Office for National Statistics

Article

How fuel poverty is measured in the UK: March 2023

The similarities and differences in how fuel poverty is measured across the UK.

Contact:
Chloe Massey, Michelle Waters
gss.housing@ons.gov.uk
+44 1633 456739

Release date:
28 March 2023

Next release:
To be announced

Table of contents

1 . Main points

- Fuel poverty is a policy area with different strategic approaches, and there are significant differences in the metrics used by each UK nation.
- It is currently not possible to get a UK figure of fuel poverty, but progress is being made to provide greater comparability between nations with some now reporting data under alternative metrics.
- In England, fuel poverty strategy is focused specifically on prioritising low-income households for energy efficiency support and is distinct from other strategies aimed at reducing income poverty.
- In Scotland, Northern Ireland and Wales, the fuel poverty strategies do not make this specific distinction.
- Scotland and England have requirements so that higher income households are not identified as fuel poor.
- In England, households with high energy efficiency in their homes are not identified as fuel poor.
- Other main differences in the metrics include whether housing costs are accounted for and the heating standards used for vulnerable households.

2 . Fuel poverty in the UK

Fuel poverty relates to households that cannot meet their energy needs at a reasonable cost. Understanding fuel poverty and estimating the number of households who may be fuel poor supports the development of policies that address its main drivers:

- energy efficiency of the home
- household income
- energy prices

In Scotland, a fourth driver of how energy is used in the home is also set out in Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019.

Fuel poverty has an impact on health, with cold homes presenting health risks particularly to those most vulnerable in society.

In the UK, fuel poverty was first measured and defined by the UK government in the 2001 Fuel Poverty Strategy. Currently, strategy related to fuel poverty is largely devolved, with each UK nation having introduced its own fuel poverty metric and targets. It is therefore not possible to compare fuel poverty statistics to give a UK-wide picture. Despite this, many policies addressing the main drivers of fuel poverty are set at Great Britain and UK-level, such as the Warm Home Discount, Winter Fuel Payment, Energy Company Obligation, and the recently introduced Energy Price Guarantee, Energy Bills Support Scheme and Alternative Fuel Payment.

Fuel poverty estimates allow each nation to track progress against its own targets and support the development of new policy. They provide insight into the characteristics of groups that may be susceptible to fuel poverty, such as by fuel type used and geographic location. In addition to these estimates, research and consultations are also conducted, such as that of the Scottish Government giving greater insight into the lived experience of fuel poverty.

It is increasingly important to understand the scale of fuel poverty, and the households that may be most affected by the significant rises in energy bills in recent years. The timeliness of the outputs means not all the recent fuel poverty estimates report on this period of rising costs.

This article has been written by the Office for National Statistics (ONS) in consultation with the Department for Energy Security and Net Zero (DESNZ) for England, the Northern Ireland Housing Executive, the Scottish Government and Welsh Government to support users' understanding of the different fuel poverty metrics across the UK.

This article is the first to use published data to explore the differences and similarities in how the UK metrics deal with the main drivers of fuel poverty: energy efficiency, household income and energy prices. It is the fifth in a series of cross-UK articles on housing and homelessness, the previous articles being on rough sleeping, the private rented sector, homelessness and affordable housing.

3 . What is fuel poverty?

Fuel poverty is referred to in legislation for England and Wales in the Warm Homes and Energy Conservation Act 2000, which regards a person in a fuel-poor household as someone on a low income, that cannot keep their home warm at a reasonable cost. In Scotland, an updated definition was set out in the Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019, which defines in detail how fuel poverty is measured. In Northern Ireland, there is no legislative definition of fuel poverty but the approach is broadly taken through the Affordable Warmth Scheme, directed at those with a low income and low energy efficiency within their home.

There have been changes over time in how fuel poverty has been measured, based on changes in the interpretation of fuel poverty and legislation. In the 2001 Fuel Poverty Strategy, the UK government set out an affordability metric that looked at the ratio between a household's income and their required energy bills. This calculation is based on required spend rather than actual spend, to mitigate against the fact some households may limit their usage.

In Northern Ireland and Wales, fuel poverty is still measured using an affordability metric. If the household's required fuel costs are at least 10% of the household's income before housing costs, that household will be classed as fuel poor.

In Scotland, a 10% threshold is used in a two-part metric. The full definition is as set out in the Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019. According to this, a household is in fuel poverty if:

- after housing costs, the total fuel costs needed to maintain a satisfactory heating regime are more than 10% of the household's adjusted net income

and

- if, after deducting fuel costs, housing 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 [note 1]

In England, the measurement of fuel poverty no longer includes a 10% threshold. The metric was most recently changed in the 2021 Fuel Poverty Strategy, to the Low-Income Low Energy Efficiency (LILEE) indicator. According to this, a household is in fuel poverty if:

- their home has a Fuel Poverty Energy Efficiency Rating (FPEER) of band D or below

and

- if, after subtracting their modelled energy costs and housing costs, their residual income is below the poverty line [note 2]

The metrics used in Northern Ireland, Wales and Scotland emphasise the relationship between income and fuel costs. In the Scottish and English metric, only households with a low income can be fuel poor. Additionally, in England, a distinction is made between fuel poverty and income poverty, whereby fuel-poor households are specifically low-income households who have low energy efficiency in their home.

It is important to note that all these metrics rely on several assumptions and underlying methods that are different across the UK, and therefore the outcome cannot be compared across all countries. These differences are explained in Section 4: Comparing the UK fuel poverty methods.

Fuel poverty outputs

Each country publishes the percentage of households estimated to be in fuel poverty, which they track over time. These estimates primarily use data from each country's Housing Survey, which include a physical inspection of the home and an interview collecting information on social characteristics, such as income and housing costs.

These statistics use different metrics and are published at different time frequencies and timeliness. There have been developments to provide greater comparability across the UK. England has published additional estimates under a 10% affordability metric (before and after housing costs), and Wales has published additional estimates under each of the other UK metrics.

More information on who produces the estimates and the underlying data can be found in the Glossary and Data sources sections.

Severe and extreme fuel poverty

In Wales, severe fuel poverty is measured and occurs where more than 20% of the income is spent on required fuel costs.

In Scotland, extreme fuel poverty is measured, occurring where more than 20% of the income after housing costs is spent on required fuel costs and there is insufficient residual income to maintain an acceptable standard of living.

In Northern Ireland, the severity of fuel poverty is assessed by looking at households where between 10% and 15%, 15% and 20%, or more than 20% of their income is spent on required fuel costs.

Additionally in Wales, those at risk of fuel poverty are identified as those who must spend between 8% and 10% of their income on fuel costs.

In England, extreme fuel poverty is not reported on, but the depth of fuel poverty is measured using the fuel poverty gap.

The fuel poverty gap

The fuel poverty gap broadly refers to the amount of money a household would need to no longer be classed as fuel poor. This provides greater insight on the depth of fuel poverty and provides a way of tracking progress towards that nation's targets.

In England, the fuel poverty gap is the reduction in fuel costs needed for a household to not be in fuel poverty. This is the lowest of either:

- the change in required fuel costs associated with increasing the energy efficiency of a fuel-poor household to a FPEER band C, or
- the reduction in fuel costs sufficient to bring the net household income above the official poverty line

In Scotland, the fuel poverty gap is the lowest of either:

- the amount required so that fuel costs are no longer 10% of the net income after housing costs, or
- the amount required for the household's net income after benefits received for a disability or care need, childcare, housing (including Council Tax, water and sewerage costs) and fuel costs to meet 90% of the minimum income standard (including the uplifts for remote rural, remote small town and islands areas)

In Northern Ireland and Wales, a fuel poverty gap is not calculated as part of their own metrics but have been reported on when publishing data for comparisons under the English metric.

Notes for: What is fuel poverty?

1. An acceptable standard of living is defined as having a residual income more than 90% of minimum income standard (MIS). This standard is produced by the Centre for Research in Social Policy at Loughborough University, and additional uplifts are made for remote rural, remote small town and islands areas.
2. Relative low income (or poverty) is defined as 60% of the median equivalised disposable income, and is used in official UK statistics (see Section 2: Persistent poverty in the UK and EU – Office for National Statistics (ons.gov.uk)).

