Department for Energy Security & Net Zero

Annual Fuel Poverty Statistics in England, 2023 (2022 data)

28 February 2023   **National Statistics**

Headline Statistics

- In 2022, there were an estimated **13.4 per cent of households (3.26 million) in fuel poverty in England** under the Low Income Low Energy Efficiency (LILEE) metric, up from 13.1 per cent in 2021 (3.16 million).

- The **aggregate fuel poverty gap** for England in 2022 was estimated at £1.10 billion under the LILEE metric up by 37 per cent since 2021 (£0.80 billion) in real terms. The **average fuel poverty gap** for England in 2022 (the reduction in fuel costs needed for a household to not be in fuel poverty) was estimated at £338, up by 33 per cent since 2021 (£254).

- Despite improvements in energy efficiency, there has been no increase in the share of households meeting the **2030 fuel poverty target** in 2022 with 52.8 per cent of all low income households living in a property with a fuel poverty energy efficiency rating (FPEER)[1] of band C or better. This was due to rising energy prices.

- It is projected that in 2023, fuel poverty will increase to 14.4 per cent (3.53 million) with the average fuel poverty gap rising by 31 per cent in real terms to £443 (in 2022 prices). An estimated 53.5 per cent of all low income households are projected to live in a property with a fuel poverty energy efficiency rating (FPEER) of band C or better.

- These statistics also include an affordability measure of the number of households who are required to spend more than 10 per cent of their income (after housing costs) on domestic energy. In 2022, 30.3 per cent of households (7.39 million) exceeded this threshold up from 20.5 per cent in 2021 (4.93 million). (See Annex D for description of this metric).

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[1] To estimate fuel poverty and measure progress against the fuel poverty target, the Department for Energy Security and Net Zero (DESNZ) is legally bound to use a fuel poverty specific energy efficiency rating. DESNZ uses the Fuel Poverty Energy Efficiency Rating system which is a modified version of the Standard Assessment Procedure (SAP) used to generate Energy Performance Certificates.

A household's fuel poverty status using the Low Income Low Energy Efficiency (LILEE) measure depends on the interaction of three key drivers:
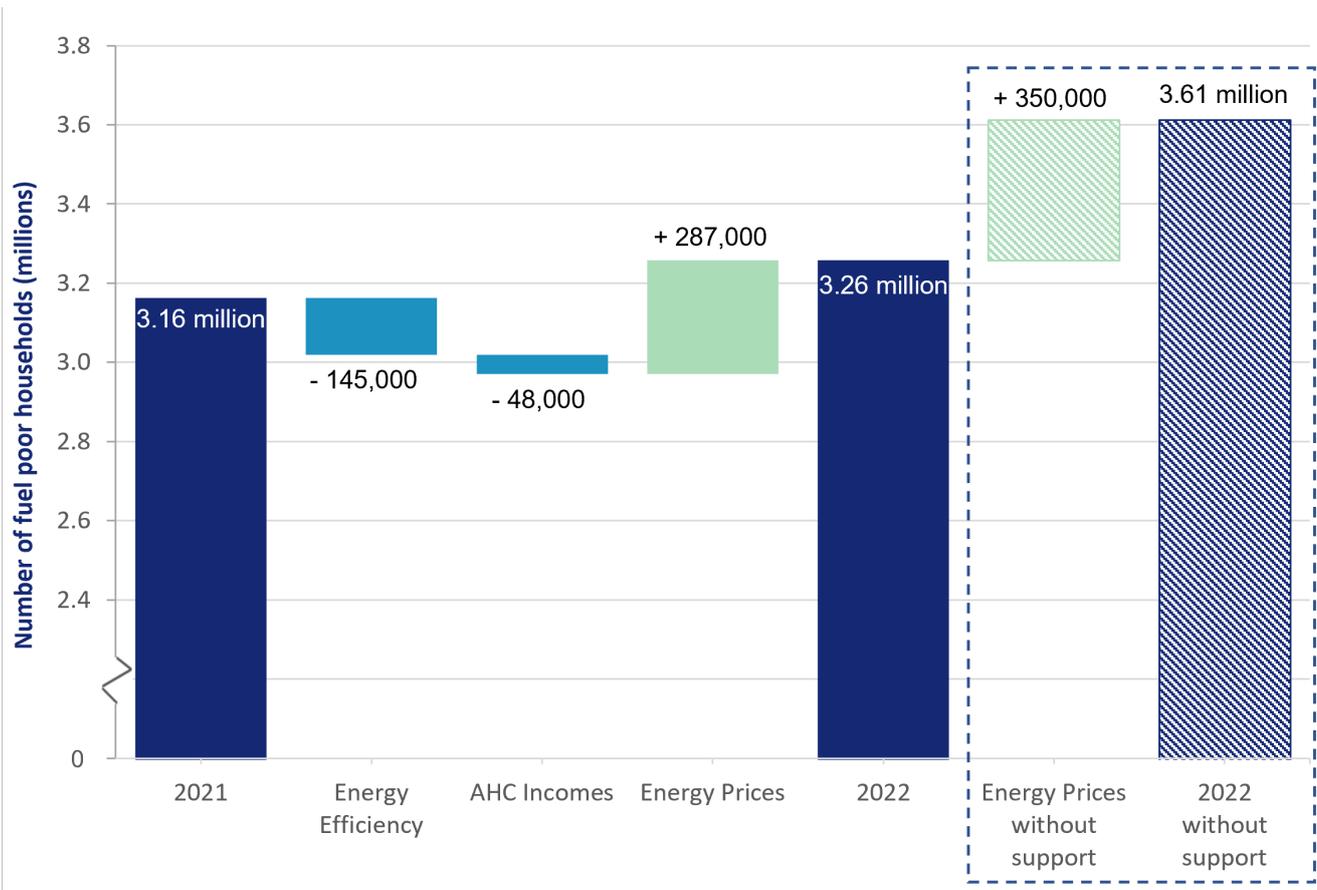
- **Energy efficiency** – Improvement in energy efficiency between 2021 and 2022 has brought more low income households up to FPEER band C which removes them from fuel poverty. The progress with energy efficiency is estimated to have reduced fuel poverty by around 145,000 households over this period if no other factors had changed.

- **Incomes** – In 2022, the income distribution began to recover from the pandemic with higher earnings growth for low income households than median. Households receiving means tested benefits received cost of living payments of £650 in winter 2022/23 which further reduced the share of households in relative poverty. The LILEE metric uses an after housing costs measure which is impacted by the change in housing costs. While mortgage rates rose at the end of 2022 it will take time for households on fixed-rate deals to be affected and those who were affected in 2022 were for a minority of the year. Overall, the change in the income distribution is estimated to have reduced fuel poverty by around 48,000 households over this period if no other factors had changed.

- **Energy prices** – Between the 2021 and 2022 fuel poverty datasets gas & electricity prices rose by 45 per cent in real terms. The energy price cap increased in April 2022 by 54 per cent to £1,971 and following the introduction of the Energy Price Guarantee in October 2022, the typical bill increased to £2,500. This increase has been partially offset through a range of government support set out in this report. The change in energy prices after government support is estimated to have increased fuel poverty by around 287,000 households over this period if no other factors had changed. The substantial increase in energy prices has therefore seen fuel poverty rise slightly overall but its impact is seen most strongly in the fuel poverty gap. It is estimated that without the energy bill support given in 2022/23 an additional 350,000 households would have been in fuel poverty in 2022[2].

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[2] This sensitivity analysis removes the Energy Price Guarantee (Oct 2022-Mar 2023) and uses the Ofgem energy price caps for the period. It removes Energy Bill Support Scheme and Council Tax rebate.

Figure 0.1 illustrates the decomposition of changes described above. The dark blue bars show the estimated number of fuel poor households in 2021 and 2022. The mid-blue bars and turquoise bars represent the drivers that have worked to remove households from fuel poverty and the source of the increase in fuel poverty respectively.

The bars in the dashed box represent the sensitivity analysis of how fuel poverty in 2022 could have increased to 3.61 million households (14.8 per cent) without the energy bill support given in 2022/23.

Figure 0.1 decomposition of changes in number of fuel poor households from 2021 to 2022.

Contents

Chapter 1: Introduction

This annual publication provides a comprehensive view of the latest statistical trends and analysis of fuel poverty in England in 2022.

Fuel poverty in England is measured using the Low Income Low Energy Efficiency (LILEE) indicator, which considers a household to be fuel poor if:
- it is living in a property with an energy efficiency rating of band D, E, F or G as determined by the most up-to-date Fuel Poverty Energy Efficiency Rating (FPEER) Methodology - this is depicted by the horizontal threshold in Figure 1; and

- its disposable income (income after housing costs (AHC) and energy costs) would be below the poverty line[3] as depicted by the vertical sloping threshold in Figure 1.

Figure 1: The LILEE metric including the fuel poverty gap
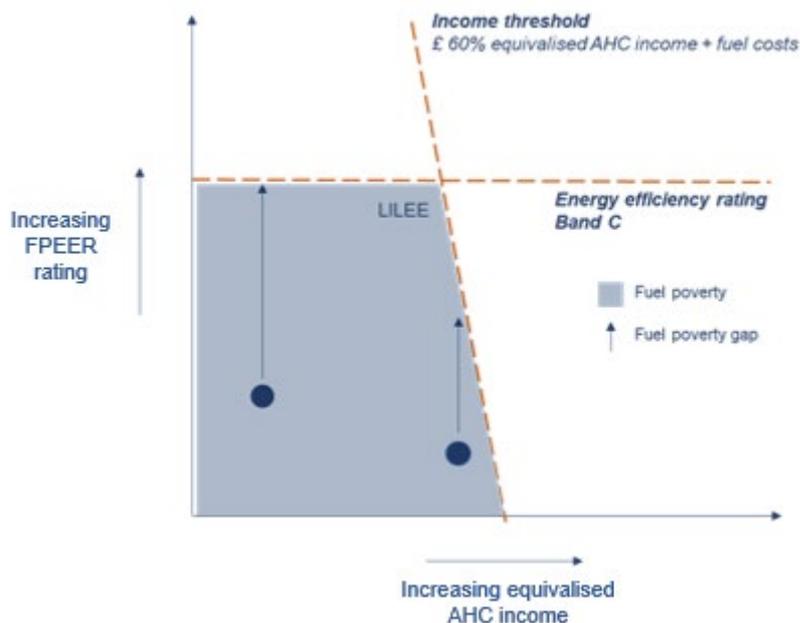
The 2014 fuel poverty target for England set an objective to ensure that as many fuel poor households as reasonably practicable achieve a minimum FPEER rating of band C[4,5] by 2030, with interim targets of band E by 2020, and band D by 2025.

The primary purpose of the Annual Fuel Poverty Statistics is to monitor progress against the statutory target and track the proportion of households in fuel poverty and their fuel poverty gap[6].

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[3] The poverty line (income poverty) is defined as an equivalised disposable income of less than 60% of the national median in Section 2 of the ONS publication Persistent poverty in the UK and EU: 2017.
[4] Energy efficiency rating is measured using Fuel Poverty Energy Efficiency Rating (FPEER), see Section 2.3.3 and glossary for more detail.
[5] Household energy efficiency ratings are banded from G (lowest) to A (highest).
[6] Fuel poverty gap is the reduction in fuel bill that a fuel poor household needs to not be classed as fuel poor.

In addition to the headline results, the key drivers of fuel poverty are presented in Chapter 2, with detailed analysis of the prevalence and severity of fuel poverty by various household and dwelling characteristics in Chapter 3. Detailed data tables are published alongside this report (see Annex G for details of published tables).

The fuel poverty statistics, and underlying data, form a key element of the evidence base supporting the Department for Energy Security and Net Zero (DESNZ) to:
- Implement the Fuel Poverty Strategy
- Inform Clean Growth Strategy ambitions
- Develop, monitor and evaluate key policies including the Energy Company Obligation (ECO), Warm Home Discount, Green Homes Grant, Home Upgrade Grant, Social Housing Decarbonisation Fund and Private Rented Sector Minimum Energy Efficiency Standards

The Government is interested in the amount of energy households need to consume to have a warm, well-lit home, with hot water for everyday use, and the running of appliances. Fuel poverty is therefore measured based on required energy bills rather than actual spending. This ensures that those households who have low energy bills simply because they actively limit their use of energy at home, by not heating their home for example, are not overlooked.

1.1 Fuel Poverty Strategy

The Government published the latest Fuel Poverty Strategy, Sustainable warmth: protecting vulnerable households in England, in February 2021. The Strategy confirmed a new fuel poverty metric, Low Income Low Energy Efficiency (LILEE).

1.2 Data

These statistics are based on data collected in the English Housing Survey (EHS), which is a continuous national survey commissioned by the Department for Levelling up, Housing & Communities (DLUHC). It collects information about people's housing circumstances and the condition and energy efficiency of housing in England.

The latest complete combined year dataset for the EHS is for 2021 based on fieldwork carried out between April 2020 and March 2022 (with a mid-point of 1st April 2021). The sample comprised 10,572 occupied dwellings where a physical inspection and a household interview was carried out. Further information including EHS releases and a detailed survey guide for users can be found at the EHS publication page.

It is noted that the 2021 dataset carries higher uncertainty than usual in particular in the smaller sub-groups such as regions since both years of data were collected using remote survey methods due to the Covid-19 pandemic. The overall number of surveys carried out was 15 per cent lower than planned and is less representative due to challenges of recruiting households to the survey remotely. Confidence intervals for the headline results are shown in Annex A.

The headline figures used in this report are projections for 2022. These are designed to represent the period between April 2021 and March 2023 inclusive. This is a significant change made for the 2023 annual report to provide more timely estimates of fuel poverty in detail. The 2022 projection is considered to be less uncertain than the 2023 projection since it is based more on observed changes to energy efficiency installations, income changes and announced energy prices. The methodology for these projections is described in section 7 or the Methodology Handbook with the data based on actual EHS data from April 2021 to March 2022 and modelled data from previous EHS data projected forward.

This publication includes a range of tables for 2022 and timeseries data 2010-2022 which are described in Annex G. The 2021 fuel poverty dataset will be made available later this year via the UK Data Service. This dataset contains the underlying data used to calculate fuel poverty and the corresponding breakdown variables used within the fuel poverty report. Documentation covering variable names and descriptions are also provided alongside the datasets.

The majority of fuel poverty variables are included in the dataset deposited at the UK Data Service under the standard End User Licence. To comply with data protection, supplementary fuel poverty variables are released under a more restricted Special Licence on the UK Data Service. To maintain the confidentiality of respondents, disclosure control is applied to both the End User Licence and Special Licence fuel poverty datasets on the UK Data Service.

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

1.3 Sub-regional data

This report provides estimates for fuel poverty at regional level in England but does not include estimates for sub-regional data. These cannot be measured directly from survey data due to small sample sizes. Separate modelling is used to produce the estimates at local authority, lower super output area and parliamentary constituency levels with the 2021 figures due to be published on 27th April.

1.4 Methodology

A methodology handbook has been published alongside this publication. This sets out the method for calculating the headline fuel poverty statistics using the LILEE indicator and the detailed methodology for calculating the income, energy efficiency and fuel prices for each household.

A Fuel Poverty Energy Efficiency Rating (FPEER) Methodology has also been published. This sets out the method for calculating a fuel poverty specific measure of household energy efficiency.

There is further information on methodological changes in Annex B.

Chapter 2: Key Drivers of Fuel Poverty in England, 2022[7]

2.1 Overview: fuel poverty in England

In 2022, 13.4 per cent of households in England (3.26 million households) were classed as fuel poor, an increase of 0.3 percentage points (95 thousand households) from 2021.

The depth of fuel poverty is measured by the fuel poverty gap. The fuel poverty gap is the reduction in fuel costs needed for a household to not be in fuel poverty. This is either the change in required fuel costs associated with increasing the energy efficiency of a fuel poor household to a Fuel Poverty Energy Efficiency Rating (FPEER) of at least 69 (band C threshold) or reducing the costs sufficiently to meet the income threshold. The average fuel poor household would require a reduction of £338 to their fuel costs to be moved out of fuel poverty, this is the average fuel poverty gap (referred to hereafter as simply the gap). The average gap in 2022 is 33 per cent higher than 2021 but 4 per cent lower than 2010 in real terms [8]. We recommend using the gap, in conjunction with the proportion, as an indication of the depth of fuel poverty.

The aggregate fuel poverty gap, which is the total of all fuel poverty gaps for households in England increased by 37 per cent since 2021. Table 2.1 below summarises these figures.

Table 2.1: In 2022 the number of households in fuel poverty increased slightly compared with 2021 but the aggregate gap increased by 37 per cent compared with 2021

Headline measure	2010	2020	2021	2022
Number of households in fuel poverty (millions)	4.78	3.16	3.16	3.26
Proportion of households in fuel poverty (%)	22.1	13.2	13.1	13.4
Aggregate gap (£ millions)	1,691	735	804	1,103
Average gap (£)	354	233	254	338

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[7] Note that caution should be used when interpreting year on year changes as the sample is not independent; fuel poverty is based on a two-year combined sample (see Annex B).
[8] The average gap and aggregate gap figures are adjusted to 2020 prices produced using the Gross Domestic Product (GDP) deflators (December 2022), published in January 2023.

Figure 2.1: Following a steady decrease over time, the proportion of fuel poor households rose slightly to 13.4 per cent in 2022 while the average gap increased by 33% to £338 in real terms.[9,10]
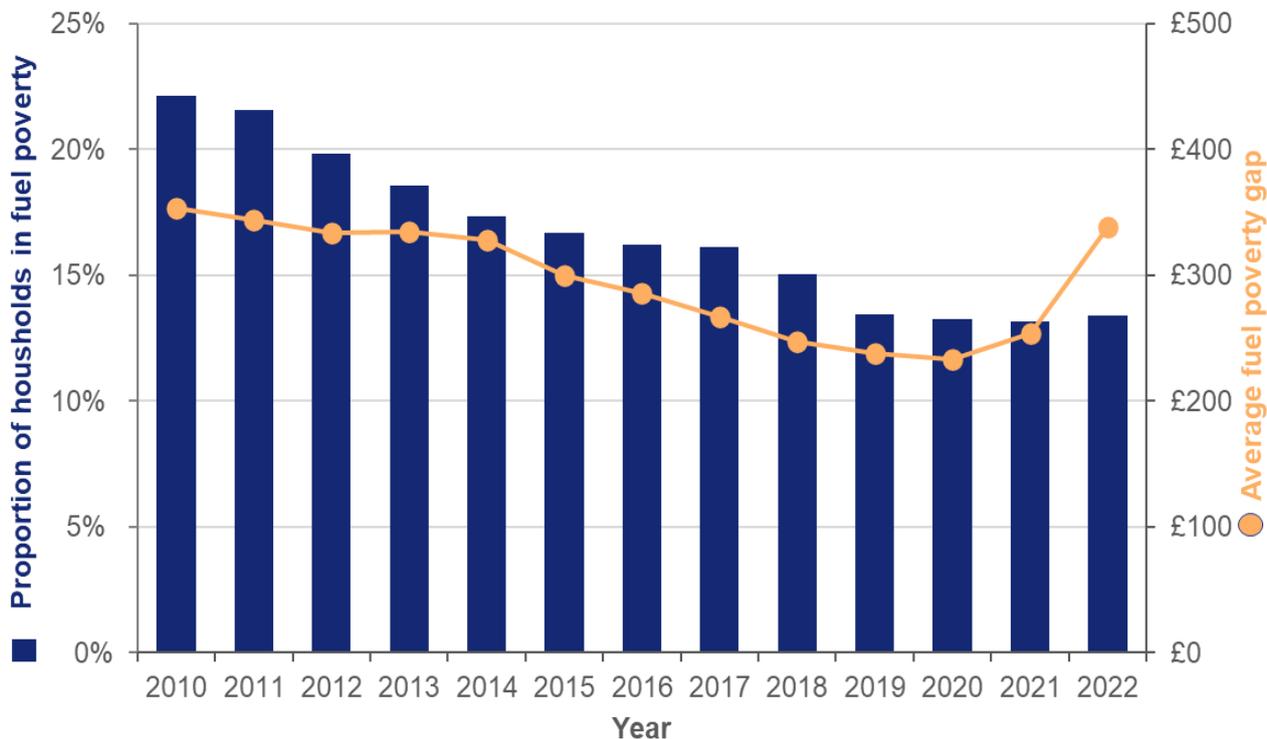
The share of homes in fuel poverty reduced every year between 2010 and 2021 with energy efficiency being the key driver. While further progress in energy efficiency was seen between 2021 and 2022 and the income distribution started to recover from the economic impact of the pandemic, rising energy prices have caused a slight overall increase in fuel poverty in 2022.

The average fuel poverty gap, which measures the depth of fuel poverty, increased by 33 per cent between 2021 and 2022 in real terms due to rising energy prices. This follows a strong declining trend which reflects the impact of energy efficiency measures in reducing the gap between the required energy costs of a household and the required fuel costs for that household at band C.

Confidence intervals for the share of fuel poor households and average fuel poverty gap are shown in Figure A.1 and A.2 respectively up 2021. The confidence intervals reflect the sample variation between years and hence small changes such as the changes in the rate of fuel poverty since 2019 are not statistically significant. Since the 2022 data point is a projection this is subject to both sample variability and modelling uncertainty.

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[9] In Annex A error bars have been added to this line to denote the confidence interval around the figures up to 2021.
[10] Left axis: blue bars show the proportion of households in fuel poverty. Right axis: orange dots show the average fuel poverty gap.

2.2 Key drivers

The fuel poverty status of a households depends on the interaction between three key drivers[11]:

The key drivers will be assessed in turn to explore their effect on headline fuel poverty figures in 2022. **Increased** energy efficiency, **higher** incomes and **lower** energy prices would each have a positive impact on a fuel poor household.

The LILEE fuel poverty indicator sets an absolute energy efficiency threshold making it easier to identify the impact of changes in energy efficiency. The relative nature of the income threshold means it is harder to see the impact of changes in income and the contribution of prices since this requires an assessment of how household incomes and fuel costs change relative to the median income.

Chapter 3 explores dwelling and household characteristics that help identify where the most severe fuel poverty gaps are, and which households are in fuel poverty.

2.2.1 The Low Income Low Energy Efficiency quadrant

Fuel poverty in England is measured using the LILEE indicator, as defined in Chapter 1. Based on a combination of household income, energy requirements and energy prices, the indicator allows households to be grouped into one of the four quadrants illustrated in Figure 2.2.

Energy Efficiency: The horizontal line provides the absolute threshold between low energy efficiency rated households (band D to G) and high energy efficiency rated households (band A to C).

Fuel costs: The Government is interested in the amount of energy households need to consume to have a warm, well-lit home, with hot water for everyday use, and the running of appliances. Fuel poverty is therefore measured based on **required** fuel costs of the energy efficiency of the home rather than **actual** spending. This ensures that households who have low energy bills simply because they actively limit their use of energy at home, for example, by not heating their home are not overlooked. An equivalisation factor is applied to reflect the different levels of energy required depending on the number of people living in the property.

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[11] See Annex B: Measuring fuel poverty in England, for further explanation of how changes to key drivers affect fuel poverty figures.

Income, on the horizontal axis, is defined as equivalised income after housing costs, tax and National Insurance. Equivalisation reflects that households have different spending requirements depending on the number and age of people living in the property.

Under the LILEE indicator there is no exact point on the income axis, for a given FPEER rating, where the household would be classed as low income since this threshold is measured using income minus fuel costs. The sloping dashed line marks a line of best fit between households classed as low income and high income and shows the impact of higher fuel costs in low energy efficiency households. The variation in fuel costs for a given FPEER is due to factors including property size, household size, occupancy pattern. The poverty threshold line is more sloped than in previous years with greater variability in fuel costs between high and low energy efficiency households. The scatter plot shows how a band F/G household with an income over £20,000 is considered a low-income household but that some band B households with incomes under £16,500 are high income.

Further information on how income and fuel costs are calculated can be found in Sections 3 and 5 of the Methodology Handbook.

Figure 2.2: 13.3 per cent of all households classified as fuel poor (LILEE) in 2022[12]
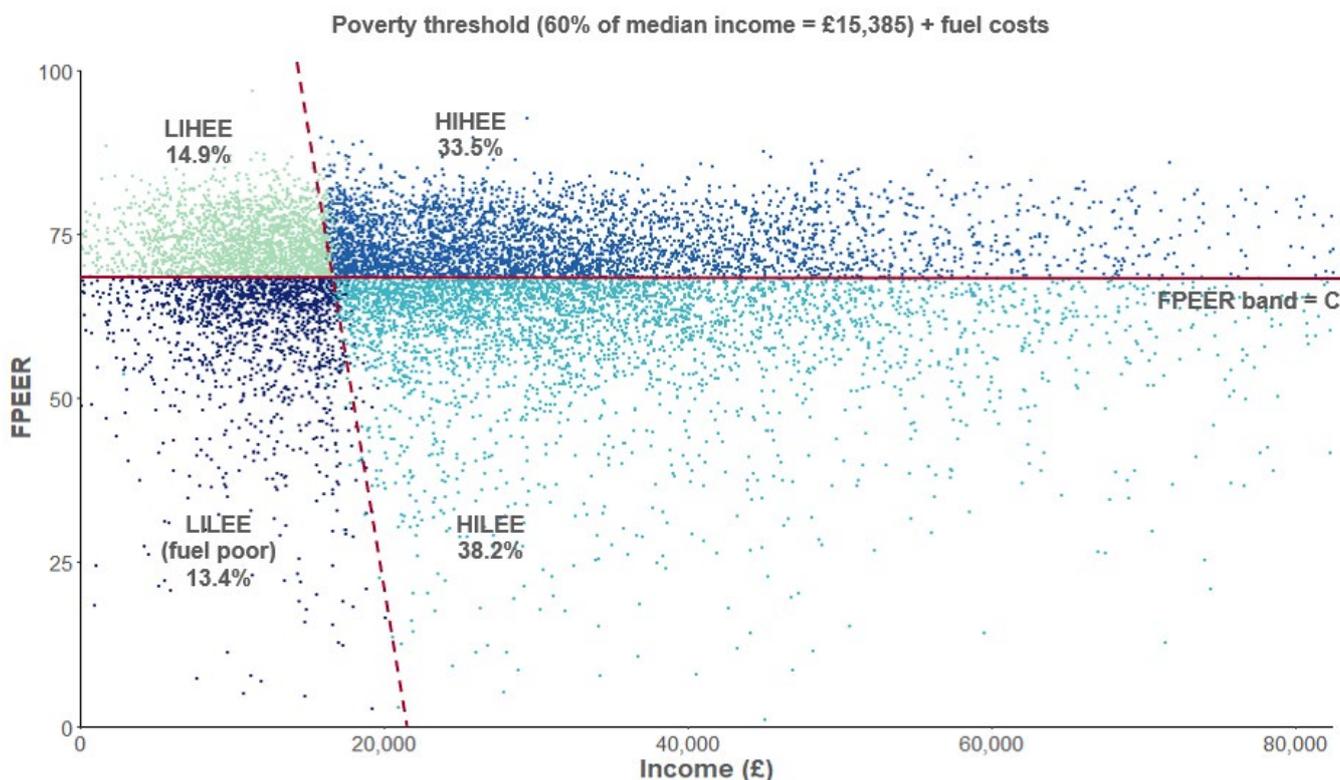
In 2022, 28.3 per cent of households were classed as having a low income (with 71.7 per cent having a high income). Overall, 51.6 per cent of households were classed as low energy

efficiency. Of those households with low incomes, 47.2 per cent were classed as low energy efficiency and hence fuel poor based on having an energy efficiency rating of band D or below.

2.2.2 Energy efficiency

Energy efficiency is a key driver of fuel poverty, as higher energy efficiency reduces a household's fuel costs for a particular size of property. The LILEE metric also sets an absolute threshold above which a household cannot be fuel poor (FPEER band C) regardless of income. Using an absolute threshold also means that once a property attains this threshold it is unlikely to fall unless energy efficiency measures are removed or in cases where the energy efficiency rating includes the receipt of Warm Home Discount.

The fuel costs in figure 2.3 of this report and 2022 Supplementary Tables are reported net of rebates provided through Warm Home Discount[13], Energy Bills Support Scheme[14] and the 2022 council tax rebate[15]. After considering these, the median fuel cost in 2022 was £1,620, up from £1,312 in 2021, an increase of 23 per cent.

Figure 2.3: Fuel costs for the least efficient[16] properties (band F/G) are almost three times higher than costs for the most efficient properties (band A-C) in 2022
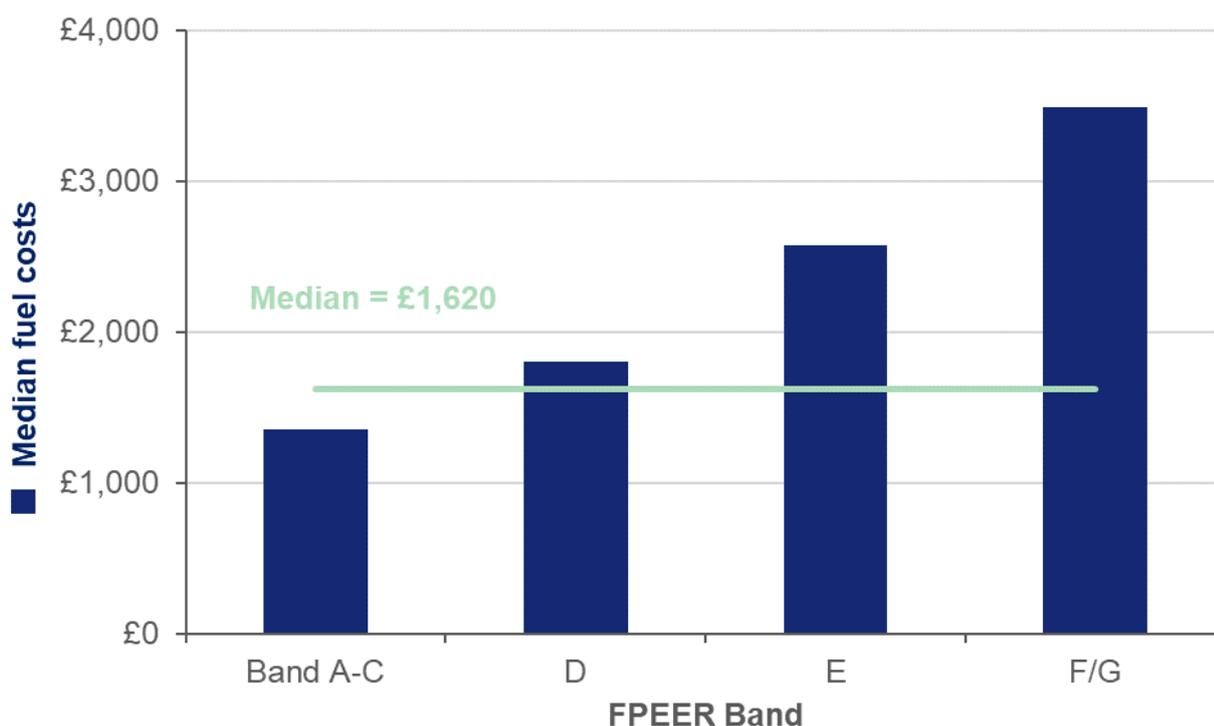
Fuel poverty modelling is based on the estimated fuel costs of a household's theoretical energy consumption since this provides a consistent assessment using the Standard Assessment

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[13] Warm Home Discount provided a rebate of £140 to approximately 2 million households in 2021/22 and is expected to have provided £150 to approximately 3 million households in 2022/23 in England.
[14] The Energy Bills Support Scheme provided a rebate of £400 to all households in 2022/23
[15] In 2022/23 a council tax rebate of £150 was given to all band A-D homes. This has been modelled as an energy saving since this was part of a specific support package to help households with energy costs.
[16] Energy efficiency measured using FPEER.

Procedure (SAP) [17] and BREDEM occupancy patterns, reflecting a standard achieved temperature for all households. Theoretical energy consumption and actual usage were compared in a special feature article, published in March 2019. The analysis suggested that in properties rated band C or lower actual consumption is, on average, lower than the theoretical value. This difference increases as the energy efficiency of a property decreases.

For fuel poverty statistics, and to measure progress against the fuel poverty target (Section 2.3), DESNZ is legally bound to use a fuel poverty specific energy efficiency rating.

The fuel poverty energy efficiency rating (FPEER) (from hereafter referred to as energy efficiency rating), is based on SAP, but accounts for the impact of policies which discount households' energy bills (e.g. the Warm Home Discount). For example, if a household has a band D Energy Performance Certificate (EPC) and they get £150 deducted from their energy bill due to receipt of the Warm Home Discount, this could move them into an FPEER band C.

The impact of the WHD rebate on FPEER depends on the relative size of the rebate to the total energy bill. In 2022/23 due to high prices, the bill saving reduced in percentage terms for WHD households despite an increase of £10 in the value of the rebate. In 2022/23 the typical energy efficiency uplift to a band D home was around 3 FPEER points down from around 5 points in 2021/22.

