



Fuel Poverty Evidence Review

Defining, Measuring and Analysing Fuel
Poverty in Scotland

Fuel Poverty Evidence Review: Defining, Measuring and Analysing Fuel Poverty in Scotland

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Executive Summary

This report examines issues around the nature and measurement of fuel poverty in Scotland. It draws on data from the Scottish House Condition Survey (SHCS) which has been the official source of descriptive statistics on fuel poverty since 1996, as well as information from the wider evidence base, including the *John Hills Fuel Poverty Review 2011-12* undertaken for England and Wales.

The Scottish Government is committed to reducing fuel poverty. In 2002 the (then) Scottish Executive in its *Scottish Fuel Poverty Statement* set a target of eradicating fuel poverty as far as reasonably practicable by 2016. **Chapter 1** describes the extent and trends of fuel poverty in Scotland, how it is currently measured and what drives fuel poverty, namely fuel prices, household income and the energy efficiency of housing. Fuel poverty has risen steadily since 2002 reaching a peak in 2009 of 766,000 households, dropping to 658,000 in 2010. This is largely attributable to the dramatic rise in fuel prices and stagnation of income. If current trends continue, it is projected that the median household will be pushed into fuel poverty from 2012. Home energy efficiency improvements alone cannot lift people out of fuel poverty given the current economic conditions, though it could be argued that they provide a more long-lasting protection from fuel poverty than income or fuel pricing, which vary over time.

Chapter 2 considers how fuel poverty impacts on the lives and well-being of individuals and households. Despite an entrenched position linking low indoor temperatures to poor health and excess winter deaths, analysis of the Scottish fuel poverty data fails to show a clear and direct link between fuel poverty and diminished health, specifically respiratory and circulatory health in the elderly and asthma in children. There is no coherent evidence base to support an association between excess winter deaths and fuel poverty in Scotland. There is some evidence of a link between satisfaction with heating (thermal comfort) and mental well-being but again it is associative rather than causal. The wider evidence base suggests that the risk of mental health and social problems in children and young people increases the longer they live in cold homes. As actual indoor temperatures are not captured in the SHCS, it is not known whether fuel poor households live at temperatures that could endanger their health. Further research is needed to explore the direct effects of fuel poverty on the wellbeing of the people in Scotland, if any.

The review then aims to go beyond the annual fuel poverty statistics and explore in greater depth who the 'fuel poor' are and what kind of housing they occupy. **Chapter 3** examines fuel poor households across a wide range of factors including household income, employment, housing tenure, under-occupancy and housing energy efficiency. The classification of fuel poor households depends to a large extent on how fuel poverty is defined. Not surprisingly, given the current definition, fuel poor households are more likely to be elderly, living on a low income, in energy inefficient housing. Only 7% of people in full-time employment experience fuel poverty. That being said, over half of fuel poor households are *not* in receipt of means-tested benefits, disability living allowance or tax credits, which tend to be the primary

means through which fuel poverty programmes are targeted. Not only that, half of households that own their properties outright experience fuel poverty. Both these factors suggest that there is a large proportion of fuel poor households that could be missed by fuel poverty interventions. Some households are fuel poor because of their house rather than their income, whilst others are fuel poor because of their income not their house, which raises questions about the underlying nature and definition of fuel poverty.

This disparity is examined further in **Chapter 4** which assesses what distinguishes fuel poverty from income poverty and how this relates to thermal comfort. Pensioner households are most likely to be fuel poor irrespective of income poverty, whilst families appear to be least likely to experience either type of poverty. Fuel poor households are more likely to own their homes outright, while income poor households are more likely to live in social housing. This may explain why fuel poor households on low incomes are more likely to live in energy efficient housing than fuel poor households on moderate/high incomes (social housing tends to be more efficient). Over a third (38%) of fuel poor households are *not* on a low income. Fuel poverty is therefore not only distinct from income poverty, but different levels of income within fuel poverty result in different ‘types’ of fuel poor households and associated energy behaviours.

Chapter 5 attempts to identify different ‘types’ of fuel poverty in order to inform the targeting of fuel poverty policies. Fuel poverty is analysed across three dimensions: household, dwelling and geographical area. A number of typologies at the household level are identified which provide good coverage of the fuel poor population (e.g. older home owners not in receipt of benefits who live in under-occupied houses). However, this methodology is unsuccessful at identifying the fuel poor in the general population. Similarly, analysing the potential of different housing types for energy efficiency improvements fails to reveal a clear message for prioritising one housing type over another, as fuel poor households can be found in all types of housing. However, preliminary mapping of fuel poverty at a sub-local authority area level appears to provide a more promising approach to targeting (area-based) fuel poverty programmes.

It seems that the classification of households as fuel poor is entirely determined by the construction of the fuel poverty metric. **Chapter 6** provides an in-depth analysis of the *Hills Fuel Poverty Review* and specifically the alternative measurements proposed in the *Interim Report* and the recommended measure in the *Final Report*. For each option, the impact on the level of fuel poverty in Scotland is considered. The new (Hills) definition would halve (modelled) fuel poverty in Scotland, and lean the distribution of fuel poverty away from older people. The chapter also considers a range of adjustments to the Scottish definition which address some of its inherent biases and known ‘weaknesses’. These include removing high income households currently classed as fuel poor, raising the pensioner age in line with current thresholds, and restricting the measurement of fuel poverty to the cost of heating and hot water. This last change would be relevant were fuel poverty to be considered as a ‘heat poverty’ issue rather than an ‘energy poverty’ one. All these adjustments lead to varying reductions in fuel poverty across different household types.

Fuel poverty is traditionally conceived as a social problem which affects people living in poor housing who cannot afford to heat their homes adequately. Its conception and nature is embedded in health concerns relating to low indoor temperatures. This report challenges these concepts of fuel poverty, both by uncovering the unclear link between fuel poverty and negative health outcomes in Scotland, and by highlighting the relatively high proportion of fuel poor households on moderate to high incomes (38%), those not in receipt of benefits (59%) and those living in efficient housing (40%).

The final **Chapter 7** poses these questions and considers how valid a measurement the current definition is of the real experience of fuel poverty, and what the policy implications of the report findings are. A number of targeting strategies and suggestions for future programmes are presented, including widening the focus from heating to other energy-saving improvements, and from individual households to communities (e.g. for off-grid housing). It is noted that incentives that reduce fuel costs (e.g. social tariffs) will be more effective at reducing fuel poverty than those that increase income (e.g. benefits). The chapter outlines the current UK and Scottish fuel poverty programmes and presents an outcome-based approach. Finally, key areas for future research are highlighted including the relationship between temperature and health, perceptions of thermal comfort (only 7% of fuel poor households report themselves as such) and the energy behaviours of fuel poor households.

Chapter 1 What and where is fuel poverty?

- 1 This chapter covers:
 - the concept of fuel poverty
 - how fuel poverty is currently measured
 - rates and distribution of fuel poverty in Scotland
 - the main drivers of fuel poverty: fuel pricing, income and energy efficiency

Key messages

- The Scottish Government has pledged to ensure that by November 2016, so far as is reasonably practicable, people are not living in fuel poverty in Scotland.
- According to the latest Scottish House Condition Survey there were 658,000 households living in fuel poverty (28%) in Scotland in 2010.
- Fuel poverty has risen steadily since 2002 reaching a peak in 2009 of 33% (766,000). The three year average for 2008-10 is 29%, or 681,000 households.
- If current trends in energy costs and income continue, it is projected that fuel bills will exceed 10% of median household income by 2012 pushing the average household into fuel poverty.
- Rural areas are at highest risk from fuel poverty, likely due to a lack of access to cheaper fuels.
- Scotland and England both currently use a fuel poverty threshold measurement of 10% of household income, but the approaches to modelling energy running costs and defining incomes differ. The varying rates cannot therefore be directly compared.
- Levels of fuel poverty are most susceptible to fuel prices, followed by household income and then the energy efficiency of housing.
- Fuel costs have risen almost six times faster than household income since 2004. This is one of the main causes of the rise in fuel poverty seen in recent years.
- Energy efficiency improvements alone cannot lift people out of fuel poverty when situated within the context of rising fuel prices and stagnant incomes.

1.1 Introduction

“Fuel poverty is a recognized social problem that affects the poor, with its roots in the quality of housing and cost of fuel”

(Boardman, 2010)

- 2 Fuel Poverty has been recognised as a problem in the UK since at least the mid-1970s when there was an observation that many people had difficulty in paying their energy bills due to low income and high and rising fuel costs. At the time fuel poverty was broadly defined as not being able to afford to keep warm. **One of the earliest concerns was the detrimental effect of cold homes on health.** Since then, the concept of fuel poverty has gained increasing political recognition and is now a cross-cutting policy issue at the forefront of poverty and climate change strategies.
- 3 The UK Government launched its Fuel Poverty Strategy in 2001 (DEFRA, 2001) which embedded fuel poverty within government policy and set out ambitious targets. In 2002, the Scottish Executive (as it was known at the time) launched the Scottish Fuel Poverty Statement (Scottish Executive, 2002) which echoed the aims of the UK strategy and set statutory fuel poverty targets¹. At the time, there were an estimated 4 million fuel poor households in the UK. This rose to a peak of around 5.5 million in 2009. **In Scotland, an estimated 28% (658,000) of households were living in fuel poverty in 2010.** Scotland has a greater proportion of fuel poor households than both England and Wales, but less than Northern Ireland. The proportion of fuel poor households is affected by the housing stock, the type of heating fuels, the required heating season and the level of household income, as well as the methodology used to measure fuel poverty² (DECC, 2011 p11).
- 4 The definition as it is known today was conceived following the publication of Brenda Boardman’s landmark book, *Fuel Poverty*, in 1991. The book set out the ‘10%’ indicator, which later became the official definition for fuel poverty in the UK. Its measurement was introduced in the mid-1990s, alongside the inception of the English House Condition Surveys.
- 5 The Scottish House Condition Survey started in 1991 and annual surveys have run since 2003, which has enabled the Scottish Government to track housing and fuel poverty trends over a considerable length of time (Section 1.2).
- 6 The **definition of fuel poverty** is based on a theoretical calculation of how much it would cost to heat a dwelling according to a specified heating regime and assumptions about use of lighting, hot water, cooking and appliances. The Scottish Government uses the following definition of fuel poverty as set out in the Scottish Fuel Poverty Statement:

A household is in fuel poverty if it would be required to spend more than 10% of its income (including Housing Benefit or Income Support for Mortgage Interest) on all modelled household fuel use.

¹ This pledge is a statutory duty under Section 88 of the Housing (Scotland) Act 2001.

² See Chapter 3 for a detailed description of how fuel poverty is calculated in Scotland.

- 7 **The Scottish Government is committed to alleviating fuel poverty “so far as is reasonably practicable” in Scotland by November 2016, under Section 88 of the Housing (Scotland) Act 2001.** The Scottish Government is required to take specific action to meet its fuel poverty target as set out in the annual Scottish Fuel Poverty Statement, the last of which was published in November 2011. A description of fuel poverty programmes is provided in Chapter 7.
- 8 In **Europe**, recognition of fuel poverty, or ‘energy poverty’ as it is often referred to, has been slower. However, as more (Eastern) European countries have joined the EU and energy prices have risen (e.g. through the removal of energy subsidies and privatisation of utility companies in these countries), fuel poverty has become an increasing EU concern (see Buzar, 2007). The European Commission now requires action on fuel poverty in all Member States, through the revised Electricity Directive.
- 9 It is difficult to compare fuel poverty in Scotland with other EU countries as there is no single European definition of fuel poverty (Boardman, 2010). Indeed, the UK is the only European country that has attempted to define fuel poverty (European Fuel Poverty and Energy Efficiency Project³). The UK appears to fare less well on accepted fuel poverty indicators, such as excess winter deaths (EWD), than other Northern European countries with similar climates (Bowie & Jackson, 2002; Xero, 2008). This is attributed to less energy efficient housing in the UK (see, for example, Consumer Focus Scotland, 2010). However, UK EWD rates are comparable with warmer countries such as Spain which suggests that EWD may not be the best indicator of fuel poverty. See section 2.2 for a more detailed discussion of EWD.
- 10 Within the academic community a new discourse around fuel poverty is emerging which considers the concept of ‘**energy vulnerability**’. This approaches fuel poverty within a wider framework encompassing notions of equity and justice in energy systems. Energy vulnerability addresses vulnerability at a social rather than individual or household level. It focuses on a wider range of impacts than those traditionally associated with fuel poverty – such as stress, social isolation and disrupted work or study – and emphasises building ‘energy resilience’ (Walker et al, 2011).
- 11 InCluESEV (Interdisciplinary Cluster on Energy Systems, Equity and Vulnerability⁴), a multidisciplinary group with members from academia, industry and non-governmental organisations, has developed the concept of energy vulnerability over the last two years (papers pending). In their response to the Hills Fuel Poverty Review Interim Report (Hills, 2011), they challenge the methodology used to calculate fuel poverty and question its ability to incorporate the full range of factors involved in producing energy vulnerability,

³ See EPEE Project - *Definition and Evaluation of fuel poverty in Belgium, Spain, France, Italy and the United Kingdom: WP2 Deliverable 7* (p5) <http://www.fuel-poverty.org/documents.htm>

⁴ <http://inclusev.kcl.ac.uk/>

such as domestic energy consumption behaviours e.g. the length of time spent in the home for some vulnerable groups of people (Walker et al, 2011).

1.2 Measuring Fuel Poverty

- 12 The current measure of fuel poverty is defined by the **Fuel Poverty Ratio** (see Box 1). A household is said to be fuel poor if, in order to maintain a satisfactory heating and energy consumption regime, it would be required to spend more than 10% of the net household income (including Housing Benefit or Income Support for Mortgage Interest) on its total energy use. The 10 percent threshold means that households with a ratio equal to or in excess of 0.1 are classed as fuel poor.

Box 1 Fuel Poverty Ratio

$$\text{Fuel Poverty Ratio} = \frac{\text{Required fuel costs (modelled energy requirements x price)}}{\text{Income (including housing benefits or income support for mortgage interest)}}$$

- 13 Fuel poverty can be categorised into 5 groups to consider the depth of the problem (Table 1).

Table 1 5-fold categorisation of fuel poverty

Not fuel poor	8% or less of the household income is required to meet fuel costs.
Marginal fuel poor	Over 8% to 10% of household income is required to meet fuel costs. Although these households are not fuel poor by definition, they are the most at risk group and could fall into fuel poverty subject to a slight change in fuel costs and/or household income.
Fuel poor	Over 10% to 13% of household income is required to meet fuel costs. These households are fuel poor by definition but they could be lifted out of fuel poverty through a slight change in fuel costs and/or household income
Severe fuel poor	Over 13% to 20% of household income is required to meet fuel costs.
Extreme fuel poor	Over 20% of household income is required to meet fuel costs.

- 14 The **Scottish House Condition Survey (SHCS)** combines a social interview with a household and physical survey of the building. Of the minimum 4000 respondents to the social interview, at least 3000 take part in a physical survey of their dwelling. The 2008-2010 data presented in this report are therefore based on 9,000 combined social and physical surveys.

The Scottish fuel poverty data presented in this report, unless otherwise stated, is based on the last three years' (2008-2010) data from the Scottish House Condition Survey (SHCS).

Household Income Calculation

- 15 Income data is collected from participants in the social module of the SHCS.
- 16 Household income is calculated on the basis of the householder with the highest income combined with the income of his or her spouse/partner. Income from other adults in the households is not collected and therefore not included in the calculation.
- 17 **Household income *before* housing costs is used to calculate the Fuel Poverty Ratio.** It has been argued that household income after housing costs should be used instead, as it provides a better reflection of a household's disposable income. This is one of the alternative indicators for fuel poverty tested in the *Hills Review* (see Chapter 6). If income after housing costs were used, the level of fuel poverty would increase.

Energy Cost Calculation

- 18 BREDEM⁵ uses the physical characteristics of dwellings in the SHCS to calculate the energy required to maintain a required level of thermal comfort (between 18°C and 23°C).
- 19 No provision is made for under-occupancy or times of day when the house is uninhabited; a standard temperature pattern is applied across the stock (see Table 3).
- 20 To establish energy costs, the modelled energy requirements are combined with fuel price and tariff data. Gas and electricity data are collected from all suppliers, from the Sutherland tables and from Department of Energy and Climate Change (DECC). Other fuel prices (e.g. oil, solid fuel, LPG, etc.) are provided by the Office for National Statistics (ONS) through DECC.
- 21 Table 2 shows the average modelled fuel bill in Scotland in 2010 using the SHCS and BREDEM. It is significant that **space heating – the main focus of the fuel poverty debate – comprises only 49% of the average modelled fuel bill.**

⁵ This is the Building Research Establishment's Domestic Energy Model. It uses a mixture of analytical and empirical techniques to assess the energy requirements of households to achieve a specific heating regime. It models annual consumption for space and water heating, lighting, appliance usage, and cooking.

Table 2 Average modelled fuel bill in Scotland (2010)

Type	Mean	Median	% of Total Mean	% of Total Median
Annual Space Heating Cost	£631	£498	49%	44%
Annual Water Heating Cost	£168	£155	13%	14%
Annual Lights & Appliance Costs	£397	£374	31%	33%
Annual Cooking Costs	£79	£75	6%	7%
Base Total Running Costs	£1,296	£1,127	100%	100%

- 22 External temperatures are also modelled throughout the day, so that heating requirements increase when solar gains drop off at night.
- 23 Six different temperature regimes for Scotland are modelled based on “degree day region”. Varying wind chill factors are also applied, resulting in nine separate climate regions.
- 24 These climate factors change the heating requirements of the dwelling; greater exposure to high winds and colder external temperatures increases energy requirements.

English and Scottish Definitions of Fuel Poverty

- 25 Although the 10% threshold is used across the UK, the approach to modelling energy requirements and household income differ.
- 26 England is similarly divided into degree day regions (DECC, 2010a). However, wind speed is not taken into account in the English model.
- 27 “Satisfactory heating” regimes in Scotland and England also differ (see Table 3).

Table 3 Summary of differences of satisfactory heating regimes in Scotland and England

	<i>Scottish heating regime</i>	<i>English heating regime</i>
Ordinary Households		
Heating pattern	Weekdays 9 hours of heating Weekend 16 hours of heating	Weekdays 9 hours of heating Weekend 16 hours of heating
Demand temperature	Primary living zone 21°C Secondary living zone 18°C	Primary living zone 21°C Secondary living zone 18°C
Vulnerable Households		
Heating pattern	Weekdays 16 hours of heating Weekend 16 hours of heating	Weekdays 16 hours of heating Weekend 16 hours of heating
Demand temperature	Primary living zone 23°C Secondary living zone 18°C	Primary living zone 21°C Secondary living zone 18°C
Under-occupied Households		
Heating extent	Whole house is assumed heated	Half house is assumed heated

Vulnerable Households

- 28 In Scotland, vulnerable households are those who have members aged 60 or over and/or with a long term sickness or disability. The English definition extends this definition to include families with children under 16 (*The UK Fuel Poverty Strategy 2001*, DEFRA (2011) p11). The heating pattern for vulnerable households in England is determined using the English Housing Survey (EHS). Since 2001, the EHS has included a question which asks whether anyone within the household occupies the dwelling during the morning or afternoon. Under the English system, if anyone is in the house in *either* the morning or afternoon during the week, the house is assumed to require all day heating, which is defined as 16 hours per day for both weekdays and weekends. In contrast, **all** vulnerable groups in Scotland are assumed to require heating 16 hours per day.
- 29 In addition to the longer heating hours given to vulnerable households under both regimes, the main living area temperature is increased to 23°C in Scotland, but not in England.

Under-occupancy

- 30 The model in Scotland does not reduce heating requirements to reflect under-occupancy because it is considered that creating cold-spots is detrimental to the physical structure of the dwelling. In England where dwellings are “under-occupied”, it is assumed that only half the home is heated.

Household Income

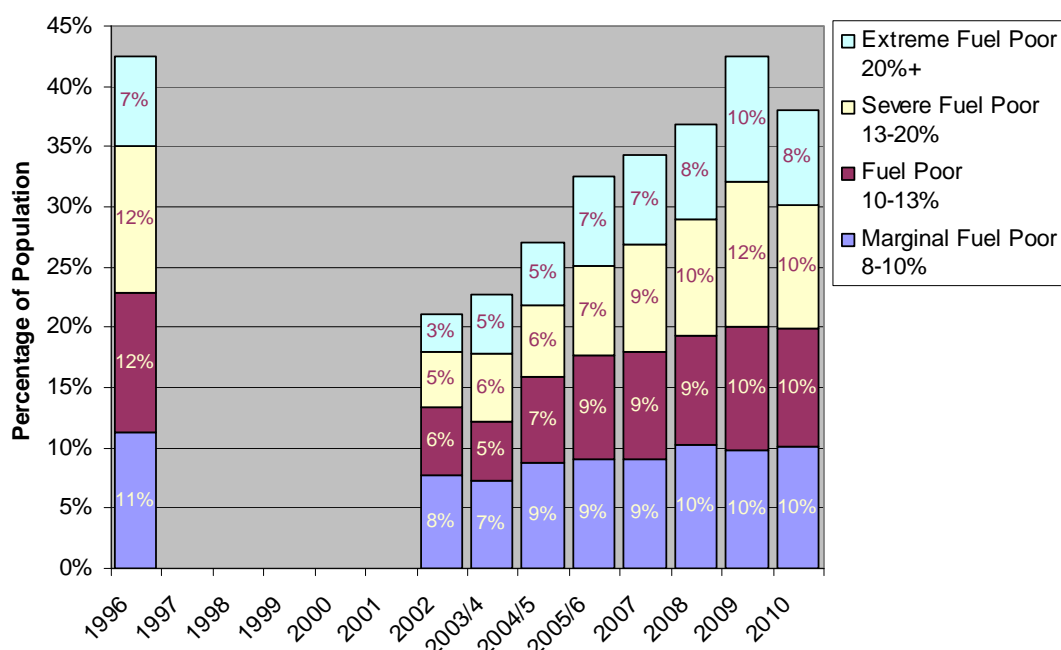
- 31 In Scotland, household income is calculated from the earnings of the highest income householder and his or her spouse/partner. Income from other adults in the household is not included. This is different from the approach in England, where income from all adults in the household is included.
- 32 The “**real**” **total household income** is therefore not available for households with 2 adults who are not living as a couple and for those with 3 or more adults. Instead, an arithmetical correction is applied to reflect shared bills. These households represent approximately 20% of the SHCS survey sample and are considered further in section 6.2.
- 33 Furthermore, **income is not equivalised in Scotland**. Equivalised income is often used in poverty analysis. It enables comparison between different households, as households of different sizes and compositions require a different level of income to achieve the same standard of living. However, SHCS income data cannot be equivalised since not all adult incomes are recorded.

Overall, these differences between the modelling regimes of Scotland and England lead to even higher levels of fuel poverty in Scotland.

1.3 The Extent of Fuel Poverty in Scotland

34 According to the latest SHCS Key Findings Report, there were 658,000 households living in fuel poverty (28%) in Scotland in 2010. From 1996⁶ to 2002 the number of fuel poor households in Scotland fell from around 36% to 13%, but then rose steadily, reaching a peak in 2009 of 33% (766,000). This peak is largely due to a sharp rise in fuel prices at that time. This is discussed further in section 1.5. These trends are presented in Figure 1.