4 . Comparing the UK fuel poverty methods

There are three main components when calculating whether a household is living in fuel poverty, these are:

- energy requirements
- fuel costs
- household income

These three components are used for fuel poverty calculations across all UK countries but there are differences in how the components are implemented, which reflect differences in each countries' policy and strategy. This means that each countries' fuel poverty estimates are different and cannot be brought together or directly compared. As discussed in Section 3: What is fuel poverty, the England and Scotland metrics have additional requirements, the methods for which are detailed in this section.

The components are calculated primarily using data from the Housing Surveys. These surveys are conducted less frequently in Wales and Northern Ireland, so additional modelling work is carried out to bring the base data up to the year of the fuel poverty estimates.

Energy requirement component

Fuel poverty estimates are not based on the actual energy consumption of a household but on the energy that would be required to meet a satisfactory level of heating and other energy uses in the home. These energy requirements are based on the home's physical characteristics, a defined heating regime and other uses of energy.

Overall, the approach for each country is similar, with a heating regime and physical characteristics informing the energy model that estimates how much energy a household would need to use.

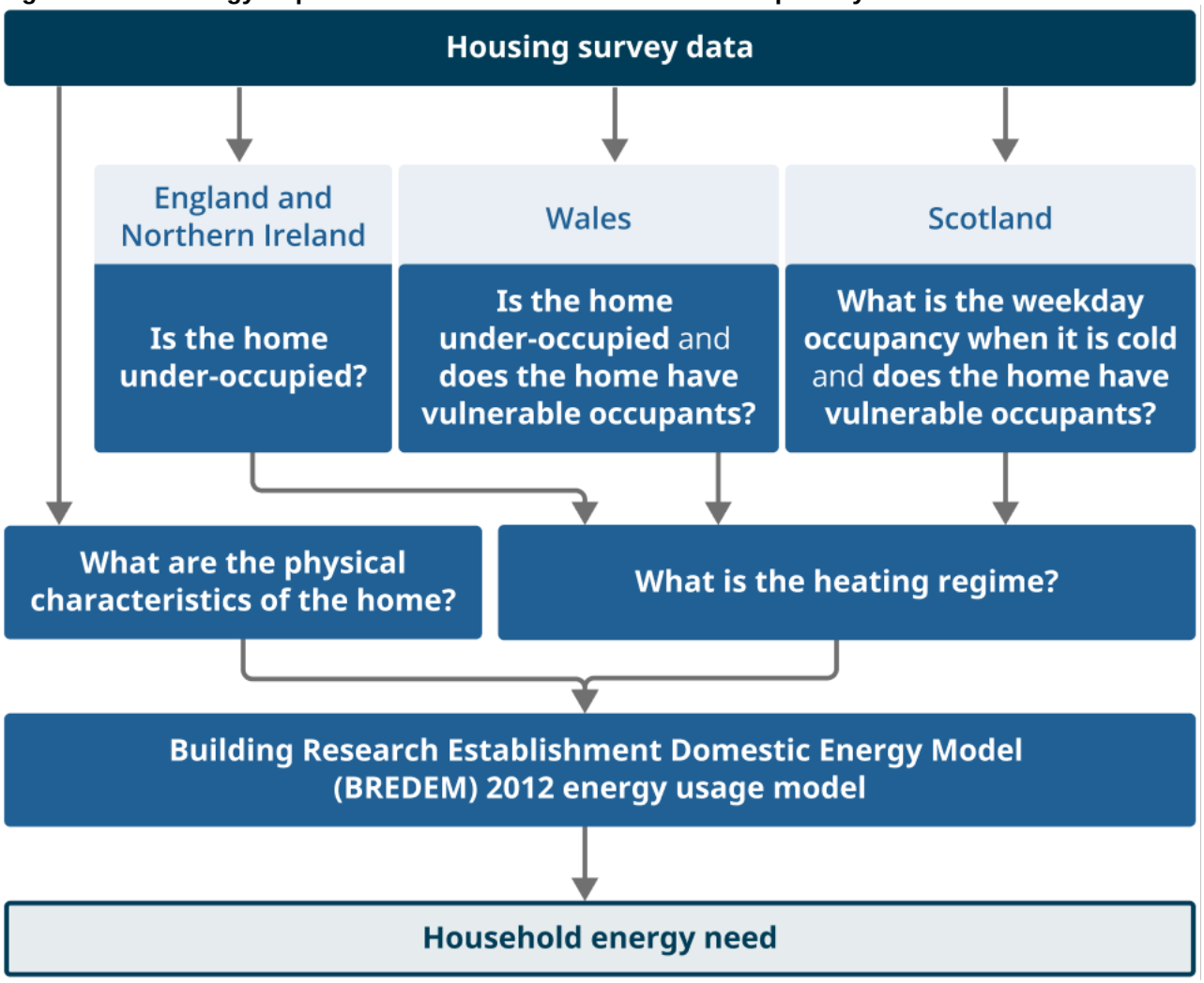
The main difference between the approaches is the heating regime that is used, each nation uses different temperatures and heating hours according to different criteria.

In England and Northern Ireland, this is based on whether the home is under-occupied.

In Wales, it is based on both occupancy and vulnerability of the occupants.

In Scotland, the regime is determined by whether the occupants are vulnerable; future estimates will also account for the levels of occupancy during the week when it is cold.

Figure 1: How energy requirements are calculated in the UK fuel poverty metrics.



Source: Office for National Statistics

More information on how the sub-components are measured is detailed in the next section, as well as insights into how these differences may affect the estimates produced.

Heating regime

The standard heating regime used for all countries' metrics is as recommended by the World Health Organization (WHO). This is 21 degrees Celsius for the living room and 18 degrees Celsius for any other room, for 9 hours a day on a weekday and 16 hours a day during the weekend.

In England, Northern Ireland and Wales, this standard heating regime is adjusted based on how the home is occupied, using assumptions about the household composition and size of the home.

In England, the interview survey includes a direct question asking whether a householder is at home during the day, this also accounted for behaviour (such as working from home) because of the coronavirus (COVID-19) pandemic.

In Scotland, questions have been added to the Housing Survey on how frequently the home is occupied during cold periods. Based on this information, enhanced heating hours combined with standard temperatures are applied to non-vulnerable households. This regime also applies to all households with a child aged 5 years or under.

In Wales's 2021 estimates, the number of people expected to be working from home was also considered. This took account of data from The Understanding Society COVID-19 Study, 2020 to 2021, and randomly assigned an additional 19% of working people to be at home all day. However, this resulted in no change to the numbers of households in fuel poverty as the household income for these working households was high enough to prevent the increased fuel costs going over the fuel poverty threshold.

In Scotland and Wales, enhanced heating temperatures and hours are used for vulnerable households whereby the occupants meet certain requirements of age and illness or disability. These criteria aim to identify people who are most susceptible to adverse health effects of living in the cold and should have their home heated differently. In Wales, one enhanced heating regime is used. In Scotland, two enhanced heating regimes are used for different vulnerable households varying by the heating hours, these are set out in the Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019; the conditions for assigning these are further outlined in the Fuel Poverty (Enhanced Heating) (Scotland) Regulations 2020. The metrics used in England and Northern Ireland do not make adjustments temperatures for vulnerable households.

Physical characteristics of the home

The energy required to maintain the heating regime is estimated using physical characteristics about the home collected in Housing Survey data. This includes characteristics such as the size, heating system, insulation and geographic location.

The location used is based on region but in future publications Scotland will be using postcode district-level geographic identifiers to take account of greater exposure to the elements and weather fluctuations.

In Wales and Northern Ireland, the Housing Survey is less frequent, so energy efficiency improvements need to be applied to the data. This is based on data from different schemes such as the Warm Homes Programme and Energy Company Obligation in Wales, Affordable Warmth in Northern Ireland, as well as trends in previous Housing Surveys to do this.

Energy modelling

To estimate the total energy consumption required, the relevant heating regime and characteristics of the home are input to a fuel poverty specific version of the Building Research Establishment Domestic Energy Model (BREDEM) (PDF, 513KB). This includes the energy required to meet the relevant heating regime as well as other uses of energy such as lights, appliances and cooking.

Fuel cost component

Household fuel costs are calculated using the estimated energy requirements. The fuel costs are assigned in the same way for each household for each country, by cross-referencing against the relevant price data.