Figure 2.4: Median energy efficiency ratings were virtually unchanged between 2021 and 2022 for low income and all households (including impact of WHD)[18]

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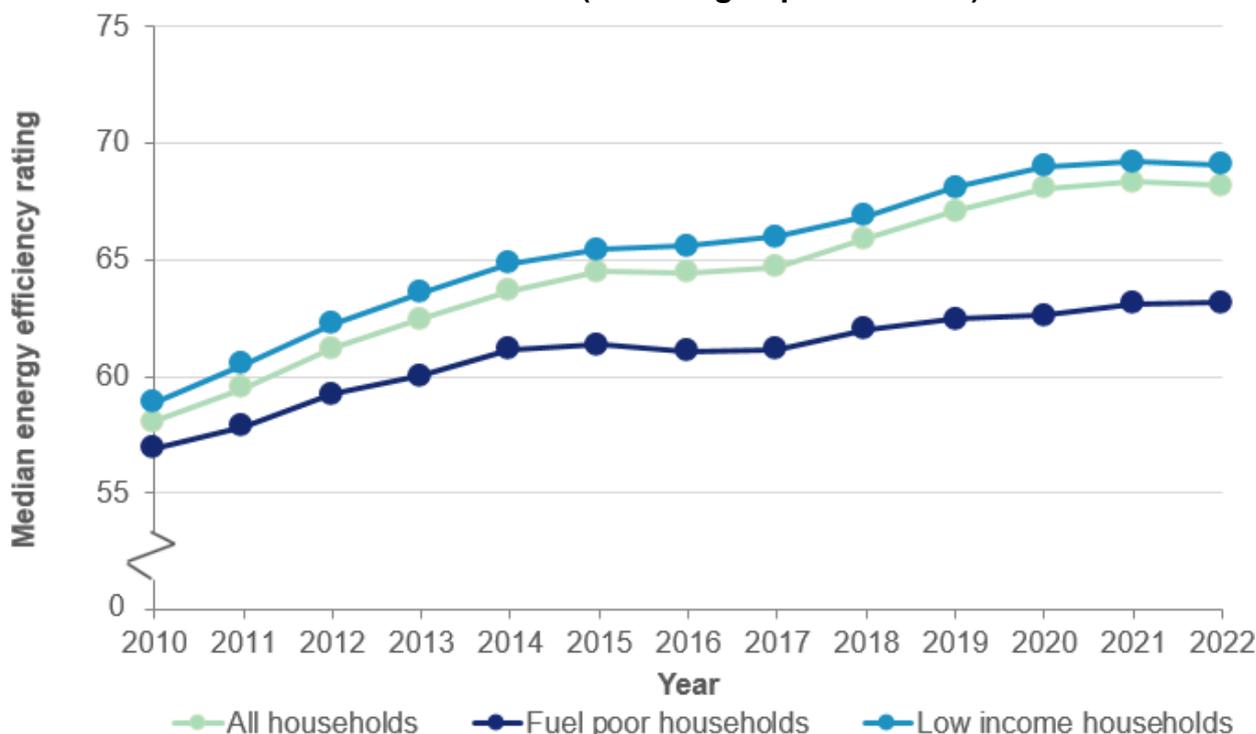
[17] Every household in England can be assessed using SAP, and a score 1-100 awarded, with 1 indicating the least energy efficient and 100 being the highest. For the purposes of Energy Performance Certificates (EPC), SAP scores are banded to give a rating A-G, A being the highest.
[18] It is noted that the 2020/21 English Housing Survey energy efficiency ratings used in the 2020 and 2021 estimates might be slightly higher due to increased sample variation associated with the data collected in the first year of the pandemic.

Figure 2.4 shows that between 2021 and 2022 the median FPEER was 68.2, down from 68.3 in 2021 but up from 67.1 in 2019. It is thought that the ratings in 2020 and 2021 might be slightly high due to the sample achieved in 2020/21 but it is also noted that while additional energy efficiency measures are observed in 2022 these are partially offset by the reduced uplift from Warm Home Discount due to higher prices.

The rate of long term growth specifically among fuel poor households is slowest since when the energy efficiency improvements made to a low income household bring this household up to band A-C, this removes them from fuel poverty and therefore this improvement is not seen within the current fuel poor group.

2.2.3 Income

Income is one of the three key drivers of fuel poverty. Changes to occupants' earnings, benefits, other income sources and housing costs determine whether a household is classed as "low income" or "high income".
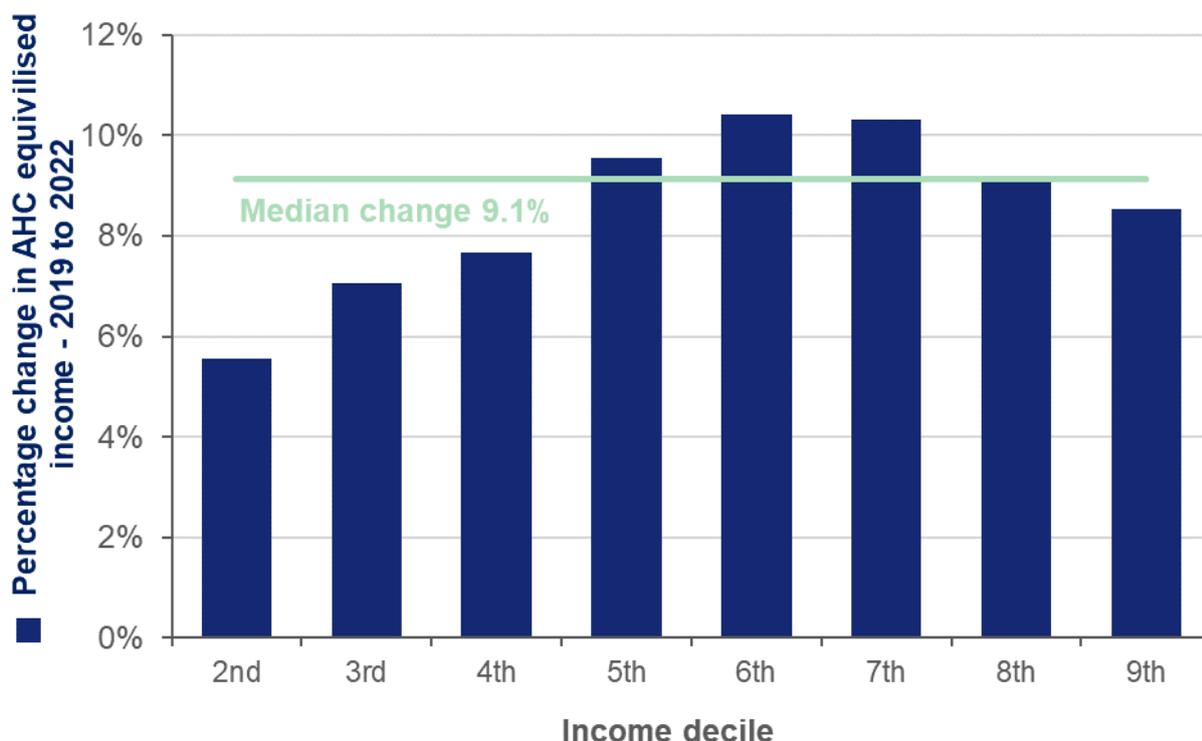
In 2022, a household was classified as low income if their equivalised income (less tax and National Insurance) once they've paid their housing and fuel costs was less than £15,385 (60 per cent of median income for all households)[19].

Figure 2.5 shows the change in incomes on an After Housing Cost equivalised basis since 2019. This baseline is chosen to show how the income distribution has changed since before the pandemic.

It is also noted that while the shape of the income distribution in the 2020 and 2021 datasets are considered accurate, the actual values of income were artificially high due to methodology issues with the data collected in the first year of the pandemic (2020/21). This was reported in Annex B of the 2022 annual fuel poverty statistics report.

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[19] In the 2022 Fuel Poverty projected dataset, the median (after housing costs equivalised income for all households) was £25,641. 60 per cent of the median is £15,385. See Figure 2 in the methodology handbook.

Figure 2.5: The growth in incomes (after housing cost equivalised) in lower deciles was less than the median income growth between 2019 and 2022

The proportion of households classed as low income increased from 25.7 per cent in 2019 to 27.2 per cent in 2022 before the impact of rising prices is considered. This is because the growth in incomes between 2019 and 2022 in the 3rd decile was significantly lower than the median income growth of 9.1 per cent and rising energy prices bring more households below the income threshold. The marginal fuel poor households are usually within the 3rd income decile but based on the income distribution in 2022, more of the 3rd decile and some of the 4th decile fell below the income threshold. When energy price changes are considered, the share of low income households rose to 28.3 per cent recognising that the additional energy costs (after rebates are considered) pull more households below the income threshold.

2.2.4 Energy prices

Energy prices are used to calculate how much the required energy for each household would cost for that specific year. The required energy bill for each household is subtracted from the equivalised household income and hence determines if a household is classified as low income.

As described in section 2.2.3, fuel costs are presented net of energy rebates. In 2022, fuel poor households were required to spend a median cost of £1,900 on their energy bills after rebates, 46 per cent (£600) more than Low-Income High Energy Efficiency households (£1,300). Characteristics of the dwelling and household which contribute to these higher costs are explored in detail in Chapter 3.

Figure 0.1 shows that without the energy bill support offered by Government in 2022/23 an additional 350,000 households would have been in fuel poverty in 2022[20]. In this scenario the median fuel cost was estimated to be £2,400 compared with the actual estimate of net fuel costs of £1,620 in 2022.

Figure 2.6: The average fuel poverty gap rose by 33 per cent in real terms between 2021 and 2022 due to rising energy prices.[21,22]
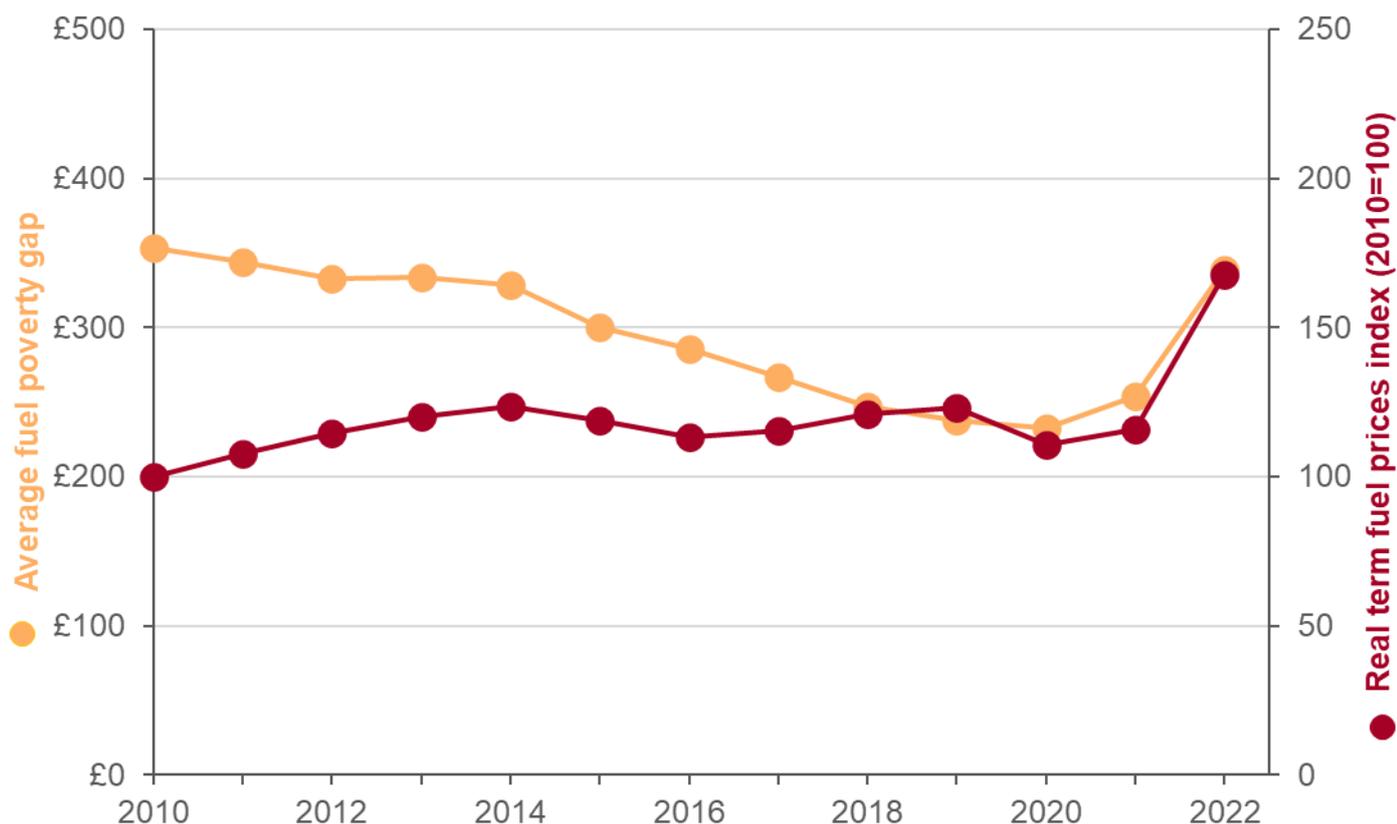

Figure 2.6 shows that while energy prices were stable the average fuel poverty gap reduced due to energy efficiency. Since 2020 as energy prices have risen the average fuel poverty gap has shown a similar trend.

The energy price series does include the impact of the Energy Price Guarantee which caps the unit price of gas and electricity to households but is not adjusted for energy rebates. Likewise, the fuel poverty gap is not directly impacted by energy rebates since these apply equally to the fuel poor households and the assumed band C costs for that household.

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[20] This sensitivity analysis removes the Energy Price Guarantee (Oct 2022-Mar 2023) and uses the Ofgem energy price caps for the period. It removes Energy Bill Support Scheme and Council Tax rebate.
[21] Produced using the Gross Domestic Product (GDP) deflators (December 2022), published in January 2023.
[22] Real term fuel prices index taken from Quarterly Energy Prices table 2.1.2. up to 2021 with 2022 estimated based on the energy price cap/guarantee

Figure 2.7 shows the annual change in average gas and domestic energy bills since 2021 by payment method.

Figure 2.7: The overall average domestic gas and electricity bill increased by 46 per cent between 2021 and 2022 in real terms (fixed level of consumption)[23]
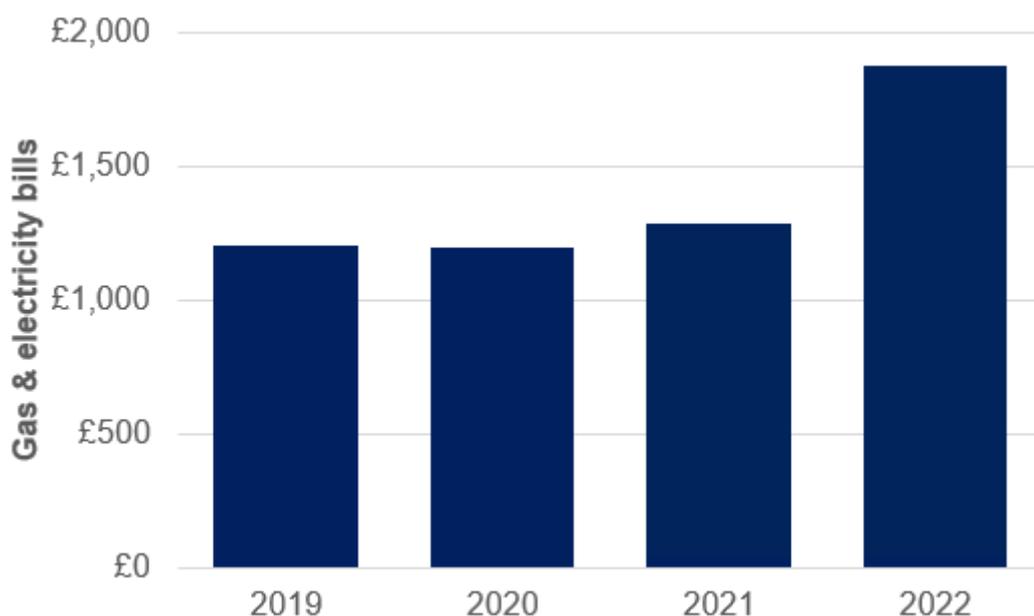
Fuel poverty datasets are based on two years of data with an average of standard bills used across the two financial years in this comparison. The change in prices between the fuel poverty datasets for 2021 and 2022 is based on the change between the average of 2020 & 2021/22 prices and the average of 2021/22 & 2022/23 prices.

Overall the projected increase in prices between 2021 and 2022 is 34 per cent for electricity and 61 per cent for gas leading to an overall increase of 46 per cent for the typical dual fuel household.

The rate of increase of pre-payment households is slightly lower (43%) and for direct debit households slightly higher (47%) with standard credit up by 45%. The cheapest payment type remains direct debit (typical dual fuel bill £1,840), followed by pre-payment (£1,880) with standard credit the most expensive (£1,990). See Tables A.1 and A.2 in Annex A for details.

Households using a prepayment electricity meter were more likely to be fuel poor, 38 per cent compared with 11 per cent for households paying by direct debit. The proportion of households paying their electricity by prepayment meter that are in fuel poverty decreased from 31 per cent

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[23] Prior to 2021/22 data, calendar year prices were used to model the prices for a financial year since financial year data was not available in DESNZ Quarterly Energy Prices until December 2022. Figures for 2022/23 are based on a consumption weighted average of the energy price cap Apr-Sep 2022 and the Energy Price Guarantee (Oct 22-Mar23). Figures are based on Standard Electricity tariffs, are in real terms and cover England and Wales. Data for gas and electricity separately can be found in Annex A. For prices for non-metered fuels used in fuel poverty modelling, see section 4 of the Methodology Hand-book.

in 2010 to 26 per cent in 2022. The average fuel poverty gap for prepayment electricity households fell from £300 in 2010 to £202 in 2022 in real terms.

Fuel poverty statistics are modelled using required fuel expenditure that takes into account the assumed heating pattern appropriate to a household's circumstances. Households are assigned one of four heating patterns depending on whether they are usually at home during the day or not and whether they under occupy their home. It is noted that in 2021/22 (the latest year of EHS survey data), 63 per cent of households reported that someone was usually at home during the day. Over this year some sectors were required to remain closed or were operating with restrictions and work from home advice was in place for around half of the year. This is lower than 71 per cent in 2020/21 when multiple "lockdowns" including school closures were in place. These compare with an average of 51 per cent over the two years before the pandemic.

Median required household energy fuel expenditure increased from £1,310 in 2021 to £1,620 in 2022, however it is noted that energy consumption at the start of 2022 was much lower than later in the year and median fuel costs would have been nearly £800 higher without the relief offered by Government in 2022/23 excluding the impact of the Energy Price Guarantee. It is estimated that without the energy bill support given in 2022/23 an additional 350,000 households would have been in fuel poverty in 2022[24].

From October 2022 to March 2023 the price of energy to households was set through the Energy Price Guarantee with a typical household required to spend £2,500 a year. This is below the Ofgem default tariff cap for the period with Government subsidising the market price of energy.

Higher energy costs affect the number for fuel poor households relative to their disposable income under the LILEE metric, for example if fuel costs rose by £500 fuel poor households would be found £500 further up the income distribution. Annex D analyses some alternative affordability metrics which are more sensitive to energy price changes.

2.3 Progress against the target

In 2014, the Government put in place a new statutory fuel poverty target for England: to ensure that as many fuel poor households as reasonably practicable achieve a minimum energy efficiency rating of band C[25,26] by 2030, with interim targets of band E by 2020, and band D by 2025 (see Figure 2.8).

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[24] This sensitivity analysis removes the Energy Price Guarantee (Oct 2022-Mar 2023) and uses the Ofgem energy price caps for the period. It removes Energy Bill Support Scheme and Council Tax rebate.
[25] Energy efficiency rating is measured using Fuel Poverty Energy Efficiency Rating (FPEER), see Section 2.3.3 and glossary for more detail.
[26] Household energy efficiency ratings are banded from G (lowest) to A (highest).

Figure 2.8: England's statutory fuel poverty target
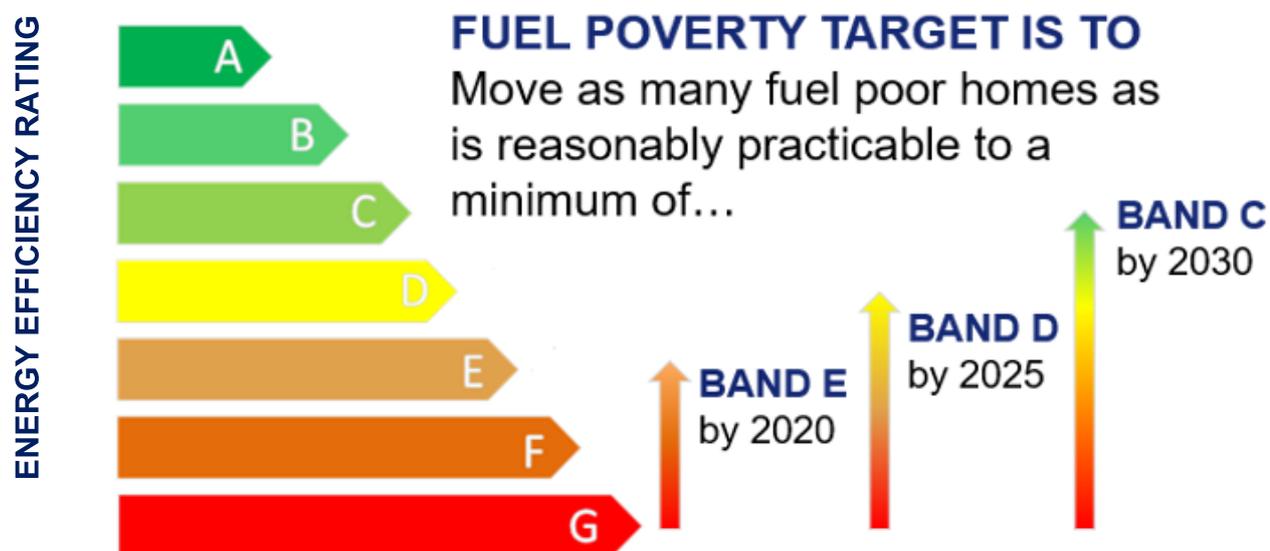
Under the Low Income Low Energy Efficiency (LILEE) metric, a household that achieves a fuel poverty energy efficiency rating of band C or above would not be measured as fuel poor, and therefore fuel poverty would be eradicated if all low income households achieved an energy efficiency band C rating, providing an absolute metric for the target. Progress towards the fuel poverty target is measured as the share of all low income households who achieve an energy efficiency band C in 2030 and the interim milestones.

The proportion and number of fuel poor households in each band are reported annually to track progress against the target. Figure 2.3, Table 2.2 and Table 2.3 show no increase in the share of low income households have reached the thresholds for the 2030 fuel poverty target and 2025 interim milestone in 2022.

There are three main reasons why there has not been an increase in low income households reaching these milestones in 2022:

- The number of low income households has increased in 2022 due to higher energy costs. This brings in a higher share of households less likely to live in the type of homes with band A-C ratings e.g. social housing and flats. It also moves further up the income distribution with households less likely to be eligible for Warm Home Discount.
- The 2020/21 data used for 2020 and 2021 estimates is subject to increased sample variation which could mean the 2020/21 energy efficiency ratings are not as representative as the other data. It is not a statistically significant difference in median FPEER observed between 2021 and 2022.
- As noted in section 2.2.2, the uplift to FPEER from WHD has reduced on average by 2 points due to the impact of higher energy prices. It is estimated that the share of households attaining the band C threshold would have risen to 54.0% if the value of the energy efficiency uplift from Warm Home Discount has not been reduced due to higher energy prices.

Table 2.2: In 2022, no increase was seen in the share of households reaching the fuel poverty target and remaining interim milestone

Fuel poverty target	2010 progress	2020 progress	2021 progress	2022 progress
Band D or above by 2025 (% of low income households)	64.6	90.1	90.3	89.8
Band C or above by 2030 (% of low income households)	14.6	52.1	53.3	52.8

Figure 2.9: Percentage of low income households in band A to C was 52.8 per cent and band A to D was 89.8 per cent in 2022
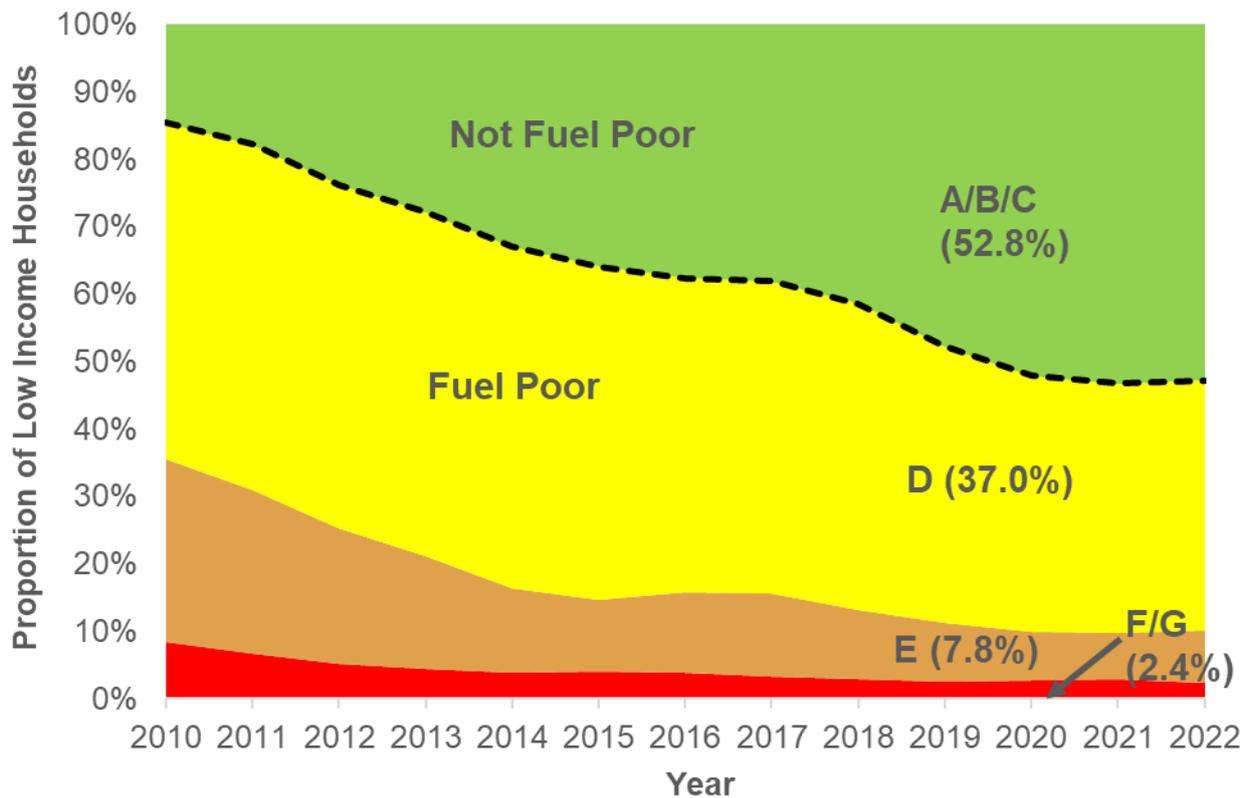
Table 2.3: Proportion and number of low income households in each fuel poverty energy efficiency band, 2010, 2021 and 2022

Low income households in each FPEER band	2010		2021		2022	
	(%)	No. households (000's)	(%)	No. households (000's)	(%)	No. households (000's)
Band A/B/C	14.6	814	53.3	3,607	52.8	3,640
Band D	50.0	2,797	37.0	2,507	37.0	2,553
Band E	27.0	1,509	6.8	457	7.8	541
Band F/G	8.5	474	2.9	198	2.4	163

2025 interim target progress – 89.8 per cent of low income households were living in properties with an energy efficiency rating in band A to D, an increase of 25.2 percentage points from 2010, and a decrease of 0.5 percentage points since 2021.

2030 target progress – 52.8 per cent of low-income households were living in properties with an energy efficiency rating of A, B or C, an increase of 38.2 percentage points since 2010 but down by 0.5 percentage points since 2021.

Confidence intervals for the fuel poverty target and milestones are shown in Figure A.3 up to 2021. The reduction shown above of 0.5 percentage points against the target between 2021 and 2022 does not represent a statistically significant difference.

# Chapter 3: Detailed Analysis of Fuel Poverty in England, 2022

Fuel poverty in England is affected by multiple characteristics of energy efficiency, income and fuel costs. This means that assigning causality to one factor alone is not possible. The following chapter analyses these individual characteristics, but users should be aware of the built-in interactions likely to exist between them.

The data behind this analysis is available in the fuel poverty detailed, trends and supplementary tables (of median incomes, fuel costs, energy efficiency ratings and floor areas) detailed in Annex G.

3.1 Property characteristics

3.1.1 Fuel Poverty Energy Efficiency Rating (FPEER)[27]

Figure 3.1: Proportion of "low income" households at different FPEER ratings in 2022. Households with FPEER D-G are also "fuel poor".
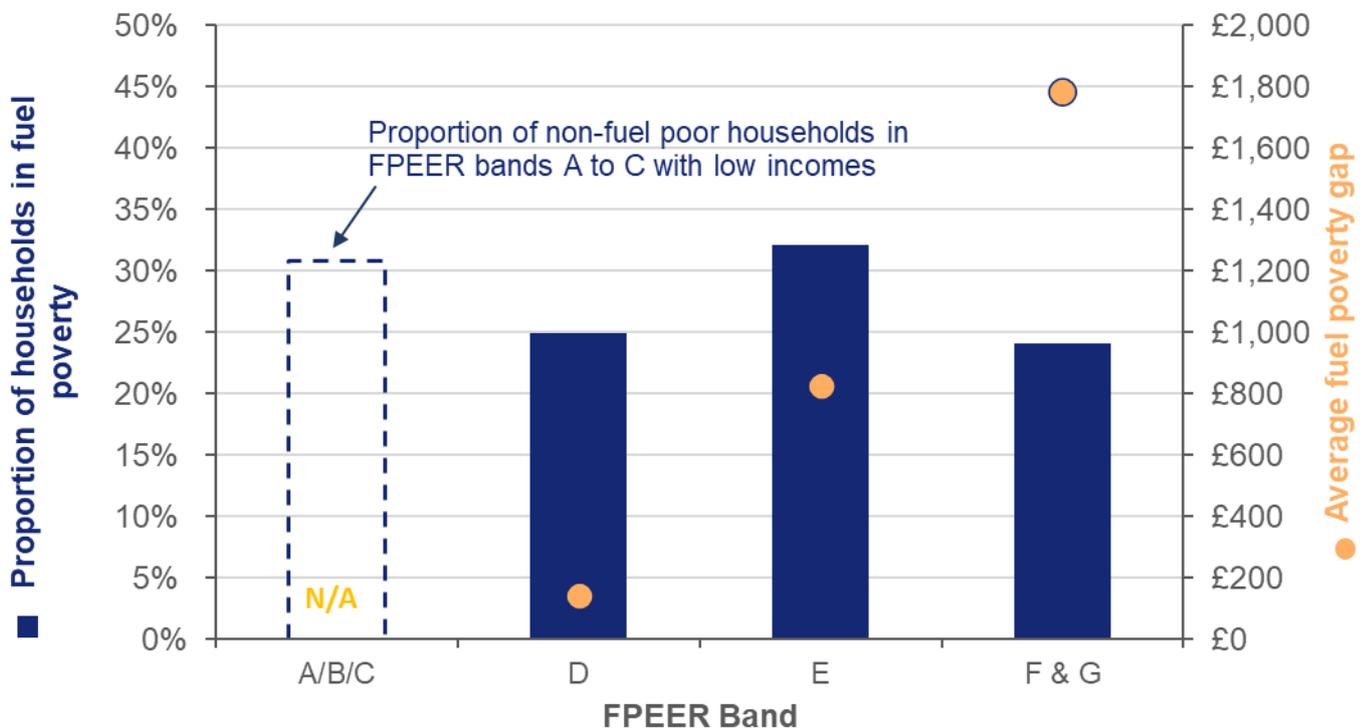
In Figure 3.1 above, other than for band A-C, the blue bars denote the proportion of households in fuel poverty for each group and the orange circles represent the average fuel poverty gap for each group. For example, the blue bars show that 24.9 per cent of households

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[27] The Fuel Poverty Energy Efficiency Rating is defined in Section 2.2.3.

who live in energy efficiency band D properties are fuel poor and they have an average gap (shown by the orange circles) of £143.

In 2022, 78.4 per cent of all fuel poor homes were FPEER band D, with 16.6 per cent band E and 5.0 per cent band F/G. Households living in band F/G have the highest median energy costs (£3,490) but also the highest median income (£26,800). The size of the average gap is highest for those living in band F&G properties in 2022.

By definition, households rated A-C are not fuel poor and therefore they do not have a fuel poverty gap. Within energy efficiency bands A-C, 30.9 per cent of households are low income[28] compared to 25.9 per cent of band D-G households. These households are not fuel poor since they have a high energy efficiency rating, but this demonstrates that low income households are more likely to be living in high energy efficiency rated homes.

