

Fuel poverty: review of evidence on existing interventions in Scotland

An update of ScotPHN 2016 fuel poverty literature review

Neza Javornik, Phil Mackie

Contents

[1. Introduction 3](#_Toc114837663)

[1.1. Health impacts of fuel poverty 3](#_Toc114837664)

[1.2. Factors associate with fuel poverty 3](#_Toc114837665)

[1.3. Definitions of fuel poverty 3](#_Toc114837666)

[1.4. Governmental targets 4](#_Toc114837667)

[1.5. Worsening of energy situation 5](#_Toc114837668)

[1.6. Purpose of this report 6](#_Toc114837669)

[2. Who are fuel poor in Scotland? 6](#_Toc114837670)

[2.1. Overall data 7](#_Toc114837671)

[2.2. Age of occupants 7](#_Toc114837672)

[2.3. Ownership and type of property 7](#_Toc114837673)

[2.4. Location 8](#_Toc114837674)

[2.5. Fuel source 8](#_Toc114837675)

[2.6. Income 8](#_Toc114837676)

[3. Methods 9](#_Toc114837677)

[3.1. Databases and year 9](#_Toc114837678)

[3.2. Screening 9](#_Toc114837679)

[3.2.1. Inclusion criteria 9](#_Toc114837680)

[3.3. Included studies 10](#_Toc114837681)

[4. Energy costs and income 12](#_Toc114837682)

[5. Financial and non-financial support 13](#_Toc114837683)

[5.1. Warm Home Discount 13](#_Toc114837684)

[5.2. Devolution of benefits 14](#_Toc114837685)

[6. Evaluation of financial and non-financial support 15](#_Toc114837686)

[6.1. Effect of COVID-19 15](#_Toc114837687)

[6.2. Cost of fuel 15](#_Toc114837688)

[6.3. Groups at higher risk 16](#_Toc114837689)

[6.4. The impact of financial and non-financial support schemes 16](#_Toc114837690)

[7. Energy efficiency and energy use advice 18](#_Toc114837691)

[7.1. Area-based schemes 18](#_Toc114837692)

[7.2. Home Energy Scotland Loans 19](#_Toc114837693)

[7.3. Private Rented Sector Landlord Loan 19](#_Toc114837694)

[7.4. Equity Loan scheme 19](#_Toc114837695)

[7.5. Home Energy Scotland 19](#_Toc114837696)

[8. Evaluation of energy efficiency and energy use schemes 20](#_Toc114837697)

[8.1. Energy efficiency measures 20](#_Toc114837698)

[8.1.1. Financial help and support 20](#_Toc114837699)

[8.2. Energy use 22](#_Toc114837700)

[8.2.1. Lack of knowledge 22](#_Toc114837701)

[8.2.2. Lack of support 22](#_Toc114837702)

[8.2.3. Suggested improvements 23](#_Toc114837703)

[9. Discussion 24](#_Toc114837704)

[9.1. Limitations of evidence 24](#_Toc114837705)

[9.2. Re-evaluation of schemes 24](#_Toc114837706)

[9.3. Future work 25](#_Toc114837707)

[9.3.1. Systematic strategy 25](#_Toc114837708)

[9.3.2. Improving support 25](#_Toc114837709)

[9.3.3. Evaluating short-term solutions 25](#_Toc114837710)

[9.3.4. Defining fuel poverty 25](#_Toc114837711)

[9.3.5. What’s next? 26](#_Toc114837712)

[10. Conclusions 28](#_Toc114837713)

[10.1. Recommendations in 2016 28](#_Toc114837714)

[10.2. Recommendations in 2022 29](#_Toc114837715)

[11. Appendix 1 30](#_Toc114837716)

[12. Appendix 2 31](#_Toc114837717)

[13. References 36](#_Toc114837718)

1. Introduction
   1. Health impacts of fuel poverty

Living in a cold, damp home is associated with physical and mental health problems. Heating our homes adequately, or worry that we can afford to do so, affects health and wellbeing. Sometimes, like with respiratory problems, these can be directly related to the cold and damp environment. In some cases, the effects are more indirect, as with a loss of mental wellbeing.

Fuel poverty is one of the mechanisms by which social, economic or environmental determinants of health creates and sustains inequalities that can lead to poor health.[[1]](#endnote-1)

* 1. Factors associate with fuel poverty

The following factors are known to be associated with households experiencing   
fuel poverty:

* low or insecure household income;
* living in buildings that are old or were not built to an appropriate standard and are draughty or poorly insulated houses; and
* where you live, particularly in rural areas where there more limited options for household fuel.

Fuel poverty can, therefore, affect a wider range of people in many types of households.

* 1. Definitions of fuel poverty

In Scotland, the current definitions used to identify households in fuel poverty are set out in statute and supporting regulation. The key documents are The Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019[[2]](#endnote-2) and The Fuel Poverty (Enhanced Heating) (Scotland) Regulations 2020.[[3]](#endnote-3) For the purposes of this updated evidence review it is important to note that the Act sets out precise definitions of fuel poverty and extreme fuel poverty (see [Appendix 1](#appendix1)). Also important to note is that the definition involves two criteria, both of which need to be met. The first focusses on the proportion of the household income that is required to heat parts of the household to standard temperatures for a standard period of hours and the second takes into account the degree to which the remaining household income, having taken into account heating and specific other costs, is sufficient to maintain an acceptable standard of living in line with UK Minimum Income Standard (with an uplift in rural areas). The Act also describes enhanced heating hours and temperatures which can be used for those households where individuals within the household may be more vulnerable to the consequences of cold or damp housing. The types of household which would be considered to attract the enhanced heating regime are determined by Scottish Ministers and are set out in the 2020 Regulations. Three enhanced heating regimes are set out that provide for different application of the standard or enhanced temperature and hours based on types of individuals resident in the household and the hours they spend in the household. Characteristics of those eligible for the enhanced heating regimes under the 2020 regulations focus on the age of household residents (children under the age of 5 years or people aged over 75 year), whether individuals that have physical or mental health conditions or illnesses likely to last over 12 months, or if someone is in receipt of benefits received for a care need or disability.

In all discussion around fuel poverty, it should be noted that many households that are experiencing fuel poverty would not fall within the Scottish definitions of a household in poverty. The Scottish Household Conditions Survey (2019) notes that 73% of fuel poor households were also income poor in 2019, whilst 27% would not be considered income poor (2019: 70% fuel and income poor and 30% fuel poor, not income poor).[[4]](#endnote-4)

* 1. Governmental targets

The Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019 sets out targets that, by the year 2040, as far as reasonably practicable:

* no more than 5% of households in Scotland will be in fuel poverty
* no more than 1% of households will be in extreme fuel poverty
* the median household fuel poverty gap will be no more than £250   
  (at 2015 prices).

