Environmental *Change* Institute

Finding the fuel poor and framing better policy

August 2023

Contents

Acknowledgements

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The report and its recommendations are entirely our responsibility.

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Executive summary

The UK Government needs to make urgent decisions about whether and how to support more vulnerable energy users in the winter of 2023-24. The additional support provided in 2022-23 has been withdrawn, but prices continue to be very high, and in the absence of help, millions of households will struggle without adequate energy for heating, hot water, cooking and other vital services. This report uses data from smart-enabled prepayment meter customers to explore how the Government can best target support to those in greatest need, i.e. those in fuel poverty, and to describe the minimum level of support needed to prevent serious suffering this coming winter.

This report is based on household energy consumption and other data for 11,519 households with dual-fuel gas and electricity supplies, provided by the energy company Utilita. Using data from four years, 2019-20 to 2022-23, analysis has looked at how energy use, rates and duration of self-disconnection have varied with external temperature, price, dwelling and household characteristics, and how policies and targeted payments affected energy use and self-disconnection.

Households under pressure

The households in our sample differ from the UK population. They are younger than average, use considerably less energy (even before the era of high prices), live in smaller homes, and are more likely to be on the energy company's Priority Services Register, which can be an indicator of vulnerability. However, their homes are similarly efficient to the English average. We cannot identify which households are in fuel poverty, though self-disconnection data is a strong indicator of inadequate energy access – the issue at the heart of fuel poverty. In total, 63% of our sample households disconnected at least once a year over these four years. For the average household, there were five disconnection events a year, totalling 28 hours of disconnection.

Impact of increased prices on energy use and disconnections

The years 2019-20 and 2022-23 are used for comparison here because 2019-20 was pre-wholesale energy price rises, was not in the pandemic period and had similar winter temperatures to 2022-23.

- Annual gas use fell by 20%, while electricity use fell by 3%. This is a huge decrease in the key heating fuel in households that were already likely under-heated.
- Average annual energy expenditure rose from £1,160 to £2,130 per customer. The latter figure includes the £400 Energy Bill Support Scheme (EBSS) provided by the government, so the household's own costs increased by 50% to £1,730.
- The combined effect of increased expenditure and reduced consumption demonstrates the determination of these low-income households to achieve a minimum level of energy services. They have stretched the household budget to try and maintain their original, possibly low levels of warmth, hot water, lighting and appliance use – and failed.
- We calculated the price elasticity of demand for gas across all homes at -0.265, which means that a 10% increase in price leads to a reduction in gas use of 2.65%. For electricity it was lower, at -0.2.
- While the percentage of customers experiencing at least one self-disconnection from gas per year has not increased, for those who are disconnected, the period of disconnection has increased by more than one quarter.

- In 2022-23,

  gas disconnections lasted eight times longer than those for electricity.

  10% of households with the highest combined (gas and electricity) disconnections were without one or both fuels for 800 hours a year - over 2 hours a day.

- The highest levels of self-disconnection were found among young households, those in energy inefficient homes, people on the Priority Services Register, and where electricity is used for heating. The likelihood of self-disconnecting was lowest amongst pensioners.

Taken together, figures on energy use and self-disconnection demonstrate the considerable level of hardship and deprivation being suffered by many, and that fuel poverty has demonstrably worsened for the households in this sample.

Impact of cold temperatures on energy use and self-disconnections

Analysis of three periods of cold weather in the region with the largest sample showed that more homes disconnected from the gas meter during cold periods, compared to before or afterwards, and this happens despite the greater need for heating. Homes on the Priority Services Register are more strongly affected by periods of very cold weather, with up to 20% of them disconnected during cold events.

Finding households in extreme need

Using smart meter data has enabled us to find sub-sets of households who appear to be in extreme need:

- Around 7% of households with a gas connection are using electricity instead of gas for heating. These households scarcely use any energy for heating and are very likely the households facing the greatest hardship. These households are also more likely to be on the Priority Services Register.
- Considering all households in all years, 4.1% spend at least 240 hours disconnected per year, with at least four disconnections lasting 12 hours or more. Households in this group tend to be younger and are more likely to be on the Priority Services Register.

Impact of policy design on energy use and self-disconnection

- Our analysis looked at the impact of two policies: the Energy Bill Support Scheme (EBSS) and Cold Weather Payment scheme. EBSS payments were credited to electricity meters. For our sample, they halved the number of electricity disconnections, but made little or no difference to gas use and self-disconnections. The £400 was helpful, but not sufficient.
- Cold Weather Payments reduced the number and duration of gas disconnections after periods of very cold weather, but made no difference to energy use or disconnections while it was very cold. Worse than this, it was households receiving the Warm Home Discount – arguably some of the most vulnerable households – who had to endure the longest gas disconnections.

Policy recommendations for winter 2023-24

Our findings led us to two immediate recommendations for policy:

A new **Energy Cost Support Scheme** to provide financial support for households in fuel poverty, worth about £1,000 per household, between October 2023 and March 2024. This support – which would halve energy costs - could be delivered in one of two ways:

1. Either spread across six months, paid directly and automatically to energy meters or as discounts on standard credit bills. £1,000 works out at £5.50 per day through the winter. This money should be divided equally for dual-fuel customers: £500 each for gas and electricity accounts (but this method is not suited to legacy prepayment meter customers). Or,
2. Each eligible household should revert to the same gas and electricity tariff that applied when the energy cap for a typical household was £1,042, in October 2020. At these lower rates – half of the present cap - the household would effectively receive a £1,000 reduction. This is our preferred method.

We cannot use the existing fuel poverty definitions or means tested benefit routes to target this help as neither of them is sufficient to identify those in most need. For speed and simplicity, eligibility should be based on criteria already available to the energy suppliers.

All the following groups should be provided with the £1,000 support for winter 2023-24:

- Households eligible for the revised Warm Home Discount scheme (expected to be 2.8 million)
- Households with one or more prepayment meters (around 4.5 million)
- Households where electricity is the main metered fuel, but annual electricity consumption is below 4,200kWh (around 1 million)
- Households who are extra-vulnerable to loss of energy supply for medical reasons and are on the Priority Services Register (assumed to be about 1 million).

Although the total could be over 9 million households, in reality, there will be overlaps between these groups. The Government has already allocated £8 billion for the Energy Price Guarantee support this financial year that is now not going to be needed; this would cover payments for 8 million households.

Extreme Weather Payments of £6.50 a day triggered by Met Office forecasts of minimum temperatures of -4°C should replace the existing Cold Weather Payments. They would be paid in advance, daily, directly onto householders' energy accounts.

Longer-term policy and practice improvements

- Led by our data, we believe the English definition of fuel poverty considerably underestimates need. A better definition is needed.
- Based on the customer benefits of smart meters, we suggest further action to encourage households on a legacy prepayment meter to switch to a smart one.
- Being on the Priority Services Register does not protect households from high levels of self-disconnection. Its design and operation needs to be reviewed.

Next steps

The University of Oxford and Cambridge Architectural Research are hoping to discuss with decision makers how to refine the proposals in this report. We also look forward to hearing from those who interface with the fuel poor about their interpretation of the evidence provided, experiences and views on the best solutions. This is our final report, August 2023.

Introduction

As a result of global events, UK household gas and electricity prices were extremely high in the winter of 2022/23. The Government responded by subsidising prices for all households and targeting further additional support to some households, through 'Cost of Living' payments. Nevertheless, despite the consequent huge expenditure of public money, many people suffered and had to self-ration their use of energy. Prices for the coming winter, although lower than last year, will still be very high, and there is no ongoing commitment to universal price subsidies. Given this, how can the Government best target support to those in greatest need, i.e. those in fuel poverty, and what is the minimum level of support needed to prevent serious suffering this coming winter? This report uses smart meter data from households who prepay for their energy to help answer these questions.

This research is based on energy use data from a sample of Utilita dual-fuel customers on smart prepayment meters for both electricity and gas. The data was provided by Utilita and we are grateful to them for this generosity. This work follows Utilita's in-house report, 'Smart Energy Data for Fuel Poverty Avoidance', which calls for urgent action to alleviate fuel poverty.[1]

Households with prepayment meters are known to be a group where fuel poverty is highly concentrated[2]. Evidence of suffering among this group is likely to be a good indicator of the problems faced by many people coping with fuel poverty. Using energy consumption data from four years, up to 2022-23, this analysis examines how energy use and rates, and duration of self-disconnections, have varied with external temperature, price, and both dwelling and household characteristics. We have also explored how different policies and targeted payments affect energy use and disconnection – giving insights into how future policy should be designed. Findings from this particular group of energy users are used to inform policy for people facing fuel poverty in general.

The focus of this report is short term: to identify who, and how much help is needed by October 2023, ready for the winter heating season. However, resolving fuel poverty is a long-term issue, and this broader context is also touched on in the report.

The report starts with a discussion of the policy context, including existing support to households facing fuel poverty. Then we describe the data used for the analysis: what data was available, and unique characteristics of the energy supplier who provided it, Utilita. The report describes our sample, including how representative these households and dwellings are of all households and homes in England and Wales. It goes on to unpack the weather data we used for analyses.

Detailed analysis follows, including:

- annual energy consumption of these households
- households that appear to have switched from gas to electric heating
- households that use Economy 7 off-peak electricity
- summertime energy use
- annual energy bills
- self-disconnections (where the household does not top-up their meter and so they are temporarily disconnected)

[1] Utilita Energy - Countdown to Cold Report - June 2023.pdf - Google Drive

[2] Government figures for England and Wales 2022 show rates of fuel poverty are almost three times higher than those for paying by direct debit for both gas and electricity (gas – 27.2% ppm, 9.7% dd, electricity – 27.8% ppm, 10.5% dd) https://www.gov.uk/government/statistics/fuel-poverty-detailed-tables-2023-2022-data. But see later for critique of the definitional basis of these statistics.

- Cold Weather Payments and how to improve them
- Price-elasticity of demand

Then the report closes with a summary of the main findings and recommendations for policy. We are producing this report now because of the urgent need to provide financial support for the fuel poor and low-income households, generally, ready for the coming winter. By October, these millions of households need to know they will be able to stay healthy and relatively warm because they can manage the cost of their energy bills. The absence of Government plans and announcements means households have no certainty. And, administratively, there is a fast-diminishing opportunity – it takes time to introduce support or refund programmes. Therefore, the scope of this report is short-term, focusing on the upcoming winter and does not cover the environmental dimensions of tackling fuel poverty. This report is an urgent call for Government action and it gives proposals for the form that it should take.

Policy context

There is a long history of concern in the UK about households that cannot afford to pay for basic energy services: heating, hot water, cooking, lights and appliances. There have been many policy interventions aimed at reducing either the extent or depth of fuel poverty, by the UK Government in Westminster and, latterly, by the Scottish Government and the Welsh Assembly. There have also been multiple changes over the years in the way fuel poverty is measured.

This section gives a short snapshot of the policy landscape regarding households currently facing fuel poverty in England and Wales. The report as a whole is relevant for GB, there is also a separate short report which focuses on Scotland.

Increasing fuel poverty

Fuel poverty is a substantial social problem in the UK that has been exacerbated by the rise in fuel prices since October 2020. Even before the price rises, there were 3.16 million fuel poor households in England[3] according to the government's definition. The number facing fuel poverty in 2023 has not been quantified, but is certain to witness a substantial increase. Using the former English definition of fuel poverty – needing to spend over 10% of net income on energy for a decent level of energy services – a recent study[4] found that 65% of all UK households were fuel poor in April 2023. That is 18 million households – an unconscionable number. This report is not going to re-run arguments about the most appropriate definition of fuel poverty or attempt to provide a definitive number of fuel poor households. However, it does take the position that Government numbers for England and Wales are highly likely to be an underestimate (an argument supported by data presented in this report, discussed later).

As a phenomenon, fuel poverty results from a combination of income, the energy requirements and efficiencies of homes and heating equipment, and the cost of energy. These characteristics can come together in multiple ways to result in fuel poverty – so a single older person with a moderate income who owns a large, poorly insulated home may be in fuel poverty to the same degree as a low-income family renting a moderately efficient flat. Higher energy prices increase levels of fuel poverty

[3] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1057272/2020_fuel_poverty_detailed_tables_under_the_Low_Income_Low_Energy_Efficiency__LILEE__indicator__ODS_.ods

[4] Who are the fuel poor? - The York Policy Engine, University of York

across the population. For individuals, the risk of fuel poverty is increased by paying high prices per unit of energy, or only having access to higher-priced heating fuels.

Financial support for the fuel poor

There are currently four main schemes that provide additional income for the fuel poor, summarised in Table 1, with more details in the Glossary. Most are based on means-tested benefits (MTBs)[5]. MTBs are the main 'passport' by which the government provides income support to low-income people.

Table 1: Summary of ongoing energy-related income support measures

Name of scheme	Countries	Amount	Eligibility
Cold Weather Payment	England, Wales and Northern Ireland	£25 per week	People on certain MTBs, paid after a week of weather below 0°C
Winter Heating Payment	Scotland	£50 annually	People on certain MTBs
Warm Home Discount	Great Britain	£150 annually in 2022	People on certain MTBs, 2.2 million in 2022
Winter Fuel Payments	Whole UK	£150-300 annually	All pensioners, 11.3 million in GB, 2021-22

These existing schemes may require the household to apply, or the payments may be automatic. For the former, there are always a significant number of fuel poor who do not take up the support on offer, as happened with households given the EBSS through fuel vouchers.[6] The money can be paid into the customer's bank or building society account, in which case it becomes part of the weekly budget and only a small proportion gets spent on fuel, perhaps 10%.

There are numerous MTB categories in the UK, with approximately 9 million households claiming one or more of these benefits. Many benefits are under-claimed, so the real numbers of those needing help are higher. To simplify, MTBs can be thought of in three main groups:

- Based mainly on income, e.g. 4.9 million receiving Universal Credit;
- Based on income and demographics, e.g. 1.2 million receiving Pension Credit;
- Focused on other criteria, including disability, long-term sickness, or being a care-provider, where the benefits are not tied solely to basic income - 2.9 million.

The UK Government has made additional 'Cost of Living' payments to around 8 million households receiving MTBs and all pensioners from 2022[7], paid to their bank or building society. These are essential to help with the daily cost of food, travel, clothing, and housing. They are not considered in this report, because we focus on fuel poverty and direct assistance with energy expenditures[8].

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[5] The following details usually refer to England and Wales, as Scotland and Northern Ireland, and sometimes Wales, have their own schemes.

[6] https://www.which.co.uk/news/article/a-third-of-energy-vouchers-sent-to-prepayment-customers-havent-been-claimed-heres-how-to-get-your-money-a0qDh6w9BDmt

[7] https://www.gov.uk/guidance/cost-of-living-payment-2022

[8] This was the approach taken by the National Audit Office: NAO (2023) Energy Bills Support. London: NAO. https://www.nao.org.uk/reports/energy-bills-support-schemes/

Difficulties of targeting benefits to the fuel poor

The difficulties of targeting support for the fuel poor – whether extra income, Cold Weather Payments or home improvement measures – have long been acknowledged. There is no definition[9] which enables an address-specific identification of the fuel poor either on the basis of income, means-tested benefits, or the energy efficiency of homes.

Based on an unusually tough definition of fuel poverty – needing to spend more than 20% of the household's net income on energy – analysis by the University of York has shown that 2.6 million fuel poor households do not receive any support with Cost of Living payments[10]. Using MTB as a passport to help is leaving large numbers of fuel poor households without additional support. Further, there is probably a significant number of households in receipt of MTB who are not actually fuel poor.

Rising energy prices

In October 2020, energy expenditures for typical UK households were capped at £1,042 a year – lower than the year before. Energy prices were falling in absolute terms. By June 2023, the cap was £2,500, held at this level, below the market price of £3,280, by the Government's Energy Price Guarantee (EPG).[11] From 1 July 2023, the level of the cap decreased to £2,074 for three months until the end of September 2023. The next level of the cap is due to be announced on 25 August. It is anticipated there will no longer be a need for the EPG.

In 2022-23, with the energy prices for the typical household capped at £2,500, the government provided a further £400 to every household in the UK, through monthly payments direct to their fuel bills from October 2022 to March 2023.

Although the fall in energy expenditures is welcome, the energy cap is still effectively double the amount it was less than three years ago in October 2020. The predictions of energy analysts, such as Cornwall Insight, are that UK energy prices will stay at about the present, relatively high, rate until at least 2030.[12]

Fuel poverty and prepayment meter customers

More than 4 million UK households have one or more prepayment meters. In 2023, Government data[13] shows there were 4.14 million prepayment electricity meters in England, Wales and Scotland, of which 2.2 million were smart, and 1.94 million traditional or legacy meters. Analysis based on Ofgem figures, suggests there were 3.27 million gas prepayment meters at the end of 2022[14]. Elsewhere in the report we round this number up to 4.5 million households with at least one prepayment meter.

Prepayment meters have traditionally been a useful way to budget and control expenditure, or to pay back a debt to the energy company while remaining on supply. However, the pay-as-you-go

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9 Different definitions of fuel poverty in operation in the UK and devolved administrations complicate the situation further.

10 Who are the fuel poor? - The York Policy Engine, University of York

11 Customers to pay less for energy bills from summer | Ofgem

12 Energy prices to remain significantly above average up to 2030 and beyond - Cornwall Insight (cornwall-insight.com)

13 https://www.gov.uk/government/publications/energy-bills-support-scheme-payments-made-by-electricity-suppliers-to-customers

14 https://www.uswitch.com/media-centre/2022/10/prepayment-meters/

method means that households experience significant seasonal variations in energy expenditure, especially for gas, the main heating fuel, which can be difficult to manage.

In the past, the price cap methodology saw prepayment customers paying slightly more than those paying for energy by direct debit (the lowest priced method), but from 1 July 2023, the Government has guaranteed that both price caps will be equalised.[15]

It remains the case that households with prepayment meters have lower than average incomes and are at higher risk of fuel poverty than the general population. Utilita's own research of the UK's prepayment households revealed that 55% are in receipt of a means-tested benefit.[16]

The much-criticised practices of British Gas in winter 2022-23 – installing old-style prepayment meters in vulnerable households – has led to a moratorium on new installations for particular customer groups and a new Supplier Code of Practice, overseen by Ofgem.[17] However, for fuel poor and low-income households, a return to standard credit energy payment methods and the risks of debt are not palatable either.

Longer term solutions to fuel poverty

The best long-term solution to fuel poverty is to ensure that those on a low-income live in homes where they can afford adequate heating and other energy services, such as hot water, lighting, and refrigeration. This requires capital investment to improve the energy efficiency of properties and equipment, so that household energy needs match their available income. These improvements are specific to the dwelling and household, and there are supply-side constraints on energy efficiency retrofit work. Therefore, upgrades are both slow and expensive to deliver: years and decades, rather than weeks and months. There is some Government-mandated investment in the energy efficiency of fuel poor homes, for instance through the Energy Company Obligation Scheme (ECO4), but this is too small to have much impact, and households are often not eligible unless more measures can be introduced at the same time. Similarly, legislation requiring private landlords to upgrade the energy efficiency of their homes will be difficult to enforce and slow to make a difference. Unfortunately therefore, improved energy efficiency is not a short-term solution to the present high levels of fuel poverty. Too many people are suffering and need immediate help in the form of income support and/or lower energy prices.