Figure 3.2: The cumulative number of energy efficiency measures installed through Government schemes[29] has increased between 2013 and 2022.[30]
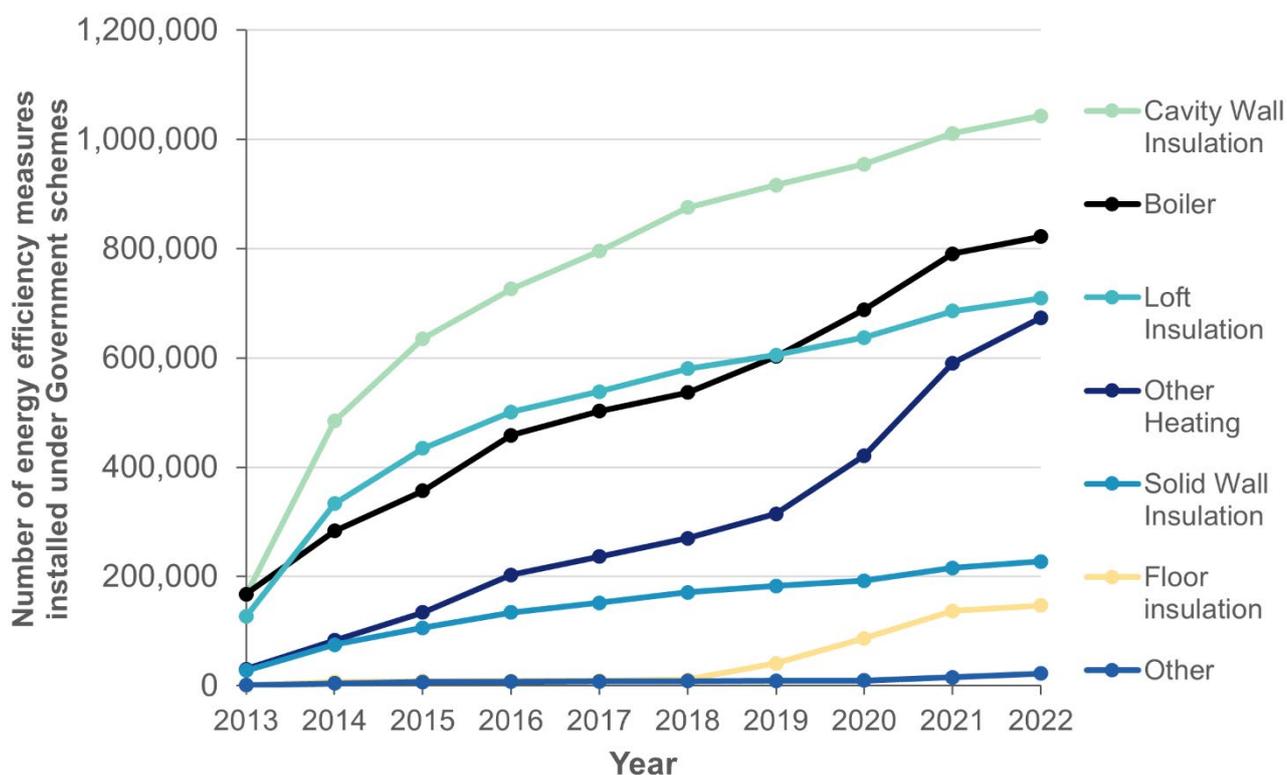
The increase in energy efficiency ratings can partly be explained by the installation of energy efficiency measures, see Figure 3.2. These statistics show there has been an increase in the cumulative number of energy efficiency measures installed each year through the Energy Company Obligation (ECO), Green Home vouchers, the Local Authority Delivery (LAD) scheme and Homes Upgrade Grant (HUG). While the delivery of some measures has levelled

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[28] Low income is defined in section 2.2.4

[29] Figure 3.2 are soured from https://www.gov.uk/government/collections/household-energy-efficiency-national-statistics and https://www.gov.uk/government/collections/green-home-grant-statistics

[30] The 'Other' category includes windows and doors, micro-generation and under floor insulation and glazing measures.

off in recent years, the introduction of ECO3 at the end of 2018 increased the delivery of boilers alongside supplementary insulation measures, typically under floor insulation and often heating controls.

Figure 3.3: As energy efficiency ratings decrease (from A to G) fuel costs tend to increase
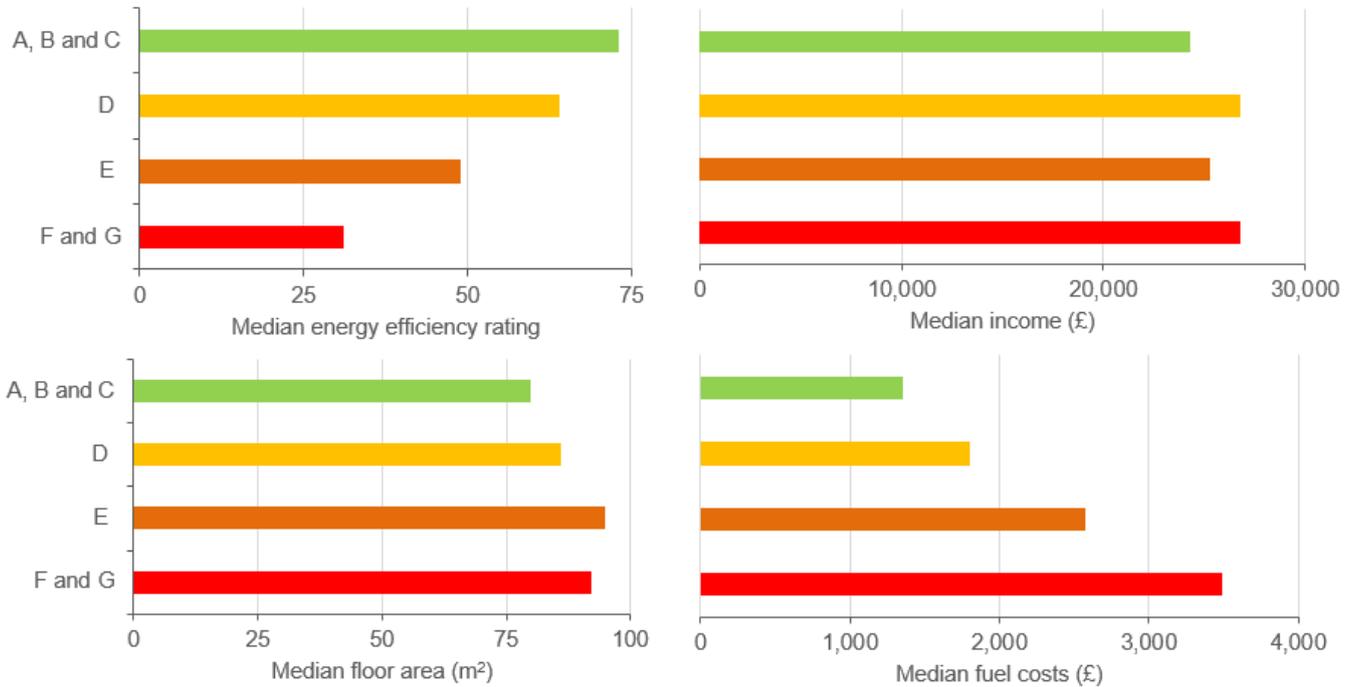

There is very strong negative correlation between median fuel costs and FPEER rating. Households in the lower FPEER bands have lower median energy efficiency ratings and also tend to be larger and more difficult to heat (figure 3.3). The differences in median fuel costs are more exaggerated in 2022 compared with previous years because the fixed value energy rebates in 2022/23 have less impact in percentage terms for households with high required expenditure.

The lowest median income is in the highest energy efficiency rating. This is partially due to social housing and flats having on average lower incomes and higher FPEER ratings. The Warm Home Discount is also targets low income households and provides an uplift to their energy efficiency rating. Further detail on tenure type is discussed in Section 3.2.1.

3.1.2 Wall type

Figure 3.4: In 2022 the average gap and proportion of households in fuel poverty is highest for those living in properties with uninsulated walls[31]
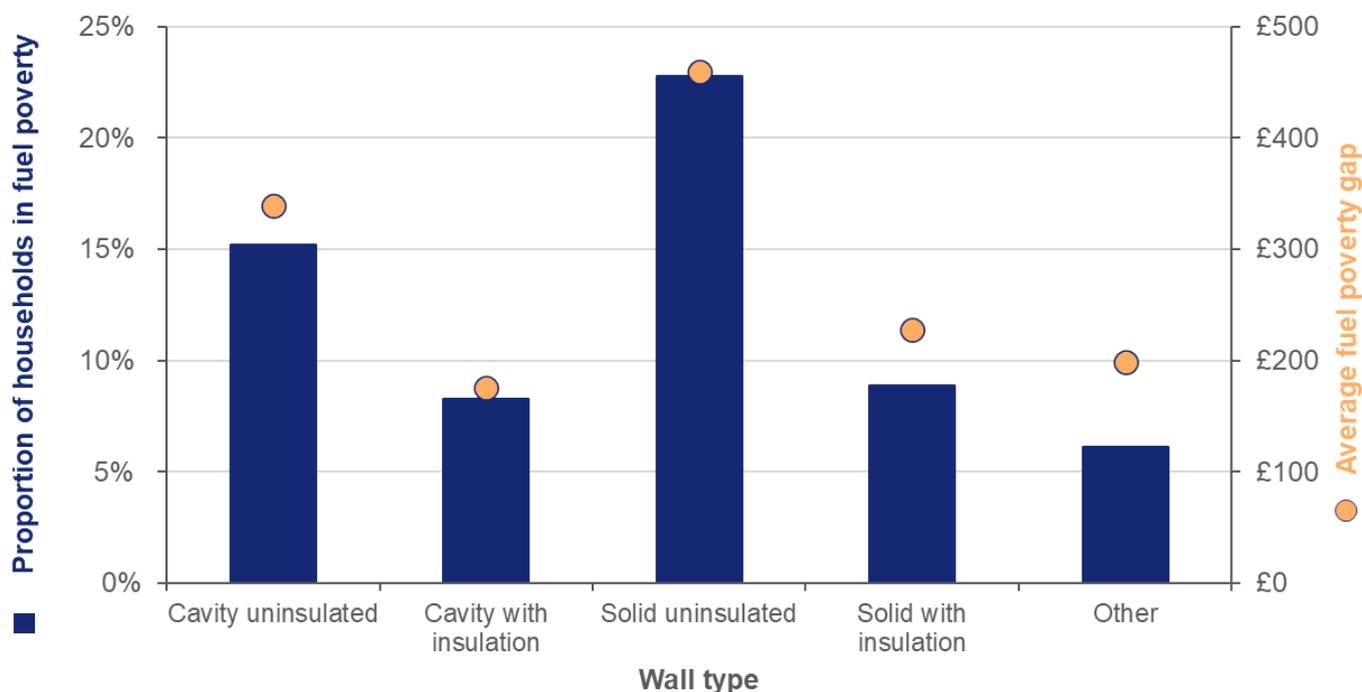
Properties with uninsulated solid walls had the highest rate of fuel poverty (22.8 per cent of households) with an average gap of £460, whereas those with insulated solid walls are less than half as likely to be fuel poor (8.9 per cent) with an average gap of £228. Properties with cavity walls follow a similar pattern – households living in properties with uninsulated cavity walls are more likely to be fuel poor (15.2 per cent) and have a larger average gap (£339) than those households living in properties with insulated cavity walls (8.3 per cent and £176).

The larger average gaps and higher likelihood of fuel poverty in properties without wall insulation are likely due to these having lower energy efficiency ratings and higher fuel costs - insulated walls have a higher median energy efficiency rating than uninsulated walls. According to figures from the National Energy Efficiency Data-Framework (NEED), properties had median percentage gas consumption savings of 8.6 per cent following the installation of cavity wall insulation, and 18.0 per cent from installing solid wall insulation[32].

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[31] The 'Other' category includes dwellings built with stone, pre-fabricated, timber and other methods. 'Other' figures based on low sample count (between 10 and less than 30), inferences should not be made based on this figure.
[32] Source: National Energy Efficiency Data-Framework (NEED) report: Summary of analysis 2021.

3.1.3 Dwelling type

Figure 3.5: The average fuel poverty gap is highest for detached properties despite these having the lowest rate of fuel poverty in 2022
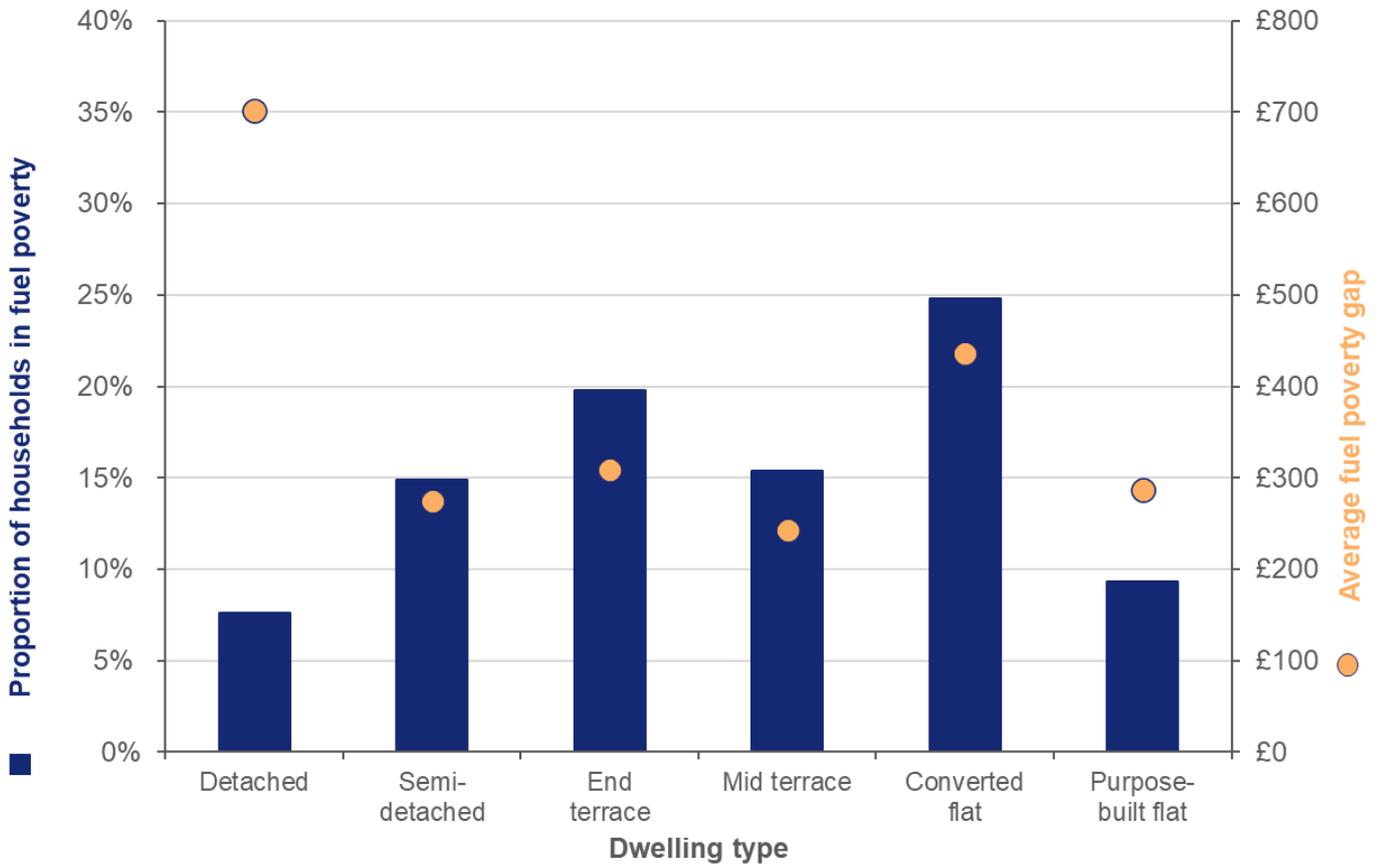
Households living in converted flats (24.8 per cent of all households) and end-terraces (19.8 per cent) had the highest likelihood of fuel poverty. In contrast, those living in detached properties have the lowest likelihood of fuel poverty (7.6 per cent). However, households living in detached properties have the largest average gap at £702, partly due to the number of exposed walls which contribute to a lower energy efficiency rating and higher floor areas, with a median floor area of 128m^2, compared to semi-detached with a floor area of 87m^2 – the next largest.

Figure 3.6 shows that households living in detached homes had much higher median incomes than other households which explains the lower levels of fuel poverty but households with the highest floor areas had the highest fuel costs and therefore the highest fuel poverty gap.

The average fuel poverty gap for households in detached homes rose by over 120 per cent compared with 33 per cent for all fuel poor households in real terms since 2021. This trend is reflected throughout the data which show that households with higher consumption e.g. detached homes, homes over 110m^2, rural and off-gas homes have seen disproportionate increases in their fuel poverty gap as higher consumers are more likely than low consumers to be considered fuel poor particularly when prices are high. These households have also seen a disproportionate rise in energy bills since while the support through the Energy Price

Guarantee provides a per unit of energy subsidy the other aspects of energy bill support provide a fixed value energy saving.

Purpose-built flats had a median energy efficiency rating of 73, compared to 66 for converted flats resulting in median fuel costs of £1,236 for purpose-built flats compared to £1,507 for converted flats. This is due to the nature of the build, age and standard of the property (more modern properties are built to a higher energy efficiency standard).

Figure 3.6: Purpose-built flats have the highest median energy efficiency but the lowest median income
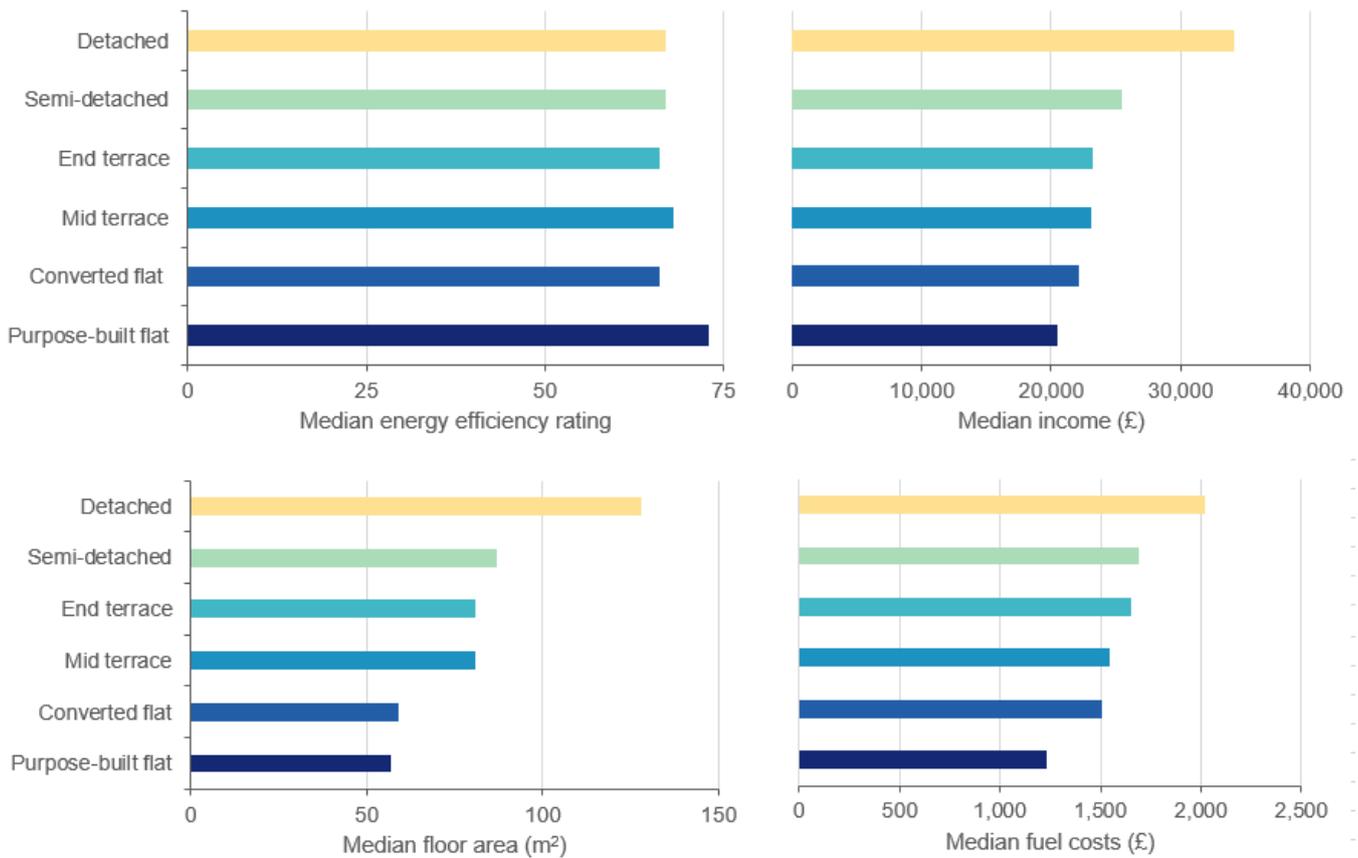
3.1.4 Floor area

Figure 3.7: Smaller properties are more likely to be occupied by the fuel poor and properties over 110m^2 have the largest average gap (£634) in 2022
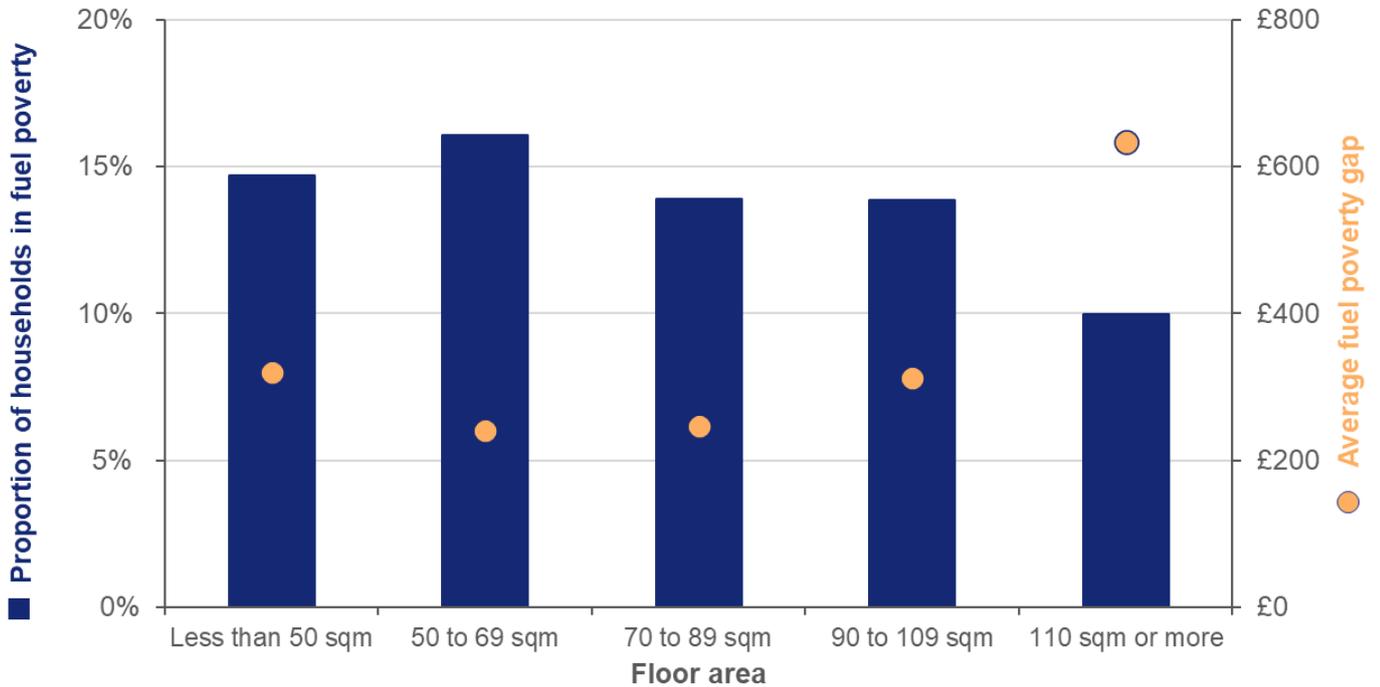
There is a higher proportion of fuel poor households among households living in smaller homes due to a lower median income of £19,978 (<50m^2) and £22,358 (50-69m^2) compared to an overall median of £25,641. In general, larger floor areas correlate with higher incomes but lower energy efficiency resulting in higher fuel costs (see Supplementary Table 8).

While the share of fuel poor households is lowest in homes with floor areas of 110m^2 or more at 10.0 per cent, they have the highest fuel poverty gap of £634. This is due to higher median fuel costs of £2,284 in these larger homes compared to £1,620 overall.

3.1.5 Property age

Figure 3.8: Households living in properties built before 1919 have the highest share of fuel poverty and highest average gap at £507, more than double the average gap properties built since 1991[33]
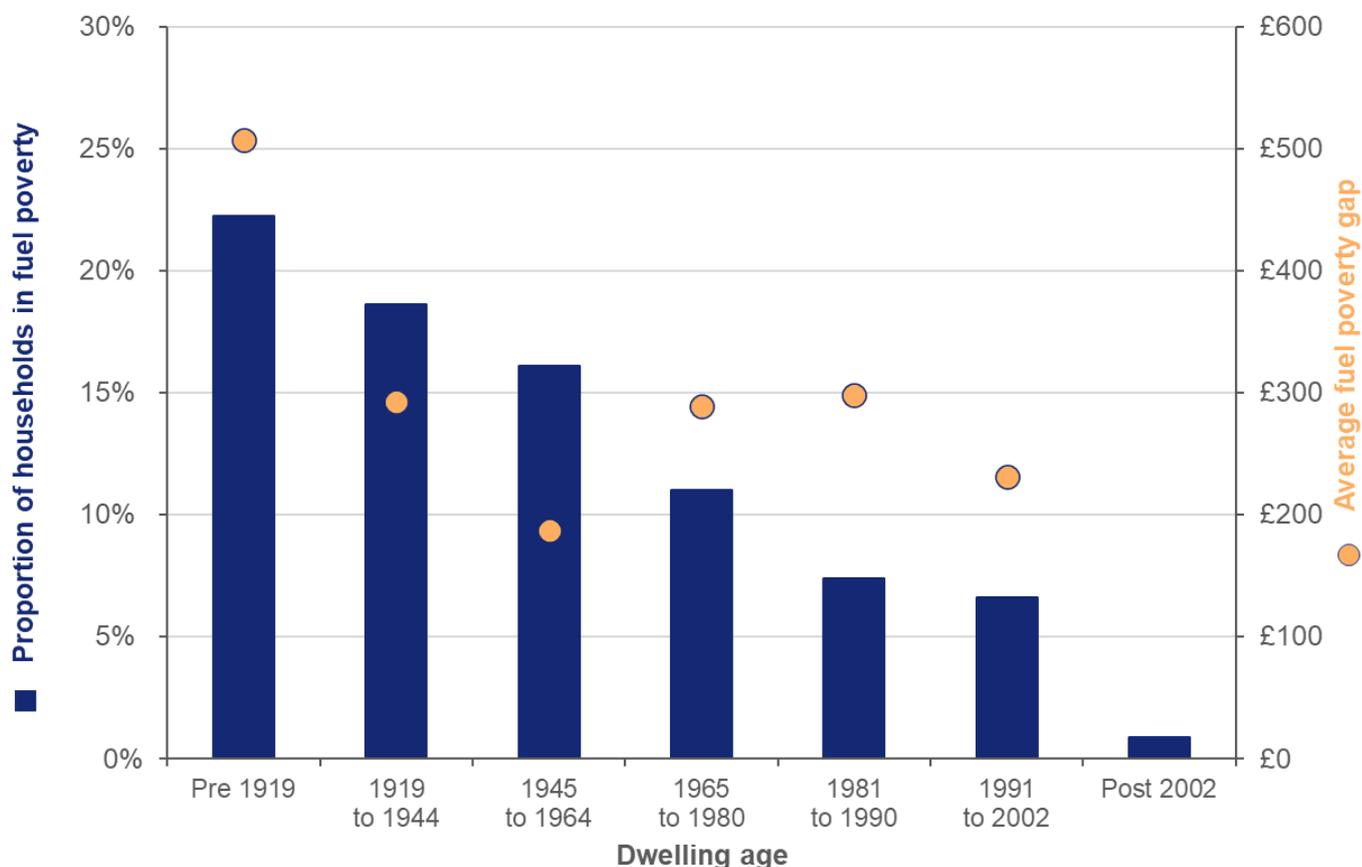
Households living in properties built before 1919 have the highest average gap at £507 and the largest proportion in fuel p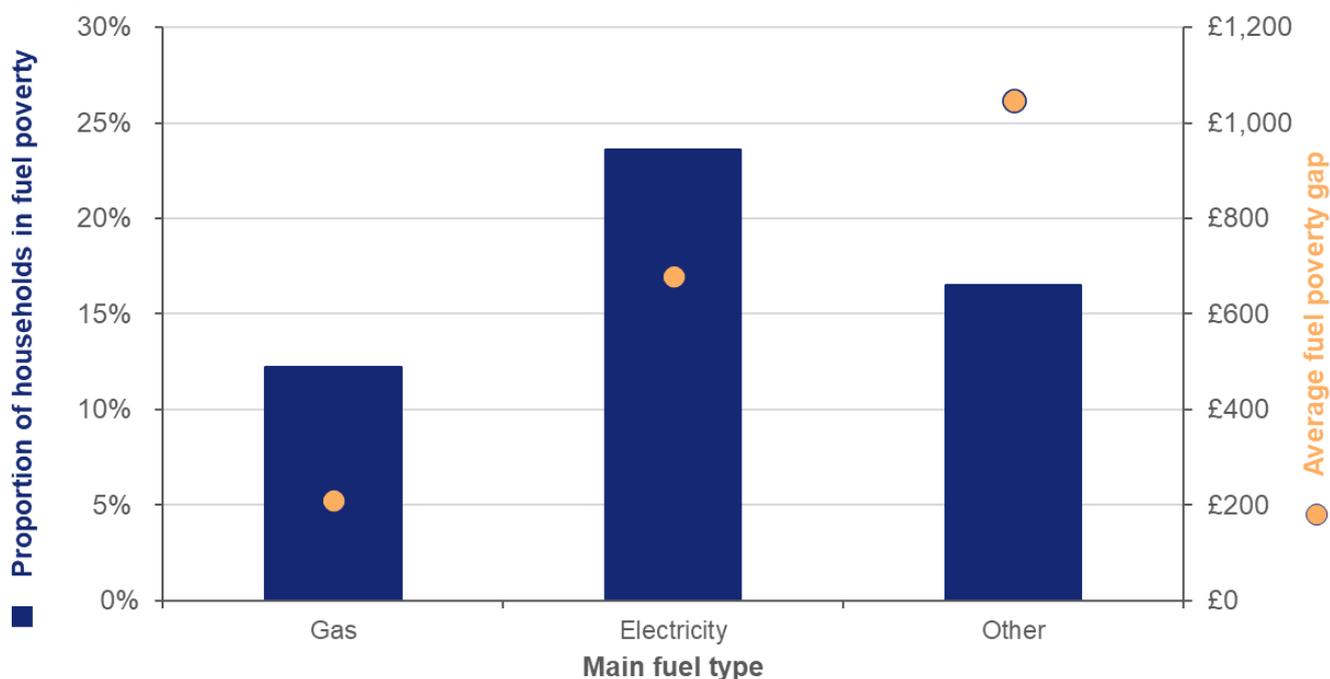overty (22.2 per cent). This is due to their lower than average energy efficiency rating and higher than average floor area leading to a higher than average fuel cost for older homes compared with newer ones (see Supplementary Table 7). This trend broadly correlates with the decreasing average fuel poverty gap in more recently built properties as energy efficiency broadly improves with decreasing property age.

Building regulations have driven up energy efficiency standards with households living in homes built after 2002 having a median energy efficiency rating of 78 (high band C) compared with 63 (mid band D) for homes built pre 1919 and the overall median of 68 (high band D).

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[33] 'Post 2002' figures for fuel poor households are based on low sample count (between 10 and less than 30), inferences should not be made based on this figure. The average fuel poverty gap has not been shown since it is not considered reliable.

3.1.6 Main fuel type

Figure 3.9: In 2022 households using electricity[34] as their main fuel for heating had the highest likelihood of being in fuel poverty but those using non gas/electric heating have the highest fuel poverty gap

Households using electricity as a main fuel for heating had the highest likelihood of fuel poverty at 23.6 per cent, compared to gas at 12.3 per cent. This is due to the higher fuel expenditure associated with properties with a lower energy efficiency but also the lower median incomes of these households (See supplementary table 10). Households using gas as their main fuel had a median energy efficiency rating of 69 compared with 62 for those using electricity and 58 for those using other fuels.

The median fuel cost for a household using electric heating is the highest at £2,087, due to the higher cost of electricity despite having the smallest median floor area of 58m^2, compared to 83^2 overall. The 'other' category which consists predominantly of oil and LPG[35], has the highest average gap at £1,048. Those using electricity as a main fuel for heating make up 7 per cent of households in England in comparison to 86 per cent using mains gas, however they account for 13 per cent of all fuel poor households.


[34] A small number of electrically powered heat pumps are included in electric heating.

[35] Other includes heating oil, anthracite nuts, household coal, smokeless fuel, wood, propane, bulk LPG, community heating from boilers/CHP/ waste heat.

