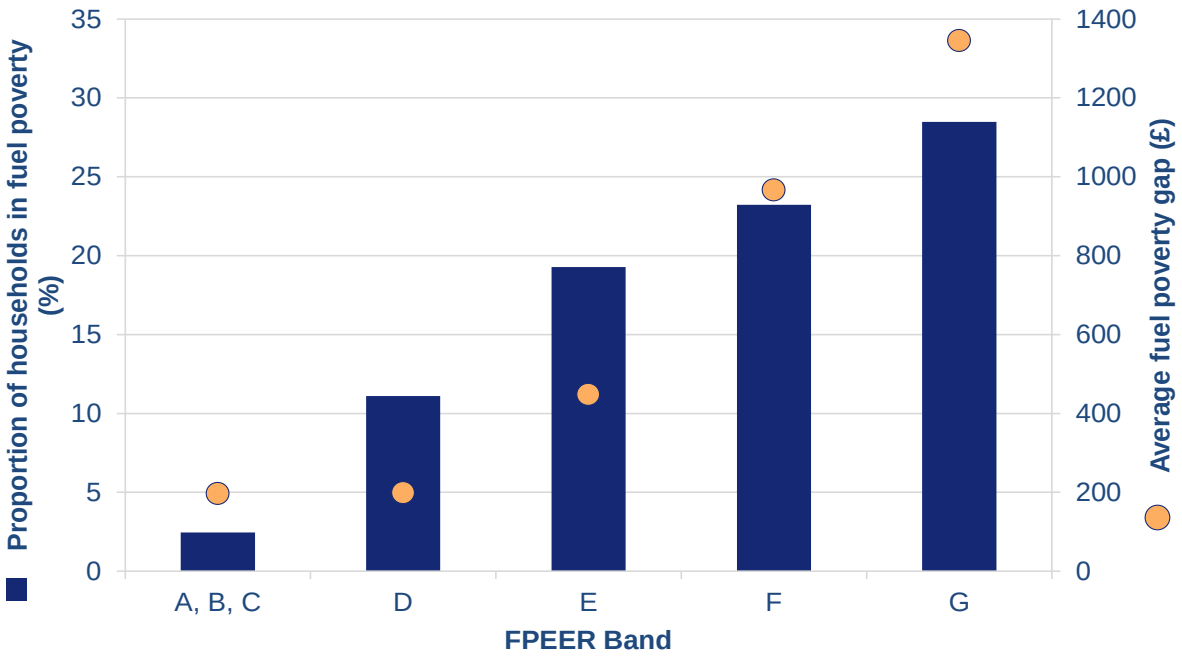
KEY DEFINITION

Fuel Poverty Energy Efficiency Rating (FPEER) [22]
FPEER is a measure of the energy efficiency of a property based on the Standard Assessment Procedure (SAP)[23] *but* accounts for policies that directly affect the cost of energy[24]. Similar to SAP, the FPEER methodology generates a rating between 1 and 100, which is then translated into an energy efficiency Band from G (lowest) to A (highest) and underpins the Government's fuel poverty target.

In 2014, the Government put in place a new fuel poverty target: to improve the energy efficiency of fuel poor homes, by getting as many households as reasonably practicable to a minimum FPEER rating of Band *C* by 2030. The latest Fuel Poverty Strategy outlines interim targets of Band *E* by 2020, and Band *D* by 2025.

Figure 3.1 shows that both the likelihood and depth of fuel poverty *decreases* as the energy efficiency of a house *increases*.

Figure 3.1: Fuel poverty and average fuel poverty gap by FPEER Band, 2014



[22] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332236/fpeer_methodology.pdf
[23] See page 19 for further detail on SAP
[24] At present this relates to the Warm Home Discount and Government Electricity Rebate

In 2014, 28.5 per cent of properties in *G* rated homes were classed as fuel poor, compared to only 2.5 per cent of *C* rated properties and above. The fuel poverty gap for *G* rated properties (£1345) is around seven times higher than for *C* rated properties and above (£196); and around four times higher than the average fuel poverty gap for all households (£371).

Figure 3.2 presents the proportion of *all* households in each FPEER Band between 2010 and 2014. This shows that the largest proportion of households in the English housing stock sit within Band *D* (around 50 per cent), and this has stayed relatively stable since 2010. The proportion of properties rated *C* and above has increased year on year while the proportion of households in *E*, *F* and *G* has steadily decreased. Households rated as *F* and *G* Bands account for a small proportion of all households (around 5 per cent).

Figure 3.2: Proportion of all households by FPEER Band, 2010-2014

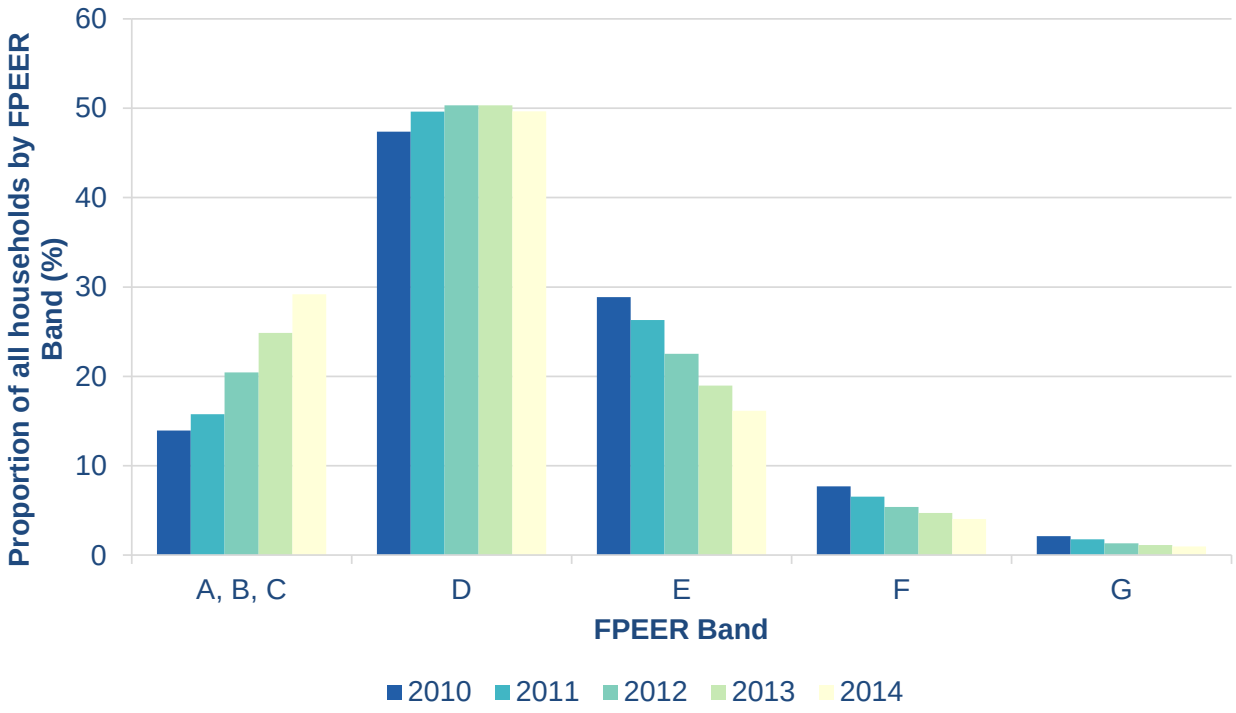
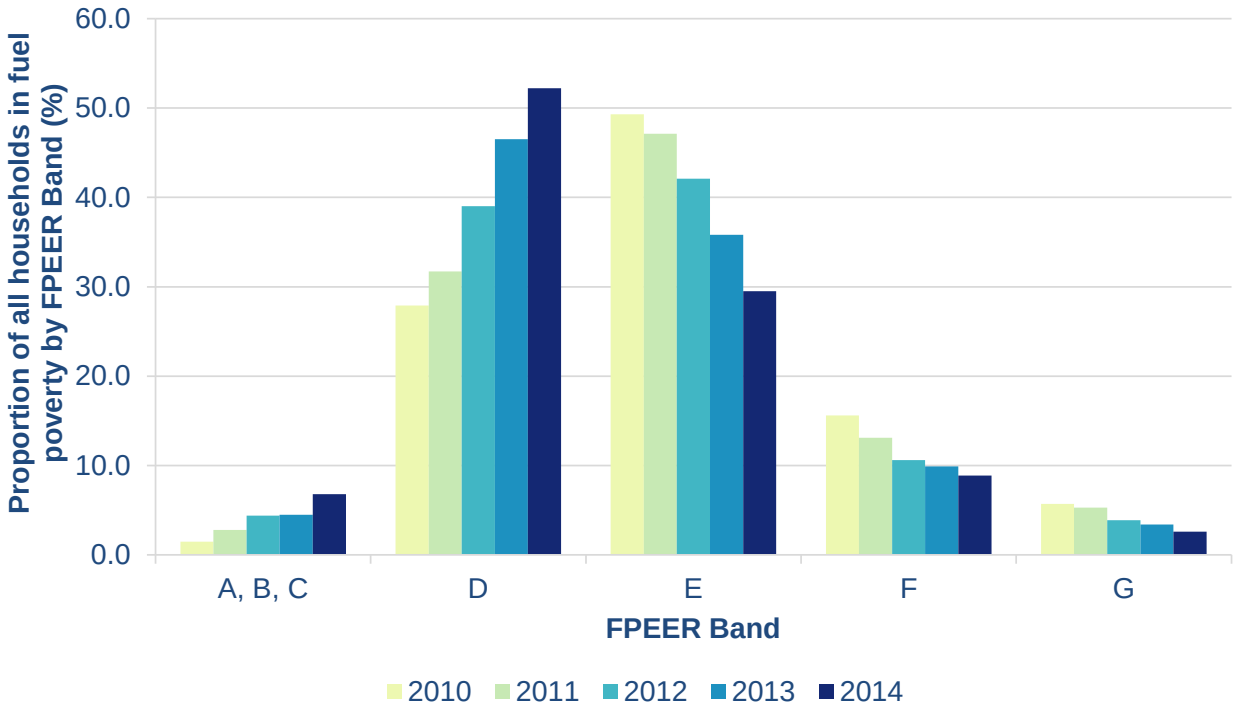


Figure 3.3 looks specifically at the *fuel poor population* by FPEER Bands between 2010 and 2014. This shows that the proportion of fuel poor households in Band *C* and above and Band *D* has increased over time, while the proportion in Bands *E*, *F* and *G* has decreased. In 2014, 6.8 per cent of fuel poor households were living in a property with an energy efficiency rating of Band *C* or above, compared to 1.5 per cent in 2010. The proportion of households in Band *E* and above has increased over the year from 86.8 per cent in 2013 to 88.4 per cent in 2014, and has seen a steady increase from 78.7 per cent in 2010. This shows progress towards the interim target of getting as many households as reasonably practicable to Band *E* or above by 2020.

Figure 3.3: Proportion of households in fuel poverty by FPEER Band, 2010-2014



The proportion of *fuel poor* households in each Band shows a different trend compared to *all households*. There is a disproportionately large amount of fuel poor households in Bands *E*, *F* and *G* compared to the overall population.

When looking at the median FPEER score, this has increased between 2013 and 2014 across all four quadrants of the fuel poverty indicator. Table 3.1 shows that *high* energy cost households (this includes the fuel poor) have a lower FPEER score by approximately 12 points than *low* energy cost households. This is consistent with the trend seen over time for SAP (Section 2.3.2).

Table 3.1: Median FPEER by each quadrant of the indicator, 2013-2014

	Median FPEER score		
	2013	2014	% change
Low Income High Cost	54.7	56.9	3.9%
Low Income Low Cost	67.9	69.2	2.0%
High Income Low cost	67.5	68.7	1.8%
High Income High cost	55.5	56.8	2.4%
Overall population	62.4	63.7	2.0%

3.1.2 Wall type

Walls can be constructed in different ways and are dependent on the building regulations at the time of construction. However, modifications can be made to the walls after they

have been built to improve insulation. The two main types of walls are *cavity* walls and *solid* walls. Cavity walls have a gap between two walls which, on its own, provides some level of insulation but this gap can be filled with insulating materials to provide a greater level of insulation. Solid walls are typically used in older builds, with no gap to add insulation as they are simply a single wall. They can be insulated post-construction by adding a layer of insulation around them.

Figure 3.4 shows that cavity wall insulation has improved over time, with a 76 per cent rise between 2003 and 2014. In 2014, 44.5 per cent of households had *insulated* cavity walls, 24.8 per cent of households had *uninsulated* cavity walls, and the remaining 30.7 per cent of households had *solid* walls.

Figure 3.4: Proportion of all households by wall type and fuel poverty status, 2014

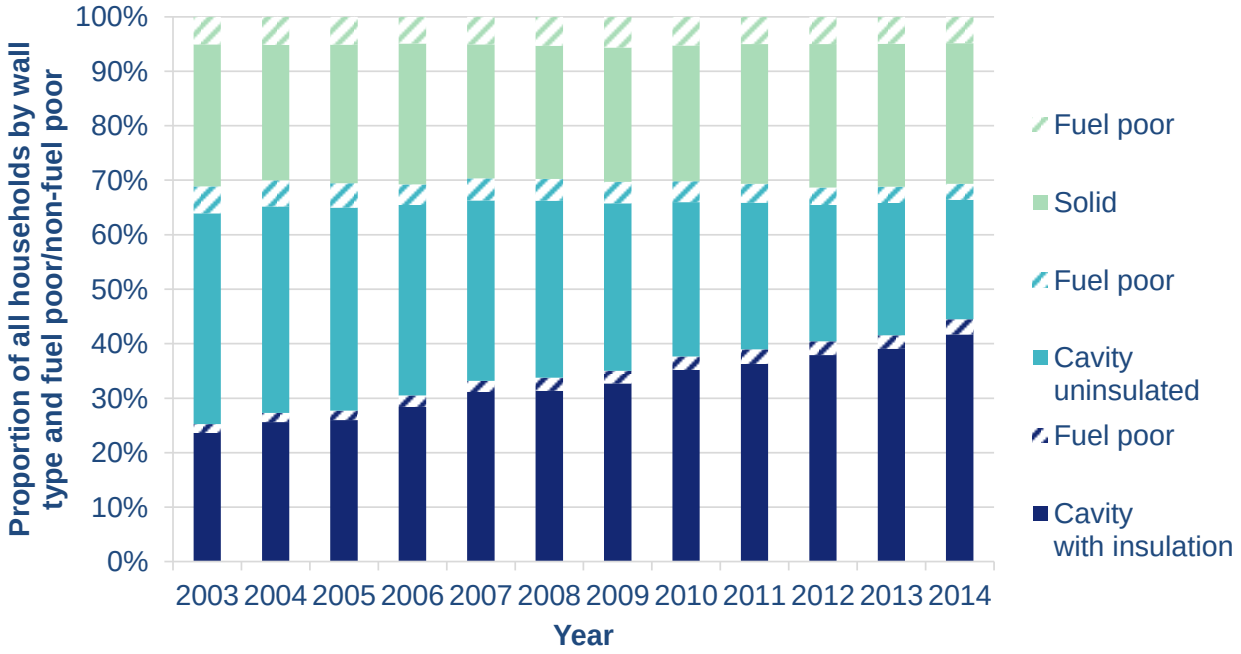


Figure 3.5 shows the proportion of households in fuel poverty and the average fuel poverty gap by wall type. Households with *insulated* cavity walls are least likely to be in fuel poverty (6.2 per cent of households with an average gap of £219) compared to households with solid walls (15.8 per cent and an average fuel poverty gap of £479).

A household's energy requirement will be lower when there is more insulation. Table 3.2 below shows that the average energy requirements are lowest for *insulated* cavity walls.