Utilita data analysis

The data used in this report was provided by the energy supplier Utilita. This section of the report describes the data and provides information about Utilita's tariffs. It also details the weather data used in analysis, gives breakdowns of household characteristics, and lays out the households' energy consumption from 2019 to 2023.

About the dataset

Utilita provided a random sample of prepayment customers, intended to be representative, but stratified to have a minimum of at least 100 households in each Energy Performance Certificate

[15] https://www.gov.uk/government/publications/energy-bills-support/energy-bills-support-factsheet-8-september-2022
[16] Utilita's 'Suffering in Silence - Smart PAYG alleviating fuel poverty' Report, Nov 2022
[17] https://www.ofgem.gov.uk/publications/energy-suppliers-sign-new-code-practice-involuntary-prepayment-installations

(EPC)[18] grade from B to G, and each customer age band, and receiving the Warm Home Discount, and being on the Priority Services Register (PSR). Stratifying by EPC grade means that the sample is restricted only to homes with EPCs. This means the sample is biased towards dwellings that have changed hands since 2007/08, when EPCs become compulsory at the point of sale or for a new rental agreement.[19] We examined how this affected the age composition of the sample compared to all Utilita customers, and found that younger customers (18-40 years old) are over-represented, with under-representation of older customers - especially those over 65. Nevertheless, even customers over 65 were still included in the sample. There may also be a skew towards more energy-efficient properties – again, because re-letting or purchasing a property is often a trigger to carry out maintenance and/or improve energy efficiency.

All households in the sample are dual fuel (gas and electricity) customers, over the period from January 2019 to May 2023. The data includes:

- consumption of electricity and gas for each day, split into night-time (11pm-6am) and day-time
- how much credit there is on each meter at the start of the day, with the value and type of top-ups each day (these could be payments by the household or interest-free loans from Utilita)
- self-disconnection events (when there is no energy supply because credit has run out): time and duration of the self-disconnection in minutes
- The name of the tariff for gas and electricity (prices were provided separately)
- Customer data - including a flag for being on the PSR[20], whether they receive the Warm Home Discount[21], and the age band of the customer (if known)
- Grid supply point, used to allocate customers to regions and hence weather data
- EPC data for almost all homes (97% of homes for at least some of the analysis period) including total floor area, property type (e.g. house or flat) and house type (e.g. terrace, detached, etc). It also includes estimated annual cost for heating and hot water and whether they have solar photovoltaics (PV) or solar hot water.

Overall, there is anonymised data for 28,728 customers. However, we need at least a whole winter season of data (October to March) to be able to proceed with analysis during the heating season. This reduces the number to 14,406 available for analysis.

There are also some customers where energy use data was not provided, probably due to data sharing permissions, and there are also some customers where there are too many gaps in the

[18] Energy Performance Certificates are a critical plank in household energy policy in the UK, and they are used to evaluate the energy- and carbon-efficiency of dwellings on a scale from A to G. By law, every dwelling that is marketed for sale or rent must have an EPC. At present, only a tiny fraction of UK homes (3% in England, according to the English Housing Survey) are A-rated.

[19] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/988980/Regulatory_and_administrative_amendments_made_since_the_implementation_of_the_2007_regulations.pdf

[20] Priority Services Register is a support service whose purpose is to ensure extra help is available to people in vulnerable situations. See Glossary for more details.

[21] The WHD is a one-off payment paid directly to the electricity bill of eligible households (those receiving the Guarantee Credit element of Pension Credit, and other households on low incomes but with high energy expenditures). Just over 2 million households in GB receive the WHD, mainly elderly people and in 2022/23 it was worth £150.

meter data. We fill holes with zero usage if there are fewer than 50 days or less than 10% of days without data for either meter. If more than 10% is missing, or more than 50 days, we exclude those homes. Sometimes there is data on credit and payments, but not always. This reduces the number of households for analysis to 11,519, but covers 23,038 individual energy meters (two per household).

Of these, there were 9,800 customers in the first winter season, 9,900 in the second, 9,300 in the third, and 8,800 in the last. 7,600 are available in all four heating seasons.

We do not know income levels, how many people live in each home, or if there are children or people with disabilities there.

Utilita tariffs and services

Utilita is the UK's eighth largest domestic energy supplier and specialises in offering a smart-enabled prepayment service to 720,000 of its 760,000 customers. It allows more convenient, remote means of paying than via a traditional prepayment meter and Utilita can access considerable data about the energy use of their customers via the smart meter.

Utilita's smart prepay customers can top up their meters in various ways:

1. They can pay at a local store, like traditional prepay customers
2. They can pay through an app on their phone, on the Utilita website or by phoning Utilita (most popular)
3. They can take advantage of self-serve interest-free 'Power Up' loans

In common with all prepayment energy suppliers, Utilita provides support to its customers as mandated by the energy regulator, but also goes further to help households avoid unwanted self-disconnections. This includes a pricing structure which eliminates standing charges and provision of easily accessible loans as well as specialist finance management support, benefits checks and an extra care team for the most vulnerable.

There are grace periods at weekends and afternoons/overnight when customers cannot self-disconnect. This is called Friendly Credit and is an obligation for all suppliers, but the protected period varies between suppliers. Utilita's Friendly Credit hours are from 2pm to 10am the next day on weekdays and all day on Saturday and Sunday, leaving a short 4-hour day-time period of time when households could experience self-disconnection.

Vulnerable Utilita customers on Utilita's 'Do Not Off Supply' list have additional protection in that if they do self-disconnect they get an urgent phone call from the Extra Care Team. These customers are supply-dependent – e.g. dependent on electricity to power things like stair lifts, bed hoists, medical refrigeration and telecare lines. These customers will have been offered a credit tariff, which would have been declined, mainly out of fear of debt.

Utilita is unique in the way that standing (daily) charges are applied. For both gas and electricity, the per day charges are rolled into the first one or two units consumed each day. As of April 2023, the extra charge for these units totalled 56p/day for electricity, 55p/day for Economy 7 or 36p/day for gas. Rolling the charge into the consumed units means that if no units are used, the daily charge is waived. This is very helpful for customers that are away for a period, for any reason. As long as they turn everything off before they go, they will not be charged at all for those days. The system also benefits customers that only use gas for heating: if they turn off the heating or let the gas meter run to zero at the end of the heating season, then there are no charges until they start using gas again the following heating season.

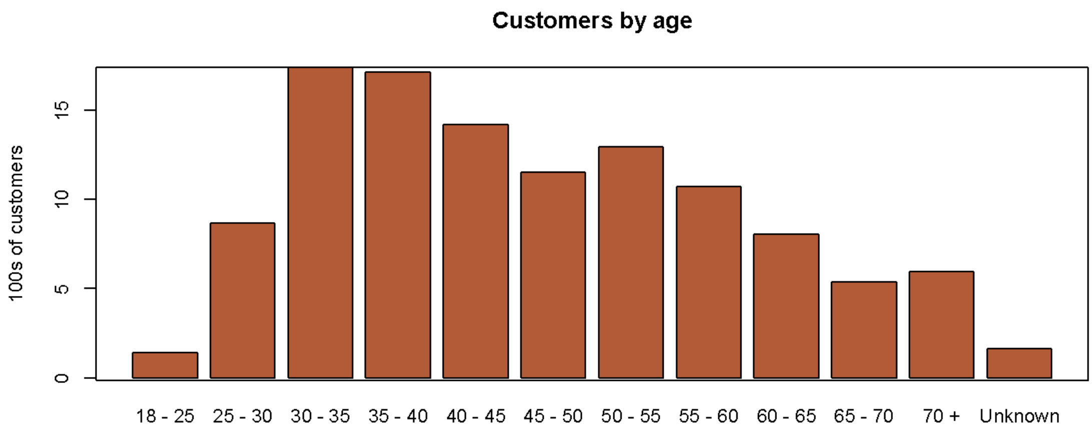
Finally, the My Utilita App includes a facility for self-service ‘Power Up’ loans. By pressing a few buttons in the app, the customer can immediately obtain a loan of up to £100 across both meters. The customer also chooses the rate of payback, with a minimum of 5% of future top-up payments.

If either Power Up loans or Friendly Credit are triggered, customers see credit on their meter, and also ‘meter debt’ on the app, which they have to repay, at the aforementioned rates.[22]

Customer attributes

Charts 1 to 3 below and Tables 2 to 4, which follow, describe attributes of the 11,519 homes (regardless of which years there is data for) after data-cleansing. Chart 1 shows that this customer sample is younger than average for energy customers nationally. The age profile means that these households are likely to contain more children than an average cohort. It is worth noting that families with children are one of the major fuel poor groups to be excluded from help by reliance on means tested benefits (MTB)[23].

Chart 1: Breakdown of customers by age



The size of home, in m^2, is available for almost all of the homes, assuming it has not changed during the period of analysis. The mean and median are both 74 m^2. This is significantly smaller than the mean size across all dwellings in England (97m^2), but still larger than the mean size for social housing (67m^2)[24]. Chart 2 shows a histogram of dwelling sizes.

[22] https://utilita.co.uk/my-utilita/faqs

[23] Who are the fuel poor? - The York Policy Engine, University of York

[24] DLUHC (2023) 2021-22 EHS Headline Report Section 2 Stock Annex Tables. London: DLUHC. https://www.gov.uk/government/statistics/english-housing-survey-2021-to-2022-headline-report

Chart 2: Breakdown of customers by size of home

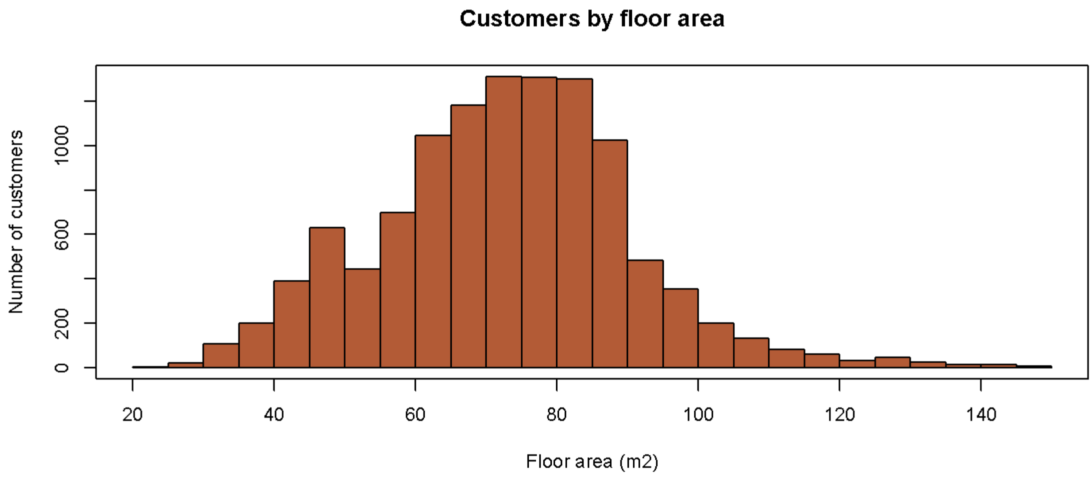


Table 2 below shows the proportions of homes by EPC grade, for homes where the EPC is known. We include the first and last years' grade as EPC ratings can change from one year to the next: roughly 11% of homes changed rating over the period. For comparison, the English Housing Survey for 2021/22 reports 47% A-C grades and 10% E-G grades. In this population the grades are slightly more extreme, with slightly more at both ends of the range (49% A-C, and 10.4% E-G in 2022/23). Chart 3 shows the same data over four years, with the specific number of cases rather than percentages: there is a surprisingly large drop in the F- or G-rated properties in 2022/23, but no increase in those rated A/B.

Table 2: Number of homes and percentage by EPC grade (where known)

	Number of cases	A/B	C	D	E	F/G
2019/20	10,260	3.9	41.2	40.8	11.8	2.1
2022/23	11,100	3.3	45.8	40.6	9.3	1.1

Chart 3: EPC ratings for this sample of homes over time: 2019 to 2023

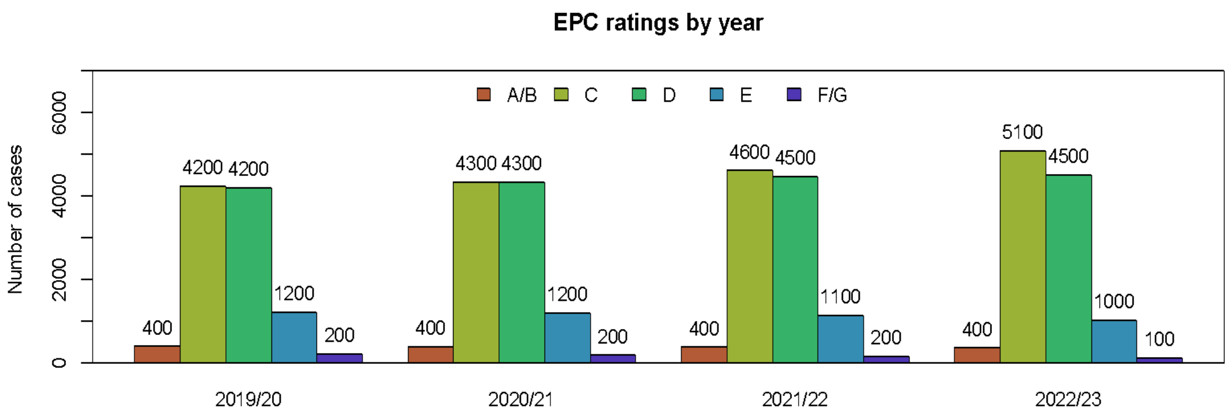


Table 3: Customer social indicators and other static indicators (11,500 homes)

Customer characteristic	Percentage of customers
Priority Services Register (PSR)	34%
Receiving Warm Homes Discount	29%
Smart Energy tariff (gas and electricity)	97.6%
Smart Energy Economy 7**	2.3%

*'Smart Energy' is what Utilita calls its smart prepay tariff.
** Since the customers are all dual fuel, with gas and electricity supplied (though some do not actually use gas), the low number of Economy 7 customers is not surprising.

Table 4: Customers by region (11,500 homes)

Region	Number	%	Region	Number	%
North West	2,635	23%	South	659	6%
Yorkshire	1,731	15%	Western	593	5%
North East	1,613	14%	South West	445	4%
South East	1,545	13%	Eastern	298	3%
Midlands West	1,160	10%	East Coast	161	1%
Midlands East	670	6%	Other	9	0%

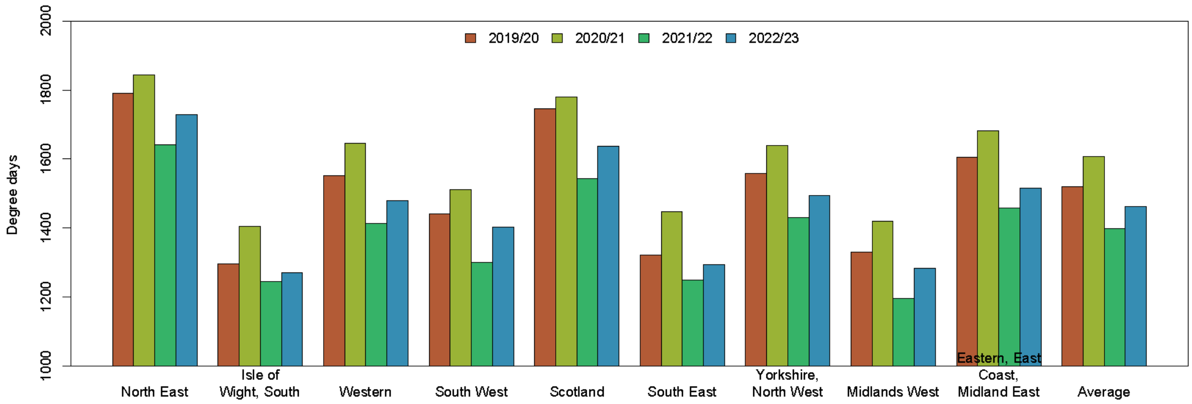
Note from Table 4 that the sample is not representative of the populations in each region: the North of England is over-represented compared to the number of homes there, while the South and Scotland are strongly under-represented. However, this sample may be representative of the geographic distribution of Utilita customers.

Weather

Utilita's 13 energy-supply regions map onto nine weather regions.[25] Chart 4 below summarises the weather for each region, in terms of heating degree days: a measure of the total heating requirement over the year. In summary, 2021/22 was the mildest heating season (with fewest degree days), followed by 2022/23, then 2019/20, and 2020/21 was the coldest heating season. Naturally, this makes a considerable difference to the need for energy for heating. Note also that in all years it was considerably colder (i.e. more degree days) in the North-East and Scotland than the Midlands and the South of the country.

[25] Note that GB energy statistics use more weather stations (17) for weather-corrections and degree day calculations:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/675493/Temperature_Stations.pdf

Chart 4: Degree days for each heating season in each of nine regions



Unfortunately, the regions are large and grid supply points can be far away from the actual houses. This means that the weather for individual homes can be rather different from the weather region associated with them. Fortunately, the trends between regions are similar. Table 5 below summarises the mean degree days and temperature for each heating season – the weighted average across all regions (weighted by population in the Utilita sample).

Table 5: Average Degree Days and external temperature for the four heating seasons

Season	Mean degree days	Mean winter temperature (°C)
2019/20	1520	7.0
2020/21	1610	6.5
2021/22	1400	7.7
2022/23	1460	7.3

Annual energy consumption

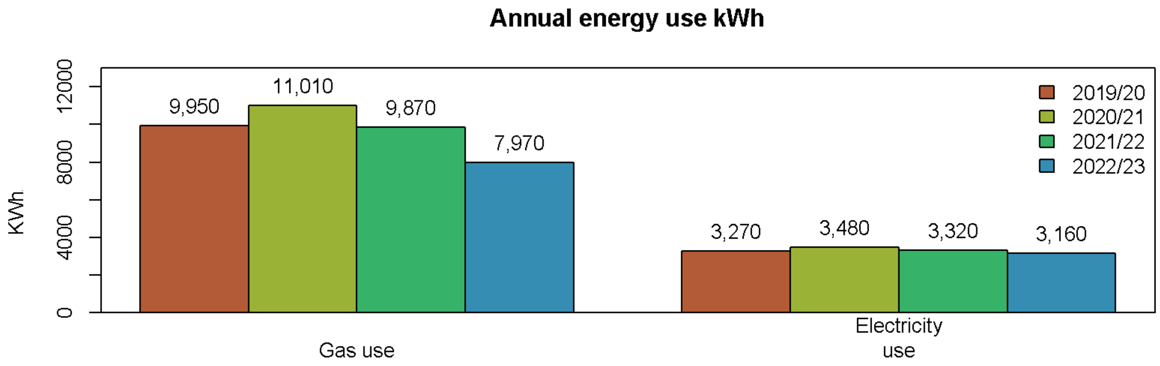
Chart 5 below shows how average daily consumption (for the year May through April) across the sample changed from 2019 to 2023. Both gas and electricity use increased from 2019/20 to 2020/21 (partly because it was colder), then both contracted in each of the two following years (which were milder). In 2022/23, gas use was more than 20% lower than 2019/20, while electricity use was just 3% lower.