3.1.7 Region

Figure 3.10: In 2022, the West Midlands had the highest proportion of fuel poor households and the South West had the highest average fuel poverty gap

The proportion of poor households across England by region
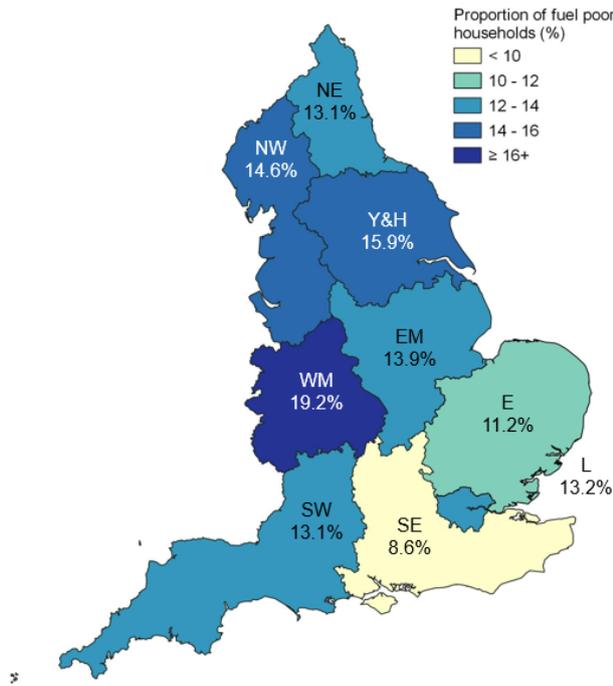
The average fuel poverty gap across England by region
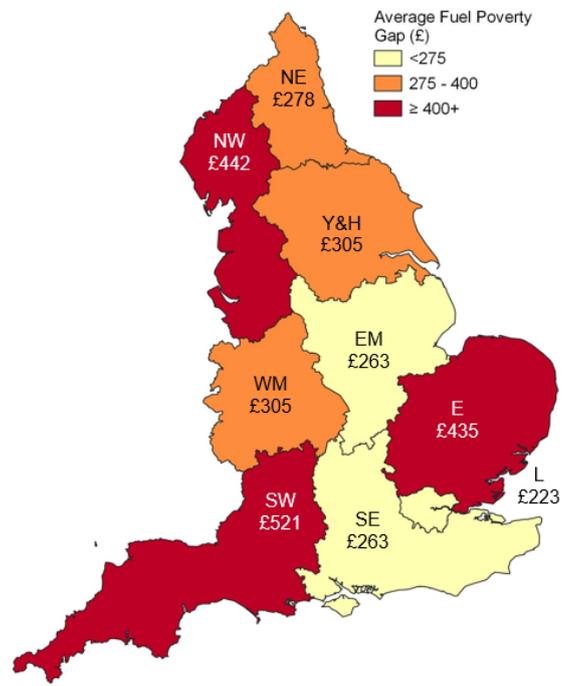
There is a high level of variation in fuel poverty rates between regions. The West Midlands had the highest rate of fuel poverty at 19.2 per cent, compared to 8.6 per cent in the South East. Given there were similar median energy efficiency ratings between regions and similar median fuel costs, the lower median incomes seen in northern regions and West Midlands have driven the higher shares of fuel poverty.

The South West had the second highest median floor area (86m^2) which drives the highest median fuel costs (£1,711) and hence the highest average fuel poverty gap of £521.

Figure 3.11: Northern regions tend to have lower than average (median) incomes, whilst southern regions outside London tend to have the largest median floor areas

Household median fuel costs across England by region

Median fuel costs (£)
- < 1,550
- 1,550 - 1,650
- ≥ 1,650
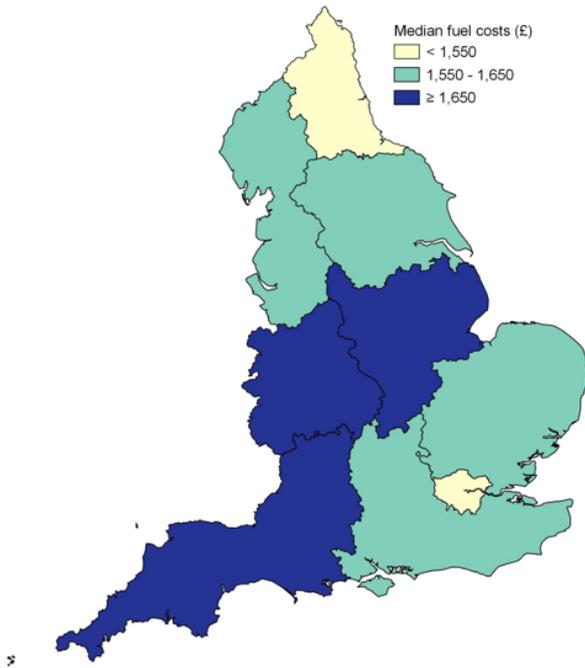
Household median income across England by region

Median income (£)
- < 24,000
- 24,000 - 26,000
- 26,000 - 28,000
- ≥ 28,000
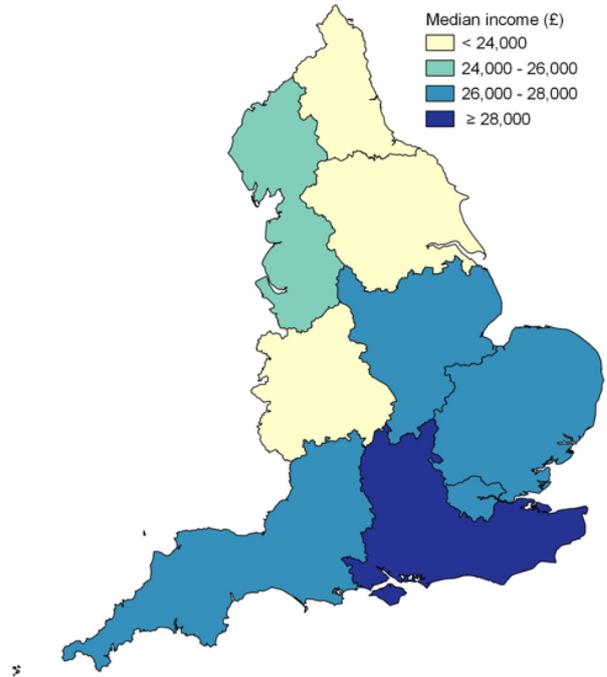
Household median energy efficiency rating across England by region

Median FPEER
- ≤ 67
- 68
- ≥ 69
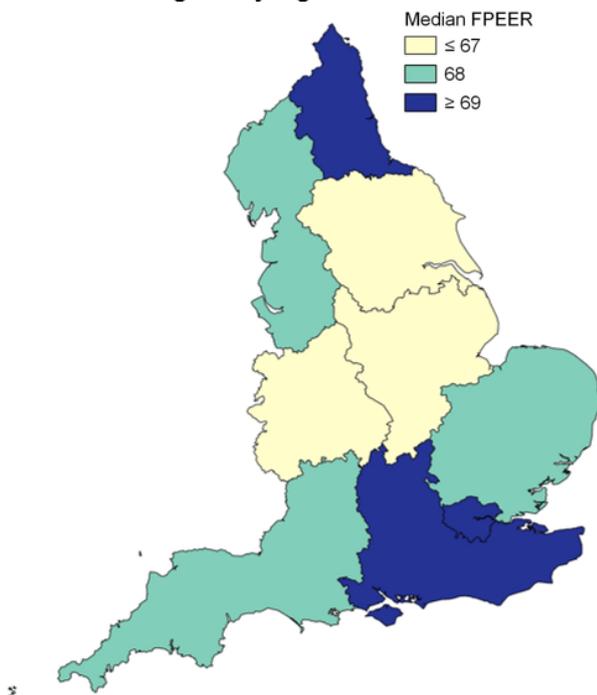
Household median floor area across England by region

Median Floor Area
- 80
- 81 - 85
- ≥ 85

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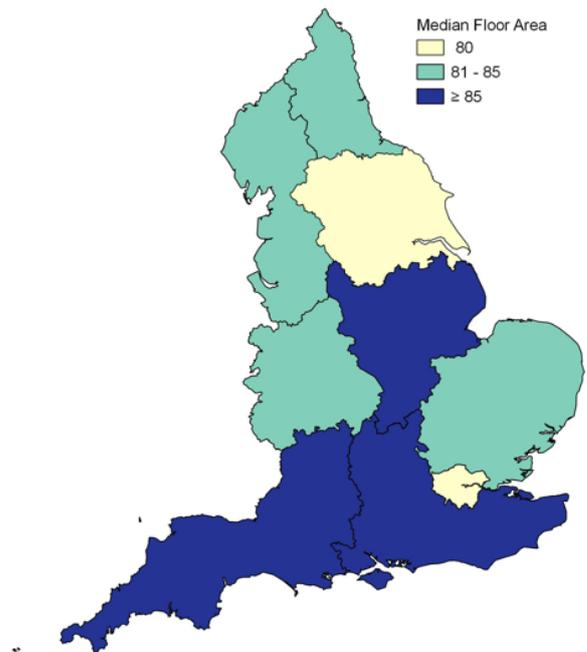
3.1.8 Rurality and gas grid connection

Figure 3.12: In 2022, households living in rural areas have a higher rate of fuel poverty and a much larger fuel poverty gap
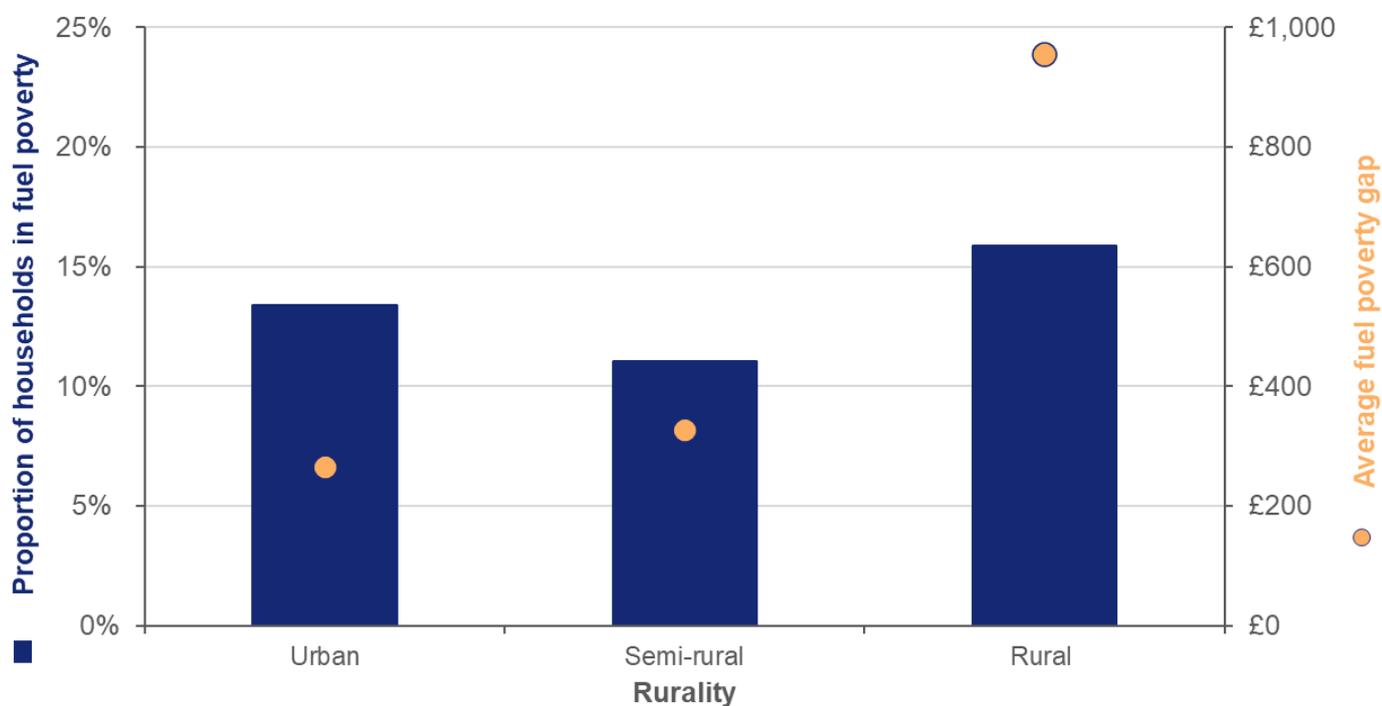
| Urban (82% of households) | Semi-Rural(6%) | Rural (8%) |

Households living in rural areas have the highest fuel poverty rate of 15.9 per cent in 2022 and the largest fuel poverty gap at £956. Households in semi-rural areas had lowest fuel poverty rate of 11.1 per cent with urban areas having the overall median rate of 13.4 per cent.

Households living in rural areas are, on average, in much less energy efficient and much larger properties but have higher than average median incomes (see Supplementary Table 4). Rural properties have a higher incidence of being off the gas grid – the survey showed 56.8 per cent are off gas grid, compared to just 9.0 per cent of urban properties.

Of households living in properties not on the gas grid, 20.1 per cent are fuel poor compared to 12.3 per cent on the gas grid. These compare with 22.9 per cent and 22.0 per cent respectively in 2010, showing the reduction in fuel poverty has largely come from households connected to the gas grid where 48.4 per cent of homes are band A-C compared with 31.3 per cent for off gas grid homes. The average fuel poverty gap for households off the gas grid was £804, over three times higher than on gas grid households (£222).

Figure 3.13: Fuel poor households are more likely to be off the gas grid and have an average fuel poverty gap over three times higher than gas households
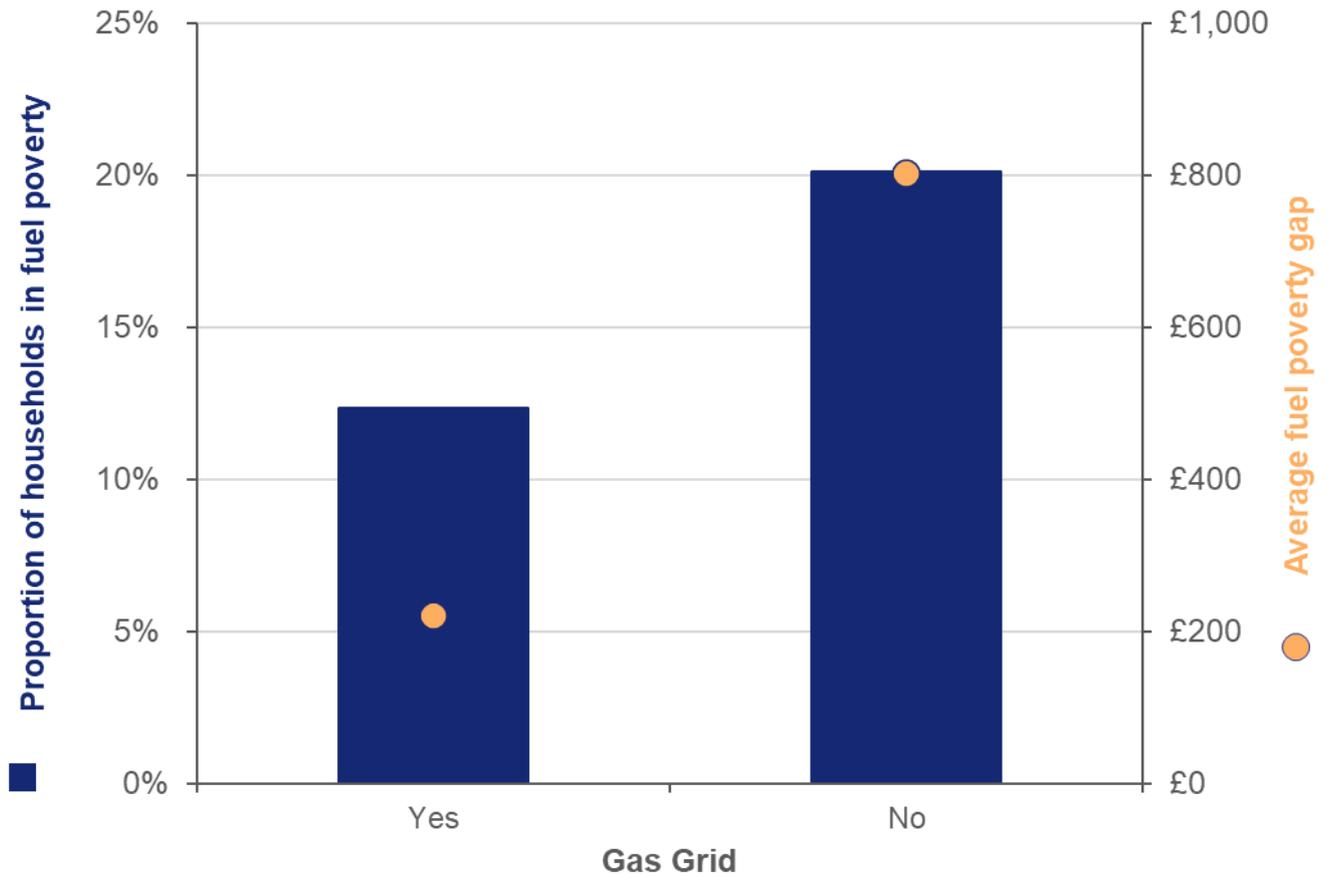
3.2 Household characteristics

3.2.1 Tenure

The differences in fuel poverty prevalence and the average gap by tenure reflect both the nature of the housing stock and household characteristics typical to a household's tenure.

Figure 3.14: The proportion of households in fuel poverty was highest for private renters at 24.1 per cent whilst owner occupiers (outright owners) have the highest average gap at £447
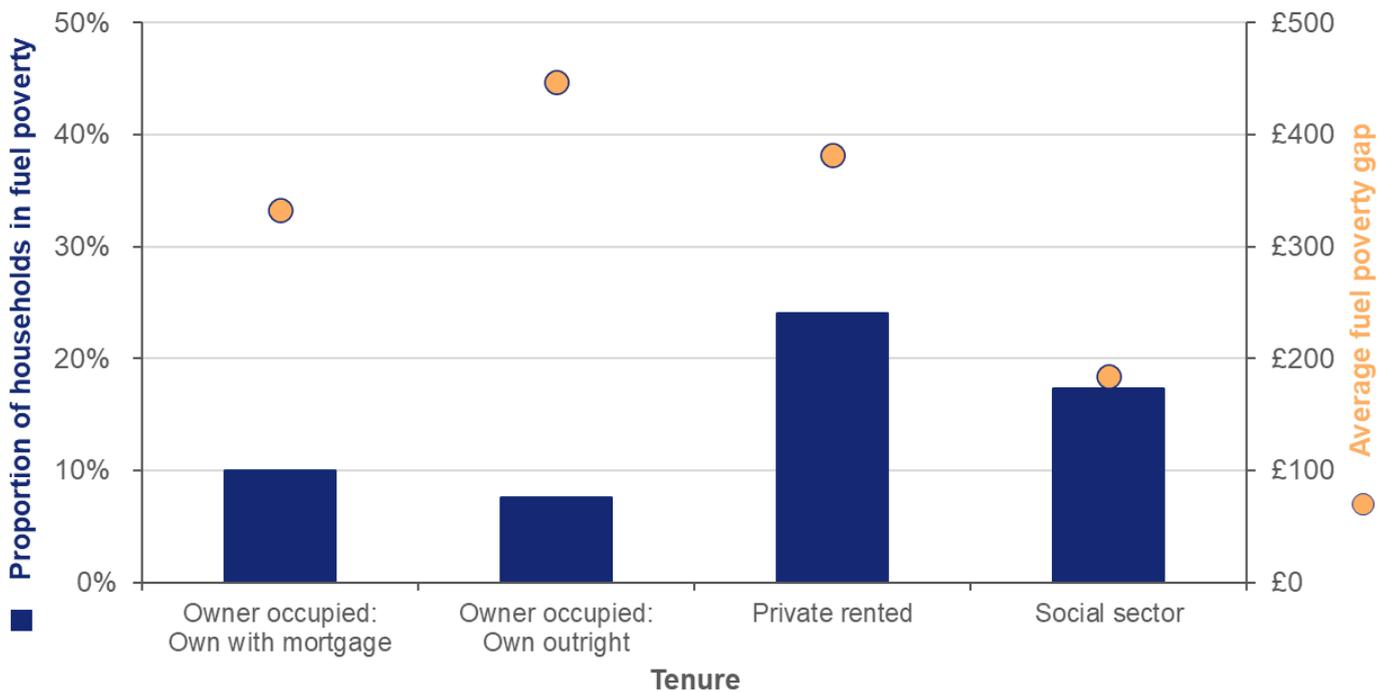
The highest level of fuel poverty was in the private rented sector with 24.1 per cent of these households being fuel poor.

Owner occupiers had the lowest level of fuel poverty reflecting their higher median incomes. Owner occupiers who own their home outright are slightly less likely to be fuel poor (7.6 per cent) than those with a mortgage (10.0 per cent). This is partly due to their minimal housing costs.

Figure 3.15: There is a higher proportion of band A- C properties that are socially rented compared to owner occupied and privately rented properties.
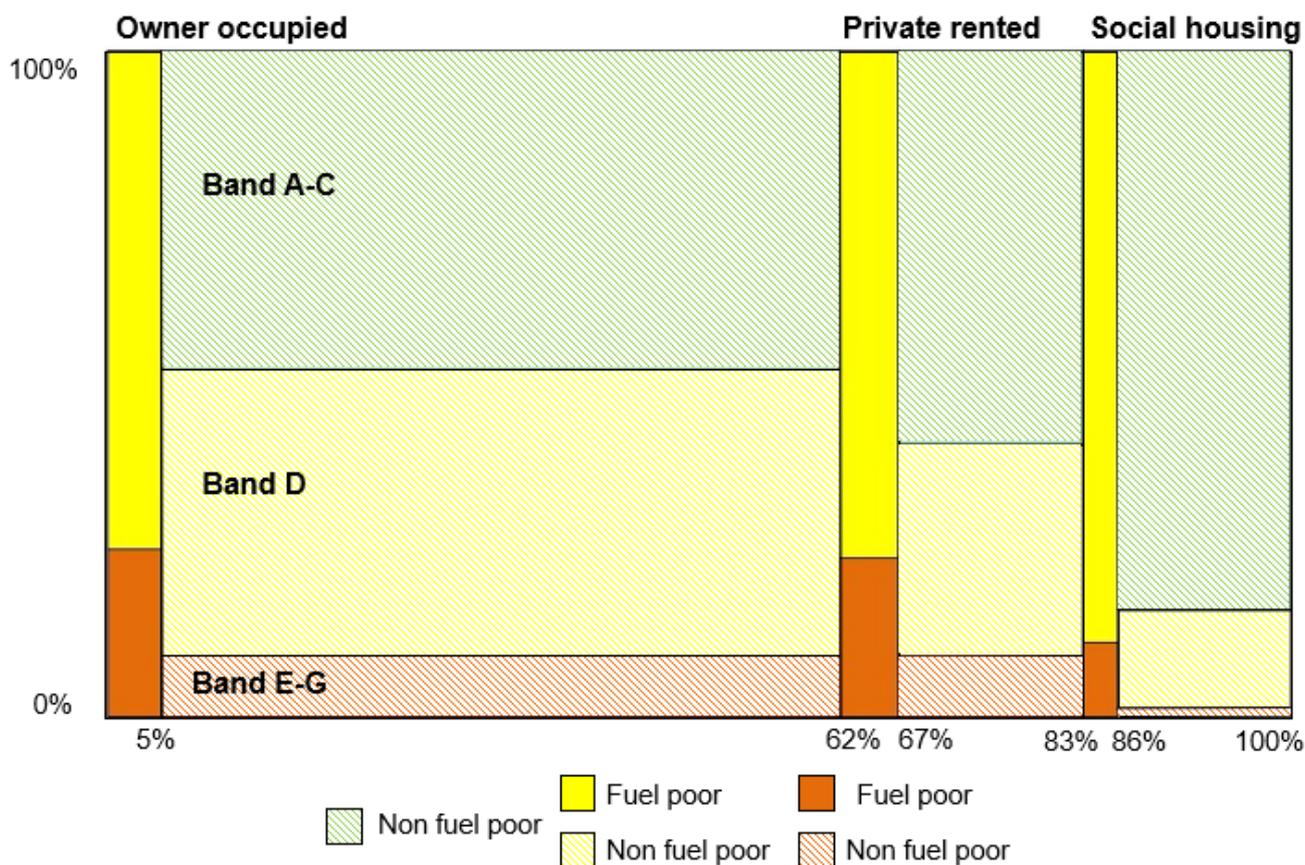
Area is equivalent to the proportion of households in that group.

By definition, any household with an energy efficiency rating of A-C is not fuel poor regardless of income. The highest share of band A-C homes is in the social housing sector where 69.5 per cent of homes were band A-C in 2022. Of households with band D-G rating in this tenure, 56.8 per cent were fuel poor. While the median income of households living in social housing was 19.1 per cent lower than for private rented households, the higher levels of energy efficiency have driven down the rate of fuel poverty from 40.3 per cent in 2010 to 17.3 per cent in 2022.

In the private rented sector, the share of band A-C homes has increased from 29.3 per cent in 2017 to 44.8 per cent in 2022 which the Private Rented Sector regulations will have helped drive. The sector still has the highest fuel poverty rate based on the lower income households who live in this sector compared with the owner-occupied sector.

Overall, 40.9 per cent of fuel poor households are owner occupied, 36.6 per cent are privately rented and 22.5 per cent live in social housing. As a comparison, 62.3 per cent of all households are owner occupied, 20.3 per cent privately rented and 17.4 per cent live in social housing.

Figure 3.16: Social housing properties tend to be more energy efficient driving lower levels of fuel poverty despite having the lowest median incomes
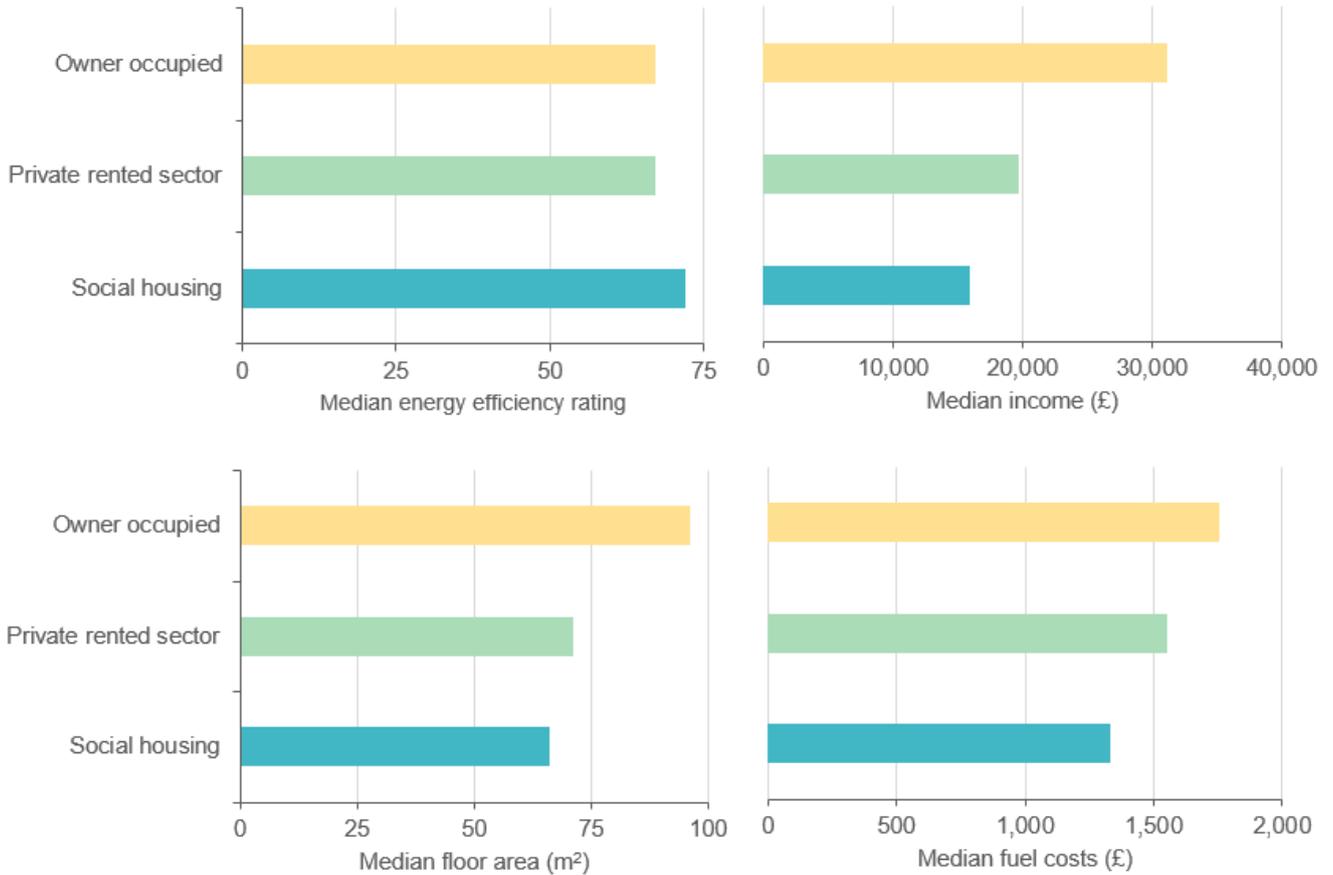
Social housing properties tend to be more energy efficient with 69.5 per cent of social rented homes now rated C or above and as such are not fuel poor. Of social rented homes below band C, 56.7 per cent were fuel poor due to the lower incomes in this tenure.

Owner occupied and privately rented properties have lower median energy efficient ratings resulting in higher energy costs and a higher average gap. The median income of owner occupiers is significantly larger than that of private renters and social renters leading to a lower rate of fuel poverty within this tenure.

3.2.2 Household composition

Figure 3.17: Single parents have the highest proportion of households in fuel poverty and couples under 60 without children have the highest average gap
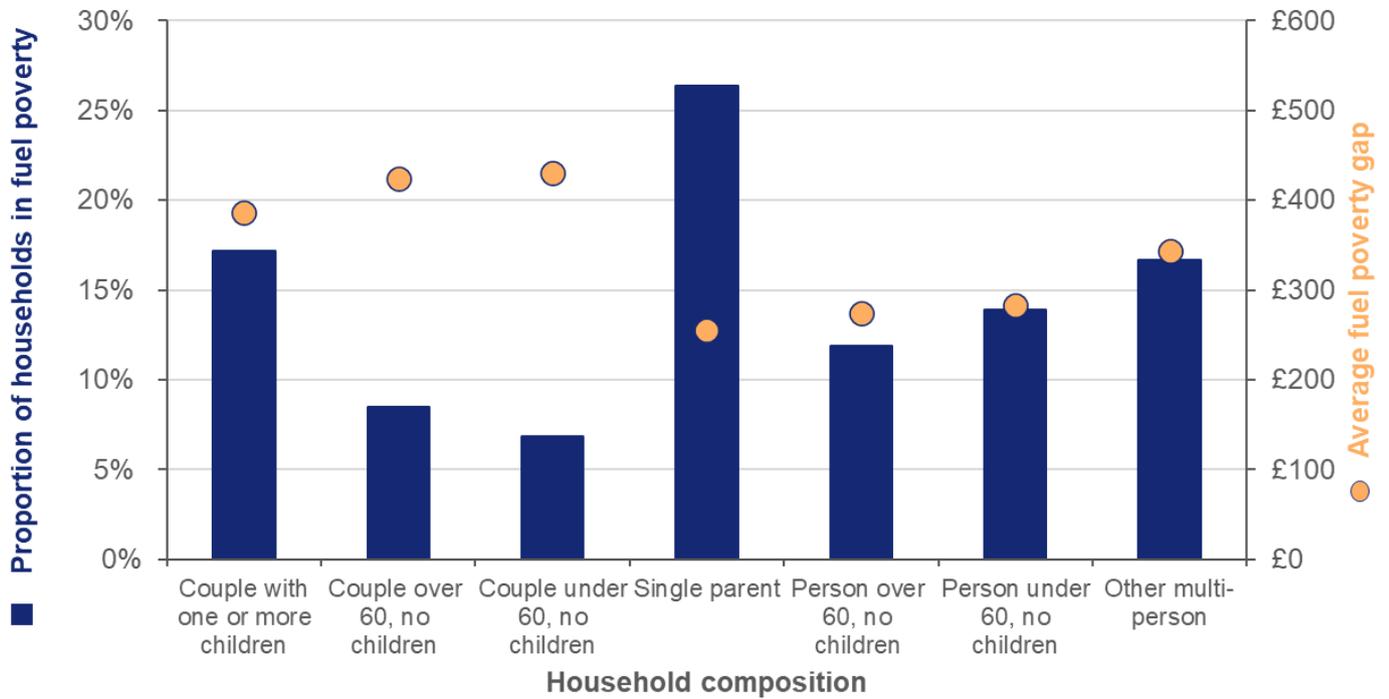
Single parent households have consistently had the highest proportion of households in fuel poverty (see Trends Table 11). In 2022, 26.4 per cent of single parent households were fuel poor likely due to their considerably lower median income (see figure 3.18) but the lowest average fuel gap of £255 due to a high energy efficiency rating.

Couples under 60 with no dependent children, had the lowest prevalence of fuel poverty (6.9 per cent) but did have the highest average gap (£430). This low rate of fuel poverty arises from this group having the highest median equivalised income (£34,454).