Figure 1 Percentage of Households in Fuel Poverty 1996-2010



35 **Extreme fuel poverty**, defined as a household having to spend more than 20% of its income on fuel, has followed a similar pattern to that of fuel poverty as a whole. In 1996 around 7% of the households were classified as extreme fuel poor which dropped to around 3% by 2002. A steady increase then occurred with a spike in 2009 when around 10% households were in this category. This has since returned to close to the average of the preceding three years of around 8% (185,000 households in 2010).

36 **Fuel poverty projections** for 2011, based on modelled data (actual data for 2011 will not be available until later this year), estimate a rise of 7% from 2010 figures. It is projected that over 800,000 Scottish households (35%) were fuel poor in 2011 (The Scottish Government, 2011⁷). The data used is taken from

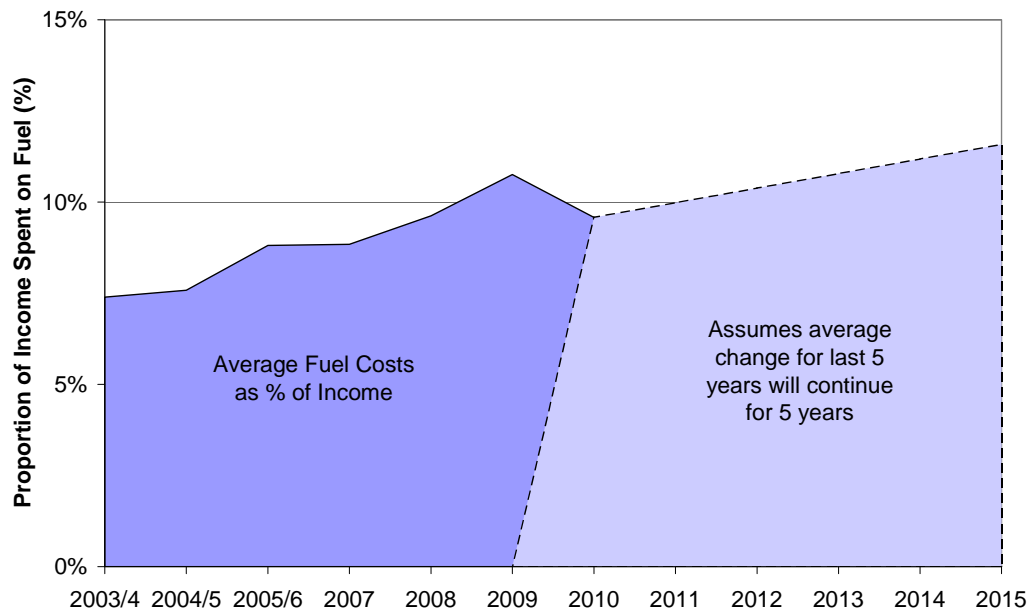
⁶ The definition of fuel poverty changed in 2002, and figures for 1996 are therefore not comparable with later years. (Scottish Executive 2002b)

⁷ The Scottish Government (2011) *Updated Fuel Poverty Estimates 2011*
<http://www.scotland.gov.uk/Topics/Statistics/SHCS/shcsdatadevelopment/UFPE2011>.

the last three SHCS survey years (2008, 2009 and 2010) and updated household income and modelled energy costs to estimate figures for July 2011 and September 2011. It is important to note that this data is still being developed and at best, should be considered as indicative.

- 37 If 5-year trends in the fuel poverty ratio continue, it is projected that the Scottish mean fuel spend will exceed 10% on average by 2012, steadily rising to 12% by 2015, **pushing the average household into fuel poverty from 2012 (Figure 2).**

Figure 2 *Projection of average fuel spend per income to 2015.*



From SHCS data 2003/4 - 2010

1.4 The Distribution of Fuel Poverty at Local Authority Level

- 38 Figure 3 and Figure 4 show the distribution of fuel poverty by local authority across Scotland. **Orkney Islands and Western Isles have the highest proportions of overall fuel poverty in Scotland.** They also have the highest proportions of severe and extreme fuel poverty. As with many rural parts of Scotland, households in these areas tend to be off the mains gas grid and dependent on more expensive fuels such as solid fuel and oil, the prices of which have risen substantially over the past decade.
- 39 The **central, more urban areas tend to show lower rates of fuel poverty.**
- 40 Although **Inverclyde and West Dunbartonshire Council both have below Scottish average levels of fuel poverty,** they also have the highest proportions (13 and 14%) of marginal fuel poverty when compared to other local authorities. This means that nearly an eighth of the households in these two local authorities could become fuel poor if there were a small increase in fuel costs and/or reduction in household income.

Figure 3 Fuel poverty rates by local authority (SHCS, 2008-10)

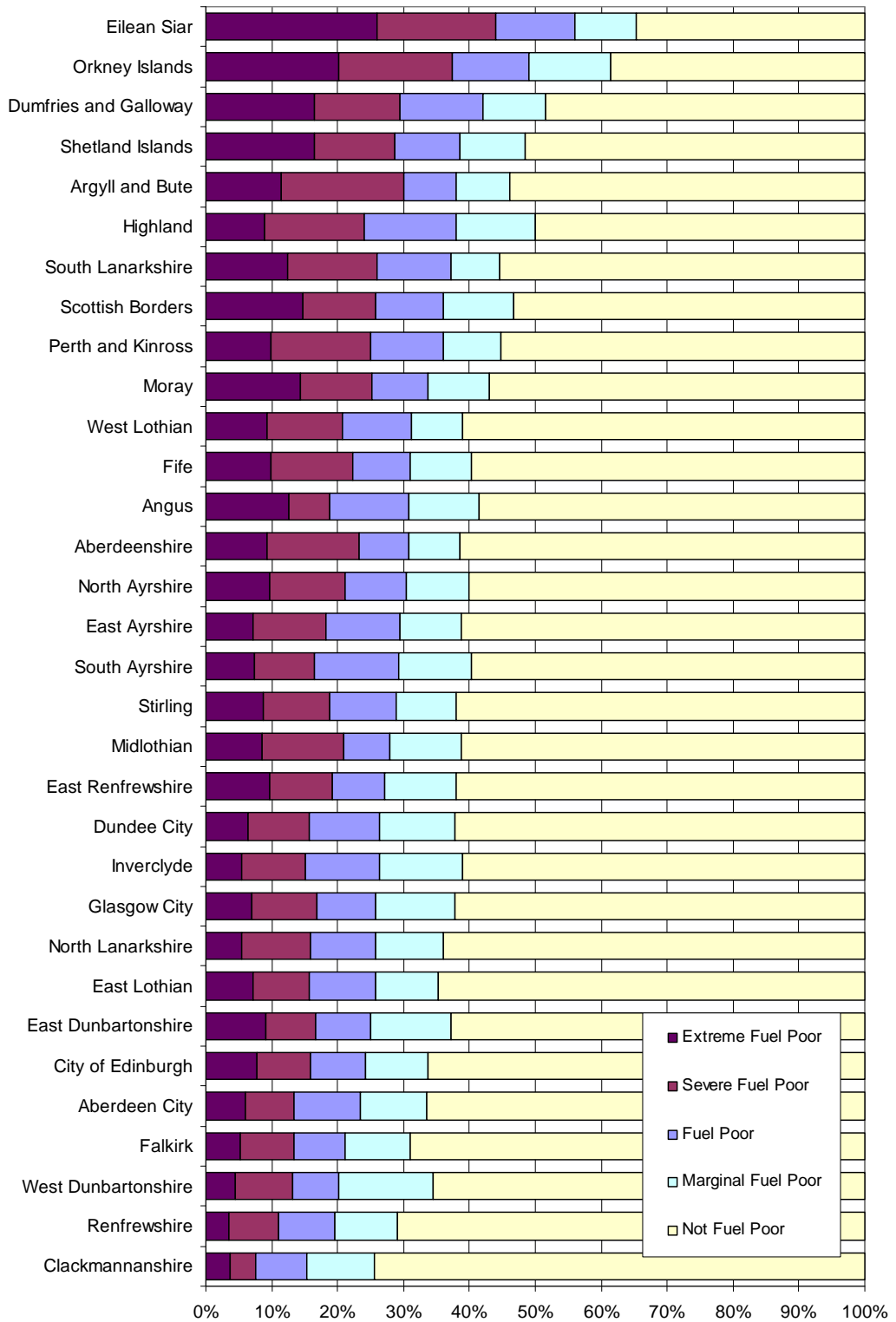
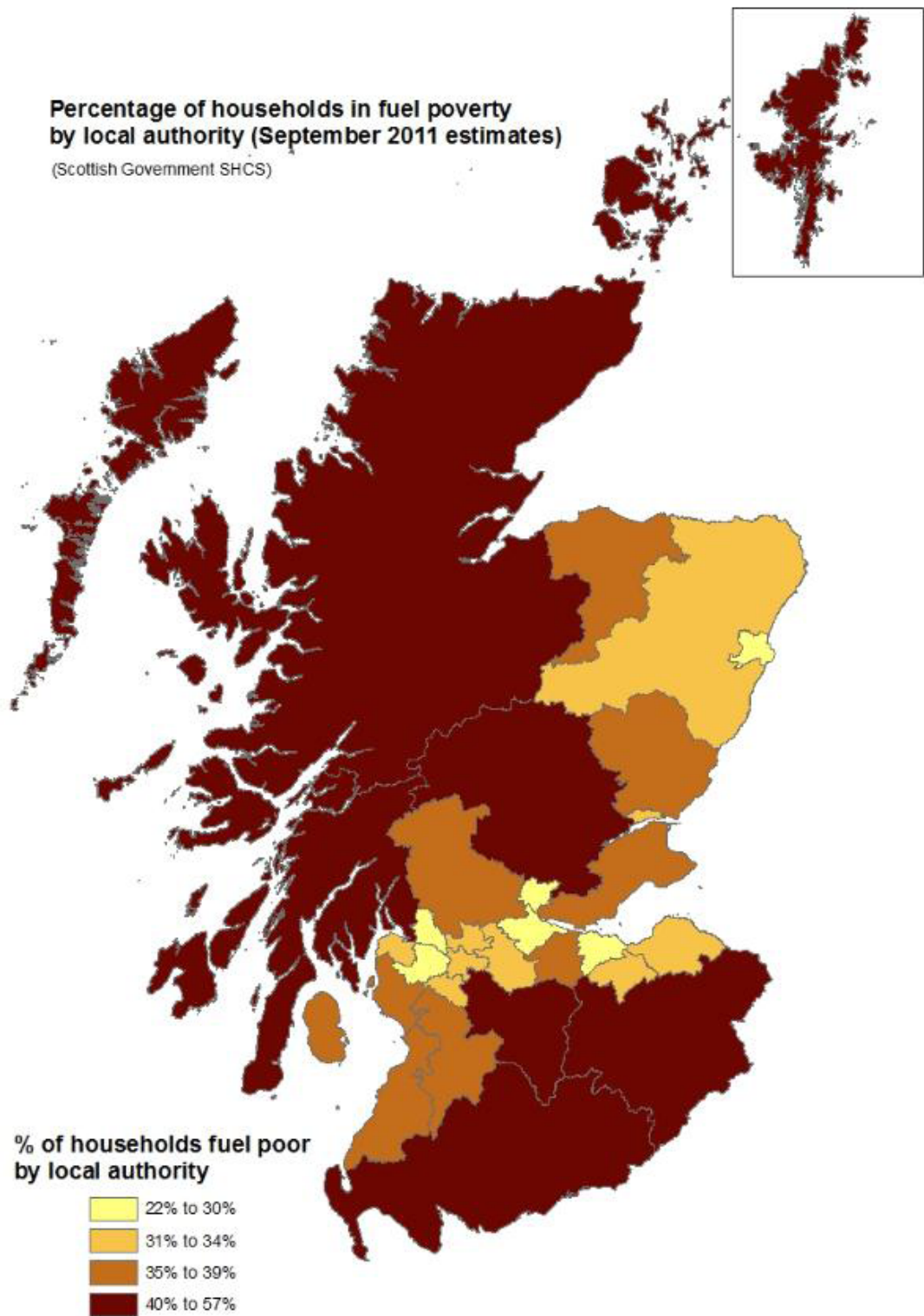


Figure 4 *Fuel poverty projections by local authority area (SHCS, 2010)*



Based on Ordnance Survey material with the permission of Ordnance Survey. Scottish Parliamentary Corporate Body 10039291.

- 41 Clearly, **understanding where fuel poor households are located** is crucial to the effective identification and targeting of fuel poverty interventions, in particular area-based programmes.

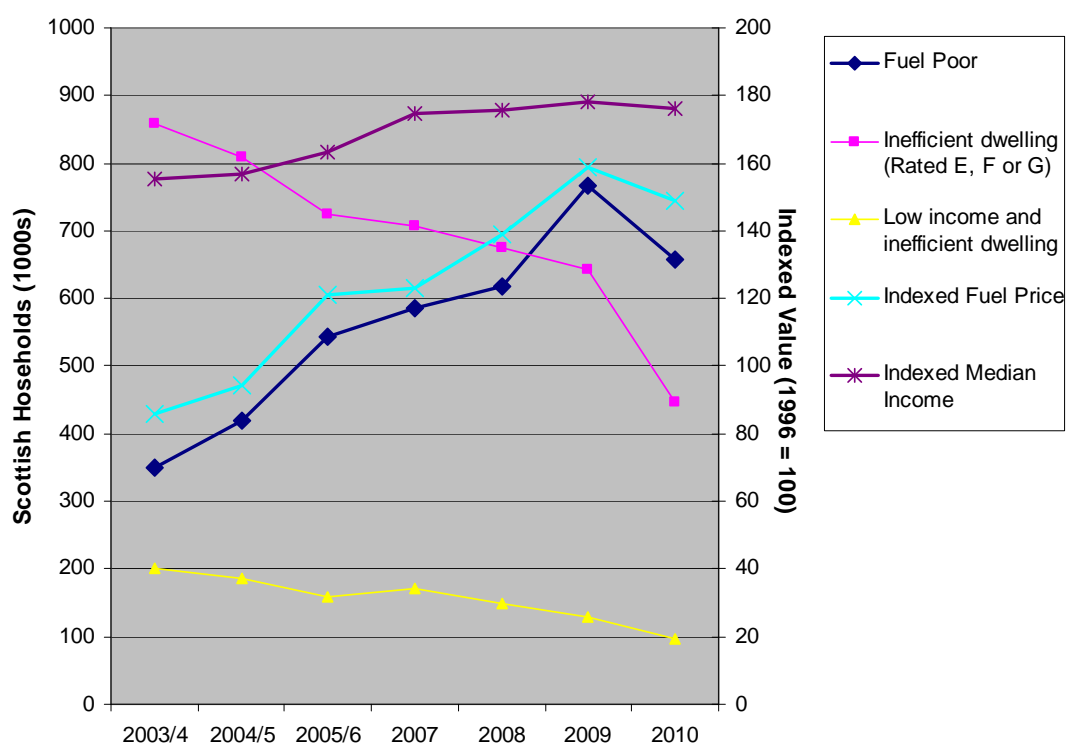
42 Further analysis of fuel poverty at the local authority level is available in Annex B. The distribution and mapping of fuel poverty at **sub-local authority level** is explored in Section 5.4.

1.5 The Drivers of Fuel Poverty

43 The three main drivers of fuel poverty are fuel costs, income and energy inefficiency. These are embedded within the definition which calculates fuel poverty on the basis of income and the cost of heating a house with given characteristics, such as levels of insulation. Figure 5 shows how susceptible the current definition is to hikes in fuel prices as the rise (and fall) in fuel poverty appears to track fuel pricing levels⁸. This is particularly evident in the 2009 fuel poverty peak which was also associated with a peak in fuel prices.

44 Since 2007, median income has remained roughly static⁹. This, combined with the said rise in fuel prices is the primary driver of fuel poverty levels in Scotland.

Figure 5 Fuel poverty, income poverty, energy efficiency and fuel prices, 2003 – 2010



⁸ Fuel price index values source: Quarterly Energy Prices. Tables available at: 2.1.3 Retail prices index: fuel components, monthly figures normalised so that 1996 has an index value of 100 <http://www.decc.gov.uk/en/content/cms/statistics/source/prices/prices.aspx>

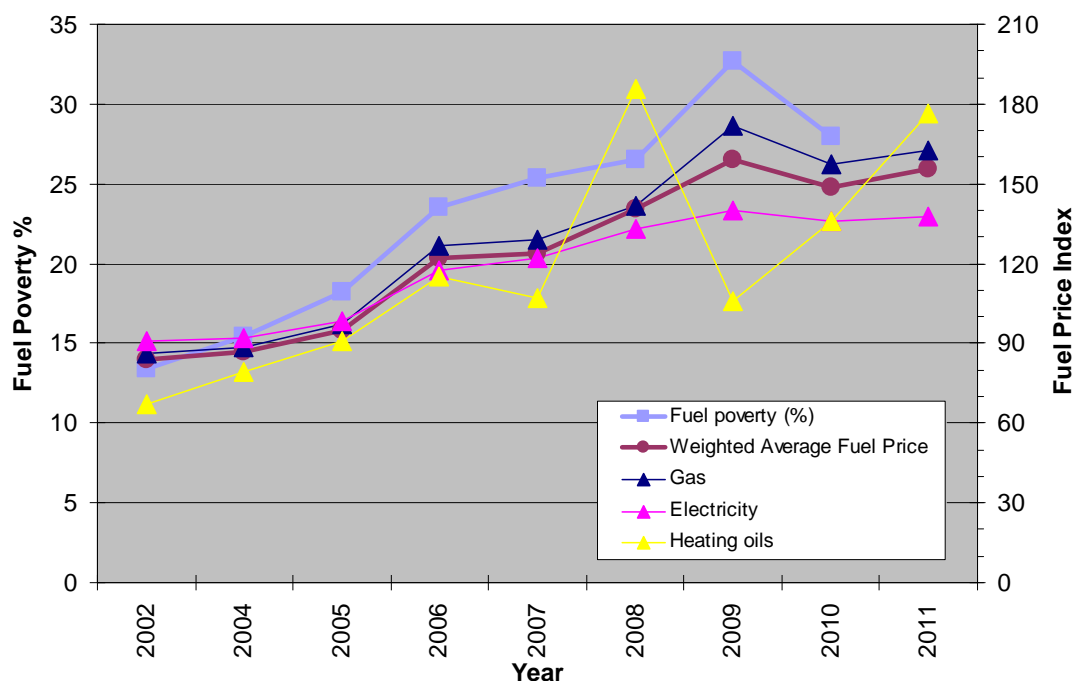
⁹ Income data from the SHCS from 1996 through 2010. Indexed such that 1996 has a value of 100

- 45 Fuel poverty has risen despite the dramatic decline in inefficient housing over the last 6 years¹⁰ (Figure 5), which have dropped dramatically from around 870,000 households in 2003/4 to around 450,000 in 2010.
- 46 These factors suggest that on their own, **energy efficiency improvements cannot lift people out of fuel poverty when situated within the context of rising fuel prices and stagnant income.**

Fuel Prices

- 47 Fluctuations in fuel prices have a dramatic effect on fuel poverty levels. Figure 6 demonstrates the changes in the three main fuel prices (gas, electricity and heating oil) between May 2002 and March 2011 against changes in fuel poverty up to July 2010. On average, between 2002 and 2009, fuel prices and fuel poverty rose. In 2010 fuel prices for all fuels except heating oils, dropped which is reflected in a fall in fuel poverty. However, since June 2010, fuel prices have started to rise again which will inevitably impact on levels of fuel poverty.

Figure 6 *Fuel Poverty and Retail Price Index fuel components*



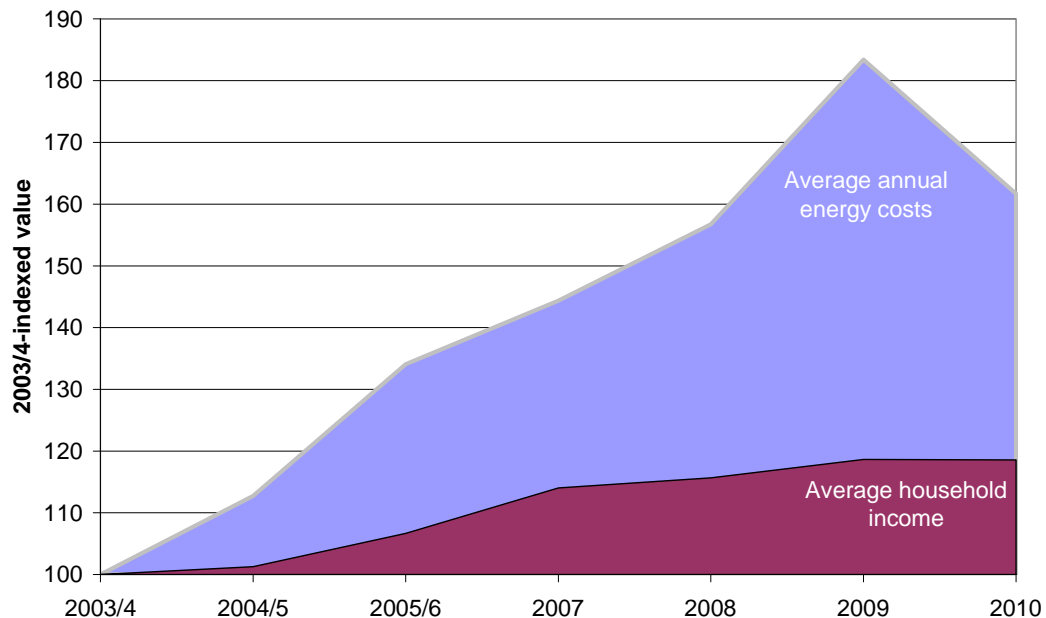
Household Income

- 48 Between 2003/4 and 2010, the average annual household income recorded by the SHCS increased by just under 19%, whilst the average annual energy cost increased by just under 62% (see Figure 7). Thus, energy costs have risen over

¹⁰ Energy inefficient housing is here defined as having a low Energy Efficiency Rating (EER) of E, F or G. EERs are based on the Standard Assessment Procedure (SAP). E, F or G-rated properties have a SAP rating of less than 55.

three times faster than household income since 2003/4. **This discrepancy between household income and fuel costs is one of the main causes of the rise in fuel poverty** shown in Figure 5.