The first heating season included roughly one week of lockdown because of COVID-19, while there were much longer periods of lockdown in 2020/21: seven months, including four months during the heating season.[26] Inevitably, this meant most people spent more time at home, particularly working age adults and school-children. This almost certainly increased household energy use in 2020/2021 – possibly as much as 6.6% for electricity and 4.1% for gas.[27]

[26] There were three lock-downs in total (March-June 2020, November 2020, January- March 2021).

[27] D Mehlig et al (2021) The impact of the UK's COVID-19 lockdowns on energy demand and emissions. Environmental Research Letters 16(5).

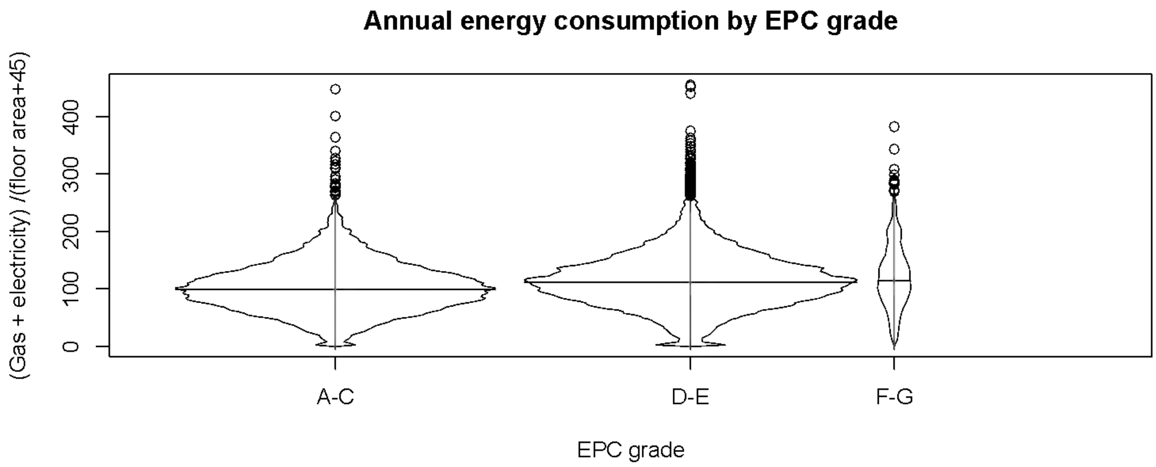
Chart 5: Mean annual gas and electricity consumption per home (May through to April, sample sizes for the seasons vary from 7,700 to 8,500)



Details of distributions around the mean are presented later (Chart 13).

Chart 6 below shows the mean annual gas and electricity consumption, summed together and broken down by EPC grade. The widths of the violin plots indicate the distribution of homes by grade and total energy use. Energy consumption is normalised by floor area using the same method as the EPC (divide by floor area in m^2 plus $45m^2$). There is only limited variation between the different EPC grades. Median energy use for A-C groups is 99, D-E is 110 and F-G is 114 kWh/m^2, indicating that the EPC rating of a home is not as strong an indicator of energy consumption as usually assumed.

Chart 6: Mean annual energy consumption by EPC grade (30,100 cases: 9,500 unique homes)



Energy consumption during the heating season

Chart 7 below shows the mean daily energy use for all homes by year, during the heating season – defined here as from October to March – by fuel. The highest use was in 2020/21, as would be expected as it was the coldest (and very likely also affected by COVID lockdowns, see above), but in 2022/23 energy use was reduced – even though this year was colder than the year before – at least partly as a result of higher energy prices (Table 6).

This is very likely a form of "self-rationing", where customers deliberately limit their energy use to make their credit last longer and/or to save money for other goods or services.

Chart 7: Mean daily energy use in the heating season per household - October to March (all homes and all heating types; 36,900 cases comprising 10,900 unique homes)

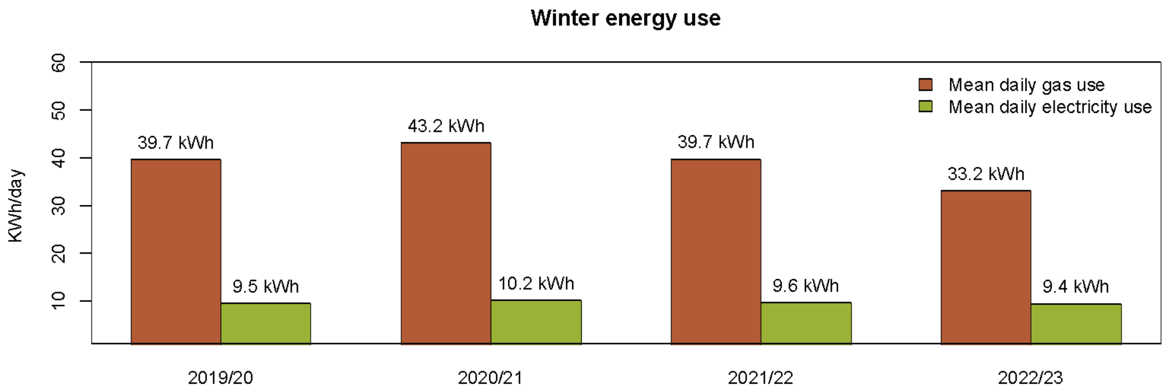


Table 6: Ofgem's annual energy costs from 2020 to 2023, per typical household

Heating season	Price cap, £ (typical total energy costs per year)	Government Bills Guarantee - typical costs, £	Effective annual bill, £	Normalised to 2019
2019/20	1179		1179	1
2020/21	1042		1042	0.883
2021/22	1277		1277	1.225
2022/23	3549	2500	2500	1.957

Source: https://heatable.co.uk/boiler-advice/history-of-ofgems-energy-price-cap

For analysis of price-elasticity of energy demand we used costs based on Utilita tariffs and Utilita customer typical consumption, see Table 14.

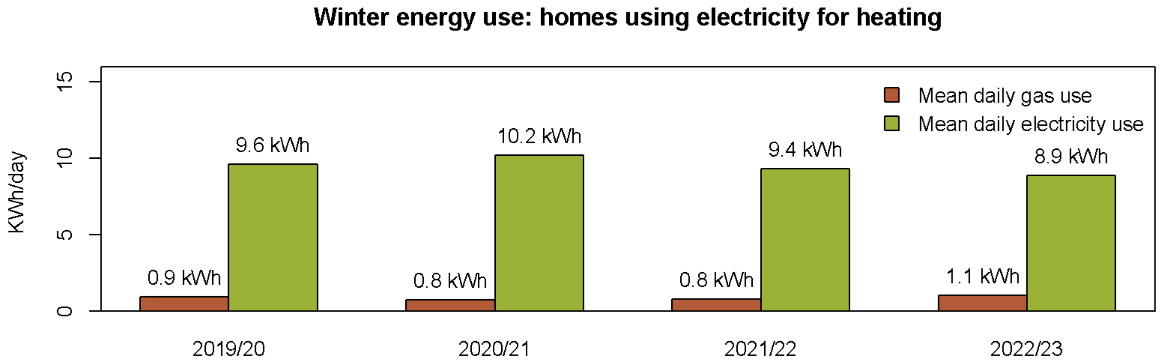
Fuel used for heating

All households in the sample had both electricity and gas meters: there were no properties in the sample that were solely electric. Not all homes that have a gas connection actually use it for heating, some appear to have switched to electricity for heating. We classified homes as switching to electricity for heating if they used more electricity than gas, and if electricity use correlated more closely than gas to weather. Chart 8 shows the same data as Chart 7 but only for homes we estimate are switching to electricity for heating. The striking feature here is how little gas is used in all years.

It is likely that some of these homes were actually vacant. It is not possible to know for certain, but it is very likely that homes with very low energy use, even when there is credit on the meter, are vacant. Based on this criterion, we estimate that 8-15% of these homes could be vacant or mostly vacant (see Appendix 1 for more information). Even if all 15% were vacant, the average gas and energy use among non-vacant homes (which would be somewhat higher than figures here) would still be very low. The proportion of all homes that are vacant (using similar criteria) is much lower: between 2.0% and 2.4%. However, the proportion is highest for both categories in the 2022/3 year, which is hard to explain. We believe these estimates are likely to be higher than the true value.

It is also possible that some of the homes not using gas for heating were supplementing electric heating using another source, such as a wood stove or open fire. However, our criteria for determining that they were using electricity includes some correlation between electricity use and heating need (i.e. external temperature). This suggests that electricity is used at least sometimes for heating. It is very unlikely that these homes use oil, because hardly any homes with a gas supply have an oil tank and the option of using oil-fired heating.

Chart 8: Mean energy use in the heating season (homes using only electricity for heating, about 6% of homes). The sample size for different seasons varies from 560 to 610.



The volume of gas used is very small – probably for just hot water and possibly cooking. The trend in electricity use is similar but less pronounced than for electricity used in gas-heated homes above (most of those in Chart 7). This is very likely a form of "self-rationing", where customers deliberately limit their energy use to make their credit last longer and/or to save money for other goods or services.

The power they are using for electric heating is minimal, and these households appear to be using less electricity for other purposes than homes using gas for heating, possibly because they are smaller. Across all years, the mean electricity use for homes using gas heating is 9.6 kWh/day and for homes using electric heating this is 9.5 kWh/day. This suggests these homes are under-heating, probably heating only one or two rooms, and for only part of the day. (It is possible that a handful of them are heating using alternative fuels – open fires, wood stoves or oil, but this is unlikely: if they could afford these they would be unlikely to have prepay meters. Similarly, less than 1% of UK homes have district heating[28], so they are very unlikely to have this either.)

They are unlikely to be heating their homes in the most economical way, since these homes are not using off-peak electricity for heating, and standard-rate electricity is more than three times the cost of gas per kWh, and simple resistance heating is only about 20% more efficient than gas.

These households really are using tiny amounts of energy – unbelievably, even less electricity per day than the average for all homes in Chart 7 above in 2021/22 and 2022/23, even though the majority of those homes have gas heating. The households switching to electricity for heating are very likely those facing the greatest hardship.

Homes switching to electricity for heating are:

- Slightly smaller – mean 71m^2 compared to 74m^2 for other homes
- More likely to be flats – 25% compared to 20% for other homes in the sample
- Less likely to be energy efficient – 3.2% rated F or G, compared to 1.5% for other homes

[28] https://switch2.co.uk/resources/guide-to-district-heating/

- More likely to have residents on the PSR register – 41% compared to 35% for other homes
- More likely to have residents over 65 (12% vs, 10%) or under 35 (25% vs. 23%)

The proportion of homes using electricity for heating varies only a little from year to year. The least was in 2020/21 (6.0%, 567 households) and the highest was in 2022/23, when prices were highest, at 6.9% (594 households).

Some of the homes with a gas supply also have Economy 7 electricity tariffs, which are intended for dwellings with storage heaters, benefitting from cheaper night-time prices, but more expensive during the day. Only 4% of cases (98 cases, 39 unique homes) using electricity for heating are on the Economy 7 tariff. Only four (11%) of these homes use electricity for heating – the others all use gas. Both groups may be paying more than they need to for electricity, although the 11% on Economy 7, may be using off-peak electricity for water heating. There are only 9 out of 268 households where the night-time electricity consumption is greater than daytime. The rest would be better off on the standard tariff.

Table 7: Proportion of homes on Economy 7 or Standard tariffs, and using different fuels for heating

	E7 tariff	**Standard tariff**	**Proportion of homes using electric heating on E7**
Heating with gas	2.1%	91.6%	
Heating with electricity	0.3%	6.0%	4.2%
Proportion of E7 customers heating with electricity	11%		

Summer time energy use

Energy use in summer is a good indicator of how much energy is used for purposes other than space heating. Chart 9 below shows how much energy is being used in summer, where summer time is defined as from June to August. The households consume approximately the same amount of gas for hot water and cooking as they do electricity for lights and all appliances in summer, measured in kWh. (It is possible some gas is used for space heating, especially in the north of England). Electricity costs are also much higher, obviously (currently around 10.1p/kWh for gas and 30.6p/kWh for Utilita customers). Note also that for the whole year (Chart 5, earlier) gas use is two or three times higher than electricity, because of far higher average gas use in winter. There are two possible explanations: either a) households are not able to reduce non-heating energy use, or b) they are able to afford the energy they use in summer more easily. In reality, it is likely that a) applies to some households, and b) applies to others.

Chart 9: Mean gas and electricity use per home per day in summer only (39,100 cases, 11,400 unique homes).

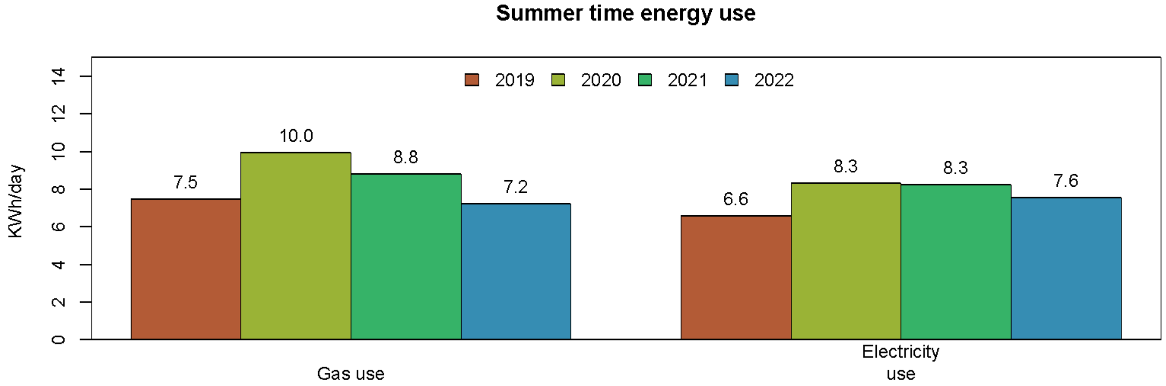


Chart 10 below shows average gas use in summer for households with and without the Warm-Homes Discount (a payment of £150 in winter to households receiving certain means-tested benefits). It shows that people receiving this payment tend to use more gas than other households in summer – possibly because they spend more time at home (they are more likely not to be working). However, the pattern of increased use in the summer of 2020 (when occupancy was higher due to COVID), and lower use in 2019 and 2022, holds for households both receiving and not receiving the payment.

Chart 10: Mean gas use per home per day in summer only – households with and without the Warm Home Discount

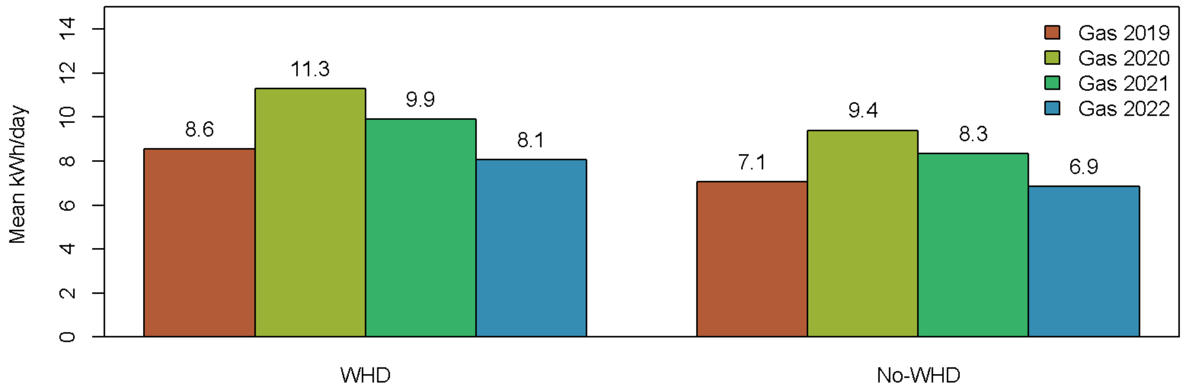
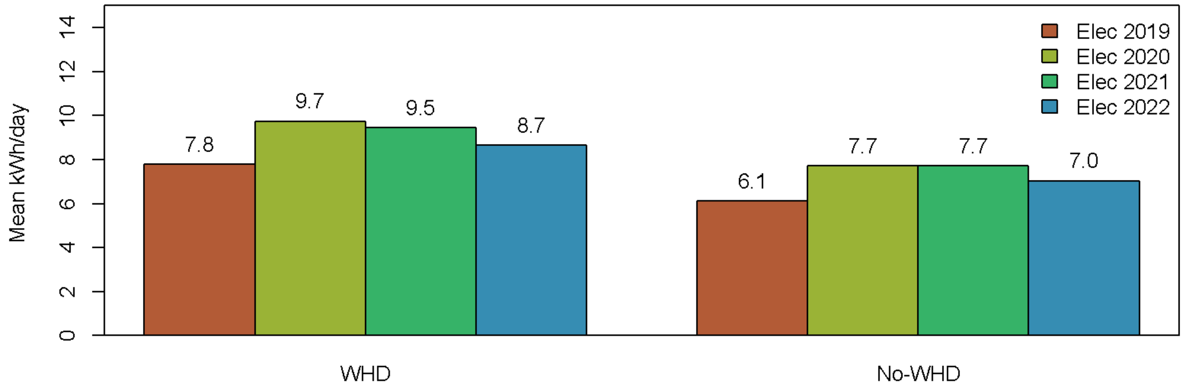


Chart 11 below shows the equivalent figures for electricity use. Again, households receiving the Warm Home Discount use more electricity in summer, on average. The pattern of consumption is again similar between WHD and non-WHD households, and it is also similar to the pattern of gas use over the four years, with increased consumption in 2020 and reduced consumption in 2022, although the yearly differences are smaller.

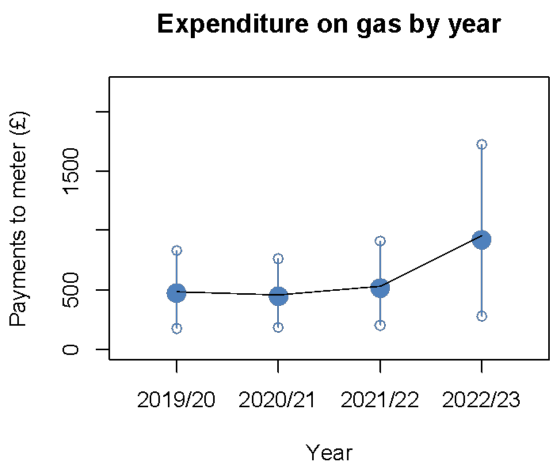
Chart 11: Mean electricity use per home per day in summer only – households with and without the Warm Home Discount



Energy bills

Energy expenditure has increased since 2019 even while energy use has decreased. Chart 12 below shows energy payments, separately for gas and electricity during whole years, from May to April. The vertical bars on the charts indicate the range that includes 90% of customers, showing there is a wide range of above-average expenditure. The bottom of the range hardly changes from one year to the next, reflecting the limited budgets of the households – except that in 2022/23 the EBSS allowed higher spending, particularly on electricity. In all cases means (horizontal lines) are slightly greater than medians (blue dots), The mean expenditures were £480, £460, £530 and £950 for gas and £680, £710, £800 and £1,180 for electricity (expenditure includes grants that are paid to the meter such as the WHD and the EBSS).