Figure 3.18: Single parent households have considerably lower median income than average
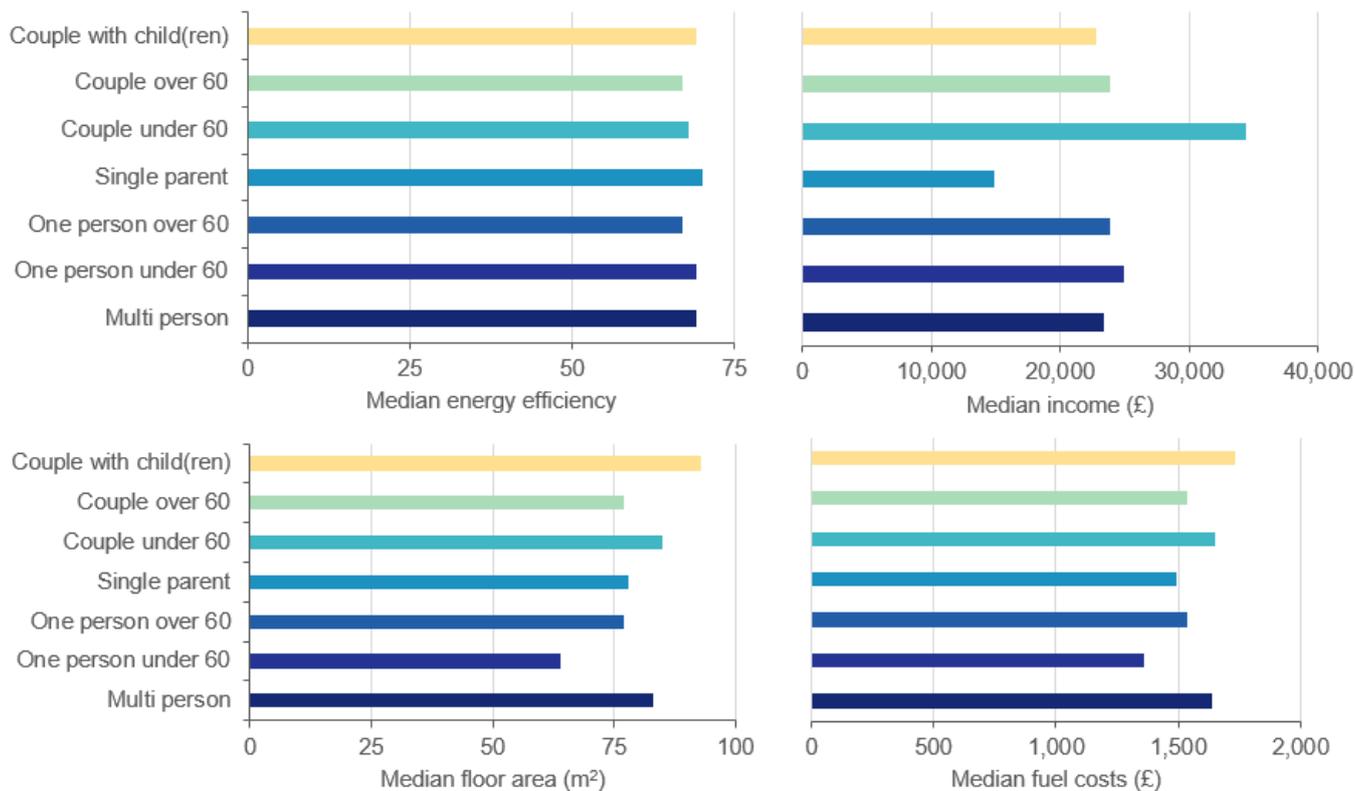
In 2022, 42.3 per cent of all fuel poor households had one or more dependent children (1.4 million households). This is 5.7 per cent of all households and 19.6 per cent of all households with children.

3.2.3 Ethnicity

Households are classified based on the ethnicity of the household reference person (HRP)[36]. Some households will contain members from more than one ethnic group, which is not reflected in this analysis.

Figure 3.19: Households with an ethnic minority HRP are more likely to be in fuel poverty but a lower average gap than households with a white HRP
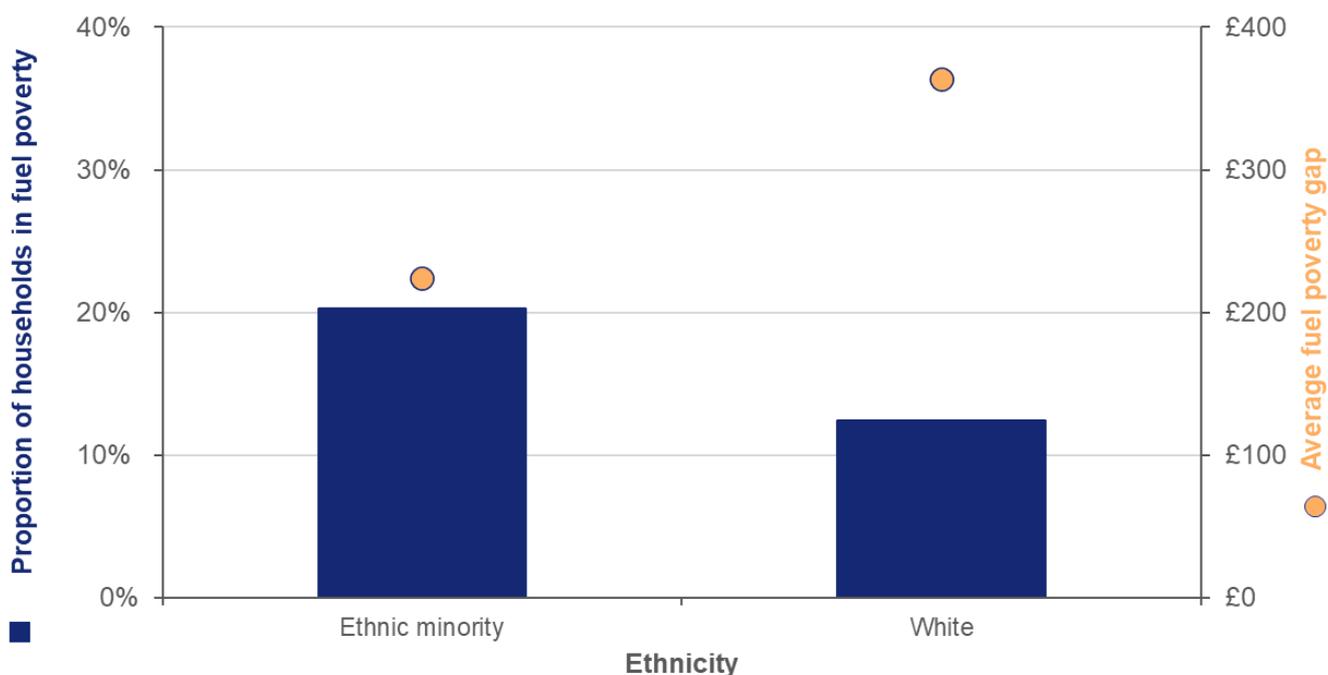
Households with an ethnic minority HRP had a higher proportion of households in fuel poverty at 20.3 per cent compared with 12.4 per cent for households with a white HRP. Households with a white HRP had a higher average fuel poverty gap of £364 compared with £224 for ethnic minorities.

In 2022, the median income for ethnic minority households was lower than the income for white households which partly explains their higher likelihood of fuel poverty[37]. However, ethnic minority households are more likely to be living in social housing (25.5 per cent compared to 16.3 per cent for white households) and tend to live in more energy efficient properties with a median energy efficiency rating of 70 compared to 68 for white households which may explain their lower average gap.

This data is also published as part of the Ethnicity Facts and Figures collection published by the Cabinet Office.

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[36] The person in whose name the dwelling is owned or rented or who is otherwise responsible for the accommodation. In the case of joint owners and tenants, the person with the highest income is taken as the HRP. Where incomes are equal, the older is taken as the HRP.
[37] See Table 16 in the supplementary tables.

3.2.4 Age

Age can be analysed in two different ways:
- Age of the oldest member of the household.
- Age of the youngest member of the household.

This allows us to distinguish between households with young children and households that comprise solely of those aged 75 and over.

Figure 3.20: Households where the age of the oldest member is between 16 and 24 have the highest likelihood of being in fuel poverty (25 per cent), with an average gap of £483
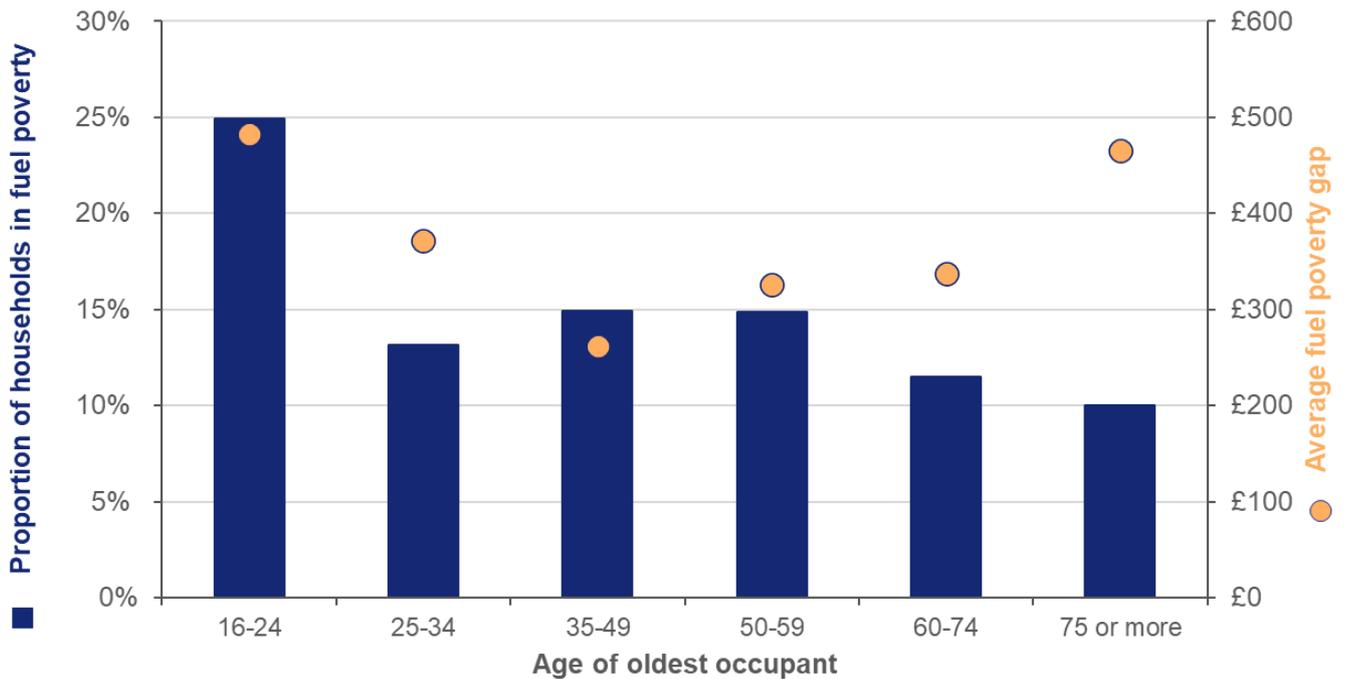
In 2022, 25.0 per cent of households where the oldest member is aged 16 to 24 years were fuel poor, which is likely to be a result of lower incomes for younger households. The youngest households (age 16-24) had a median income of £14,037 compared to £25,641 for all households (See Supplementary table 15).

Figure 3.21: Households including children and young people have the highest likelihood of being in fuel poverty
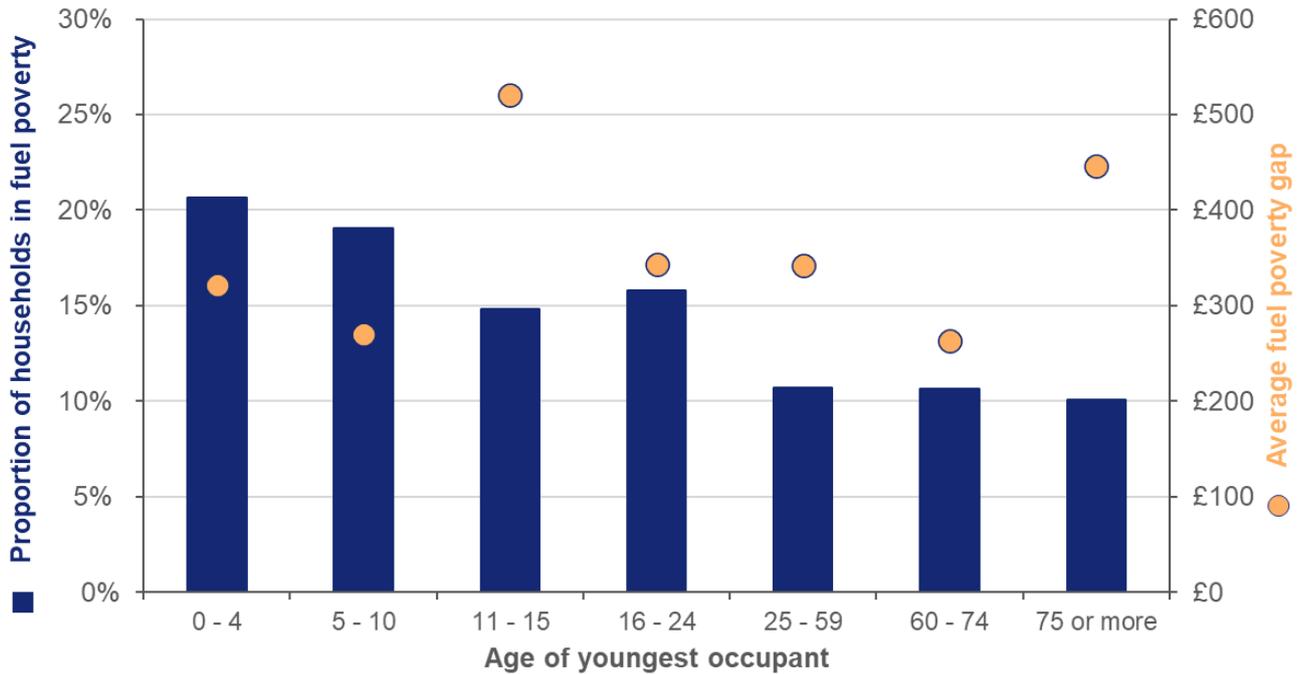
Households with children and people aged 24 or under had the highest prevalence of fuel poverty. This is due to these households having lower than average equivalised median income. Equivalised income reflect the number of people in the household who depend on the total household income. The lowest median income was for households with a child aged 0-4, and 5-10 of £18,872 and £19,832 respectively compared with an overall median income of £25,641.

3.3 Household income

3.3.1 Employment status

Data are based on the household reference person (HRP). Many households will contain members with a mixture of employment statuses, which is not reflected in this analysis.

Figure 3.22: Households with an unemployed HRP or one in full time education have the largest proportion of households in fuel poverty while households with a HRP in full time work have the lowest[38]
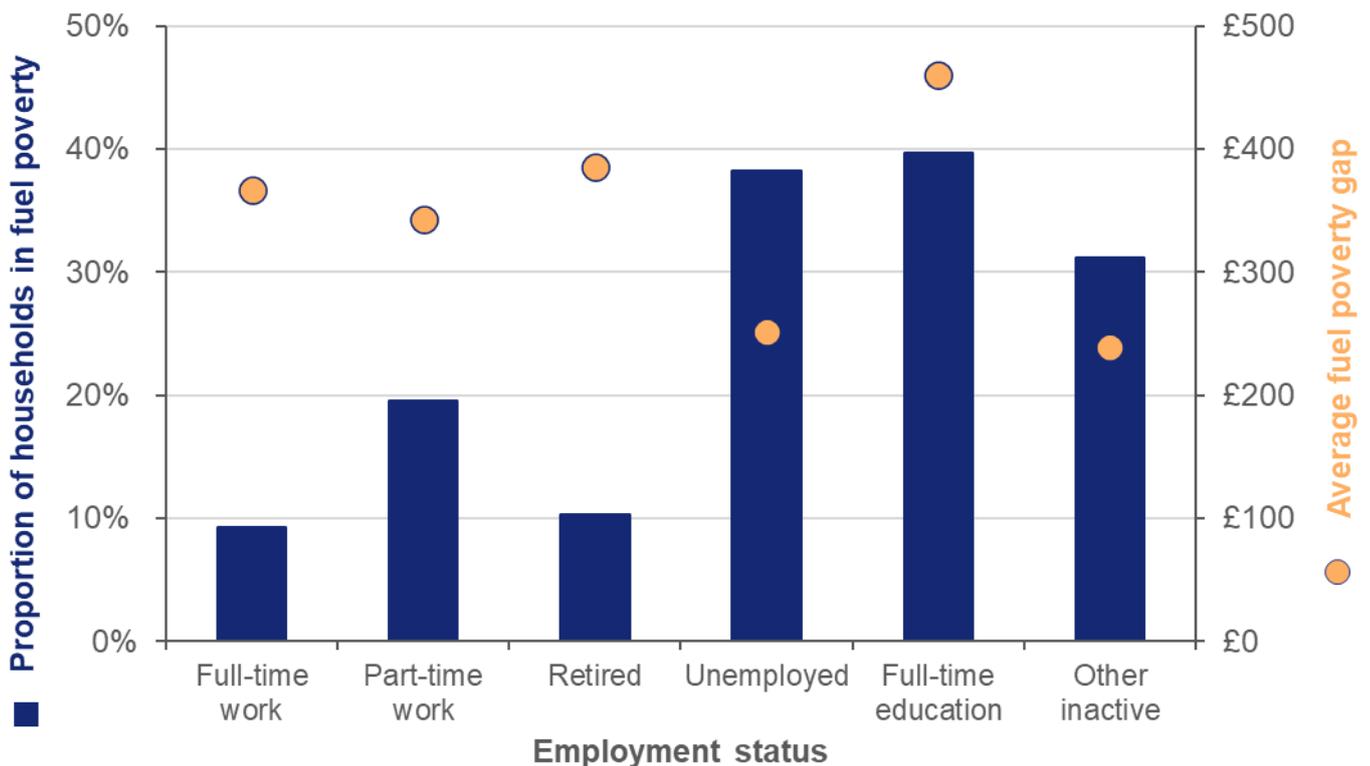
Figure 3.22 shows that those in full-time work and retired have the lowest proportions that are classed as fuel poor (9.3 per cent and 10.3 per cent, respectively). Whereas households where the HRP is a full-time student (39.7 per cent) or unemployed (38.2 per cent) have the highest likelihoods of being in fuel poverty.

Despite having a lower level of fuel poverty, retired households have the highest fuel poverty gap of £385 other than those in full time education reflecting their higher median fuel costs (£1,699) due to slightly higher floor areas, lower energy efficiency and reporting that they are more likely to be at home during the day on weekdays, although it is noted the differences in daytime occupancy between different employment statuses has been less significant since the start of the pandemic.

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[38] Figures for households where the HRP is in full time education are based on small sample sizes, inferences should not be made based on this figure

Figure 3.23: Households where the HRP is unemployed have the lowest median income and the lowest median fuel costs
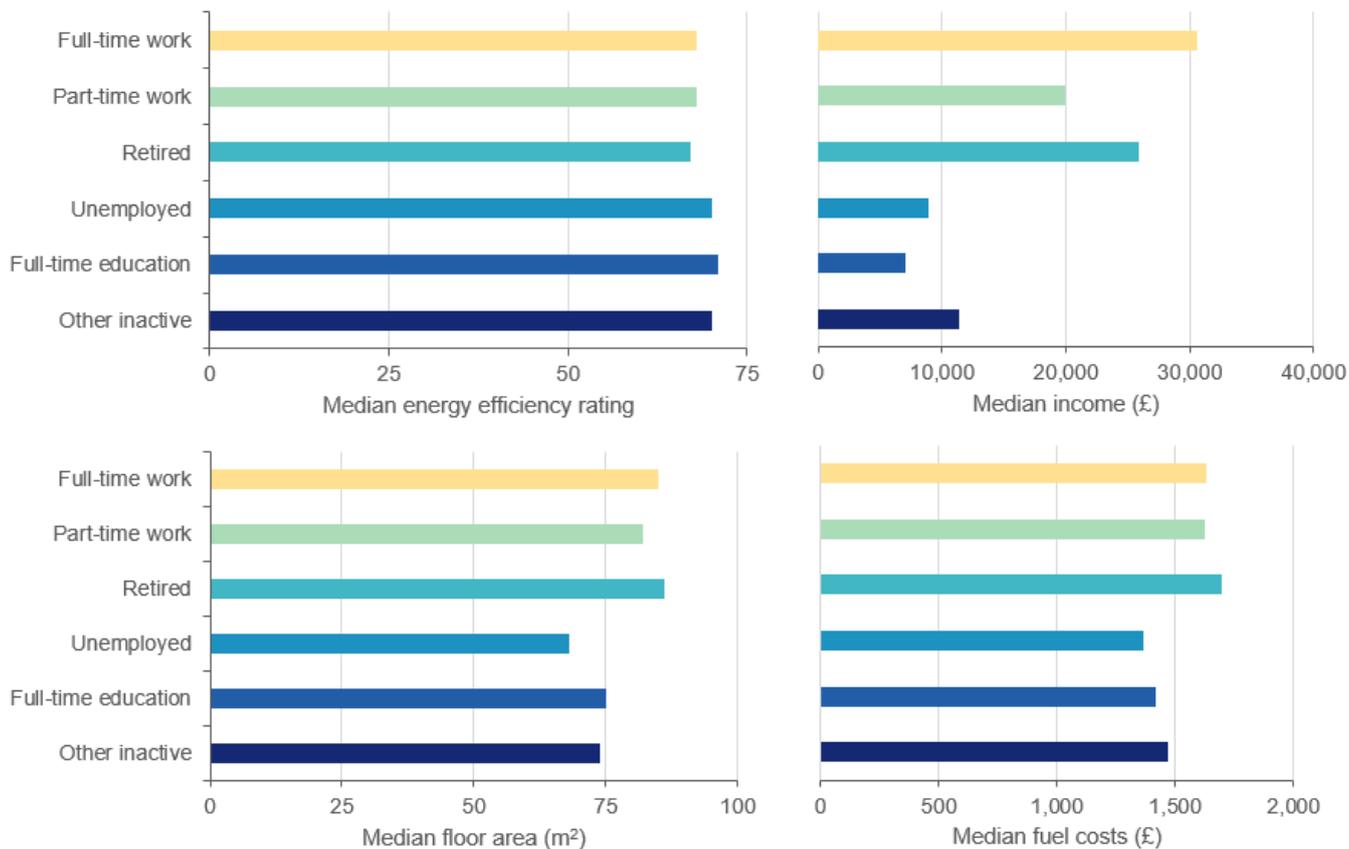
The median income for households tends to be negatively correlated with the proportion of households in fuel poverty. For example, households where the HRP is in full time work have the lowest proportion in fuel poverty (9.3 per cent) and the highest median income of £30,529.

3.3.2 Benefits

Income from disability benefits (Attendance Allowance, Disability Living Allowing and Personal Independence Payments) are not included in the fuel poverty income calculation. This reflects that these benefits are specifically given to manage living with a disability. The analysis below does not count households as receiving benefits unless they received another benefit in addition to a disability benefit.

Figure 3.24: In 2022, 30 per cent of households in receipt of benefits were fuel poor compared with 7 per cent not in receipt of benefits supporting low income households[39]
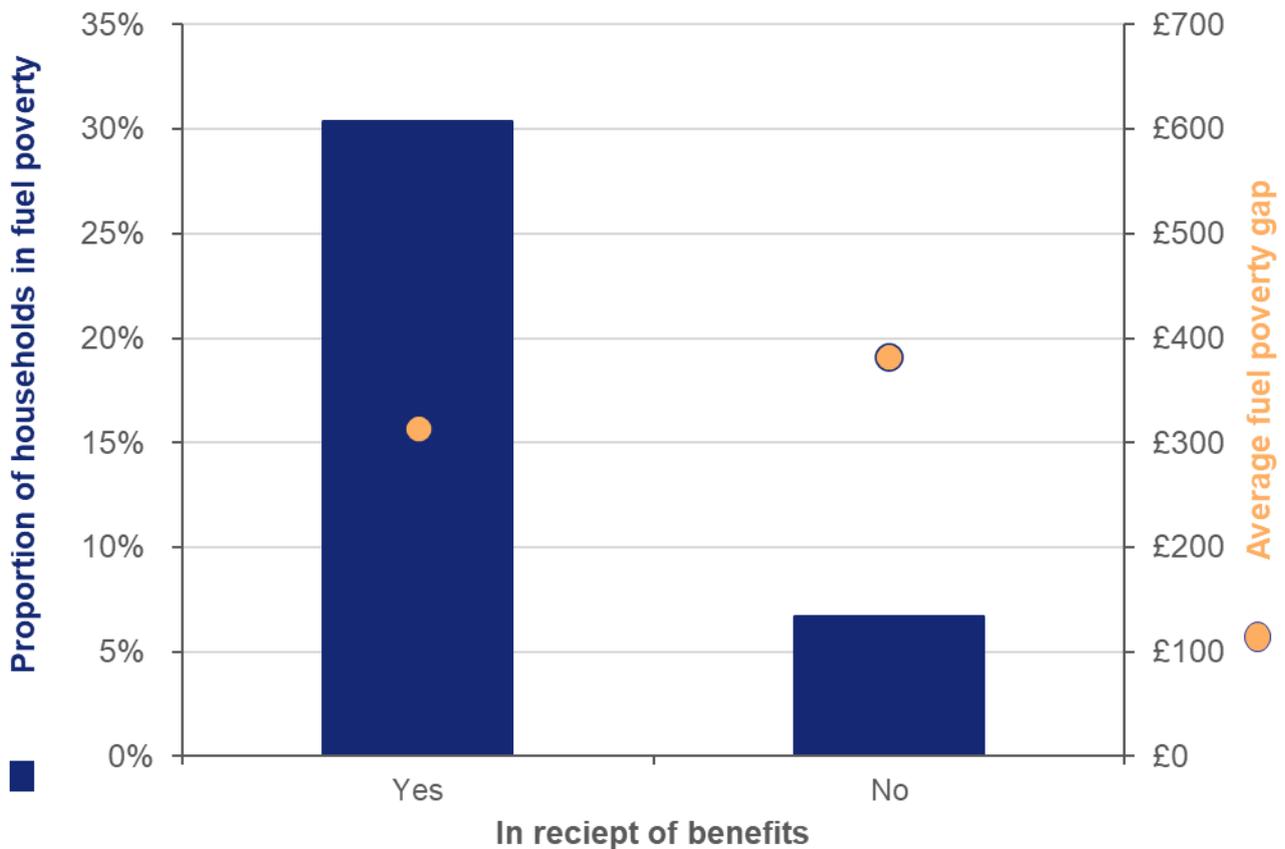
Overall an estimated 64.0 per cent of households in fuel poverty are receiving at least one of these benefits (Table 34a). This share rises to 72.1 per cent if disability benefits are included (Table 34b).

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[39] Income Support, Universal credit, Jobseeker's allowance, Employment and support allowance, Pension credit, Housing benefits, Local housing allowance, Council tax benefit, Child tax credit & Working tax credit. It does not include households receiving other state benefits e.g. State pension or Child benefit which are not specifically for low income households.

Figure 3.25 Households in receipt of benefits had much lower incomes than other households but also higher energy efficiency ratings and smaller floor areas leading to lower median fuel costs than other households.
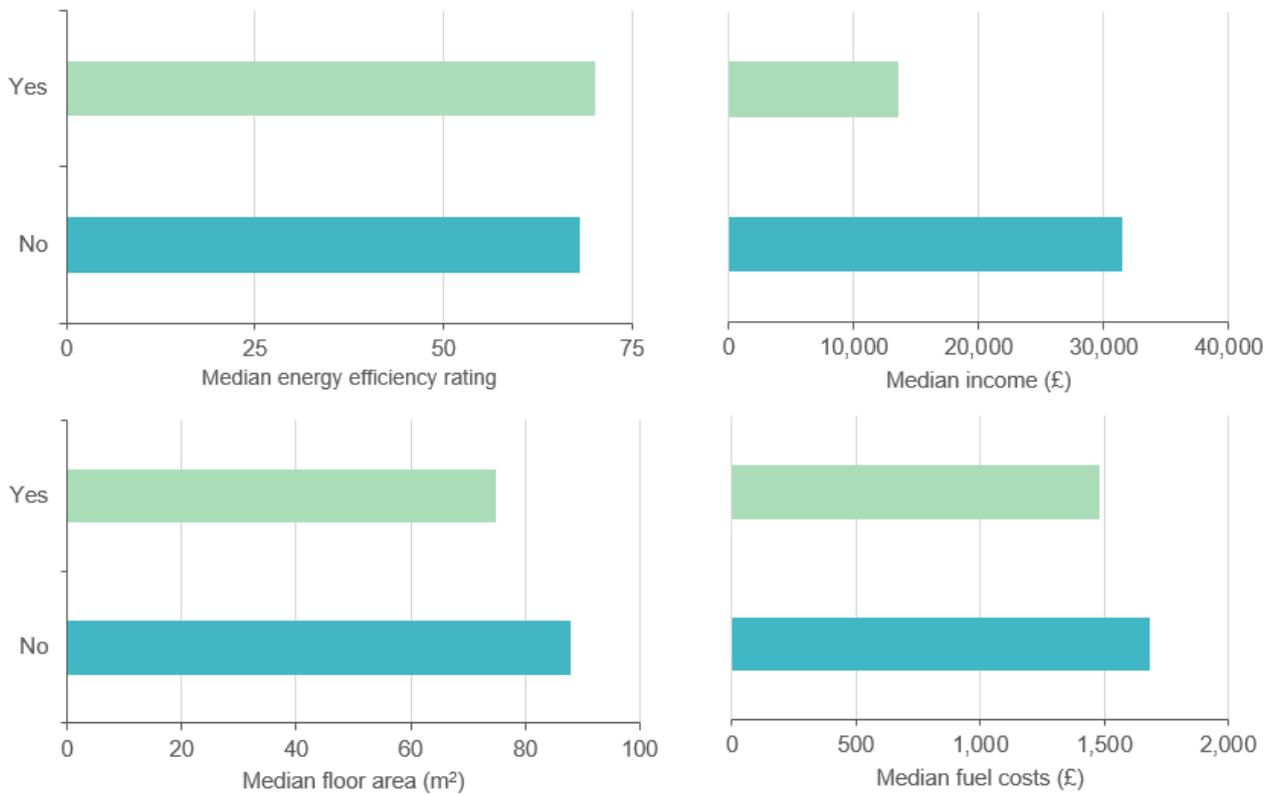
3.4 Fuel payment type

Households that pay by prepayment meter have historically had the highest likelihood of fuel poverty of the payment types. It should be noted that under the LILEE metric this is driven by the lower incomes associated with households with these tariffs rather than the tariff itself. It is noted though that the fuel poverty gap for these households is affected by tariffs which is seen in figure 3.26.

3.4.1 Electricity payment method

Figure 3.26: Households that pay for their electricity by prepayment have the highest proportion in fuel poverty but the lowest fuel poverty gap
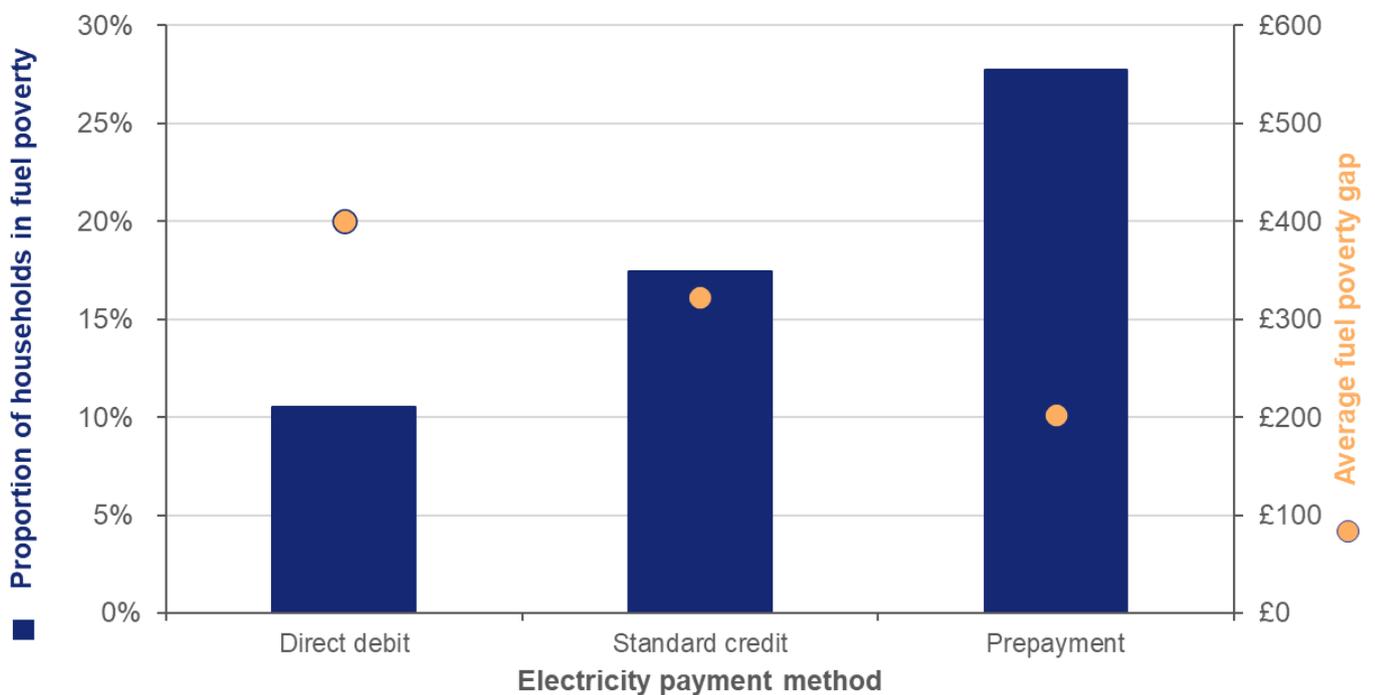
The share of households in fuel poverty using a pre-payment electricity meter is 27.8 per cent compared with 10.5 per cent for direct debit. Households with pre-payment electricity meters had the lowest median income of £14,856, driving high levels of fuel poverty, but the lowest median floor area of 69m^2 and the lowest fuel costs of £1,439 which contribute to this payment method having the lowest fuel poverty gap of £202.