To appropriately assign the relevant price, each Housing Survey collects information on:

- fuel type
- location (to correctly allocate regional fuel cost)
- bill payment method for mains gas and electric (direct debit, pre-payment meter)

Once the relevant costs are assigned, this gives a modelled fuel bill for each household. In England, Scotland and Wales, the Warm Home Discount rebate is deducted from this bill for eligible households. This scheme is not available in Northern Ireland.

For each nation, appropriate fuel prices are sourced from regularly published statistics such as the Quarterly Energy Prices published by the Department for Energy Security and Net Zero for mains gas and electricity. The granularity of these data varies by nation and additional price corrections (such as accounting for subnational variation) are made.

Comparing the fuel costs output

The differences in how the energy requirements and subsequent fuel costs are calculated may impact the estimates produced in several ways.

The Scottish and Welsh metrics increase the heating temperatures and hours used in the heating regimes for vulnerable households. This increase will result in a higher fuel bill, and therefore increase the likelihood of being fuel poor for these households.

Additionally, the heating regimes used in England, Wales and Northern Ireland assume that only half the home is heated if it is considered under-occupied. In Scotland, the heating regime does not consider this kind of under-occupancy. This decision was made by the Scottish Government based on evidence that under-heating sections of the home can lead to issues such as cold and damp affecting the home's physical structure and householder's health (PDF, 1.94MB).

The location data for energy modelling are based on regional data for England, Wales and Northern Ireland. In Scotland, more granular location data are used, which may more accurately account for extreme weather, and the energy required to mitigate the effects of this. Accounting for this more extreme weather may result in an increased fuel bill and increase the likelihood of a household being in fuel poverty.

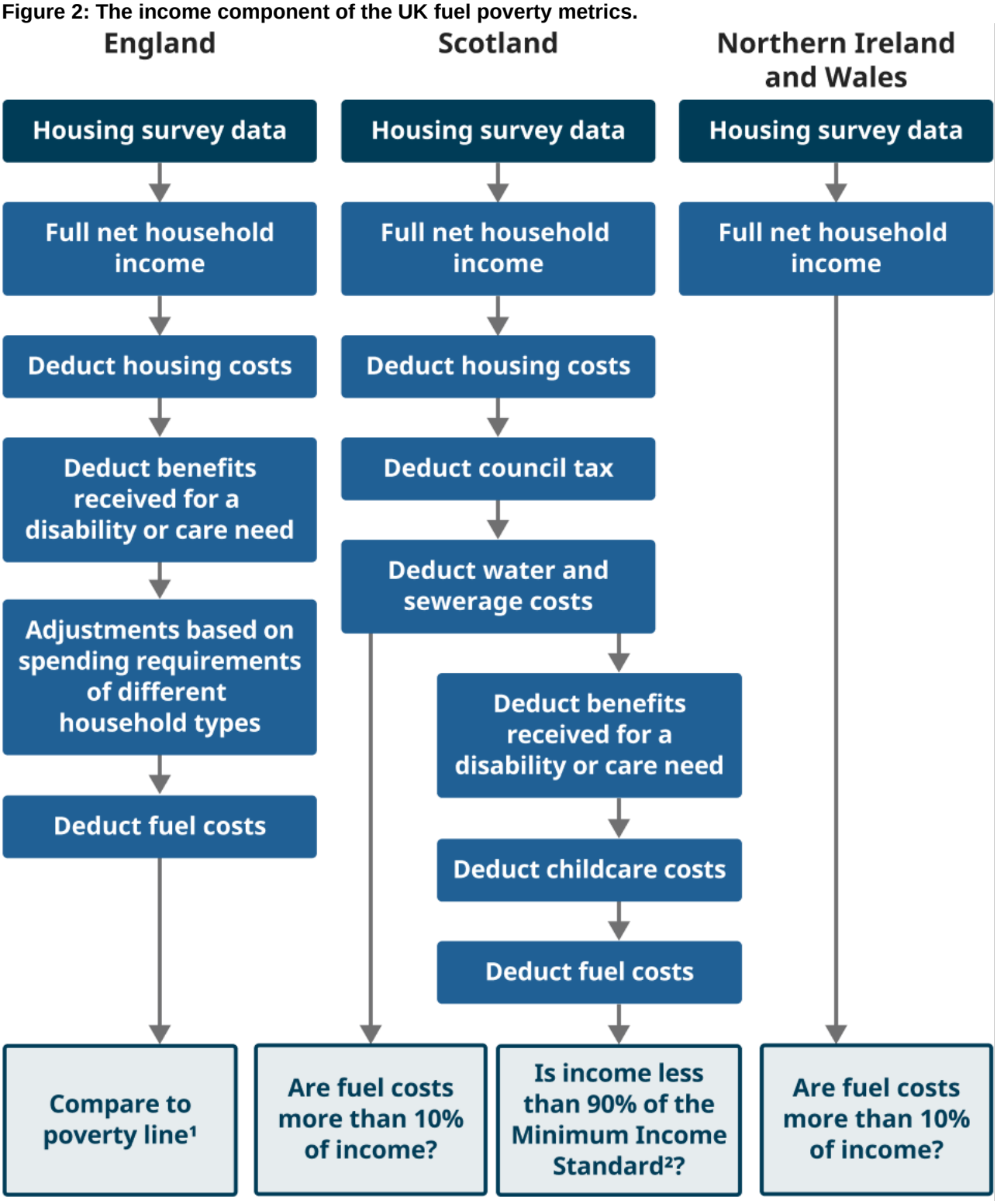
Other requirements

In England, there is also an additional requirement so that only those who have poor energy efficiency, and subsequently higher fuel costs, can be classed as fuel poor. This is accounted for by using a Fuel Poverty Energy Efficiency Rating (FPEER), which is calculated with similar methods used to assess energy performance of domestic properties and adjusted based on policy interventions that directly affect household energy costs, such as the Warm Home Discount. This requirement means that a household cannot be fuel poor if it has an FPEER rating of C or above.

Income component

The calculated fuel costs are compared against the household income as part of the overall fuel poverty metric. Household incomes are calculated using the household interview part of each countries' Housing Survey, and different definitions of income are used across the UK. There are two main differences: whether the income is a before or after housing costs measure of income, and whether only low-income households can be fuel poor. Figure 2 shows a high-level comparison of how income is used in the fuel poverty metrics across the UK.

Figure 2: The income component of the UK fuel poverty metrics.



Source: Office for National Statistics

Notes:

1. The poverty line is defined as 60% of the median equivalised disposable income, and is used in official UK statistics (see Section 2: Persistent poverty in the UK and EU - Office for National Statistics (ons.gov.uk)).

2. The Minimum Income Standard is used to define an acceptable standard of living. It is produced by the Centre for Research in Social Policy at Loughborough University, and additional uplifts are made by the Scottish Government for remote rural, remote small town and islands areas.

In England, Northern Ireland and Wales, the income of the household reference person (HRP) and any partner are included. The income of additional adults is estimated using Housing Surveys and other sources of wage data.

In Scotland, future Housing Surveys will collect this information on up to five adult members of the household.

For all countries' metrics, the full household income broadly comprises of the following elements:

- employment and self-employment earnings
- benefit income
- additional income through investments and pensions

For all UK metrics, the full household income excludes tax and National Insurance, and Council Tax charges are also deducted. The Winter Fuel payment is added to the full income, where applicable.

In England and Scotland, deductions are then made to this income measure, with both metrics excluding housing costs from the income. In Scotland, water and sewerage charges are additionally excluded.

In England, any benefits that cover disability costs are excluded. Additionally, the spending requirements of different households are considered, and adjusted within the measure to account for household composition (such as increasing the income of single people).

This compares with Scotland where all social security benefits are initially included in the income used to compare against fuel costs. Benefits received for a disability or care need, fuel, housing and childcare costs are later deducted and compared with the corresponding Minimum Income Standard (MIS) for the additional requirement of the Scottish metric. Similarly to the England metric, the MIS requirement also accounts for the different spending requirements of households.

Comparing the income measure

A main difference in the income across the UK is whether it is before or after a housing costs measure of income. In Northern Ireland and Wales, housing costs are not excluded from income; this may reduce the likelihood of a household being in fuel poverty. Whereas an after-housing cost measure of income (used in England and Scotland) more accurately reflects the affordability of the fuel costs, as committed housing costs cannot be used for these.