Figure 3.5: Fuel poverty and average fuel poverty gap by wall type, 2014

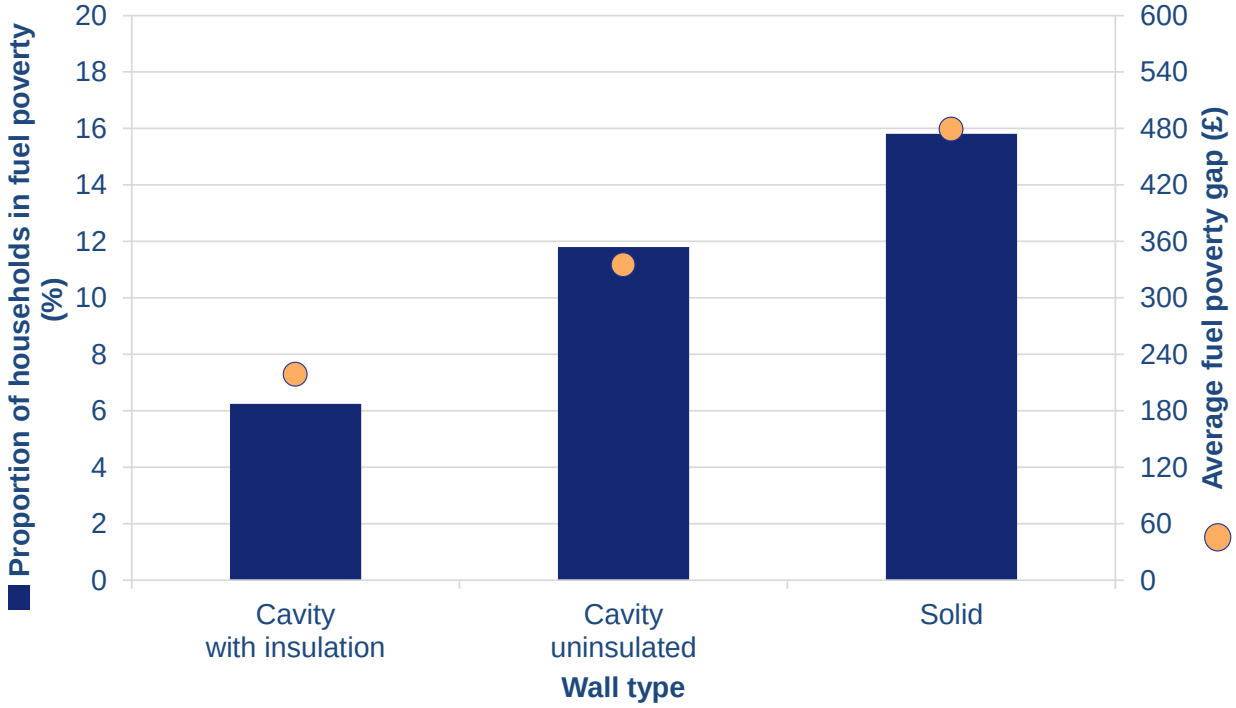
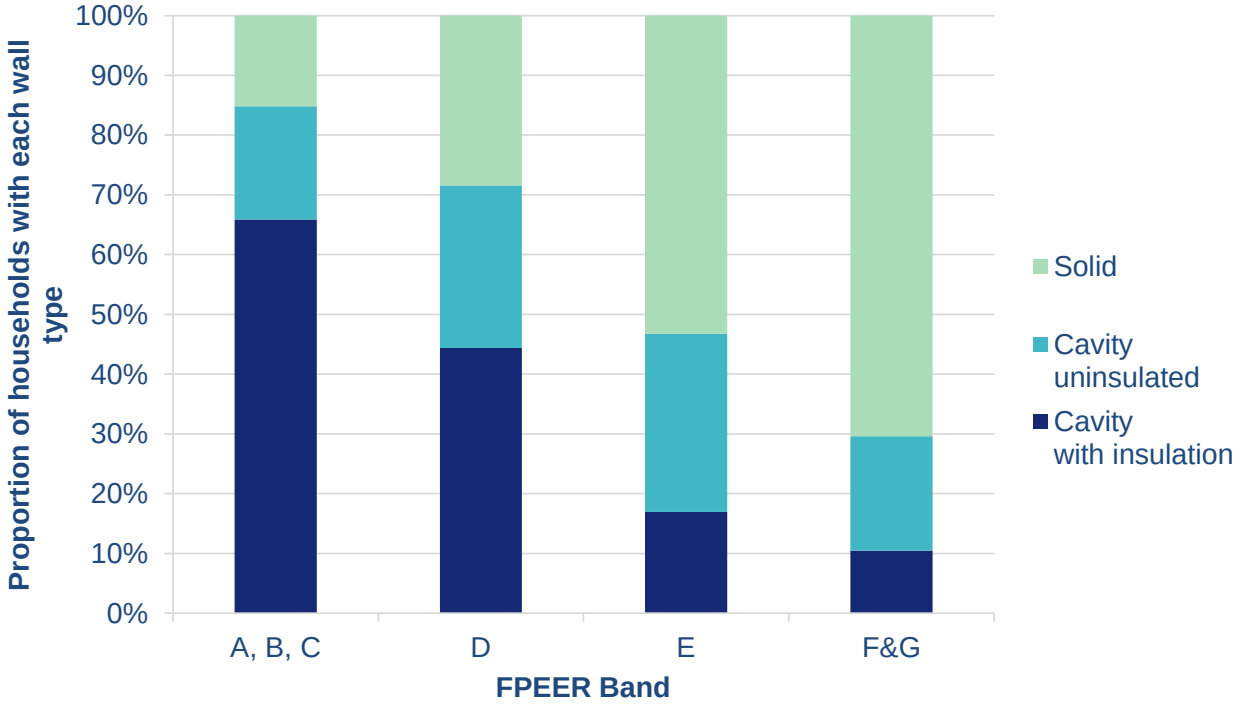


Table 3.2: Average energy requirements by wall type

	Average energy requirements (kWh)
Cavity insulated	17,278
Cavity uninsulated	20,384
Other/Solid	23,289

As shown in Figure 3.6, wall type is closely correlated with FPEER. The majority of households rated as *C* or above, have *insulated* cavity walls. In contrast, the majority of households rated *F* and *G* are of *solid* wall construction. As seen in Section 3.1.1, there is a much higher proportion of fuel poor households in dwellings rated *F* and *G*, and this is correlated with wall type.

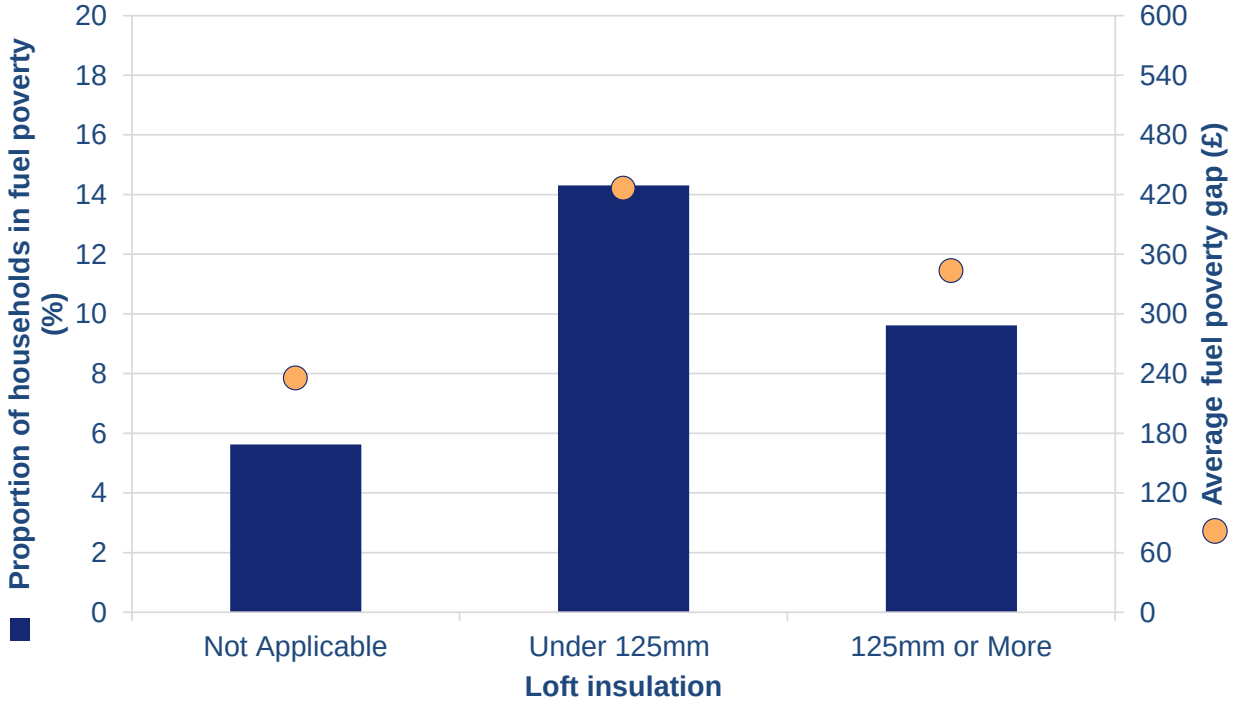
Figure 3.6: Proportion of all households by wall type, 2014



3.1.3 Loft insulation

Similar to wall insulation, the prevalence and depth of fuel poverty is lowest for properties with greater insulation. If a household has 125 mm or more of loft insulation, fuel poverty rates decrease from 14.3 per cent to 9.6 per cent; and the average fuel poverty gap decreases from £426 to £343 (see Figure 3.7). Households that are classed as 'not applicable' include purpose built and converted flats, excluding any top floor flats. Flats tend to be smaller in size and insulated by surrounding flats, lowering their energy requirements. These properties have both the lowest levels of fuel poverty and average fuel poverty gap.

Figure 3.7: Fuel poverty and average fuel poverty gap by loft insulation type, 2014



3.1.4 Floor area[25]

The likelihood of being fuel poor increases as dwelling size increases; rising from 5.4 per cent of houses that are less than 50 square meters, to 12.7 per cent of houses that are 110 square metres or more (see Figure 3.8). Fuel poor households in the largest homes tend to be deeper in fuel poverty – the average fuel poverty gap for the smallest homes is around £235, compared to around £640 for the largest homes. Households in larger properties tend to have larger energy costs compared to smaller homes. This may be due to a combination of the composition of the household, and having a larger area to heat. This explains why properties with a floor area of 110 square metres and above have a much larger fuel poverty gap (see Table 3.3).

[25] Figures around the floor area have been slightly revised due to a correction in the categorisation of the boundaries.

Figure 3.8: Fuel poverty and average fuel poverty gap by floor area, 2014

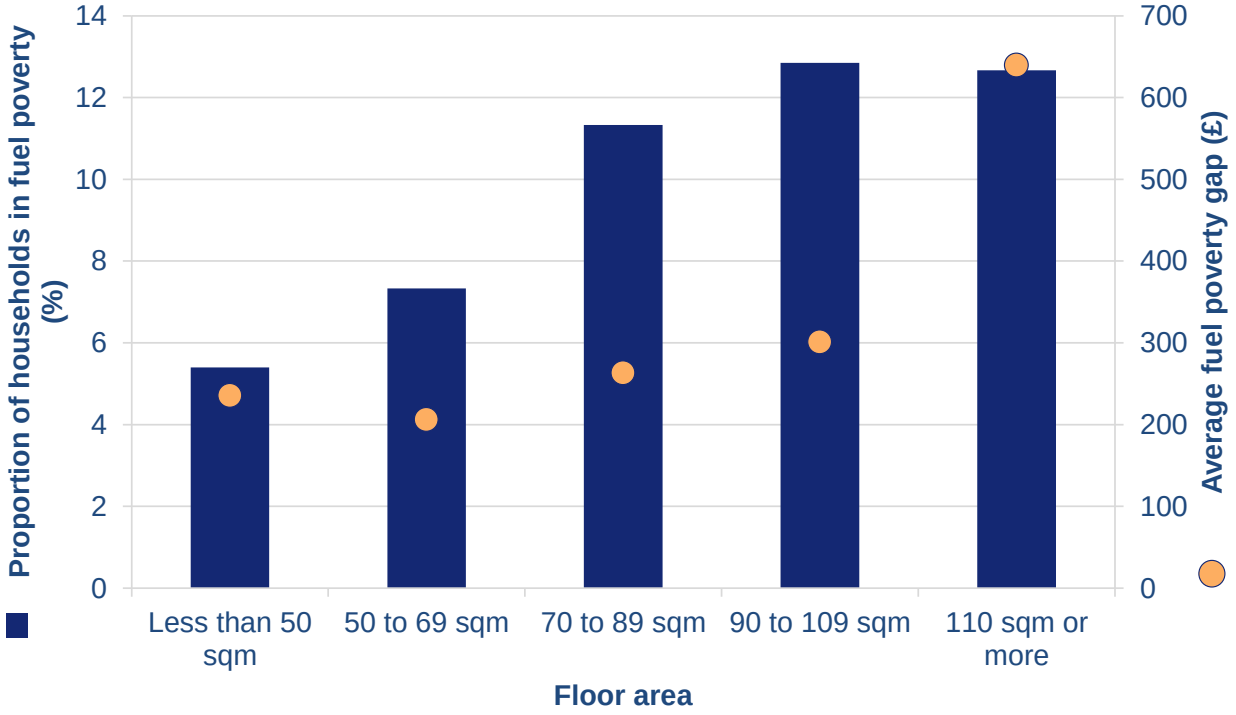


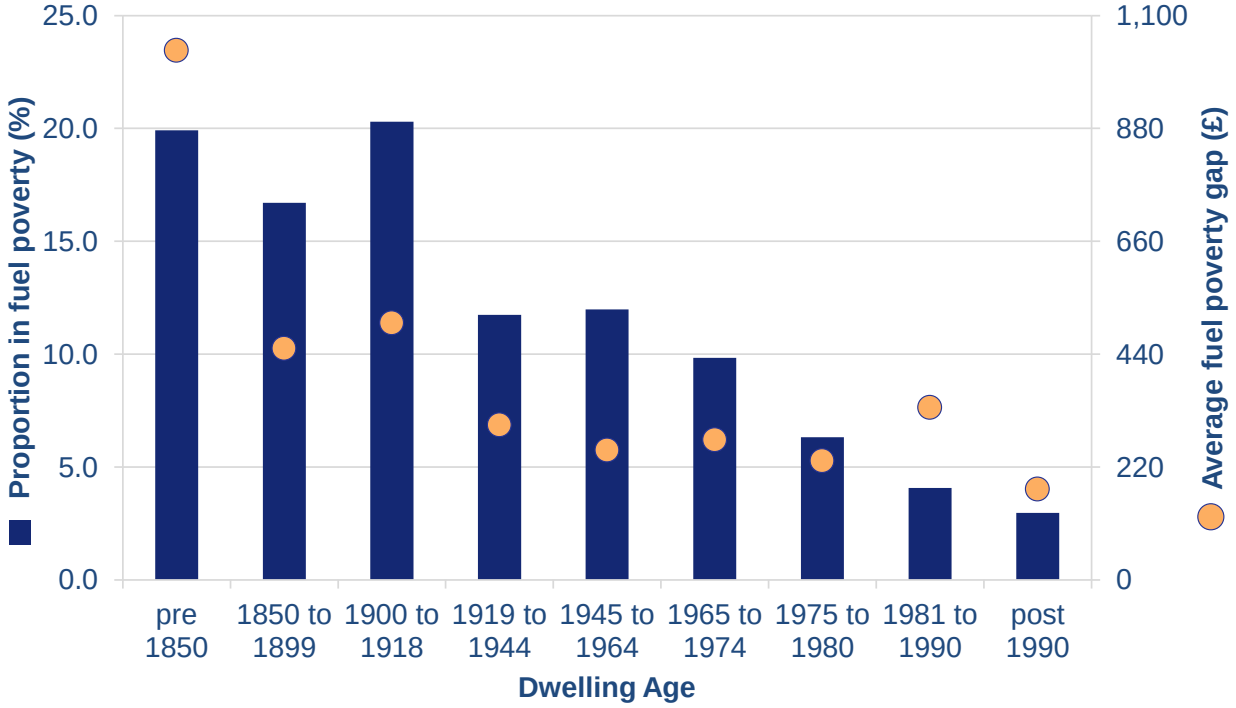
Table 3.3: Median unequivalised fuel costs by floor area, 2014

	Median unequivalised fuel costs (£)
Less than 50 sqm	849
50 to 69 sqm	1,052
70 to 89 sqm	1,266
90 to 109 sqm	1,395
110 sqm or more	1,707
Overall population	1,284

3.1.5 Dwelling Age

The age of a building interacts with fuel poverty levels. Older dwellings have a higher proportion of households in fuel poverty compared to newer dwellings. In 2014, 19.9 per cent of households living in a dwelling built pre-1850 were fuel poor; this is compared to just three per cent of dwellings built post-1990. There is also a large difference in the average fuel poverty gap between the oldest and newest builds with pre-1850 dwellings at £1,032 compared to the newest at £177. Figure 3.9 shows *all* categories of dwelling age by the proportion and depth of fuel poverty.

Figure 3.9: Fuel poverty and average fuel poverty gap by age of dwelling, 2014



Large differences in fuel poverty levels between dwelling age are likely to be due to energy efficiency levels, which impact a household's energy requirements. Households built pre-1919 have a much higher proportion of solid wall rather than cavity walls construction (see Figure 3.10 below). As discussed in Section 3.1.2, households with solid walls have much higher energy requirements and prevalence of fuel poverty.

Wall type by dwelling age correlates well with average household energy costs. The large average gap seen in Figure 3.9 for dwellings aged pre-1850 is likely to be due to the much larger average energy costs seen in Figure 3.11. The large energy costs in this group are most likely the result of a combination of *all* energy efficiency measures of the dwelling, and not only solid walls. Otherwise, we would expect other older dwelling categories with a large proportion of solid wall households also to have high energy costs and correlating average fuel poverty gaps.