Chart 12: Expenditure on gas and electricity by year (vertical bars show 90% range, blue dots show the medians and lines join the means; sample sizes for each season vary between 7,700 and 8,500)



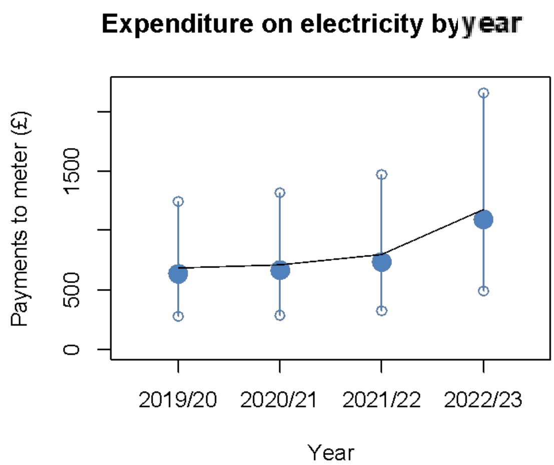
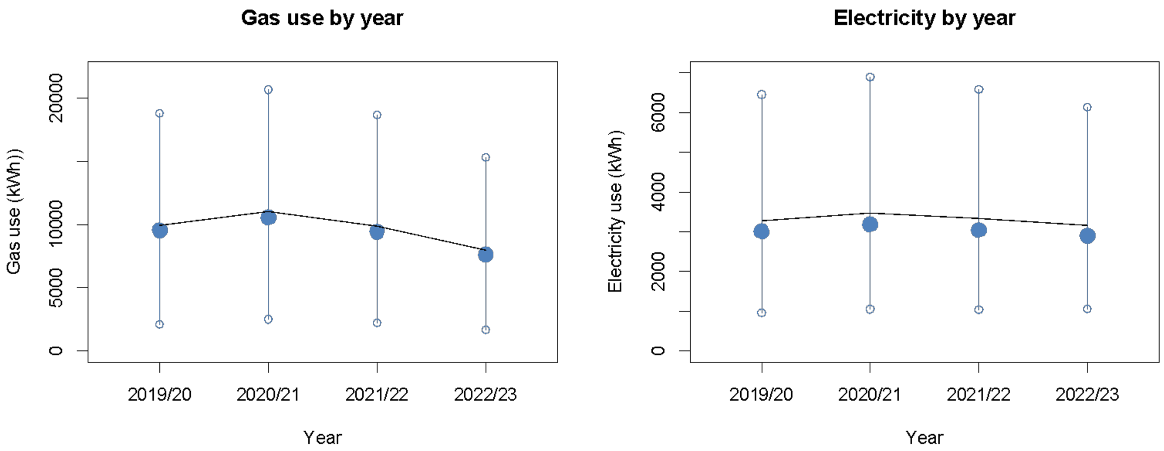


Chart 13 (below) shows how energy use varies from year to year, increasing in 2020/21 and falling afterwards, especially for gas. The mean yearly consumptions were 9,950, 11,010, 9,870, and 7,970 kWh for gas and 3,470, 3,480, 3,320, and 3,160 kWh for electricity.

The use of gas decreased slightly even at the low end of the range, though there was little change for electricity. This partly reflects the EBSS payment on the electricity meter, and partly the fact that households can reduce heating more easily than critical services such as refrigeration. We would not expect these figures to be affected by the 0.4% increase in the number of suspected vacant properties in 2022-23.

We also worked out the actual split between gas and electricity expenditure was 45% gas, 55% electricity in 2022/23 (varying slightly between years, due to external temperatures and relative energy prices). However, gas bills are naturally higher in winter and lower in summer. Overall, when considering how to support households facing fuel poverty, we think it would be counterproductive to tilt support payments in favour of electricity.

Chart 13: Consumption of energy by year (blue dots show medians and lines connect means).



The range (distance between white dots) on all of the above charts is very large, indicating high variation between households – from very low energy use to quite high energy use by some households – especially for gas.

Self-disconnections

For a household to be disconnected from gas or electricity can be a disaster. Without electricity, households cannot run a fridge (which they may need for medicines) or freezer, charge a mobile phone, or use everyday lights or appliances. Losing electricity at night risks frail and elderly people having falls. Without gas many households have no heating and extremely limited options for cooking. The risk of disconnection can also threaten mental health – particularly among elderly households, who can be very anxious about losing energy supply.

Households cannot self-disconnect over the weekend. Utilita extends the mandated Friendly Credit period across weekends and from 2pm to 10am the next day during the week. We are not focusing here on self-disconnections of less than 5 minutes, which implies that the householder has funds for an immediate top-up. (Our view is that any electric disconnection is undesirable, since it means that cold appliances and lights go off, and either of these may mean people are unsafe at home.)

Chart 14: Percentage of households affected by disconnects by year and by minimum length (in minutes)

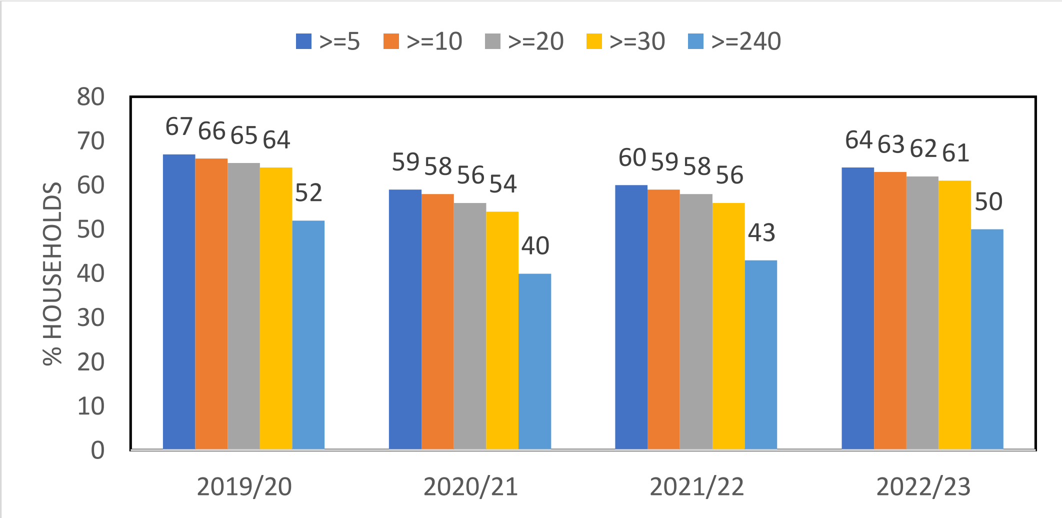
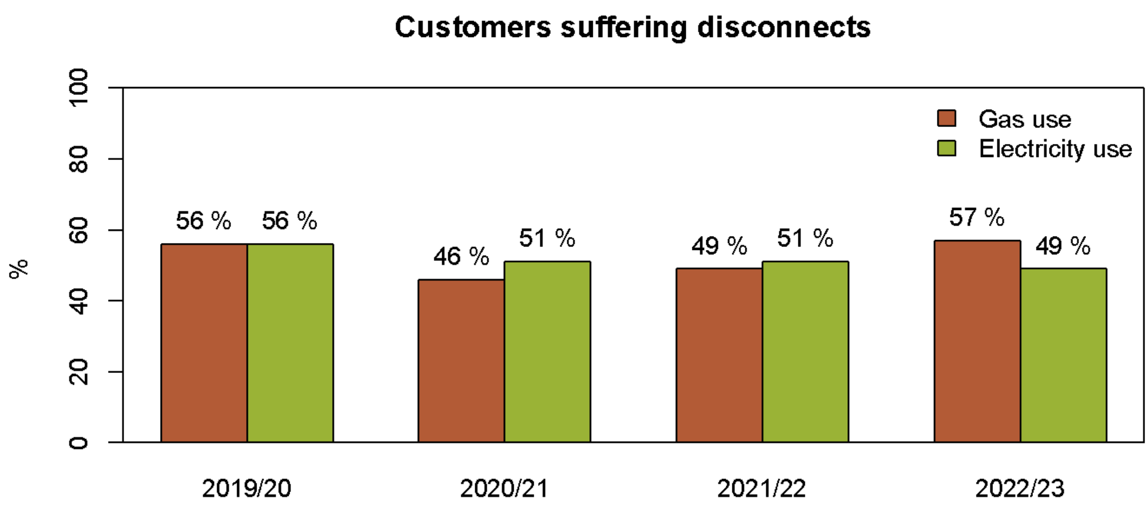


Chart 14 shows the proportion of households with disconnects of any type by year and threshold. In 2022/23 61% of homes had disconnects longer than 30 minutes and 64% had disconnects of 5 minutes or more. Only 3% of homes had disconnects which were shorter than 30 minutes – so choosing 5 minutes as the minimum cut off period does not lead to inclusion of many brief disconnection periods.

While the number of disconnects for gas and electricity meters was similar in the first three years, there were markedly fewer electricity disconnects in the 2022/3 heating season. This is because of the £400 Energy Bill Support Scheme, which was paid directly as credit to the electricity meter for prepay customers. However, the number of disconnects from gas increased from 2021/22 to 2022/23, see Chart 15 below.

Chart 15: Percentage of all customers who experienced at least one self-disconnection over the year (total sample size is 32,700, from 10,100 homes with data over 1 to 4 years)



The distribution of hours of disconnection is very skewed, with a long tail of high disconnection periods, so we have used median rather than the mean to illustrate typical values. (For gas in 2022/23, the mean hours of disconnection were 245, while the median was 23.) These figures only include homes that suffered a disconnection - which was 62% of homes for gas *or* electricity on average per year, including 78% of homes at least once over the course of four winters (some had just a gas disconnection, others electricity, but most had both). It is possible that the longer hours of disconnect were skewed by homes that were vacant, where the meter was not topped up. As well as more customers having gas disconnections in 2022/23, they tended to last longer (see Chart 16). In previous years gas disconnections were three to four times longer than electricity, on average, rising to eight times longer in 2022/23.

Chart 16: Median hours of disconnects (total per customer) for customers suffering disconnects, by heating season (sample size 20,500 cases from 7,800 homes)

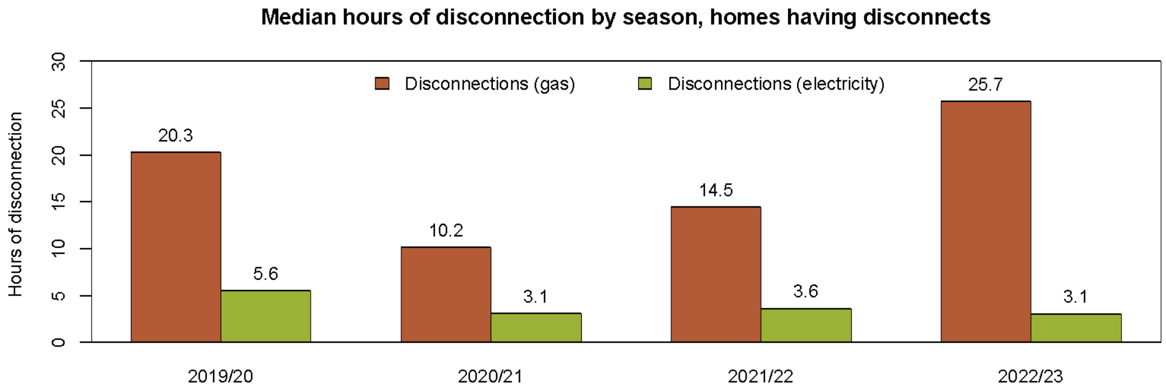
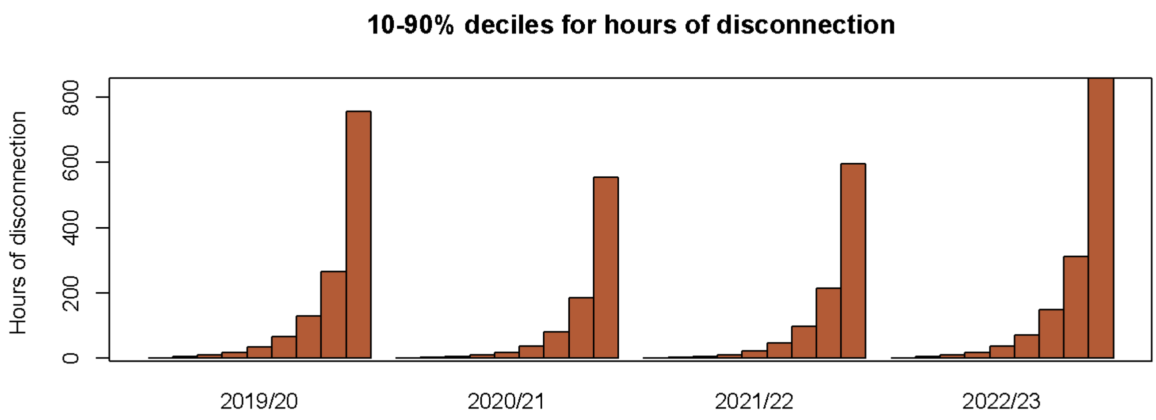


Chart 17 shows the distribution of hours of disconnection for gas and electricity combined, confirming that a few customers have long periods of disconnection. Each column on the chart shows 10% of households, so the small steps to the left each year show that households with short disconnections tend to have similar periods disconnected, whereas those suffering longer disconnections have a wider range – especially in 2023.

Chart 17: Distribution of hours of disconnection: gas plus electricity (sample size is 20,500, from 7,800 homes)



Self-disconnections from electricity are much shorter than disconnections for gas, and simultaneous disconnections for both gas and electricity are rare: only 2% had disconnections of 12 hours on both meters on the same day. However, a home with gas central heating cannot use it once the electricity is cut off and the pump does not work. Among homes that have a total disconnection time of more than 100 hours in a year (14,400 cases, from 3,200 homes), 44% had more than 12 hours of disconnection from the gas meter, from two or more events, compared to 18% with 12-hours of disconnection from electricity from at least one event.

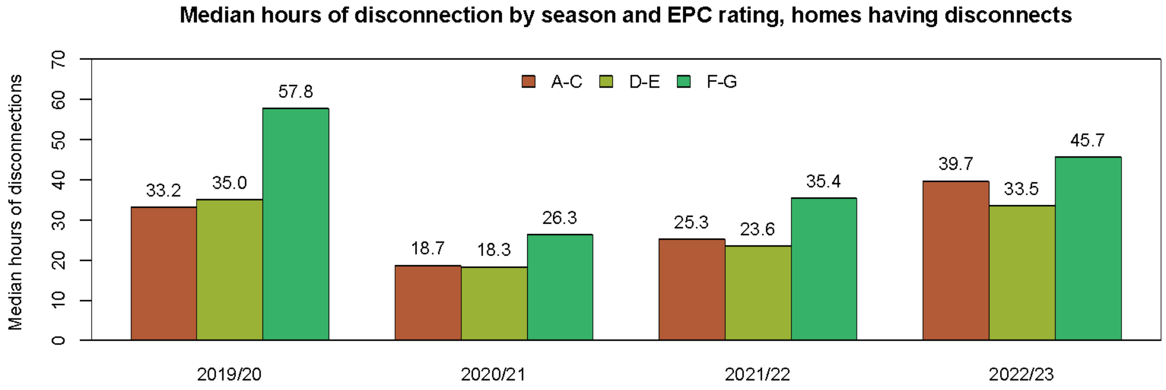
Considering all households in all years, 4.1% (1,330 cases, from 790 homes) have at least 240 hours of disconnects (total per year), with at least four events of 12 hours or more. Following the trends for disconnections in general (Chart 17) homes enduring this painful combination of long, multiple periods of disconnection was most common in 2022/23 (6.6%) and the second worst season was 2019/20 at 4.2%. Households suffering like this tended to be:

- Younger: 7.2% of the 18-35 age group; 3.6% of the 35-65 and 0.3% of the 65+ group
- On the PSR register: 6.1% compared to just 3.0% not on the register
- Living in more efficient homes (4.7% of A-C rated homes, compared to 3.3% of F and G rated homes)
- By 2022/23, disconnections in A-C rated homes had become longer than those in D or E rated homes

These trends are consistent with the data for shorter self-disconnects, except for the correlation with EPC rating. Homes with F or G ratings are more likely to self-disconnect, but less likely to have very long periods of self-disconnection. There are relatively few cases with F/G ratings, but the relative proportions are statistically significant (p-value < 0.001).

Chart 18 below shows hours of disconnection for each heating season and EPC grade. The F- and G-rated homes have more hours of self-disconnection, probably reflecting the higher cost of heating in those homes. This is most obvious for the first and last years. The high level of disconnects in 2019/20 is hard to explain, and likely to be linked to COVID and households using more energy because they spend more time at home. (Some may also have been ill with COVID, requiring more heating to stay comfortable.) The level of disconnections in homes with an EPC band of A-C suggests that these households suffer comparable levels of hardship to people in less energy efficient homes. This may indicate that the Government's current definition of fuel poverty (Low Income, Low Energy Efficiency – 'LILEE'), which excludes households in A-C bands, is flawed. Note that nearly all homes in Band A-C are actually C-rated, and most in Band D-E are D-rated (Table 1). Thus, we should not draw general conclusions about energy efficiency and self-disconnection from comparing these bands, but note that efficiency rating of C does not appear sufficient to protect residents from high levels of disconnection (and hardship).

Chart 18: Median hours of self-disconnection for each heating season (total gas and electricity disconnections for each customer), by EPC rating for homes self-disconnecting (sample size is 18,900 cases, from 7400 homes)



Mean disconnections are affected by a small number of households with high disconnections, but they have the advantage of showing consequences for the extreme cases, which are absent from median hours. They indicate little change in the number of disconnections from year to year, but then a large rise in gas disconnections in 2022/23, see Table 8 below.

Table 8: Mean number of self-disconnections by season (total by customer) (sample size is 20,500 cases from 7,800 homes)

Heating Season	Gas disconnections	Electricity disconnections
2019/20	7.2	6.4
2020/21	6.0	5.9
2021/22	7.2	6.5
2022/23	11.1	6.1

What kinds of households have self-disconnections?

Table 9 (below) is produced using data from all years together, and in all cases the average (disconnections or hours) are shown, for just one year. So 63% of 'all' households self-disconnected in any year, on average, and the households that self-disconnected were off-supply five times each year, and for 28 hours in total. The likelihood of self-disconnection varies slightly with characteristics of the property and the household. The strongest correlation is between the age of the bill payer and self-disconnections, with people under 25 much more likely – and people over 65 much less likely – to face disconnection. This could indicate the inexperience of many younger people with how to manage their fuel consumption, as well as the dread many older people have of getting into debt.

Younger households suffer more and longer self-disconnections, also those in homes with an F- or G-rating. Surprisingly, there is no evidence of links between other EPC grades and increased likelihood of self-disconnection. Those living in smaller homes are no more likely to self-disconnect, but tend to spend more time off-supply (possibly because they have fewer adults on average, so just one income rather than two, and no option for a second or third resident to top-up if the main account holder has no money).

The high number of customers on the PSR register who self-disconnect is concerning. But when these households receive the WHD, because they are pensioners, the incidence drops substantially. Customers receiving the Warm Home Discount have very slightly less time disconnected. Homes switching to electricity for heating are more likely to self-disconnect, and when they do so it is for longer periods – sometimes far longer. This is owing to the inter-quartile range and the most affected 25% of households switching to electricity are disconnected 10 times in the year for a total of 965 hours a year (this is over 18 hours a week). This is particularly concerning because electricity is important for safety at home (for lighting and to keep chilled food safe). Electricity is also likely to be the fuel of last resort in the home – households will do all they can to ensure they have electricity.