The adjustments made in the English and Scottish measure for spending requirements mean that within these metrics, the income is more comparable across different sizes and types of households, as the different spending requirements have already been accounted for.

5 . What influences fuel poverty?

As discussed in this article, the metrics used to estimate fuel poverty look at the relationship between three main drivers:

- energy efficiency of the home
- household income
- energy prices

This section explores the differences in how these drivers are dealt with by each metric. The differences mean we cannot directly compare the fuel poverty estimates to give a UK-wide picture but there is value in looking at the data to understand how the metrics work.

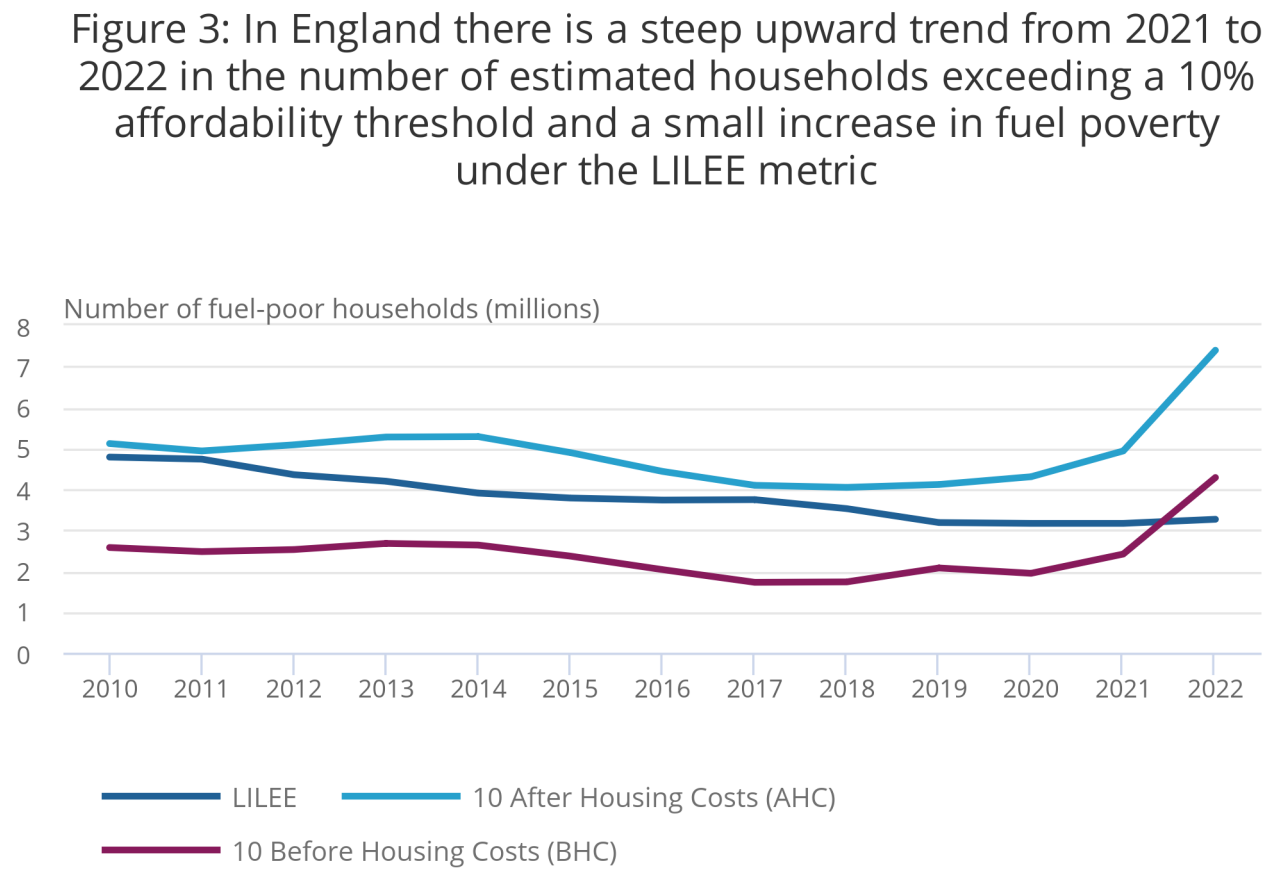
The data used in this section have been selected to illustrate the differences between the metrics, and the impact those differences may have on fuel poverty outputs across the UK. More data are available from the Department for Energy Security and Net Zero (DESNZ) for England, the Northern Ireland Housing Executive, the Scottish Government and Welsh Government.

Rising energy prices

In the last year, energy prices reached levels never seen before in the fuel poverty calculations. While estimates from the different UK metrics cannot be directly compared, the data within this section explore how the different metrics respond to these rising fuel costs.

In England, the latest headline estimates are for 2022. These have been published under the Low-Income Low Energy Efficiency (LILEE) metric, and additional affordability estimates have been published using a 10% of household income threshold, both before and after housing costs (Figure 3). The LILEE metric tracks progress in energy efficiency improvements and assumes that those with high energy efficiency in their homes will not experience unreasonably high energy costs so are not fuel poor. An affordability metric, such as the 10% thresholds used in Scotland, Wales and Northern Ireland, may be more effective in reflecting the scale of households currently under pressure from high energy prices.

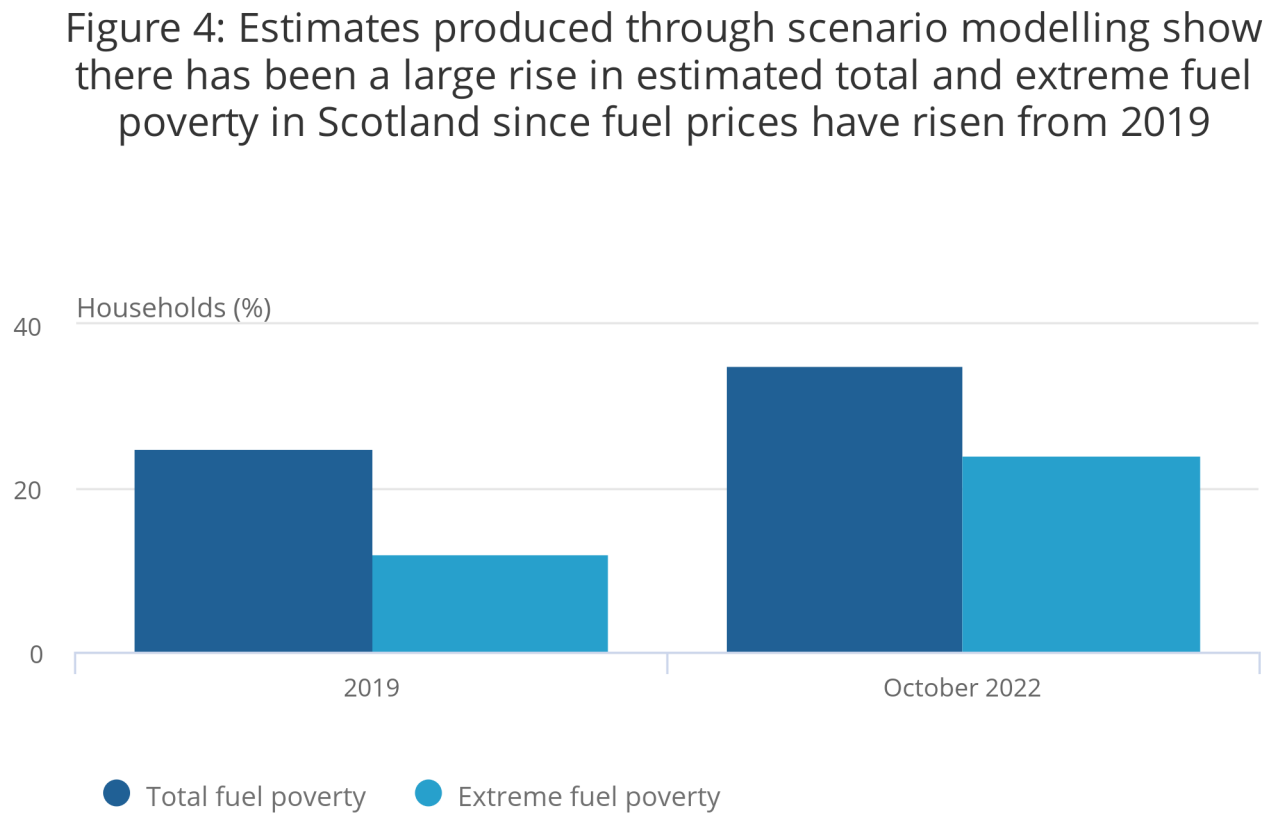
Figure 3: In England there is a steep upward trend from 2021 to 2022 in the number of estimated households exceeding a 10% affordability threshold and a small increase in fuel poverty under the LILEE metric



Source: Annual Fuel Poverty Statistics (Annex D) from the Department for Energy Security and Net Zero

In Scotland, the latest headline estimates relate to 2019. Additional modelling work has been conducted to provide insight on what fuel poverty rates would be with the Energy Price Guarantee (EPG) in place for October 2022 to March 2023. Figure 4 shows that in October 2022, 35% of households in Scotland were expected to be in fuel poverty. This is up from 25% of households in fuel poverty in 2019, before the large increase in fuel prices.