Figure 3.10: Proportion of all households by wall type and age of dwelling, 2014

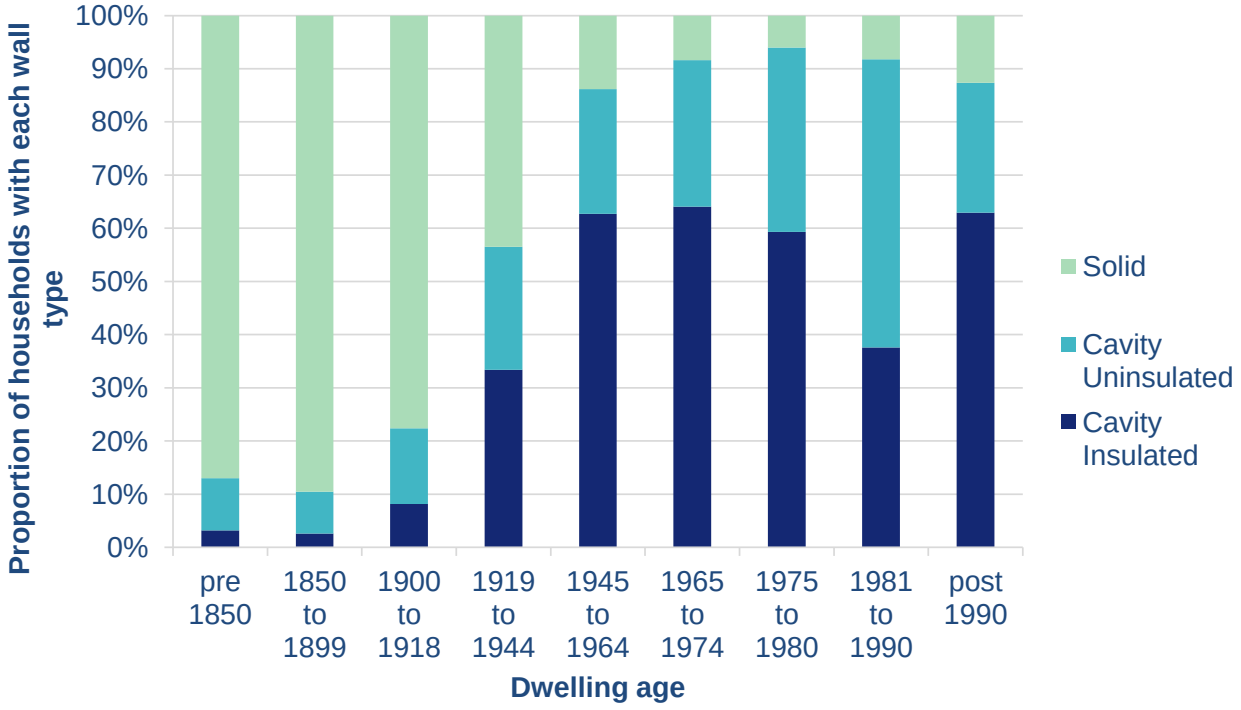
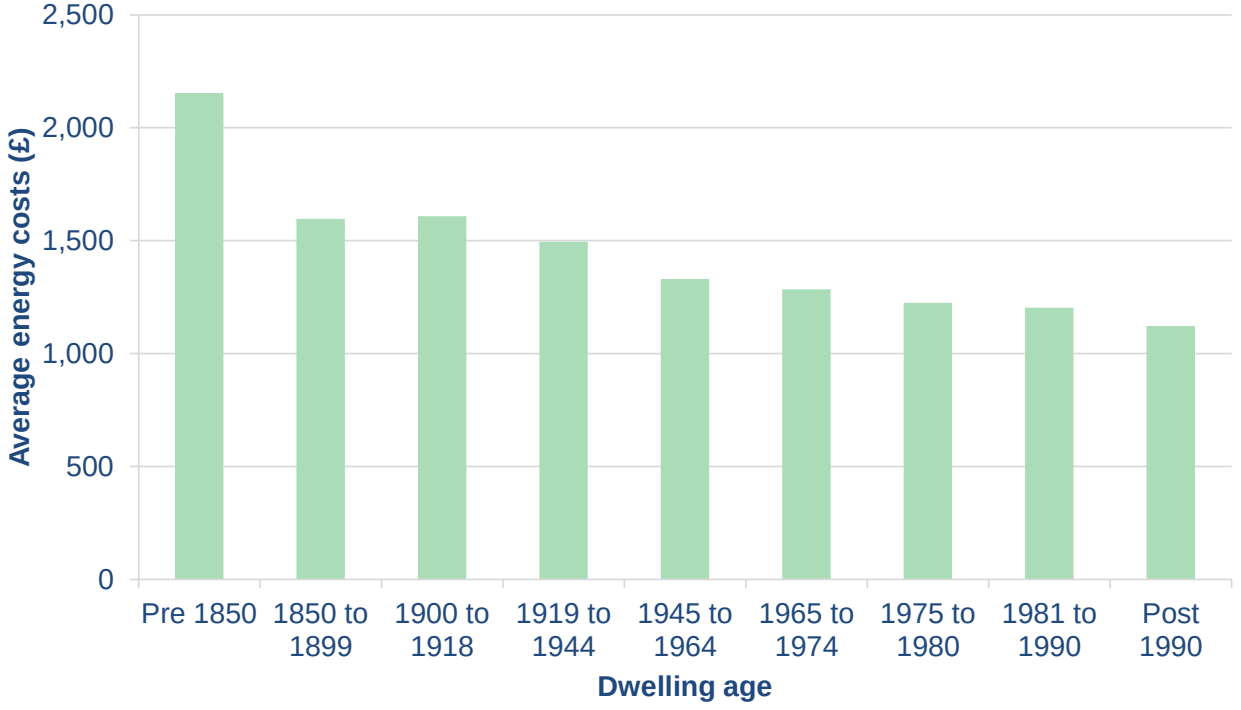


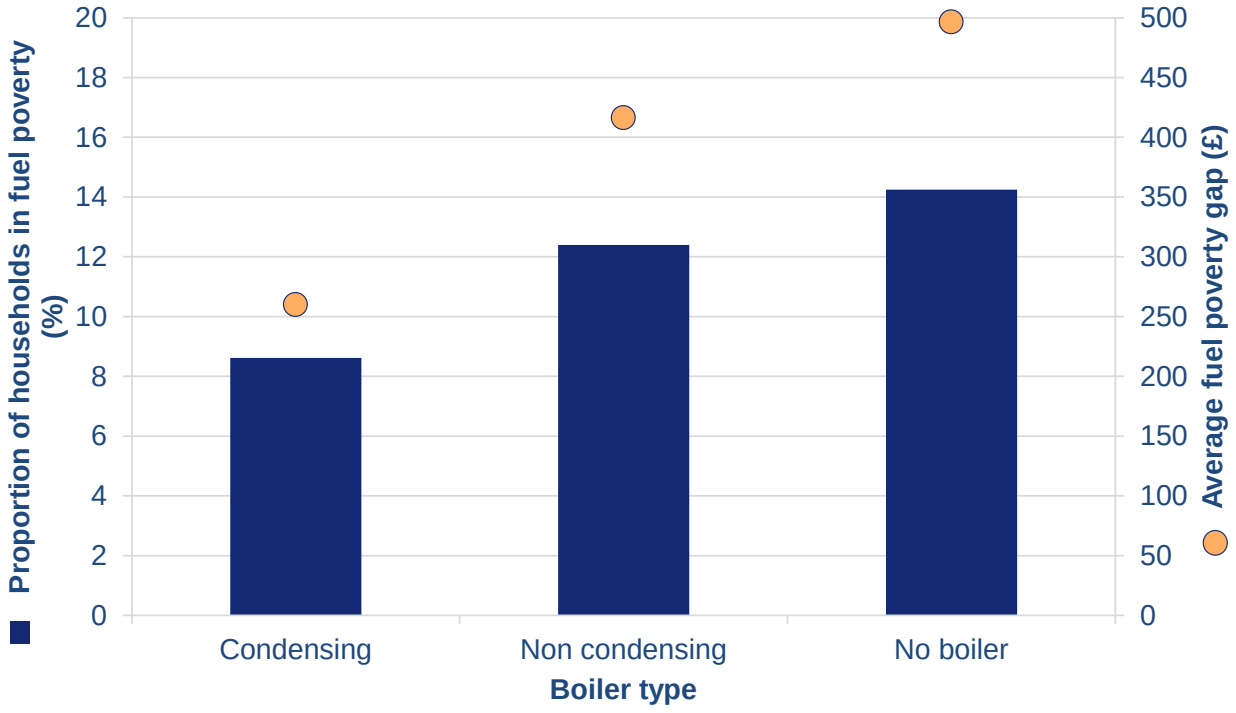
Figure 3.11: Average energy costs by age of dwelling, 2014



3.1.6 Boiler type

Condensing boilers are typically more energy efficient – they take air directly from outside through a flue, whereas non-condensing boilers tend to take air from inside the property. Figure 3.12 shows that households with a condensing boiler are least likely to be fuel poor, with lower than average fuel poverty levels (8.6%), compared to households with a non-condensing boiler (12.4%) or no boiler (14.3%), which both see higher than average fuel poverty levels. The depth of fuel poverty follows the same pattern - properties with a condensing boiler have an average fuel poverty gap of £287 compared to properties with a non-condensing boiler (£416) and those with no boiler (£496).

Figure 3.12: Fuel poverty and average fuel poverty gap by boiler type, 2014

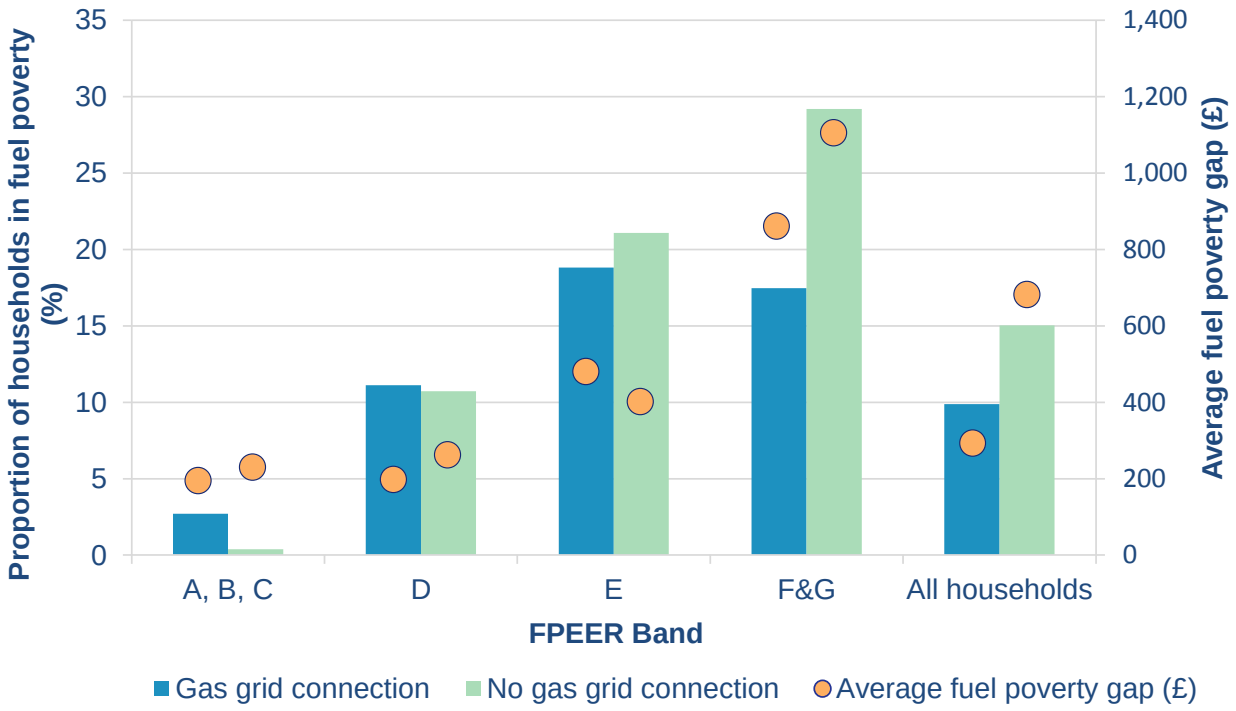


3.1.7 Gas grid connection

In general, mains gas is the cheapest fuel for providing heat to a home, and properties *not* connected to the gas network use more expensive alternatives. In 2014, approximately 15.0 per cent of all households that were *not* connected to the gas grid were classed as fuel poor, compared to 9.9 per cent of households that *were* connected to the gas grid (Figure 3.13). This trend has remained relatively stable over time, where 16.7 per cent of properties that were *not* connected to the gas grid were classed as fuel poor, compared to 10.9 per cent of properties connected to the gas grid in 2003.

However, when split by FPEER rating, the level of fuel poverty and the average fuel poverty gap is highest for households rated in Bands *F* and *G* with *no* gas grid connection. This is due to the high cost of heating a household when not connected to mains gas, in conjunction with a low energy efficiency rating, both of which would increase energy costs and the likelihood of being fuel poor.

Figure 3.13: Fuel poverty and average fuel poverty gap by gas grid connection, 2014

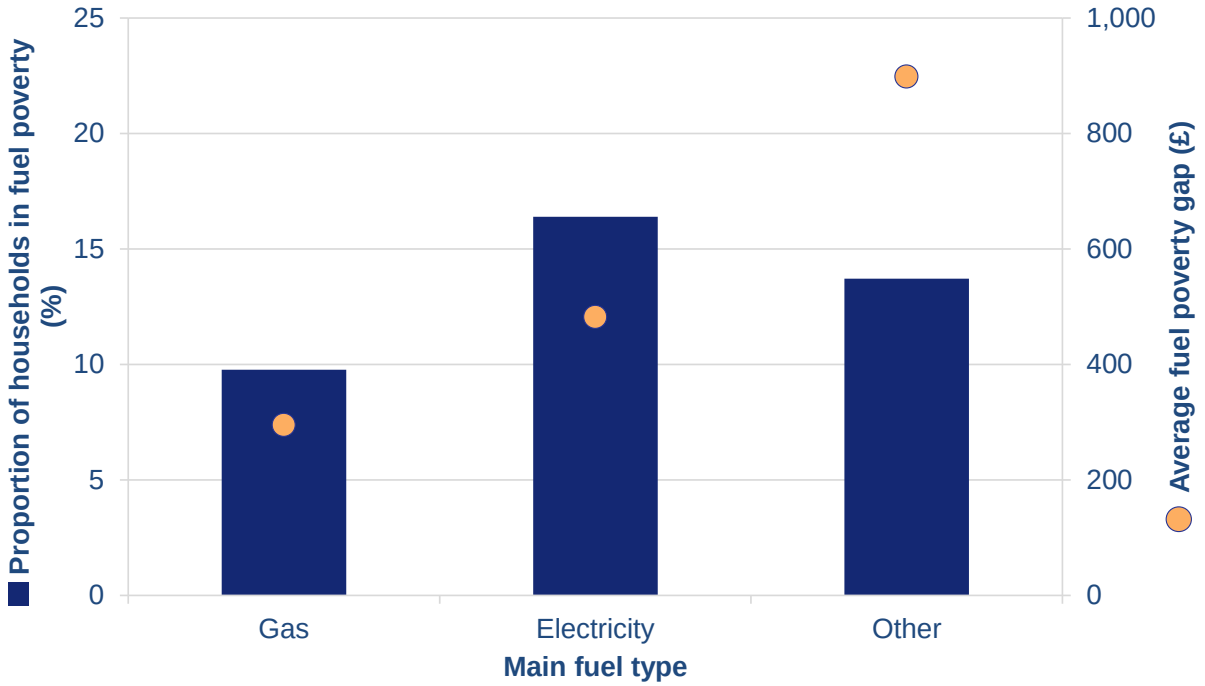


3.1.8 Main fuel type

Main fuel relates to the *type* of fuel that is used to heat the house. Mains gas is the most common type with 85.4 per cent of all households using this. 98.2 per cent of properties that have a gas grid connection use gas as their main fuel type. All other households use electricity, or 'other'[26] fuels. Those with electricity as their main fuel type are more likely to be in fuel poverty (see Figure 3.14). However, the average fuel poverty gap is greatest for those using other fuel types. This is likely to be due to the higher cost associated with these fuels.

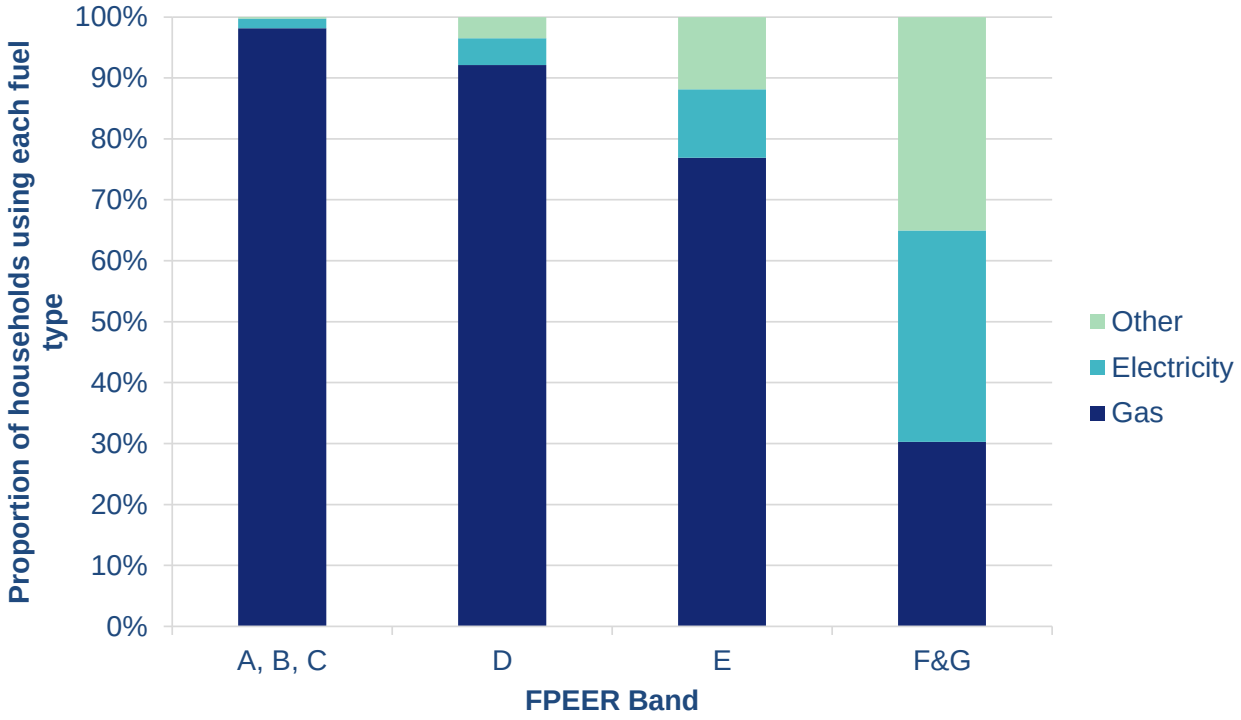
[26] 'other' includes heating oil, solid fuels, bottled gas and heating from a communal boiler.

3.14: Fuel poverty and average fuel poverty gap by main fuel type, 2014



The majority of households with an FPEER rating of *C* or above use mains gas as their primary fuel type (see Figure 3.15). However, households rated as *F* or *G* have the highest proportion of households using 'other' fuel types, therefore increasing their likelihood of being fuel poor.