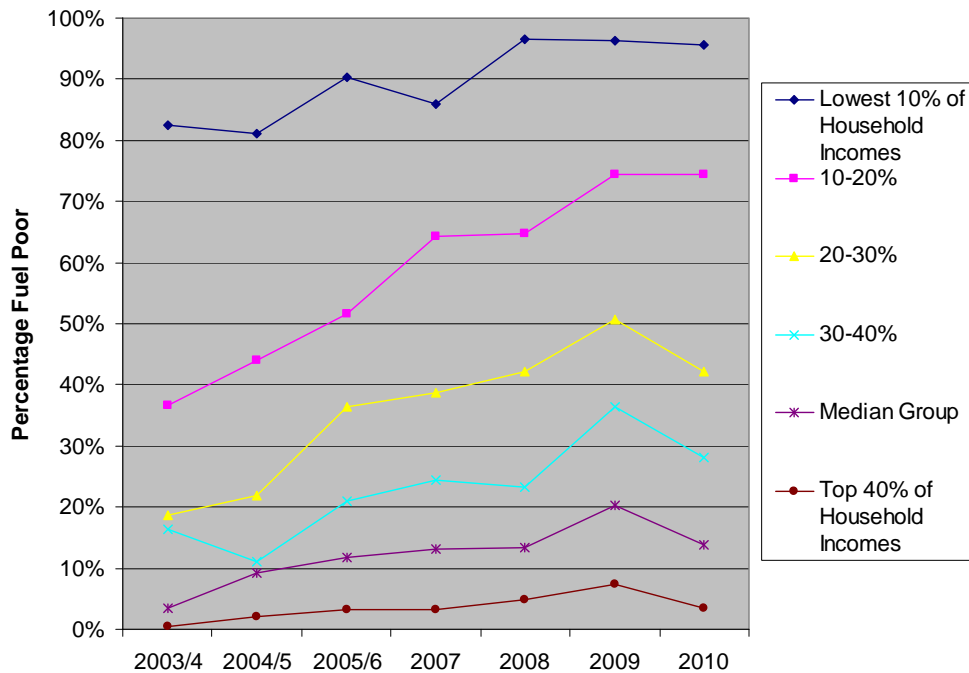
Figure 7 *Indexed increase in fuel costs and household income 2003/4 to 2010.*



- 49 Fuel poverty is strongly correlated with income poverty¹¹; 78% of those in income poverty are fuel poor, while only 14% of those not in income poverty are fuel poor. **Almost all of those in the lowest income band (less than £100 per week) are fuel poor (98%).** Low income households are also far more likely to experience extreme fuel poverty (see Chapter 3).
- 50 It is not just the poorest households that are affected. Figure 8 shows how fuel poverty has risen in all income groups. In the top 40% and median income groups fuel poverty rate has risen by approximately 3% and 10% respectively over the past 6 years.
- 51 Fuel poverty rates for the lowest income decile group remains much greater than all other income bands, rising from approximately 82% in 2003/4 to approximately 95% in 2010. However, the lowest 20-40% of incomes are more sensitive to fuel price increases, illustrated by the 2009 peaks in Figure 8.

¹¹ Income poverty is defined as a household earning less than 60% of the national median household income.

Figure 8 Rate of fuel poverty within income decile groups



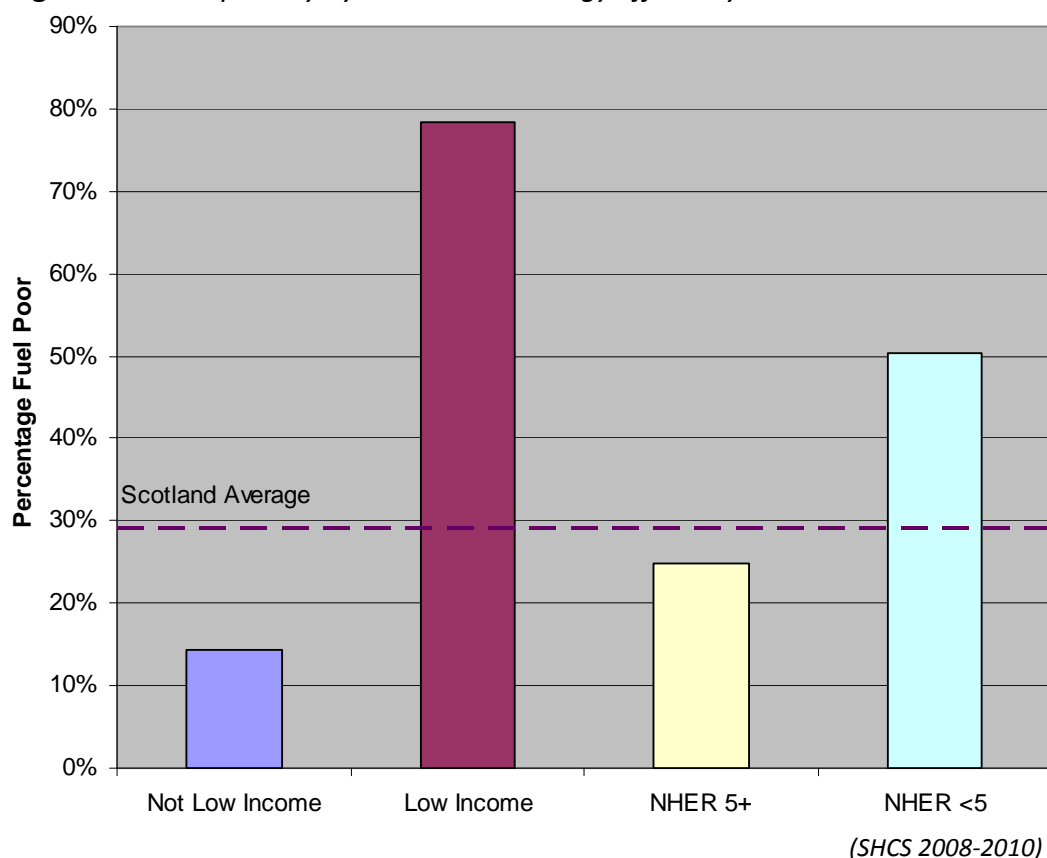
Energy Efficiency

- 52 The energy efficiency of housing in Scotland has gradually improved. In 2010 the proportion of dwellings assigned a 'good' NHER¹² rating increased from 55% to 62%. Levels of loft insulation (200mm or more), for example, have improved dramatically over the last 7 years, from just 258,000 dwellings in 2003/4 to 628,000 in 2010. Improvements have also been seen in cavity wall insulation (62% in 2010 compared to 33% in 1996) and solid wall insulation (11% in 2010 compared to 6% in 1996).
- 53 Although changes in energy (in)efficiency may not appear to be strongly associated with fuel poverty when viewed alongside fuel pricing and income (Figure 5), it does correlate reasonably well with fuel poverty; as energy inefficiency (NHER less than 5) decreases, fuel poverty decreases. Fuel poor households are more likely to be poorly insulated and energy inefficient. It is on this basis that interventions aim to alleviate fuel poverty through the installation of energy saving measures such as insulation and new heating systems.

¹² National Home Energy Rating (**NHER**) is used to measure a dwelling's energy efficiency. The methodology considers all energy use in the home including cooking and electrical appliances and allows for regional and geographic climate variations on a scale of 0 (poor) to 10 (excellent). Dwellings rated 7 or more are labelled as 'good' energy efficiency and those rated 2 or less are 'poor'.

- 54 Fuel poverty is therefore driven by both poor housing and low incomes. Figure 9 shows how fuel poverty is far more prevalent in low income households (in particular), but also in households in energy inefficient homes.

Figure 9 Fuel poverty by income and energy efficiency



- 55 Income and fuel pricing, however, remain the most powerful drivers of fuel poverty. Even with energy efficiency improvements, should income continue to stagnate or even dip, or fuel prices increase, fuel poverty will be on the rise again.
- 56 Modelled calculations¹³ conducted by the Scottish Government estimate that:
- If there was a minimum NHER of 7 (everyone had a good NHER) then 25% would still be fuel poor, compared to 32% in 2009 when mean NHER was 6.3 and median 7.
 - If there was a minimum NHER of 8 (everyone had a very good NHER) then 22% would still be fuel poor.

¹³ The data derives from a “ready reckoner” developed within the Scottish Government. It is based on 2009 SHCS data (and therefore not comparable to the rest of the analysis). Please note that fuel poverty was higher in 2009 than in 2010 and also that the analysis uses an NHER energy rating system rather than SAP (SAP is the UK Government's ‘Standard Assessment Procedure’ for the energy rating of dwellings). It calculates energy used by space heating, hot water and lighting and is measured on a scale from 1 (poor) to 100 (excellent)).

- **If there was a minimum NHER of 10 (everyone had an exceptionally good NHER) then 14% of dwellings would still be fuel poor.**

57 That being said, large scale housing improvements, although not eradicating fuel poverty, could substantially lower the level of fuel poverty in Scotland.

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Chapter 2 The Effects of Fuel Poverty

58 This chapter provides an introduction to the effects of fuel poverty, including:

- The physical health effects of fuel poverty
- Excess winter deaths
- The mental health effects of fuel poverty
- Indirect impacts of fuel poverty
- Indirect impacts of fuel poverty on children and young people

Key messages

59 The key findings from this chapter are summarised below.

- As it stands, the evidence in the Scottish fuel poverty data does not support claims of a direct link between fuel poverty and poor health outcomes, including respiratory illness.
- Evidence around health impacts tends to relate specifically to cold housing rather than fuel poverty per se. The lack of evidence on actual room temperatures means the links between fuel poverty and cold housing are unclear.
- There is no coherent evidence base to support a link between fuel poverty and excess winter deaths in Scotland.
- There is some evidence of an association between fuel poverty and mental well-being, particularly the link between heating costs and increased levels of stress.
- There is some evidence suggesting an association between levels of thermal comfort and mental well-being, particularly in children and young people.
- For children, the wider evidence base suggests that the risk of physical and mental health problems increases the longer they live in cold homes.
- Further research is needed to explore the nature and direction of the effects of fuel poverty and/or cold housing on people in Scotland.

2.1 Introduction

60 This chapter discusses the potential consequences of fuel poverty and cold housing on the lives and well-being of individuals and households.

61 The area which has received the most attention is the association of fuel poverty with poor health. To date the evidence base has presented the case that cold housing has a **direct negative effect** on people's health (e.g. World Health Organisation, 1987; Wilkinson, 2009; Zealey, 1991; The Marmot Review, 2011). It is argued that cold housing reduces people's resistance to illness such

as influenza, and that the cold exacerbates conditions such as heart disease and strokes. Cold homes have also been associated with damp and the growth of fungi and dust mites which have been linked to respiratory conditions such as asthma in children.

- 62 However, the evidence makes a number of assumptions. Firstly, fuel poverty and cold housing tend to be used synonymously, with the weight of evidence focusing on cold housing. Although closely interlinked, a fuel poor household need not necessarily be a cold house as its inhabitants may decide to heat their homes, albeit at the expense of other essential household goods.
- 63 Secondly, the low temperatures associated with poor health outcomes, and excess winter death in particular, are probably lower than the average indoor temperature (below 12°C). Although this is considered further in section 4.3, **actual household temperature is not measured when calculating fuel poverty and this makes it difficult to draw causative conclusions between fuel poverty and poor health outcomes on the basis of low indoor temperatures.**
- 64 In terms of the **indirect effects of fuel poverty**, the assertion is that fuel poor households often must compensate for disproportionate fuel bills by cutting back on other aspects of household budgets such as food and leisure activities. This can lead to poor diet, and affect people’s social lives, both of which can impact on the health and well-being of those who experience fuel poverty, particularly vulnerable groups within society (*The Scottish Fuel Poverty Statement*, The Scottish Executive, 2002b).
- 65 Yet despite this evidence linking cold housing to ill health and mortality (in the case of excess winter deaths), there is little indication within the Scottish fuel poverty data (SHCS) of a direct causal link between fuel poverty and poor health.

2.2 Fuel Poverty and Health

Indoor Temperatures and Health

- 66 The *UK Fuel Poverty Strategy* (2001) specifies the temperature level that can have a negative effect on health:

“resistance to respiratory disease falls when temperatures fall below 16 degrees centigrade. Temperatures below 12 degrees centigrade result in raised blood pressure...This, with raised fibrogen levels due to respiratory infections in winter, is associated with increased deaths from coronary thrombosis in winter.”

(DEFRA/DTI, 2001: para.1.14)

- 67 The World Health Organisation (WHO) set a household temperature benchmark of 18°C with increases of 2-3°C for vulnerable groups (WHO, 1987). The UK Government recommends a temperature of 21°C for the living room and 18°C in other rooms. In Scotland the temperature level used for calculating fuel poverty is the same but it is raised to 23°C in the living room for the elderly

and long-term sick and disabled (LTSD). **Actual household temperatures are not measured** and, as noted, this makes it difficult to determine what proportion of fuel poor households are living at temperatures that could endanger their health.

- 68 A study in 1999 reported that over 80% of people over 65 live in temperatures below 18.3°C and about 60% live in temperatures less than 16°C (Environmental Epidemiology Unit, 1999 cited in Burholt & Windle, 2006). As temperatures below 16°C are thought to lower resistance to **respiratory infection** (Bull et al, 2010), it is possible that persistent exposure to cold temperatures could impact on respiratory health.
- 69 A study of a Warm Front scheme found that the average living room temperature was 17.9°C and 15.9° in the bedroom before the intervention, although some households recorded as low as 7°C. After improvements, some homes still had temperatures below 15°C (Green and Gilbertson, 2008).
- 70 Overall, however, **very little research has been done into actual indoor temperatures and heating duration** (Owen, 2010). The last time actual temperature measurements were included in the English House Condition Survey was in 1996. At that time, the model overestimated the temperature that most households heat their homes to¹⁴.

Fuel Poverty and Health – Snapshot of the Evidence Base

- 71 Research undertaken by the Rural Services Network (2010) of 1255 households in England found those with a respiratory illness living in rural fuel poor households were more likely to turn down heating in winter months than those with respiratory illness in (rural) non-fuel poor households, which could aggravate their health condition(s). The report also found that (rural) fuel poor households were more likely to have someone suffering from asthma, respiratory or heart related illness or have someone in the home with a long-term illness or disability¹⁵.
- 72 Similar associations have been found between **asthma and damp homes**, which is typically linked to cold homes. For example, Williamson et al (1997), (cited in Bull et al, 2010) report that people with asthma are two to three times more likely than the general population to live in damp homes. It has also been argued that the cold impairs lung function and can trigger bronchoconstriction in asthma and chronic obstructive pulmonary disease (Collins, 2000 cited in Bull et al, 2010). Cold temperatures have been linked to other health conditions common to the elderly such as **arthritis and rheumatism** (see The Marmot Review, 2011).

¹⁴ The English House Conditions Survey is currently running an Energy Follow-Up Survey which will monitor internal temperatures in the home. Results are not yet available.

¹⁵ Again, the correlation is drawn between ill health and cold homes, not fuel poverty as it is measured in the EHCS/SHCS.

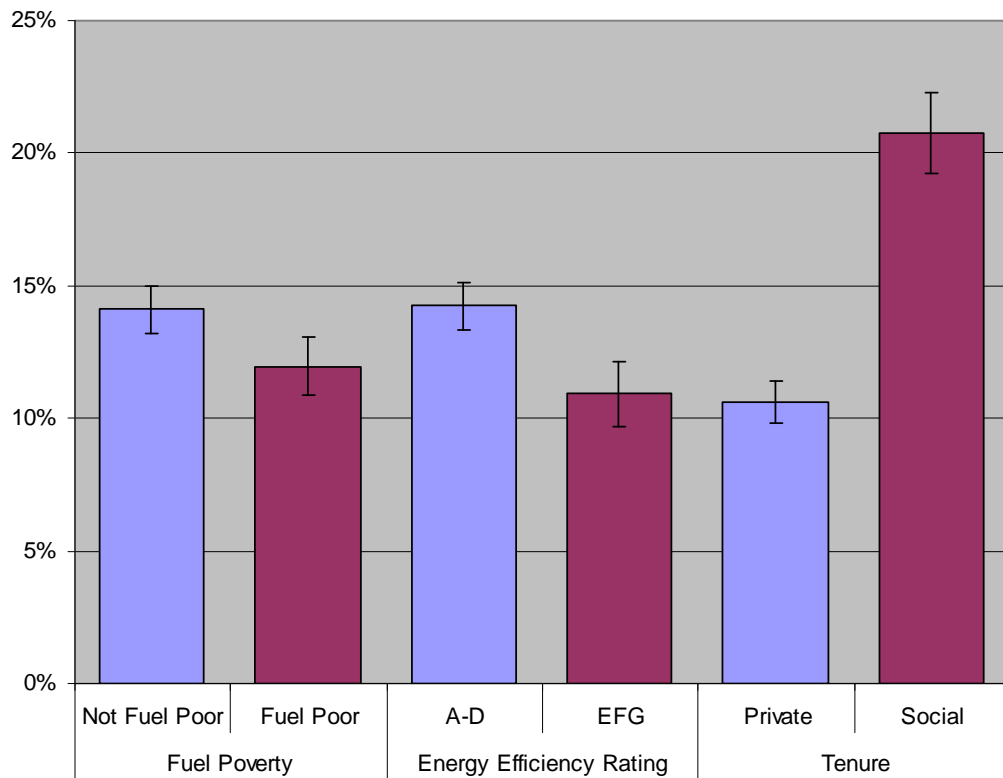
- 73 Asthma is a condition which commonly affects young children. Approximately a **third of family households include a child or children with respiratory health problems**, such as asthma (The Scottish Executive, 2002a). A growing number of evidence reviews have suggested a link between cold housing and respiratory illness in children (The Marmot Review, 2011; Liddell, 2008; Liddell & Morris, 2010).
- 74 Another potential **effect of fuel poverty on the young** is the **increased risk of hospital admissions**. Infants living in fuel poor households have been reported to be at greater risk of admission to hospital or primary care facilities when other contributory factors have been accounted for (based on findings of a 5-city USA study which involved similar families who were in receipt of/not in receipt of a winter fuel subsidy) (cited in Liddell, 2008). Child development studies suggest that the effects of poor housing on children are long-term and are not reversed by living in improved housing in adulthood (see Heyman et al, 2005).
- 75 There is therefore a fairly reasonable evidence base on which to link low temperatures with poor health, particularly in the elderly and the very young. What is less clear is what those temperature levels are, whether the link is causal, and more crucially, what role if any fuel poverty plays in this relationship.

Fuel Poverty and Health Impacts in Scotland

- 76 In 2002 the (then) Scottish Executive published a report on housing and health related issues in Scotland. The report found **no statistically significant association between poor housing and ill health**, thus no conclusion about causality could be made (The Scottish Executive, 2002a).
- 77 Analysis of 2008-10 SHCS data confirms this pattern (see Figure 10)¹⁶. The data shows that **households in fuel poverty appear to be less likely to suffer a respiratory illness in Scotland**. Of the fuel poor households, 12% report having a respiratory illness, compared with 14% of non-fuel poor households.
- 78 A similar negative correlation was found between energy efficiency and respiratory illness (see Figure 10).

¹⁶ Household respiratory illness among adults is measured in the SHCS by those adults identified as long-term sick or disabled suffering respiratory problems and/or if the respondent only has suffered an asthma attack in the last year. For children, questions for non-respondents who have suffered an attack and any children in the household on asthma medication are added.

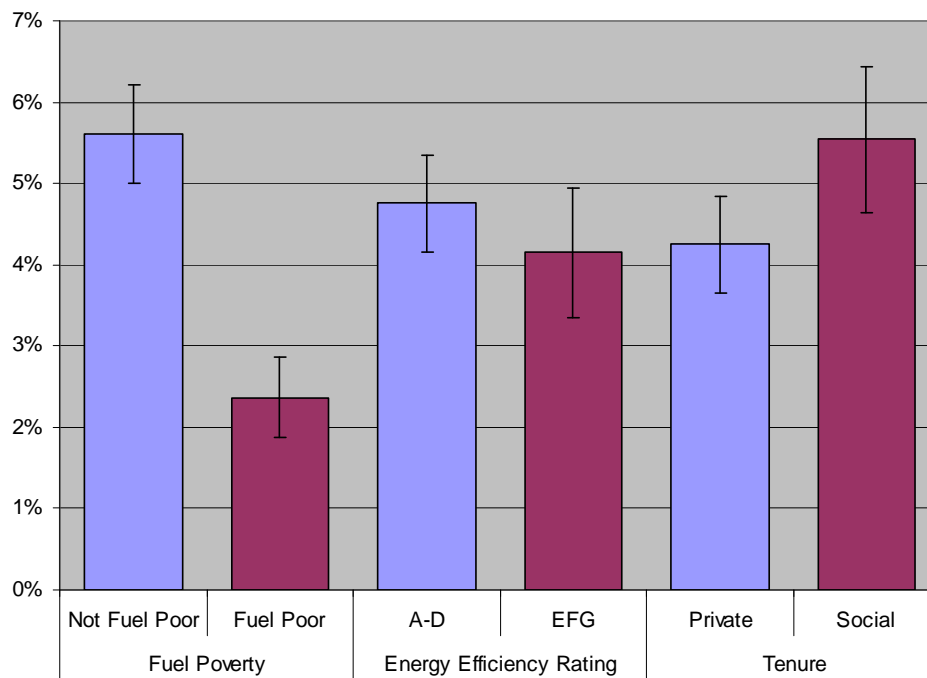
Figure 10 *Percentage of households with any respiratory illness by Fuel Poverty, Energy Efficiency and Tenure (SHCS, 2008-10)*



- 79 One possible explanation is that **people with respiratory illness are almost twice as likely to live in social housing**, which tends to be more energy efficient (and therefore warmer) than private housing (median SAP¹⁷ rating of 73 compared to 64 respectively). Energy efficiency (as measured through SAP ratings) has been found to be associated with overall (self-reported) health. For example, a longitudinal survey of over 500 households found that energy efficiency was associated with improved health through better thermal comfort, and improved satisfaction with one's living conditions and overall health (Heyman et al, 2005).
- 80 Among **children**, the lack of a link between fuel poverty and respiratory illness is even more marked: 2% of fuel poor households with a child with respiratory problems versus 6% of non-fuel poor households (see Figure 11). Similarly, asthmatic children are more likely to live in energy efficient, social housing.

¹⁷ SAP is the UK Government's 'Standard Assessment Procedure' for the energy rating of dwellings. It calculates energy used by space heating, hot water and lighting and is measured on a scale from 1 (poor) to 100 (excellent).

Figure 11 Percentage of households with child(ren) with respiratory problems



- 81 **The Scottish fuel poverty data therefore seems to suggest that respiratory illness in adults or children is not associated with fuel poverty.** Overall, it is interesting to note that the Scottish Health Survey reports respiratory illness at a much higher rate than the SHCS; adult respiratory illness is recorded at a 50% higher rate and childhood respiratory illness at a 200% higher rate.¹⁸ The Health Survey is conducted on an individual basis rather than by household, which may go some way in explaining this variation, and it also poses health questions differently, covering respiratory health in far more detail than the SHCS¹⁹.
- 82 Analysis was done to assess some of the other health complaints associated with fuel poverty/cold housing: arthritis and heart, blood pressure and circulation problems. Correlations were found between fuel poverty and these additional health problems (see paragraph 117 and Figure 15). However, when we control for age (over 60s) (using regression analysis) this association disappears.

¹⁸ *The Scottish Health Survey: Volume 1: Main Report Tables 8.1 (Adults) and 8.9 (Children)*. Available <http://www.scotland.gov.uk/Publications/2011/09/27084018/0> retrieved 02/05/2012

¹⁹ In the SHCS, one question asks the respondent to first indicate whether anyone in the household has a long-term illness or disability, before then being asked whether the illness is respiratory. Childhood respiratory illness is asked as a stand-alone question (whether taking medicine for asthma or had an asthma attack in last 12m) (SHCS, 2010). The Scottish Health Survey includes a detailed MRC Respiratory Symptom Questionnaire, an asthma module and a nurse visit. From 2012, the SHCS will be integrated with the Scottish Household Survey and will include questions on smoking.