These targets are to be applied to Scotland as a whole and to the 32 local   
authorities in Scotland individually. National milestones for 2030 and 2035 were  
also established.

The Scottish Government aims to reach their targets and reduce fuel poverty in all those groups by addressing the four drivers of fuel poverty (high energy costs; low household income; poor energy efficiency of the home; and how energy is used in the home).

These are addressed in the fuel poverty strategy – Tackling fuel poverty in Scotland: a strategic approach[[5]](#endnote-5) – which was published on 23 December 2021 by the Scottish Government. It is unclear whether these targets will be revised.

* 1. Worsening of energy situation

At the same time there is every expectation that this situation is worsening. On 1 April 2022, the maximum price energy suppliers could charge households in   
England, Scotland and Wales was raised, which resulted in an increase in energy bills by up to 54%.

This, in addition to the rising costs of living related to the COVID-19 pandemic, reductions in the supply of energy fuels, and other social factors, has increased the probability of fuel poverty in Scottish households. On 8 September 2022 the Prime Minister [announced that a new Energy Price Guarantee](https://www.gov.uk/government/news/government-announces-energy-price-guarantee-for-families-and-businesses-while-urgently-taking-action-to-reform-broken-energy-market) would be introduced from 1 October 2022. This has been set at £2,500 a year and will last two years. It is lower than the original Q4 2022 price cap, substantially lower than forecasts for 2023, but still 27% above the summer 2022 cap.[[6]](#endnote-6) In addition to the price cap, both the UK and Scottish Governments have introduced various supports or mitigating measures, described in a cost of living support factsheet (published on 26 May 2022).[[7]](#endnote-7)

* 1. Purpose of this report

This report does not seek to describe the impact of the current cost-of-living crisis on the experience of, and consequences from, fuel poverty.

Rather, the present review extends the ScotPHN review which was published in 20161 in response to the growing concerns associated with the current cost of living crisis. It sets out to assess what has changed in relation to interventions and measures to reduce or prevent household fuel poverty within the context of the four drivers of fuel poverty set out by the Scottish Government. It is important to remember that the aim of the present report is to evaluate the interventions that were in place before the current cost-of-living crisis. As the research is often slow to catch up with the ongoing events, we suggest this report is used as an assessment of what has been shown to be effective in relation to lowering fuel poverty in Scotland. We believe this could help to inform approaches to resolving the current cost-of-living crisis.

1. Who are fuel poor in Scotland?

Fuel poverty statistics are routinely published as part of the Scottish House Conditions Survey (SHCS) – the most recent of which contains data from 2019.4 As such, these figures will not consider the effects of either the COVID-19 pandemic or the recent cost-of-living crisis. However, Scottish Government have provided updated estimates of fuel poverty, based on scenario modelling, to account for the impact of both the COVID-19 pandemic[[8]](#footnote-1) and the cost of living crisis[[9]](#footnote-2), which can be found on their website.

* 1. Overall data

In 2019, the SHCS indicated that there were 24.6% of households living in fuel poverty. This is slightly lower than the 2016 estimate of 25.7% (see Table 1).

The proportion of households living in extreme fuel poverty were not meaningfully different between 2016 (12.6%) and 2019 (12.4%). In terms of the median   
household fuel poverty gap (adjusted for 2015 prices), the gap in 2019 was £700 for fuel poor households.

The SHCS contains wider details relating to the size, composition of the households and characteristics of the houses themselves.

Table 1: Households in fuel and extreme fuel poverty 2016-2019

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Fuel poverty, 000 (%)** | **Extreme fuel poverty, 000 (%)** | **Sample size – households** |
| 2016 | 631 (25.7%) | 308 (12.6%) | 2,794 |
| 2017 | 583 (23.7%) | 293 (11.9%) | 2,948 |
| 2018 | 619 (25.0%) | 279 (11.3%) | 2,905 |
| 2019 | 613 (24.6%) | 311 (12.4%) | 2,950 |

Source: Clarkson, Amin and Wood, 2020.4

* 1. Age of occupants

Almost half (48%) of fuel poor households were households without children or older members. Around 16% of households living in fuel poverty were families with children and 36% were households with older people living there.

* 1. Ownership and type of property

Fuel poverty by property ownership varied, with the largest proportion of fuel poor households (44%) being owner occupiers, 38% were renting in the social housing sector and 18% in the private rental sector.

Houses accounted for 57% of fuel poor households: of which 17% were detached properties, 18% semi-detached and 23% terraced. The remaining 43% of households were flats.

* 1. Location

The fuel poverty rate in rural households was higher than urban households (rural: 29% vs. urban: 24%). However, levels of fuel poverty for remote rural households were shown to have increased from 33% in 2018 to 43% in 2019.

* 1. Fuel source

Households using electricity as their primary heating fuel remained highest for levels of fuel poverty at 43%, compared to households using gas (22%), oil (28%) and other fuel (31%) as their primary heating fuel.

A higher proportion of households with a pre-payment meter (electricity, gas or both) were in fuel poverty compared to those without a pre-payment meter, 36% compared to 22% respectively.

* 1. Income

It was noted that while low income is associated with fuel poverty, it is not equivalent. In 2019, 73% of fuel poor households were also estimated to be (relatively) income poor, with the remaining 27%, an estimated 165,000 households, not considered income poor. This is a broadly similar pattern to 2018 (70% fuel and income poor and 30% fuel poor not relatively income poor).

It is regrettable that the SHCS does not record any details which may assess the proportion of households in fuel or extreme fuel poverty where individuals within   
the household may be vulnerable to poor health as a consequence of being in   
fuel poverty.

1. Methods

This review was undertaken as a scoping review following PRISMA 2020 guidelines for systematic reviews.[[10]](#endnote-8)

* 1. Databases and year

The search was carried out using a combination of terms for fuel poverty and included searches of the following databases: Google Scholar, Medline, Web of Science and a grey literature search.

We focused on the period between 2016 and 2022 to ensure the inclusion of the relevant research since the last ScotPHN fuel poverty update.1

* 1. Screening

The titles and abstracts of all identified studies were screened for relevance. To be included, articles had to be published in English between 2016 and 2020 and had to focus on drivers of fuel poverty.

* + 1. Inclusion criteria

After the initial screening, abstracts were read in-depth to determine whether studies were looking at the drivers of fuel poverty. Then, full-text articles were read to be excluded if in-depth examination had showed that any of the inclusion criteria were not applicable. The exact number of papers excluded at each step can be seen in **Figure 1**.

In total, 36 new papers published since 2016 were selected for the final inclusion (16 from grey literature). An attempt was made to allocate the papers according to which of the four drivers they primarily addressed. This did not prove helpful, so the decision was taken to split into those which addressed energy costs and income (nine papers) and those considering energy efficiency and energy use (18 papers). The remaining nine were included to provide information on (updated) broader fuel poverty background.