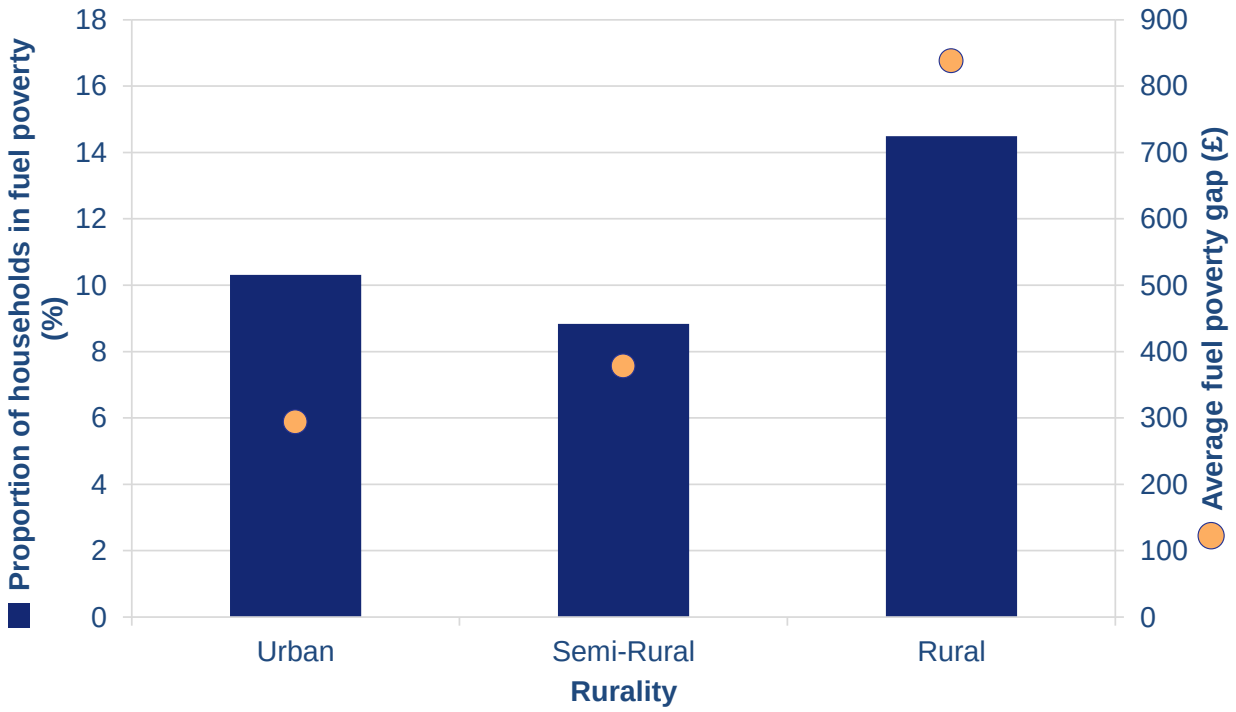
Figure 3.15: Proportion of households by main fuel type, 2014



3.1.9 Rurality

Households living in an area classified as *rural*[27], have the highest proportion living in fuel poverty and the largest fuel poverty gap. Figure 3.16 shows that fuel poverty is similar in areas classified as urban and semi-rural. More isolated households may have higher fuel poverty due to fewer of these households having a gas connection. Around 90 per cent of both urban (91.4 per cent) and semi-rural (87.1 per cent) households have a gas connection compared to only 49.1 per cent of those in rural areas.

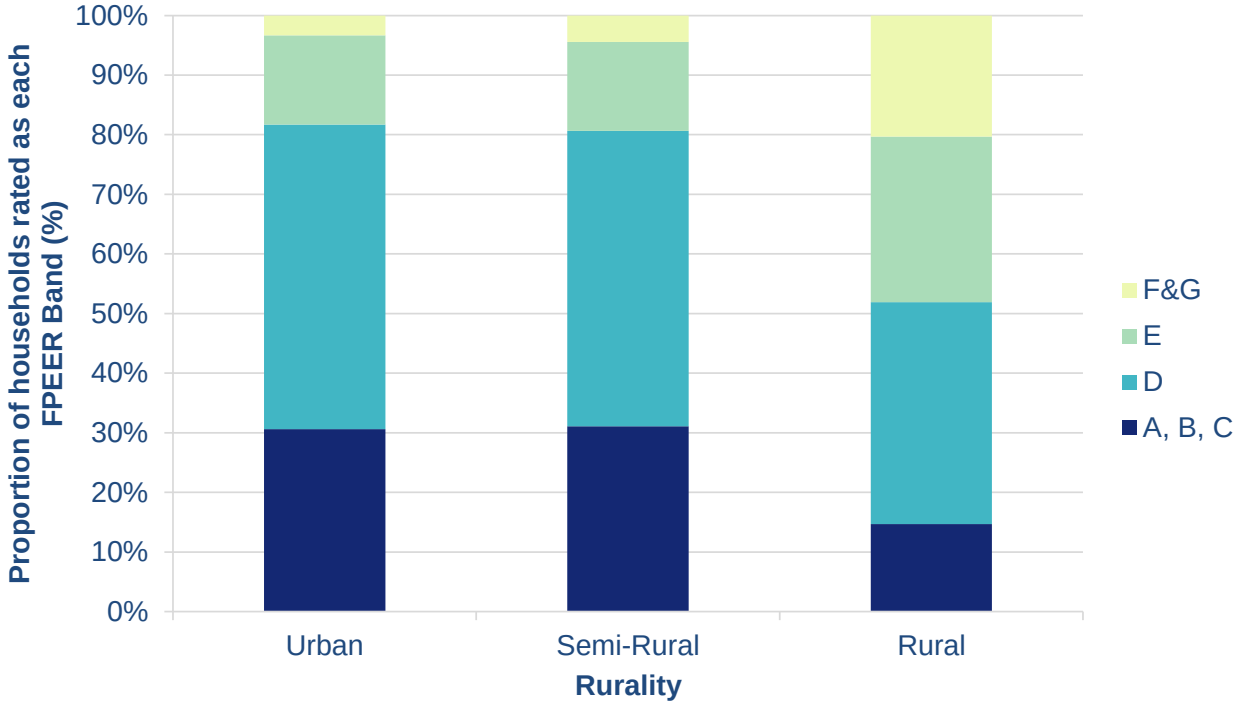
Figure 3.16: Fuel poverty and average fuel poverty gap by rurality, 2014



The proportion of households within each FPEER Band differs by rurality. Overall, urban properties have a lower proportion of households rated as *F* or *G*, and more households rated as *C* or above. Rural areas have a much greater proportion of *F* and *G* rated households; 20.3 per cent compared to just 3.3 per cent for urban areas (see Figure 3.17). This could explain why there is a much higher proportion of rural households in fuel poverty, and why their average gap is much greater.

[27] 'Rural' – Villages, hamlets and isolated dwellings; 'Semi-Rural' – Towns and fringe; 'Urban' – Urban. Rurality definitions from ONS https://www.gov.uk/government/collections/rural-urban-definition

Figure 3.17: Proportion of households by rurality and FPEER Band, 2014



3.1.10 Region

There are a number of regional differences affecting the level and depth of fuel poverty. These differences tend to reflect the age of the housing stock, the climatic conditions and relative income levels across the country.

Figure 3.18 shows that households in the West Midlands, South West and North East of England have the highest proportion of households in fuel poverty, with over 12 per cent of households classed as fuel poor in each region. Households in the South East and East have the lowest levels of fuel poverty at around eight per cent. As seen last year, the North East has the lowest fuel poverty gap at £256; the South West has the largest fuel poverty gap at £498; and the remaining regions sit around the average (£371).

Figure 3.18: Fuel poverty and average fuel poverty gap by region, 2014

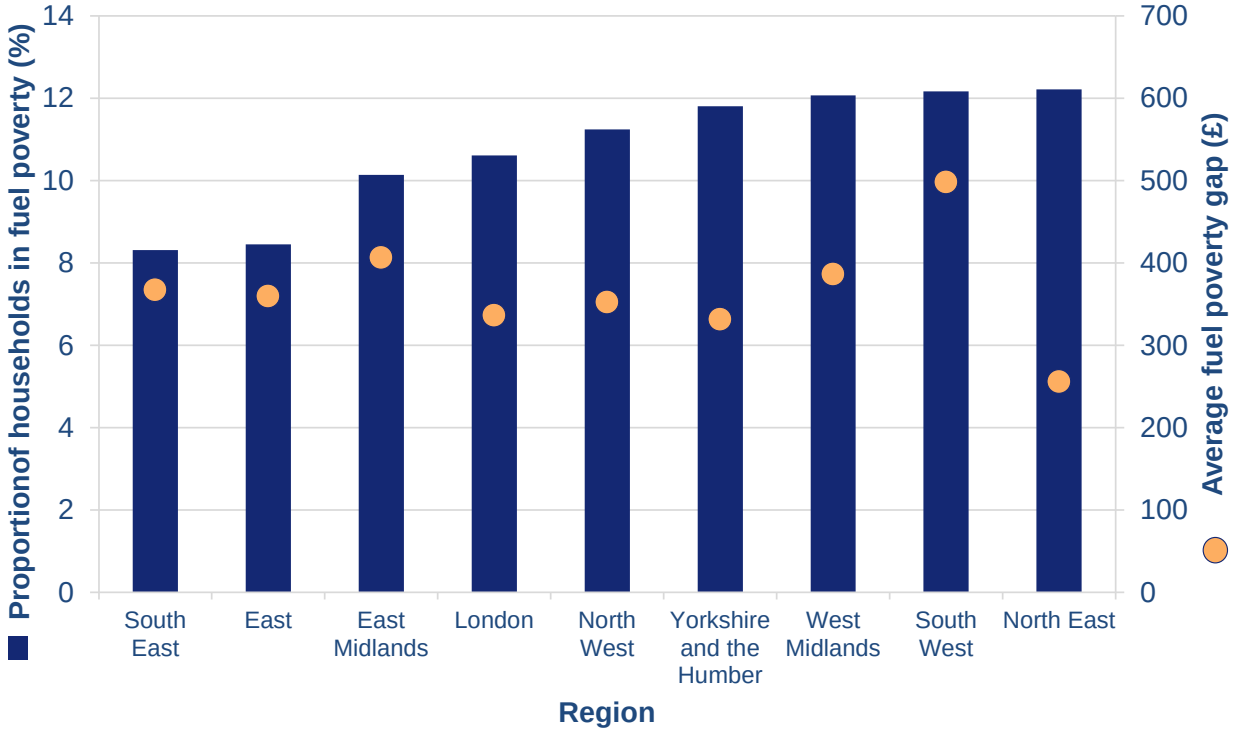


Figure 3.19 shows that, between 2003 and 2014, the North East and Yorkshire and the Humber have both seen the largest percentage decrease in fuel poverty levels, from over 17.0 per cent in 2003, to approximately 12.0 per cent in 2014, whereas in London, the proportion of households in fuel poverty has increased from 9.1 per cent to 10.6 per cent during the same period.

In general, regions with higher fuel poverty rates tend to have lower average incomes. Table 3.4 shows that three out of the four regions with the highest levels of fuel poverty (West Midlands, the North East and Yorkshire and the Humber) have a median equivalised after housing cost (AHC) income lower than the overall population. However, a combination of better insulation measures and access to the gas grid, counteract the depth of the fuel poverty experienced.

Figure 3.19: Fuel poverty by region, 2003-2014

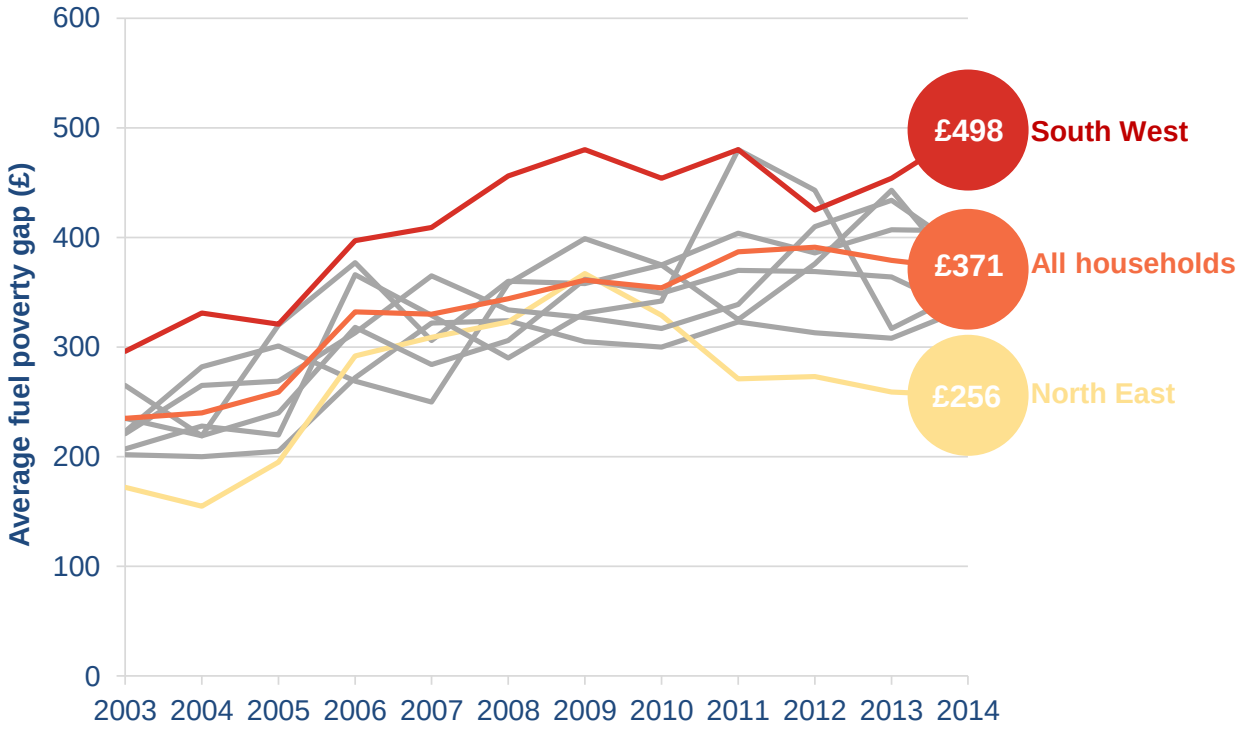
Table 3.4: Median equivalised after housing cost (AHC) income by region, 2014

	Median equivalised AHC income (£)
North East	18,519
West Midlands	19,274
North West	19,758
Yorkshire and the Humber	19,972
North West	19,758
London	20,329
South West	21,267
East Midlands	21,359
East	21,952
Overall population	20,729

Figure 3.20 shows that in 2014, on average, the South West of England has the largest fuel poverty gap (£498) and the North East has the lowest (£256). There has been a relatively stable increase in the fuel poverty gap across all regions in England between 2003 and 2014. Most of the regions have a relatively similar fuel poverty gap except the largest and smallest. This is due to lower than average fuel costs for the North East and

higher than average fuel costs for the South West, and is further related to differences in access to the gas grid and energy efficiency measures.

Figure 3.20: Average fuel poverty gap by region, 2003-2014



More information and further geographical breakdowns can be found in the sub-regional experimental statistics publication at the following link:

https://www.gov.uk/government/statistics/2014-sub-regional-fuel-poverty-data-low-income-high-costs-indicator

3.2 Household Characteristics

Fuel poverty rates and the fuel poverty gap vary notably across household characteristics. This may be due either to differences in income, different energy requirements, or a combination of both, dependent on a household's composition.

Different tenure types impact the prevalence and depth of fuel poverty. Those living in owner occupied properties have the highest fuel poverty gap, and those living in local authority and housing association properties have the lowest fuel poverty gap. This is likely to be due to owner occupied properties having a relatively low median FPEER score (62.5) compared to those living in local authority and housing association properties (68.3 and 69.6, respectively).

The composition of a household has an impact on fuel poverty levels. Despite misconceptions, households composed of those aged over 60, either as a couple or one person, have one of the lowest levels of fuel poverty. Conversely, single parent households have the highest level of fuel poverty.

This is corroborated when looking at the age of household members. Older households (where the youngest member is over 75) have seen a downward trend in the levels of fuel poverty from 14.3 per cent to 5.1 per cent. In contrast, although younger households (where the oldest member is aged 16 to 24) have also seen a reduction in fuel poverty levels over time, they have a substantially higher proportion in fuel poverty (24.3 per cent).

Employment status of a household also impacts on fuel poverty. Those who are unemployed have the highest levels at 28 per cent, with the main driver relating to income.

Method of payment for both gas and electricity also affects the prevalence of fuel poverty and the average fuel poverty gap. Those with pre-payment meters are more likely to be fuel poor, but have a lower than average fuel poverty gap than those who pay by direct debit or standard credit.

3.2.1 Tenure

There are clear differences in fuel poverty rates and the average fuel poverty gap by tenure type[28]. These reflect both the nature of the housing stock and household characteristics typical to a households' tenure.

Figure 3.21 shows that the level of fuel poverty is highest in the private rented sector, with 20 per cent of households in fuel poverty. The *depth* of fuel poverty, however, follows a different pattern: owner occupied housing has the largest average fuel poverty gap (£437), followed by private rented (£372), housing association properties (£228) and local authority (£188).