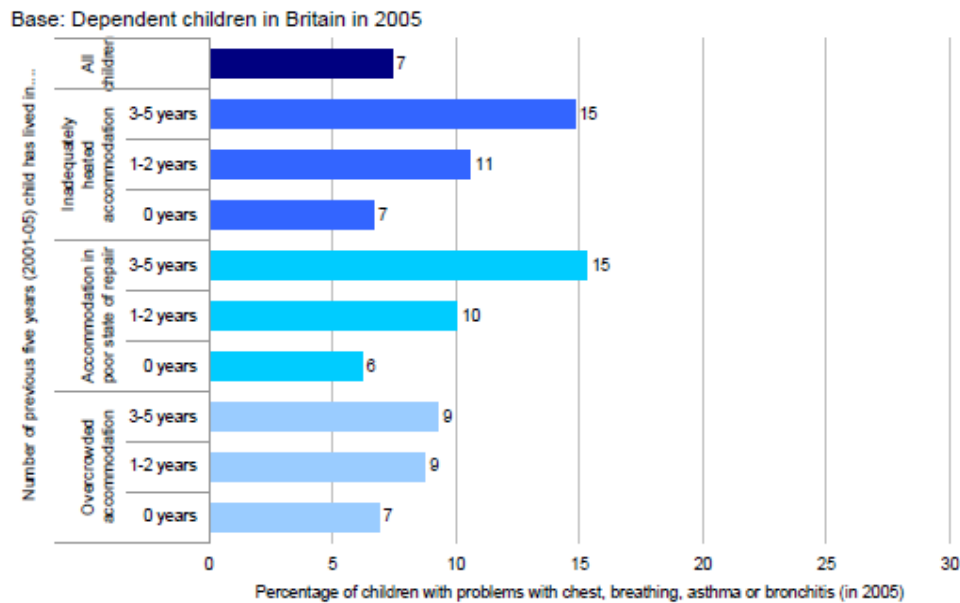
The Evidence from Fuel Poverty Interventions

- 83 Some evaluations of fuel poverty interventions have shown a link between installation of energy efficiency measures and improvements in householder perception of thermal comfort levels, and, in some cases, improvements in health and well being.
- 84 For example, Shortt & Rugkasa (2007) evaluated a fuel poverty programme (installation of central heating) in a rural community in Northern Ireland and found **increased thermal comfort levels** in the home and **improvements in self-reported health**. These included a significant reduction in arthritis/rheumatism and (insignificant) reductions in 'other' illnesses. This was accompanied by a decreased demand on the health service (GP visits). In contrast, in the control group (no intervention) there was an increase in chest infections, 'other' illnesses and stress/mental health problems, whilst GP visits remained static. This would tend to suggest that warmer homes may help prevent as well as alleviate some health problems. Interestingly there was no variation between the experimental and control group in the incidence of pneumonia/hypothermia which have been linked to excess winter deaths which would suggest that these conditions were not affected by fuel poverty improvements.
- 85 A small NHS study, reported an association between energy efficiency improvements and **alleviation of respiratory problems in children**. The research examined the impact of installing central heating on asthmatic children in Cornwall. Improvements were reported in the symptoms of asthma and reduced time off school (Somerville et al, 2000).
- 86 The more recent large-scale NatCen research (Barnes, 2008) which followed 14,000 children over 5 years reported that respiratory problems were more than twice as prevalent in children who lived for 3 years or more in cold homes²⁰ (15%) than comparable children living in energy efficient homes (7%) (see Figure 12 below). These homes tended to be less likely to have central heating. **Householders were as likely to report inefficient/broken heating or poor insulation as the main reason for inadequately heated homes as they were to report cost.**
- 87 A similar pattern was seen in children living in damp homes. The report cites evidence that suggests a significant reduction in the incidence of allergies in children after homes are made more energy efficient. Overall, however, health problems (long standing illness or disability, chest/breathing problems inc. asthma, stomach problems, feeling unhappy about family life) were more

²⁰ 'Inadequately heated homes' was a self-reported measure. Families were asked in the annual Family and Children Study (FACS) whether they were able to keep their accommodation warm enough in winter. **It did not measure household income and it is therefore not possible to construct a direct measure of fuel poverty.**

closely associated with housing in poor repair than with cold homes, although the risk increased the longer a child lives in a cold home.

Figure 12 *Percentage of children with problems with chest, breathing, asthma or bronchitis, according to the number of years they have lived in bad housing*



Excerpt from NatCen Study, Barnes et al, 2008 (p44)

- 88 In Scotland, a small case study review of the Energy Assistance Package reported **general (self-reported) improvements in health** (mostly relating to respiratory conditions) and overall quality of life in some of the case studies following the installation of more efficient central heating (The Scottish Government, 2011, unpublished).
- 89 A review of the main large-scale studies into the health impacts of fuel poverty over the last 10 years concluded that fuel poverty interventions, typically energy efficiency home improvements, had a **modest measurable impact** in improving the physical health of adults and children, including a reduction in the severity and frequency of children’s asthmatic symptoms (Liddell & Morris, 2010).
- 90 Other evaluation studies, however, tend to report mixed findings:
- A randomised controlled trial of a fuel poverty intervention in Northeast England over a four-year period found that despite increases in room temperatures, **no gains were seen in self-reported health**. However, modest correlations were found between room temperature and **improved social functioning**, suggesting that social isolation may be an unexplored effect of fuel poverty (Heyman et al, 2011).
 - A substantial 4-year review of the Warm Front scheme found **no clear link between the intervention and better physical health** (Green & Gilbertson, 2008). However, the study does report **improvements in mental health** through the alleviation of fuel poverty and stress.

- In Scotland, a **review of the impact on health of the Central Heating Programme two years after installation failed to show a clear and direct impact on health outcomes** despite evidenced reductions in the condensation, dampness and cold in recipients' homes (The Scottish Executive, 2007). No change was reported in recipients' usage of health services or medications; nor was any significant effect reported on recipients' experience of long term illness or disability, or mental health.
- 91 Overall, **the evidence of a direct link between fuel poverty and physical health appears to be inconclusive**. Many of the studies focus on the effect of poor housing, particularly cold housing, rather than fuel poverty per se, and this makes it difficult to draw conclusive findings. Measures of health are often taken within a year or two of an intervention, which may be too early to see improvements in chronic and long-term conditions such as respiratory problems. There are also problems with self-reported health data (although this is acknowledged in some studies which measure health service and medication use). The sample size of some studies is small and interpretation of such findings should be taken with caution. For example, the Shortt & Rugkasa (2007) study, NHS study (Somerville et al, 2000) and Scottish Government review of the Energy Assistance Package, which all reported a positive impact, involved small sample sizes (10-100). Additionally, not all studies included control groups. There does, however, appear to be some emerging evidence on the mental health and indirect impacts of fuel poverty. These are discussed in more detail later in the chapter.

Excess Winter Deaths

- 92 Excess winter deaths were one of the early concerns in the 1970s when the phenomenon of fuel poverty first emerged (Boardman, 1991). Since that time excess winter deaths has become an established, though not undisputed, fuel poverty indicator. Excess winter deaths are seasonal variations in deaths, defined as:

“the number of deaths of people aged 65 and over in the four winter months (December to March), minus the average number ... during the preceding four months (August to November) and subsequent four months (April to July).”

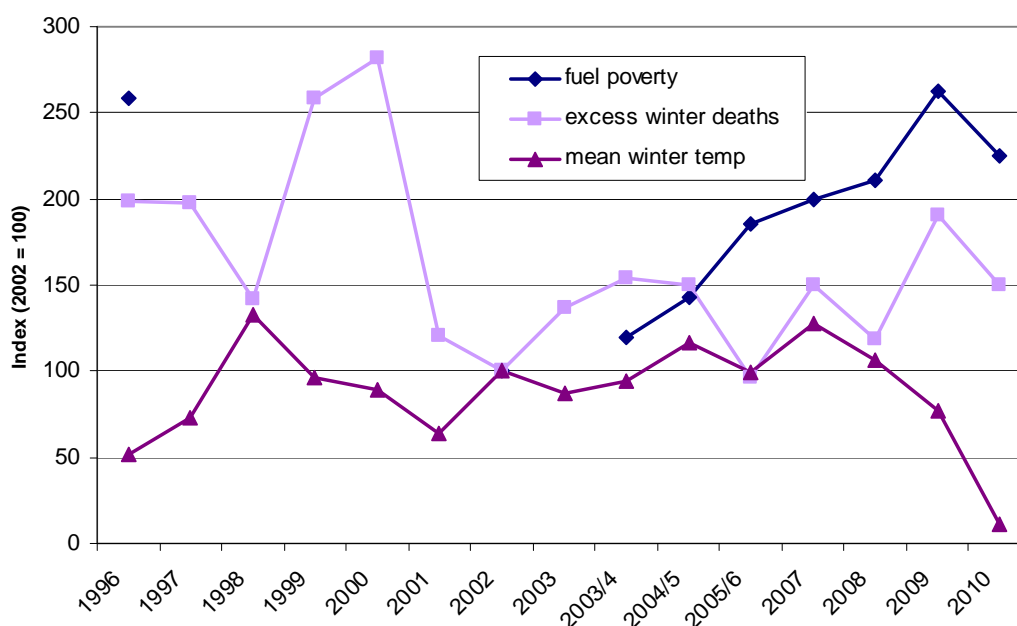
(Bull et al, 2010)

- 93 In 2001, the seminal report on excess winter deaths, *Cold Comfort*, published findings on the impact of housing conditions on excess winter deaths between 1986 and 1996. It reported that during the winter months (Dec-Mar) there was a 23% excess of deaths from heart attacks and strokes. Excess winter deaths were greater in people living in poorly heated housing, in dwellings with low energy-efficiency ratings, and in older properties. There was little variation within socio-economic groups. It was therefore concluded that low indoor temperatures contributed to excess winter deaths, and that improvements in the thermal efficiency of housing would lead to substantial health benefits (Wilkinson et al, 2001). Once again the association was forged between cold temperature and mortality, rather than fuel poverty itself.

94 Despite this distinction, **fuel poverty has become synonymous with excess winter deaths** (see e.g. The Marmot Review, 2011; Bull et al, 2010) which are increasing year on year. The UK has one of the highest rates of excess winter death in Europe. In 2010/11 this amounted to over 28,000 deaths (2,450 in Scotland; 25,700 in England and Wales; 740 in Northern Ireland²¹). UK figures are approximately double that of Scandinavian and other affluent Northern European countries such as Finland and Germany (who experience colder winters than us), but similar to those in Italy, Ireland, Portugal and Italy (most of whom experience milder winters than us) (Bull et al, 2010; Boardman, 2010). This suggests that neither internal nor external winter temperature may not be the main causative factor in excess winter deaths.

95 Figure 13 shows the levels of excess winter deaths, fuel poverty and winter temperature in Scotland between 1996 and 2010. The fuel poverty data is derived from the SHCS dataset and the excess winter death and winter temperature rates derive from the General Register Office for Scotland²² (GROS).

Figure 13 *Excess winter death rates, fuel poverty and winter temperature in Scotland between 1996-2010.*



²¹ Figures available from Northern Ireland (<http://www.nisra.gov.uk/demography/default.asp32.htm>), England and Wales (<http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-235062>) and Scotland (<http://www.gro-scotland.gov.uk/statistics/theme/vital-events/deaths/winter-mortality/2010-11/tables-and-figures.html>)

²² <http://www.gro-scotland.gov.uk/statistics/theme/vital-events/deaths/winter-mortality/2010-11/tables-and-figures.html>

- 96 Whilst it is not possible to calculate any correlation between the three datasets²³, it might be reasonable to expect some observable association. However, it is clear from Figure 13 that **excess winter deaths do not follow the fuel poverty trend year on year**. Furthermore, there does not appear to be any correlation between winter temperature and the other two variables. Surprisingly, during last winter (2010/11), the coldest on record, the number of excess winter deaths dropped; as did fuel poverty.
- 97 Therefore, **there does not appear to be a coherent evidence base to support a link between fuel poverty and excess winter deaths in Scotland**, based on the statistical data currently available. This is not to say that such a correlation does not exist or cannot be proven but that **an evidence gap exists**.
- 98 Evaluations of fuel poverty interventions on excess winter death rates (which may contribute to filling that evidence gap) have also been unable to establish a direct correlation (e.g. El Ansai & El-Silimy, 2008). Doing so is extremely difficult due to the huge variety of possible intervening factors ranging from lifestyle to socio-economic factors. Overall, the literature suggests that a causal link between fuel poverty and excess winter deaths remains unproven.

The Mental Health Effects of Fuel Poverty

- 99 Fuel poverty can impact on people's mental health in a number of ways. The choice of whether to 'heat or eat' is often quoted as being a reality for some people (see Green, 2007). Not surprisingly **financial pressures can place considerable levels of stress on fuel poor households**. People living in fuel poverty may only heat a limited number of rooms (e.g. the living room) and this can lead to overcrowding which can affect mental health (Gabe & Williams, 1993 cited in Heyman et al, 2005), particularly in young people. The day-to-day experience of living in cold, damp housing can have psychological consequences such as higher levels of depression (Khanom, 2000 cited in Shortt & Rugkasa, 2007).
- 100 A recent UK Government review of the evidence of the health impacts of fuel poverty and cold housing reported associations between fuel poverty and mental health. The Marmot Review (2011) reported that fuel poverty and cold housing can have a damaging effect on the mental health of all age groups, and that adolescents living in cold homes, in particular, are at greater risk of multiple mental health problems.

Evidence from Fuel Poverty Interventions

- 101 Although evidence of physical health improvements following fuel poverty interventions are inconclusive, a number of studies already discussed have

²³ Excess winter death rates are available by NHS boards, whilst fuel poverty data is only available by local authority; therefore the data here is for Scotland as a whole.

reported direct improvements in mental health (Heyman et al, 2011; Green & Gilbertson, 2008; Shortt & Rugkasa, 2007).

- 102 The Warm Front review, for example, reported that “Reducing fuel poverty is a major route to improving mental health” (Green & Gilbertson, 2008). Indeed, **of all the health outcomes assessed, the only significant improvement was in mental health.** Recipients of heating and insulation measures were 40% less likely to report a high level of psychological distress after installation. **Thermal comfort levels were also found to be associated with levels of psychological distress.** Householders with bedroom temperatures of less than 15°C were 50% more likely to report distress than those who maintained temperatures at 21°C.
- 103 Those who had great difficulty in paying fuel bills were 4 times more likely to suffer anxiety and depression or psychological distress than those who paid their bills easily. **A key message was that the primary route to better mental health was the relief of financial pressures.**
- 104 Shortt & Rugkasa (2007) provide a summary of evidence which has found significant decreases in the levels of stress and/or mental illness following housing improvements, re-housing or energy efficiency improvements (e.g. Blackman et al., 2003; Blackman et al., 2001; Smith et al., 1997, all cited in Shortt & Rugkasa, 2007).
- 105 Liddell & Morris (2010) in their evidence review of the health impacts of “fuel poverty” (in most cases meaning cold homes) over the last ten years, reported that significant mental health effects have been found in most of the large-scale studies they reviewed in both adults and adolescents. The evidence seemed to suggest **the most common effect of “fuel poverty” was a vulnerability to anxiety and depression.** Their review included the Warm Front review (Green & Gilbertson, 2008), The Scottish Central Heating Programme (Platt et al, 2007), the NATCEN report on housing and children (Barnes et al, 2008) and several New Zealand studies.
- 106 In sum, there does appear to be some evidence of a link between factors associated with fuel poverty (cold housing, difficulty in paying fuel bills) and poor mental health outcomes in adults and adolescents. However, the distinction between fuel and income poverty and the direction of causation remain unclear.

The Scottish Evidence on Mental Health

- 107 The Scottish House Condition Survey does not typically measure or report on householders’ mental health and its relationship to fuel poverty.
- 108 However, the social interview element of the survey does ask the householder whether they are *long-term sick or disabled*, and within that whether they have mental health problems. Data from the last 3 years does not reveal a significant relationship between fuel poverty and self-reported (long-term) mental health problems. Although fuel poor households are more likely to report a (long-term) mental health problem (5.6%) than non-fuel poor

households (3.8%), the difference is not statistically significant. Perhaps surprisingly, households living in extreme fuel poverty are less likely to report a (long-term) mental health problem (3.2%). A similar pattern is seen when householders are asked to what extent the condition of the property has affected their emotional or mental well-being. **No significant association is seen between fuel poverty, house condition and mental well-being.**

- 109 Interpretation of these findings, however, should be cautious as the indicators used to measure mental health (the questions in the survey²⁴) are not the most valid or direct measures. The nature of fuel poor householders may also have a bearing on these findings, in terms of their likelihood in reporting mental illness (see Chapter 3).

Mental health survey (2002)

- 110 In 2002 a separate mental health questionnaire was administered alongside the SHCS social interview using the General Health Questionnaire (GHQ12²⁵) and reported in that year's SHCS Findings Report (Scottish Executive, 2002a). **The report did not find any association between risk of mental health problems and fuel poverty.** However, dissatisfaction with heating was found to be a significant predictor of a high GHQ12 score (possible psychiatric disorder). This suggests that **thermal comfort level is an important factor in the mental well-being of householders.** The key findings of the report are stated in Box 2.

Box 2 *Housing and Mental Health in Scotland (2002)*

- Respondents who report their heating is not satisfactory are more likely to also report recent psychosocial disturbance.
- There is no association between NHER, extent of central heating or the existence of damp in the dwelling and mental health.
- There is an association between income and mental health with low income being associated with higher GHQ12 scores.
- Significant predictors of a poor mental health (high GHQ12 score) are: satisfaction with heating; tenure; location (urban or rural); satisfaction with home; and satisfaction with neighbourhood
- Factors not associated with poor mental health include: fuel poverty, age of respondent; overcrowding; disrepair to dwelling; dampness and dwelling type.

²⁴ Respondents to the SHCS Social Interview must first indicate whether they have a long-term sickness or disability, before then indicating whether this is a mental health problem.

²⁵ The GHQ12 is a well-established survey instrument designed to detect possible psychiatric morbidity in the general population. It is based on 12 questions about general levels of happiness, depression, anxiety and sleep disturbance over the four week period prior to interview. A score of 4 or more is used as a threshold to identify respondents with a possible psychiatric disorder.

111 Whilst, these findings appear to establish a link between the warmth of a home and mental well-being it is unclear what mediates this relationship and how it relates to fuel poverty. Further research and analysis is required to establish whether the pattern of findings still stands and what impact, if any, the recent rise in fuel poverty may have had on householders' mental health.

2.3 The Indirect Impacts of Fuel Poverty

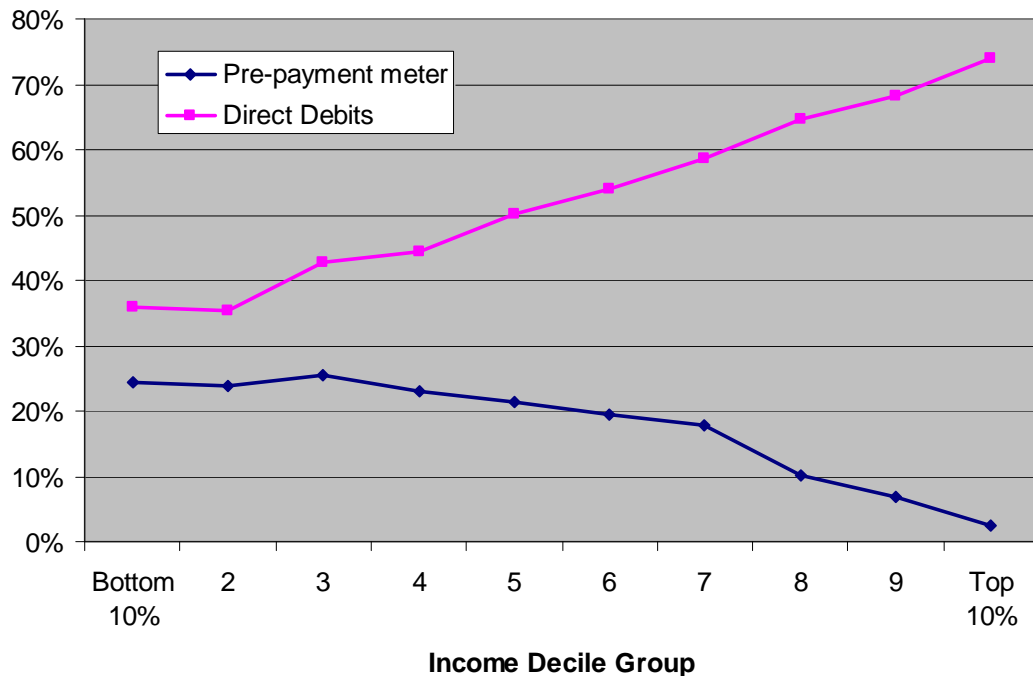
112 Fuel poverty or cold homes can indirectly affect people's lives by influencing their lifestyle choices, the opportunities available to them and their relationships with others.

Economic Pressures

113 People struggling to pay high fuel costs may be pushed into poverty and struggle to cover other essential household costs. Fuel poor households may be at a **fuel disadvantage** and pay more for their energy due to expensive tariffs.

114 People on low incomes are less likely to be on the cheapest direct debit tariffs (Hills, 2011) and more likely to use pre-payment meters than higher income groups (Figure 14).

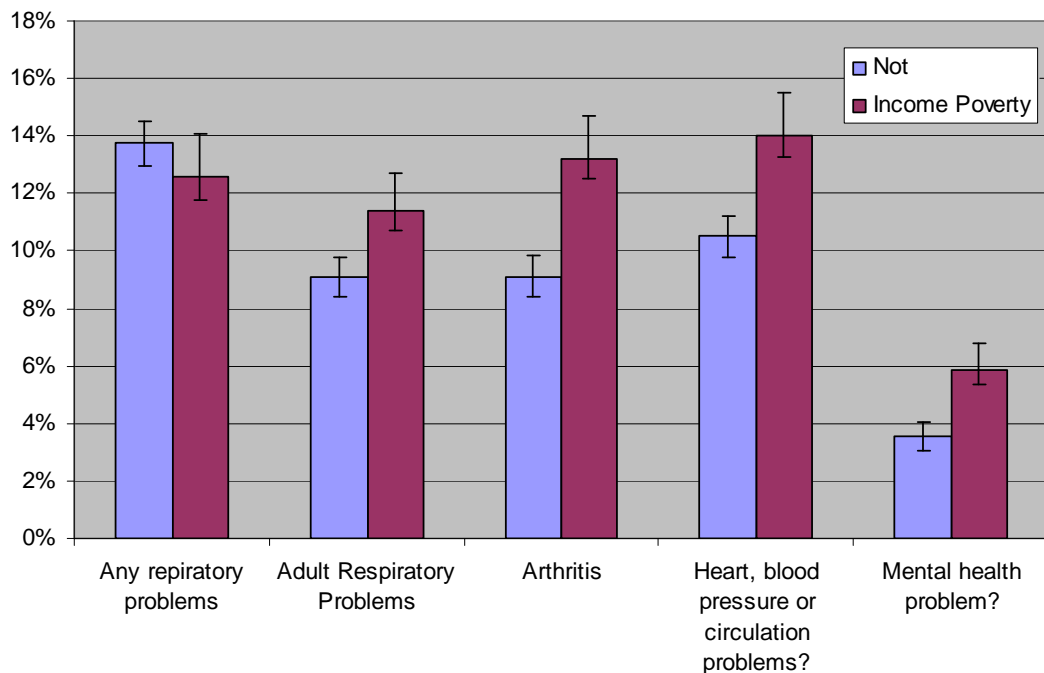
Figure 14 Fuel payment types by income group



115 A large US study based on secondary data found that the extra cost of heating in the winter resulted in reduced spending on food in poor households. This led to a reduction in caloric intake of ten percent during cold spells compared to richer families (Bhattacharya et al, 2003).