* 1. Included studies

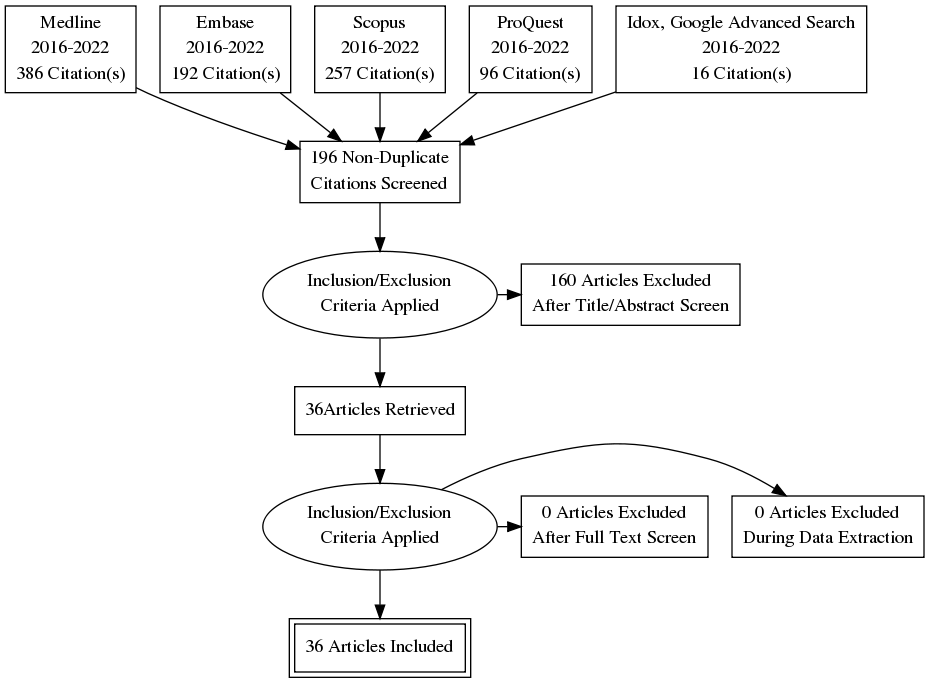
The included papers were read in-depth. The extracted information from the studies included country, author, type of study, year of publication, setting, population, intervention type and which driver of fuel poverty they were addressing.

The studies were synthesised qualitatively, with an emphasis being placed on what the more recent literature added to the findings of the 2016 ScotPHN review.1

The results section includes a high-level summary of these studies. The individual studies and their characteristics that were included can be found in [Appendix](#appendix1) 2.

What constitutes fuel poverty as a potential social and economic circumstance, is defined differently depending on the country in which the research was conducted. These variations in definitions have had an impact on the types of analyses we could conduct. For example, meta-analysis of the effectiveness of interventions would be difficult due to differently defined demographics. Furthermore, the changes in legislative approaches to defining fuel poverty within the same countries through the years mean that certain interventions, included in this review, might have been conducted under a different definition than others, despite their identical geographical location. Therefore, to maximise the understanding of this heterogeneous landscape, the present review aimed to qualitatively evaluate and synthesise the selected studies to see what appears to be effective when addressing drivers of fuel poverty.

Figure 1: The screening process for updating the evidence base on fuel poverty since the ScotPHN 2016 review



1. Energy costs and income

In relation to energy costs, the ScotPHN 2016 review1 commented:

‘There is little to indicate at present that in the medium to long term, gas and electricity prices will fall.’

At that time, a significant increase in prices due to a very challenging geo-political situation was not envisaged.

Factors such as dependence on fuel imports (especially of imported gas which rose by 312% between 2020 and 2021),[[11]](#endnote-9) the perceived impact of the ‘green levy’ on energy providers, and the consequences of the COVID-19 pandemic are likely to continue to sustain the recent rise of energy prices.

These will create even more pressure on the ability of households to afford   
energy directly or pay for goods and services that also have to deal with increased fuel costs.

It is against this background that the relationship between relative household poverty and fuel poverty is understood, but – importantly – is not seen as equivalent.4

1. Financial and non-financial support

Major sources of financial support from the Scottish Government identified in the ScotPHN 2016 review1 were the Winter Fuel Payment[[12]](#endnote-10) and the Cold Weather Payment10 scheme.

In addition to these, a number of schemes providing financial and non-financial support were identified including: the Warm Home Discount scheme;[[13]](#endnote-11) supplier-based energy trust funds (e.g., Scottish Power’s Hardship Fund);[[14]](#endnote-12) suppliers’ Priority Service Registers[[15]](#endnote-13) providing non-financial advice and priority reconnection for vulnerable consumers.

* 1. Warm Home Discount

This review noted the continuation of some of the same schemes. The Warm Home Discount (WHD) scheme is still operational. In 2020, the scheme reported11 that 229,938 households received the WHD in Scotland (2018 figures), which represented 9.3% of Scottish households. At the same time, 25% of Scottish households were defined as fuel poor, which suggests that a majority of households in fuel poverty did not access the WHD.

Importantly, the WHD highlights that of those defined as fuel poor but not eligible for WHD, there was a high concentration of working-age households (68%), in particular single households.

In terms of reducing fuel poverty levels, the WHD was more effective when received in addition to energy-related social securities, which is reported as providing a reduction to fuel costs of 22.1%. For those living in debt, the WHD was less effective and was not considered very beneficial by the recipients.

Energy trust funds are still offering grants and the Priority Service Register is still in place; however, the 2022 review found no new evaluations of these schemes.

* 1. Devolution of benefits

With the devolution of benefit awarding powers from the UK Government to the Scottish Government, financial support arrangements to address fuel poverty have been changed.

From winter 2022, the Cold Weather Payment (CWP) of £25 for every 7-day period of very cold weather will be replaced with Low Income Winter Heating Assistance (LIWHA).[[16]](#endnote-14) This provides a new £50 winter heating payment paid annually to those low-income households currently eligible for the CWP, regardless of the weather.

The CWP was evaluated by the Scottish Government in 2021, with the findings showing there is general support for replacing the current CWP, and three-fifths (61%) agreed LIWHA is an effective way to tackle winter heating costs for people on low incomes.

Similarly, the Winter Fuel Payment was replaced in Scotland by Winter Fuel Assistance, which redefined the conditions under which the payments were received.

From 2021, any family living in Scotland with a child who is in receipt of the higher rate component of Disability Assistance for Children and Young People is eligible for Winter Heating Assistance, while those that were eligible under the previous conditions remain so.

No evaluation of the effectiveness of these schemes has been put in place.