Figure 4: Estimates produced through scenario modelling show there has been a large rise in estimated total and extreme fuel poverty in Scotland since fuel prices have risen from 2019



Source: Scottish House Conditions Survey Main Findings, 2019 from the Scottish Government, The Cost-of-Living Act 2022: First Report to the Scottish Parliament from the Scottish Government

Notes:

1. The figure for 2019 is the official headline estimate published with the 2019 Scottish House Condition Survey.

2. Estimate for October 2022 was produced through scenario modelling and is not an official headline estimate.

The time period for which data are available varies in each of the four countries. Because of timeliness in reporting, not all the latest fuel poverty estimates report on the recent period of rising costs. In Wales, additional modelling work was conducted to show the potential impact of the energy price cap increase in April 2022, and assuming all households are on the price cap, up to 45% of households were estimated to be in fuel poverty. In Northern Ireland, figures that include 2022 fuel prices are expected to be published later this year.

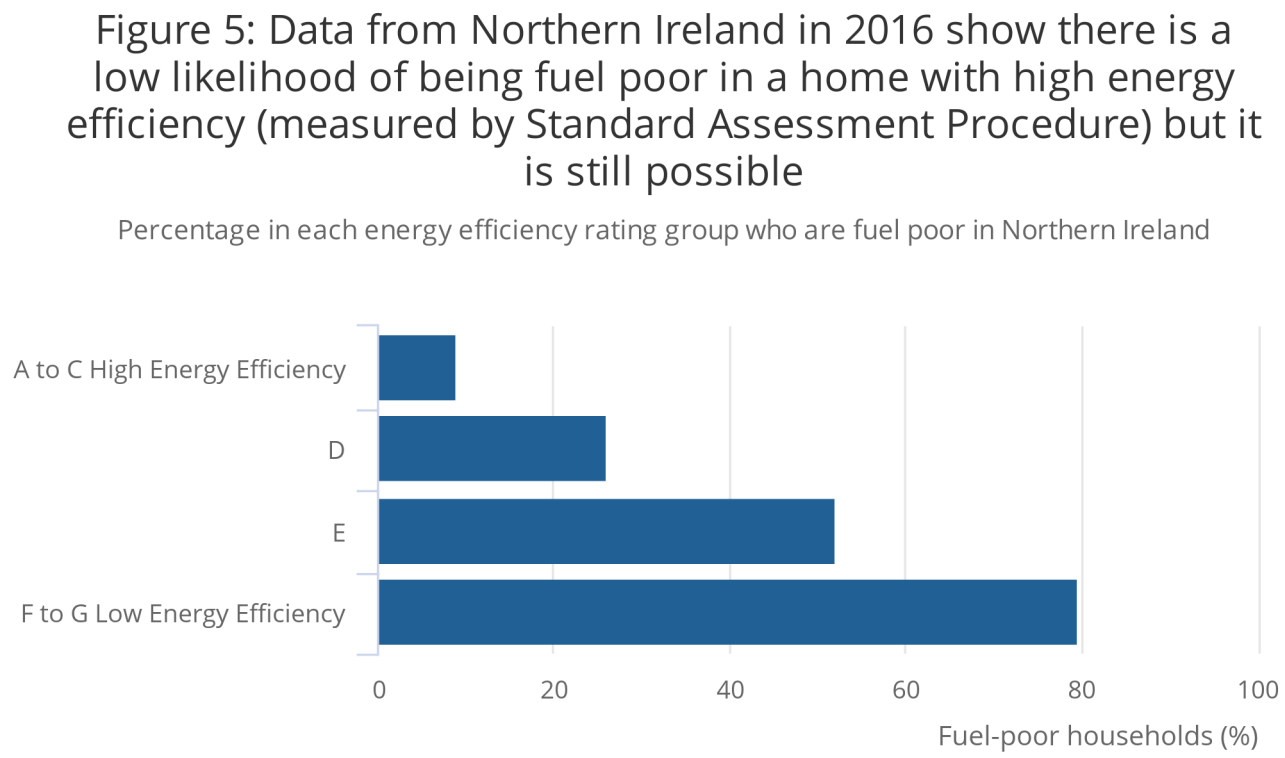
Energy efficiency

Energy efficiency of the home is recognised as a main driver of fuel poverty across the UK. The data within this section demonstrate how energy efficiency is dealt with by the different metrics. Across all metrics, households with lower energy efficiency in their home will have higher required fuel costs and an increased likelihood of being in fuel poverty.

In England, the metric does not class households with high energy efficiency in their home as fuel poor, regardless of their required energy costs. In Scotland, Wales and Northern Ireland, this is not a requirement and households with high energy efficiency in their homes can be fuel poor (Figure 5).

Figure 5: Data from Northern Ireland in 2016 show there is a low likelihood of being fuel poor in a home with high energy efficiency (measured by Standard Assessment Procedure) but it is still possible

Percentage in each energy efficiency rating group who are fuel poor in Northern Ireland



Source: Northern Ireland House Condition Survey, 2016 from the Northern Ireland Housing Executive

Notes:

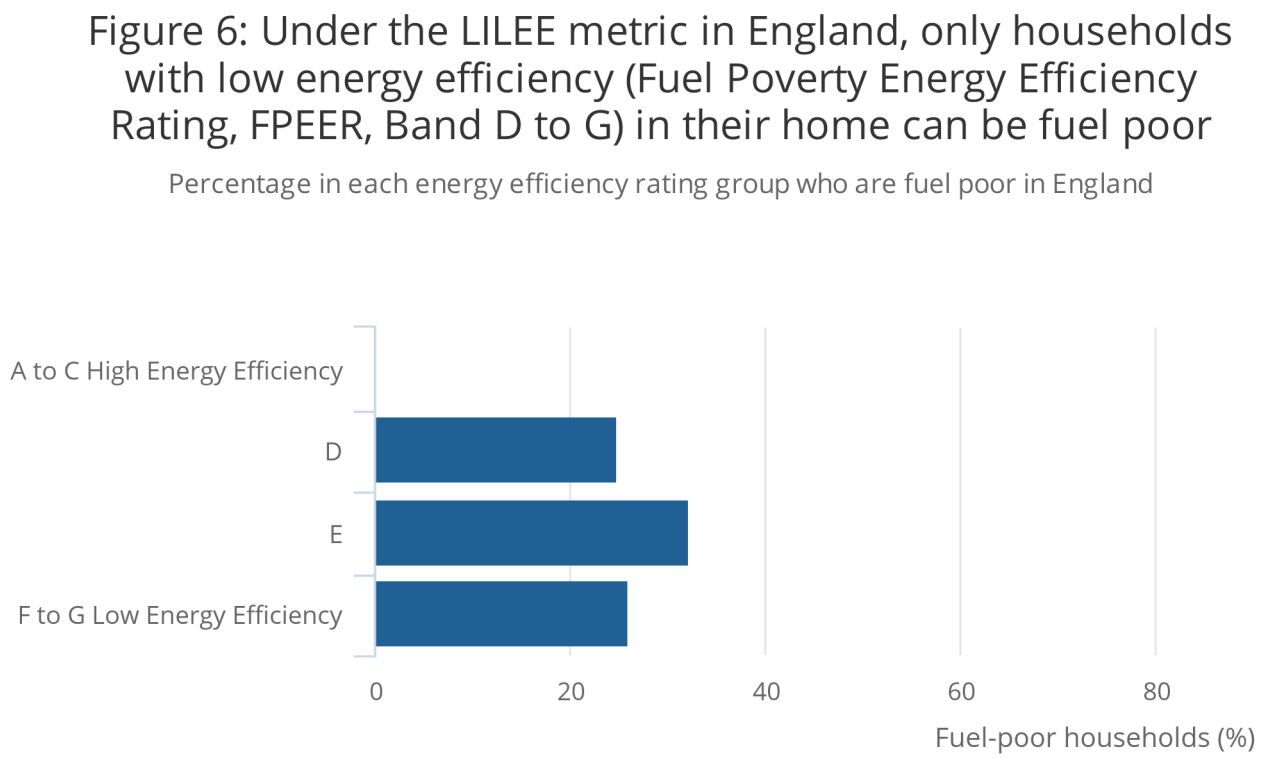
1. Energy efficiency rating band F to G should be treated with caution because of low sample size.