- 116 Pensioners on very low incomes have been reported to cut back on food when temperatures are very low (see Hills, 2011 p61).
- 117 Correlations between **income poverty and health issues** associated with cold housing are more evident than those with fuel poverty. This association bears out even when we control for age using linear regression analysis, as was not the case for fuel poverty (see paragraph 82).

Figure 15 “Cold housing health issues” and Income Poverty



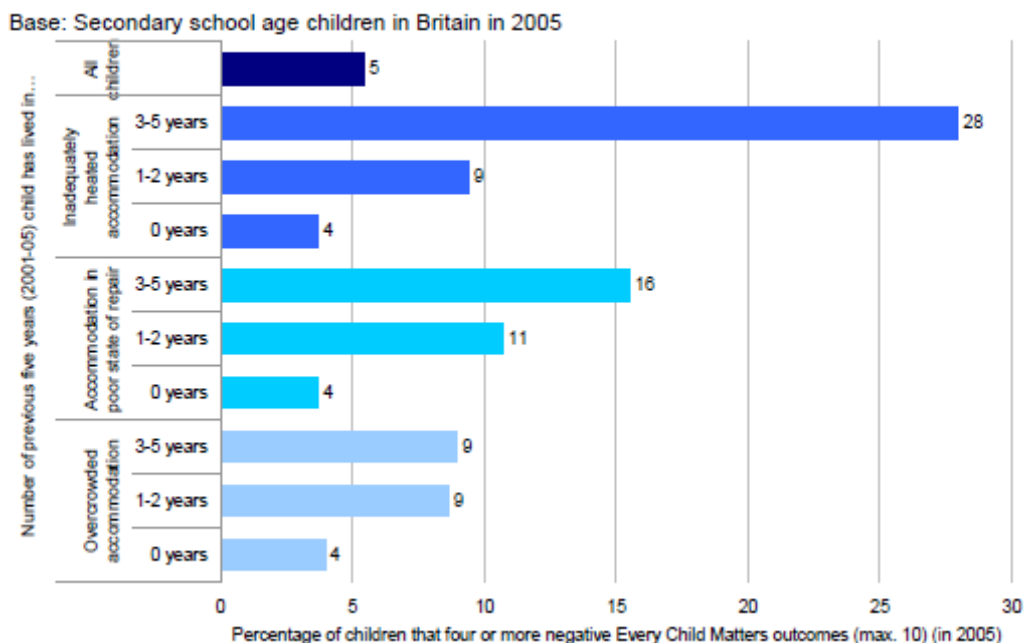
Social Problems

- 118 A number of studies report a link between cold homes and social isolation (e.g. Roberts, 2008), with some citing modest correlations between raised room temperature and improved social functioning (Heyman et al, 2011). There is a **social stigma** attached with living in cold, poor housing (Thomson, 2011) and associated problems like a reduced budget for going out and reluctance to invite friends into a cold house (The Marmot Review, 2011).
- 119 Children and young people appear to be particularly vulnerable to many of the indirect impacts of fuel poverty. Although the literature on the effects on children is scarce, there is some emerging evidence that suggests that the effects on fuel poverty in infants and children are primarily on physical health which may affect educational achievement, whilst in adolescents the effect of fuel poverty appears to be primarily on their mental health (Liddell, 2008) which can affect, for example, their propensity to undertake risky behaviours. These effects, if confirmed by further research, would be detrimental to children’s educational attainment, emotional well-being and resilience (The Marmot Review, 2011).

120 A major NatCen study in 2008 (already discussed) reported the negative impact of self-reported cold housing on children and young people across a range of social and physical outcomes (based on the outcomes defined under Every Child Matters²⁶) (Barnes et al, 2008). These included truancy, exclusion, running away from home, lack of a quiet place to do homework, and trouble with police. The relevant findings are summarised below.

121 **Children who lived in inadequately heated homes were significantly associated with multiple negative Every Child Matters (ECM) outcomes.** The risk increased substantially the longer children lived in cold homes. Figure 16 clearly demonstrates this, with 28% of children living in cold accommodation for 3-5 years having 4 or more negative ECM outcomes, compared with 4% of those had lived in cold housing for less than a year. However, these figures do not control for additional risk factors, such as low income.

Figure 16 Percentage of children that have four or more negative “Every Child Matters” outcomes, according to the number of years they have lived in bad housing



Excerpt from NatCen Study (Barnes, 2008) (p56)

122 An increased duration of living in inadequately heated accommodation was also significantly associated with having no quiet place at home to do homework and children in this group were:

- more likely to skip school
- more likely to be in trouble with the police

²⁶ Every Child Matters defines outcomes across 5 dimensions: Be Healthy, Stay Safe, Enjoy & Achieve, Make a Positive Contribution, and Achieve Economic Well-Being.

- more likely to fear mugging
 - more likely to be suspended from school
 - more likely to live in a family with income poverty
 - less likely to have family holiday
- 123 **Cold housing** was found to impact significantly on **adolescents** in particular.
- Cold housing had highly significant effects on **adolescent risk-taking** (e.g. early alcohol and tobacco abuse) and truancy, even after controlling for many other contributory **factors**.
 - **The only housing quality factor to be associated with poor mental health in adolescents was living in an inadequately heated home.** 28% of adolescents who had lived for long periods in poorly heated homes were at significant mental health risk, compared with 4% of similar children who lived in homes that were adequately heated.
- 124 This is attributed to the lack of personal space available to adolescents in cold homes as a result of overcrowding in warm rooms, which was associated with the feeling of being ‘unhappy with family life’.
- 125 Overcrowding in heated areas of the house could make it more difficult for a child to concentrate and complete their homework (Scottish Fuel Poverty Statement, The Scottish Executive, 2002b). This is compounded by physical health, especially respiratory, problems which can lead to missed school days (e.g. see Somerville, 2000). Cold homes may increase the amount of time it takes to recover from an illness, which could result in longer absences from school.
- 126 Of course all these studies report associations not causality. Further research is needed to determine why cold housing and negative child outcomes correlate with one another, particularly where other contributory factors (e.g. income) are controlled for. It is also important to emphasise that **the association is with cold housing and not fuel poverty**. Often cold houses are associated with other aspects of bad housing such as poor state of repair, and it can be difficult to separate out the impact of a cold home, and even more so the impact of fuel poverty.

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Chapter 3 Fuel Poor Households and Their Homes

127 This chapter presents the social and physical characteristics of fuel poor households in Scotland, covering:

- the social characteristics of the fuel poor
- the characteristics of their homes
- the extreme fuel poor
- the behaviour, culture and 'churn' of fuel poor households

Key Messages

- The people identified as fuel poor is determined by the nature of the definition used. Different definitions will identify different target groups.
- Over half of fuel poor households in Scotland are pensioners.
- In Scotland, 59% of fuel poor households are not in receipt of means-tested benefits, disability living allowance or tax credits.
- In Scotland, 78% of households on a low income are fuel poor.
- In Scotland, only 7% of people in full-time employment experience fuel poverty.
- Fuel poor households are more than three times more likely to live in an energy inefficient home than those not experiencing fuel poverty, but approximately half of those living in energy inefficient housing are not fuel poor.
- 50% of households that own their properties outright are fuel poor.
- The 'extreme fuel poor' are twice as likely to be elderly, to own their homes outright and to live rurally.
- In Scotland, 73% of fuel poor households are economically inactive due to retirement, unemployment, disability or family commitments.
- As a third of energy use is attributed to lighting and appliances fuel poverty initiatives could go beyond heating improvements.
- Further research would be beneficial in understanding the behaviour and culture of the 'fuel poor' and into what types of households experience persistent fuel poverty versus intermittent fuel poverty.

3.1 Introduction

128 Identifying who is fuel poor depends to a large extent on the definition. Different definitions will identify different target groups such as pensioners or

families with young children. The current definition favours the elderly and those on low incomes living in energy inefficient homes.

Low income is defined as a household earning less than 60% of the national median household income (unless otherwise stated).

- 129 Using the Scottish House Condition Survey (SHCS), fuel poor households were examined across a range of variables in two broad categories: dwelling characteristics, and household or social characteristics. These are summarised in Table 4.

Table 4 Existing Fuel Poverty Characteristics in Scotland (SHCS 2010)

Social characteristics	Age of household occupants	The elderly are most at risk from fuel poverty: 49% of households with 1 or more pensioner are fuel poor, compared with 18% of households without pensioners.
	Vulnerable families	Of households with children, single parent families are most at risk: 31% live in fuel poverty.
	Single person households	Single person households are more likely to be fuel poor. Single pensioners are most at risk: 55% of single pensioner households are fuel poor.
	Household income	The likelihood of experiencing fuel poverty increases as household income decreases. Almost all of those in the lowest income band (less than £100 per week) are fuel poor (98%).
Dwelling characteristics	Rurality	38% of those in rural areas suffer fuel poverty compared with 26% of urban households. Extreme fuel poverty is twice as prevalent in rural areas.
	Type of Dwelling	People in terraced or tenement flats are least likely to (25%) experience fuel poverty and those in detached houses are most likely (34%).
	Age of Dwelling	A third of households (162,000) living in dwellings built pre-1919 are fuel poor compared to 17% (86,000) of those living in dwellings built after 1982.
	Tenure	Local Authority tenants are the most likely to experience fuel poverty, followed by Housing Associations. Private tenants, however, are three times more likely to suffer extreme fuel poverty than those living in socially rented dwellings.
	Energy Efficiency	Households in energy inefficient dwellings are more likely to experience fuel poverty. 58% of people living in dwellings rated NHER 'poor' are living in fuel poverty compared with 40% of those in dwellings rated 'moderate', and 20% of those rated 'good'.

<i>cont'd...</i>	Type of space/water heating	Those without central heating are more likely to be fuel poor. Those that are off the gas grid are more likely to be fuel poor.
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*Data source: Scottish House Condition Survey: Key Findings 2010
(The Scottish Government, 2011).*

3.2 Social Characteristics

Vulnerability and Income

130 The *UK Fuel Poverty Strategy 2001* defined those most vulnerable to fuel poverty as,

“older households, families with children and householders who are disabled or suffering from a long-term illness”.

(The UK Fuel Poverty Strategy 2001, DTI, p11)

131 Although there is no equivalent formal definition of ‘vulnerability’ in Scotland, fuel poverty initiatives have tended to target similar groups of people. The Energy Assistance Package, for example, targets owners and private sector tenants in receipt of a qualifying benefit that are either elderly, families with children aged under 16, pregnant women, terminally ill or disabled. The Scottish Fuel Poverty definition classifies vulnerable households as those who have members aged 60 or over and/or with a long term sickness or disability (Table 3).

132 **In Scotland, 78% of households on a low income are fuel poor.** The figure rises to 98% for those people living in the lowest income band (less than £100 per week). There is therefore an inverse relationship between income and fuel poverty; as income decreases the risk of fuel poverty of increases. However, over a fifth of low income households are not fuel poor (22%), and some households on a higher income (above 60% median income) still experience fuel poverty (14%). This discrepancy is most likely attributable to the energy efficiency of the homes. See Chapter 4 for a fuller discussion of income poverty and fuel poverty.

133 For Scotland as a whole:

- 11% of households in Scotland are fuel poor but not income poor
- 5% of households in Scotland are income poor but not fuel poor
- 18% of households in Scotland are fuel and income poor
- 66% of households in Scotland are neither fuel nor income poor

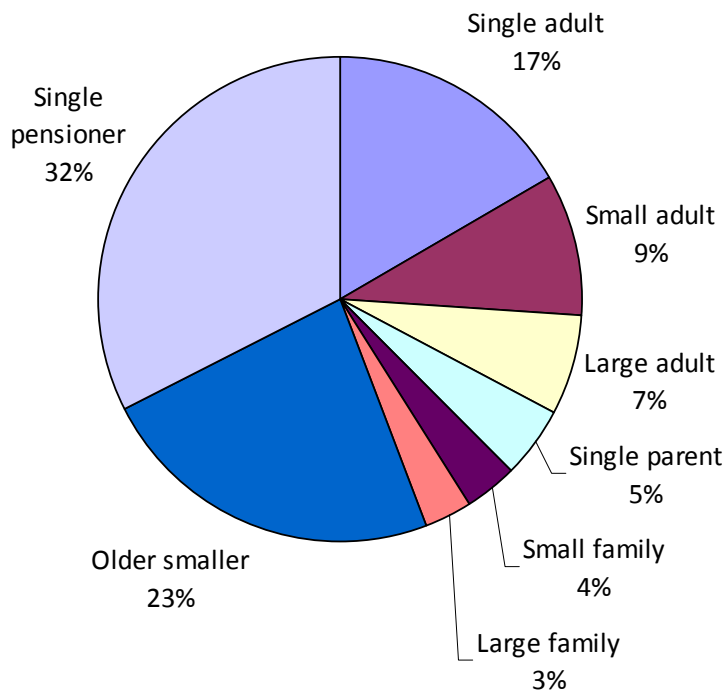
134 Fuel poverty schemes tend to target vulnerable groups on the basis of income, using benefit uptake as a proxy measure of low income. However, some studies suggest that this **‘passport to benefits’** can lead to a misalignment of fuel poverty funding (Sefton, 2004 p20). **In Scotland, 59% of fuel poor households are not in receipt of means-tested benefits, disability living allowance or tax credit.** This may be explained by the large number of elderly

people who experience fuel poverty in Scotland (55% of the fuel poor are elderly).

- 135 **A policy that targets those most vulnerable to fuel poverty on the basis of income (receipt of benefits) may seem a straightforward way to identify recipients, but it risks missing over half of the fuel poor households in Scotland.**

Household Type

Figure 17 *Fuel Poverty by Household Type*



SHCS 2008-2010

- 136 Of those experiencing fuel poverty, the household types²⁷ most at risk are pensioners living on their own (32%), households with pensioners in them (23%) and single non-pensioner adults (17%) (see Figure 17).
- 137 The remaining fuel poor are made up of adult households (16%) and households with families (12%).

Households with Children

- 138 Compared to other household types, families represent the least at risk group (see Figure 17). **Approximately 1 in 10 families in Scotland are fuel poor (12%).** This appears to contradict the common (mis)conception that families

²⁷ The SHCS categorises households into 8 types: single adult, small adult, single parent, small family, large family, large adult, older smaller, and single pensioner.

with young children are one of the most at risk groups²⁸. In fact, **only 5% of the fuel poor in Scotland have a child under 5 in the household**. This does not mean of course that families living in fuel poverty should not be targeted. As we saw in Chapter 2, the impact of fuel poverty, and persistent cold housing in particular, on children and young people can be detrimental to their health and well-being. Children living in lone parent households are far more vulnerable to fuel poverty, with **1 in 3 single parents experiencing fuel poverty in Scotland**.

Single Person Households

- 139 Research consistently reports single pensioners as being one of the most ‘at risk’ groups (e.g. Sefton, 2004). **In Scotland, over half of single pensioners suffer fuel poverty (59%)**, or to put it another way, 32% of all fuel poor households are single pensioners. Of all household types, single pensioners are also most at risk of extreme fuel poverty (20% in 2008-10). The prevalence of lone pensioners is perhaps not surprising given that elderly people are nearly twice as likely to live alone. It may also be explained by the different definitions used in Scotland to measure fuel poverty in the elderly²⁹.
- 140 **32% of single adult households are fuel poor**, of which 30% experience extreme fuel poverty. Working age, low income single adult households are more likely than not to be fuel poor (Palmer et al, 2008). Viewed within the current climate of rising fuel prices, increasing unemployment/stagnant incomes, welfare reform and increasing numbers of single households, this group could become particularly vulnerable to fuel poverty in the future.
- 141 **Single parents are nearly 3 times more likely to experience fuel poverty than couples with children**. Interestingly, single parent households are more likely than other household types to live in an energy efficient house, probably because they are also more likely to be in social housing. This would suggest that solutions to their fuel poverty must focus on income, not efficiency.
- 142 **Single parent households are more likely than other household types to describe themselves as fuel poor** (to state they experience difficulty in affording their energy requirements), followed closely by single adults. **Single pensioner households were the least likely to consider themselves as living in fuel poverty**. This could be attributable to a range of factors from different perceptions of thermal comfort (satisfactory room temperature levels), to a ‘stigma’ attached with admitting financial difficulties. Further research is needed to ascertain this, but the implications are relevant to the

²⁸ This may be because households with young children are not classed as ‘vulnerable’ within the Scottish fuel poverty definition, and may therefore be under-represented in reported levels of fuel poverty.

²⁹ Scotland uses a higher temperature (23°) for the elderly and infirm and does not adjust for under-occupancy

implementation and impact of fuel poverty interventions that target these groups.

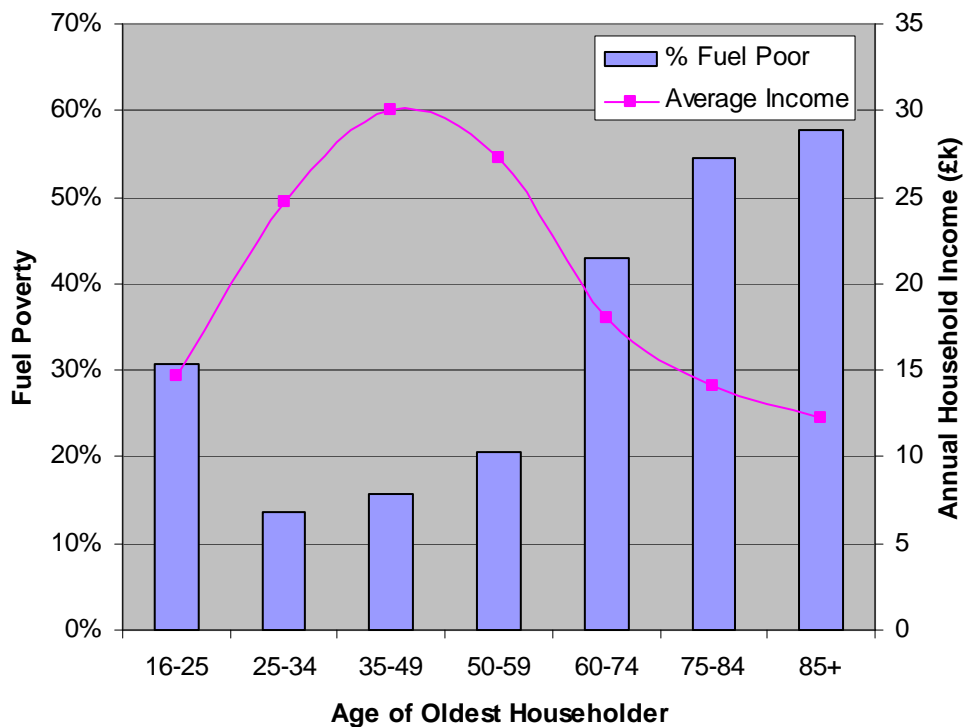
- 143 The number of single pensioner and single parent households have remained relatively static since 1996. However, the proportion of single adult households has increased, which may make them increasingly significant as a fuel poor group in the future.

The Elderly

- 144 **Over half of households in fuel poverty in Scotland are pensioners (56%).** As previously noted, they are also particularly vulnerable to extreme fuel poverty. Pensioners have therefore been the target of many fuel poverty interventions. The main UK policy is the winter fuel payment which is a non-means tested benefit eligible to all people aged 60 or over. In 2009 the UK Government also extended the CERT scheme³⁰ to all householders aged 70 or over, regardless of income.
- 145 In Scotland, **38% of pensioners are on a low income.** 1 in 10 single pensioners live on less than £6000 per annum. As 146 demonstrates, fuel poverty increases with householder age and decreasing income. As people get older and their income falls they become more vulnerable to fuel poverty.
- 146 In England, elderly fuel poor households represent less than a fifth all pensioner households. Boardman (2010, p59-62) therefore argues that an indiscriminate approach to targeting household types irrespective of income (such as the winter fuel payment) may not be the most effective route.
- 147 In Scotland, however, **half of pensioner households live in fuel poverty.** This difference may be partly explained by the increased heating regime for the elderly (Table 3), but it could also be attributed to other factors such as the type of properties that older people inhabit

³⁰ The CERT (Carbon Emissions Reduction Target) Scheme places an obligation on large electricity and gas suppliers to achieve a specified amount of carbon savings across homes in Great Britain. Suppliers meet this target by promoting the uptake of low carbon energy solutions to household energy consumers - http://www.decc.gov.uk/en/content/cms/funding/funding_ops/cert/cert.aspx

Figure 18 Fuel Poverty by Householder Age and Income



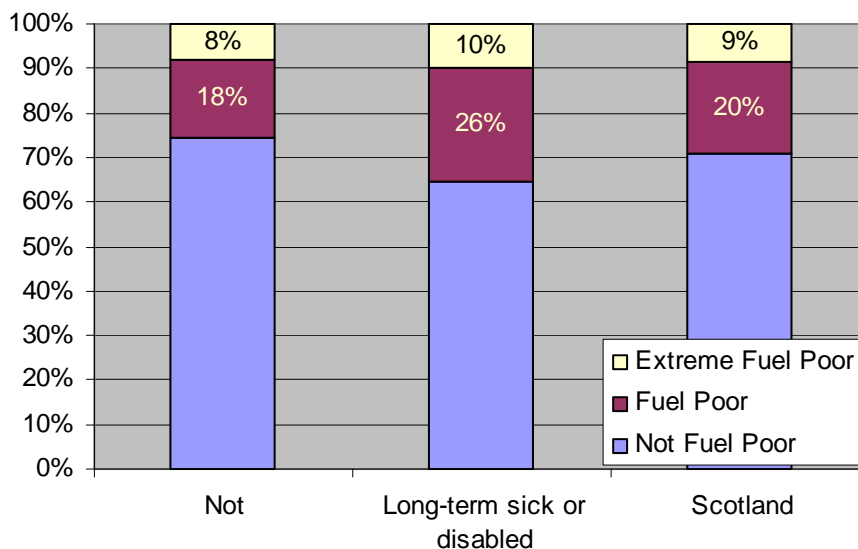
- 148 **More than half of pensioners in Scotland do not receive benefits** (62%) (means-tested, DLA, tax credits). This figure rises to 70% when considering fuel poor pensioners, and 80% for fuel poor pensioners who own their homes outright. In Scotland, therefore, the targeting of pensioners as a homogenous group may not be as problematic as in England.
- 149 The **culture and attitudes of older people** towards heating the home in winter may also contribute to their living in cold homes. For example, one study that explored the experiences of older people affected by fuel poverty in the winter, reported that the people interviewed usually turned heating off during the day and that it was common practice to sleep in an unheated bedroom and to keep the window open at night (Wright, 2004).
- 150 When compared to non-pensioner householders, elderly people are:
- Nearly four times as likely to own their house outright (58% compared to 15%)
 - Nearly **twice as likely to live in under-occupied houses** (41% of elderly live in such houses compared to 24% of non-pensioners)
 - Far less likely to live in privately rented housing (5% compared to 13%)
 - Far less likely to have a mortgage (8% compared to 46%)
 - Less likely to live in modern housing (post-1982) (18% compared to 23%)
 - More likely to live rurally (19% compared to 16%)
 - Slightly more likely to be off the mains gas grid (11% compared to 9%)

- 151 The fact that elderly people are more likely to own their own homes may make them ineligible for some means-tested benefits, and therefore less likely to meet the criteria for some fuel poverty grants. As already noted, **only a fifth of fuel poor pensioners who own their homes are in receipt of benefits** (means-tested, DLA, tax credits). This means **any fuel poverty scheme which awards grants on the basis of benefit eligibility would miss 80% of the fuel poor within this category.**
- 152 It is also worth noting that the Scottish definition of fuel poverty “favours” elderly households (by classifying them as ‘vulnerable’) and does not reduce energy needs for under-occupied houses. This may further explain the tendency for elderly households to be more likely to be classed as fuel poor than other household types in Scotland.