1. Evaluation of financial and non-financial support

Studies that have evaluated financial and non-financial support schemes show that the rising cost of fuel pushes people into fuel poverty through various factors:

* large fuel bills based on estimates not actual readings[[17]](#endnote-15)
* errors with charges made by the energy supplier
* general poor financial management by the householder
* the need for longer and higher heating regimes due to disability.[[18]](#endnote-16)

In remote areas, supplier mistakes and inaccuracy with billing and breakdown of supplier-customer relations was found to be a considerable part of energy advice service workload.[[19]](#endnote-17)

* 1. Effect of COVID-19

A study by the Energy Savings Trust[[20]](#endnote-18) found that the COVID-19 pandemic increased the financial pressure on households. For example, 61% of Scottish residents claimed to have used more energy in 2021 due to the pandemic, which has resulted in energy bills rising by an average of 15%.

People were greatly concerned about their energy bills, with 70% worried about   
their bills going up in the future. In the study, of the 316 people who claimed to be living in fuel poverty, almost half (46%) attributed this to COVID-19 lockdown and   
its consequences.

* 1. Cost of fuel

Across all the studies, concerns were voiced about high and rising costs of fuel, worry about being able to afford to heat the home, and difficulties reported in keeping track of usage particularly for those with electric heating and/or those who lived in rural areas.

Scottish Government's enquiry into the lived experience of fuel poverty showed there was a preference for pre-paid gas and electricity meters because the households could see what they are using, even though these meters are comparatively   
more expensive.[[21]](#endnote-19)

* 1. Groups at higher risk

For some participants, the rising cost of fuel made it difficult to afford other necessities such as food.15 In a study in the Western Isles, the cost of heating was found to be significantly higher than on the UK mainland, indicating that those residents paid more because of their remoteness.[[22]](#endnote-20) A study with refugees found that some lacked knowledge about the cost of fuel.[[23]](#endnote-21)

The evidence[[24]](#endnote-22) suggests that certain groups (rural, minorities, lower socioeconomic status, and people with disabilities and long-term illnesses) were more likely than others to report to have been struggling financially or to have problems heating their homes. They were also likely to express a greater need for support.

This indicates that certain groups are likely to be already disadvantaged and more likely to suffer from both social and health consequences of fuel poverty. Therefore, it is crucial, particularly in the light of the current cost of living crisis, to re-evaluate the eligibility criteria for financial support schemes to identify whether they capture all of those groups.

* 1. The impact of financial and non-financial support schemes

Overall, research suggests that while there is an advantageous element to financial and non-financial support schemes in Scotland, there is little information available on how effective these support schemes are in the longer term.

Only one study directly sought to address this gap.[[25]](#endnote-23) The study investigated the effectiveness of analysis of a potential increase in household cash payments   
in Spain.

The study concluded that while it would alleviate short-term fuel poverty, it does not resolve any of the reasons for poor energy performance of the household and is as such not suitable as a means of providing a medium- or long-term solution for   
the household.

In terms of non-financial support schemes, financial and energy literacy seem to be poor, particularly among those that are most affected by fuel poverty.

As such, these schemes are welcome, as they might be helpful to alleviate some of the fuel poverty issues by offering advice on energy management. However, it is important to remember that while energy and billing advice might be beneficial, it does not in itself solve the problem of poverty.

Similarly, financial support appears to be at least partially beneficial to those that receive it. However, not everyone eligible applies, and there is little evidence of it being effective in the long term.

From the public health perspective, the literature at the present time does not offer sufficient evidence to either reject or support financial and non-financial support for those who are fuel poor.

1. Energy efficiency and energy use advice

The ScotPHN 2016 review1 discussed various Scottish and UK Government home improvement loans and schemes that were being offered to homeowners, tenants, landlords or communities.

Those identified included schemes to support individual or community use of renewable energy and district heating schemes, alongside the key source of additional Scottish Government funding: Home Energy Efficiency Programmes for Scotland (HEEPS).[[26]](#endnote-24)

Of these schemes funded via HEEPS identified in the ScotPHN 2016 review1, those that are still relevant in 2022, include:

* local authority, area-based schemes,[[27]](#endnote-25) targeting energy-efficiency measures
* the range of loan schemes and advice programmes run through Home Energy Scotland:[[28]](#endnote-26)
* Warmer Homes Scotland,[[29]](#endnote-27) providing a range of advice and support measures to vulnerable homeowners and private sector tenants
* Private Rented Sector Landlord Loans,[[30]](#endnote-28) supporting home improvement measures for private landlords
* Home Energy Scotland Loans, covering a range of wider energy-related, home improvements.[[31]](#endnote-29)

All other schemes previously noted in the ScotPHN 2016 review1 have been replaced or incorporated into the Scottish Government’s programme of fuel poverty work.

New schemes identified by this review include Equity Loan scheme.

* 1. Area-based schemes

Area-based schemes have not been formally evaluated, but some research suggests that local authorities are best placed to identify and deliver energy-efficiency measures to relevant parties.19

* 1. Home Energy Scotland Loans

In 2020–2021, Home Energy Scotland Loans supported 1,221 households to install more than 1,247 renewable measures.

The number of heat pumps for which funding was committed through the Home Energy Scotland Loan scheme increased by almost a third, from 586 systems in 2019–20 to 762 systems in 2020–2021.26

* 1. Private Rented Sector Landlord Loan

The Private Rented Sector Landlord Loan supported a different demographic, providing funding for 54 measures in 44 properties over the 2020–2021   
financial year.28

* 1. Equity Loan scheme

In 2017, the Scottish Government piloted the Equity Loan scheme.[[32]](#endnote-30) It is designed to help homeowners improve the energy efficiency of their home and make certain repairs to the fabric of the building.

The original pilot was extended in 2018 and is currently available in Argyll and Bute, Dundee, Glasgow City, Inverclyde, Perth and Kinross, Renfrewshire, Stirling and the Western Isles.

* 1. Home Energy Scotland

The scheme is accessed via Home Energy Scotland and delivered by the Energy Saving Trust.

The scheme is based on the principle of equity release and allows applicants to borrow money against the value of their property with the Scottish Government taking a security against the property.

1. Evaluation of energy efficiency and energy use schemes
   1. Energy efficiency measures

The Warmworks study[[33]](#endnote-31) evaluated various energy efficiency measures (e.g., cavity wall insulations and boiler replacements) delivered in Scotland through Home Energy Scotland. It found that participants who were classified as being fuel poor showed general awareness that making home energy efficiency improvements is a potential means of reducing fuel bills.

Most owner-occupier participants said they have installed double glazing, loft or cavity wall insulation, both self-funded and loan/grant aided.