Table 9: Proportions of households/dwellings of different types that were disconnected for more than 5 minutes, and how long they were disconnected (yearly values averaged over the 4 winters)

Customers	Self- disconnected (all customers, average per year over 4 years)	Median (interquartile range) – total hours of disconnection over the year for those with disconnects*	Median (interquartile range) of number of disconnections over the year for those with disconnections**
All	63%	28 (5.3 – 164)	5 (2 - 17)
Age 18-25	78%	51 (9.3 – 249)	8 (3 - 24)
Age 35-65	63%	23 (4.7 – 141)	5 (2 - 16)
Age 65+	31%	7.7 (2.3 –42)	2 (1 - 5)
Size < 70m^2	59%	35 (6.2 – 225)	5 (2 - 16)
70-100m^2	65%	23 (4.8 – 129)	6 (2 - 22)
100m2+	66%	24 (4.8 –128)	6 (2 - 17)
Priority service register	66%	41 (6.0 – 55)	7 (2 - 23)
Warm homes discount	63%	25 (4.5 – 134)	6 (2 - 20)
PSR, WHD and age 65+	30%	6.9 (2.1 – 42)	2 (1 – 6)
EPC rating A-C	63%	29 (5.3 – 175)	5 (2 - 17)
EPC rating D-E	63%	27(5.4 – 152)	5 (2 -17)
EPC rating F-G	68%	37 (6.2 – 228)	6 (2 - 22)
Switching to electricity for heating***	63%	63 (6.7 – 965)	3 (1 - 10)

*Gas hours plus electricity hours disconnected – when both are off it counts double. These figures show average hours per year. ** Again, when both electricity and gas are off it counts double, and figures show the average number of disconnects per year. *** Ignoring gas disconnections.

Disconnections each day

Chart 19 and Chart 20 (below) show the mean length of self-disconnections each day through the year (all homes) and the credit on the meter, starting from May 2022. Homes are not able to self-disconnect at the weekend due to Friendly Credit hours, hence the sharp peaks on Mondays and troughs every weekend. However, if they are already self-disconnected before the weekend, they are not reconnected over the weekend, unless the account holder tops up or requests a Power Up loan.

The chart for electricity shows credits from the Energy Bill Support Scheme (EBSS) of £67/£66 per month from October 2022 to March 2023, and a consequent drop in disconnections to just a few minutes of disconnection per day from October onwards. The chart for gas shows increased disconnections in winter despite the EBSS (which appears to make no difference whatsoever to gas disconnections for Utilita customers). There are probably also some payments from Cold Weather Payments, but these do not show up on the meter, so they do not appear in the data.

The EBSS payments were paid to the electricity meter, and they led to markedly less disconnection time for electricity – but not for gas. Both Utilita and some other companies (such as Shell Energy) enabled the EBSS to be split across both meters, but apparently most Utilita customers accepted the default payment to their electricity meter.[29]

Chart 19: Credit and disconnections for electricity, May 2022 to April 2023 (electrical disconnections fall by about half and credit balances rise as a result of the EBSS)

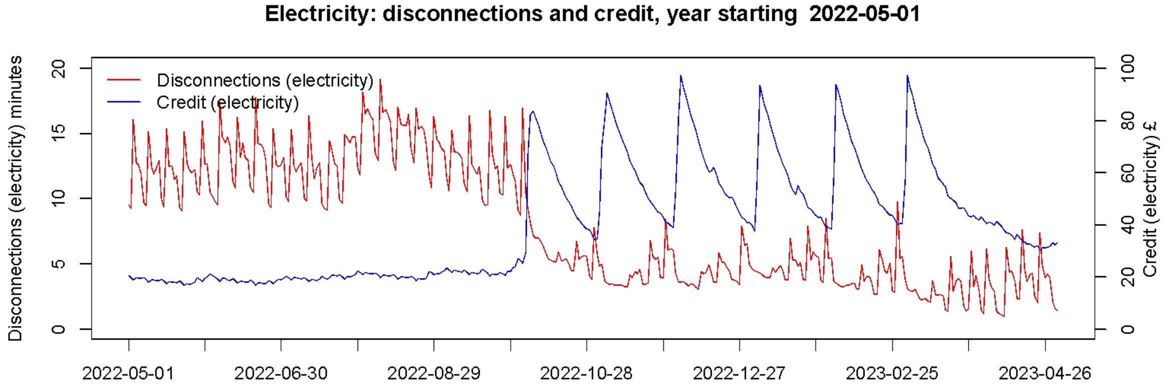


Chart 20: Credit and disconnections for gas, May 2022 to April 2023 (more disconnections over the heating season)

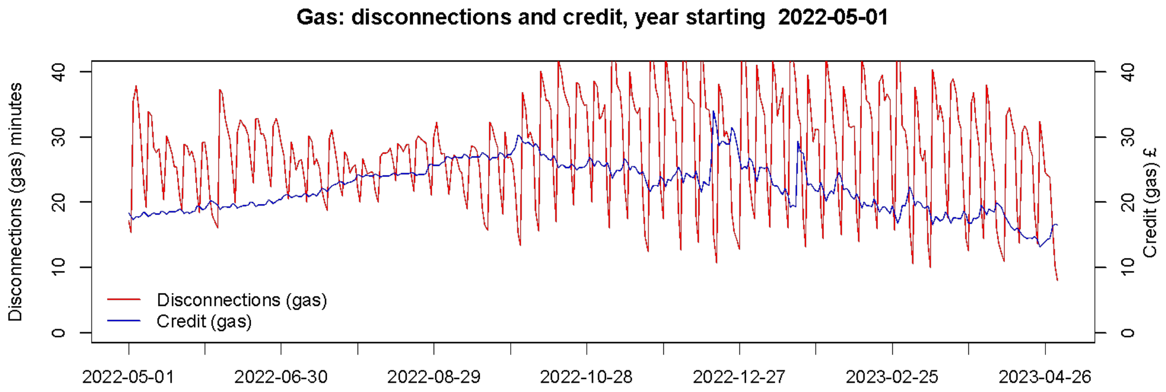


Chart 21 and Chart 22 (below) show the equivalent figures for 2021/22. There was no EBSS that winter because it had not yet been introduced. (There may have been Cold Weather Payments, but they are not paid to the meter, so they may have been used for non-energy purposes.)

[29] https://help.shellenergy.co.uk/hc/en-us/articles/8410612849809-How-the-Energy-Bills-Support-Scheme-works-for-prepayment-customers

In Chart 21, there are broadly similar credit balances for electricity throughout the year, but disconnections have been rising since September 2021, particularly in the last couple of months shown. Gas credit balances in Chart 22 fluctuate most in winter, and gas disconnections have become longer since September 2021, with a sharp increase in mid-March 2022. Both these charts indicate that households were coming under greater stress as the year progressed.

Chart 21: Credit and disconnections for electricity, May 2021 to April 2022

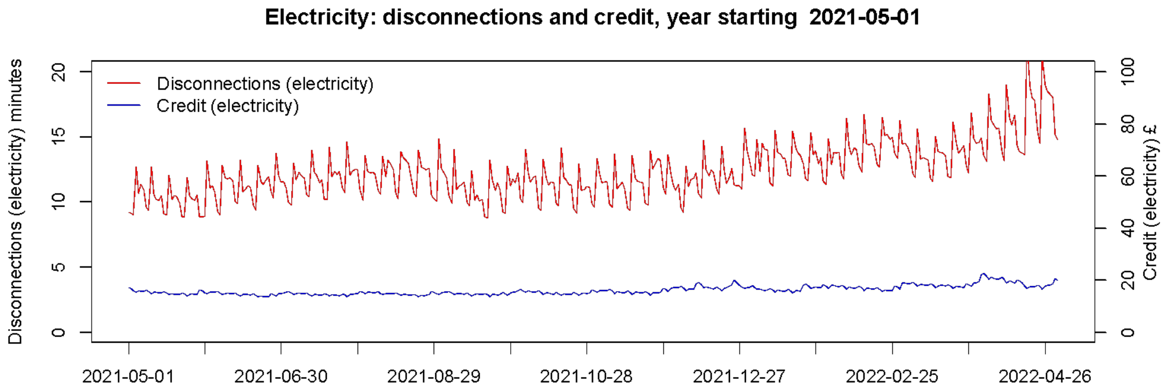
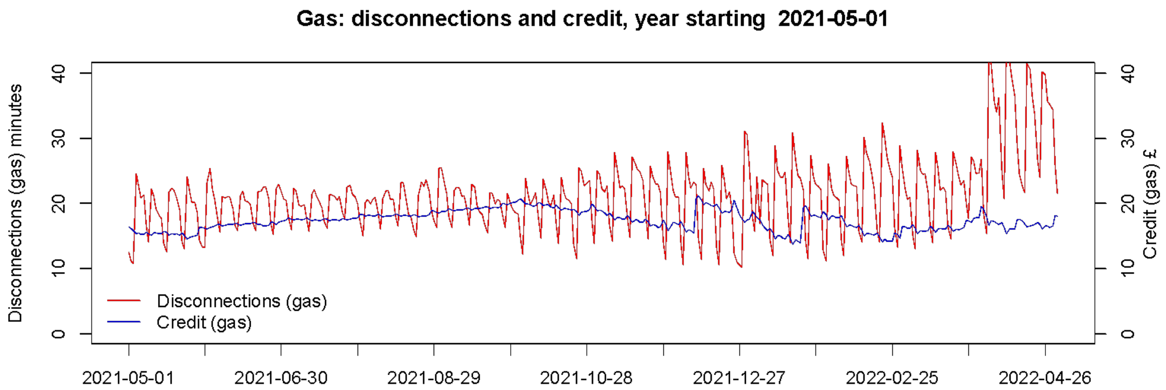


Chart 22: Credit and disconnections for gas, May 2021 to April 2022



Impact of Cold Weather Payments

This section focuses on three periods of cold weather in the North West region, which is the largest region there is data for. We used a single region because different regions have different weather, and using average weather would lose detail. (Note this section does not exclude homes that are suspected of being vacant.)

Chart 23, Chart 24 and Chart 25 show the temperatures during the three periods. Subsequent charts compare disconnections (for gas) for households with and without WHD, and households on the Priority Services Register (PSR).

In each case we have compared disconnections during the cold period with 14 days before and 14 days after. The cold period itself is at least a week, but can be longer. If it ends on the weekend (including Friday) it is extended through Monday so that self-disconnections delayed by Friendly

Credit are included. Dotted lines in the charts show daily maximum and minimum temperatures, and you can see that a mean daily temperature of 0°C is roughly equivalent to a minimum temperature of -4°C.

Chart 23: Temperatures before, during and after a brief cold period from 7/Feb/2021

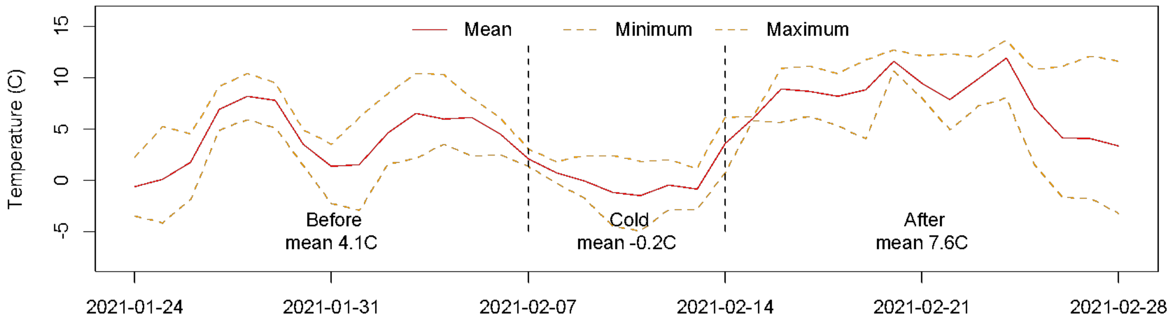


Chart 24: Temperatures before, during and after a <u>severe</u> cold period from 7/Dec/2022

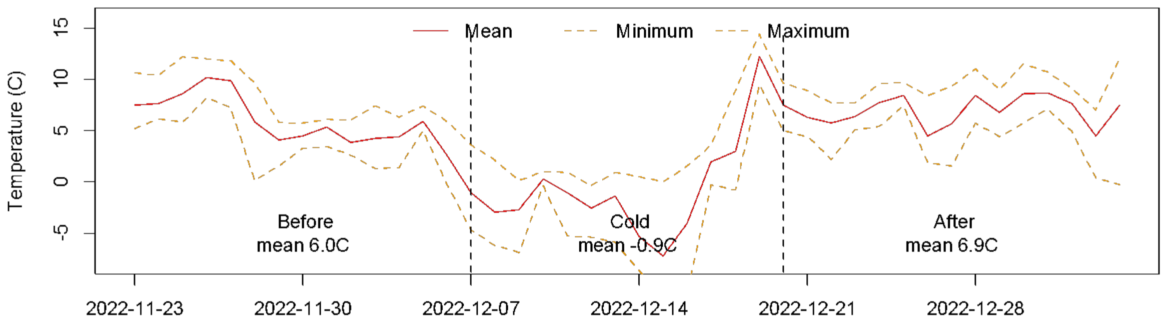
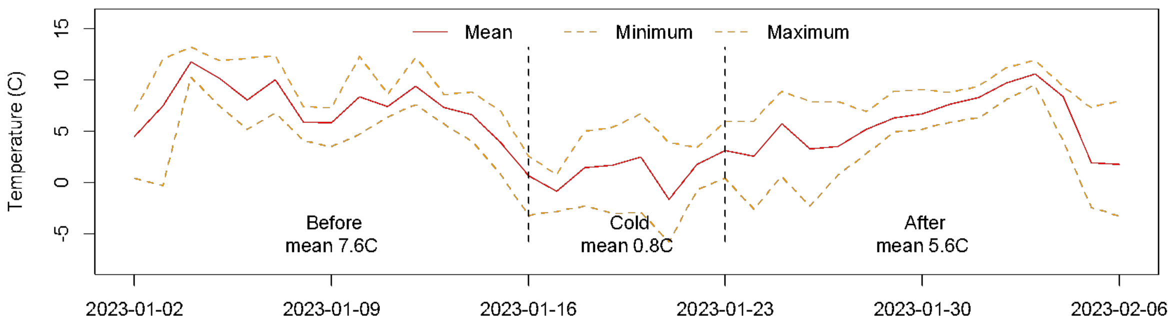


Chart 25: Temperatures before, during and after a mild cold period from 16/Jan/2023.



During the winter months, households could be receiving additional income from three different sources, but we cannot identify which households had the first two:

- Cold Weather Payments – £25 paid into the bank, not the energy account, up to 14 days later. CWPs were probably triggered by the severe December event (Chart 23), for eligible households in qualifying regions;
- Winter Fuel Allowance - £100-300 paid into the bank of all pensioner households, in early December;
- Warm Home Discount – £150 paid onto the energy account, often just before Christmas, again only for eligible households.

We have focused on the receipt of WHD, because it is paid into the energy account and is identifiable in the Utilita data.

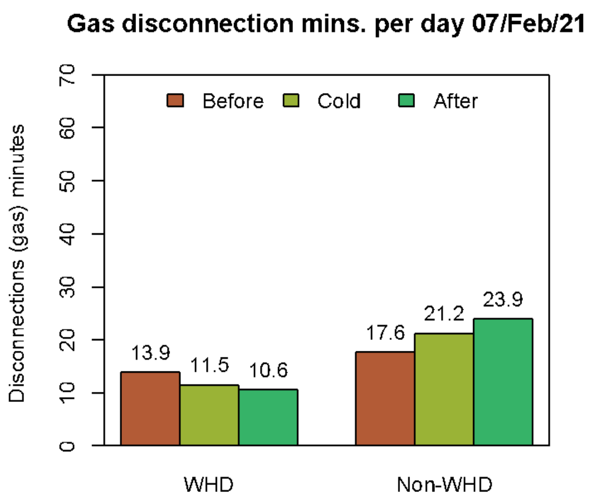
The cold weather experienced in the North-West region in the three episodes in Charts 22-24 indicate that households need to use more energy if they are going to maintain their level of warmth. For the majority of households relying on gas for heating, they can only keep the heating on if they stay connected to their gas supply and are not disconnected, but success is limited.

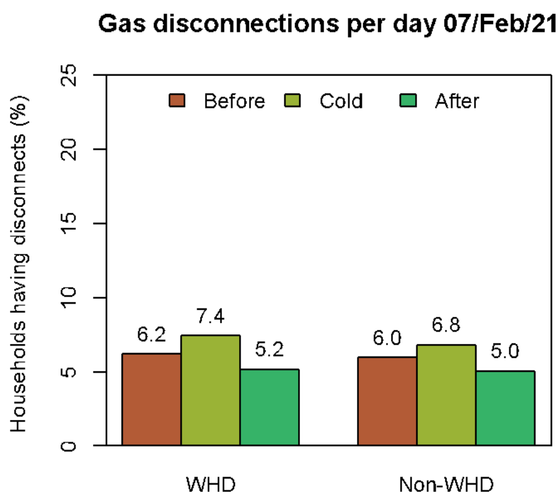
The next set of three charts (Chart 26, Chart 27, Chart 28) show household gas disconnections split out according to whether households receive the WHD or not. For each set of households:

- The left-hand charts show the mean minutes of disconnection per household per day. This is the average over all households, not just homes with disconnects. All three charts have the same y-scales for easy comparison.
- The right-hand charts show the proportion of homes disconnected for longer than 5 minutes per day. All three charts have the same y-scales for easy comparison.

In Chart 26, the homes in receipt of the WHD have less time disconnected in all three periods than other households, but the number of disconnections increases in the cold period, in comparison with before and after. Those who did not receive the WHD had similar numbers of disconnections, although they were longer.