In England, the relationship between fuel poverty and energy efficiency is central to the metric as only households with low energy efficiency in their home can be fuel poor (Figure 6). This relates to the fuel poverty target for England that states for as many fuel-poor households as reasonably practicable to achieve an energy efficiency rating of at least band C by 2030.

Out of households who have low energy efficiency in their home, there is a weak relationship between energy efficiency and fuel poverty; this may be because under the LILEE metric, households with low energy efficiency must also have an income below the poverty line to be fuel poor.

Figure 6: Under the LILEE metric in England, only households with low energy efficiency (Fuel Poverty Energy Efficiency Rating, FPEER, Band D to G) in their home can be fuel poor

Percentage in each energy efficiency rating group who are fuel poor in England



Source: Annual fuel poverty statistics report 2023, 2022 data from the Department for Energy Security and Net Zero

The data used in this section have been selected to illustrate the relationship between energy efficiency and fuel poverty in the different metrics, and show the energy efficiency requirement used in England, but not in Scotland, Wales and Northern Ireland.

Household income

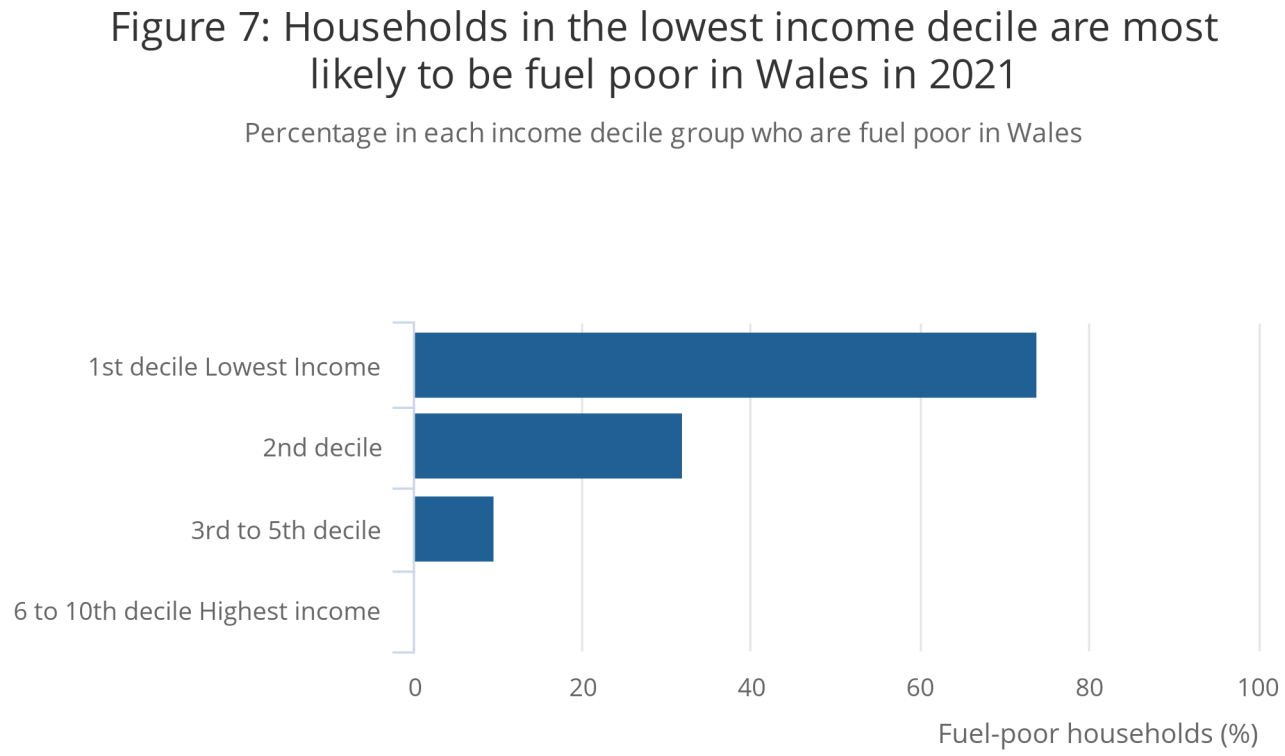
Household income is also a main driver of fuel poverty. In England and Scotland, it is a requirement in the metric for fuel-poor households to have a low household income. Another main difference in the UK metrics is whether the income included in the calculation includes housing costs or not. Where housing costs are included, it can reduce the likelihood of a household being in fuel poverty.

The data within this section demonstrate the impact the different fuel poverty metrics have on fuel poverty estimates.

In Northern Ireland and Wales, the metrics do not exclude higher income households and use the income before housing costs to compare against required fuel costs. Despite this, there is still a clear relationship of those on a lower income being more likely to be in fuel poverty as shown by the data from Wales in Figure 7.

Figure 7: Households in the lowest income decile are most likely to be fuel poor in Wales in 2021

Percentage in each income decile group who are fuel poor in Wales



Source: Fuel Poverty modelled estimates for Wales: as at October 2021 from the Welsh Government

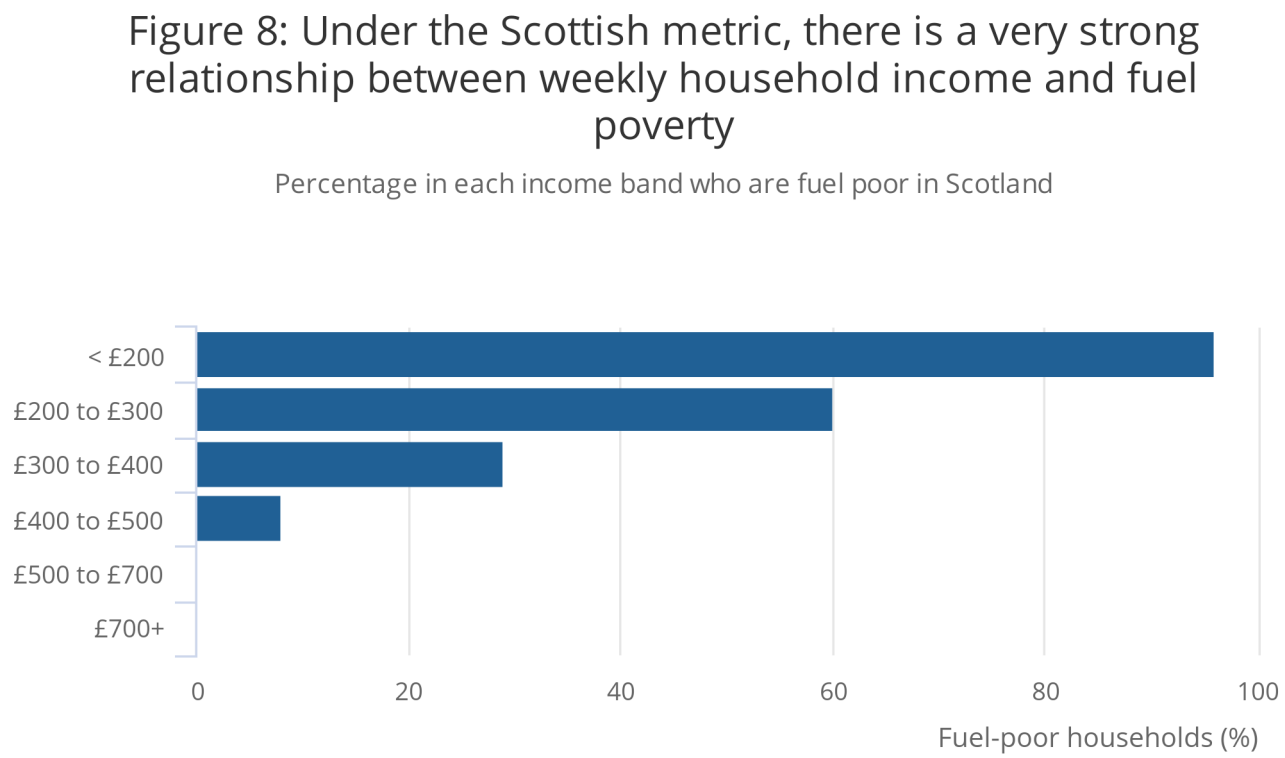
Notes:

1. 6th to 10th deciles are not included because of low sample size.