However, most respondents in the study had not taken the initiative themselves. They had been contacted directly about the measures and schemes by their energy provider, local authority or government agency, which they appreciated.

This suggests that placing the responsibility for seeking energy efficiency support solely onto the homeowner is unlikely to lead to householders actively seeking support to change/improve home energy efficiency.

* + 1. Financial help and support

A UK study17 identified various barriers to improving the energy efficiency of homes including a requirement to make financial contributions to enable improvement work to go ahead.

The ability to access and understand advice was problematic for some. Some participants expressed feelings of frustration and powerlessness as they were not sure where to go for energy efficiency information and, where different information sources existed, which were the trustworthy sources.

There was generally less trust expressed to private sector energy companies and installers and higher levels of trust with public and third sector organisations.

Furthermore, households in the private rented sector seem to believe that they were not eligible for energy efficiency interventions due to lack of home ownership.

Households comprising those in low-paid work often assumed that support for energy efficiency measures was only targeted at people not in work. Others in the study were reluctant or unable to share personal information with scheme providers and missed out on the intervention as a result.

This indicates that even when taking initiative and approaching relevant services, householder’s experience further barriers in improving the energy efficiency of   
their homes.

* + - 1. Low-income families and households with disabled members

Low-income families and households with disabled members taking the first steps towards improvement measures described various concerns that deterred them from undertaking the work.[[34]](#endnote-32) These were:

* fears about damage and mess
* disruption to household routines
* upfront costs or uncertainty about hidden costs (such as redecoration)
* difficulties with collecting information needed for the repairs (e.g., householder with disability unable to access loft to measure amount of loft insulation and unable to pay someone else to do it)
* the amount of time (especially for those in work, those with young children, or those with debilitating health conditions)
* anxiety about the extent of physical disruption (especially for those with strict health routines).

These factors need to be considered in the context of targeting individuals in energy efficiency interventions, particularly as their willingness to participate in schemes might depend more on their physical ability than their need for home energy efficiency improvements.

* 1. Energy use
     1. Lack of knowledge

Across the studies looking into energy use, some participants did not know how to use their heating systems effectively.

In a study involving low-income families and households with disabled members, some participants reported that after the installation of energy efficiency measures, they were unclear about how to use the new systems (e.g., new boilers). They   
also felt they had not been given enough information or support about how to use   
it appropriately.32

This was also shown in other studies, for example, the lack of knowledge about using electric heating systems was a major problem for many households in the Citizen's Advice Scotland study.[[35]](#endnote-33)

* + 1. Lack of support

Furthermore, some other studies show that participants reported a lack of available information on how smart meters can save money.[[36]](#endnote-34) This indicates that installing the new technology might be a necessary, but not a sufficient step in helping people manage their energy consumption.

Without appropriate support that can educate individuals about energy efficiency and offer impartial advice about energy use, the potential of smart meters and other new technological advances in energy efficiency is diminished.

* + 1. Suggested improvements

Overall, there are a number of schemes delivered across Scotland to support energy efficiency measures that are generally welcomed by the participants. Furthermore, these schemes appear to be essential in reducing fuel poverty in the long run.

While there has been an improvement in the delivery of the schemes by centralising some of the programmes and continuing to support local authorities in their delivery of energy efficiency measures, there are still a number of barriers in accessing them.

Clearer messaging about accessibility and eligibility for schemes, as well as non-financial advice on how these measures can be best used once installed,   
would improve the overall effectiveness of the energy efficiency and energy   
use programmes.

1. Discussion

This updated review shows that the evidence base relating to fuel poverty has not changed much since 2016. All of the interventions and schemes included in this review had already been in place in 2016.

It is also clear that public engagement with these interventions has not significantly improved over recent years.

* 1. Limitations of evidence

It is important to remember that these studies all reflect a time and place prior to both the COVID-19 pandemic **and** the current cost of living crisis.

The current cost of living crisis is likely to exacerbate the impact of financial pressures on household fuel poverty.

This means that the ability to financially contribute to any kind of home improvement works has likely diminished among the general population.

Furthermore, it also indicates that while there is a place for energy use advice, this might be less effective than before 2022, as fewer people are now able to afford   
to pay.

* 1. Re-evaluation of schemes

Existing schemes and their feasibility must be re-evaluated to determine how they can be most effective in the current economic and social climate.

Additionally, given the rising cost of living and the impact this will have on financial resilience in the general population, it is unlikely that the scale and scope of these schemes and interventions will be sufficient to meet the demands posed by the number of people needing support.

* 1. Future work
     1. Systematic strategy

The papers included in the 2016 and the 2022 ScotPHN reviews suggests that a more systematic strategy, including support from integrated health, social and community care services, operating in liaison with neighbourhood and community organisations will remain very important.

* + 1. Improving support

The evidence shows that relying on individuals and householders to seek assistance proved to be a slow and poorly understood process.

Supporting existing mechanisms to help individuals and households to navigate a way through the differing criteria for eligibility and subsequently supporting them to seek and secure benefits and services is likely to be required.

This is in line with the Fuel Poverty Forum's recommendation to collaborate with existing local social and community networks, because these groups know their localities and can tailor support accordingly.

* + 1. Evaluating short-term solutions

The short-term solutions presented in the included studies typically include either direct cash supports, providing loans or similar interventions.

There has been very little evaluation of the long-term effects of these on preventing or reducing fuel poverty. Where there was an attempt to carry out an evaluation of direct financial support, the evidence indicated that it could meet immediate needs, but was not a sustainable medium-term solution to fuel poverty.

* + 1. Defining fuel poverty

Defining fuel poverty is based on decisions taken at governmental level.

The current fuel poverty indicator has a number of important advantages. It looks to the household as a whole and focuses on making homes more fuel efficient. It recognises fuel poverty as an issue related to, but distinct from, income poverty. It is also one of the few indicators that recognises disadvantage, poverty and exclusion in rural Scotland.

However, from the point of view of health and wellbeing, the focus on disposable income relative to household costs means that the current fuel poverty indicator does not directly measure the levels of ‘thermal comfort’ that households deem appropriate themselves and whether they actually achieve these levels.

There is also good evidence that certain groups (children, the elderly and groups who spend more time at home) may require a greater level of thermal comfort at home. Subjective measures of thermal comfort (self-reported by households on whether their home is warm enough in winter) might be more appropriate indicators for measuring the consequences of fuel poverty on health.

Fuel poverty as a driver of short-term loss of wellbeing and longer-term poor health is clear. In seeking to advance a population approach to preventing and reducing the health and wellbeing consequences of fuel poverty, care must be taken to recognise that the majority of interventions and schemes included in this review are examples of secondary and tertiary prevention that seek to minimise the harms that can accrue.

* + 1. What’s next?