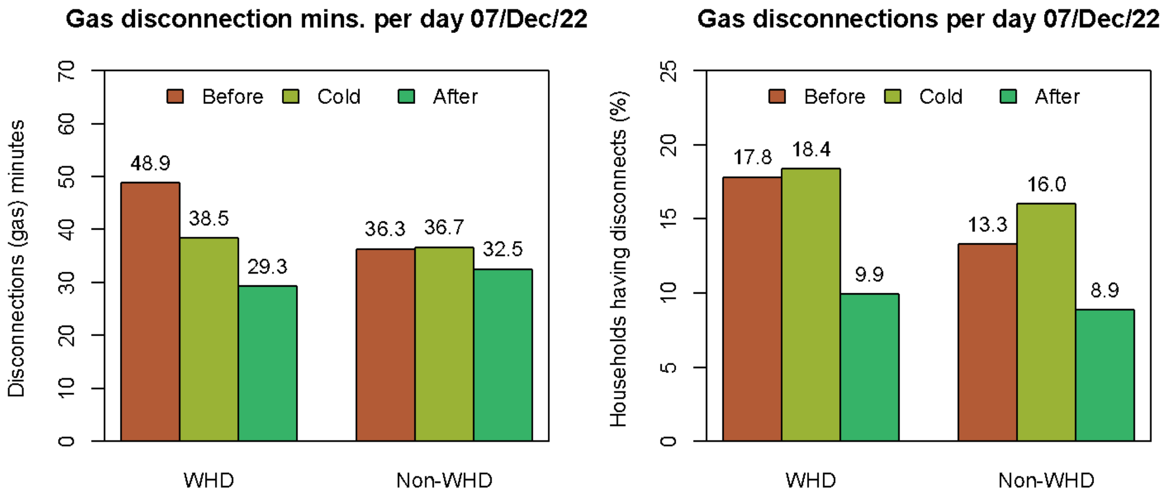
Chart 26: Disconnections 7-14 February, 2021 by receipt of WHD (590 homes on WHD, 1270 others)





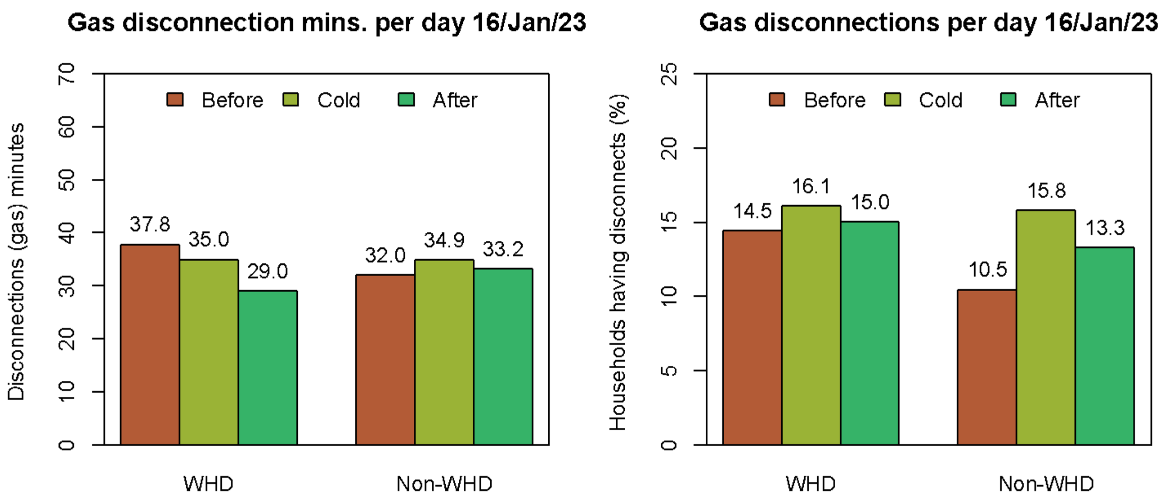
In Chart 27, during the two weeks of the severe cold spell before Christmas 2022, the pattern is similar – except that there are fewer and shorter disconnections after the cold period, in comparison with both before the cold weather and during it. This is probably because that period overlaps with Christmas, but also it is probable that some households received additional income into their bank accounts from a cold weather payment or a winter fuel allowance. Temporarily, at least, they had a slightly higher weekly income. This period is colder than either of the other two and both the number of disconnections and their length was greater, demonstrating the extra hardship and deprivation produced by a cold winter in this region.

Chart 27: Disconnections 7-21 December, 2022 by receipt of WHD (590 homes on WHD, 1250 others)



In Chart 28, the pattern is only slightly better than in the previous month (Chart 27), even though it is milder. This, like much of the evidence, appears to indicate lower levels of resilience in households as the energy crisis continues. The WHD does not provide households with protection during the cold weather, as the proportion of households disconnecting for longer than 5 minutes a day is, in all three cold spells, higher than those not in receipt of the WHD. This may indicate that the WHD is properly targeted, but of insufficient amount and going to too few households.

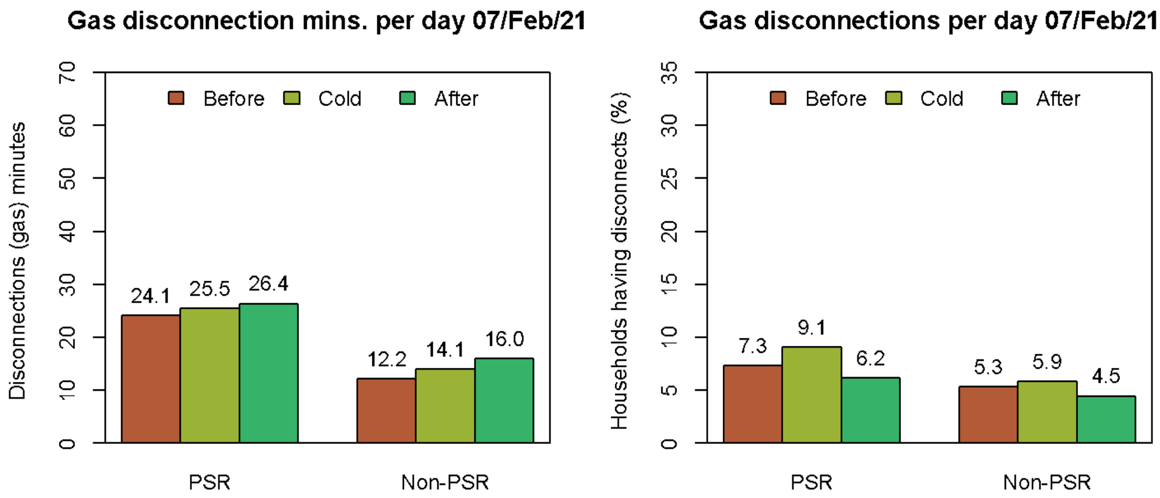
Chart 28: Disconnections 16-23 January 2023 by receipt of WHD (590 homes on WHD, 1250 others)



The following three charts (Chart 29, Chart 30, Chart 31) show the same cold periods and households, but split by whether they are on the PSR or not. In this region, 42% [15% / 29% is 52%] of homes on the PSR were also on WHD – see Table 10, below the charts. Homes on the PSR were more strongly affected by disconnections in all three cold periods.

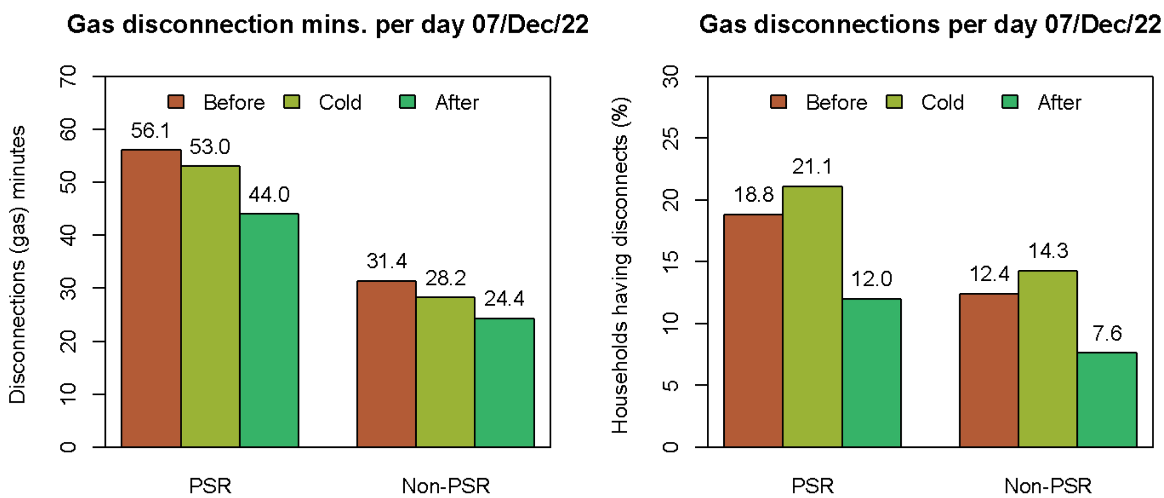
In Chart 29, for all households, whether on the PSR or not, the length of disconnections rose from before the cold period to during the cold period and rose again after it ended. The number of disconnection events peaked during the cold period. Those households on the PSR suffered more than those who are not in this region.

Chart 29: Disconnections 7-14 February, 2021 by PSR (670 homes on PSR, 1170 others)



In Chart 30, the length and number of disconnections experienced during this period of severe cold was over double the rate experienced in February 2021 (Chart 29). There was some respite after the cold period partly due to Christmas and, probably, partly due to other cold-related payments. However, more than a fifth of the PSR households had long disconnections lasting, on average, nearly an hour a day during this period.

Chart 30: Disconnections 7-21 December, 2023 by PSR (670 homes on PSR, 1170 others):



In Chart 31, the strong evidence of hardship continues, with both the length and number of disconnections staying high for all households in the region, particularly those in the PSR group. This again confirms the evidence of diminishing resilience in 2023.

Chart 31: Disconnections 16-23 January, 2023 by PSR (670 homes on PSR, 1170 other)

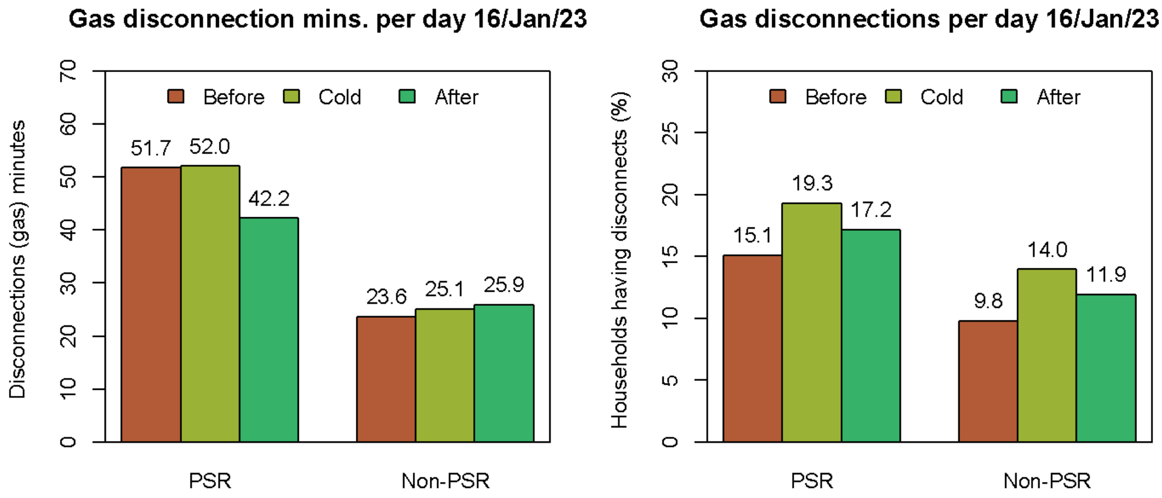
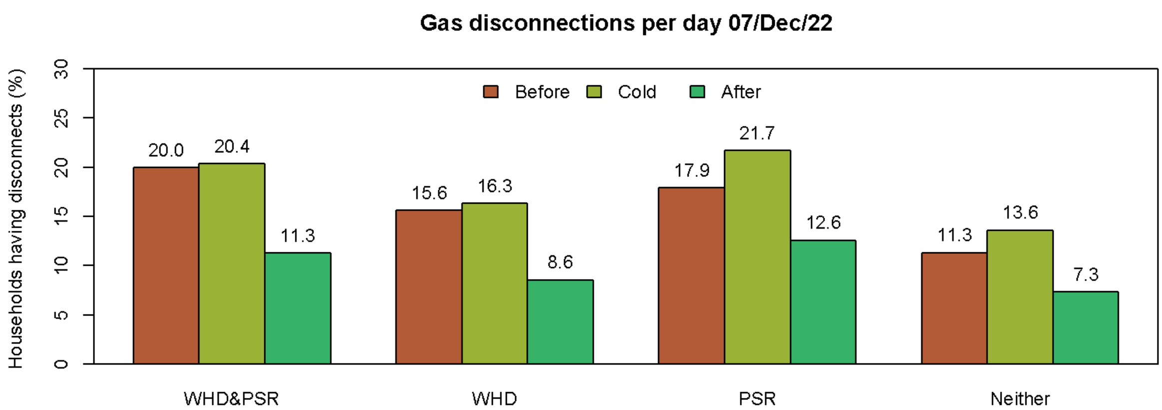


Table 10: Proportion of our sample homes in the North-West region on PSR, WHD or both

	WHD	**Non-WHD**
PSR	15%	20%
Non-PSR	14%	51%

The final chart in this section, Chart 32, below, shows the proportion of households having disconnections separated into four groups: WHD, PSR, both and neither. This chart shows disconnections for the severest weather event – the other two cold events show a similar pattern, but the sample sizes were small. The households most affected are those on PSR but not WHD, then households in receipt of both. The eligibility criteria for these two programmes are completely different: WHD is for sub-sectors of those on means-tested benefits, whereas the PSR lists those deemed to be vulnerable to a loss of supply, independently of income.

Chart 32: Disconnections 7-23 December 2022 by PSR and WHD (sample sizes are both: 300; WHD: 290; PSR: 370; neither: 880)



To summarise the cold weather analysis and gas disconnections in this one region, overall we see that:

- More homes were disconnected from the gas meter during cold periods, compared to before or afterwards, and this happens
  - despite the greater need for heating,
  - the vast majority using gas for heating and
  - regardless of whether they were on WHD or not;
- Sometimes they manage to reduce the overall disconnection time;
- PSR homes were more strongly affected by periods of very cold weather than other homes, even if they were on WHD;
- Over 20% of PSR homes were disconnected during the worst cold event for an average of nearly an hour a day.

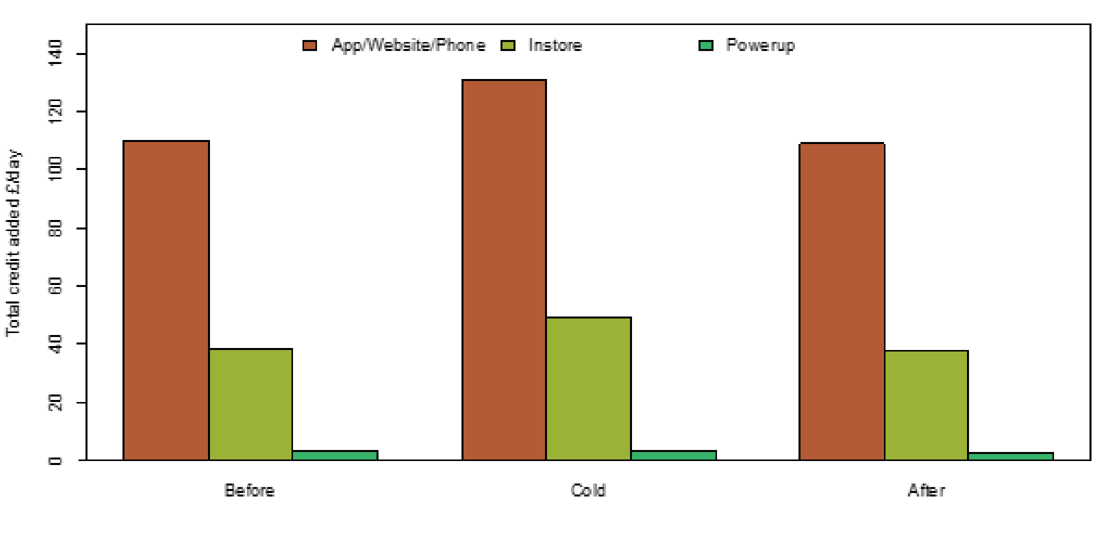
How do households on prepay meters pay for their energy?

Utilita's prepay customers have several ways they can pay to top up their meters:

1. They can pay at a local store, like traditional prepay meter customers
2. They can pay through an app on their phone, by calling Utilita, or by making payments on Utilita's website, or
3. They can self-serve an interest-free 'Power Up' loan.

How they paid before, during and after a period of cold weather is shown in below, Chart 33. At all times, they are most likely to pay using the app/website or by telephone, with only about a third as many payments in shops, and a very small number of Power Up loans, relative to other top-up payments. You might expect there to be more Power Up loans during the very cold period, but there were only marginally more when it was very cold - this may be due to fear of debt. Unsurprisingly, there were most top-ups when it was very cold.

Chart 33: Payment type before, during and after a cold-weather period (credit columns indicate the total credit added across all households averaged by day, for each period)



Price elasticity of demand (during the heating season)

For this part of the analysis we carried out regression analysis of gas and electricity demand versus price and other variables for each house, for each heating season. This was used to calculate elasticity of demand for a typical winter day. We split the sample in two ways:

(a) By whether they use gas or electricity for heating (as discussed above)
(b) By EPC rating.

We split by EPC rating because the EPC rating scheme is non-linear. Below E the rating calculation uses a log function of cost instead of a linear function. We used only homes that have EPC ratings in this calculation, only homes that are available in all four seasons, and only homes that are consistent in using either gas for heating or electricity for heating throughout. We require a minimum sample of 100 homes in each group – unfortunately there are not enough in the A/B or F/G EPC ratings that use electricity for heating. The total number of cases (homes/year) in each group is shown in Table 13 (below). The figures are somewhat different from those cited earlier in this report, because the other figures are separated by year.

Table 13: Number of home/year cases with gas or electric heating, in each EPC band

	A/B	C	D	E	F/G
Gas	993	11,168	10,307	2,434	323
Electric	-	450	423	152	-

The prices used are based on the daily cost to a typical Utilita customer – with typical Utilita energy consumption over the winter 2019/20 (40 kWh a day for gas and 9 kWh a day for electricity). The high rate 'first charges' (which Utilita uses in place of a standing charge) are included and the EBSS credits in 2022/23 are also included. The cost is different for Utilita customers on Smart Energy or Smart Economy 7. The costs are shown in Table 14 (below).

Table 14: Daily cost of average gas and electricity consumption in winter, for these Utilita customers, by season, based on average gas and electricity consumption for 2019/20 and prices for each year

	2019/20	2020/21	2021/22	2022/23
Standard tariff	£3.66	£3.26	£4.02	£5.58
Economy 7 tariff	£3.60	£3.23	£3.85	£5.92

Apart from price, the variables used in the regression analysis are: average degree days per day (for the weather associated with the grid supply point), whether or not they have the Warm Homes Discount, whether or not they are on the Priority Services Register, and the age of the bill payer (18-35, 35-65 and 65+).

We used normalised energy demand in the same form used for EPCs i.e. kWh/(floor area + 45m^2). However, we also found that total floor area (tfa) remains a statistically significant element. The effect increases energy use in larger dwellings. Using the rather complicated EPC floor area calculation in normalisation is consistent with using energy ratings.

Weather is different in the different regions, so we adjusted both degree days and energy use to balance these effects. For degree days, we subtracted the degree days from the first season, and similarly for energy use, we adjusted each home's energy use up or down so that the mean for each weather region in the first season was equal to the overall mean for the first season. This means the regression analysis is based on the change in weather and the change in energy consumption in each successive heating season rather than the difference in weather between regions.