Long-term Sick and/or Disabled

- 153 People with a long-term illness and/or disability (LTSD) tend to spend more time in the home and may be less mobile, both of which would increase their energy demand and associated fuel costs.
- 154 Since the UK Fuel Poverty Strategy (DTI, 2001) highlighted LTSD people as ‘vulnerable’ and at greater risk of fuel poverty, many fuel poverty initiatives have been targeted at people in receipt of disability living or long-term sick allowance.
- 155 In Scotland, **people with LTSD tend to be more likely to be fuel poor than the average Scottish household.** As with elderly households, LTSD are classed as ‘vulnerable’ and are therefore “favoured” in Scottish fuel poverty calculations.

Figure 19 *Fuel poverty among the long-term sick or disabled*

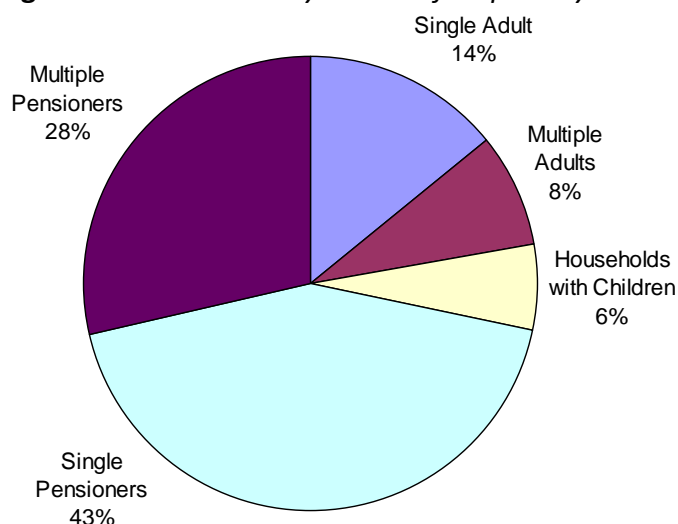


Workless Households

156 In Scotland, 73% of fuel poor households are economically inactive³¹. Within this, nearly three quarters are pensioner households (71%), followed by single adult households (15%).

157 **Only 7% of people in full-time employment experience fuel poverty.**

Figure 20 *Economically inactive fuel poor by household type*



158 Different (fuel poor) household types tend to be economically inactive for different reasons:

- “Pensioner” households are almost all **retired** (97%)
- Adult (non-pensioner) households are most likely to be **unemployed** (30%), followed by long term sick or disabled (28%) and retired (20%).
- Families are most likely to **look after the home/family** (43%), followed by unemployed (21%) and in further education (15%)

159 Looked at another way, **half of households that are ‘economically inactive’ are fuel poor** (53%), compared to 13% of working households. This is not surprising given that workless households tend to have **lower incomes**. Equally unsurprising is that workless households in fuel poverty tend to be (retired) pensioner households (68% of workless households are pensioner households), particularly single pensioners, living in homes they own outright (44% of fuel poor workless households own their homes outright). They are also more likely to live in local authority and housing association houses than economically active households (44% in total).

³¹ Households where the highest income holder (and their spouse) is a unemployed and seeking work, permanently sick or disabled, retired, a carer or is unable to work due to short-term ill-health.

160 **Students** (those in further education) were excluded from this analysis. The sample numbers are very small and given that many students live in Houses of Multiple Occupation (HMOs) where the SHCS does not collect income data from all household members any fuel poverty data would be unstable. However the little evidence available suggests that fuel poverty could be a significant (though perhaps temporary) issue for students.

Gender

161 In Scotland, 41% of households have a female highest income householder. Of these, 36% are fuel poor, compared with 24% of male highest income households, representing a 50% increased risk.

162 One reason for this discrepancy stems from the fact that at-risk household types are much more likely to have women as the only adult. Of single pensioner households, 71% are women; of single parents, 93% are women.

163 Excluding pensioners and single parents, there remains **an income gap between male and female householders**: households where a woman is the highest income householder earn on average 30% less than those with male breadwinners.

Ethnicity

164 Very little information is available about ethnicity and fuel poverty. A national study of children and young people in 2008 found that children in families that had a Black mother were more than twice as likely (as all children) to experience persistent inadequate heating (10% compared to 4%) (Barnes et al, 2008). This would suggest that black and minority ethnic (BME) families may be at greater risk of cold housing, and possibly fuel poverty. BME households are now starting to be included within the list of fuel poverty vulnerable groups (e.g. Faulk, 2009).

165 It is not currently possible to analyse the Scottish data by ethnicity (due to sample size³²) but clearly this is an area that warrants further investigation.

Tenure

166 The latest Scottish data on fuel poverty (2010) suggest that **local authority tenants are most likely to experience fuel poverty** (32%), followed by those living in Housing Associations (29%), and owner-occupiers and private-renters (both 27%). Overall, those living in the social sector are slightly more likely to be fuel poor (30%) than those living in the private sector (27%). However, the variation between fuel poverty across different tenures is relatively small³³,

³² There are not enough cases (households of BME origin) within the SHCS database to enable statistical analysis.

³³ Due to the policy interest in the private Rented Sector additional information is provided in Annex D

and it is likely that as the energy efficiency of social housing continues to improve, housing tenure may become a less potent indicator of fuel poverty.

- 167 The **inhabitants** of different types of housing may have a bearing on fuel poverty. For example, local authority and housing association tenants are 2 to 3 times more likely to have a **long-term sickness or disability** (29% and 30% respectively), than owner occupiers (11%) and private renters (15%). Other intervening factors could include income which is substantially lower in social sector households compared to private sector households, particularly owner occupiers (both outright owners and mortgage holders) whose average income is almost double that of social sector households.
- 168 The pattern shifts when considering **extreme fuel poverty**, which is almost **twice as prevalent in the private sector** (9% compared to 5% social sector). Indeed, some (UK) literature suggests that fuel poverty may be more likely in households that are privately rented and even those that are outright owner-occupiers (e.g. Boardman, 2010). In Scotland, extreme fuel poverty is more pronounced in **home ownership** than the private rental sector: **61% of those who are living in extreme fuel poverty own their homes outright** (compared with 25% of those not living in extreme fuel poverty who own their homes outright).

The Private Rented Sector

- 169 Overall, levels of fuel poverty in the Private Rented Sector are 2% lower than the general population.
- 170 Due to the disparity in energy efficiencies (Figure 23), fuel poverty tracks the age of the dwelling rather well as shown in Table 5. However, in all age of dwelling cohorts there is less fuel poverty in the public rented sector than in the general population, except for pre-1919 where it is the same.

Table 5 *PRS Fuel poverty by Dwelling Age*

Age of dwelling	Fuel Poverty		Sample	National Fuel Poverty Rate
	000s	%		
pre-1919	35	35%	354	35%
1919-1944	6	28%	85	32%
1945-1964	8	27%	128	32%
1965-1982	6	22%	105	29%
post-1982	6	13%	179	18%
PRS	62	27%	851	29%

SHCS 2008-10

Who are the private sector extreme fuel poor?

- 171 People living in private sector houses (owner-occupiers or private renters) who experience extreme fuel poverty, when compared to non extreme fuel poor private sector households, are:

- More than **twice as likely to own their homes outright** (74% compared to 35%)

- Nearly **four times more likely to be elderly**, particularly single pensioners (38% compared to 10%)
- **Twice as likely to live rurally** (36% compared to 18%)
- More likely to live in **under-occupied houses** (55% compared to 35%)
- Almost twice as likely to live in **older houses** (37% live in pre-1919 houses compared to 22%; 12% live in post-1982 houses compared to 25%)
- More likely to live in a **detached house** (44% compared to 27%)
- More likely to be **long-term sick or disabled** than the non (extreme) fuel poor (37% compared to 27%)

172 In contrast, the only reliable indicator for **extreme fuel poor social sector households** is household type. People living in extreme fuel poverty in the social sector are twice as likely to be single adult households (than non-extreme fuel poor). This suggests that **single adult social tenants are a target group for tackling extreme fuel poverty**.

Summary of Social Characteristics

173 The above description has shown that fuel poverty is a highly complex phenomenon. The findings reveal a number of key issues and many useful variables when considering fuel poverty. There appears to be two broad policy considerations; the relationship of fuel poverty to low incomes and home ownership, and the prevalence of fuel poverty for equalities groups.

Low Income and Additional Risk Factors

174 Low income is clearly a key driver of fuel poverty, and it is even more powerful when combined with other risk factors. Palmer's report on the relationship between low income and fuel poverty, although based on 2003-2005 data from the English House Condition Survey (EHCS), provides some helpful indicators as to which low income groups may be most at risk of fuel poverty (see Palmer et al, 2008):

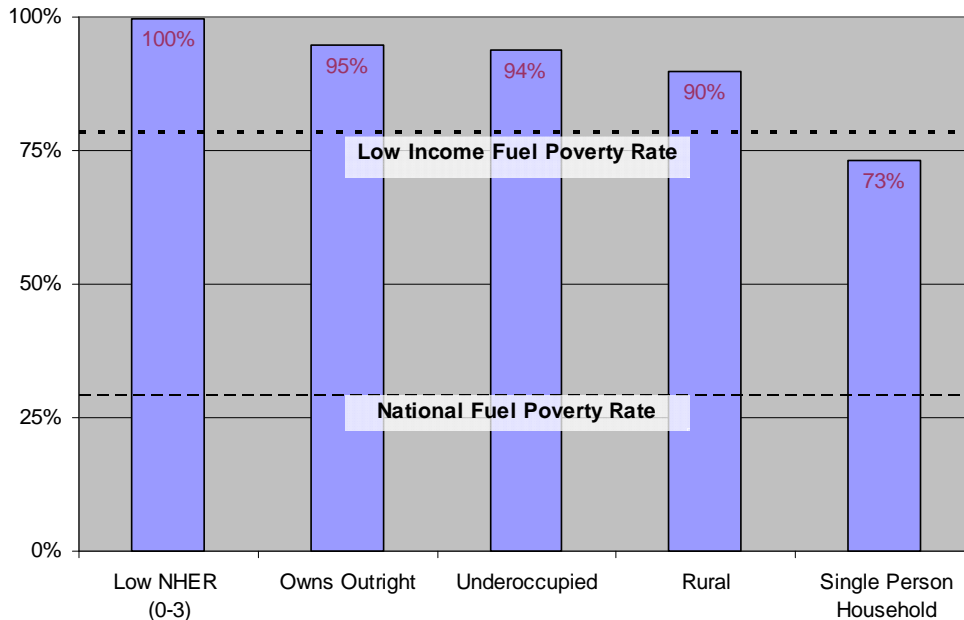
- People living in energy inefficient homes (SAP³⁴ under 30)
- Single person households (both over and under 60)
- Property owners (outright owners)
- People living in rural areas (rather than suburban or city/urban areas)
- People living in large unoccupied houses³⁵

³⁴ SAP is the UK Government's 'Standard Assessment Procedure' for the energy rating of dwellings. It calculates energy used by space heating, hot water and lighting and is measured on a scale from 1 (poor) to 100 (excellent).

³⁵ Where a house exceeds bedroom standard by +2

- 175 Analysis of Scottish data (SHCS) using Palmer’s risk indicators suggests that all of the indicators when combined with low income correlate well with fuel poverty, in particular energy inefficiency, house ownership (outright owners) and under-occupancy (see Figure 21). For example, **in Scotland, 100% of low income households living in energy inefficient homes are fuel poor.**

Figure 21 *Low income households by fuel poverty*



- 176 This analysis demonstrates the value in analysing fuel poverty within categories (such as income) as it can uncover patterns that would otherwise be masked. It also highlights the problems in treating the fuel poor as a homogenous group.

High Capital but Low Income

- 177 One group that has emerged from the findings is households that own their properties outright. Such households may not qualify for means-tested benefits but may still experience fuel poverty. They may lack the funds required to invest in energy efficiency measures due to low income and therefore be at risk of deeper fuel poverty as fuel prices increase.
- 178 There are also households who own their own houses and are *not* income poor, but are still classed as fuel poor. This group is discussed in detail in Chapter 4.

Fuel Poverty Prevalence for Equalities Groups

- 179 The evidence shows that fuel poverty is particularly high for older age groups, for those who are long term sick and/or disabled and for women.
- 180 The data is too sparse to be able to draw conclusions around ethnicity but it is something that merits further research. These findings suggest the importance of Equalities Impact Assessments in taking forward any policies or programmes related to fuel poverty.

3.3 Dwelling Characteristics

181 The houses that people live in play a key role in people’s experience(s) of fuel poverty. Although treated in this chapter as distinct from social characteristics, in reality the two overlap.

Energy Efficiency

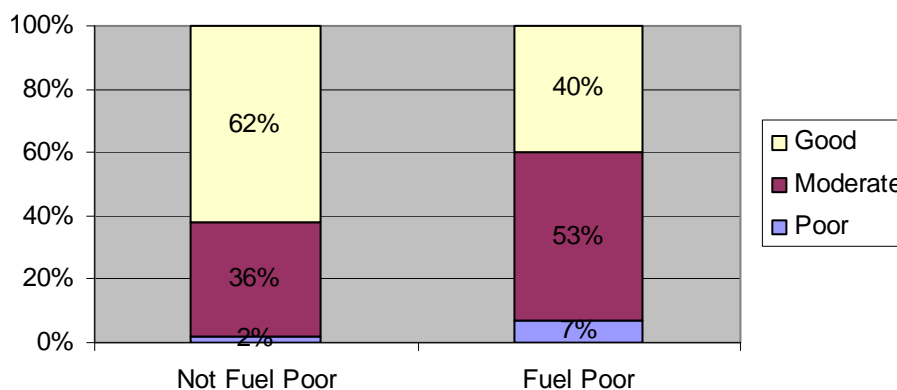
182 It is not surprising that people living in energy inefficient housing are at greater risk of fuel poverty. Homes with little insulation and poor heating need more energy to warm them, which increases fuel spend and makes the household more vulnerable to rises in fuel prices.

183 In Scotland, **over half of those people living in energy inefficient housing are fuel poor**, compared with a quarter of those living in efficient homes. **Fuel poor households are also more than three times more likely to live in an energy inefficient home (‘poor’ NHER rating) than those not experiencing fuel poverty.**

184 Boardman found that fuel poor households tend to remain in energy inefficient housing longer than fuel poor households who live in efficient housing, suggesting that this is a persistent rather than a transient issue for some people (Boardman, 2010 p143).

185 The fuel poor live in less efficient homes overall, as Figure 22 illustrates.

Figure 22 Fuel poverty by NHER band



186 Fuel poor households tend to have less well-insulated homes than non-fuel poor homes. Table 6 shows that **fuel poor households are far less likely to have loft insulation than non-fuel poor households**. This pattern is even more pronounced for extreme fuel poor households.

187 Fuel poverty interventions have therefore tended to focus on the installation of energy saving measures such as loft insulation and more efficient heating systems as the primary means through which to alleviate fuel poverty. However, interventions tend to target households by income (receipt of benefits) rather than by the energy efficiency of housing. For example, a review of the Warm Front scheme showed that grants were disproportionately skewed towards low income households, with inefficient houses (SAP under 30) representing 14% of eligible households but 40% of fuel poor households

(Sefton, 2004). In Scotland, the Energy Assistance Package does target inefficient homes (those with a poor SAP score), but only at the last stage of the assessment (Stage 4), which assesses householder's eligibility for measures such as central heating.

Table 6 *Fuel Poverty by extent of loft insulation*

Loft Insulation	Not Fuel Poor	Fuel Poor	Extreme Fuel Poor
none	49%	25%	26%
25mm	60%	21%	18%
50mm	62%	26%	11%
75mm	74%	18%	8%
100mm	74%	18%	8%
150mm	72%	20%	9%
200mm	71%	22%	7%
>200mm	69%	23%	8%

(SHCS, 2008-10)

- 188 Conversely, **the poorest households do tend to live in slightly more energy efficient homes than average.** This is probably because they are more likely to live in social housing which is increasingly becoming more energy efficient than some private sector housing, largely driven by the Scottish Housing Quality Standard (73% social sector housing is rated as 'good' NHER, compared to 57% private sector).
- 189 However, **to lift a low-income household out of fuel poverty would require a very energy efficient house** (Boardman, 2010), and even then some households may remain in fuel poverty. As noted in paragraph 56, it is estimated that roughly 14% of households would remain fuel poor even if all houses in Scotland were highly energy efficient (minimum NHER of 10).
- 190 Lastly, it is important to recognise that not all people living in energy inefficient homes are fuel poor. **Approximately half of those living in energy inefficient housing are not fuel poor**³⁶. Of all the fuel poor households, 93% live in moderate/good (NHER-rated) homes; 7% live in poor NHER houses. However, only 3% of homes in Scotland are rated 'poor' so **the fuel poor are twice as likely to live in a poor NHER home.**

Type of Heating

- 191 The average household in Scotland uses gas for its heating and hot water, and electricity for appliances and lighting. Table 7 shows, that fuel poor households do not follow this trend. **People living in fuel poverty are far less likely to be on mains gas** (75% of mains gas users are not fuel poor) which puts them at a **fuel disadvantage**. Furthermore, all-electric homes tend to be poorer, whilst

³⁶ 55% of households with a poor Energy Performance Certificate (EPC) (Level E,F or G) are NOT fuel poor; 45% are.

oil-fuelled homes tend to be wealthier (oil must be bought in bulk) (Boardman, 2010 p114).

- 192 As we saw in Figure 14, low income households are also more likely to be on more expensive fuel tariffs, increasing their fuel costs.

Table 7 *Fuel Poverty by type of central heating*

Primary Heating Fuel	Not Fuel Poor	Fuel Poor
<i>Mains gas</i>	82%	67%
<i>Heating Oils</i>	5%	11%
<i>Solid Fuels</i>	1%	3%
<i>Electricity</i>	13%	19%

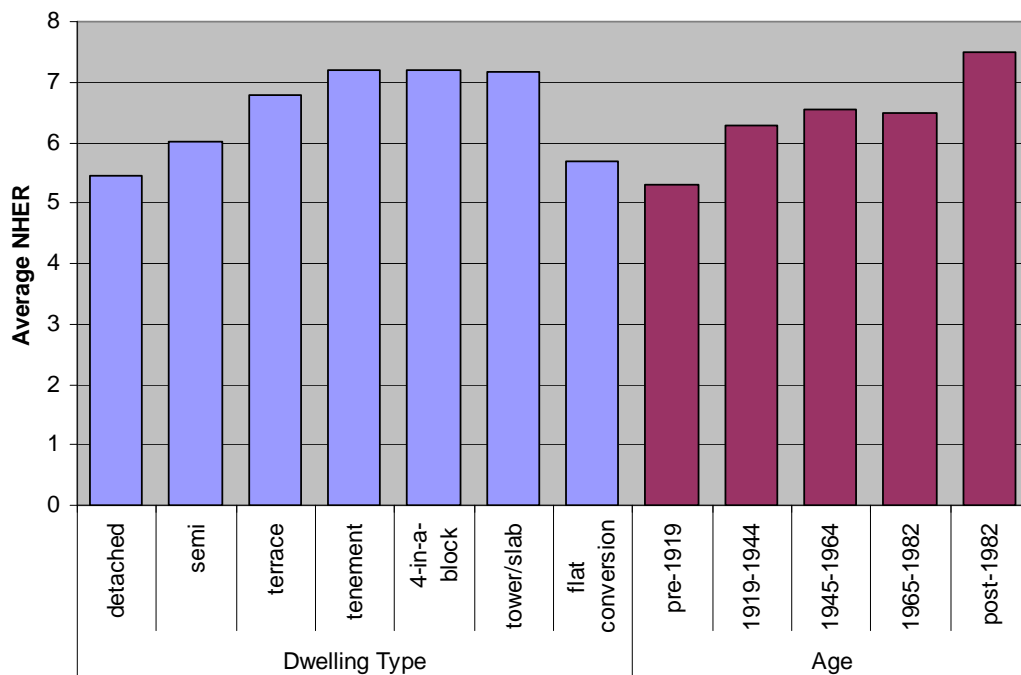
(SHCS, 2008-10)

- 193 Households without **central heating** are more likely to be fuel poor than those with central heating. Similarly households that are **off the gas grid** are much more likely to be fuel poor than those on the gas grid (47% are fuel poor, compared with 27% of those on grid). This may be because the properties themselves are harder to heat, and that other types of fuel may be less efficient and more expensive than gas. Off-gas properties are more likely to be rural and some argue that fuel poverty schemes often fail to address the fuel disadvantage of off-grid or rural homes (e.g. Wright, 2004; Shortt & Rugkasa, 2007). Urban tower blocks are also heated electrically (Boardman, 2010).
- 194 Electric heating, known to be one of more expensive forms of space/water heating depending on the tariff, is more prevalent in social housing (19% local authority; 25% housing association) and the private rental sector (26%) than in privately owned properties (10% owner occupier). However, further analysis reveals that there is little difference between the use of mains gas and electricity in private and social housing fuel poor households, and this is therefore unlikely to be a significant factor.
- 195 Chapter 5 explores the energy expenditure of fuel poor households compared to non-fuel poor households in more detail.

Age and Type of Property

- 196 Fuel poverty varies by type of property. People in terraced or tenement flats were less likely to experience fuel poverty (28 and 25% respectively) than those in **detached houses** (36%). Detached houses have more external walls and a roof through which heat is lost, and therefore tend to be less energy efficient and cost more to heat (see the SHCS 2010 Findings Report, Figures 6 & 7). As Figure 23 demonstrates, detached houses have higher carbon emissions than other dwelling types (although this is falling as more new homes are built).