To successfully tackle fuel poverty in Scotland, public health must recognise the need to address the social and economic inequalities that allow for the creation of fuel poverty. The current piece of work suggests which are the schemes and approaches that appear to be effective in the longer run. However, the report is not providing any estimates of how effective these interventions will be in the cost of living crisis. Potential future directions of work could include modelling of the effectiveness of the interventions in the current crisis, to predict which of the interventions should be emphasised to reduce fuel poverty in the way that is most impactful for those that are experiencing the largest inequalities.

This means supporting the development and implementation of interventions that improve individuals’ financial resilience, the quality of the housing in which they live, and help create a sustainable approach to affordable energy use on a primary prevention level.

1. Conclusions
   1. Recommendations in 2016

In 2016, the ScotPHN review1 laid out a number of recommendations which outlined the specific leadership required of the local public health team, to address the immediate challenges associated with fuel cost increases affecting households then.

* Advise/remind the NHS and wider partners on the links between fuel poverty, cold homes and ill-health.
* Explore how approaches to the delivery of the local NHS as an anchor institution could be a vehicle for addressing fuel poverty.
* Explore how best to align efforts within the national and local systems to tackle fuel poverty with investment in climate change and green jobs.
* Work with local community planning/resilience partnerships and wider partners to identify who and where those most vulnerable to fuel poverty reside within NHS Board areas, exploring the use of data and intelligence systems to support this.
* Work with partners to explore the barriers to participation in current measures and scope to extend the reach to those most in need by encouraging increased partnership with trusted sources of information and support based on lived experience input.
* Work to realise the potential for fuel poverty and cold home-related activities to be delivered as part of other health improvement/health promotion activities.
* Explore how best to minimise potential barriers to health service professional engagement with issues related to fuel poverty.
* Explore the feasibility and potential benefits of developing training for frontline staff to support their understanding of fuel poverty and the prevention of its health consequences.
* Provide specialist public health advice and guidance on monitoring and evaluating interventions and measures and to be an advocate for the inclusion of evaluation in fuel poverty interventions to better determine what works.
* Link with fuel poverty leads across local and national whole-system public health organisations to share experiences and knowledge of local measures and activities to address fuel poverty.
  1. Recommendations in 2022

In reviewing the material published since 2016, there is little to suggest that these recommendations (plus two more) have been overtaken by new and compelling evidence of what works in preventing and reducing the potential consequence of fuel poverty on health and wellbeing.

What has changed is the urgency with which the whole public health system needs to respond to these recommendations to minimise the likelihood of harms to the people across Scotland.

At the same time, responding to the fuel poverty issue within the context of the current cost of living crisis emphasises the profound need to address the social and economic causes that drive inequalities in Scotland.

1. Appendix 1

**Current Scottish Fuel Poverty Definitions**

The Scottish definition of fuel poverty as set out in legislation, where a household is in fuel poverty if:

* in order to maintain a satisfactory heating regime, total fuel costs necessary for the home are more than 10% of the household's adjusted (i.e. after housing costs) net income (and more than 20% in the case of extreme fuel poverty); and
* if, after deducting those fuel costs, benefits received for a care need or disability and childcare costs, the household's remaining adjusted net income is insufficient to maintain an acceptable standard of living.

Under this definition, a household’s adjusted after housing costs net income is net of income tax, national insurance contributions, mortgage or rent payments, childcare costs, council tax, water and sewerage charges.

The remaining adjusted net income must be at least 90% of the [UK Minimum Income Standard](https://www.lboro.ac.uk/research/crsp/mis/) to be considered an acceptable standard of living, with an additional amount added for households in remote rural, remote small town and island areas.

In 2021, 90% of the UK Minimum Income Standard ranged between £8,140 and £21,160 depending on the household type and between £10,260 and £24,590 to reflect the higher cost of living in remote rural, remote small town and island areas.

1. Appendix 2

Table 2: studies included in the summary of energy prices, income

|  |  |
| --- | --- |
| Author | Summary |
| Green M. Voices of people experiencing poverty in Scotland. Joseph Rowntree Foundation; 2017 | Focus group study with 10 focus groups in first stage with different groups in areas across Scotland and seven focus groups that Save the Children conducted with children and young people. Second stage with one focus group with selection of participants from stage one |
| Mould K, Baker R. Uncovering hidden geographies and socio-economic influences on fuel poverty using household fuel spend data: a meso-scale study in Scotland. Energy & Social Sciences 2020;31:21–31 | 15 illustrative case studies examining the geographical and social factors contributing to fuel poverty in Scotland |
| Darby S. Coal fires, steel houses and the man in the moon: local experiences of energy transition. Energy Research & Social Science 2017;31:120–127. | Interviews and observations with low-income householders and their energy advisers |
| Energy Savings Trust. Home energy programmes delivered by Energy Saving Trust in Scotland 2021. Energy Savings Trust; 2021. | An overview of Scottish home energy policy programme, delivered by Home Energy Scotland. Section 4 in the report explains the Home Energy Scotland advice service. Section 5 details the financial support made available to homeowners, tenants and landlords in Scotland to help them improve the energy performance of their homes. Section 6 focuses on programmes designed to improve the delivery of home energy improvements by the supply chain, social landlords and local authorities |
| Energy Savings Trust. How has COVID-19 affected people’s attitudes to home energy in Scotland?; 2021. | A quantitative online self-completion interviewing (CAWI) approach with a total of 2,013 Scottish respondents completing the survey between 23 March and 1 April 2021. All were aged over 18, resident in Scotland and either a leaseholder or owner-occupier |
| Lindsey K, et al. Refugees' experiences and views of poverty in Scotland. Glasgow Caledonian University; 2020. | Key informant interviews with staff from organisations working with refugees. Focus groups with 12 refugees |
| Scottish Government. The cost of remoteness - reflecting higher living costs in remote rural Scotland when measuring fuel poverty: research report; 2021 | The report estimates the percentage uplift required in remote rural areas of Scotland to calculate fuel poverty, identifying additional minimum living costs for households in remote rural Scotland that typically add 15–30% to a household budget, compared to urban areas of the UK |
| Scottish Government. Lived experience of fuel poverty: evidence review; 2021 | The report provides an overview of the current state of knowledge on the lived experience of fuel poverty in Scotland |
| Barella, R, et al. Does cash money solve energy poverty? Assessing the impact of household heating allowances in Spain; 2019 | An assessment of the impact of the potential increase of heating allowances on fuel poverty |