Figure 3.27: Households that pay for electricity by prepayment meter tend to live in smaller properties, have lower than average median fuel costs and a much lower median income
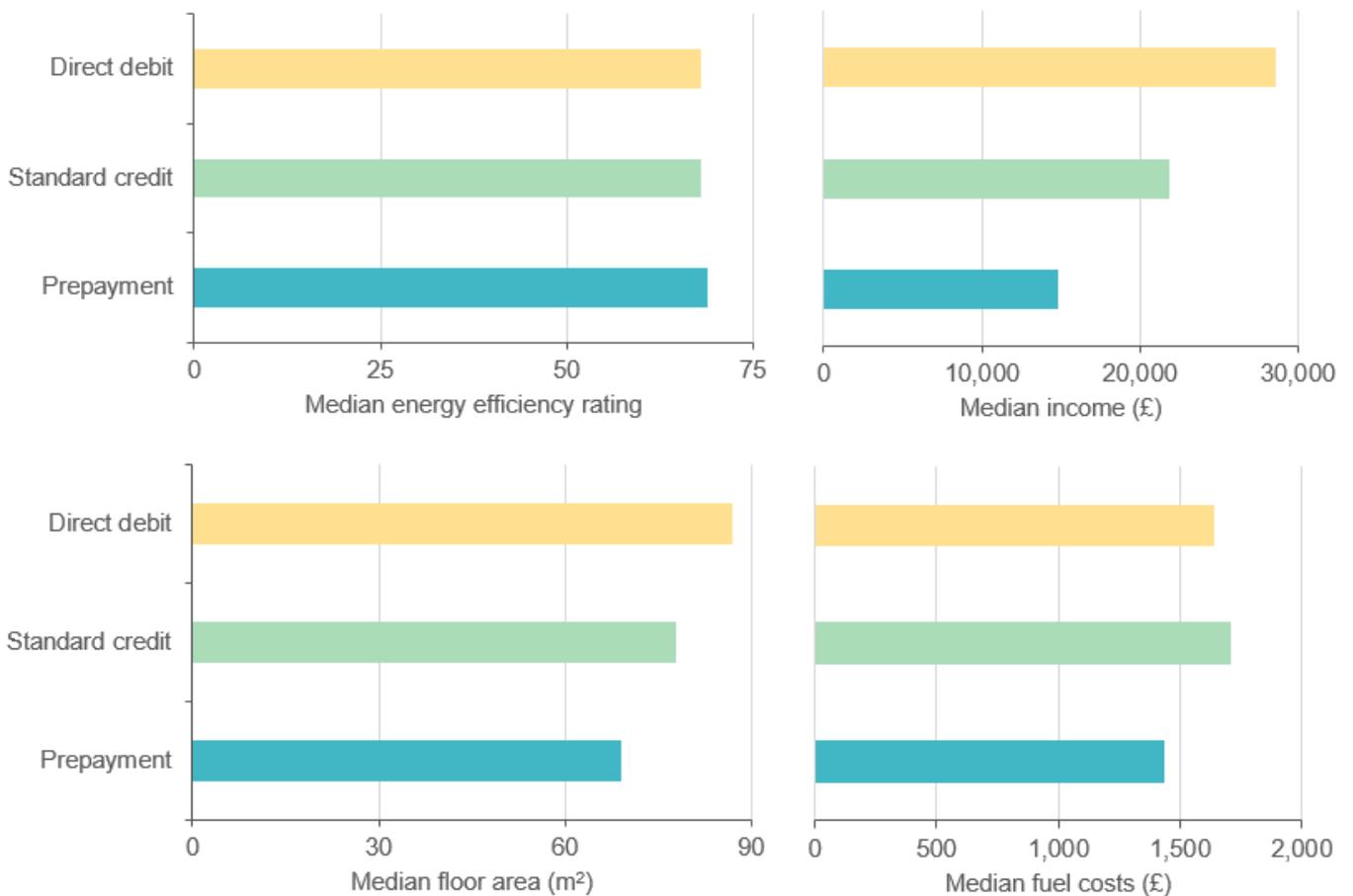
The proportion of households in fuel poverty and the average gap follows a similar pattern for a household's gas method of payment as it did for electricity method of payment.

As presented in this chapter and summarised in Chapter 2, the prevalence of fuel poverty in England varies by several key dwelling and household characteristics.

More detailed information can be found online in the accompanying detailed, trends and supplementary tables for fuel poverty in England.

Chapter 4: Projected Fuel Poverty Figures

4.1 Projected headline figures, 2021-2023

Table 4.1: Projected headline figures, 2021-2023[40]

Headline figures	2021 Outturn	2022 Projection	2023 Projection
Number of households in fuel poverty (millions)	3.16	3.26	3.53
Proportion of households in fuel poverty (%)	13.1	13.4	14.4
Aggregate fuel poverty gap (£ millions)	804	1,103	1,562
Average fuel poverty gap (£)	254	338	443

Note that these figures are based on our fuel poverty projections model. These should be interpreted as indicative projections, not precise point estimates.

As mentioned in section 1.2, the 2022 figures are projections but since the analysis of these trends has already been explored in section 2, the analysis in this section focusses on the trend to 2023.

Figure 4.1: The proportion of households in fuel poverty is projected to increase to 14.4 per cent in 2023 driven by increases in energy fuel prices

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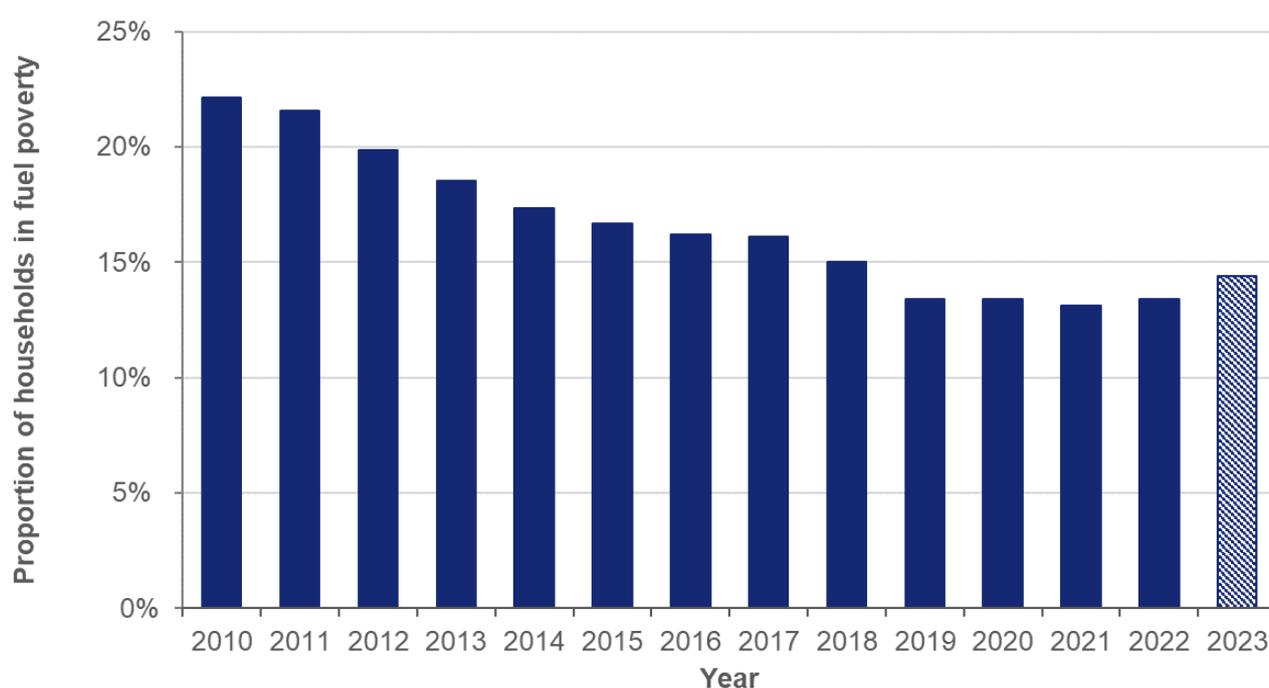
[40] The fuel poverty gap figures are adjusted to 2022 prices.

Figure 4.1 shows the proportion of households in fuel poverty fell steadily from 22.1 per cent in 2010 to 13.1 per cent in 2021 and is then projected to increase to 14.4 per cent in 2023. This is mainly due to higher energy prices which are projected to increase from 2022 for consumers by an estimated 50 per cent for gas and around 36 per cent for electricity in 2023.

The average fuel poverty gap for England in 2023 (the reduction in fuel costs needed for a household to not be in fuel poverty) is projected to be £443, up by 31 per cent in real terms since 2022 (£338). The fuel poverty gap is directly affected by changes in fuel prices since it measures the reduction in fuel costs needed for a household to not be in fuel poverty.

Figure 4.2: The average fuel poverty gap is projected to increase rapidly since 2021 to £443 in 2022 prices
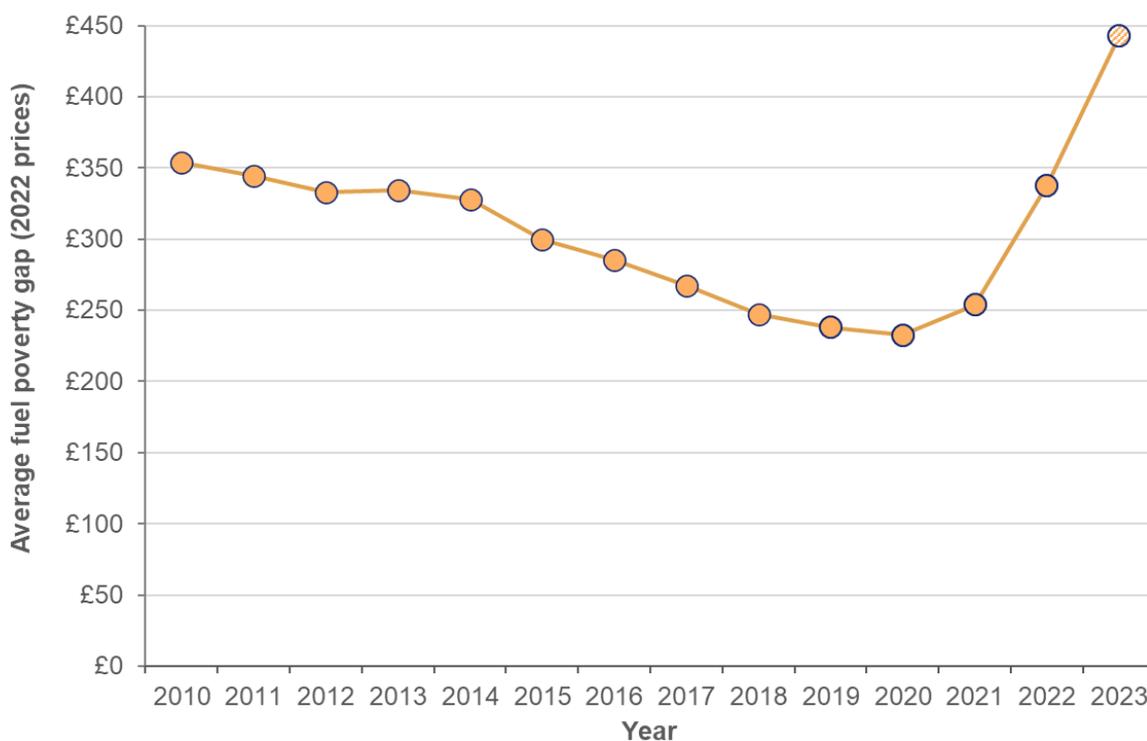
The aggregate fuel poverty gap for England is projected to be £1,562 million in 2023 an increase of 41.7 per cent in real terms since 2022 (£1,103 million). This growth reflects the higher average gap due to higher energy costs and the higher number of fuel poor households.

Affordability estimates have also been made for the 2023 projections. These are shown in Annex D.

The estimates presented above are based on projecting forward from two years of survey data and so the year on year trend does not present the full impact of changes affecting single years.

4.2 Changes to key drivers, 2022-2023

The key drivers will be assessed in turn, to explore their effect on the projections. The latest EHS survey data covers 2021. This analysis of drivers reflects assumption of changes between 2022 estimates and 2023 projections. **Higher** incomes, **increased** energy efficiency and **lower** energy prices would each reduce the rate of fuel poverty. More information on key drivers can be found in Section 2.3.

While the fuel poverty indicator has an absolute threshold for energy efficiency, the relative nature of the income threshold makes it difficult to accurately isolate individual reasons for change.

A household's fuel poverty status depends on the interaction of three key drivers

- **Energy efficiency** – Improvement in energy efficiency has brought more low income households up to FPEER band C which removes them from fuel poverty. The progress with energy efficiency is estimated to have reduced fuel poverty by around 159 thousand households since 2022 if no other factors had changed.

- **Incomes** – In 2022, the income distribution began to recover from the effects of the Covid-19 pandemic with higher earnings growth for low income households. Households receiving means tested benefits are due to receive cost of living payments of £650 in 2022/23 and £900 in 2023/24. Overall there was a minimal change in the number of fuel poor households due to income changes.

- **Housing costs** - The LILEE metric uses an after housing costs measure of income which is impacted by increases in housing costs. While mortgage rates rose at the end of 2022 many of those on fixed-rate deals will remain unaffected by these changes, and many households who do experience increased rates will only feel this effect for part of the year. Since these changes also affect the median income which reduced by over £200, there has been a very minor change in the number of fuel poor due to housing cost increases.

- **Energy prices** – Between the 2022 and 2023 it is projected that gas & electricity prices for direct debit consumers will rise by 50 per cent and 36 per cent, respectively, in real terms. In November 2022 it was announced that the Energy Price Guarantee (EPG) will be extended from April 2023 to the end of March 2024 at a revised rate, meaning a typical household will pay no more than £3,000 per year on their energy bill. The change in energy prices is projected to increase fuel poverty by around 425 thousand households over this period if no other factors had changed. The substantial increase in energy prices has therefore seen fuel poverty rise overall in 2023, but its impact is seen most strongly in the fuel poverty gap.

To help users understand the impact of each of these drivers a decomposition of the main changes for the 2022 to 2023 projections is shown. Table 4.2 shows the headline estimates of

fuel poverty and Table 4.3 the estimates of the fuel poverty gap as these changes are modelled in sequence.

- Scenario 1 – Changes between 2022 and 2023 due to **energy efficiency measures**, Warm Home Discount (WHD) and housing stock change[41].

- Scenario 2a – Changes between 2022 and 2023 due to **income and announced government income support packages,** plus scenario 1 impact.

- Scenario 2b – Changes between 2022 and 2023 due to **housing cost changes,** plus scenario 2a impact.

- Scenario 3 - Changes between 2022 and 2023 due to **prices and announced government energy cost support packages as a result of increased energy prices,** plus scenario 2b impacts.

Table 4.2 Projected share of fuel poor households by scenario

Scenario	2023 Projection
2022 estimate	*13.4%*
1 (energy efficiency)	12.6%
2a (energy efficiency + income)	12.6%
2b (energy efficiency + income+ housing costs)	12.7%
3 (energy efficiency + income + price)	14.4%

Table 4.3 Projected average fuel poverty gap by scenario (real 2022 prices)

Scenario	2023 Projection
2022 estimate	*£338*
1 (energy efficiency)	£325
2a (energy efficiency + income)	£332
2b (energy efficiency + income+ housing costs)	£333
3 (energy efficiency + income + price)	£443

The figures for scenario 1 in 2023 show that as a result of energy efficiency improvement in the housing stock the rate of fuel poverty would fall from 13.4 per cent in 2022 to 12.6 per cent. A slight change in the income/housing costs distribution projects fuel poverty levels to 12.7 per cent. Once the increase in energy prices and government support is included, this increases to 14.4 per cent.

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[41] The increase in housing stock improves energy efficiency since new build homes are assumed to be band A-C.

Overall, the average fuel poverty gap is projected to increase from £338 in 2022 to £443 in 2023 (in 2022 prices).

4.2.1 Energy efficiency

Fuel poverty under LILEE has shown a strong declining trend driven by energy efficiency, as more low income households achieve an energy efficiency rating of C or above. Currently, the main policies under which energy efficiency measures are installed include:

Policy	Incentive	Type of measure covered
Energy Company Obligation (ECO) [42]	Households eligible for ECO can get a grant to cover, or contribute to the costs of, home energy efficiency improvement.	Replacement boiler, heating improvements, insulation, double glazing, additional innovative measures. The new phase of ECO (ECO4) takes a fabric first multiple measure whole-house retrofit approach with the aim to encourage the installation of insulation, renewables and district heating connections as well as upgrading inefficient heating systems.
Green Homes Grant (GHG)	Households applied for vouchers to fund measures. Applications closed on 31st March 2021. The scheme covered both low-income households and other households.	A range of insulation measures, low carbon heating and heating controls for property owners
Sustainable Warmth Competition (LAD, HUG)	The Sustainable Warmth Competition awards funding to Local Authorities to help them upgrade energy inefficient homes of low income households in England. It launched in June 2021 and closed to applications in August 2021. There is a Local Authority Delivery element and the Home Upgrade Grant (HUG) element to the scheme	The competition's focus is on upgrading the worst insulated owner occupier and private rented homes with energy efficiency installations and low carbon heating. LAD provides support to support low-income households heated by mains gas and the HUG scheme supports low-income households off the gas grid.
Microgeneration Certification Scheme (MCS)	The Microgeneration Certification Scheme (MCS) certifies, quality assures and provides consumer	The MCS consists of small scale renewable electricity technologies

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[42] From October 2018, the ECO scheme was wholly targeted to low income vulnerable households. In previous phases of the ECO scheme, any household was entitled to subsidies towards energy efficiency improvements, regardless of their income. ECO statistics.

Policy	Incentive	Type of measure covered
	protection for microgeneration installations and installers.	such as solar PV, biomass, wind, heat pumps and heat products.
Warm Home Discount (WHD)	Annual rebate for electricity bills for low income and vulnerable households. For the purposes of fuel poverty modelling this provides an uplift to the FPEER rating.	£150 rebate off electricity bills in 2022/23 and 2023/24, up from £140 in 2021/22.

The overall trend in the increase of condensing boilers (including condensing-combination boilers) in England is projected to continue. Around 950,000 additional condensing boilers (excluding new builds) are added to the stock of homes, between 2022 and 2023. The model has been developed to account for the high number of condensing boilers that already exist in the English Housing Survey and as such are removed as these are already captured through the policies listed above, or as a result of the new dwellings modelled.

In 2022 the Government reformed the WHD scheme, increasing the overall size, and introducing a high energy cost element to the working age eligibility criteria. Data was provided to energy suppliers, enabling them to issue rebates to eligible customers automatically. The fuel poverty projections modelling has been based on this consultation.

4.2.2 Income & housing costs

A key component of this year's projections has been to understand the changes in incomes as the economy recovers from the pandemic.

The components that comprise a household's full income[43] (after income tax and National Insurance contributions) are categorised as follows:

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

Additionally, announced government support to help with increased energy prices which impact income have also been included in this component of projections. This includes a £300 increase for households who receive benefits under the Cost of living allowance for both 2022 and 2023, and the Pensioner Cost of living allowances of £650 in 2022 and £900 in 2023. This government support, together with energy bill support through EBSS package, are estimated to reduce the impact of energy prices increases in 2022 and 2023.

Strong income growth is projected across the income distribution with the median income increasing by 5.3 per cent since 2022. As described in the Methodology Handbook, different sources are used for projecting earnings and other income sources some of which can be

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[43] See Chapter 3 of the Methodology Handbook for further details.

projected separately across the deciles. In addition, the share of each income source within deciles and the amount of housing costs affects the overall change in income within a decile.

Since the growth in income in the 3rd decile (which is where the marginal low income households are generally found) is similar to the growth in the median income, the impact of income seen in scenario 2a makes negligible change to the level of fuel poverty.

A key focus of 2023 is the rise in housing costs which vary by tenure. Social rents in 2023 will rise in line with cap set by HMT of 7 per cent. Private rents are estimated to rise overall by 2% per cent. Around half of owner occupiers are outright owners so have no housing costs with a mixed picture for those with outstanding mortgages.

The English housing survey collects data on mortgages including the type of mortgage deal, the value of debit outstanding and length of term remaining. This analysis reflects expected mortgages rates that households would switch onto depending on when their deal is likely to end. Our calculation is then based on how much of the year the household will pay interest at their new rate. Overall, it is expected that mortgage costs will be 6 per cent higher in 2023 than 2022 but with significant variation depending on if and when a household's fixed rate deal comes to an end.

Overall this has very little impact on the number of fuel poor households since all tenure housing costs except outright owners are moving at similar rates.

The overall share of households in the low income fuel poverty quadrants (Low Income Low Energy Efficiency & Low Income High Energy Efficiency) increases further between 2022 and 2023 since this is also affected by higher fuel costs described in section 4.2.3 which affect household disposable income.

4.2.3 Energy prices

Table 4.4 Annual domestic gas bills are projected to increase by 50 per cent between 2022 and 2023 (real 2022 prices)

Gas method of payment	2022 (2021/22+2022/23) (£)	2023 (2022/23+2023/24) (£)	Percentage change 2022 - 2023 (%)
Prepayment	941	1,410	+50
Standard Credit	987	1,493	+51
Direct debit	901	1,353	+50
All payment types	**925**	**1,390**	**+50**

Table 4.5: Annual domestic electricity bills are projected to increase by around 35 per cent between 2022 and 2023 (real 2022 prices)

Electricity method of payment	2022 (2021/22+2022/23) (£)	2023 (2022/23+2023/24) (£)	Percentage change 2022 - 2023 (%)
Prepayment	937	1,259	+34
Standard Credit	1,002	1,359	+36
Direct debit	941	1,285	+37
All payment types	**951**	**1,294**	**+36**

Under the LILEE metric the impact of fuel prices has traditionally been quite small on the overall level of fuel poverty, however they do have a direct impact on the fuel poverty gap.

Reflected in the 2023 projection is the November 2022 announcement that the EPG will be extended from April 2023 to the end of March 2024 at a revised rate[44], meaning a typical household will pay no more than £3,000 per year on their energy bill. The substantial increase in energy prices has therefore seen fuel poverty rise overall in 2023, but its impact is seen most strongly in the fuel poverty gap.

In 2023, whilst accounting for the EPG and WHD, we project the level of fuel poverty to be 14.4 per cent and the average fuel poverty gap to increase from £338 in 2022 to £443, in 2023 in real terms. This projected large increase in the estimated fuel poverty gap is driven by continued expected increases in energy prices.

The headline 2023 estimates above assume that gas and electricity prices will be at the level of the Energy Price Guarantee throughout 2023/24. Recent estimates suggest that prices could fall below the level of the cap from July 2023. Using prices from the latest HMT Green Book it might be that fuel poverty in 2023 would be slightly lower than projected at 14.3 per cent with an average fuel poverty gap of £432 in 2022 prices.

4.3 Projected progress against the target

The Government's statutory fuel poverty target for England is to ensure that as many fuel poor households as reasonably practicable achieve a minimum energy efficiency rating of band C[45,46] by 2030, with interim targets of band E by 2020, and band D by 2025. See section 2.2.

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[44] https://www.gov.uk/government/publications/energy-bills-support/energy-bills-support-factsheet-8-september-2022
[45] Energy efficiency rating is measured using Fuel Poverty Energy Efficiency Rating (FPEER).
[46] Household energy efficiency ratings are banded from G (lowest) to A (highest).

for more details on England's statutory fuel poverty target and the final progress against the 2020 milestone.

Under the LILEE metric, a household that achieves a fuel poverty energy efficiency rating of band C or above would not be measured as fuel poor, and therefore fuel poverty would be eradicated if all low-income households achieved an energy efficiency band C rating, or above. Progress towards the fuel poverty target is measured as the share of all low-income households who achieve an energy efficiency band C in 2030 and the interim milestones.

Within these projections, estimates are made for 2022 and 2023 of the share of low-income households who would meet the band C target and band D milestone at this period.

Table 4.3: Projected headline figures, 2021-2023[3]

Fuel poverty target	2021 Outturn (%)	2022 Projection (%)	2023 Projection (%)
Band D or above by 2025	90.3	89.8	90.1
Band C or above by 2030	53.3	52.8	53.5

Figure 4.4: Further progress is projected to be made towards the band C fuel poverty target and band D interim milestone
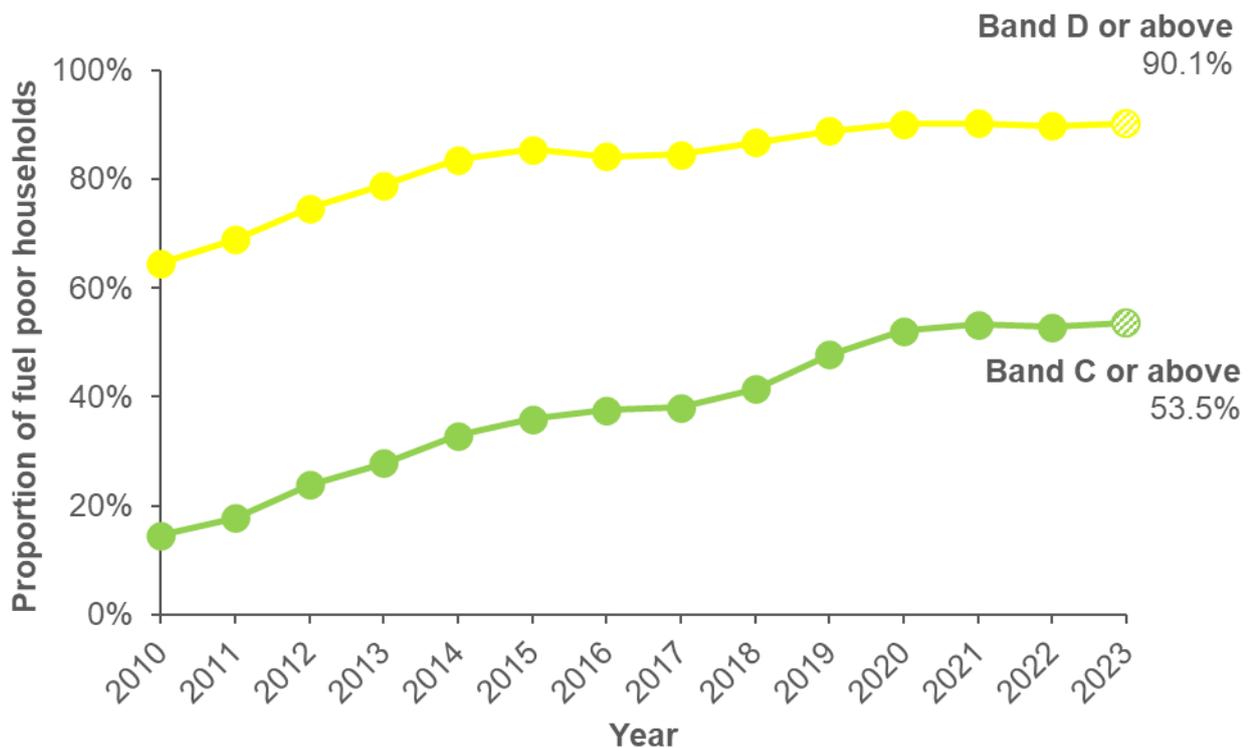
Progress towards the interim milestones and the 2030 target is projected for 2023, with 53.5 per cent of low-income households projected to be in Band A to C, 90.1 per cent of low income households projected to be in Band A to D.

Annex A: Additional Data and Figures

A.1 Confidence intervals for fuel poverty estimates

Figure A.1 to A.3 present confidence intervals for the headline figures measured in this report. Confidence intervals are not shown beyond 2021 since those estimates are projections and will be subject to both sampling error and additional modelling uncertainty. This modelling uncertainty has not been quantified.

A new methodology for calculating confidence for fuel poverty indicators has been used this year that produces narrower confidence intervals in Figure A.1 and A.3 than previously shown.

Figure A.1: Proportion in fuel poverty, 2010 to 2021 - 95 per cent confidence intervals dictated by the light blue bars[47]
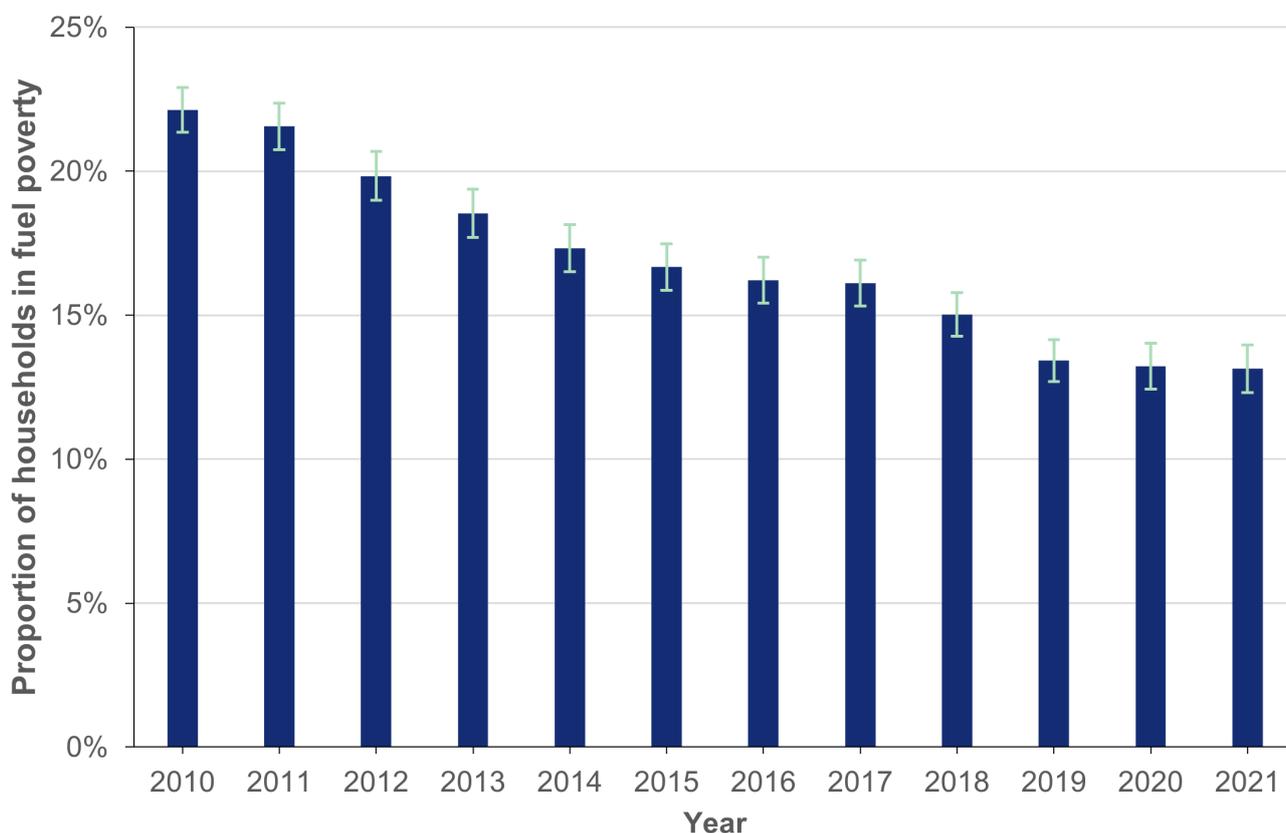
In 2021, the proportion of households in fuel poverty is an estimate based on a sample of 10,572 households from the EHS. Individual survey cases in the EHS are weighted up to give the total number of households in the UK.

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[47] Following a methodology review by the Building Research Establishment, changes have been made to the assumption of the degrees of freedom used in figure A.1 and A.3. The new methodology recognises the contribution of the whole sample in calculating the standard error regardless of whether the household was fuel poor or not.

Based on the nature of the EHS sample, the 95 per cent confidence interval for the proportion of households in fuel poverty in 2020 is 13.1 per cent +/- 0.8 percentage points[48]. We can therefore be 95 per cent sure that the true proportion of households in fuel poverty in 2021 is between 12.3 and 14.0 per cent.

The confidence intervals have been slightly wider in 2020 and 2021 due to the design factor being greater in 2020 and 2021 (1.27) than in 2019 (1.20). This increase is due to the less representative sample within the EHS in 2020/21. In 2020/21 the interview survey achieved a response rate of 8 per cent compared with 47 per cent in 2019/20 and provisionally 31 per cent in 2021/22 with physical survey targets then selected from the achieved interview surveys. Survey response rates in 2020/21 were affected by the enforced move to recruiting households by letter and telephone rather than on the doorstep. Knock to nudge doorstep recruitment was introduced in 2021/22. Weights are applied to control for the changes each year in the achieved sample.