Figure 23 Mean NHER by Dwelling Type and Age



197 The age of the dwelling is also an important factor as newer homes tend to be more efficient. Over a third of households (35%) living in dwellings built pre-1919 are fuel poor compared to 18% (86,000) of those living in dwellings built after 1982. This is most likely because older properties tend to be less energy efficient and therefore cost more to heat.

Under-occupancy

198 An increasing body of evidence reports a link between fuel poverty and under-occupancy (e.g. Palmer et al, 2008; Moore, 2008,). For example, in England, the proportion of under-occupying households that are fuel poor is approximately double that of households not under-occupying (DECC, 2012, p42).

199 Houses that are owned outright are far more likely to be under-occupied. **Half of houses that are owned outright in Scotland are under-occupied, of which 70% are older households.** Analysis of the SHCS data reveals a modest but significant correlation between under-occupancy and fuel poverty. This may be particularly relevant for particular ‘types’ of fuel poverty such as extreme fuel poverty in the private sector and the elderly.

Summary of Dwelling Characteristics

200 An analysis of dwelling characteristics of fuel poor households suggests that the houses that people live in play a crucial role in fuel poverty. An old, off-grid, detached house is more than likely to be highly energy inefficient and to pose a significant fuel poverty risk to its inhabitants, current or future, particularly if they are on a low income.

201 Another way to look at it is to consider someone with a low income living in an energy efficient house. This person is far less likely to be fuel poor than if they were living in poor housing. Household circumstances may improve but this

will have less impact if the quality of housing remains poor. Improving the energy efficiency of a house offers a more permanent alleviation of fuel poverty than either income or fuel pricing which vary over time. However, as noted previously, improved energy efficiency alone will not eradicate fuel poverty.

- 202 Although much has been done in the social housing sector through the Scottish Housing Quality Standard and fuel poverty interventions (such as the Energy Assistance Package) are already targeting the private sector, further dwelling improvements are clearly required if fuel poverty is to be significantly reduced over the long-term.

3.4 Rurality

- 203 In Scotland, the Orkney Isles and the Western Isles experience the highest levels of fuel poverty, primarily attributable to extreme weather conditions and high fuel costs, while the Central Belt has the lowest levels of fuel poverty.
- 204 Rural fuel poverty is consistently higher than the national average (Housing Scotland, 2011), and is a bigger problem in Scotland than the rest of the UK. Fuel disadvantage can be as high as 70% in rural areas in England and is likely to be even higher in Scotland (Rural Services Network, 2010).
- 205 Rural houses are more likely to be **off mains gas grid**, and tend to be older, detached, under-occupied and ‘hard to treat’ (e.g. more likely to have solid walls), all of which make a house less energy efficient and more costly to heat.
- 206 In Scotland as a whole, **38% of people who live in rural areas experience fuel poverty** compared to 26% of those living in urban areas. **Extreme fuel poverty is twice as prevalent in rural areas.** Rural fuel poor households are more likely to be single pensioners.
- 207 Rural households in Scotland can be very remote indeed, often paired with unreliable electricity supply methods (Underwood et al, 2007). In Orkney, for example, nearly half of households are fuel poor. This is mainly attributed to the harsh climate, high fuel costs and low incomes (Inkster, 2010). However, rural homes may be less likely to be targeted for fuel poverty schemes precisely because of their remoteness (and associated expense), and high levels of owner occupation, isolation and lack of access to certain fuels (DSD, 2004 cited in Shortt & Rugkasa, 2007). In Scotland, however, area-based programmes have proven very popular in more remote areas.
- 208 In Scotland, the rural fuel poor households are:

- **Five times more likely to be single pensioners** (31% compared to 6%) and twice as likely to be households with more than one elderly person
- **Over three times more likely to live in a house with a poor NHER rating** (21% compared to 6%) and far less likely to live in one with a good rating
- Twice as likely to live in **older homes** (built pre-1919) (41% are fuel poor compared to 24% non fuel-poor)

- Twice as likely to own their **own homes outright** (56% compared to 23%)
- More likely to be off grid (61% compared to 45%)
- More likely to live in a detached house (58% compared to 42%)

209 A study into the hidden nature of rural fuel poverty in Northern Ireland found that some rural households remained fuel poor even following a fuel poverty intervention. This was mainly attributed to low income (Shortt & Rugkasa, 2007; see also Faulk, 2009). Indeed, as we have seen, **when combined with low income, the likelihood of a rural household being fuel poor is 90%.**

3.5 Who Are The ‘Extreme Fuel Poor’?

210 We have already seen that the characteristics of the extreme fuel poor differ from those of fuel poverty. This section examines this variability and identifies which risk factors are most closely associated with extreme fuel poverty.

211 The extreme fuel poor (EFP) are (see Figure 25):

- **More than four times more likely to be a low income household** (84% compared to 17% non-EFP and 23% general population)
- **Six times more likely to live in an house rated with a ‘poor’ NHER energy efficiency rating** (12% compared to 2% non-EFP and 3% general population)
- **Twice as likely to be elderly**, particularly a single pensioner (62% of EFP are elderly compared to 29% non-EFP and 32% general population)
- **More than twice as likely to own their homes outright** (61% compared to 24% non-EFP and 28% general population)
- **Twice as likely to live rurally** (32% compared to 16% of non-EFP and 17% of the general population)
- Nearly twice as likely to live in **old housing** (pre-1919) (33% compared to 18% non-EFP and 19% general population)
- Nearly twice as likely to live in a **detached house** (36% compared to 19% non-EFP and 21% general population)
- More than one and half times more likely to live in an **under-occupied house** (47% compared with 28% non-EFP and 29% general population)

Figure 24 *Extreme Fuel Poverty by dwelling and household type.*

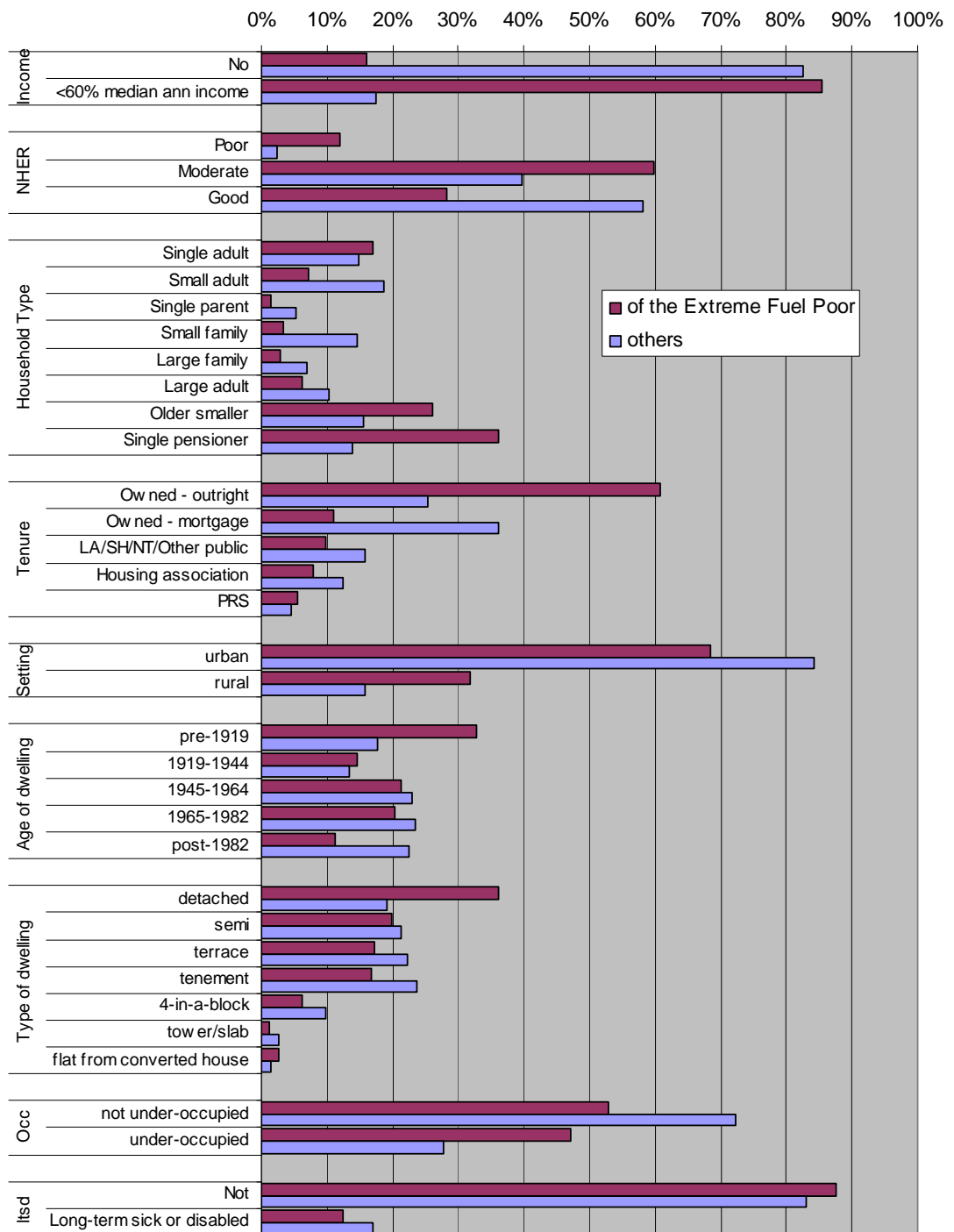
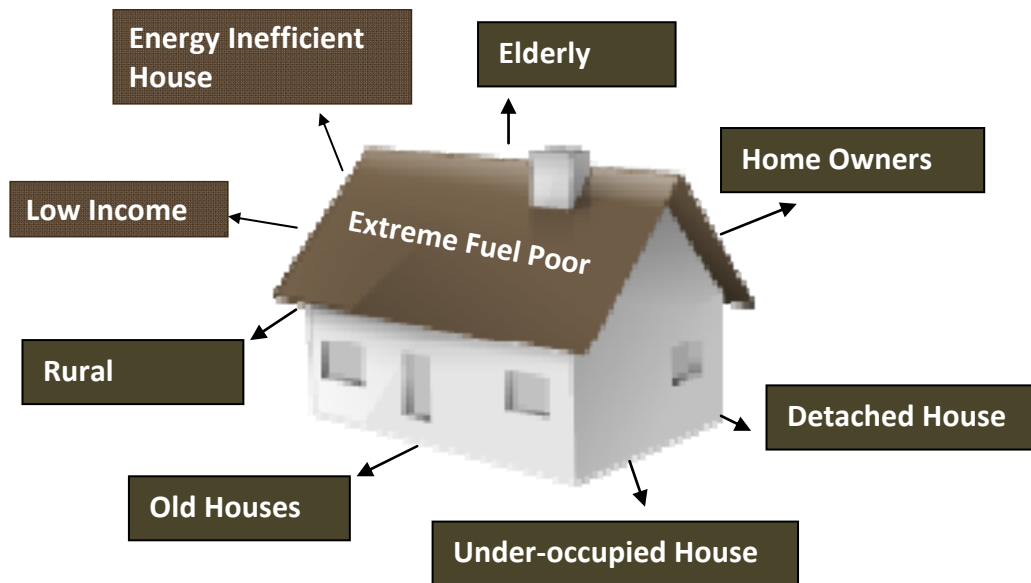


Figure 25 Characteristics of the 'Extreme Fuel Poor'



212 Through this analysis a pattern emerges of property-owning (outright), low-income, elderly people at risk of severe fuel poverty whose houses tend to be rural, old, under-occupied and detached, and as a consequence, energy inefficient and expensive to heat.

3.6 Fuel Poverty Typologies

213 A set of characteristics groups among the fuel poor was derived using statistical clustering (see Chapter 5 for details). The results are presented in 3.7 as a summary of social and dwelling characteristics in the fuel poor.

3.7 "Real" Fuel Poverty – Behaviour, Culture and Churn

214 Lastly, it is useful to briefly consider the behaviour and 'movement' of fuel poor households.

215 The culture of some fuel poor households may differ from others e.g. variations in levels of thermal comfort observed in older people (see Wright, 2004). Very little is known about the energy usage behaviour of fuel poor households. Actual energy usage is not recorded. SHCS does ask respondents to estimate their annual fuel bills and heating hours. However, these may not be reliable, particularly in direct debit "estimated bill" systems where an accurate charge is usually only levied once a year.

216 Fuel poverty is a dynamic phenomenon: people move in and out of fuel poverty at different points over time. This situation has been coined as the 'churn' of fuel poverty (see NEA, 2005). Some households may experience **persistent** or 'chronic' fuel poverty, whilst for others it may be '**intermittent**' (Healy & Clinch, 2004). For most people fuel poverty is a temporary phenomenon which varies over time primarily due to changes in income.

Table 8 *Fuel poor typologies*

Grouping	Households	% of Fuel Poor
A. Older Home Owners - Energy Inefficient dwellings, Rural	66,000	10%
B. Older Home Owners - Long Term Sick or Disabled, Urban	90,000	13%
C. Older Home Owners - under-occupied, no benefits	75,000	11%
D. Older Home Owners - other	59,000	9%
E. Unemployed - Not Owned - single adult, no children	147,000	22%
F. Unemployed - Not Owned - multiple Long Term Sick Disabled adults, - no children	31,000	4%
G. Urban - on benefits with children	46,000	7%
H. Working - energy inefficient rural house	45,000	7%
U. Ungrouped/Other	123,000	18%
Total	681,000	100%

217 However, for some groups fuel poverty can be more persistent e.g. **single pensioners** (in particular), single parents, low income households and occupants of energy inefficient homes (see Sefton, 2004). This clearly has implications for the targeting of fuel poor households and whether policy focuses its efforts on chronic or intermittent sufferers. Sefton (2004) argues that the emphasis should be on the 'chronic' sufferers, and in particular, single pensioners.

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Chapter 4 Fuel Poverty, Income Poverty and Energy Behaviour

218 This chapter covers:

- The distribution of fuel and income poverty by
 - the energy efficiency of homes
 - household types
- Energy use:
 - Household energy: running costs
 - Household energy: heating hours
 - Household energy: monitoring
 - Dwelling satisfaction levels

Key Messages

- One tenth of households experience fuel poverty but not income poverty, but only 5% of households are income poor but not fuel poor.
- Income poor households are more likely to live in social housing, while fuel poor households (particularly those that are not income poor) are more likely to own their homes outright.
- 38% of fuel poor households are fuel poor but *not* income poor
- Over half of households that are “fuel poor and income poor” live in energy efficient housing while households that are “fuel poor but not income poor” are more likely to live in energy inefficient homes.
- Pensioner households are most likely to be fuel poor irrespective of income poverty. Families appear to be least likely to experience either type of poverty when compared to other household types.
- The analysis appears to reveal something distinct about households that are ‘fuel poor but not income poor’ who tend to be older or ‘vulnerable’ households living in under-occupied, energy inefficient houses which they heat for longer.
- Reported heating hours tend to be significantly less than the hours assumed for modelling purposes; however for households that are neither income poor nor fuel poor the modelled energy costs seem to be a reasonable predictor of actual costs. These are difficult findings to reconcile.

4.1 Introduction

219 In Chapter 1 we recognised the importance of income as a key driver of fuel poverty. However this relationship is not absolute; **many higher income households are also currently classed as fuel poor.**

220 In this chapter we consider the relationship between fuel poverty and income poverty in an effort to draw out what, if anything, distinguishes the fuel poor from other low income households. The analysis categorises and compares households across the following characteristics:

Table 9 *Fuel and Income Poverty Categories*

Main Grouping	Sub-groupings
Fuel Poverty	Fuel poor versus non-fuel poor
Income Poverty	Income poor versus non-income poor
Fuel and Income Poverty	Neither fuel nor income poor
	Not fuel poor but income poor
	Fuel poor but not income poor
	Fuel and income poor

221 A household is considered to be in income poverty where their annual income is below 60% of the national median. The data used throughout the chapter derives from the SHCS data 2008-2010.

4.2 Distribution of Fuel and Income Poverty

222 Income poverty plays a crucial role in the extent and depth of fuel poverty. However, it is interesting to note that **one in three fuel poor households are not income poor.** 223 shows the percentage of Scottish households in each of the categories. 11% of households in Scotland are fuel poor but *not* income poor.

223 Using the five-fold classification of fuel poverty presented in Table 1, we see in Figure 26 that more than half of the “not fuel but income poor” group are in marginal fuel poverty (8-10% spend). The Fuel and income poor are at much higher risk of extreme fuel poverty.

Figure 26 Extent of fuel poverty by Fuel and Income Poverty group

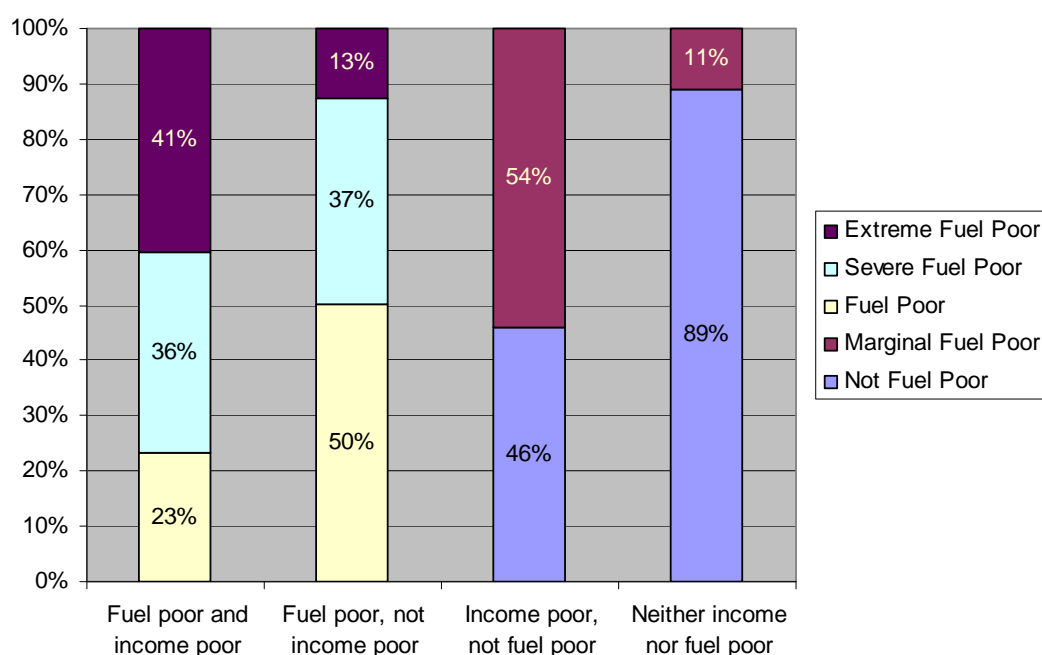


Table 10 Distribution of households by fuel and income poverty

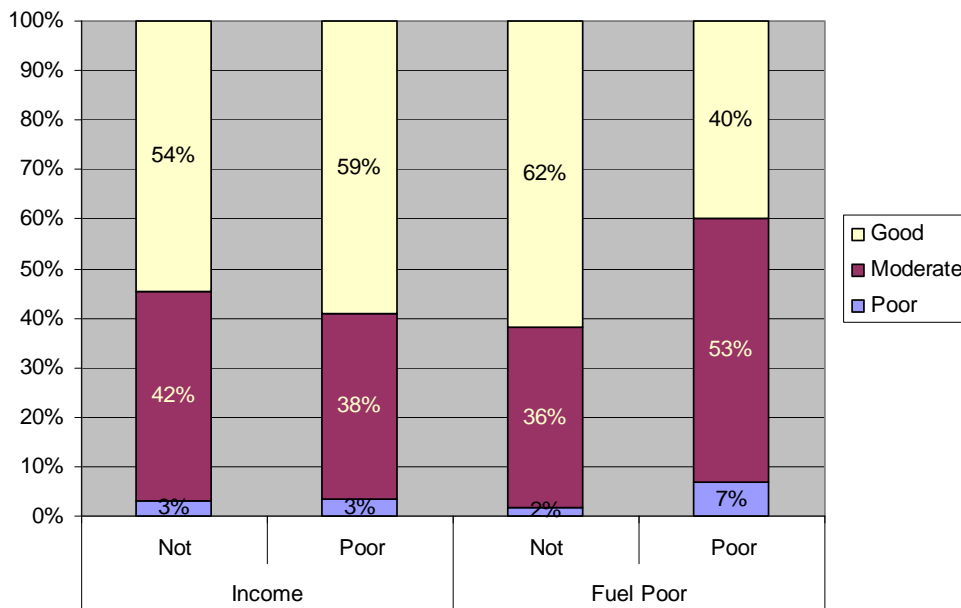
Fuel Poverty	Number	Percentage
Not Fuel Poor	1,664,000	71%
Fuel Poor	681,000	29%
Total	2,345,000	100%
Income Poverty		
Not Income Poor	1,798,000	77%
Income Poor	546,000	23%
Total	2,345,000	100%
Fuel and Income Poverty		
Neither fuel nor income poor	1,547,000	66%
Not fuel poor but income poor	116,000	5%
Fuel poor but not income poor	262,000	11%
Fuel and income poor	420,000	18%
Total	2,345,000	100%

Dwelling Characteristics

Energy Efficiency

224 As described in Section 3.3, fuel poor households are more likely to live in energy inefficient housing than non-fuel poor households. However, this difference is less striking for income poverty; in fact there is a small correlation between income poverty and more efficient homes.