**Table 3: studies included in the summary of energy efficiency and energy use**

|  |  |
| --- | --- |
| Authors | Summary |
| Bray N, Burns P, Jones A, Winrow E, Edwards, RT. Costs and outcomes of improving population health through better social housing: a cohort study and economic analysis. International Journal of Public Health 2017:62(9):1039–1050 | The study assesses the impact of warmth-related housing improvements on physical health, wellbeing and quality of life of families living in social housing |
| Caballero N, Della Valle N. Tackling energy poverty through behavioral change: a pilot study on social comparison interventions in social housing districts. Frontiers in Sustainable Cities; 2021. | The study assessed the suitability of behavioural change interventions for energy inefficient behaviours by consumers, concluding that the appropriateness of such interventions depended on type (and quality) of housing |
| Charlier D, Legendre B, Risch A. Fuel poverty in residential housing: providing financial support versus combatting substandard housing. Applied Economics 2019;51(49):5369–5387. | The study, set in Italy, assesses the effectiveness of social energy subsidies and social housing to reduce fuel poverty |
| Citizen's Advice Scotland. Hard-wired problems - delivering effective support to households with electric heating. Citizen's Advice Scotland; 2018. | Citizens Advice Scotland sought to gain insight into the nature and reach of support services for those who use electric heating, and consumers’ experiences of using them, to determine if and how services could be better supported or improved |
| Darby S. Coal fires, steel houses and the man in the moon: local experiences of energy transition. Energy Research & Social Science 2017;31:120–127 | Interviews and observations with low-income householders and their energy advisers, carried out in a district of central Scotland whose economy had depended on coal and paraffin shale mining to learn how energy transitioning has worked in the past |
| Fyfe C, Telfar L, Barnard, Howden-Chapman, P, Douwes J. Association between home insulation and hospital admission rates: retrospective cohort study using linked data from a national intervention programme; 2020. | A study assessing the health impacts of retrofitted home insulation |
| Energy Saving Trust. Home energy programmes delivered by Energy Saving Trust in Scotland 2021. Energy Saving Trust; 2022. | An evaluation of home energy programmes, delivered by Energy Saving Trust |
| Grey CNB, Jiang S, Nascimento C, Rodgers SE, Johnson R, Lyons RA, Poortinga W. The short-term health and psychosocial impacts of domestic energy efficiency investments in low-income areas: a controlled before and after study. BMC Public Health 2017;17(1):140 | The study examined the relationship between energy efficiency investments to homes in low-income areas, and mental and physical health of residents, as well as a number of psychosocial outcomes likely to be part of the complex relationship between energy efficiency measures and health outcomes |
| Groves C, Shirani F, Pidgeon N, Cherry C, Thomas G, Roberts E, Henwood K. ‘The bills are a brick wall’: narratives of energy vulnerability, poverty and adaptation in South Wales; 2020 | An analysis of qualitative longitudinal data, produced from three rounds of interviews carried out in a community in south Wales, UK, offers insights into how, as a dynamic condition, energy vulnerability may arise out of complex interactions between socio-material conditions, household characteristics and capabilities |
| Melone H. Gender-based perspectives of fuel poverty in Scotland. MREs dissertation. Glasgow Caledonian University; 2019 | This qualitative research explores the gender perspectives of fuel poverty, looking in detail at energy use in the home, energy awareness, attitudes to energy conservation and energy behaviours |
| Peralta A, Camprubí L, Rodríguez-Sanz M, Basagaña X, Borrell C, Marí-Dell’Olmo M. Impact of energy efficiency interventions in public housing buildings on cold-related mortality: a case-crossover analysis. International Journal of Epidemiology 2017;46(4):1192–1201. | A case-crossover analysis of the impact of energy efficiency interventions in public housing buildings on cold-related mortality, showing positive association between retrofitting energy efficiency measures and reduced mortality |
| Sharpe RA, Williams AJ, Simpson B, Finnegan G, Jones T. A pilot study on the impact of a first-time central heating intervention on resident mental wellbeing; 2020 | A pilot study that assesses the impact of an intervention to install a new first time central heating system in order to reduce fuel poverty on household satisfaction with indoor temperatures/environment ability to pay bills and mental wellbeing |
| Snell C, et al. Working paper - policy pathways to justice in energy efficiency. UK Energy Research Centre; 2018. | A report looking at the implications of existing domestic energy efficiency policies across the four nations of the UK, and how suitable they are for those particularly vulnerable to fuel poverty |
| THAW. (n.d.). Tackling Household Affordable Warmth (THAW) Orkney | A report assessing the efficiency of energy non-financial support service carried out in Orkney |
| Wade F, Webb J, McCrone D, Wakelin J. Evaluation of HES (Home Energy Scotland) homecare pilot. Scottish Government; 2019. | A report evaluating the Scottish Government energy efficiency programme |
| Ipsos MORI, Sheldrick, B. Support needs of those in fuel poverty – research report; 2017 | A report on the demographics and the required support of those in fuel poverty |
| Sheriff G et al. Fuel poverty in the Western Isles: 10 lessons. Interim report of the moving together project. University of Salford; 2019 | A report evaluating the financial and non-financial support services offered in Western Isles |
| Warmworks. Projects - helping to make homes warmer and more energy efficient; 2022. Retrieved February 22, 2022, from [www.warmworks.co.uk/projects](http://www.warmworks.co.uk/projects) | An evaluation of various home renovation schemes, offered in Scotland |