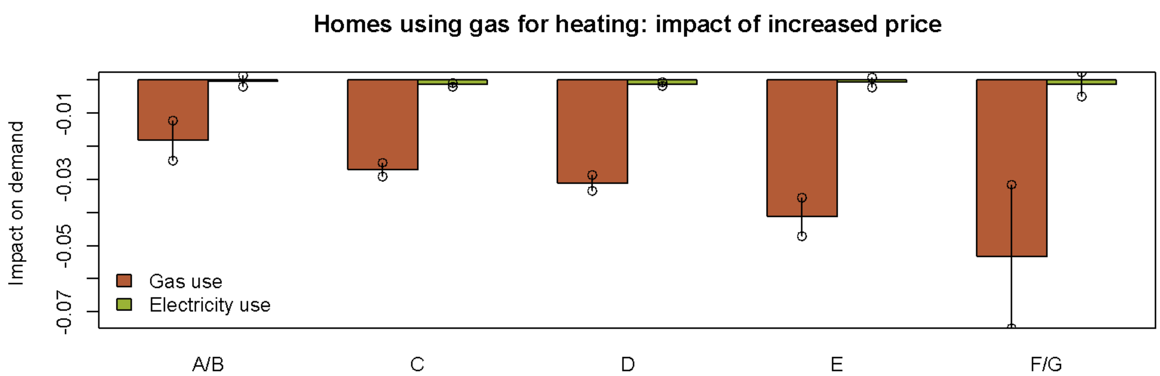
The regression analysis shows that even when price is combined with other factors (weather, age of occupant, EPC rating, PSR status, and receipt of WHD), it only accounts for a small proportion of the variation in energy use over the four years. The adjusted R-squared values (a statistical measure of how well variables correlate to outcomes, from 0 to 1, where 1 is a perfect correlation) are very low, mostly only 0.05 to 0.1 (Note Chart 34 and Chart 35 below do not show R-squared). Some of the noise in the data is doubtless due to inaccuracy in the degree days calculations, because there are only nine weather regions and the grid supply points used to locate dwellings in regions are not always a good indicator of which region they belong to. There is also a great deal of variation in individual homes due to personal circumstances. However, the results are all statistically significant (with p-values below 0.00001) and this indicates they are meaningful.

Higher R-squared values for households with electric heating could be because weather is less important for these homes (due to them already using intermittent and only partial heating) so the low-resolution weather data has less effect.

The charts below show overall results, and subsequent sections use these results to estimate price elasticity of demand.

As expected, an increase in price discourages energy use (i.e. it deters households from heating their homes). Price affects both electricity and gas, and the impact is greatest in the least efficient homes, see Chart 34 (below).

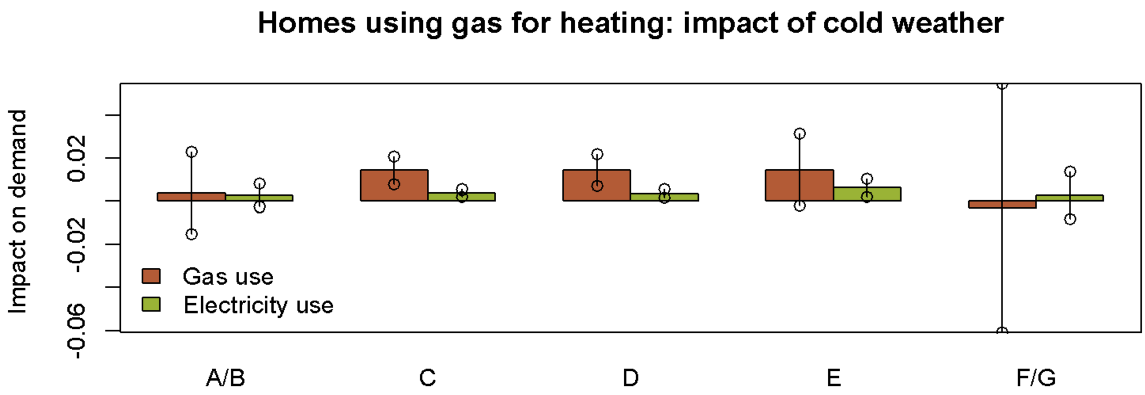
Chart 34: Reduction in demand for gas resulting from higher gas prices – by EPC rating



The effect is less pronounced in the homes using electricity for heating – mainly because they are using less energy and have less scope for adjustment. Below, we show that the elasticity is also lower for the homes using electricity – although it is still high.

In cold winters, households use more gas – but only a little see Chart 35 below. The difference is negligible in the most efficient (A or B-rated) homes. In cold winters they also use more electricity but the effect is smaller than for gas. It is surprising that F- and G-rated homes actually use *less* gas when it is cold, but there are relatively few of them (320), and the confidence intervals on the F- and G-rated homes are very wide. This may suggest that households in energy inefficient homes realise what poor value they get from their expenditure on heating, so prefer to use their limited funds on something that is seen by them to be of better value.

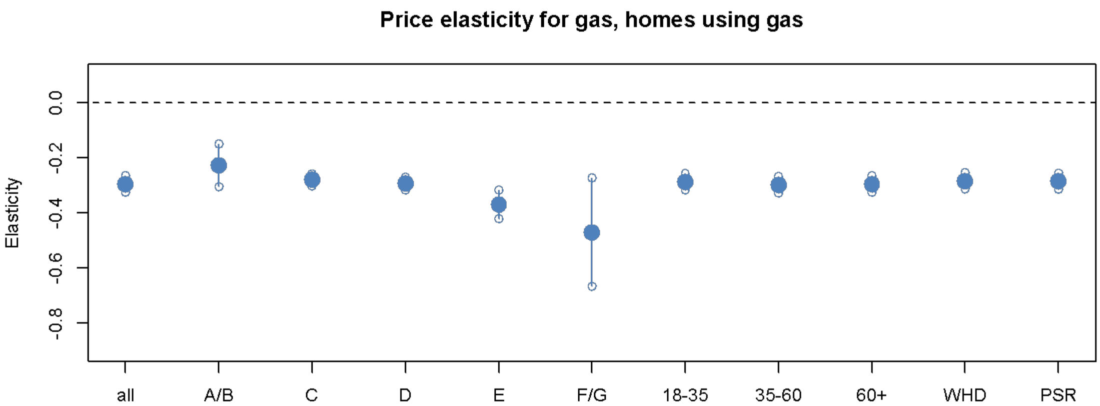
Chart 35: How homes with gas heating alter demand for energy in cold weather



Based on these coefficients, we have calculated the price elasticity of demand for homes with different characteristics, and these are shown in Chart 36 and Chart 37 (below). Elasticity of -0.3 means that a 10% increase in price leads to a reduction in energy use of 3%. In each case we have used the weighted mean of all homes in the dataset with that characteristic i.e. where the EPC rating is D, we have estimated the mean elasticity of every combination of characteristics with that EPC rating, weighted by the number of homes in the dataset with that combination. In all cases we have assumed a mid-sized home (74 m^2, the average size for Utilita customers, but relatively small by national standards). In fact the size of the home makes very little difference – for example, considering a D-rated home with no WHD or PSR, with a householder aged 35-65, varying floor area from 50 to 100m^2 changes the elasticity from -0.329 to -0.332.

The left-hand side of Chart 36 below suggests that the main driver for price elasticity is the EPC rating of the home, with households in the least efficient homes (E-, F- and G-rated) reducing their heating the most. The right-hand side suggests that age and receipt of the WHD or being on the PSR do not make much difference. The overall mean elasticity of demand is -0.265.

Chart 36: Price elasticity of demand for gas, for homes using gas for heating. The bars show 95% confidence range.



Price elasticity of demand for electricity in homes using electric heating is much lower, although the trends are similar, as shown in Chart 37. Note, again, that there are no homes using electric heating with F or G EPC ratings.

Chart 37: Price elasticity of demand for electricity in homes using electric heating

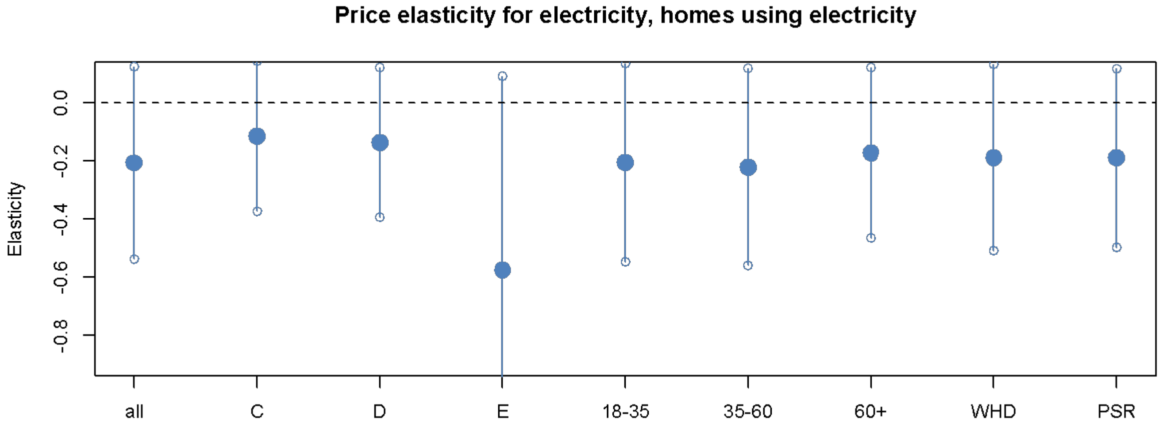


Table 15 below shows the mean elasticity for all homes, and for the most and least efficient homes. The upper and lower bounds are the 95% confidence intervals, as above.

Table 15: Price elasticity of demand for gas and electricity, by EPC grade

	All homes or EPC grade	Most likely	Lower bound	Upper bound
Gas for homes heating with gas	All	-0.265	-0.249	-0.325
	A/B	-0.227	-0.150	-0.305
	F/G	-0.470	-0.274	-0.666
Electricity for homes with gas heating	All	-0.058	-0.025	-0.092
	A/B	-0.020	0.061**	-0.101
	F/G	-0.061	0.099	-0.220
Electricity for homes with electric heating	All	-0.207	-0.123	-0.537
	C*	-0.115	0.142	-0.373
	E*	-0.575	-0.091	-1.240

*There were no homes using electric heating with A/B or F/G EPC ratings. **Some of the Lower bounds are positive (implying energy use rises when prices increase (!)). This seems extremely unlikely, but this reflects the distribution, and the 'Most likely' figures are more important.

We can do a much simpler calculation as a sanity check on these elasticity figures. Overall, for gas, annual consumption relative to 2022/23 is down 20% and the price is up 64%. (Using Utilita prices and consumptions). That makes a simple estimate of elasticity -0.31 (-0.2/0.64). However, 2022/23 was somewhat warmer, so less heating was required. The difference in degree days was 4% - if all the gas was used for space heating, then the remaining reduction would be 16% which would result in an estimate of elasticity of -0.25 (0.16/0.64). The true answer therefore lies between -0.25 and -0.31 – this confirms that our 'Most likely' figure for the price elasticity of demand for gas is reasonable.

Main research findings

Here we highlight our main research findings. This research is based on energy use by households on smart prepayment meters for both electricity and gas – generally accepted to be a group where fuel poverty is highly concentrated. Evidence of suffering among this group is likely to be a good indicator of the problems faced by many people coping with fuel poverty.

- The households in our sample had below average energy use from the start, partly because they live in smaller-than-average properties.
- Between 2019/20 and 2022/23, consumption by these Utilita customers dropped by 20% for gas and by 9% for electricity, despite the slightly milder winter in 2022/23.
- Because of rising prices, the cost of below-average energy consumption for households in our sample nearly doubled: average annual expenditure rose from £1160 to £2130 per customer. The latter figure includes the £400 EBSS provided by the government, so that the household's own costs increased by only 50% to £1730.
- The combined effect of reduced consumption but increased expenditure demonstrates the determination of these low-income households to try and achieve a minimum level of energy services. They have stretched the household budget to try and maintain their original, possibly low, levels of warmth, hot water, lighting and appliances – and failed.
- Fuel poverty has demonstrably worsened for the households in this sample.
- A household lacking funds will 'self-disconnect', by not putting more money onto the prepayment meter. In this analysis, we count disconnections lasting five minutes or more, because of the danger created for people and medicines. (Shorter self-disconnections are likely to be intermittent while the household carries out the top-up.)
- The highest levels of self-disconnection were found with young households, those in energy inefficient homes, people on the Priority Services Register and where electricity is used for heating. The latter group had by far the most and longest disconnections.
- The likelihood of self-disconnecting was lowest amongst pensioners – probably because they are at home more, and do everything possible to avoid disconnection.
- In total, 63%, nearly two-thirds, of our sample households disconnected at least once a year over these four years. On average, there were five self-disconnection events a year totalling 28 hours.
- These figures demonstrate the considerable level of hardship and deprivation being suffered by these fuel poor households.

Homes using electric heating

We were surprised to find that there are 7% of households with a gas connection who use electricity instead of gas for heating. These households scarcely use any energy for heating, and they are very likely the households facing greatest hardship; they are also highly likely to be on the Priority Services Register. This switch away from gas may indicate they are economising severely and limiting their budget to just one meter. Utilita customers do not have a standing charge independently of consumption, so avoiding the standing charge is not the reason in this sample. (Though avoiding standing charges, particularly those incurred when the home is empty, is a major concern of other prepay customers.)

Households on prepayment meters generally have a better understanding of the relative costs of gas and electric heating than non-prepay customers – because they inevitably know more than most about where their money is going. They probably realise that electric heating will cost them more than a gas-fired system, if they heat the same area. If heating is restricted to a limited space, however (perhaps only one room), then an electric heater which can easily be switched on and off, will seem more economical and maybe more appropriate to them. It is hard to see how such low energy use can be adequate to safeguard their health.

Policy analysis and proposals

Here we take a broader look at options that might work for all tariffs and payment methods, not just smart- or prepayment-meters. This indicates areas where fuel poverty policy should focus in the short term, for the coming winter.

We focus on making the case for two key policies:

- A new support scheme – which we are calling the 'Energy Cost Support Scheme' – to compensate the fuel poor for high energy prices from October 2023 – March 2024
- A revision to the Cold Weather Payment policy to provide better quality support during cold periods – renamed the 'Extreme Weather Payment'

We also briefly outline longer-term options around targeting, improvements needed to the Priorities Services Register, and the case for switching from legacy to smart prepay meters. There is no consideration here of universal policies, such as the Energy Bill Support Scheme (EBSS), which went to all households. Although such policies are administratively quick and easy, they are too expensive and they subsidise energy use for higher-income households.

Many campaign groups, energy companies, researchers and others are very concerned about the current lack of support for vulnerable households in Winter 2023/24. There are a number of proposals of how support can be provided including universal basic energy provisioning, social tariffs, a national energy guarantee as well as wider energy market reform recommendations such as the Green Power Pool.[30] For example, Fuel Poverty Action propose a free fuel allowance that would go to all households, regardless of whether they are in fuel poverty or not[31]. Above this basic allowance, the unit rates are higher to compensate (plus there is additional funding from a windfall tax and other sources). Analysis from the New Economics Foundation recommends a basic allowance of 1,050kWh of electricity and 2,700kWh of gas.[32]. However, a major re-alignment of the tariff such as this would take some time to introduce and there would have to be a thorough debate about a policy that gives a free allowance to everyone. Our recommendations will focus on policy which can be implemented in the coming weeks for the upcoming winter.

[30] Robinson and Simcock (2022) have assessed the strengths and weaknesses of various fuel poverty alleviation policies including EBSS, removing environmental levies from fuel bills, payment using MTBs, Universal Basic Energy, a new social tariff, freezing energy prices at April 2022 price cap, etc. Grubb, Drummond and Maximov (2022) recommend disentangling electricity prices from gas markets to incentivise electricity use, as well as deploy it as a fuel poverty measure to provide fuel poor households to access the benefits of cheaper renewable sources.

[31] https://energyforall.org.uk/

[32] https://neweconomics.org/uploads/files/national-energy-guarantee.pdf

Energy Cost Support Scheme

The purpose of this scheme is to replace the EBSS with a targeted scheme which ensures that the fuel poor can afford the same amount of energy as before the energy price rises.
In more detail, the principles used to inform scheme design are:

Level of support	Fuel poor households should be enabled to access the same level of energy services they could afford in 2020/21
Payment route	Payments should be made directly onto the households' energy bills/ prepayment meters
Targeting	<u>Protecting the most vulnerable:</u> The priority of the Scheme is to ensure that fuel poor households are not excluded from support, even if that may potentially result in some non-fuel poor households benefiting from the scheme. <u>Simplicity and speed:</u> The targeting criteria must be based on information that energy companies already have access to, so that payment can begin by October 2023.

Level of support

In order to ensure that households can have access to the same energy services as they did prior to the price rises, we suggest support equivalent to £1,000 per household, paid over the heating season from October to March. This support would halve energy costs

This amount is based on two factors:

- In October 2020, the cap for typical households at £1,042 was more than £1,000 below the present level of £2,074;

- The EBSS gave every household £400 onto their electricity account in the 2022-23 winter. For our sample, this substantially reduced, but did not eliminate, self-disconnection from electricity – almost half of households still had insufficient money to keep supply on all the time. The EBSS had no effect on the rate of disconnections from gas, which remained high. By implication, £400 is insufficient support for electricity, and so should be increased to £500 to virtually avoid all self-disconnections. The average UK household spends roughly equal amounts of money on gas and electricity, so a further £500 should be given to reduce gas costs, making the support £1,000, in total.

Two different options for paying this are:

A monthly lump sum per household, at £167 per month from October 2023 to March 2024, which is equivalent to £5.50 per day. However, this method would not work reliably for legacy pre-payment meter households – who would need to claim vouchers - and so is not universally applicable.

Or a **reduced tariff**. It is relatively easy for an energy supplier to change the tariff for a customer, particularly for those on a smart meter, if instructed by the Government. In this option, the support would be provided by reverting back to the unit rates applicable in October 2020, when the cap for a typical household was £1,042. Using this lower tariff would, therefore, equate to paying £1,000 to households if they used the typical consumption of 12,000kWh of gas and 2,900kWh of electricity.

Many fuel-poor households are not using this much energy, particularly now with high prices, although they are likely to need to increase their consumption (because they are almost certainly under-heating).

The lower unit rates (3.5p/kWh for gas and 12.5p/kWh of electricity) would, therefore, apply to all the consumption of an eligible household. This open-ended approach reduces the problem of fuel poor households who need to use large amounts of energy (owing to a large-sized house or family and energy inefficient homes). At these lower prices, their consumption would be expected to increase from present levels and, thus, to reduce their fuel poverty, but not eradicate it.

There are pros and cons for these different payment options in terms of fairness, practicality and the psychology of budgeting. We believe either could work for most households, but the lump sum payment would not be suitable for legacy prepayment meter customers, owing to the technical impossibility of adding credit to a legacy prepayment meter, and vouchers not being a suitable alternative. Therefore, the reduced tariff is our preferred method.

All other households would continue paying the unit rates and standing charges set by Ofgem in the price cap for the typical household.

Targeting

In an ideal world, a support payment would go to all fuel poor households, and only those households. However, as shown earlier, there is disagreement around the number of fuel poor households. To recap, Government figures[33] in 2022 suggest there were 3.26 million fuel poor households in England, whereas using a different definition of fuel poverty gives an estimate as high as 18 million UK households[34]. Led by our data, we believe the current English definition of fuel poverty significantly underestimates need. For example, the LILEE (low income, low energy-efficiency) definition excludes all households residing in a property in EPC bands A-C. This is at odds with our evidence that 63% of these households are experiencing frequent disconnections from their energy supply (Table 9), because of a shortage of money for fuel. A better definition is needed.

In addition, there is no existing targeting mechanism enabling payment to go to all households in fuel poverty. Means tested benefits (MTB) are not an adequate means of targeting--there are concerns that at least a third of the fuel poor are not included[35].