[28] https://www.gov.uk/guidance/definitions-of-general-housing-terms

Figure 3.21: Fuel poverty and average fuel poverty gap by tenure, 2014

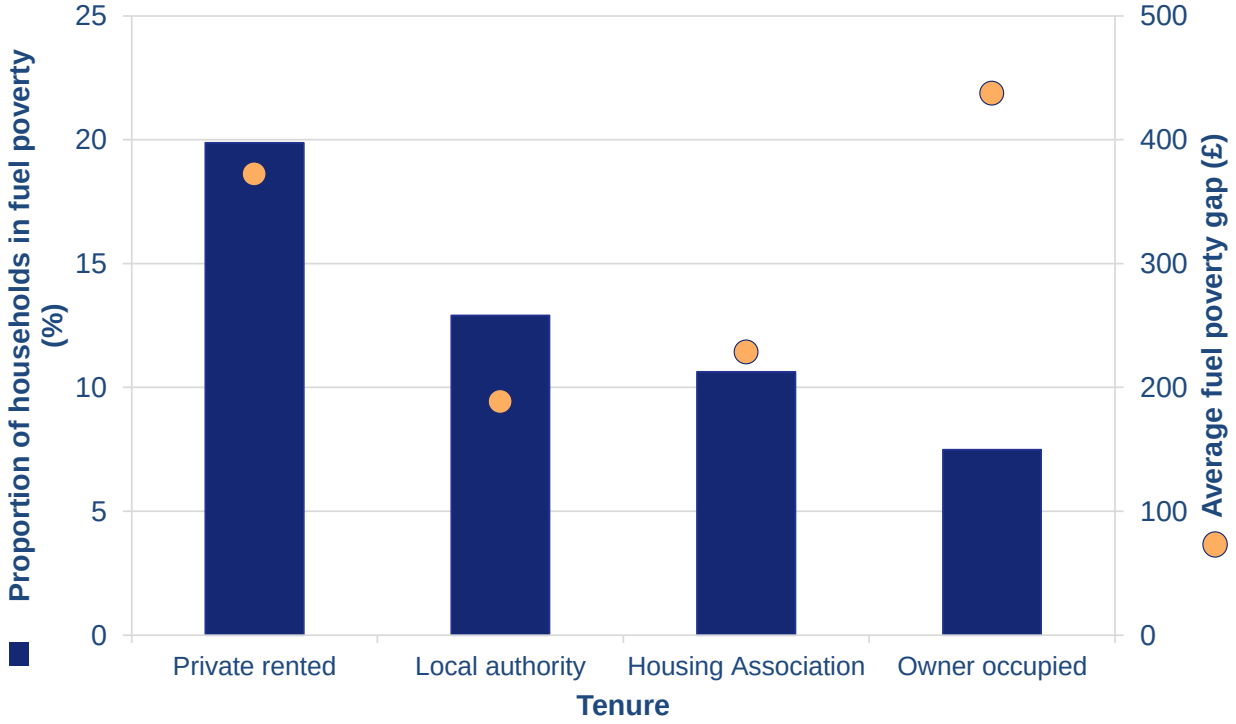


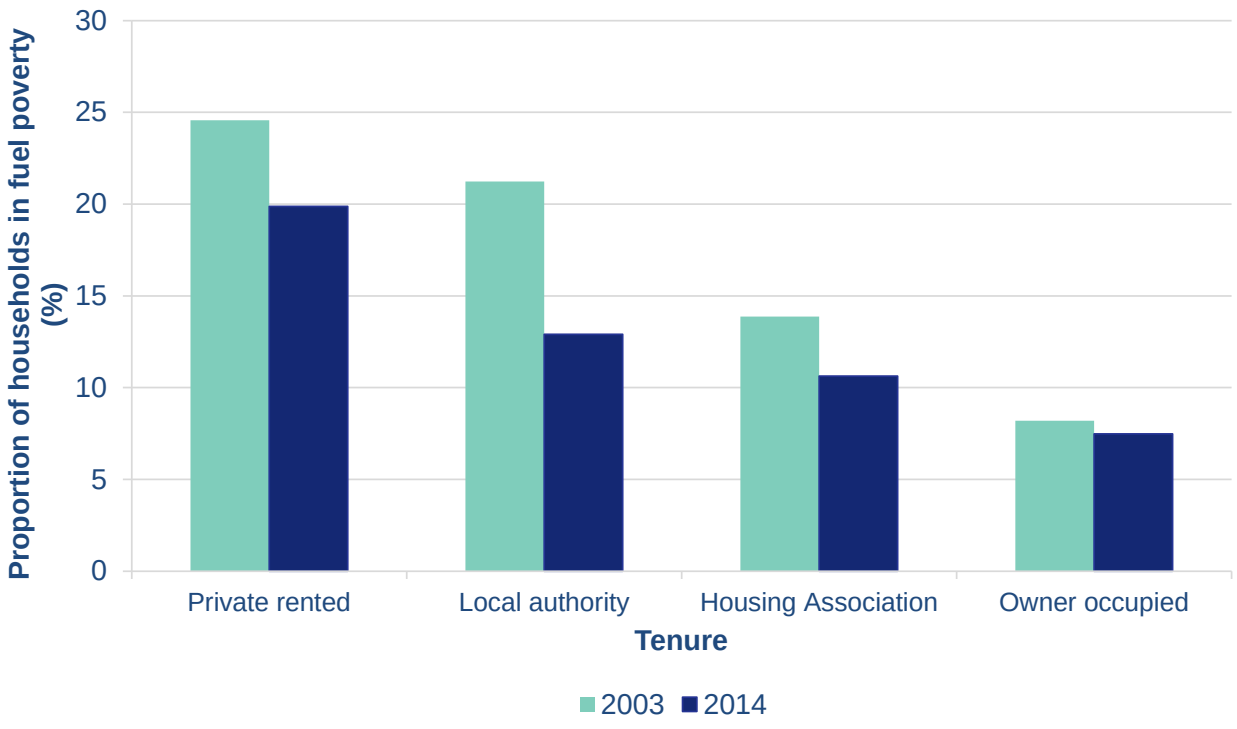
Table 3.5 shows that the median FPEER score is much higher for local authority and housing association properties than it is for owner occupied and private rented properties. This helps explain why the *depth* of fuel poverty is higher for owner occupied and private rented properties. Social housing tends to be better insulated, resulting in lower energy costs, and therefore, limiting the depth of fuel poverty within these property types.

Table 3.5: Median FPEER by tenure, 2014

	Median FPEER score
Private rented	62.9
Local authority	68.3
Housing association	69.6
Owner occupied	62.5
Overall population	63.7

Figure 3.22 shows that overall, the prevalence of fuel poverty has decreased across all tenure types since 2003, with the largest decrease seen within local authority housing (eight percentage points) and the smallest decrease seen for owner occupied housing (one percentage point).

Figure 3.22: Fuel poverty by tenure, 2003-2014

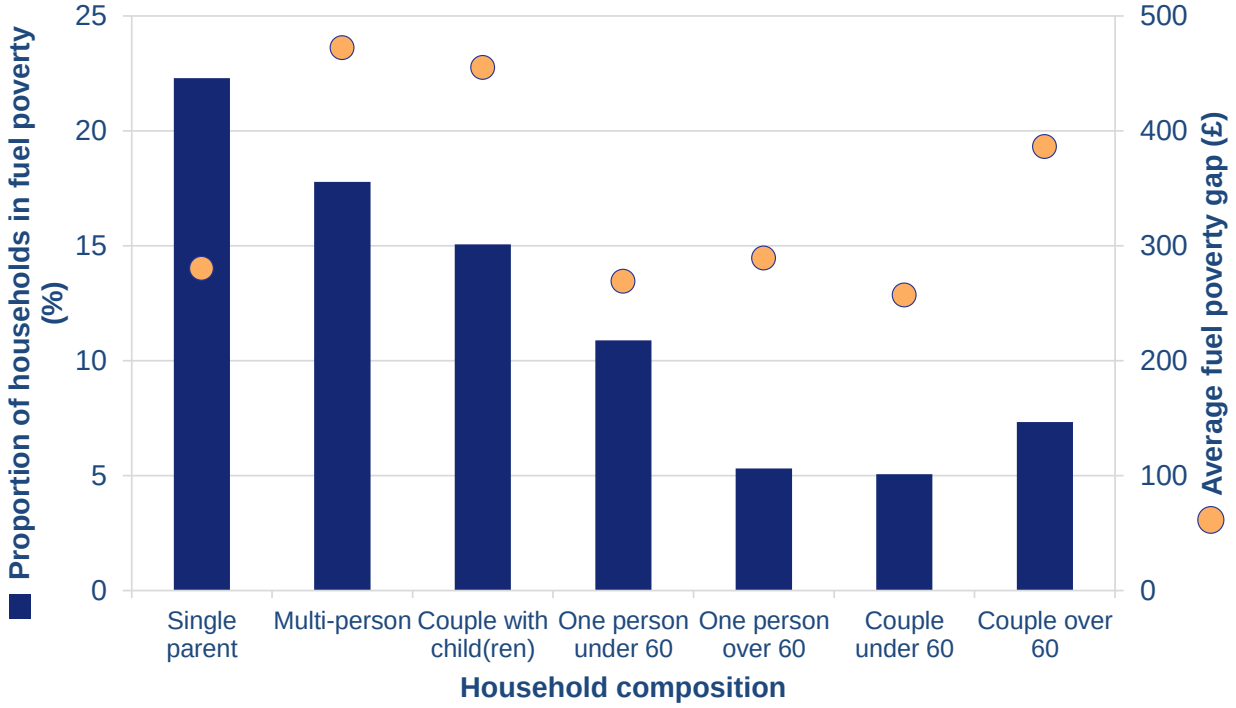


3.2.2 Household composition

The proportion of households in fuel poverty varies depending on composition. In 2014, those categorised[29] as *single parents* saw the highest proportion of households in fuel poverty (see Figure 3.23). However, the average fuel poverty gap for this group is among the lowest at £280, with multi-person households seeing the highest at £472.

[29] 'Couple with child(ren)' – Couple with dependent child(ren); 'Couple over 60' – Couple, no dependent child(ren) aged 60 or over; 'Couple under 60' – Couple, no dependent child(ren) under 60; 'Single parent' – Lone parent with dependent child(ren); 'One person over 60' – one person aged 60 or over; 'One person under 60' – one person; under 60; 'Multi-person' – Other multi-person households

Figure 3.23: fuel poverty and fuel poverty gap by household composition, 2014



Since 2003, single parents have consistently seen the highest proportion of households in fuel poverty, although this level has decreased over time from 27 per cent in 2003 to 22.3 per cent in 2014 (see Figure 3.2.4 below). There is also a downward trend in the proportion of fuel poor amongst one person households, with the most substantial fall in fuel poverty levels seen for households consisting of one person aged over 60; decreasing from 13.3 to 5.3 per cent between 2003 and 2014.

Why single parents have the highest prevalence of fuel poverty is likely to be related to income. The median after housing cost income for this group is one of the lowest, at around £13,000 a year, along with one person households.

A key differential in fuel poverty occurs when you consider the number of people in a household that the income must support. Single parents must support themselves, *as well as* their child(ren), which leaves them with less income to pay for energy costs and a higher likelihood of being in fuel poverty. Table 3.6 shows the after housing costs income for each household type, un-equivalised and equivalised (see key definitions box on page 10). This also shows that the equivalised income of one person households *without* children, have a much higher median income, as they only have themselves to support. This helps explains why we do not see high rates of fuel poverty among these groups.

Figure 3.24: Proportion of households in fuel poverty by household composition, 2003-2014

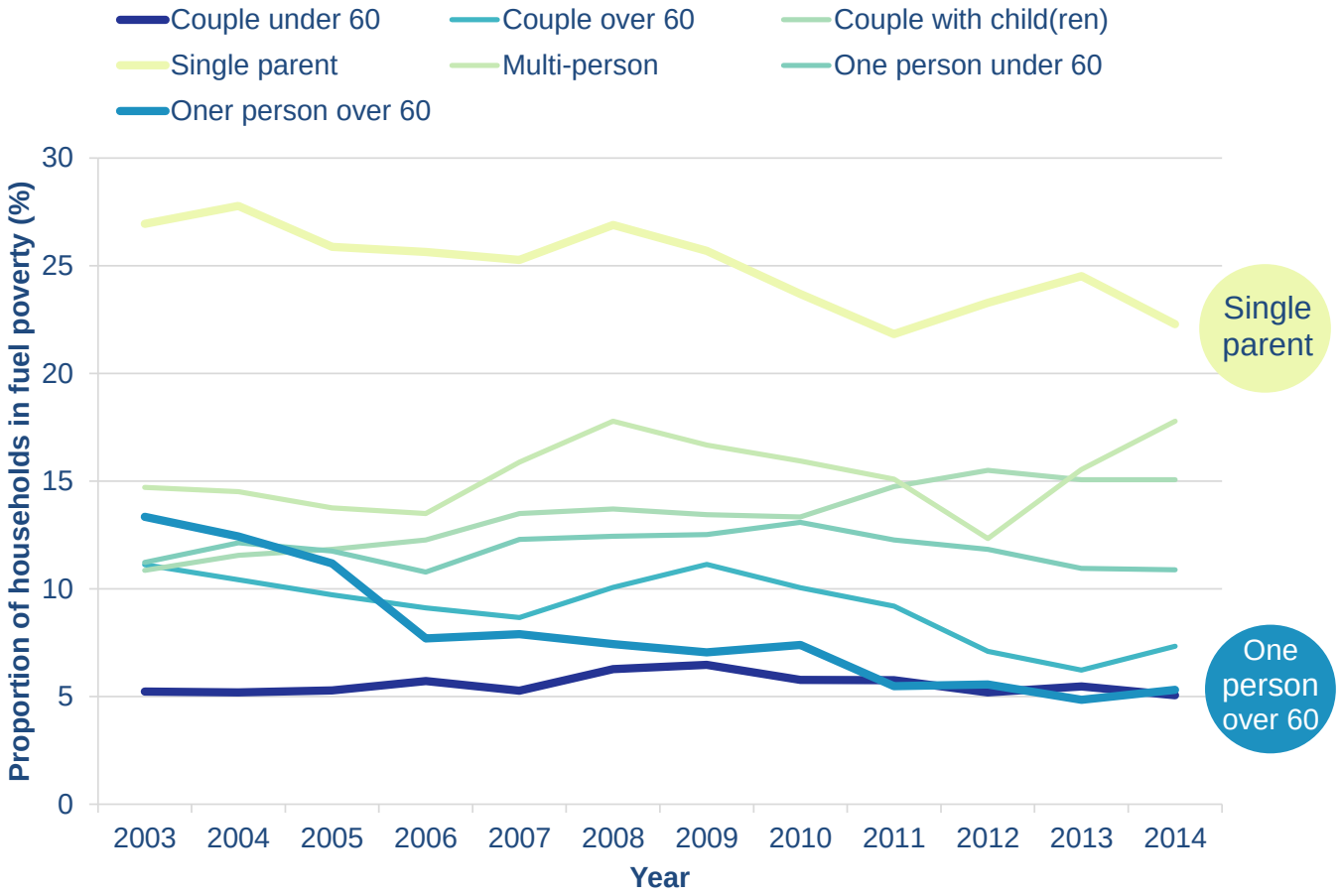


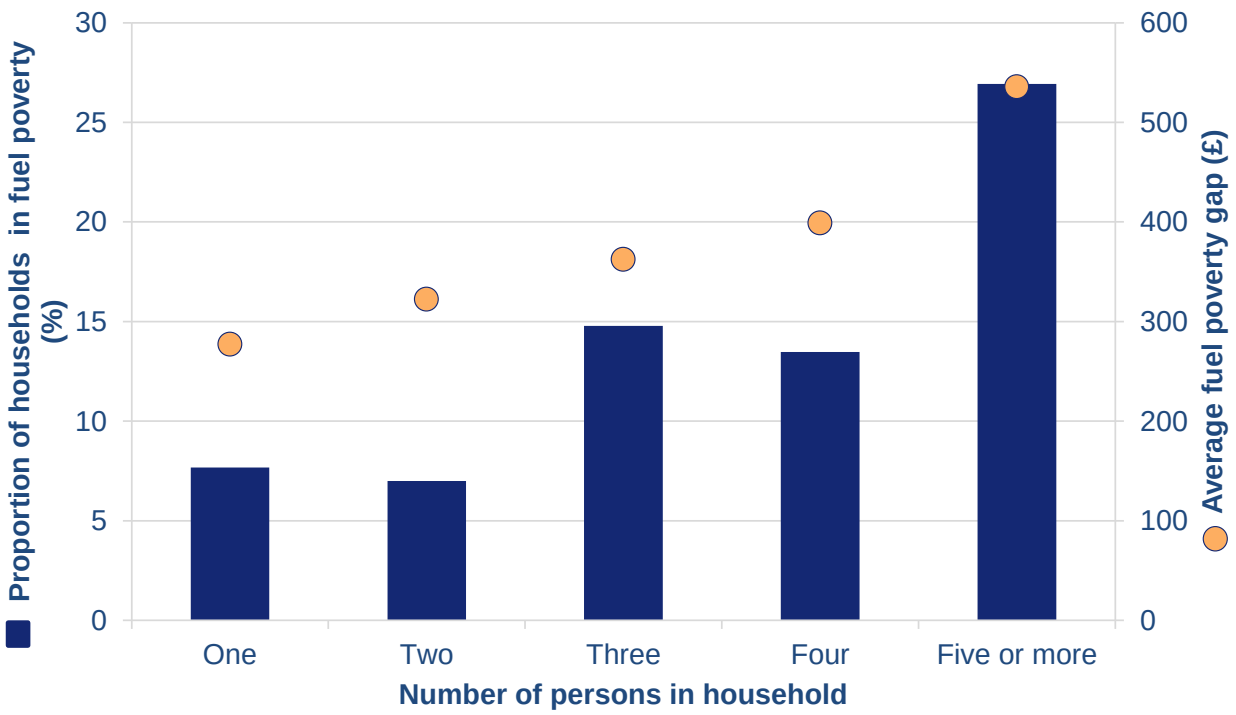
Table 3.6: Median AHC income by household composition, 2014

	Median AHC income	Median Equivalised AHC income
Single parent	**£13,191**	**£ 12,481**
Multi-person	£21,228	£ 17,665
Couple with child(ren)	£27,054	£ 17,917
One person under 60	**£10,741**	**£ 18,519**
One person over 60	**£12,153**	**£ 20,953**
Couple over 60	£25,551	£ 24,301
Couple under 60	£33,154	£ 28,627

3.2.3 Household size

Figure 3.25 shows that the proportion of households in fuel poverty, and the average fuel poverty gap, tends to increase as the number of people in the household increases. The proportion of households in fuel poverty is smallest for households with two people (7.0 per cent) and largest for households with five or more people (26.9 per cent). The average fuel poverty gap is smallest for single person households (£277) and largest for households with five people or more (£536).

Figure 3.25: Fuel poverty and average fuel poverty gap by number of persons in household, 2014



Between 2003 and 2014, fuel poverty levels for one and two person households has steadily decreased, whereas the proportion of households that are fuel poor with 3 or more people has steadily increased over the same period (Figure 3.26).