The Scottish metric uses a minimum income standard to prevent higher income households from being considered fuel poor, and considers housing costs, benefits for a disability and care need, and childcare costs. The way income is dealt with means that all low-income households who struggle to afford to heat their homes are included under the Scottish metric (Figure 8). The 2021 Scottish fuel poverty strategy is situated within wider plans to reduce poverty and inequality, and this is reflected in the metric used.

Figure 8: Under the Scottish metric, there is a very strong relationship between weekly household income and fuel poverty

Percentage in each income band who are fuel poor in Scotland



Source: Scottish House Conditions Survey Main Findings, 2019 from the Scottish Government

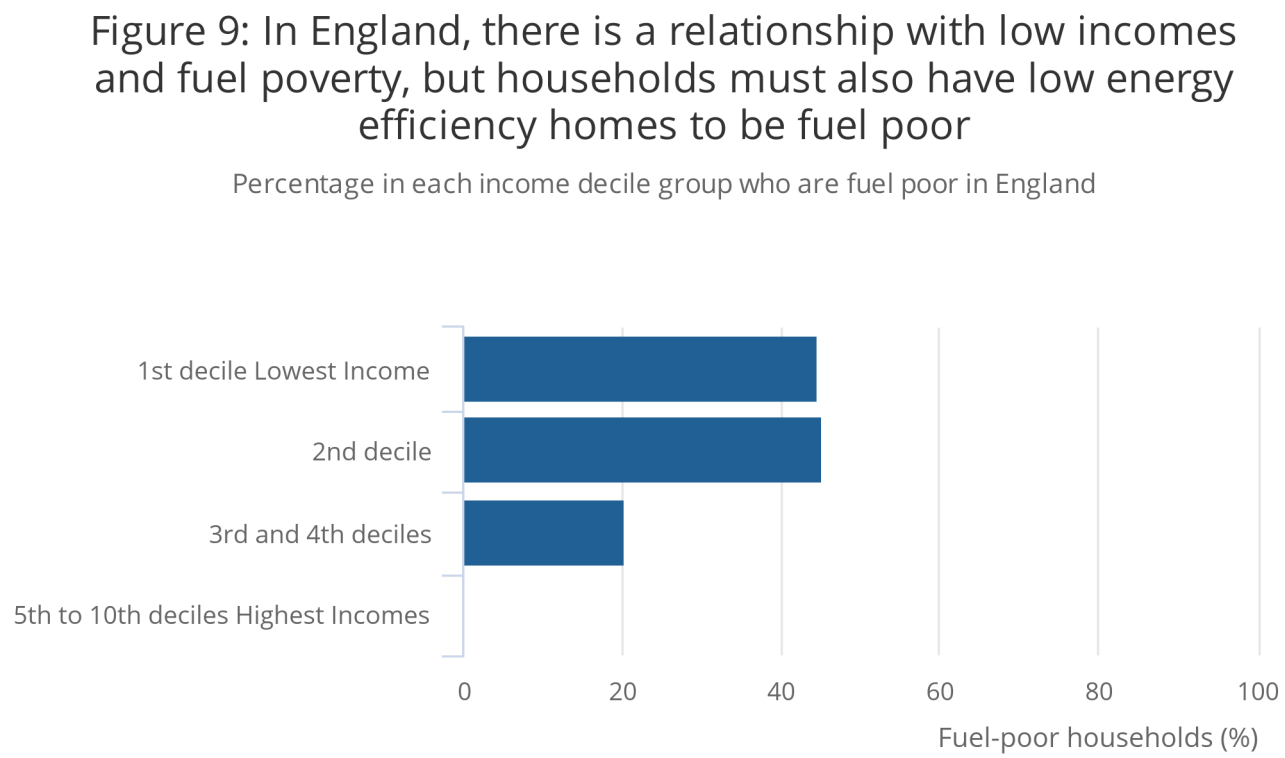
Notes:

1. Weekly household income groups £500 to £700 and over £700 are excluded because of low sample sizes.

The LILEE metric specifies that a fuel-poor household has both a low income and low energy efficiency in their home, so there may be low-income households whose homes have high energy efficiency so are not recognised as fuel poor. Progress against the statutory targets in England are tracked by looking at the number of low-income households whose homes are upgraded to an energy efficiency rating of at least band C (Figure 9).

Figure 9: In England, there is a relationship with low incomes and fuel poverty, but households must also have low energy efficiency homes to be fuel poor

Percentage in each income decile group who are fuel poor in England



Source: Annual fuel poverty statistics report 2023, 2022 data from the Department for Energy Security and Net Zero

Data used in this section

In this section, data have been shown on energy efficiency of the home, household income and energy prices as they are central to the four UK fuel poverty metrics. While fuel poverty estimates cannot be directly compared between countries, the different outputs do give us insight into how the metrics treat energy efficiency, income and energy prices.

Data are published on several characteristics of fuel-poor households, such as household tenure and age. However, as these are less central to the fuel poverty metrics it is more difficult to consider why differences may occur between the metrics and such comparisons could lead to misinterpretation.

6 . Glossary

The following provides explanations of specific terminology related to components of the fuel poverty metrics and the Housing Surveys. Explanations of these terminology are split into two sections:

- fuel poverty components
- Housing Surveys

Fuel poverty components

The following describes technical elements of the fuel poverty components, which are not used widely in other methodology.

BREDEM 2012

A fuel poverty specific version of the Building Research Establishment Domestic Energy Model (BREDEM) (PDF, 513KB) methodology is used to predict the energy requirements of a household. It uses information from the Housing Survey physical survey component, as well as the household's location and information about the occupants and their daily routine.

Fuel Poverty Energy Efficiency Rating

The Fuel Poverty Energy Efficiency Rating (FPEER) methodology is used by Department for Energy Security and Net Zero (DESNZ) for the purpose of producing fuel poverty estimates. It is derived from the Standard Assessment Procedure (SAP) rating for assessing energy performance of domestic properties, but includes policy interventions that directly affect household energy costs. The full methodology is set out in more detail in the Fuel Poverty Regulations and methodology for England.

Heating regimes

Heating regimes are set for each country outlining the target temperature, portion of the home heated, and the heating hours required for households to maintain. These requirements are then taken into consideration when calculating the energy requirement for homes. There are differences in the heating regime standards used across the UK.

Heating regimes in England and Northern Ireland

For households where members are out of the house during the typical working day, a "standard" heating regime is applied, where:

- homes need to be heated for 9 hours on weekdays and 16 hours on weekends
- the temperature needed is 21 degrees Celsius in the living area and 18 degrees Celsius in the rest of the home

For households where any members are at home in the morning or afternoon on a weekday, a "full" heating regime is applied where:

- homes will need to be heated for 16 hours on weekdays and weekends
- the temperature needed is 21 degrees Celsius in the primary living area and 18 degrees Celsius in the rest of the home

A further distinction is made for homes that are under-occupied, where it is assumed that only part of the home is heated. For full details on how occupancy is worked out, and further specifics on each heating regime, see the methodology handbook for fuel poverty estimation in England and the main report for the Northern Ireland Housing Conditions Survey (PDF, 3.13MB).

Heating regimes in Scotland

All heating regimes in Scotland require the heating of the whole home, regardless of whether all the rooms or bedrooms are occupied.