The size of the 95 per cent confidence interval around the proportion of households in fuel poverty increases between 2010 and 2021. This is because the total sample size of the EHS has decreased by 34 per cent across this time period but the rate of fuel poverty is also falling. This has therefore reduced the number of cases that make up the fuel poor population each year, and the confidence we have in our estimates of the proportion has decreased slightly.

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[48] Calculated using the following formula: $p \pm 1.96(design\ factor * standard\ error)$ where $p = 13.1\%$ and the standard error is calculated for a proportion sqrt [0.131*(1 − 0.131) / 10,572]=0.33%. The EHS $design\ factor = 1.27$ (average design factor for the EHS sample).

Figure A.2: Average fuel poverty gap, 2010 to 2021 (real 2022 prices). 95 per cent confidence intervals indicated by the red bars
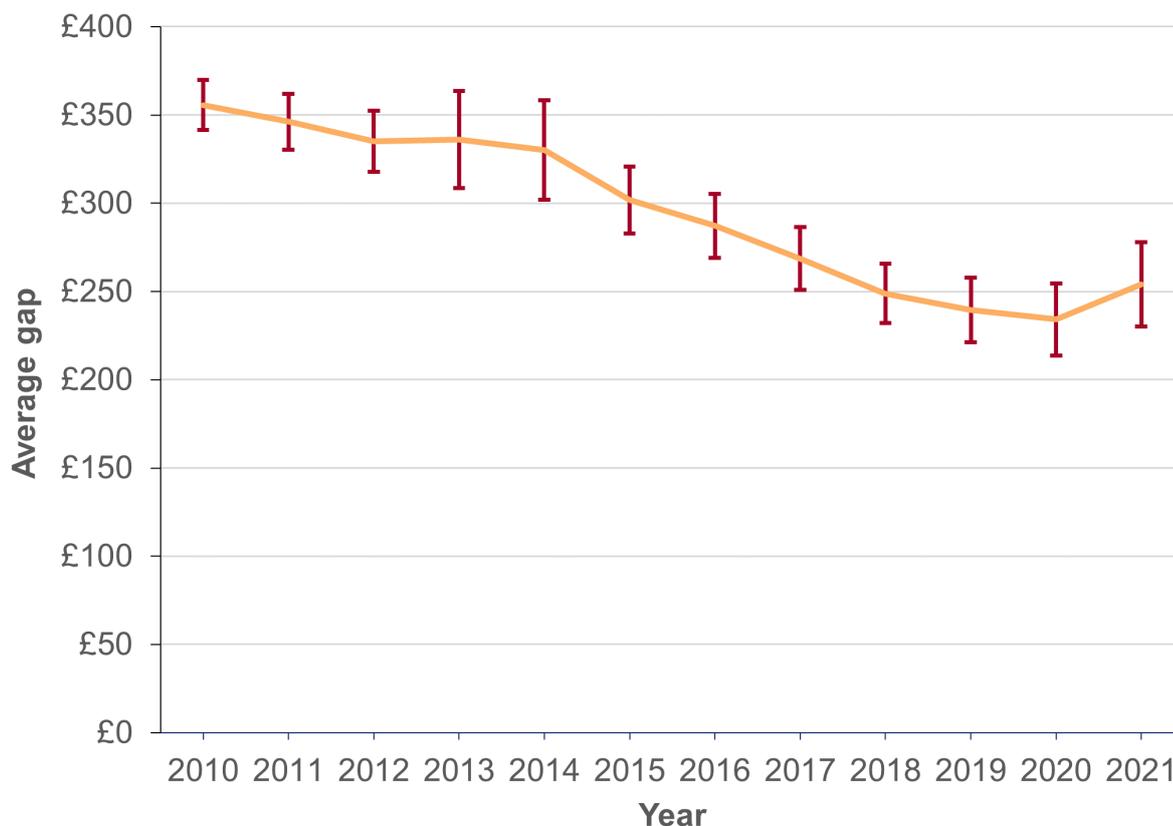
All fuel poor households have a fuel poverty gap based on their fuel expenditure and income relative to their nearest threshold to exit fuel poverty. The calculation of the average gap is the aggregate fuel poverty gap divided by the number of fuel poor households.

The 95 per cent confidence interval for the average gap in 2021 is £254 +/- £24[49] (figure A.2). We can be 95 per cent certain that the true average gap in 2021 is between £230 and £278.

Similar to the proportion of households in fuel poverty, the size of the 95 per cent confidence interval around the average gap increased between 2010 and 2020, as the total sample size of fuel poor households in the EHS has decreased.

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[49] Calculated using the following formula: $p \pm 1.96(design\ factor * standard\ error)$ where $p = £254$ and the standard error is around £10. The EHS $design\ factor = 1.27$ (average design factor for the EHS sample).

Figure A.3: Progress against the fuel poverty target, 2010 to 2021 - 95 per cent confidence intervals dictated by the bars
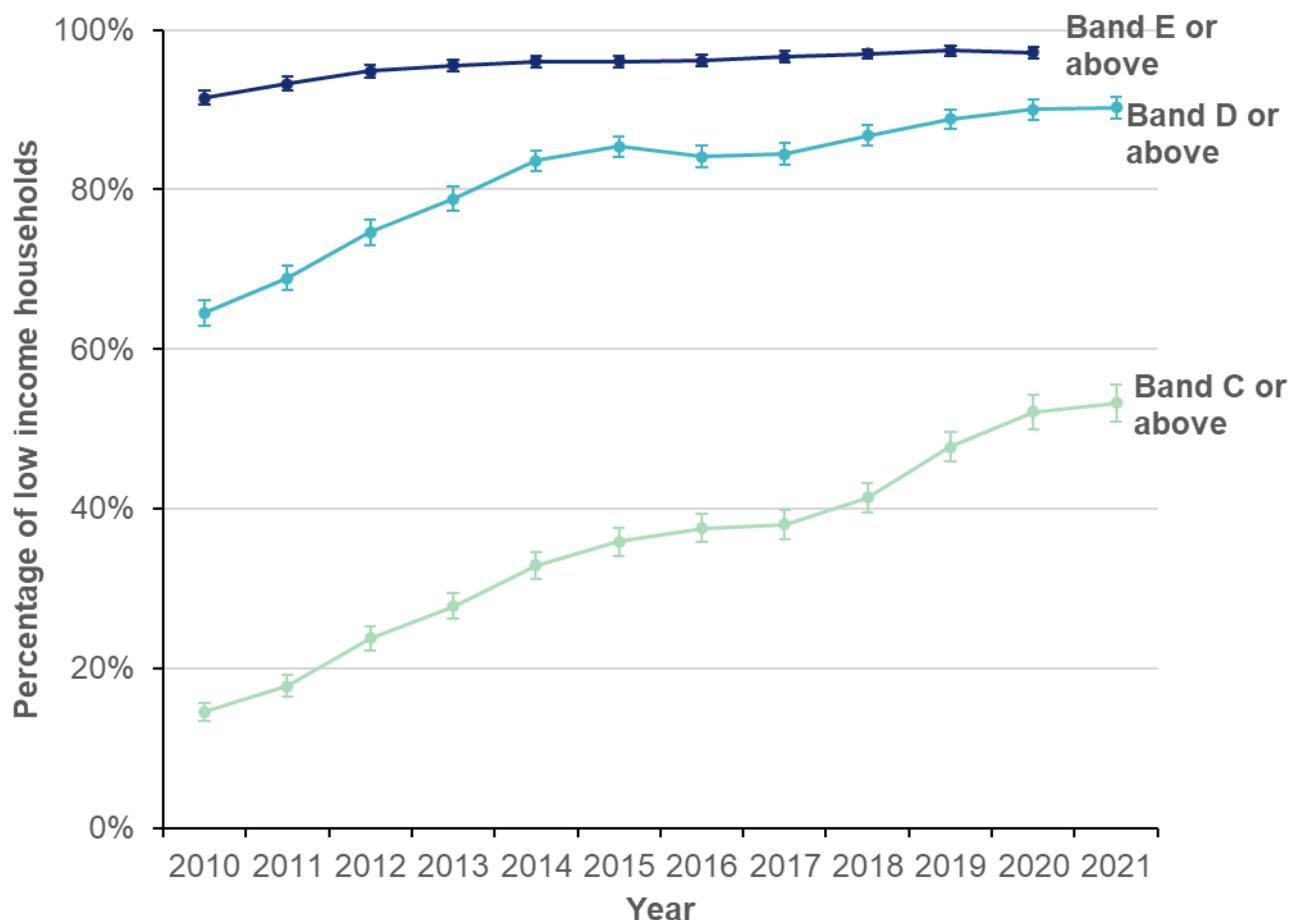
The 95 per cent confidence interval around the estimate of the proportion of households in band C or above in 2020 is 53.3 per cent +/- 2.3 percentage points. We can be 95 per cent certain that the true proportion of low income households in band C and above in 2021 is between 51.0 and 55.6 per cent.

The 95 per cent confidence interval around the estimate of the proportion of households in band D or above in 2020 is 90.3 per cent +/- 1.4 percentage points. We can be 95 per cent certain that the true proportion of low income band D and above households in 2021 is between 89.0 and 91.7 per cent.

Figure A.1 shows that the confidence intervals around the proportion of households in fuel poverty widen over time as the share of fuel poverty reduces combined with smaller and less representative samples in 2020 and 2021. The size of the confidence intervals around progress towards the target figures, however, remains similar between 2010 and 2021. This is because the proportion of households in more energy efficient properties is increasing. Therefore, the number of individual cases in each group increases and the confidence intervals do not widen.

A.2 Energy cost analysis

As discussed in Section 2.3.5, Tables A.1 and A.2 show the change in annual domestic electricity and gas bills for each payment method. These compare the prices used for the 2021 fuel poverty statistics (2020 & 2021/22 prices) and 2022 statistics (2021/22 & 2022/23 prices) in real 2022 prices. Prices for 2022/23 are derived based on a consumption weighted average of the energy price caps for that period[50].

Table A.1 Annual domestic gas bills increased by 61 per cent between 2021 and 2022 (real 2022 prices)

Gas method of payment	2020 (£)	2021 (£)	2022 (£)	Percentage change 2021 - 2022 (%)
Prepayment	576	595	941	+58
Standard Credit	599	617	987	+60
Direct debit	535	559	901	+61
All payment types	**553**	**574**	**922**	**+61**

Table A.2: Annual domestic electricity bills increased by 34 per cent between 2021 and 2022 (real 2022 prices)

Electricity method of payment	2020 (£)	2021 (£)	2022 (£)	Percentage change 2021 - 2022 (%)
Prepayment	659	718	937	+30
Standard Credit	702	757	1,002	+32
Direct debit	632	695	941	+35
All payment types	**649**	**709**	**952**	**+34**

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[50] Direct debit dual fuel price energy cap for Apr-Sept 2022 (£1,971) and Energy Price Guarantee Oct 2022 – Mar 2023 (£2,500). Winter prices are used for 70% of gas demand and 60% of electricity demand.

A.3 Energy efficiency trend

As shown in figure 2.3, 52.8 per cent of low income households are rated A-C compared with 48.4 per cent of all households in figure A.4. This demonstrates the combined effect of targeting energy efficiency measures to low income homes and the impact of the Warm Home Discount.

Figure A.4: The proportion of all households split by energy efficiency rating bands
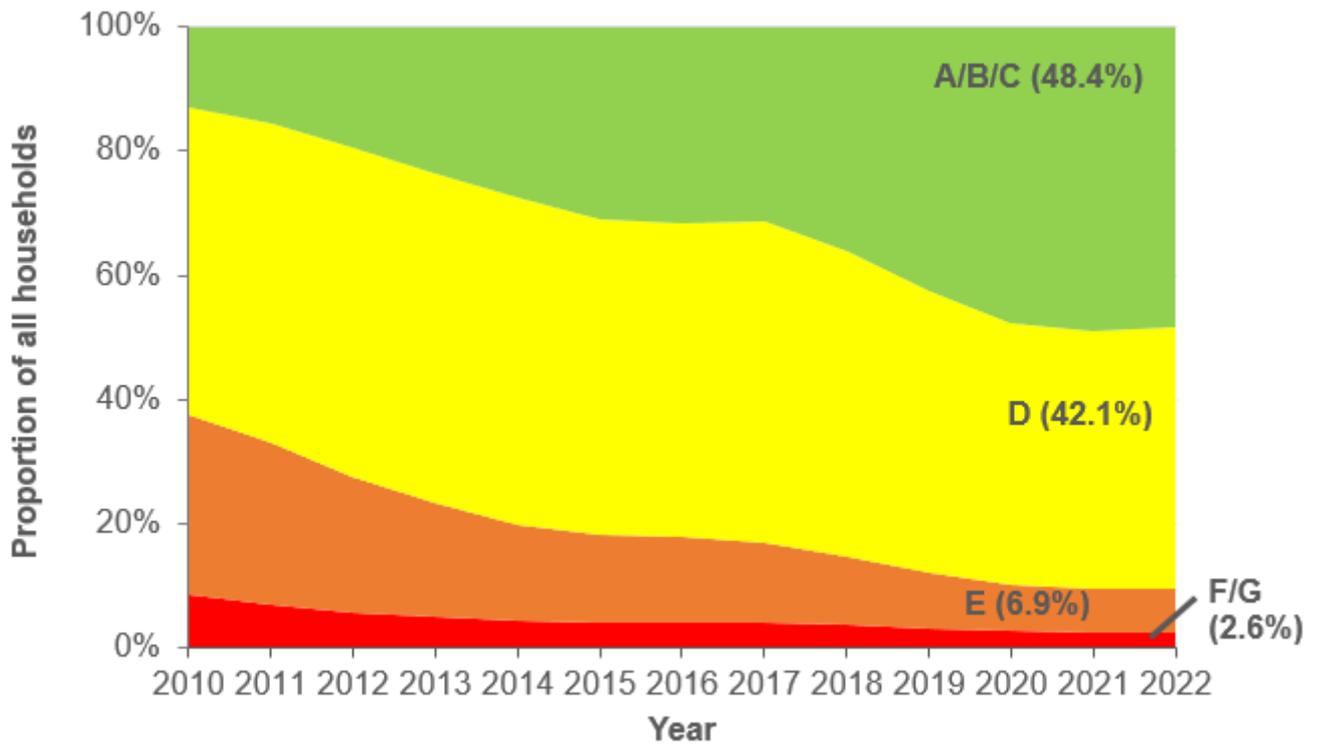
Annex B: Measuring Fuel Poverty in England

This annex provides more detailed information on the following: how the Low Income Low Energy Efficiency (LILEE) indicator of fuel poverty works, and understanding the drivers of fuel poverty, data sources, and methodological updates for the 2021 estimates. A glossary of key terms used throughout this report and supporting links can be found of the end of the Annexes.

B.1 Introduction to Low Income Low Energy Efficiency

Fuel poverty in England is measured using the LILEE[51] indicator, which considers a household to be fuel poor if:

- it is living in a property with an energy efficiency rating of band D, E, F or G as determined by the most up-to-date Fuel Poverty Energy Efficiency Rating (FPEER) Methodology - this is depicted by the horizontal threshold in Figure B.1; and

- its disposable income (after housing costs and energy needs) would be below the poverty line[52] as depicted by the sloping line threshold in Figure B.1.

Low Income Low Energy Efficiency 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 (in pounds) faced by fuel poor households to compared with the required fuel costs at the threshold that would make them non-fuel poor. This is illustrated in Figure B.1, where the indicator consists of:

- the **number** of households that have both low incomes and low energy efficiency (shown by the shaded area in the bottom left-hand quadrant in B.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 B.1), which represents the difference between the required energy costs for each household and the nearest fuel poverty threshold (in pounds).

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

The fuel poverty indicator contains a relative measure, as it compares households to national income thresholds but also uses an absolute energy efficiency rating. A change in income will only have an impact on fuel poor households when they see relatively larger income changes

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[51] The calculation of the LILEE metric is set out in detail in the LILEE Fuel Poverty Methodology Handbook.
[52] The poverty line (income poverty) is defined as an equivalised disposable income of less than 60% of the national median, as shown in Section 2 of the ONS release 'Persistent Poverty in the UK and EU'.

(increase or decrease) than the overall population. The absolute measure of energy efficiency means that improving the energy efficiency rating to at least band C will remove the household from fuel poverty regardless of income and fuel costs.

Figure B.1: Fuel poverty under the Low Income Low Energy Efficiency indicator
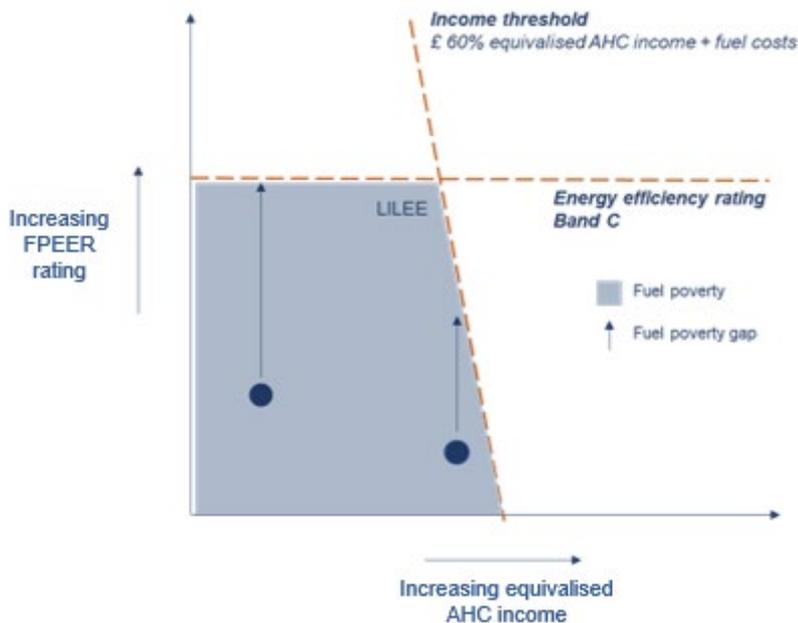
Fuel poor households (bottom left-hand quadrant of Figure B.1) include some households who may not traditionally be considered poor but are pushed into fuel poverty by their high energy requirements and low energy efficiency (this is reflected in the gradient of the income threshold).

Those in the bottom right-hand quadrant also have low energy efficiency but their relatively high incomes mean that they are not considered to be fuel poor.
Those in the top right-hand quadrant have both high incomes and high energy efficiency and are therefore not fuel poor.

While it is recognised that households in the top left-hand quadrant have low incomes, they also have high energy efficiency and so are not considered to be fuel poor.

B.2 How the Low Income Low Energy Efficiency (LILEE) indicator of fuel poverty works

Fuel poverty is estimated by calculating each household's position relative to two thresholds (illustrated in Figure B.2). The first is an absolute energy efficiency threshold whereby a household cannot be considered fuel poor if it has an FPEER rating of band C or above. The second threshold is a relative measure which considers a household's disposable income;

After Housing Cost (AHC) income[53]. The AHC income is defined by equivalising a household's income after deducting their housing costs. The low income threshold is then calculated by taking 60 per cent of the median income value having ranked all the AHC incomes in the dataset and adding on the household's equivalised required fuel costs. To be fuel poor under the LILEE indicator, a household's energy efficiency rating must be below FPEER band C and their equivalised AHC income much be below the income threshold.

For incomes or housing costs to affect the number of households in fuel poverty they must change by a greater or lesser amount for those at the margins of fuel poverty, than for those not in fuel poverty. Fuel price changes have a limited effect on the LILEE metric unless their change is large because the change in fuel costs is measured relative to a household's income. The fuel prices through do have a significant effect on the fuel poverty gap.

While the energy efficiency rating threshold and income thresholds under the LILEE metric define the number of fuel poor households, the depth of fuel poverty is measured through the fuel poverty gap. This is the monetary difference between a household's current fuel costs and the fuel costs they need to not be considered fuel poor. The fuel poverty gap is indicated by the upward pointing arrows in the LILEE quadrant in Figure B.1, which show households can exit fuel poverty by either attaining a band C energy efficiency or through the income threshold by which their fuel costs have decreased to a value that they are no longer under the low income threshold.

Figure B.2, below, illustrates how fuel poor households may move out of fuel poverty, either due to an increase in disposable income and/or an increase in household energy efficiency rating.

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[53] As set out in section 3 of the Fuel Poverty Methodology Handbook for LILEE, benefit payments made specifically to the HRP and any partner to cover the additional costs of living with a disability including Disability Living Allowance (DLA), Personal Independence Payments (PIP) and Attendance Allowance (AA) are excluded from the household income used for LILEE.

Figure B.2: Movement across the income and fuel costs threshold due to either increases in income, reductions in energy consumption or a combination of both
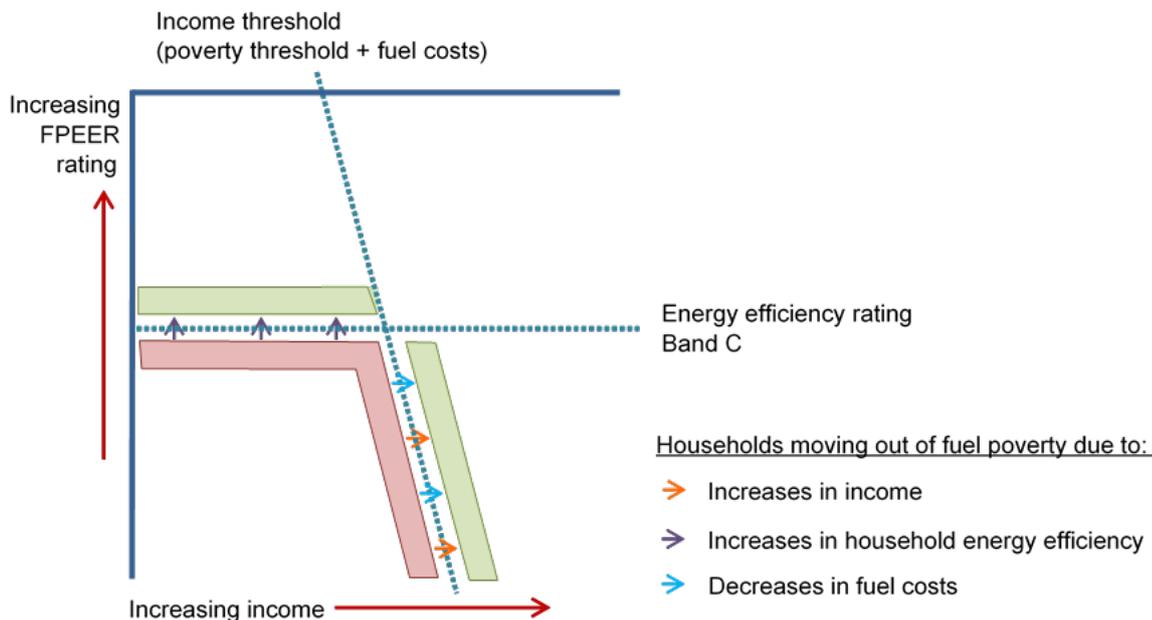
B.3 Drivers of Fuel Poverty

There are three key elements in determining whether a household is fuel poor: Household Income, Energy Efficiency Rating, and Fuel Prices.

Measuring household income

The Low Income Low Energy Efficiency indicator is based on modelled incomes calculated after housing costs and council tax have been taken into account, since money spent on housing costs cannot be spent on fuel. Mortgage payments, rent payments and council tax 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 equivalised to reflect the fact that different household types will have different spending requirements. 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. These equivalisation factors were devised by the Organisation for Economic Co-operation and Development (OECD) and are widely used across Europe.

Measuring household energy requirements

The fuel poverty definition uses household energy requirements in two ways. Firstly, the energy efficiency rating sets the low energy efficiency threshold. Secondly, the required fuel

costs which includes fuel for heating the home, heating water, lighting, appliance usage and cooking. In calculating the required fuel costs, the energy costs are modelled, dependent on the following factors:

- The economic circumstances of householders (for example, if they are working from home regularly, 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[54] based on their household composition and energy set-up. In reality, households may under or over-heat their home, relative to the recommended levels.

Measuring fuel prices

Detailed fuel prices 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.

To calculate fuel poverty a household's required energy costs must be modelled. This is 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. Like 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.

B.4 Data Sources

The English Housing Survey (EHS)

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 Levelling up, Housing & Communities (DLUHC), 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, approximately 12,000 households take part in the interview. Around half of these properties are selected for the follow-up physical survey (key to fuel poverty energy modelling), involving a physical inspection of the property by professional surveyors.

Two years' worth of EHS data from households selected for both the interview and physical surveys are combined to ensure an adequate sample size for fuel poverty modelling. For the

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[54] An adequate standard of warmth is defined as 21ºC for the main living area and 18ºC for other occupied rooms. Further detail can be found in the Methodology Handbook.

2021 data, this covers the period between 1 April 2020 and 31 March 2022, and comprises 10,572 households over two consecutive data collection years (2020/21 and 2021/22). Therefore, users are advised to use caution when looking at year on year changes in fuel poverty, as the samples will not be independent. The headline results from the 2021 EHS were published on 15 December 2022. Full data relating to the 2021 EHS, will be made available by DLUHC later this year through the UK Data Service.

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 modelled using data from other sources including: DESNZ Quarterly Energy Prices; ONS Consumer Price Index; and Sutherland Tables. Further information on modelled fuel price data is available in the Methodology Handbook.

B.5 Methodological Updates

Changes to the BREDEM model

In the last year there have been no changes to underlying methodology used to model household energy requirements using the Building Research Establishment Domestic Energy Model used for the fuel poverty modelling (BREDEM 2012 version 1.1).

Changes to the English Housing Survey (EHS)

Energy related data collection methodology update (2020/21 and 2021/22 datasets)
For 2020/21 and 2021/22, there were changes to both the interview and physical surveys due to the COVID-19 restrictions in England. Interviews were completed by telephone rather than face-to-face, whilst internal inspections were replaced by external inspections.

Due to the sudden nature of the restrictions, no thorough testing of this new methodology was possible. Given this, it is unclear how greatly this change of methodology affected the outcome versus how much is real change such as economic changes in employment and income and lifestyle change such the size and composition of households and the amount of time spent at home. Surveyors collected the physical inspection data using an assessment of the exterior of the dwelling together with a short interview carried out (socially distanced) to ask the occupants for details of items usually captured internally by the survey[55]. This included items such as the type of heating system present, and extent of low energy lighting. Whenever possible, surveyors also used information from energy performance certificates (EPCs) and web-based tools such Google Street View and Rightmove to inform decisions.

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[55] EHS 2020 physical survey form highlighting data collected directly and indirectly by the surveyor.

Where data was missing (e.g. loft insulation present but no insulation thickness given) due to the data collection method changes, imputed default values were used consistent with the approach used in a full survey year.

Changes to fuel prices methodology

In the 2021-22 data the modelling changed to use financial year estimates of energy prices. These were published in the DESNZ Quarterly Energy Prices publication for the first time in December 2022 and were developed for fuel poverty modelling this year since in a time of volatile retail energy prices and significant changes in the energy retail sector there can be considerable differences between calendar and financial year data.

In the 2021 combined data prices for 2020 and 2021-22 have been used. The 2022 projection is representative of prices for 2021-22 and 2022-23.

Annex C: Fuel Poverty across the devolved nations

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

C.1 Scotland[56]

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

As set out in section 3 of the Act, a household is in fuel poverty if[57]:
- in order to maintain a satisfactory heating regime, total fuel costs necessary for the home are more than 10 per cent of the household's adjusted (after housing costs) net income; and
- if after deducting fuel costs, benefits received for a care need or disability and childcare costs, the household's remaining adjusted net income is insufficient to maintain an acceptable standard of living. The remaining adjusted net income must be at least 90 per cent of the UK Minimum Income Standard (MIS) to be considered an acceptable standard of living, with an additional amount added for households in remote rural, remote small town and island areas (RRRSTI).

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

Where a household is in fuel poverty, the fuel poverty gap is the annual amount that would be required to move the household out of fuel poverty. This is either:
- the amount required so that the fuel costs necessary for the home are no longer more than 10 per cent of the household's adjusted net income (after housing costs), or
- the amount required which, after deducting fuel costs, benefits received for a care need or disability and childcare costs, means the household's remaining adjusted net income is sufficient to maintain an acceptable standard of living.

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

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[56] Scottish House condition survey
[57] See section 4 of the SHCS 2019 methodology notes for further details.

In addition to a new definition of fuel poverty, the Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019 also set targets to eradicate fuel poverty. The 2040 targets are that:

- no more than 5 per cent of households in Scotland are in fuel poverty
- no more than 1 per cent of households in Scotland are in extreme fuel poverty
- the median fuel poverty gap of households in Scotland in fuel poverty is no more than £250 adjusted to take account of changes in the value of money.

Scotland publishes fuel poverty data in the annual Scottish House Condition Survey (SHCS) Key Findings report. The figures presented in the 2019 report are a best estimate of fuel poverty rates, extreme fuel poverty rates and the median fuel poverty gap under the new definition of fuel poverty as set out in the Act. They reflect amendments made to the legislation during the Bill process up to and including Stage 2.

The physical aspect of the SHCS did not resume after the pandemic restrictions were introduced in March 2020 until the 2021 survey so no measured fuel poverty data is available for 2020[58]. The results of the 2021 SHCS are expected to be published in May 2023[59] and will include the first set of fuel poverty estimates fully compatible with all of the elements of the new definition in the Act.

The first set of fuel poverty estimates fully compatible with all of the elements of the new definition in the Act, including the Fuel Poverty (Enhanced Heating) (Scotland) Regulations 2020 and Fuel Poverty (Additional Amount in respect of Remote Rural Area, Remote Small Town and Island Area) (Scotland) Regulations 2020 which came into force on the 26th February 2020, requires additional information to be collected from 2020 onwards and the production of a new MIS for RRRSTI areas.

In 2019, 613,000 households (24.6 per cent of all households in Scotland) were in fuel poverty, a similar level to 2018 (619,000 households or 25.0 per cent). The 2019 fuel poverty rate (24.6 per cent) was lower than that recorded between 2012 and 2015 (ranging between 27.7 per cent - 31.7 per cent).

It is estimated that 311,000 households (or 12.4 per cent) were living in extreme fuel poverty in 2019. This was similar to the previous year (279,000 households or 11.3 per cent) but a decrease from the peak of 384,000 households (or 16.0 per cent) in 2013.

The actual median fuel poverty gap for fuel poor households in 2019 was £750. This is higher than the median fuel poverty gap between 2015 and 2018. The median fuel poverty gap (adjusted for 2015 prices) for fuel poor households in 2019 (£700) is higher than in 2018 (£610) but similar to the median gap in 2012 to 2017.

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[58] The 2021 SHCS has been carried out by an external-only inspection, supplemented with alternative sources of data (e.g. from the Energy Performance Certificate) and the householder providing information to surveyors via telephone. This external+ approach has been designed to provide as reliable as possible estimates of key statistics, including on fuel poverty, energy efficiency and external repairs, while maintaining no contact with the household. https://www.gov.scot/publications/coronavirus-covid-19-impact-on-scottish-household-survey-and-scottish-house-condition-survey-fieldwork-in-2020-and-2021/

[59] https://mailchi.mp/5137479c6fe6/delay-in-publication-of-2021-shcs-key-findings-report?e=9ce00891d0

C.2 Wales[60]

Wales use a 10 per cent indicator. Households that need to spend more than 20 per cent of their income (before housing costs) on fuel costs are also defined as being in severe fuel poverty. However, their methodology differs from Scotland in relation to the heating assumptions used. In March 2021 the Welsh Government published Tackling fuel poverty 2021 to 2035 which includes targets to ensure that by 2035: no households are estimated to be living in severe or persistent fuel poverty as far as reasonable practicable; no more than 5% of households are estimated to be living in fuel poverty at any one time as far as reasonably practicable; and the number of all households "at risk" of falling into fuel poverty will be more than halved based on the 2018 estimate.

Following work to rebase the 2018 estimate of fuel poverty to take into account the effects of the COVID-19 pandemic and recent significant energy price rises, the Welsh Government published Fuel poverty modelled estimates for Wales: as at October 2021. In 2021, the most recent data available, 196,000 households in Wales were living in fuel poverty, equivalent to 14 per cent of all households. Of these, 38,000 households were living in severe fuel poverty, equivalent to 3 per cent of all households. 153,000 households were identified as being at risk of fuel poverty, equivalent to 11 per cent of all households. The percentage of households in fuel poverty has increased from 12 per cent in 2018, but is lower than the 26 per cent of households in 2008.

C.3 Northern Ireland[61]

Northern Ireland uses a 10 per cent indicator but has no statutory target. The approach has been to assist those private sector households most at risk of fuel poverty through schemes such as Affordable Warmth. A new fuel poverty strategy is under development.

In order to provide more up to date figures, NIHE commissioned the Building Research Establishment (BRE) to model estimates of the levels of fuel poverty in Northern Ireland in 2017, 2018 and 2019. Using 2016 Northern Ireland House Condition Survey (NIHCS) data as a base, BRE adjusted fuel prices and household incomes, and simulated the installation of energy efficiency improvement measures, all to 2017, 2018 and 2019 levels. The number of fuel poor households in 2017 was estimated to be 128,0000, equivalent to 17 per cent of all households and in 2018, the estimates were 131,000 fuel poor households, equivalent to 18 per cent of all households and in 2019 the estimates were 179,000 fuel poor households, equivalent to 24 per cent of all households.