Similarly, the average fuel poverty gap has increased steadily since 2003 for households with four occupants or less. The average fuel poverty gap for five or more person households has seen the largest increase, from £296 to £536 in 2014. This trend appears to follow the national trend in domestic fuel prices (see Section 2.3.3 for discussion around domestic prices).

Figure 3.26: Fuel poverty by number of persons in household, 2003-2014

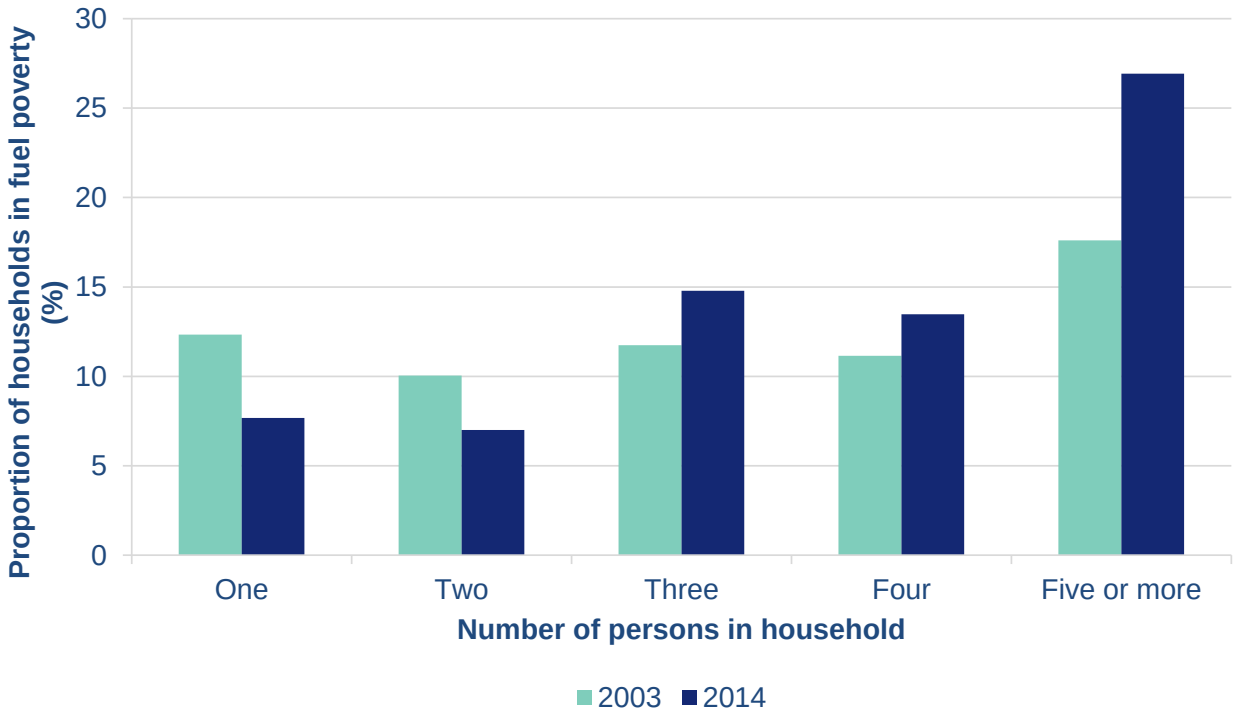
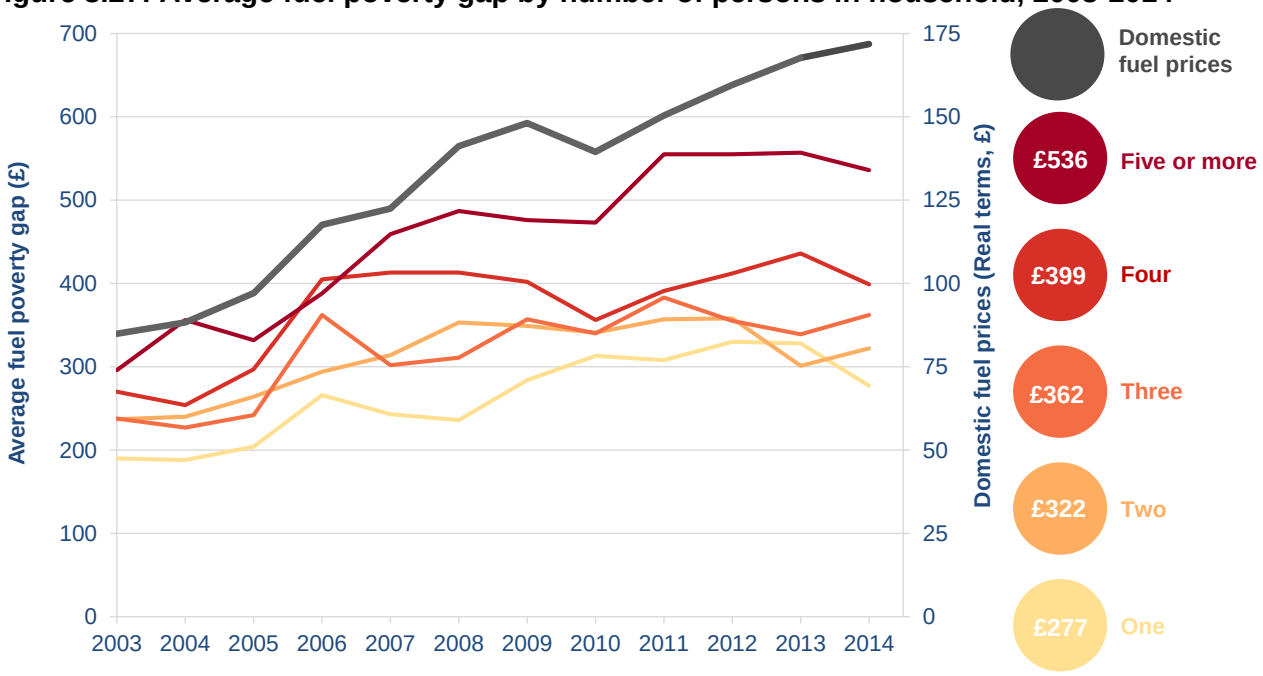


Figure 3.27: Average fuel poverty gap by number of persons in household, 2003-2014



3.2.4 Age

Age can be analysed in two different ways. Looking at the age of the *oldest* member of the household identifies younger households. Whereas, looking at the age of the *youngest* member of the household identifies older households. This allows us to distinguish between households with young children, and households that comprise solely of those aged 75 and over.

Age of the *oldest* member of the household has an impact on the levels of fuel poverty. Where the oldest member is aged 16 to 24 years, 24.3 per cent were fuel poor. This is likely to be a result of lower incomes for these households. As Table 3.7 shows, the average equivalised after housing costs income is much lower for the youngest households, with a median income of around £10,541 compared to £20,729 for *all* households.

Table 3.7: Median equivalised AHC income by age, 2014

	Median Equivalised AHC income
16 – 24	£ 10,541
25 – 34	£ 18,867
35 – 49	£ 19,097
50 – 59	£ 22,343
60 – 74	£ 23,559
75+	£ 21,222
Overall population	£ 20,729

Figure 3.28: Fuel poverty and average fuel poverty gap by age of the *oldest* member, 2003-2014

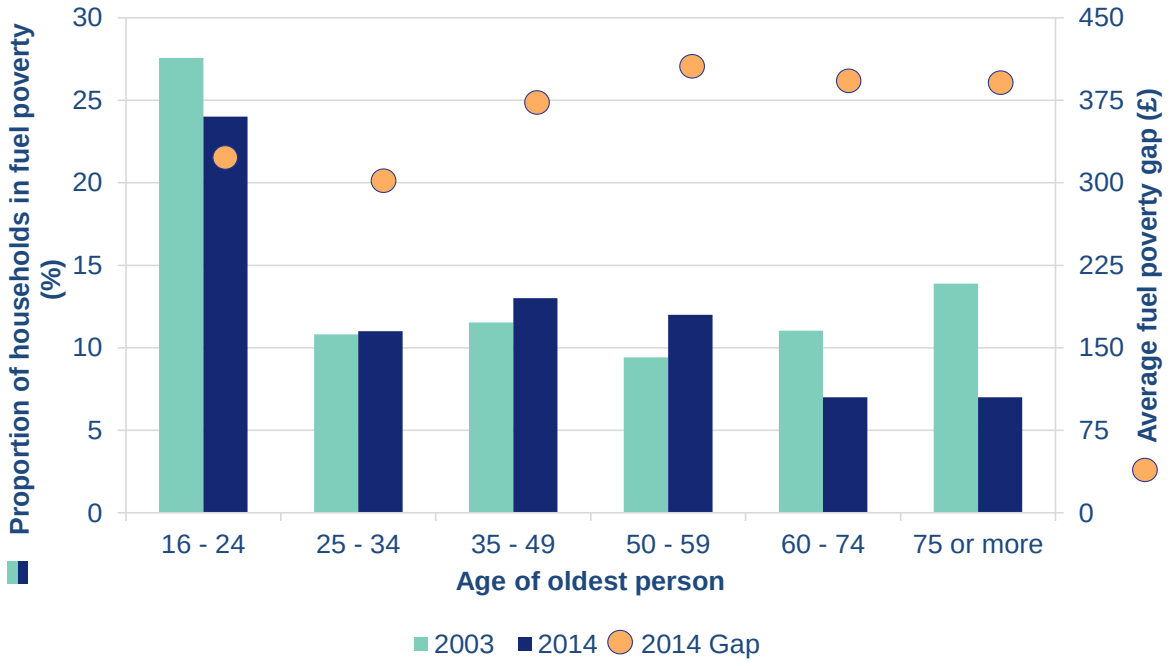
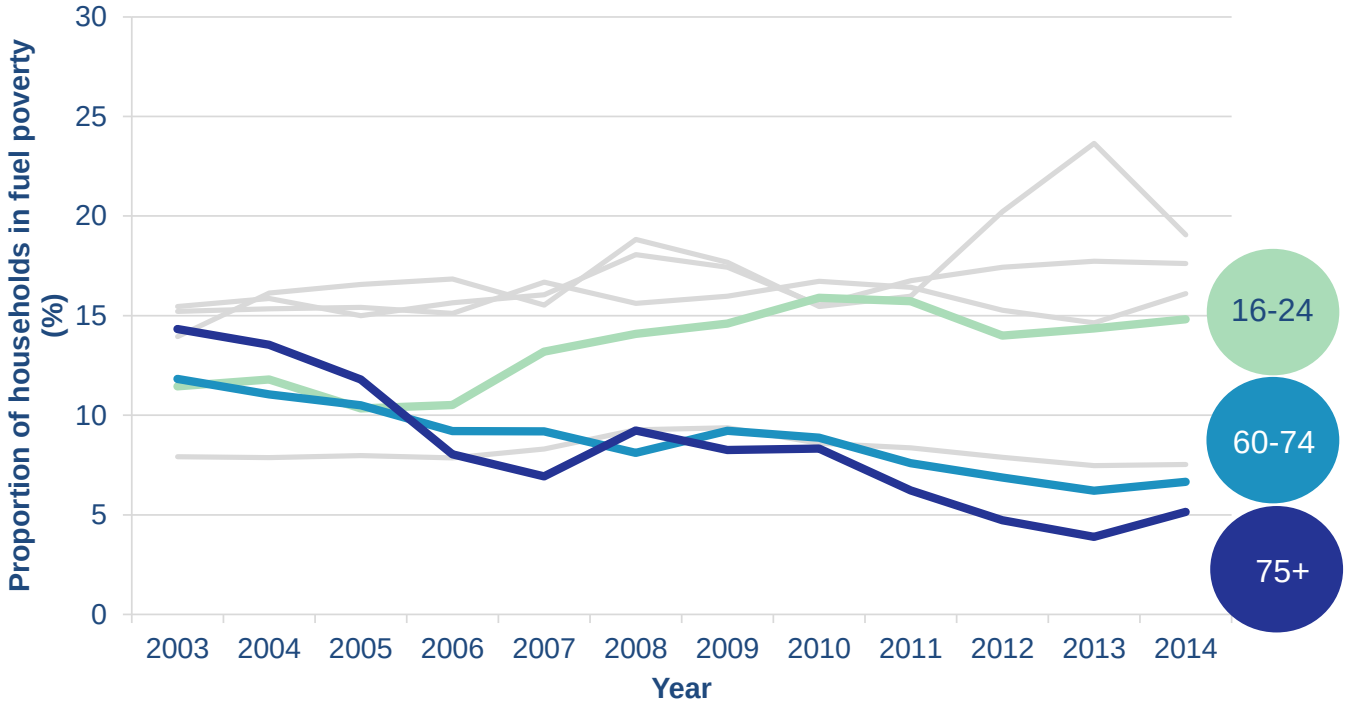


Figure 3.28 above, shows how the proportion of each age category in fuel poverty has changed since 2003. Those living in households where the oldest person was aged 75 or over had the second highest proportion living in fuel poverty in 2003. Since then, there has been a downward trend within this age group, and in 2014, they had the *lowest* proportion living in fuel poverty at just seven per cent.

Age of the *youngest* member of the household is also important to consider when looking at the effects of age on fuel poverty. Figure 3.29 below shows the proportion of households in fuel poverty by age band of the youngest person. The two dark blue lines highlight the two oldest household categories: ages 60 to 74 and 75 plus. There has been a downward trend in the proportion in fuel poverty within these age groups, suggesting that fuel poverty has markedly improved for the older ages compared to the rest of the population. Those where the youngest member of the household is aged 16 to 24 has seen an increase in fuel poverty levels. This group may also include those living alone at that age (see section above about age of oldest member of the household).

Figure 3.29: Proportion of households in fuel poverty by age of the *youngest* member, 2003-2014[30]



[30] In 2013, households where the youngest member is aged 11 to 15, saw a sharp increase in fuel poverty. However, this has since fallen in line with previous levels.

The number of households with children living in fuel poverty has remained fairly stable over time. In 2014, there were approximately 1.04 million fuel poor households with one or more children (around 4.6 per cent of all households).

3.3 Household income

By definition of the fuel poverty indicator (see key definition box on page 8), only households with *low* incomes can be classified as being fuel poor. Around 40 per cent of households in the lowest and second lowest income deciles are classed as fuel poor, and 12.3 per cent of those in income deciles three and four (combined). In 2014, the average fuel poverty gap did not differ greatly between income deciles, sitting around the average (£371) for each group.

3.3.1 Working status

There is a large difference in the number of fuel poor households between those that are working or inactive[31] (9.0 per cent and 11.5 per cent, respectively) compared to those that are unemployed (27.8 per cent) as seen in Figure 3.30. The equivalised after housing cost (AHC) incomes can be found in Table 3.8. This shows that the inactive group, which consists of 67 per cent of over 60s, have an equivalised AHC income that is higher than the unemployed group and closer to the working group. This is partially due to the low housing costs of many older households, who may own their home outright. However, the depth of fuel poverty for the working and inactive group is higher than the unemployed group. This may reflect the smaller properties, which tend to be occupied by unemployed households.

[31] 'Inactive' predominantly relates to those that are retired or students

Figure 3.30: Fuel poverty and average fuel poverty gap by working status, 2014

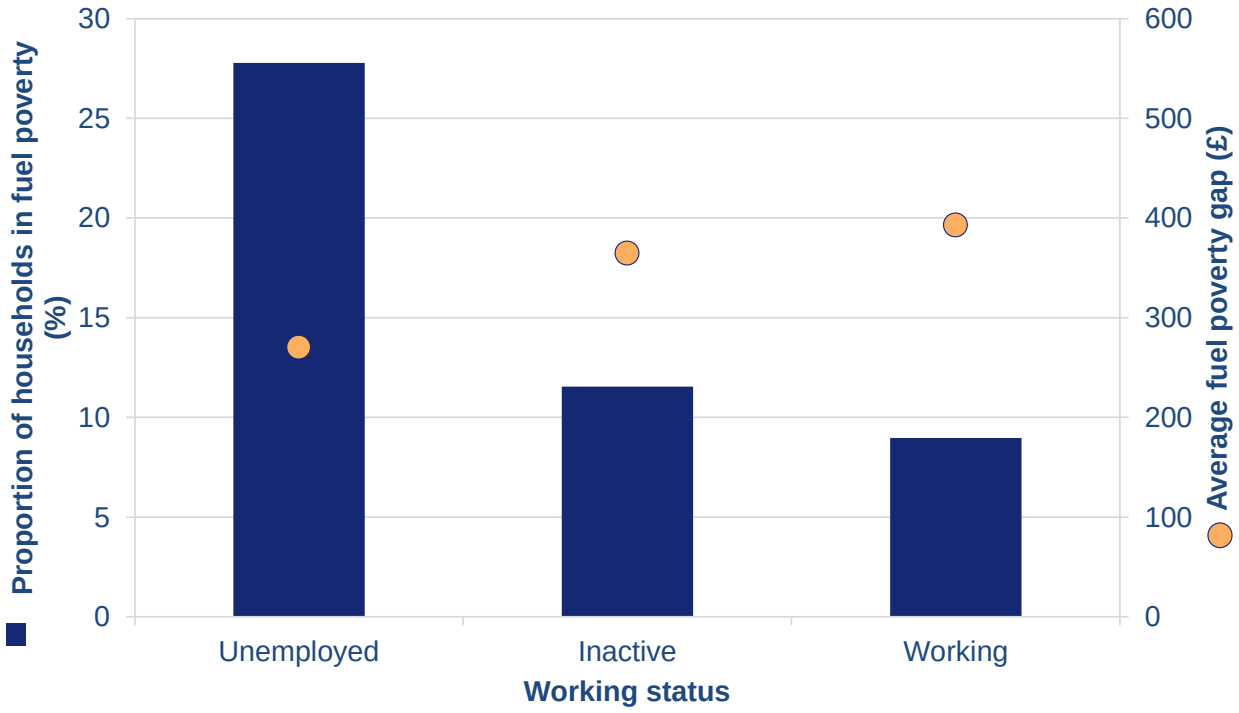


Table 3.8: Median equivalised after housing cost (AHC) income by working status, 2014

	Median equivalised AHC income (£)
Unemployed	8,371
Inactive	18,895
Working	23,404
Overall population	20,729

3.4 Fuel Payment type

For both gas and electricity, direct debit is the most common method of payment. The proportion of households paying by this method has increased steadily since 2003 (see Figures 3.31 and 3.32). This is typically the cheapest method of payment for both gas and electricity[32]. The proportion of fuel poor households are lower for direct debit for both gas and electricity customers, compared to all other payment types. This may be attributed to

[32] Average prices by method of payment can be found in the quarterly energy prices publication: https://www.gov.uk/government/statistical-data-sets/annual-domestic-energy-price-statistics

the lower costs associated with this payment method. However, a household is more likely to be fuel poor if using a pre-payment meter.