The standard heating regime in Scotland, when households have no vulnerable members or children aged 5 years or under is:

- the temperature needed is 21 degrees Celsius in the main living area and 18 degrees Celsius in the rest of the home
- 9 hours on weekdays and 16 hours on weekends

There are three enhanced heating regimes for Scotland.

Enhanced heating regime one sets the temperature of 23 degrees Celsius in the living room and 20 degrees Celsius in the rest of the home for 16 hours a day, when both the following criteria apply:

- the home is frequently occupied during the morning or afternoon when it is cold
- the household includes vulnerable household members (any member of the household is aged 75 years and over, has a long-term physical or mental health condition or illness, or is in receipt of care or disability related benefits).

Enhanced heating regime two sets the temperature of 23 degrees Celsius in the living room and 20 degrees Celsius in the rest of the home for 9 hours on weekdays and 16 hours a day, when:

- the home is not occupied during the morning or afternoon when it is cold
- the household includes vulnerable household members (any member of the household is aged 75 years and over, has a long-term physical or mental health condition or illness, or is in receipt of care or disability related benefits)

Enhanced heating regime three sets the temperature of 21 degrees Celsius in the living room and 18 degrees Celsius in the rest of the home for 16 hours a day, when:

- the home is frequently occupied during the morning or afternoon when it is cold
- the household member is aged 5 years or under

Full details of the heating regimes are set out in the Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019; the conditions for assigning these are further outlined in the Fuel Poverty (Enhanced Heating) (Scotland) Regulations 2020.

Heating regime in Wales

The standard heating regime for households who are out of the house during the working day, states that:

- homes need to be heated for 9 hours on weekdays and 16 hours on weekends
- the temperature needed is 21 degrees Celsius in the living room and 18 degrees Celsius in the rest of the home

For households where members of the home are older (a person aged 60 years and over) or disabled (a person living with a long-term limiting illness or who is disabled):

- homes need to be heated for 16 hours on weekdays and weekends
- the temperature needed is 23 degrees Celsius in the living room and 18 degrees Celsius in the rest of the home

Both these regimes assume that the house is fully occupied and requires heating throughout all rooms. Further standards are set in Wales, which cover homes that are under-occupied or fully occupied during the day, so assume that only part of the home is heated. For further information on all the heating regimes used in Wales and the criteria for assigning them, see the methodology report for the WHCS (PDF, 863KB).

Housing Surveys

A primary source of data used in fuel poverty estimates are each nation's Housing Survey, consisting of an interview component, where household occupants answer questions about their income sources, employment, patterns of daily activity, as well as a physical component taking information about the building construction, age, location, heating system installation and any energy efficiency measures installed.

English Housing Survey (EHS)

The English Housing Survey is an annual survey, commissioned by the Department for Levelling Up, Housing and Communities (DLUHC), involving both a household interview and a physical property inspection by a surveyor. The survey is taken randomly across England in a clustered manner, covering half of the country each year, and two consecutive years of survey data are used to calculate fuel poverty statistics.

The survey for 2020 to 2021 was impacted by coronavirus (COVID-19) in terms of household circumstances and survey methods; the survey was conducted using telephone interviews and external building surveys, with some modelling of internal changes to homes.

Northern Ireland Housing Conditions Survey (NIHCS)

Current fuel poverty estimates in Northern Ireland are modelled using data from the 2016 Northern Ireland Housing Conditions Survey, a national survey conducted on a stratified random disproportionate sampling of 3,000 dwellings (to ensure a representative inclusion of all types of housing stock), and includes a physical inspection and a household survey.

The most recent survey was in 2016, therefore additional steps are necessary to adjust these base data to account for changes in income, fuel costs and energy efficiency. Full details of source data adjustment can be found in the Northern Ireland Housing Executive's Estimates of Fuel Poverty in 2019 report (PDF, 131KB).

Scottish House Condition Survey (SHCS)

The Scottish House Condition Survey is an annual survey, undertaken as part of the larger Scottish Household Survey, with fieldwork running from January to December each year focusing on the circumstances, condition and energy efficiency of Scottish housing. The latest available SHCS survey results were published in 2020 using data collected in 2019, and include the results of 4,843 social interviews of households and 2,997 physical building surveys.

National Survey for Wales (NSW)

The National Survey for Wales is an annual interview survey of approximately 12,000 people, focusing on household characteristics such as income, housing costs and energy payment method, but does not include questions about the physical nature of homes.

Welsh Housing Conditions Survey (WHCS)

The Welsh Housing Conditions Survey is a national survey of housing circumstances, condition and energy efficiency of Welsh housing. It was most recently completed in 2017 to 2018, which included 2,249 full surveys of households and physical building characteristics.

Fuel poverty estimates are based on the latest available WHCS and NSW data. In 2021, estimates were modelled based on 2017 to 2018 WHCS data and uplifted to 2021, bringing them in line with inflation and household energy efficiency improvements.

7 . Data sources and quality

Housing Surveys

Fuel poverty estimates use national Housing Surveys as a primary data source on physical characteristics of the home and household characteristics. Details on the housing survey for each country are given in the Glossary.

Fuel prices

The main sources of fuel price data used within the fuel poverty estimates are:

- Quarterly Energy Prices (QEP) tables used for metered fuel prices in England, Scotland and Wales
- Sutherland Tables for liquid petroleum gas (LPG) and bottled gas prices in England and Wales, non-metered fuels for Northern Ireland, and LPG and solid fuel prices in Scotland
- Consumer Prices Index (CPI) for coal, heating oil and smokeless fuel prices for England, and used to uprate oil, coal/smokeless solid fuel, wood, E10/E24 tariff electricity and communal heat prices for Wales
- SAP 2012 prices for minor fuels (such as biofuels), communal heating, wood, E10 and E24 electricity tariffs for England, E10 and E24 tariff electricity and communal heat prices for Wales

In addition, the Department for Energy Security and Net Zero (DESNZ) produce average annual prices for gas, standard tariff and off-peak (economy 7) tariff electricity for direct debit, standard credit and pre-payment customers for Northern Ireland. For Scottish estimates, data from a bespoke survey of energy suppliers are used for electricity tariffs not included in Quarterly Energy Prices (QEP) tables (E10, E18 and E24). For Wales, base prices for heating oil, coal and smokeless fuel were obtained directly from DESNZ.

8 . Future developments

Although fuel poverty strategy and metrics are currently different across the UK, analysts across the Government Statistical Service (GSS) are working together to improve how these are communicated to users and can provide more value in informing current public policy and debate.

9 . Related links

Cost of living insights tool: Energy
Online tool | Updated weekly
This tool provides the latest data and trends about the cost of living. You can explore changes in energy prices and how this is affecting people.

Impact of increased cost of living on adults across Great Britain
Article | 20 February 2023
Analysis of the proportion of the population that are affected by an increase in their cost of living, and of the characteristics associated with financial vulnerability, using data from the Opinions and Lifestyle Survey.

Public opinions and social trends, Great Britain
Bulletin | 24 March 2023
Social insights on daily life and events, including actions and attitudes related to cost of living and rising energy prices, working arrangements and well-being from the Opinions and Lifestyle Survey.

How has discretionary spending been affected in recent winters?
Article | 21 February 2023
This article explores how consumer pressures and behaviours over the festive winter period have changed for discretionary spending in 2022 in comparison with previous winters.

Tracking the impact of winter pressures in Great Britain: 18 to 29 January 2023
Article | 27 February 2023
This article provides insights from our Winter Survey, examining how cost-of-living rises, and difficulty accessing NHS services are affecting people during the winter months.

Fuel poverty in the UK
Article | Last updated 24 March 2023
This research briefing sets out how fuel poverty varies across the UK, policies to address fuel poverty and stakeholder comments on the issue.

Local area data dashboard: fuel poverty
Dashboard | 17 January 2023
This data dashboard by the House of Commons library allows you to look at snapshot fuel poverty estimates at constituency level in England and local authority level in Scotland, Wales and Northern Ireland. The dashboard allows you to look within each nation, but not compare across because of the differences in metrics used. The most recent estimates available do not account for the recent increases in domestic energy prices, but there are plans to update this dashboard once new data become available.

10 . Cite this article

Office for National Statistics (ONS), released 28 March 2023, ONS website, article, How fuel poverty is measured in the UK: March 2023