The next release in the series of modelled fuel poverty estimates (using the 2016 HCS as a base) for Northern Ireland are due March 2023.

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[60] Fuel poverty estimates for Wales
[61] Estimates of fuel poverty in Northern Ireland in 2019 (nihe.gov.uk)

In 2016, an estimated 160,000 households were fuel poor, 22 per cent of the total. This represents a significant improvement since 2011 when the figure was 42 per cent (294,000) of the total. This improvement is a result of a focus from the Northern Ireland Housing Executive (NIHE) and the Department for Communities (DfC) to tackle poor energy efficiency in the housing stock since 2011 and lower than average fuel prices (particularly gas and electricity – depending on payment method) and a decrease in household energy use.

C.4 Office for National Statistics (ONS) work

The ONS is working to improve statistical coherence of UK fuel poverty statistics. The fuel poverty estimates across the four nations of the UK cannot be directly compared due to definitional difference and the resulting differences in methodologies for calculating them.

The ONS is working closely with the statistical producers of these outputs (the Welsh government, Scottish government and Northern Ireland Housing Executive, and DESNZ), to improve the statistical coherence of fuel poverty for data users.

The ONS plans to publish work in 2023 to explain the differences in fuel poverty methodologies, this work will consider how these differences impact the estimates published across the different countries of the UK.

This work will be especially relevant in the context of ongoing rises in energy prices across the UK.

C.5 Summary

Due to 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 1.3 of the Methodology Handbook.

Annex D: Affordability measures for England

D.1 Background to affordability measures

Fuel poverty in England is measured by Government using the Low Income Low Energy Efficiency (LILEE) metric. This measure was confirmed in the [Sustainable warmth: protecting vulnerable households in England](#) in February 2021. This measure includes energy efficiency, household income and modelled energy costs and therefore includes the impact of energy prices. This measure closely aligns to the fuel poverty target and tracks progress effectively of the number of households reaching a minimum FPEER rating of band C and hence not fuel poor.

Prior to 2013, England used an affordability measure where a household was considered to be fuel poor if it was required to spend at least 10 per cent of its income on energy costs. Similar measures are still used by other UK nations as described in Annex C. England stopped using this measure following a [review by Professor John Hills](#). The indicator is heavily influenced by energy prices which were considered to be largely outside of the control of Government and therefore thought not to be effective in monitoring delivery through fuel poverty schemes to reduce the energy consumption needs of households. The 10 per cent threshold was also considered arbitrary with volatile energy prices necessitating a recalibration of expectations of the share of income that could reasonably be spent on energy. A change was also made to the income metric to an after housing costs income metric to better reflect household's ability to meet energy costs.

D.2 Impact of price on fuel poverty

There has been considerable stakeholder interest in the impact of rising energy prices on fuel poverty over the last year with energy prices in winter 2022/23 around double that of 12 months ago. Government has continued to use the LILEE metric to monitor the additional households in fuel poverty who live in band D-G homes and who now fall below the poverty line due to higher energy costs. The fuel poverty gap also rises since the gap between a households required energy costs and the costs if that household was to exit fuel poverty either though higher income or attaining a high energy efficiency rating. Roughly speaking if energy prices double the average fuel poverty gap doubles.

Generally, the impact of energy prices in LILEE is low since a change in bill is compared directly with income and so a £100 increase in energy costs can be offset with £100 increase in income. In the projections for 2023 there is a strong increase in the number of fuel poor households given the unprecedented rise in energy prices. This is seen to a lesser extent in the 2022 estimates with the increase introduced part way through the year and a wide range of energy bill support given.

DESNZ is aware that many stakeholders and commentators are using affordability based metrics. This is typically the previous indicator used in England where a household is

considered fuel poor if it is required to spend 10% of its income (after tax) on household energy which is similar to the metric used in Wales. Alternatively a metric also used is where a household is considered fuel poor if it is required to spend 10% of its income (after tax & housing cost) on household energy costs. While there are similarities with the metric used in Scotland these are not directly comparable since the Scotland measure includes an income threshold.

D.3 "10 per cent" affordability measures

The analysis in this annex, shows the number of households in England who have modelled required energy costs greater than 10% of their household income using the two affordability metrics mentioned above

Metric 1 (BHC income) – Household income after deductions for income tax and national insurance.

Metric 2 (AHC income) – Before housing costs income minus housing costs

Chart D.1 Comparison of the fuel poverty metric (LILEE) with affordability metrics
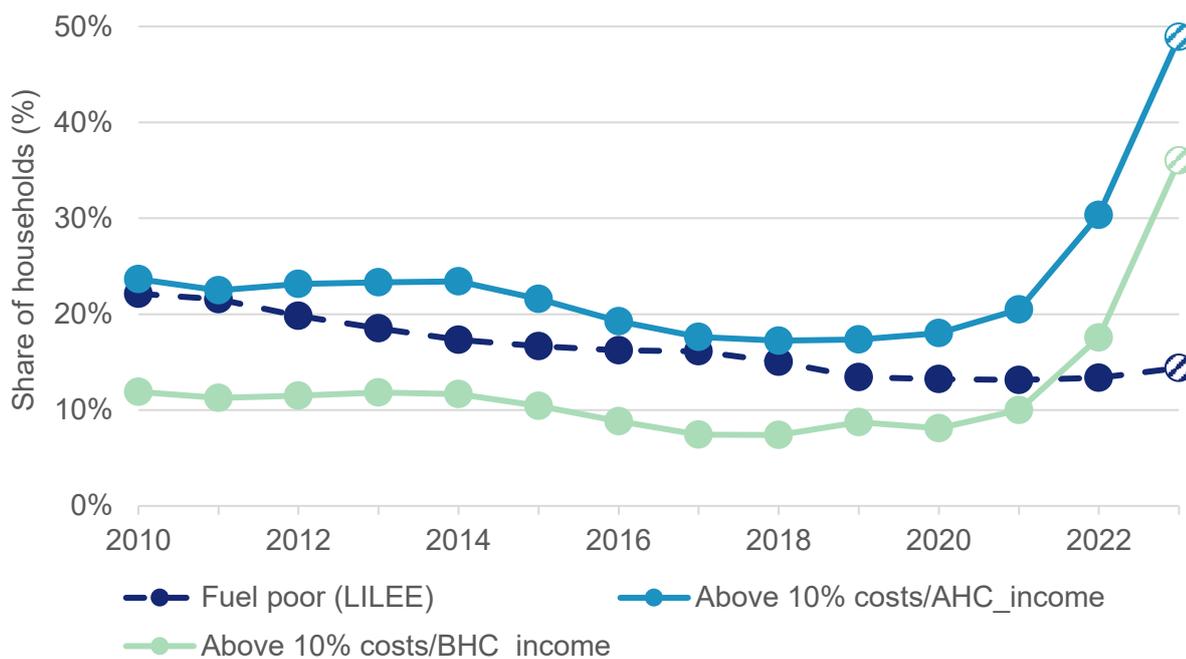
The share of fuel poor households decreased steadily between 2010 and 2019 driven by energy efficiency. Since 2019 this has showed very little change as energy efficiency progress was offset by income changes during the pandemic followed by rising energy prices which are projected to rise further in 2023. The 10% affordability measures are much more sensitive to energy prices and between 2021 and 2023 the share of households exceeding these affordability thresholds is estimated to increase to 30 per cent for AHC in 2022 and 49 per cent in 2023. The BHC measure will always be lower than AHC and up to 2021 was lower than the LILEE metric. This is estimated to increase to 18 per cent in 2022 and 36 per cent in 2023.

Table D.1 Comparison of the number of households in fuel poverty under Low Income Low Energy Efficiency with households required to spend more than 10 per cent of their income on energy costs (millions of households)

	Fuel poor (LILEE)	Above 10% costs/AHC_income	Above 10% costs/BHC_income
2010	4.78	5.11	2.57
2011	4.73	4.93	2.47
2012	4.35	5.08	2.52
2013	4.19	5.27	2.67
2014	3.90	5.28	2.63
2015	3.78	4.89	2.36
2016	3.73	4.43	2.03
2017	3.74	4.09	1.72
2018	3.52	4.04	1.73
2019	3.18	4.11	2.07
2020	3.16	4.30	1.94
2021	3.16	4.93	2.41
2022	3.26	7.39	4.28
2023 projection	*3.53*	*12.00*	*8.83*

The estimates above are based on the same data as the official fuel poverty estimates with two years of data combined. The 2022 projection is based equally on a time of relatively normal energy prices (2021/22) and one year of higher prices with an extensive package of financial support (2022/23). The 2023 projection is based on two years of higher energy prices with the government's support package included.

Annex E: Analysis of progress against fuel poverty interim milestones

E.1 Introduction

As set out in section 2.3, supporting the fuel poverty target are interim milestones. These milestones are for as many low-income households as reasonably practicable to achieve a minimum FPEER rating of band E by 2020 and a minimum FPEER rating of band D by 2025.

This analysis seeks to understand more about the low-income households who did not meet those thresholds in the 2020 data and what additional measures would be required to meet these.

The 2022 fuel poverty statistics annual report showed that in 2020, an estimated 186,000 low-income households (2.9 per cent) had a fuel poverty energy efficiency rating less than band E and 656,000 (9.9 per cent) had a rating less than band D[62].

The methodology used for this analysis is based on how fuel poverty gaps are calculated. This is summarised in section 6 of the Fuel Poverty Methodology Handbook. The BREDEM model used for the fuel poverty gap identifies a package of energy efficiency measures that can be installed in the property and allocates these based on their theoretical cost effectiveness. In many cases a single measure is sufficient to lift the households to the minimum threshold e.g. FPEER 38.5 (Band E) and in some cases, a package of multiple measures is required. In a very small number of cases there is no feasible combination of technical measures that can enable the home to reach the minimum thresholds.

E.2 What does it mean to be reasonably practicable?

It is not possible in this analysis to consider the full range of practicability issues affecting the development and implementation of Government schemes, activities of suppliers and installers of energy efficiency measures and the ability of households to engage with schemes available and willingness to accept the range of measures offered. To partially explore this question, the analysis looks at the type of measures needed to achieve the thresholds and the costs of installing these.

The Minimum Energy Efficiency Standards require privately rented homes to achieve a minimum rating of EPC band E where this can be achieved at a cost of less than £3,500. This analysis considers measures costing £3,500 or below to be 'low cost' and those in excess of that to be 'high cost'.

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[62] The new analysis in this report shows there were an estimated 163,000 low-income households below band E in 2022, representing 2.4 per cent of all low-income households.

There is considerable variation in the costs of installing energy efficiency measures in particular homes and these also vary over time with some significant change in terms of material and labour costs. Costs will also vary due to different installation requirements in particular homes.

Given this uncertainty, the analysis has allocated standard measures into two categories. These costs should be broadly indicative of whether or not the typical cost of each measure is 'low cost' (£3,500 or less), or 'high 'cost' (more than £3,500). This allocation has been based on BREDEM assumptions based on the Energy Saving Trusts' Energy Efficiency Good Practice Guide from 2005 consistent with Energy Performance Certificates and augmented with more recent evidence from a range of sources.

Table E.1 Cost assumptions for energy efficiency measures used in this analysis

Low cost measures	High cost measures
Low energy lights	Photovoltaics
Hot water cylinder insulation	Double glazed windows
Draught proofing	Condensing oil boiler
Loft insulation	Condensing boiler (fuel switch)
Cylinder thermostat	Solar water heating
Heating controls	Solid wall insulation
Heating controls for warm air system	Biomass boiler
Storage heaters	Biomass room heater with boiler
Insulated doors	Wind turbine
Cavity wall insulation	
Flat roof insulation	
Glazing replacement	
Replacement warm-air unit	
Roof room insulation	
Upgrade boiler, same fuel	
Floor insulation	
Condensing boiler (no fuel switch)	

While some of the Government's energy efficiency schemes provide a range of measures to households free of charge, there are reasons other to cost why households would not want the measure in particular where these are invasive measures or there are hassle factors such as emptying lofts. For example, solid wall insulation is recommended but it either reduces the internal floor areas as well as requiring redecoration or as an external measure changing the external appearance of a property. While schemes such as the Energy Company Obligation have required part of that obligation to be achieved through solid wall insulation there are likely to be many households reluctant to accept this measure. It should also be noted that the BREDEM model used to recommend which measures to install does not account for the listed status of a building which may be prohibitive for certain energy efficiency measures such as external solid wall insulation.

E.3 Summary of analysis for 2020 interim milestone (band E)

In 2020, there were an estimated 186,000 fuel poor households below band E. Below is a detailed summary of the energy efficiency measures recommended to bring these households to band E or above and the costs associated with these[63]. In a limited number of cases, there was no BREDEM-identified pathway for a household to reach band E. Where a combination of measures is required to reach the minimum threshold, this has only be classified as low cost if the assumed cost of all the measures combined is less than £3,500.

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[63] A small proportion of households reach the 'band E' target by achieving a sufficient increase in modelled FPEER to escape fuel poverty through the income threshold before reaching band E. This is due to lower modelled energy costs due to increased household energy efficiency.

Figure E.1: 33 per cent of fuel poor households below band E could achieve an FPEER rating of E at a low cost[64,65].
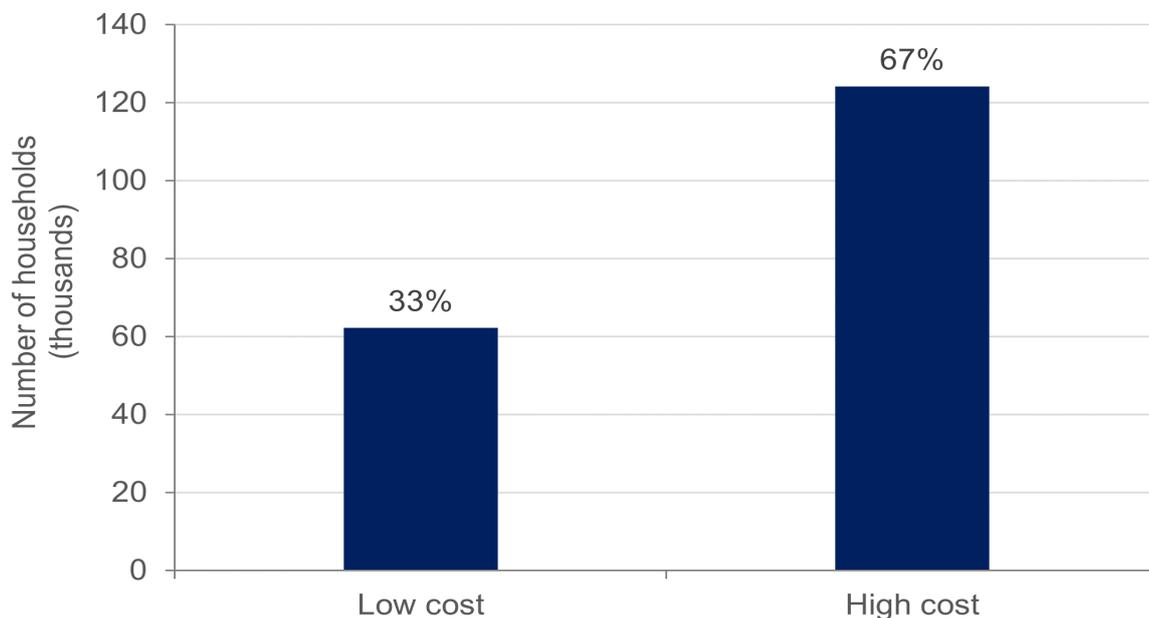

Figure E.1 shows that approximately two thirds of fuel poor households below band E require the installation of a high cost energy efficiency measure to bring them up to a minimum of band E (or multiple measures summing to over £3,500). This often includes solid wall insulation which decreases room size if installed internally and alters the appearance of the building if installed externally.

However, one third of fuel poor households below band E could potentially achieve an FPEER rating of E with low cost measures, including an estimated 10 per cent (18,000 households) for which loft insulation alone would be sufficient to reach this target.

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[64] There were a small number of households for which there was no BREDEM-identified pathway to reach band E. These were categorised as 'high cost' households.
[65] Costs are based on the Energy Saving Trusts' Energy Efficiency Good Practice Guide (2005) and Minimum Energy Efficiency Standards have been used to set £3,500 as a low/high cost threshold.

Figure E.2: Solid wall insulation was recommended for 58 per cent of households to enable them to reach band E[66,67].
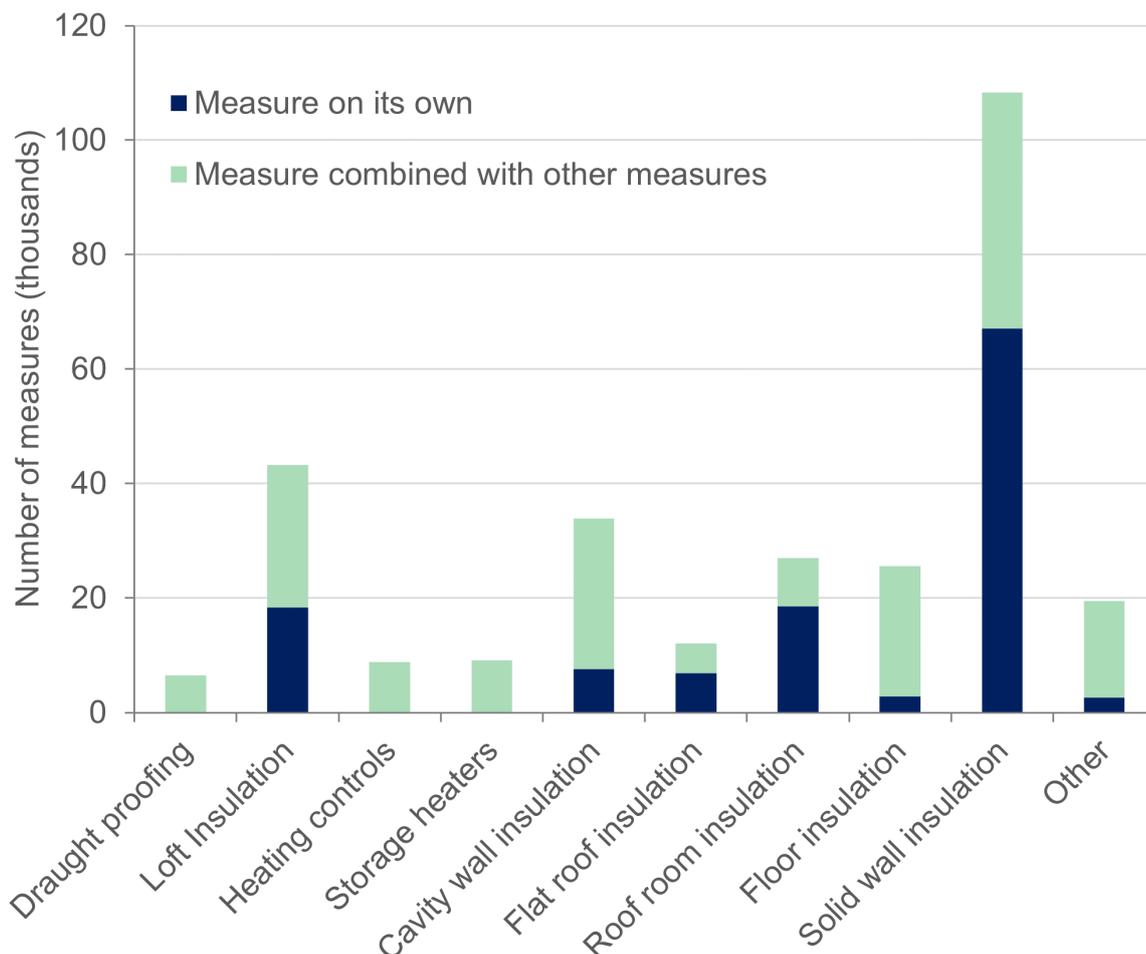

Figure E.2 shows the total number of measures recommended by the BREDEM model to bring households below band E to band E or above. The dark blue bars represent the number of measures which, on their own, are sufficient to enable a household to reach this target. The turquoise stacked bars represent the number of times this measure was recommended in conjunction with other measures to enable a household to reach the band E target.

Overall, 60 per cent of all recommended installations were cheaper measures, such as loft insulation, cavity wall insulation, room-in-roof insulation, and under floor insulation. These were often required to be installed in conjunction with other measures. In total, 67 per cent of households required only the most cost effective measure to reach band E, with a remaining 33 per cent of households requiring multiple measures.

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[66] This includes a small number of measures which were recommended to households for which there was no BREDEM-identified pathway to reach band E.
[67] "Other" refers to measures including cylinder thermostats, boiler upgrades with the same fuel, solar water heating, insulated doors, and photovoltaics.

E.4 Summary of analysis for 2025 interim milestone (band D)

In 2020, there were an estimated 2,403,000 households below band D, of which 27 per cent (656,000 households) were fuel poor[68]. Below is a detailed summary of the energy efficiency measures recommended to bring these households to at least band D and the costs associated with these[69]. For a limited number of cases, there was no BREDEM-identified pathway for a household to reach band D.

Figure E.3: 36 per cent of fuel poor households below band D could achieve an FPEER rating of D at a low cost[70,71].
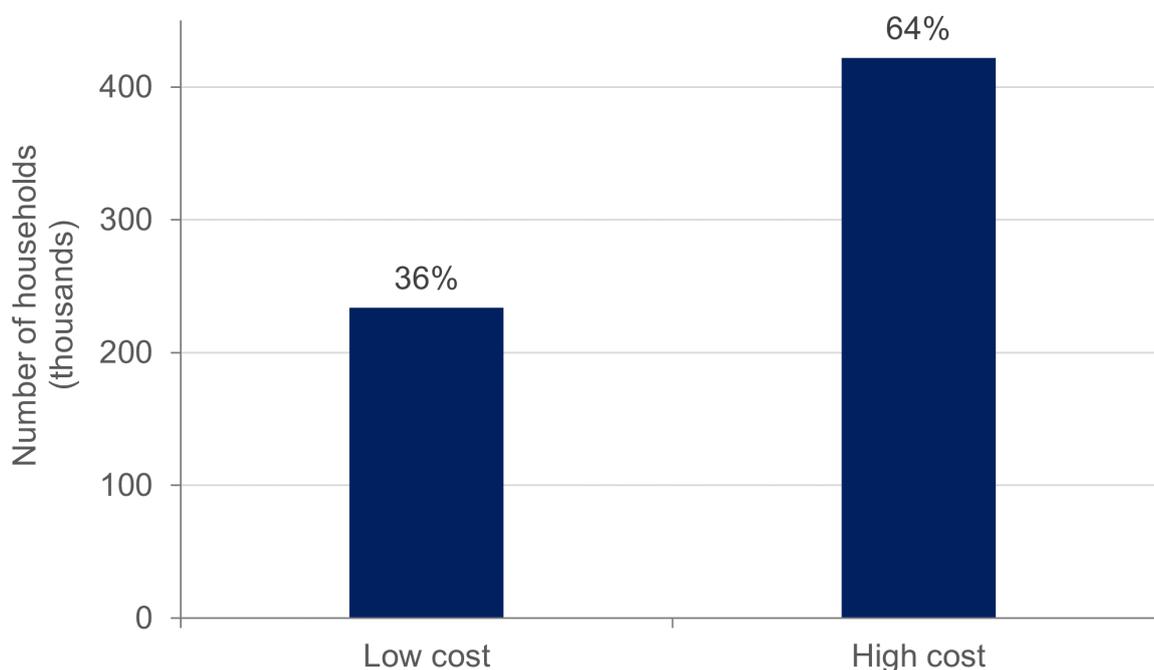

Figure E.3 shows that approximately 64 per cent of fuel poor households below band D require the installation of a high cost energy efficiency measure to bring them to band D or above (or multiple measures summing to over £3,500). These included the installation of solid wall insulation. However, over one third (approximately 36 per cent) of fuel poor households below band D could potentially achieve an FPEER rating of D at a lower cost.

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[68] The new analysis in this report shows there were an estimated 704 thousand low-income households below band D in 2022, representing 10.2 per cent of all low-income households.

[69] A small proportion of households reach the 'band D' target by achieving a sufficient increase in modelled FPEER to escape fuel poverty through the income threshold before reaching band D. This is due to lower modelled energy costs due to increased household energy efficiency.

[70] There were a small number of households for which there was no BREDEM-identified pathway to reach band D. These were categorised as 'high cost' households.

[71] Costs are based on the Energy Saving Trusts' Energy Efficiency Good Practice Guide (2005) and Minimum Energy Efficiency Standards have been used to set £3,500 as a low/high cost threshold.

Figure E.4: There was a wider range of energy efficiency measures recommended to increase the FPEER rating of fuel poor households to bring them to band D[72,73].
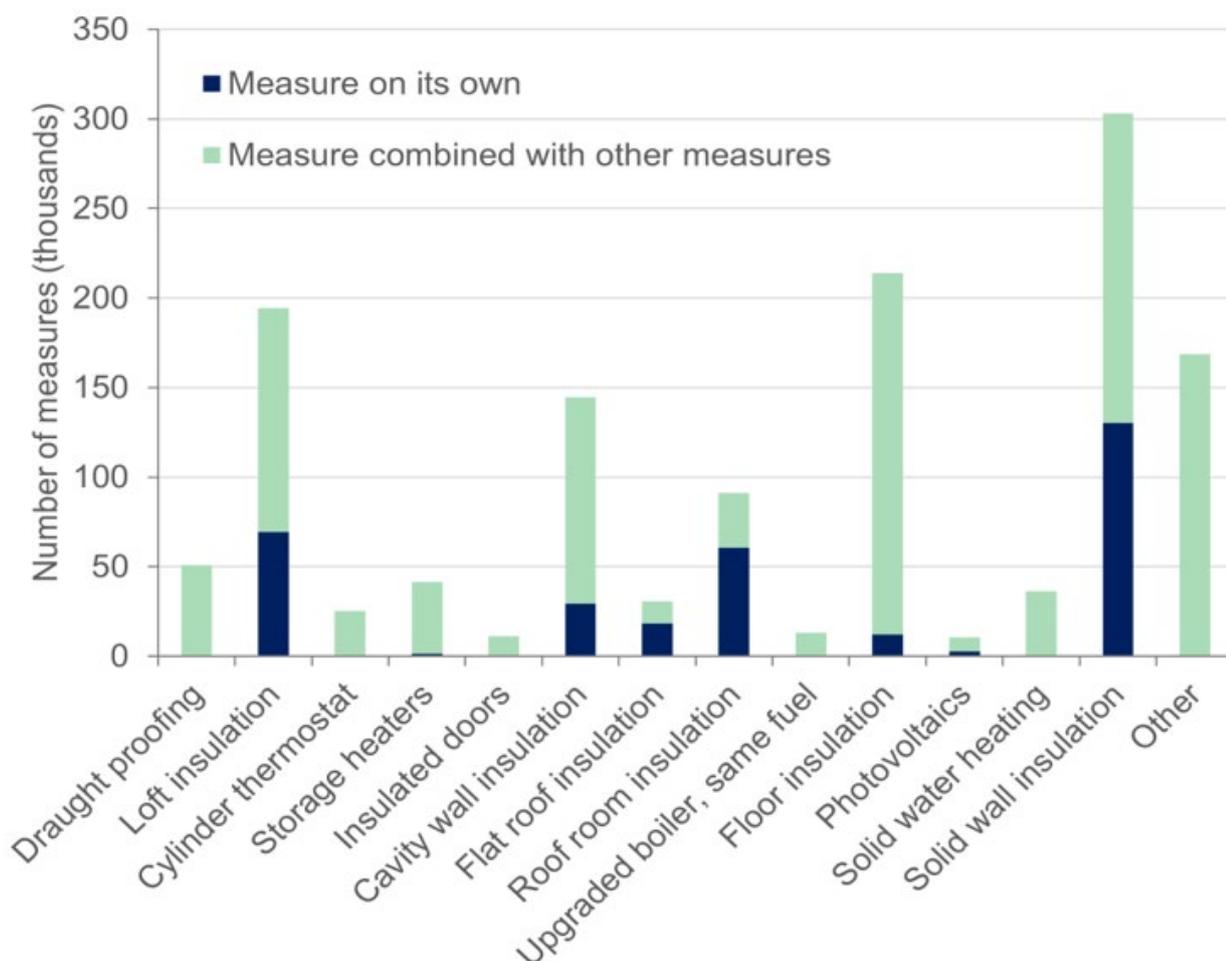

Figure E.4 shows the total number of measures recommended by the BREDEM model to bring households below band D to band D or above. The dark blue bars represent the number of measures which, on their own, are sufficient to enable a household to reach this target. The turquoise stacked bars represent the number of times this measure was recommended in conjunction with other measures to enable a household to reach the band D target.

Overall, 49 per cent of fuel poor households below band D could potentially reach the band D target by installing a single measure and 20 per cent of households could achieve the target with solid wall insulation only. In total, 49 per cent of households required only one measure to reach band D, and 51 per cent required more than one measure.

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[72] This includes a small number of measures which were recommended to households for which there was no BREDEM-identified pathway to reach band D.

[73] "Other" measures include low energy lights, hot water cylinder insulation, heating controls for wet central heating systems, glazing replacement, double glazed windows, changing heating to condensing gas boiler with and without a fuel switch, biomass room heater with a boiler, and wind turbines.

Annex F: Relevant Links

F.1 Income Indicators

[Households below average income](#)

[Winter fuel payments](#)

[Cold weather payments](#)

F.2 Fuel Price Indicators

Actual expenditure on fuel (as percentage of total income) -
[Total](#)
[Weekly average](#)

[Fuel prices](#)

Number of customers on prepayment -
[Electricity](#)
[Gas](#)

Average annual bills by payment method -
[Electricity](#)
[Gas](#)

[Consumer vulnerability](#)

[Switching stats](#)

F.3 Housing Indicators

[Indicator SAP rating](#)

[Number of insulated homes](#)

[Local Authority housing investment on energy efficiency improvements](#)

F.4 Excess winter deaths

[Excess winter deaths](#)

Annex G: Accompanying tables

The following tables are available in Excel and ODS format on the department's statistics website.

Detailed tables LILEE (2021 data).

Detailed tables LILEE (2022 data).

Trends tables LILEE (2010-2022)

Supplementary tables (2021 data)

Supplementary tables (2022 data)

A fuel poverty dataset containing the underlying data for 2021 will be made available on the UK Data Service later in 2023.

Annex H: Technical information

An updated methodology handbook has been published alongside this publication. This sets out the method for calculating the headline statistics using the LILEE indicator and the detailed methodology for calculating the income, energy efficiency and fuel prices for each household.

Annex I: Acknowledgements

The fuel poverty modelling relies on the English Housing survey delivered by the Department for Levelling Up, Housing and Communities (DLUHC) and their contractors and expert modelling by the Building Research Establishment (BRE).

Annex J: Definitions

Term / Acronym	Definition
Adequate standard of warmth	Is defined as 21ºC for the main living area and 18 ºC for other occupied rooms.
Aggregate fuel poverty gap	The fuel poverty gap for each individual household is aggregated across all fuel poor households to produce a national total
AHC	After Housing Costs
Average fuel poverty gap	The average (mean) fuel poverty gap across all fuel poor households.
BREDEM	Build Research Establishment Domestic Energy Model
CW	Cavity Wall
DESNZ	Department for Energy Security & Net Zero
DWP	Department for Work and Pensions
ECO	Energy Company Obligation
EHS	English Housing Survey
Equivalisation	An adjustment factor to standardise spending and energy requirements across households of different sizes.
Equivalised AHC income	After housing costs income equivalised by household composition
Equivalised fuel costs	Household fuel costs equivalised by the number of people in the house
FPEER	Fuel Poverty Energy Efficiency Rating
Fuel Poverty (LILEE)	A household is considered to be fuel poor if: they are living in a home below band C and were they to spend the required amount on fuel costs for the home, they would be left with a residual income below the official poverty line.
Fuel poverty gap (LILEE)	The difference in pounds between the required energy costs for each fuel poor household and the nearest fuel poverty threshold
LILEE	Low Income, Low Energy Efficiency
DLUHC	Department for Levelling Up, Housing & Communities
OECD	Organisation for Economic Co-operation and Development
ONS	Office for National Statistics
Percentage points	The arithmetic difference between two percentages
Real terms	An adjusted financial number after correcting for the effect of inflation
RHI	Renewable Heat Incentive
RPI	Retail Price Index
SAP	Standard Assessment Procedure
SW	Solid Wall

Annex K: Further information

Revisions policy

The DESNZ statistical revisions policy sets out the revisions policy for these statistics, which has been developed in accordance with the UK Statistics Authority Code of Practice for Statistics.

User engagement

The DESNZ statement on statistical public engagement and data standards sets out the department's commitments on public engagement and data standards as outlined by the Code of Practice for Statistics. Users are encouraged to provide comments and feedback on how these statistics are used and how well they meet user needs. Comments on any issues relating to this statistical release are welcomed and should be sent to: fuelpoverty@beis.gov.uk

National Statistics designation

National Statistics status means that our statistics meet the highest standards of trustworthiness, quality and public value, and it is our responsibility to maintain compliance with these standards. The continued designation of these as National Statistics was confirmed in July 2022 following a compliance check by the Office for Statistics Regulation. The statistics last underwent a full assessment against the Code of Practice for Statistics in 2014.

Pre-release access to statistics

Some ministers and officials receive access to these statistics up to 24 hours before release. Details of the arrangements for doing this and a list of the ministers and officials that receive pre-release access to these statistics can be found in the DESNZ statement of compliance with the Pre-Release Access to Official Statistics Order 2008.

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