3.4.1 Gas payment method

In 2014, 62.2 per cent of households used direct debit to pay for gas, and 11.9 per cent had no gas connection, and this has remained fairly stable since 2003.

Figure 3.31: Method of payment – gas, 2003-2014

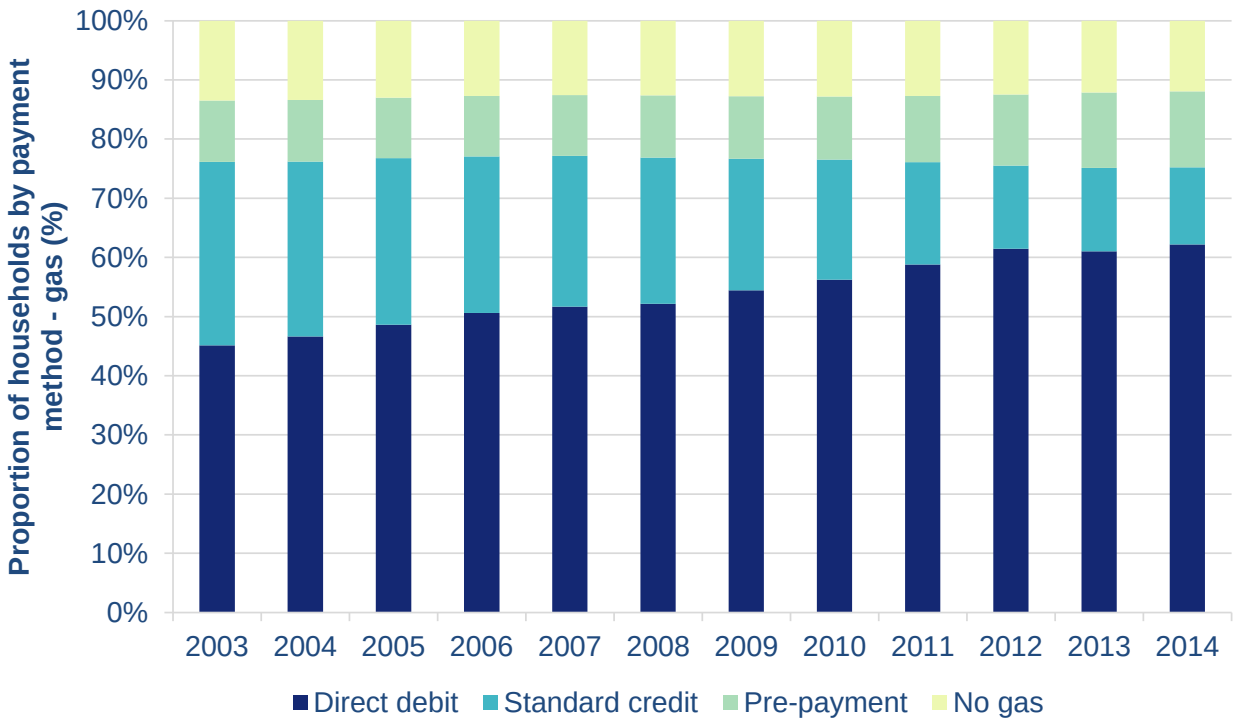
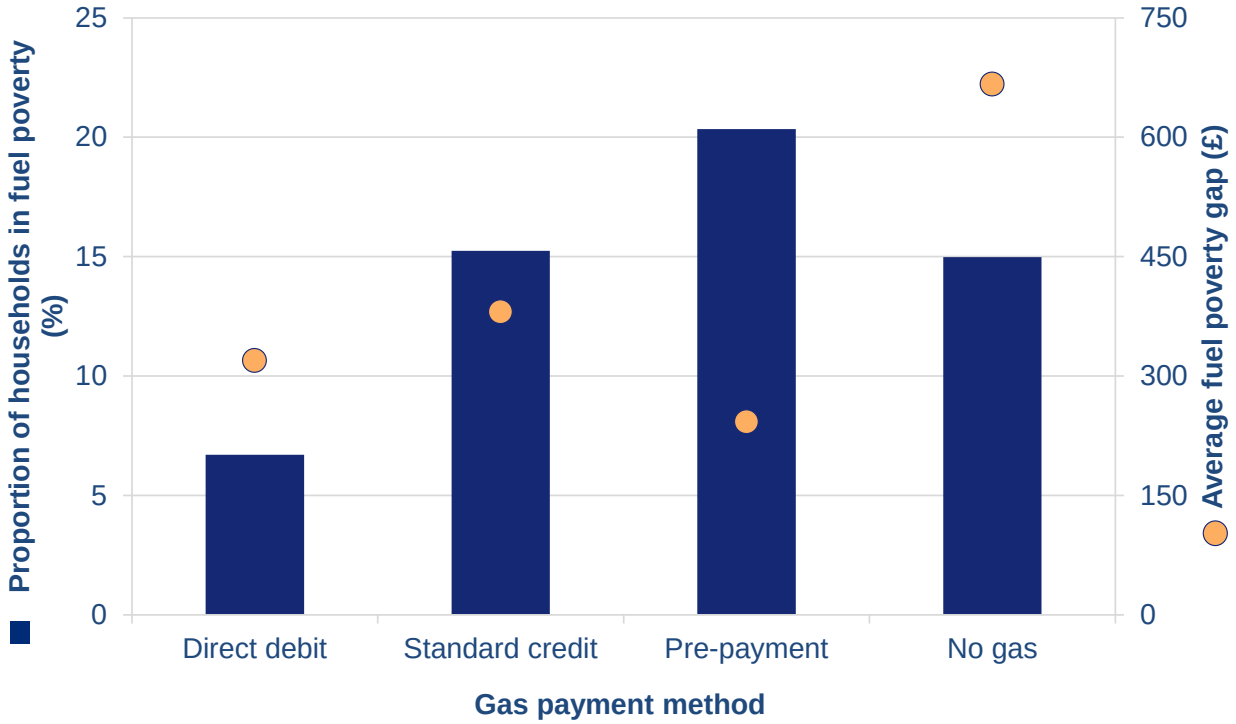


Figure 3.32 shows the proportion of households who are fuel poor and the average fuel poverty gap by method of payment.

The average fuel poverty gap was greater for households paying by standard credit (£381) and the smallest for households paying by pre-payment meters (£242). However, the largest average fuel poverty gap was for those with no gas connection (£667) with around 15 per cent of this group being classed as fuel poor.

Figure 3.32: Fuel poverty and average fuel poverty gap by gas payment method, 2014



The unusual pattern of pre-payment having the highest proportion of households in fuel poverty, but the lowest fuel poverty gap, is likely to be due to a combination of factors. They both have, on average, higher FPEER scores compared to other households, *and* smaller properties, as seen in Table 3.9.

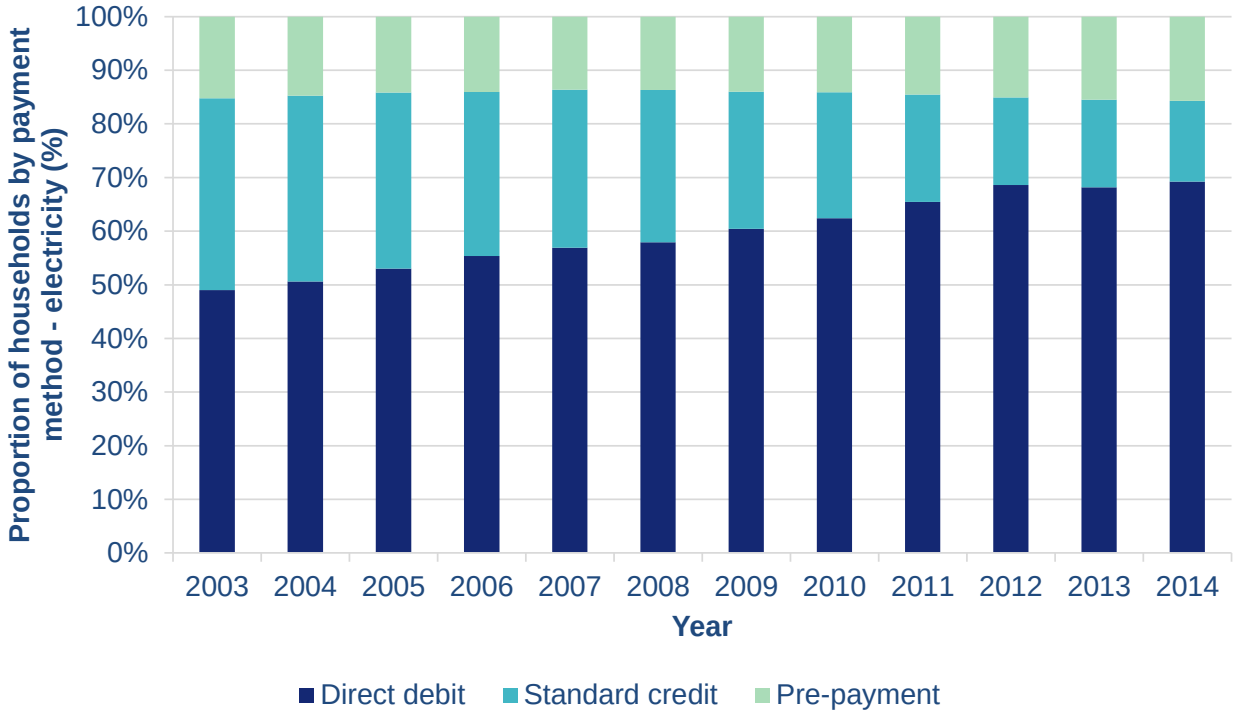
Table 3.9: Median FPEER score and floor area by payment type - gas, 2014

	Median FPEER score	Median Floor area (m^2)
Direct Debit	63.7	88.7
Standard Credit	63.3	78.7
Pre-payment	66.2	71.7
No gas	55.2	74.5

3.4.2 Electricity payment method

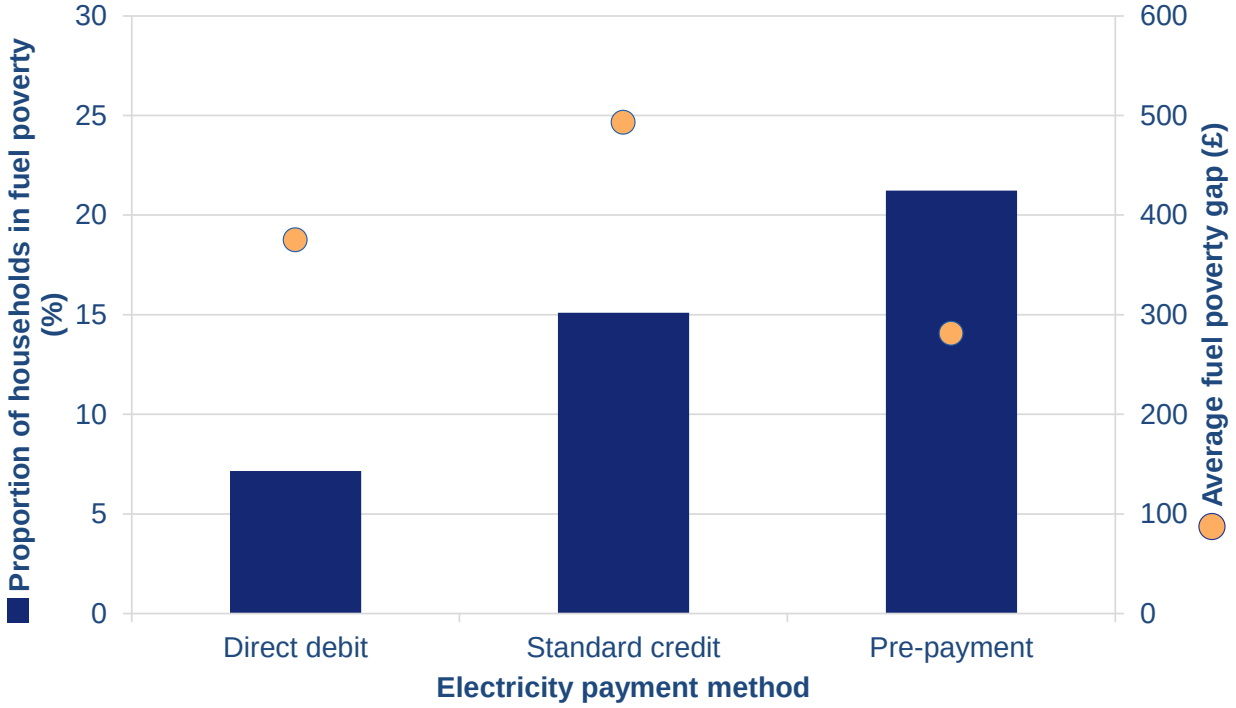
The most common method of payment for electricity is also by direct debit. In 2014, 69.2 per cent of households paid for electricity by direct debit (see Figure 3.33).

Figure 3.33: Method of payment – electricity, 2003-2014



There was a higher proportion of pre-payment customers in fuel poverty compared to those paying by direct debit or standard credit (see Figure 3.34 below). However, the average fuel poverty gap was lowest for this group at £281 compared to the highest; standard credit at £493.

Figure 3.34: Fuel poverty and average fuel poverty gap by electricity payment method, 2014



Similarly to gas, the lower average fuel poverty gap seen in pre-payment households is likely to be due to the combination of smaller, better insulated households. Table 3.10 shows the average FPEER score by floor area.

Table 3.10: Median FPEER score and floor area by payment type - electricity, 2014

	Median FPEER score	Median Floor area (m^2)
Direct Debit	63.2	88.5
Standard Credit	62.3	77.2
Pre-payment	65.8	70.9

Chapter 4: Fuel Poverty Projections

4.1 Overview of the Projections

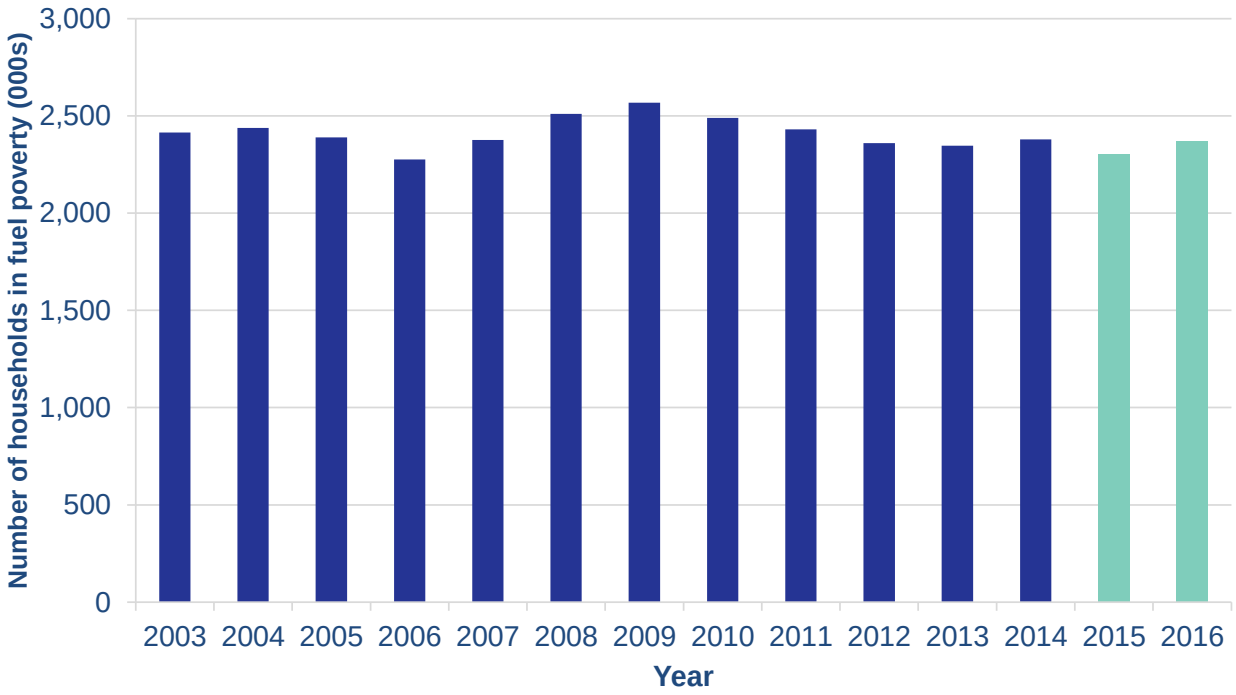
This chapter looks at fuel poverty projected into 2015 and 2016. The current publication analyses the latest available data for fuel poverty, which has a two year lag. Therefore, this section estimates fuel poverty levels up to the end of 2016. The three main drivers of fuel poverty - income, energy requirements and fuel prices - have been modelled for the next two years to provide estimates of the number of households and the depth of fuel poverty. This chapter gives an overview of the changes modelled in each of the three drivers, followed by an explanation of the projected figures. The detailed methodology can be found in Chapter 7 of the Methodology Handbook[33].