Targeting is very difficult and inevitably imperfect. The suggestions provided here are our best understanding of effective targeting options for this winter, based on customer information that energy companies already have, with some ideas for better future options also outlined.

[33] DEZNS (2023) Annual fuel poverty statistics in England (2022 data)

[34] Who are the fuel poor? - The York Policy Engine, University of York

[35] J Bradshaw & A Keung (2023) Rising Fuel Poverty. York: York University. https://www.york.ac.uk/media/business-society/research/CPAG-Poverty-173-rising-fuel-poverty.pdf

We suggest that **all** the following groups, which will overlap to some degree, are provided with the £1,000 support for winter 2023/24.

Households in receipt of Warm Home Discount	WHD is paid to certain households on means-tested benefits with payments by the energy company to the customer's electricity meter account. It is in the process of being revised to include those who have low incomes, but high energy expenditure, based on modelling the housing stock and in line with the LILEE definition of fuel poverty. The indications are that with the revised scheme from October 2023, 2.8 million households will be eligible for this benefit.
Households with prepayment meters	All households on a prepayment meter – up to 4.5 million - whether smart or legacy. These are some of the households on the tightest budgets, and our evidence shows how high prices have reduced their energy consumption in 2022/23.
Households where electricity is the main metered fuel, but annual electricity consumption is below 4200kWh	This category is designed to include primarily households whose pattern of consumption indicates that despite having a gas meter they use electricity for heating (up to 7% of homes, based on our data). It also includes electricity-only households who have 'low' level of heating, according to Ofgem figures. This is a difficult number for us to quantify, but we estimate a total of about 1 million households.
Households vulnerable to the loss of electricity for medical reasons and are on the Priority Services Register	This is not all households on the PSR, but those with medical vulnerabilities which make continuous energy supply even more critical. Some energy companies may have lists of these households (as Utilita does). We estimate there may be up to 1 million of these households.

Adding numbers in these groups, this would amount to around 9 million UK households. However, these groups will overlap to some extent so the total number will be lower (we do not have the data to know by how much). Not all these households will be in fuel poverty, but we believe there is good evidence that the majority will be. Without additional support their use of energy, and access to the vital services it provides, will be considerably less this coming winter compared to three years ago, leading to serious suffering.

Is this policy affordable? The Government has put aside £8 billion more to support energy users in the current financial year than appears to be needed for the Energy Price Guarantee.[36] £8bn would cover £1,000 for 8 million households. Although a large sum of money, this is already set aside for help with fuel bills. All that is needed is to make sure it is paid to the fuel poor.

Better future targeting through smart data

Smart meter data should enable better targeting of help to those in most need, in future years. One suggestion is that present energy consumption could be used as the trigger for help--households that used less than a certain amount of energy (electricity and gas combined) last year would be eligible for government help this year. This assumes that low energy users are deprived

[36] Hansard, 18 April 2023: https://hansard.parliament.uk/commons/2023-04-18/debates/711D1C8D-F9CA-47B9-A0AE-A1BDEB4B81D6/EnergyPriceGuaranteeExtension

and under-consuming, whereas they could be energy-efficient or they could be the owners of second homes[37] (which inevitably have low consumption). The exact threshold would have to be researched, particularly because actual consumption gives no indication of the level of deprivation being suffered - people in cold homes need to use a lot more energy to be warm.

For Winter 2023-24, we have suggested using 4,200kWh, across both fuels, as used by Ofgem to define the 'minimum tolerable' electricity use as a targeting category. This would be very frugal use, and few households use this little – but the average yearly consumption by the electric heaters in this study was still lower, in all four years.

The advantage of expanding this approach is that it would be easy for every energy supplier to introduce for smart meter customers and to do so quickly without the complications of means-testing. An allowance based on actual consumption avoids the need for frequent adjustments as prices change. A disadvantage is the sharp cut-off – households consuming even 1kWh more than the allowance would not be entitled to any assistance. This would imply that there might need to be a taper - with lesser help for slightly higher consumers.

More generally, our research has identified groups of householders who appear to be in particular need, using very little energy or experiencing extremely high frequency and length of disconnection, and more work needs to be done to find out why their energy consumption is so low, the effects that is having on their health and well-being, and what support they need.

Experience during the Electricity System Operator's 'demand flexibility service' experiments[38], using benchmarking for individual customers, shows that smart meter data can be used in sophisticated ways to make payments to individuals based on their characteristics and patterns of energy use.

Replacing Cold Weather Payments with Extreme Weather Payments

Our analysis showed that Cold Weather Payments are currently failing to protect vulnerable households on prepay meters from disconnection in cold weather: there are more disconnections in cold weather. Support is provided too late to make a significant difference when cold weather strikes, and £25 for a week of cold weather may also be insufficient for the poorest households to keep warm. Here we present additional analysis to determine what level of support would be needed to enable households to remain warm in cold periods, and thus ensure an improved Cold Weather Payment policy - which we are calling the Extreme Weather Payment - fulfils its aim.

This section of the report uses the Cambridge Housing Model[39] v3.11 to carry out full SAP (Standard Assessment Procedure, the method behind EPCs and used in Building Regulations for energy efficiency in new homes) calculations for 12,298 dwellings surveyed as part of the English Housing Survey. The calculations used here focus exclusively on energy use for space heating, and for a single month in winter. The Cambridge Housing Model uses a modified SAP internal temperature, assuming the living room is heated to 19°C (based on evidence from monitored internal temperatures in homes in England and Scotland), with other rooms heated to around 17°C. This is likely to be similar to heating settings for households at risk of fuel poverty – accepting that some households will have higher demand temperatures, and others lower.

[37] 0.5 million households have second homes in the UK (some holiday lets may be extra, but if a business they should not be on a domestic energy tariff).
[38] https://www.nationalgrideso.com/electricity-explained/electricity-and-me/esos-demand-flexibility-service
[39] https://www.gov.uk/government/publications/cambridge-housing-model-and-user-guide

We estimate the increase in space heating costs of a single day of very cold temperature-mean temperature of 0°C (which is likely to be similar to a minimum temperature of -4°C or below). Table 11 below shows energy use for heating, and costs, for an average day in January (using 30-year average external temperature data, and nine weather regions across England), compared to a single day at 0°C. The table shows that households with gas heating would incur additional costs of £2.17 a day, on average. Households with off-peak Economy 7 storage heaters, meanwhile, would incur additional costs of £4.13 a day when it is freezing outside.

Table 11: Comparing heating costs – Average January day vs 1 day at 0°C

Mean Energy for space heating in January in an average year (kWh)	Mean Energy for space heating in January in an average year at continuous 0°C (kWh)	Difference (kWh)	Additional energy per day (kWh)	Gas daily cost increase (10.1p/kWh)	Electricity daily cost increase (19.2p/kWh)
1,664	2,331	667	21.5	£2.17	£4.13

Table 12 (below) shows a similar comparison, but the 'baseline' energy use for heating is for an average month in winter, not January. This is not unreasonable because extreme low temperatures can occur in any month from October to March. Again, costs are compared to a single day at 0°C.

Table 12 shows that households with gas heating would incur additional costs of £3.41 a day, on average. Households with Economy 7 electric heating, meanwhile, would incur additional costs of £6.49 a day when it is freezing outside.

Table 12: Comparing heating costs – Average winter day vs 1 day at 0°C

Mean monthly energy in winter for space heating in an average year (kWh)	Mean Energy for space heating in January in an average year at continuous 0°C (kWh)	Difference (kWh)	Additional energy per day (kWh)	Gas daily cost increase (10.1p/kWh)	Electricity daily cost increase (19.2p/kWh)
1,283	2,331	1,048	33.8	£3.41	£6.49

We propose 'Extreme Weather Payments' as a replacement for Cold Weather Payments, which should be paid before or during periods of very cold weather, based on predictions of such weather from the Met Office – which are already published before cold weather strikes. Extreme Weather Payments must be as simple as possible, and they must protect households with either gas or electric heating. For this reason, they must be at least £6.50 for each day the average temperature is 0°C. The Met Office does not publish average daily temperatures in advance, but it does publish minimum temperatures, so we advocate a prediction of -4°C or lower minimum temperature as the trigger for payments.

Extreme Weather Payments are needed for any period of extreme cold, since vulnerable households are already under-consuming and need support whenever extreme cold occurs. For this reason, they should be paid for each day in regions where the Met Office predicts a minimum temperature below -4°C. They should be paid in advance, not in retrospect, so the household knows they have the extra money for heating.

Eligibility could be tied to a wider group of recipients than at present, for instance the same as those getting the FBSS, so the money could also be paid by the energy supplier, directly onto the householder's energy account.

Switching from legacy to smart prepayment meters

This research could only be undertaken because the households are on a smart meter. This means that Utilita has the evidence of energy consumption, in real time, if they choose to look at it or flag it for attention. The company can intervene and provide additional support credits or interest-free loans promptly and limit periods of extreme hardship – a process that is supplemented through the active use of an app. Those prepayment meter users with a smart meter benefit from this additional support, by staying connected for longer, and using more energy than households with legacy prepayment meters, who cannot be assisted in the same way. Utilita's own research showed that their customers on a smart prepay meter had lower levels of self-disconnection than customers who still had a legacy prepay meter (or pay-as-you-go (PAYG), they are the same thing):

> 'During winter 22/23 electricity use in legacy PAYG households was down 21% compared to 3% in Smart PAYG households.'[40]

This is because with a smart meter and good over-the-phone and app support, a household can avoid a self-disconnection or be reconnected quickly after self-disconnecting, for instance if they use Friendly Credit or a longer-term interest-free loan. Also, any external financial support, such as EBSS, reaches all their accounts promptly. Legacy prepay users have to leave the house to add money to their keycard and, with the vouchers for EBSS, take them to be cashed, which many households did not do. Findings such as this confirm the benefits of being on a smart prepay, rather than a legacy meter.

The benefits of a smart meter are dependent on the way that the individual energy company responds to real time information and the extent to which Ofgem requires certain standards and enforces them. The transfer of legacy prepayment meters to smart meters should be a primary focus, together with clear guidance from Ofgem to energy suppliers as to the level of financial support and advice that should be provided – and how promptly. This expands on the present requirements for instance to provide 'Friendly Credit'.

A strong policy recommendation is to encourage households on a legacy prepayment meter to switch to a smart one. If householders have major concerns about smart meters, the energy companies, Ofgem and the government should listen carefully, establish what these concerns are and deal with them. This may require the involvement of neutral energy advice agencies and consumer organisations.

Improving the Priority Service Register (PSR)

Priority Services Register is a free support service that makes sure extra help is available to people in vulnerable situations. Being on the PSR means households get advance warning of scheduled power cuts, priority support in an emergency and other types of support[41]. Households are eligible for the PSR under a number of categories, including if they are of state pension age, are disabled or have a long-term illness, have young children or need to use medical equipment that requires an energy supply. However, our data showed that PSR households are one of the groups most likely to self-

[40] Utilita (2023) Smart energy data for fuel poverty analysis, p6

[41] https://www.ofgem.gov.uk/information-consumers/energy-advice-households/getting-extra-help-priority-services-register

disconnect: two thirds of PSR households self-disconnected each year over the four years, with a median level of seven disconnections lasting 30 hours. This seems to be the opposite of the aim of the register. We prioritise knowing who they are without giving a priority to their ability to stay on supply on a daily basis.

Utilita has an additional support category for their most vulnerable customers – they are identified by a flag on their account stating 'Do Not Off Supply' and they have to be kept on supply all year.

The whole PSR policy appears to need an overhaul and rethink, to include:

- The categories to more closely reflect the urgency of reconnection, and/or staying on supply
- Those in the most vulnerable category (e.g. using medical equipment which needs an energy supply) to have a DNOS or equivalent flag, for the whole year, so they cannot self-disconnect
- A new policy to determine how the running costs of these PSR households are met, when they themselves can no longer afford them
- Clear requirements for the suppliers to upgrade and check on membership of the PSR on a regular, at least annual, basis
- Enforcement by Ofgem that these standards are achieved in practice
- Making PSR households a focus of energy efficiency policies, so they have homes that are cheaper to keep warm; this does not ensure they have sufficient money for electricity for medical equipment
- Undertake an extensive publicity campaign as many eligible households are not even aware of the PSR's existence
- Because of the present, and continuing, crisis of high energy prices, our suggested policies have primarily focused on supporting fuel poor households' daily expenditure on energy.

Final remarks

We know that the best, long-term solution to fuel poverty is to improve the energy efficiency of the home and its energy-using equipment – a slow process. However, for these disadvantaged households, their present consumption clearly dropped in the 2022-23 period, indicating a reduced ability to cope and greater deprivation. The need for essential and immediate help before the start of the 2023-24 winter is evident and confirmed, in multiple ways, through this report.

Glossary of key terms and policies

Case
One case in this report is 1 household for 1 year. Often the energy consumption data runs for less than the full four years – possibly because the household moves home or changes supplier.

Cold Weather Payment (England, Wales and Northern Ireland)
For people on certain benefits (mainly means tested), the Cold Weather Payment (CWP) is automatically paid into their bank or building society when it is very cold in their region of the country. This is a payment of £25, after a week of continuous freezing weather (at or below 0°C), to help pay, retrospectively, for extra heating costs. In 2020-21, nearly £100 million was paid out.[42]

Energy Performance Certificates (EPCs)
EPCs are a critical plank in household energy policy in the UK, and they are used to evaluate the energy- and carbon-efficiency of dwellings on a scale from A to G. By law, every dwelling that is marketed for sale or rent must have an EPC. At present, only a tiny fraction of UK homes (3% in England, according to the English Housing Survey) are A-rated.

Fuel poverty
The traditional definition of fuel poverty is that it exists when a household is unable to obtain adequate energy services – all of them, not just heating – for less than 10% of income[43]. This is still the basis for defining fuel poverty in the devolved administrations and is still used, unofficially, in Whitehall. The official definition for England now is 'LILEE' (low-income, low energy efficiency), which links the costs needed (as opposed to spent), the accepted definition of poverty (60% of median income) and the energy efficiency of a home[44]. By this definition, households living in properties that achieve the three highest grades on the Energy Performance Certificate, bands A-C, cannot be in fuel poverty. This is an arbitrary decision by the Government that has not been supported by evidence.

Priority Services Register (PSR)
Priority Services Register is a free support service whose purpose is to ensure extra help is available to people in vulnerable situations. Being on the PSR means households get advance warning of scheduled power cuts, priority support in an emergency and other types of support[45]. Households are eligible for the PSR under a number of categories, including if they are of state pension age, are disabled or have a long-term illness, have young children or need to use medical equipment that requires an energy supply.

Self-disconnections
Self-disconnections happen when supply is cut off because there is no credit on the meter. In this report we use 'disconnections' as a shorthand. These do not happen over the weekend or evenings because Utilita extends 'Friendly Credit' at weekends and from 2pm to 10am during the week. Our analysis does not include disconnections of less than 5 minutes – we assume very short disconnections are not indicative of lack of funds.

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[42] Background and methodology: Cold Weather Payment estimates 2022 to 2023 - GOV.UK (www.gov.uk)
[43] Boardman, B (1990), *Fuel poverty: from cold homes to affordable warmth*, Belhaven Press, p201
[44] https://www.ons.gov.uk/peoplepopulationandcommunity/housing/articles/howfuelpovertyismeasuredintheuk/march2023
[45] https://www.ofgem.gov.uk/information-consumers/energy-advice-households/getting-extra-help-priority-services-register

Self-rationing
Ofgem's definition[46] is that self-rationing is where customers may deliberately limit their energy usage to help their credit last longer, or save money for other essentials. This cannot be identified from energy meter data alone.

Winter Heating Payment (Scotland)
The Winter Heating Payment (WHP)[47] does not depend on how cold the temperature gets. It is an annual payment of £50 that is mainly paid automatically to eligible households.

Warm Home Discount (WHD)
This is for people on certain benefits (mainly means tested, and similar to those used for CWP eligibility). The core group of recipients are pensioners: about 1 million out of an eligible 2.2 million households. The scheme is being revised, but last year the one-off payment of £150 was made automatically: a total of 2.2 million households received £350 million.

The revision is going to add those on a low-income with high energy expenditures, based on modelled, not actual data. Some high energy expenditures are created because people live in large energy-inefficient houses, which may favour larger families over smaller ones.

Winter Fuel Payments (WFP)
This goes to all pensioners and no-one else, regardless of income, and is paid automatically into their bank or building society accounts. It has no link, in reality, to fuel poverty, except for those pensioners who are fuel poor. Many of these payments go to wealthier pensioners who do not need support. In winter 2021-22, 11.3 million households in Great Britain received WFP[48].

[46] https://www.ofgem.gov.uk/publications/consumer-vulnerability-strategy-2025
[47] https://www.mygov.scot/winter-heating-payment
[48] DWP (2022) Winter Fuel Payment statistics, https://www.gov.uk/government/statistics/winter-fuel-payment-statistics-for-winter-2020-to-2021-and-winter-2021-to-2022

Appendix 1: How many homes in this sample were vacant?

Overall we estimated that 2%-2.4% of all homes in the sample provided by Utilita were vacant* in winter, varying from year to year.

For the households that switched to electric heating, we found between 8.5% and 15.2% of them were suspected vacant in winter. Many more were suspected vacant in 2022/23 – it is hard to be sure why: possibly because people are sharing (with partners or family members in different dwellings) to save money on bills, or perhaps in some cases because holiday homes or second homes were heated a little in winter, until the energy price rise in 2020/23.

Note that there are relatively small samples in each year - all homes from 8,607 to 9,608 – as described at the beginning of the report, this is because analysis is restricted to homes with a full heating season of data.

*Our tests for suspected vacants were:

- No electricity use and less than 5 units of gas/day, and a standard deviation for gas use less than 1. Also rarely add credit to the meter.
- On at least half of the days, electricity consumption is less than 2 kWh/day but there is credit on the meter.
- No credit added to the meter during the winter (whole 6 months) and electricity use is less than 10kWh/day.
- Hardly any variation in daily electricity use – likely just one or two appliances left on (standard deviation for the spreadsheet daily electricity consumption is less than 10% of the mean).

There is more detail in Table A1 below.

Table A1: How many homes were suspected vacant, based on four tests

	Just homes switched to electricty for heating					All homes			
Criteria	n.2019/20	n.2020/21	n.2021/22	n.2022/23		n.2019/20	n.2020/21	n.2021/22	n.2022/23
No electricity used	0	0	0	0		55	67	47	28
Unused credit	30	40	40	90		93	126	115	197
No credit added	29	37	41	1		94	101	102	4
Unvarying electricity use	6	1	1	2		17	16	16	6
Any	52	67	66	90		193	230	201	206
Number of cases in the season	609	567	556	594		9,608	9,507	9,198	8,607
Cases as percentage of the sample									
No electricity used	0.0%	0.0%	0.0%	0.0%		0.6%	0.7%	0.5%	0.3%
Unused credit	4.9%	7.1%	7.2%	15.2%		1.0%	1.3%	1.3%	2.3%
No credit added	4.8%	6.5%	7.4%	0.2%		1.0%	1.1%	1.1%	0.0%
Unvarying electricity use	1.0%	0.2%	0.2%	0.3%		0.2%	0.2%	0.2%	0.1%
Any	8.5%	11.8%	11.9%	15.2%		2.0%	2.4%	2.2%	2.4%