1. References

1. Arnot, J. Fuel poverty: overview. ScotPHN. NHS Health Scotland; 2016. [www.scotphn.net/wp-content/uploads/2016/11/2016\_11\_10-Fuel-Poverty-JA-Lit-review.pdf](http://www.scotphn.net/wp-content/uploads/2016/11/2016_11_10-Fuel-Poverty-JA-Lit-review.pdf) [↑](#endnote-ref-1)
2. The Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019. https://www.legislation.gov.uk/asp/2019/10 [↑](#endnote-ref-2)
3. The Fuel Poverty (Enhanced Heating) (Scotland) Regulations 2020. https://www.legislation.gov.uk/sdsi/2020/9780111043677 [↑](#endnote-ref-3)
4. Clarkson A, Amin R, Wood C. Scottish House Condition Survey: 2019 key findings. Technical report. The Scottish Government; Edinburgh; 2020. [↑](#endnote-ref-4)
5. Scottish Government. Tackling fuel poverty in Scotland: a strategic approach. (2021) <https://www.gov.scot/publications/tackling-fuel-poverty-scotland-strategic-approach/#:~:text=The%20fuel%20poverty%20strategy%20sets,)%20(Scotland)%20Act%202019.> [↑](#endnote-ref-5)
6. Bolton, P. & Stewart, I. Domestic Energy Prices: Research Briefing. (2022). https://researchbriefings.files.parliament.uk/documents/CBP-9491/CBP-9491.pdf [↑](#endnote-ref-6)
7. H.M. Treasury. Cost of living support factsheet: 26 May 2022. (2022). [↑](#endnote-ref-7)
8. [Experimental analysis of the impact of COVID-19 on Fuel Poverty Rates Report](https://www.gov.scot/binaries/content/documents/govscot/publications/research-and-analysis/2020/08/scottish-house-condition-survey-additional-analysis/documents/experimental-analysis-of-the-impact-of-covid19-on-fuel-poverty-rates-report/experimental-analysis-of-the-impact-of-covid19-on-fuel-poverty-rates-report/govscot%3Adocument/Experimental%2Banalysis%2Bof%2Bthe%2Bimpact%2Bof%2BCOVID-19%2Bon%2BFuel%2BPoverty%2BRates%2BReport.pdf) [↑](#footnote-ref-1)
9. [A stronger and more resilient Scotland: the Programme for Government 2022 to 2023](https://www.gov.scot/publications/stronger-more-resilient-scotland-programme-government-2022-23/) [↑](#footnote-ref-2)
10. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. Systematic Reviews 2021;10(1):1-11. [↑](#endnote-ref-8)
11. ONS. Trends in UK imports and exports of fuels; 2022. [www.ons.gov.uk/economy/nationalaccounts/balanceofpayments/articles/trendsinukimportsandexportsoffuels/2022-06-29](https://www.ons.gov.uk/economy/nationalaccounts/balanceofpayments/articles/trendsinukimportsandexportsoffuels/2022-06-29) [↑](#endnote-ref-9)
12. Scottish Government. Help with heating costs. Policy. Scottish Government: Edinburgh; 2021. [www.gov.scot/policies/social-security/help-with-heating-costs/](https://www.gov.scot/policies/social-security/help-with-heating-costs/) [↑](#endnote-ref-10)
13. UK Government. Warm Home Discount Scheme; 2020. [www.gov.uk/the-warm-home-discount-scheme](https://www.gov.uk/the-warm-home-discount-scheme) [↑](#endnote-ref-11)
14. Scottish Power. Hardship Fund; 2022. <https://community.scottishpower.co.uk/t5/Extra-Help/Hardship-Fund/ta-p/53> [↑](#endnote-ref-12)
15. Ofgem. Priority Service Registers; 2022. [www.ofgem.gov.uk/getting-extra-help-priority-services-register#:~:text=The%20Priority%20Services%20Register%20is,operator%20to%20get%20on%20it](https://www.ofgem.gov.uk/getting-extra-help-priority-services-register#:~:text=The%20Priority%20Services%20Register%20is,operator%20to%20get%20on%20it) [↑](#endnote-ref-13)
16. Scottish Government. Low Income Winter Heating Assistance (LIWHA): consultation. Scottish Government: Edinburgh; 2021. [www.gov.scot/publications/consultation-low-income-winter-heating-assistance-liwha/](http://www.gov.scot/publications/consultation-low-income-winter-heating-assistance-liwha/) [↑](#endnote-ref-14)
17. Green M. Voices of people experiencing poverty in Scotland. Joseph Rowntree Foundation; 2017. [↑](#endnote-ref-15)
18. Mould K, Baker R. Uncovering hidden geographies and socio-economic influences on fuel poverty using household fuel spend data: a meso-scale study in Scotland. Energy & Social Sciences 2020;31:21 –31. [↑](#endnote-ref-16)
19. Darby S. Coal fires, steel houses and the man in the moon: local experiences of energy transition. Energy Research & Social Science 2017;31:120–127. [↑](#endnote-ref-17)
20. Energy Savings Trust. Home energy programmes delivered by Energy Saving Trust in Scotland 2021; 2021. [↑](#endnote-ref-18)
21. Scottish Government. Lived experience of fuel poverty: evidence review; 2021. [↑](#endnote-ref-19)
22. Sheriff G, et al. Fuel poverty in the Western Isles: 10 lessons. Interim report of the moving together project. University of Salford; 2019. [↑](#endnote-ref-20)
23. Lindsey, K. et al. Refugees' experiences and views of poverty in Scotland. Glasgow Caledonian University; 2020. [↑](#endnote-ref-21)
24. Ipsos MORI, Sheldrick B. Support needs of those in fuel poverty – research report; 2017. [↑](#endnote-ref-22)
25. Barrella R, Linares JI, Romero JC, Arenas E, Centeno E. Does cash money solve energy poverty? Assessing the impact of household heating allowances in Spain. Energy Research & Social Science 2021;80:102216. [↑](#endnote-ref-23)
26. Scottish Government. Home energy and fuel poverty; 2021. [www.gov.scot/policies/home-energy-and-fuel-poverty/energy-saving-home-improvements/](https://www.gov.scot/policies/home-energy-and-fuel-poverty/energy-saving-home-improvements/) [↑](#endnote-ref-24)
27. Scottish Government. Area-based schemes; 2016. [www.gov.scot/policies/home-energy-and-fuel-poverty/energy-saving-home-improvements/](https://www.gov.scot/policies/home-energy-and-fuel-poverty/energy-saving-home-improvements/) [↑](#endnote-ref-25)
28. Home Energy Scotland. [www.homeenergyscotland.org/](https://www.homeenergyscotland.org/) [↑](#endnote-ref-26)
29. Home Energy Scotland. [www.homeenergyscotland.org/find-funding-grants-and-loans/warmer-homes-scotland/](https://www.homeenergyscotland.org/find-funding-grants-and-loans/warmer-homes-scotland/) [↑](#endnote-ref-27)
30. Home Energy Scotland. [www.homeenergyscotland.org/find-funding-grants-and-loans/private-landlord-loans](https://www.homeenergyscotland.org/find-funding-grants-and-loans/private-landlord-loans) [↑](#endnote-ref-28)
31. Home Energy Scotland. [www.homeenergyscotland.org/make-my-home-warmer/](https://www.homeenergyscotland.org/make-my-home-warmer/) [↑](#endnote-ref-29)
32. Scottish Government. Improving energy efficiency; 2018. [www.gov.scot/news/improving-energy-efficiency/](http://www.gov.scot/news/improving-energy-efficiency/) [↑](#endnote-ref-30)
33. Warmworks. Projects - helping to make homes warmer and more energy efficient; 2022. Retrieved 22 February 2022, from w[ww.warmworks.co.uk/projects/](https://www.warmworks.co.uk/projects/) [↑](#endnote-ref-31)
34. Snell C, et al. Working paper - policy pathways to justice in energy efficiency. UK Energy Research Centre; 2018. [↑](#endnote-ref-32)
35. Citizen's Advice Scotland. Hard-wired problems - delivering effective support to households with electric heating. Citizen's Advice Scotland; 2018. [↑](#endnote-ref-33)
36. Melone H. Gender-based perspectives of fuel poverty in Scotland. MREs dissertation. Glasgow Caledonian University; 2019. [↑](#endnote-ref-34)