4.2 Projecting Fuel Poverty to 2015 and 2016

The proportion of households in fuel poverty is projected to fluctuate during 2015 and 2016. In 2015, the proportion is projected to dip slightly to around 10.2 per cent. In 2016, this is then projected to rise to roughly the same level as seen in 2014 at 10.5 per cent. The darker blue bars in Figure 4.1 show the published estimates of the number of households in fuel poverty (in thousands) from 2003 to 2014; the lighter green bars show the projected number of households (in thousands) in fuel poverty for 2015 and 2016.

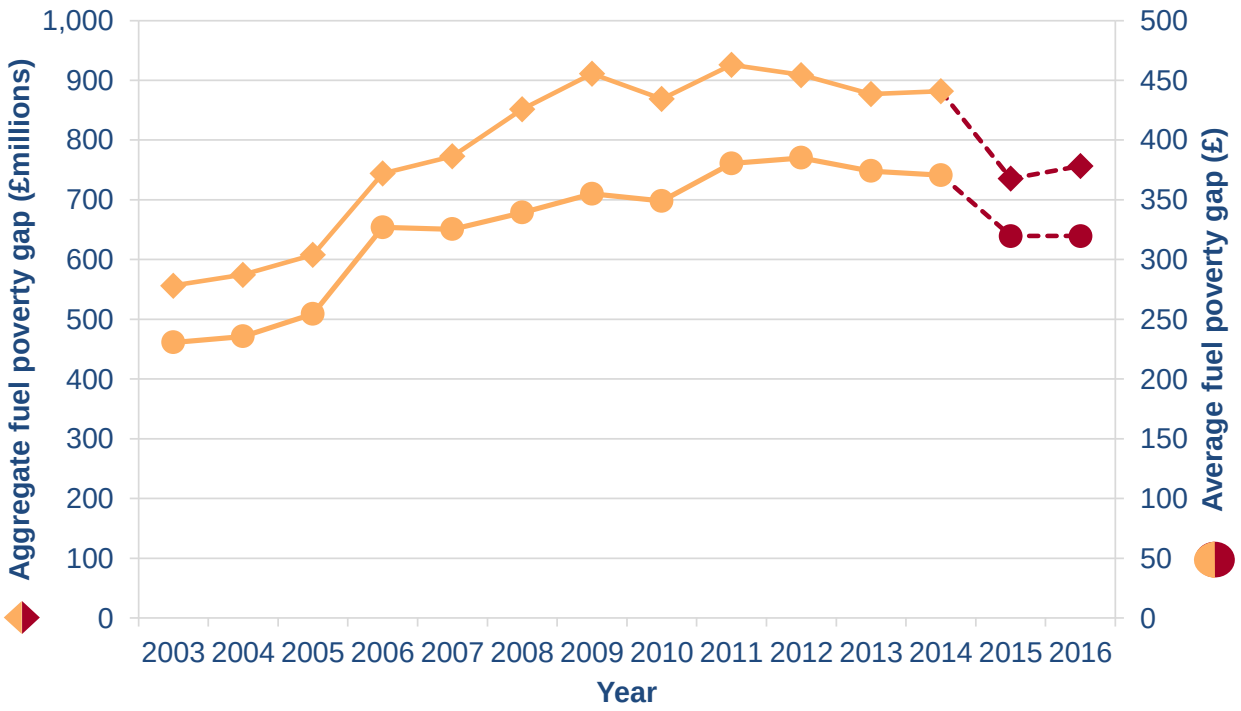
[33] https://www.gov.uk/government/publications/fuel-poverty-statistics-methodology-handbook

Figure 4.1: Fuel poverty levels for 2003-2014, and projections for 2015 and 2016



The depth of fuel poverty is also expected to decline during this period. The aggregate fuel poverty gap is projected to fall to around £736 million in 2015. The aggregate gap is then projected to increase slightly to around £757 million. However, this remains below that of recent years, as can be seen in Figure 4.2 when looking at the trend line represented by diamonds. The average fuel poverty gap is also projected to decrease to around £320 for both 2015 and 2016 (represented by circles in Figure 4.2). The lighter orange colour for both trends show the published estimates of the fuel poverty aggregate and average gap, whereas the darker red colour represents the projected figures.

Figure 4.2: Aggregate and average fuel poverty gap 2003-2014 in cash terms, and projections for 2015 and 2016



The remainder of this chapter looks at what has influenced the direction of these projections. Each of the drivers of fuel poverty are assessed, with the final section drawing these areas together, to explain the overall impact on the projected fuel poverty figures.

4.3 Changes in Income

To understand how households' income changed in 2015 and 2016, income must be broken into individual elements, as income from different sources does not necessarily change at the same rate. Within the dataset, income is broken down into each of the following categories:

- Earnings
- Savings
- Benefits
- Other
- Winter fuel payments

Each of these categories has been uprated by different income indicators for each year. Earnings, savings and income from 'other' sources were inflated using figures from the

Economic and Fiscal Outlook produced by the Office for Budget Responsibility[34]. Earnings were inflated by the increase in average earnings; savings were inflated by GDP; benefits were inflated by CPI; and 'other' was inflated by CPI cash. In 2015 and 2016, each of these elements increased. The amount paid for Winter Fuel payments remained the same as 2014.

4.4 Changes in Energy Efficiency

Changes to energy efficiency will have an impact on the energy requirements. If the dwelling is insulated well, or has a more efficient boiler, less energy will be required to heat it to the minimum defined temperatures. To model any improvements to the dwellings over these time periods, energy efficiency measures are randomly allocated throughout the housing stock data. This is achieved by taking just those households that are eligible for each measure and sorting them within that dataset based on a random number. The households are then flagged to be allocated in order of the dataset until the correct number has been distributed. Within the projections model, energy efficiency has the greatest impact on the changes to fuel poverty. The full method for allocating these can be found in Chapter 7 of the Methodology Handbook[35].

As we are projecting two years ahead of the fuel poverty headline statistics, the number of energy efficiency measures installed in the first year of the projections is known. These come from a range of other statistical publications[36] and include the following energy efficiency measures:

- Loft insulation
- Cavity wall insulation
- Solid wall insulation
- Replacement standard boilers
- Ground source heat pumps
- Air source heat pumps
- Biomass boilers
- Solar PV
- Condensing boilers

For the second year of the projection (2016), we do not know exactly how many of each of these measures will be installed. Therefore, we use estimates of each, based on knowledge drawn from the policy areas. The savings on energy requirements as a result of

[34] http://budgetresponsibility.org.uk/efo/economic-fiscal-outlook-march-2016/
[35] https://www.gov.uk/government/publications/fuel-poverty-statistics-methodology-handbook
[36] https://www.gov.uk/government/collections/household-energy-efficiency-national-statistics
https://www.gov.uk/government/collections/renewable-heat-incentive-statistics
https://www.gov.uk/government/collections/feed-in-tariff-statistics

these measures being installed, are then calculated and a new energy requirement for each household produced.

4.5 Changes in Prices

The changes in prices for 2015 are also known, and are published as part of the energy prices publication[37]. The prices for 2016 are estimates based on information on changes in the market, where available; otherwise, they are held constant. The unit costs for these are multiplied by the new number of units of energy required. This is added to the standing charge for each fuel to produce a new projected total energy cost per household for each year.

Some households are eligible for a rebate on their energy bill, known as the Warm Home Discount[38]. The amount paid for Warm Home Discount (£140) was expected to remain the same as 2014, but the number of recipients was expected to change. These were therefore randomly re-allocated to eligible recipients for both the 2015 and 2016 projections. For those that were allocated the rebate, this was deducted from their energy costs.

4.6 How the Changes Interact

The changes to the three key drivers interact with each other and the relative nature of the indicator to provide the projections for fuel poverty. The known or predicted annual changes in income are used to produce new income thresholds for the 2015 and 2016 projections. As each household's income is made up of different combinations of sources (e.g. earnings, benefits, savings and investments), the amount that each household's income changes will vary. This means that each household's relative position to that threshold would have changed. As earnings increased by the largest amount, those previously close to income threshold, with an income solely of earnings, may have been pushed over the threshold and out of fuel poverty. This will result in a lower number of households in fuel poverty.

The energy efficiency measures that have been randomly allocated throughout the housing stock dataset will have been allocated to households that fit the necessary criteria. Some measures are targeted to those less able to pay for installations themselves. This means that they would not have been distributed evenly throughout the quadrants and, due to eligibility, those with a low income would have been allocated certain measures over others. As a result, energy requirements are likely to have decreased more for households with low incomes than for those with high incomes.

[37] https://www.gov.uk/government/statistical-data-sets/annual-domestic-energy-price-statistics
[38] Warm Home Discount is provided as a rebate on electricity bills

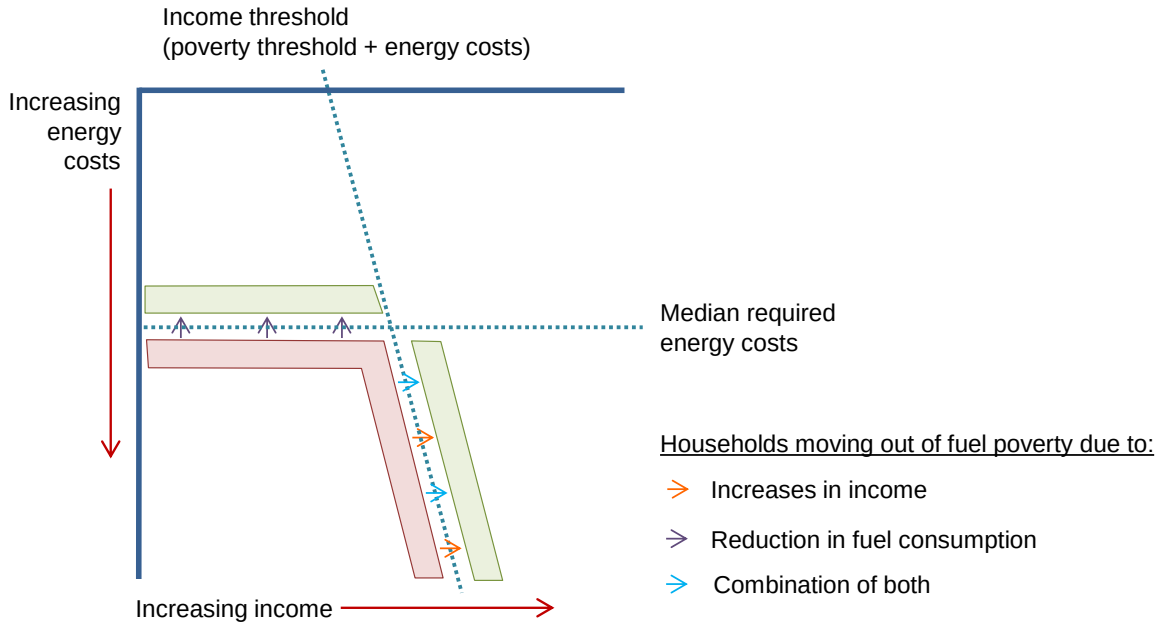
The price decrease will have had a greater impact on those people who have high energy requirements, as it would have reduced their actual total energy costs further than those who have low energy costs. This means that those with a *high* energy requirement would have moved in relation to the energy threshold. Their energy costs would have reduced by a greater amount than those with *low* energy costs, therefore, those in the Low Income High Costs quadrant would have moved closer to the threshold, thus decreasing their average fuel poverty gap.

ANNEX A: Further detail on how the Low Income High Costs Indicator works

This annex provides more detailed information on how the Low Income High Costs (LIHC) indicator of fuel poverty works.

Figure A1, below, illustrates how fuel poor households may move out of fuel poverty, either due to a reduction in required energy costs, an increase in income, or by a combination of both. However, due to the relative nature of the LIHC measure, it is difficult to isolate accurately an absolute reason for change.

Figure A1: Movement across the income and fuel costs threshold due to either increases in income, reductions in energy consumption or a combination of both



Figures A2 and A3 highlight the different responses to the fuel poverty LIHC indicator under a scenario where fuel prices rise by 10 per cent. In relation to fuel poverty levels, the energy costs of all households should increase by the same amount in proportional terms. For the fuel poverty gap, households with larger energy requirements will see greater increases in their energy costs (and thus fuel poverty gaps for those in the LIHC quadrant), in monetary terms.

Figure A2: Fuel poverty *levels* under the scenario where fuel costs increase by 10%

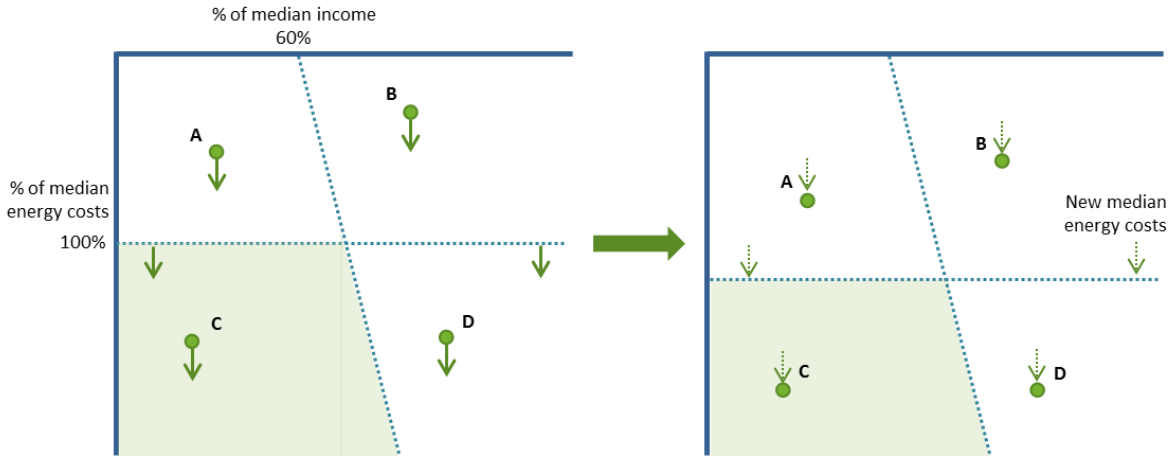
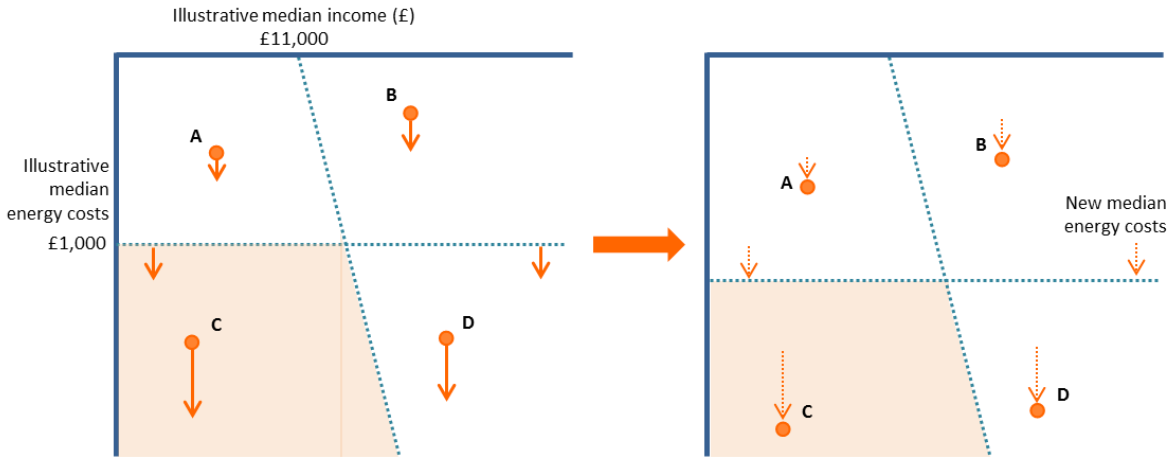


Figure A3: Fuel poverty *gap* under the scenario where fuel costs increase by 10%



In this example (where there are no changes in energy requirements or income), households whose fuel costs are below the median (households A and B) will see their costs increase by less, in pounds, than the median. As a result, these increases will never take them over the threshold into fuel poverty, as the median fuel costs will always increase by more than the individual fuel costs. However, households with fuel costs *above* the median (households C and D) will see a larger increase in their energy costs, in pounds, compared to the median. These households will therefore spend increasingly more than median costs, such that the difference between their fuel costs and the median costs will widen.

Consequently, there will be no change in the number of households in fuel poverty, but households already in fuel poverty will move deeper into fuel poverty. The gap, which represents the difference between household fuel costs and the median fuel costs, will therefore increase.

ANNEX B: Relevant Links

Income Indicators

Households below average income

https://www.gov.uk/government/statistics/households-below-average-income-19941995-to-20132014

Winter fuel payments

https://www.gov.uk/government/statistics/winter-fuel-payment-recipient-and-household-figures-2014-to-2015

Cold weather payments

https://www.gov.uk/government/collections/cold-weather-payments-statistics-2014-to-2015

Fuel Price Indicators

Actual expenditure on fuel (as percentage of total income)

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/487649/table_261.xls

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/487650/table_262.xls

Fuel prices

https://www.gov.uk/government/statistical-data-sets/monthly-domestic-energy-price-stastics

Number of customers on pre-payment

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/511476/table_242.xls

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/511479/table_252.xls

Average annual bills by payment method

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/511466/table_221.xls

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/511470/table_231.xls

Fuel debt and disconnections

https://www.ofgem.gov.uk/sites/default/files/docs/2015/09/annual_report_2014_final_0.pdf

Switching stats

https://www.gov.uk/government/statistical-data-sets/quarterly-domestic-energy-switching-statistics

Housing Indicators

Indicator SAP rating

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/395007/stats_summary_2015.pdf

Excess winter deaths

http://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/excesswintermortalityinenglandandwales/previousReleases

Number of insulated homes

https://www.gov.uk/government/collections/green-deal-and-energy-company-obligation-eco-statistics

Local Authority housing investment on energy efficiency improvements

https://www.gov.uk/government/statistical-data-sets/local-authority-housing-statistics-data-returns-for-2014-to-2015

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