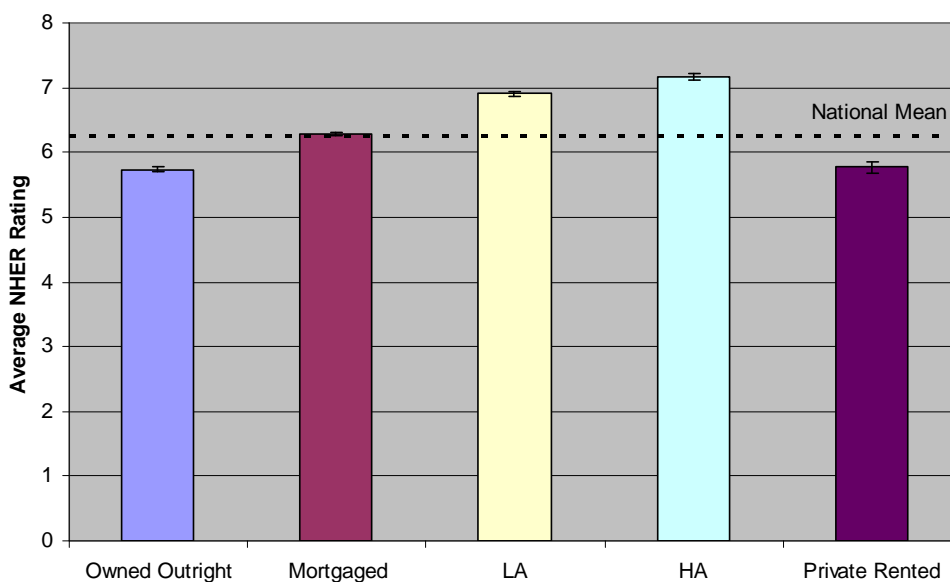
Figure 27 NHER band by Income and Fuel Poverty



225 One explanation for this may be that households that have low incomes (but are not fuel poor) have additional factors which may entitle them to social housing, which tends to be more energy efficient (see Figure 28):

- 51% are long term sick and/or disabled compared with 35% in the Scottish population overall
- 8% are single parents, compared with the 5% population average

Figure 28 Average NHER by tenure

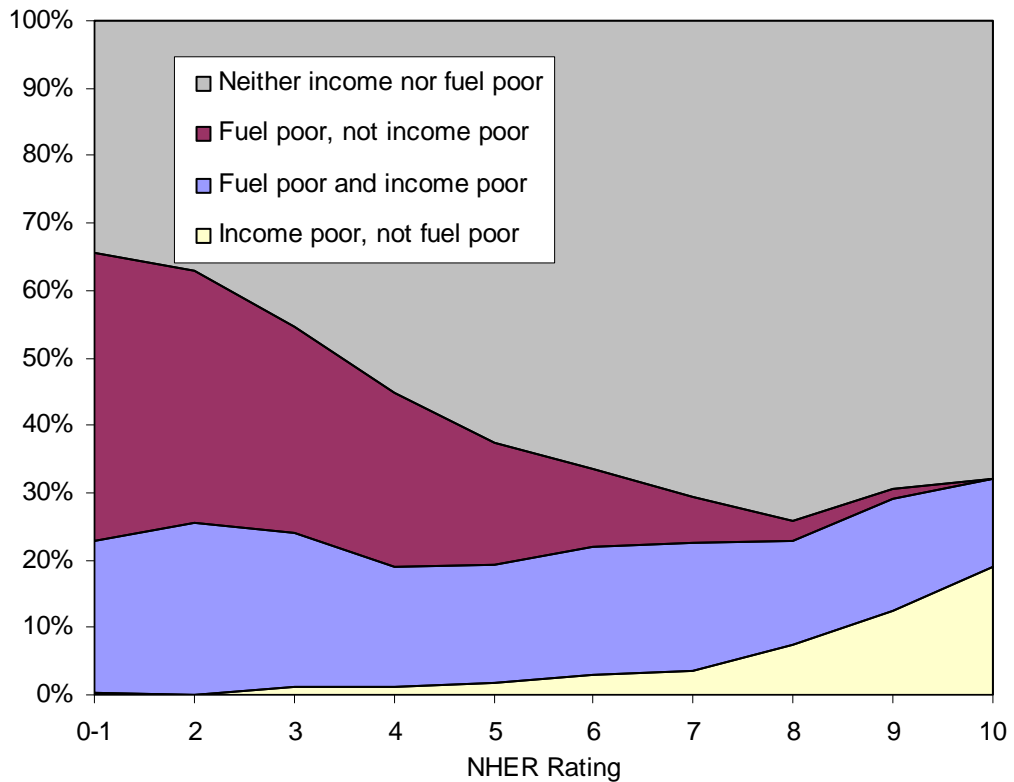


226 Overall, when we look at the energy efficiency profile of these groups (Figure 29), we can see that:

- **the fuel poor, not income poor live in inefficient housing**
- some of the income poor are removed from fuel poverty due to high levels of efficient housing

- the **fuel and income poor** can live in housing at any level of efficiency

Figure 29 *Energy efficiency profile of income and fuel poor groups*

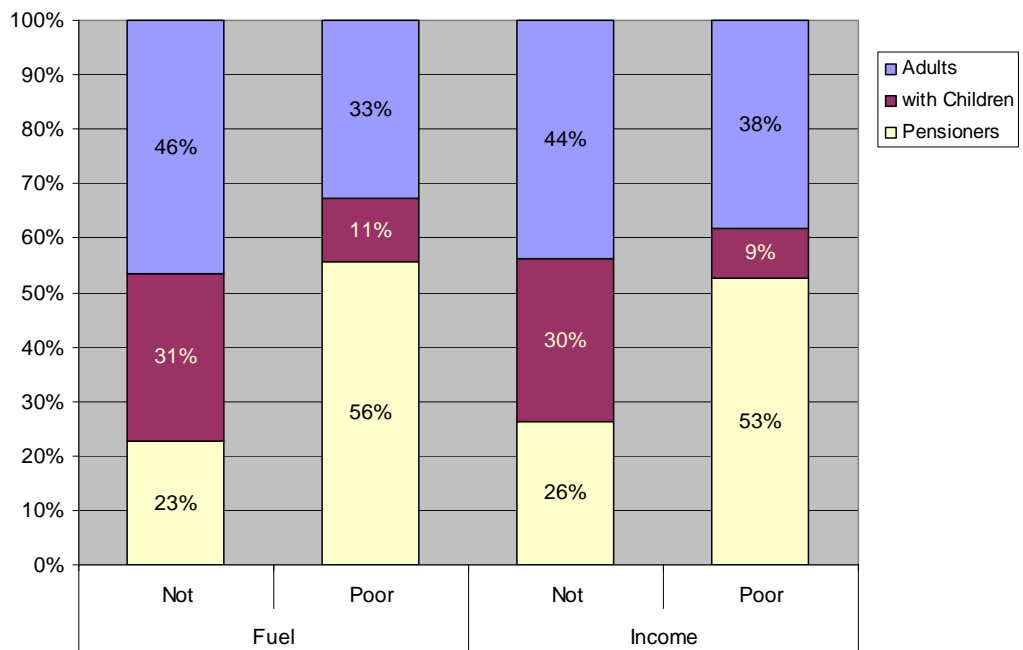


Social Characteristics

Household Type

- 227 The distribution of household type in fuel or income poverty is fairly similar (228). This is not surprising given that the make up of a household will impact on the level of household income.
- 228 When these categories are combined, we find that **pensioner households are most likely to be fuel poor irrespective of income poverty** accounting for 56% of the “fuel and income poor” households and 55% of the “fuel poor but not income poor” households (compared to 32% of all households).

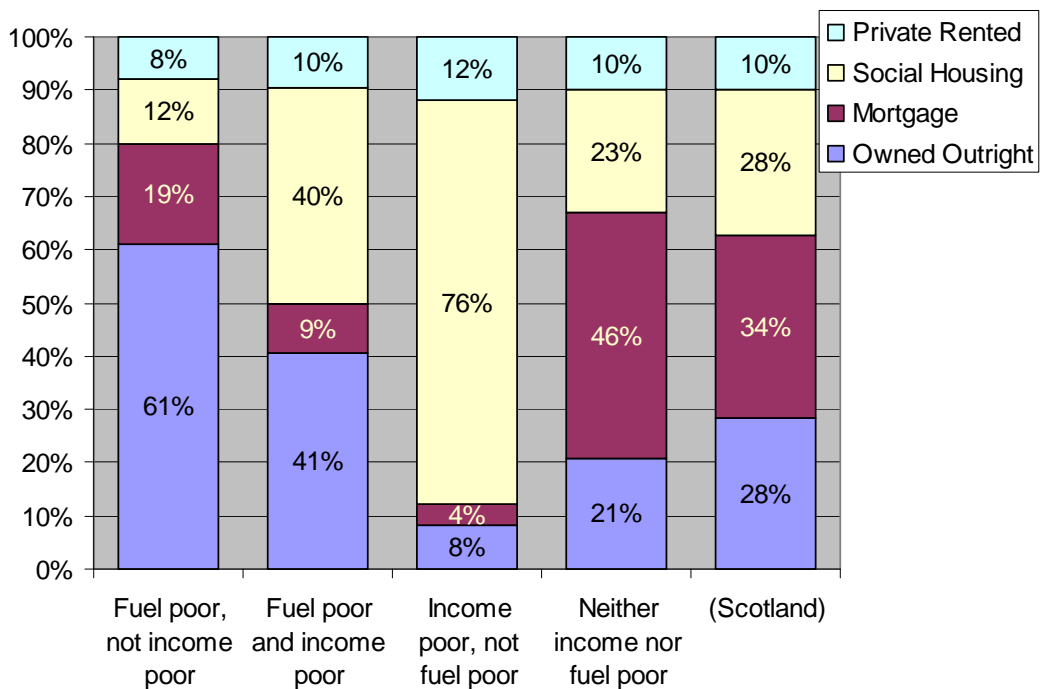
Figure 30 Household types by Fuel and Income Poverty



Housing Tenure

229 The type of housing tenure that people occupy varies significantly between the different fuel/income poor groups. Figure 31 shows **fuel poor groups are more likely to own their own homes outright**, while **income poor groups are more likely to live in social housing**, particularly the ‘income poor but not fuel poor’ household group. Both groups are far less likely to have a mortgage.

Figure 31 Tenure share of fuel and income poverty combined groups

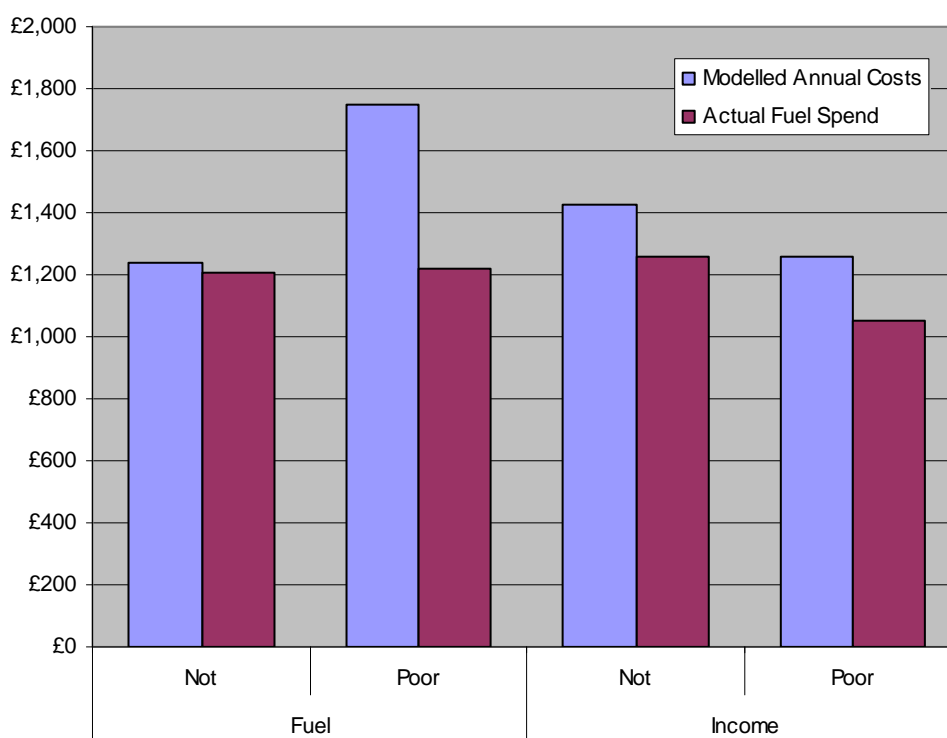


4.3 Household Energy Behaviours

230 Whilst no data is collected on real energy behaviours (heating hours, internal temperatures, appliance use, etc.) a great deal can be learnt about fuel poor and low income groups by observing the differences between modelled energy use (i.e. the amount the fuel poverty calculation estimates a household needs to spend to heat their home) and actual spend on fuel bills³⁷.

231 Figure 29 shows a marked difference between modelled and actual fuel costs, particularly for the fuel poor, who demonstrate an average spending gap of over £500 per year (that is they estimate that they spend £500 less than the model suggests they need). By contrast, the non fuel poor spend very close to the modelled required cost. This discrepancy could be due to behaviour (fuel poor households may ration their energy use in order to pay for other household essentials (Hills, 2011)) but it is also likely to be affected by the fuel poverty calculation itself.

Figure 32 *Modelled and actual energy running costs by fuel and income poverty*

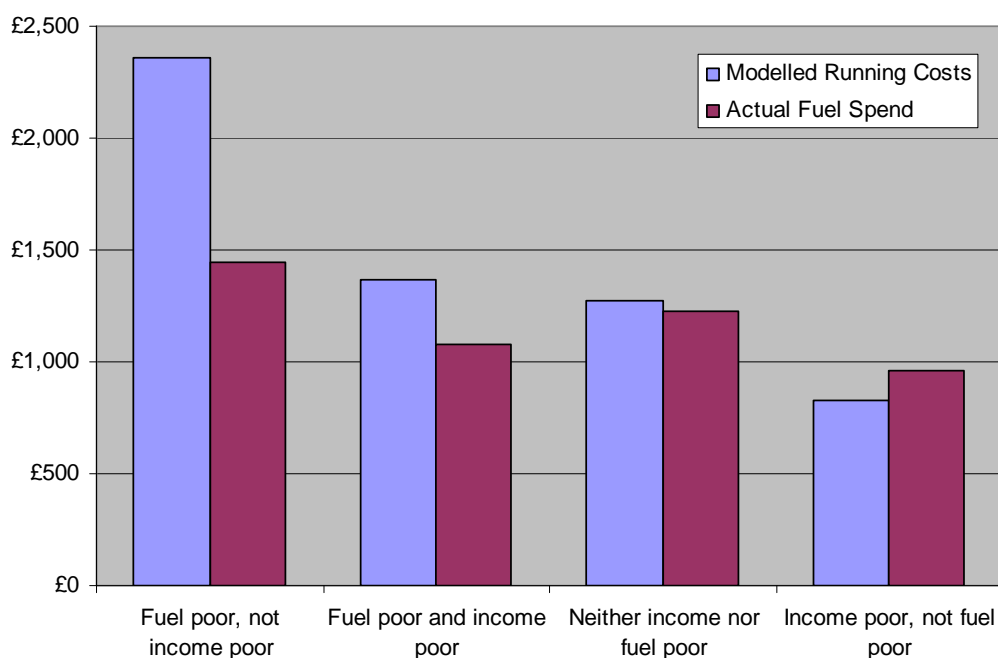


232 The intersection of fuel and income poverty reinforces this relationship, as shown in Figure 33. **The fuel spend gap is far greater among fuel poor households, as we might expect, but particularly in the ‘fuel poor but not income poor’ category.**

³⁷ Respondents to the SHCS Social Interview are asked to estimate their annual fuel bills. Due to refusals some data is lost, but around 90% of respondents answer this question.

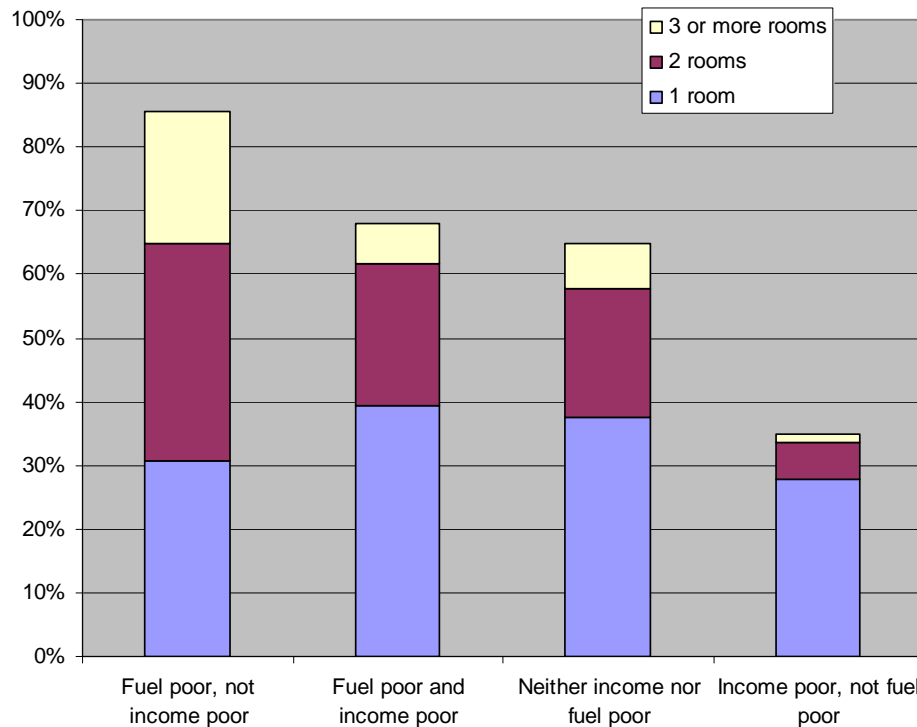
- 233 In contrast, the actual spend for ‘income poor not fuel poor’ households is slightly higher than the modelled spend. This may be because, as described below, income poor households are more likely to live in (energy-efficient) social housing where the benefits of heating the house have a more marked effect (the “rebound effect”).
- 234 As we saw in Figure 14, the poor are less likely to take advantage of the cheapest tariffs and more likely to use pre-payment meters. Modelled costs do not account for the energy tariff used by the household, so this effect will inflate the reported spend relative to the model.

Figure 33 *Difference between actual and modelled energy running costs by fuel and income poverty combined groupings*



- 235 A further explanation may be levels of household under-occupancy. Figure 34 shows that income poor (but not fuel poor) households tend to be more fully occupied so fewer rooms will be left unheated, increasing the fuel bill towards the modelled value. **The highest rate of under-occupancy is seen in households that are fuel poor but not income poor**, the same group that shows the largest fuel spend gap. The model assumes that the whole house is heated where in reality the householder may only partially heat their home.

Figure 34 Rate and level of under-occupancy among income and fuel poor groups



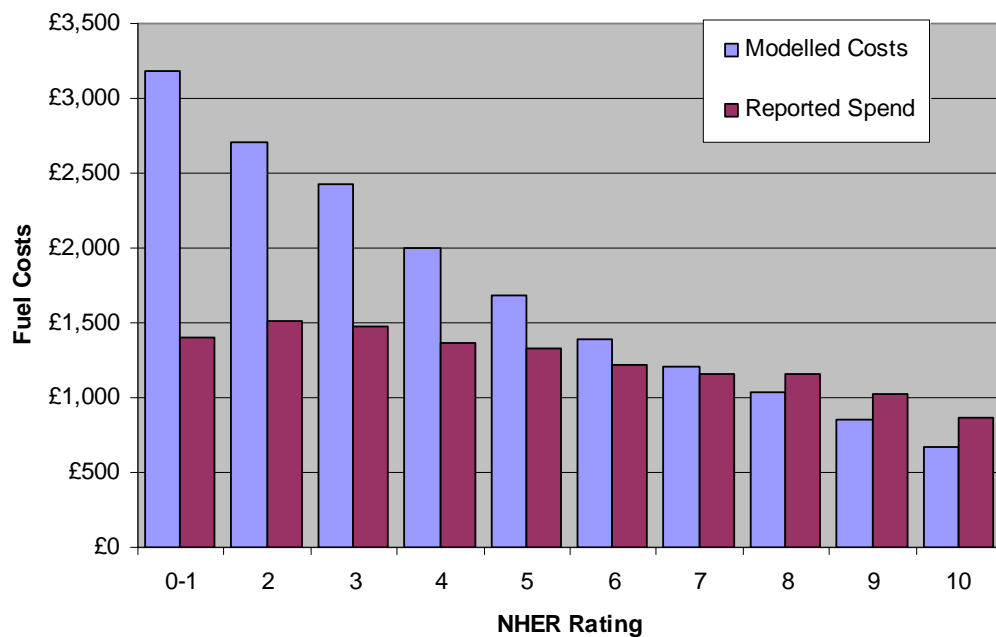
236 Interestingly, 5% of the small sample of households that answered questions on heating satisfaction are neither income nor fuel poor according to the model but reported that their heating system did not keep them adequately warm in winter months. While this was significantly lower than groups in income and/or fuel poverty, it indicates that a significant proportion of households who feel pressure meeting energy costs are not identified as fuel poor.

Energy Efficiency

237 The modelled spend is notably higher than the actual spend for energy inefficient houses (NHER 0-3). As Figure 35 shows, **actual fuel spend is approximately half that of the modelled spend in poor NHER homes**. The effect is smaller for moderately rated houses, and, reversed in households with a good NHER rating (7+), which actually spend more than the model assumes.

238 People living in energy inefficient houses may spend less than modelled for a range of reasons, such as affordability or under-occupancy. In contrast, people living in warm, efficient homes may 'offset' these benefits by increasing their energy consumption elsewhere in the home, again illustrating the '**rebound effect**'.

Figure 35 *Modelled and actual fuel costs by NHER*



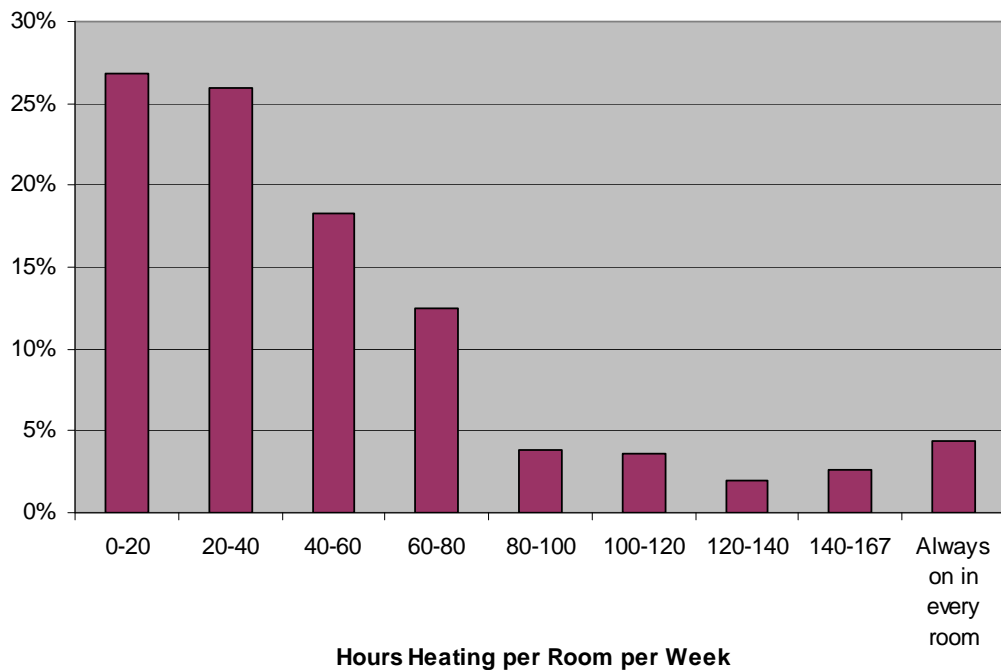
4.4 Heating hours

239 The duration of heating³⁸ was also analysed for fuel and/or income poor groupings. Figure 36 shows the distribution of reported heating hours across the survey. It shows that most households report that they heat between 0 and 40 hours per week. Few households heat their homes to the extent used in the fuel poverty model, where a non-vulnerable household would heat for 77 hours per week and a vulnerable would heat for 112 hours per week.

240 However this does not necessarily mean that the modelled hours are ‘wrong’. There are many issues to be considered when comparing this data. The modelled data works on building physics principles to establish how many hours of heat are required to reach and maintain a temperature. The surveyed hours are more likely to respond to a household pattern of living and may reflect how many hours they are in the dwelling, when they switch heating on or off rather than how many hours it is at a required temperature. Fuel cost data also suggest that where households are neither income poor nor fuel poor the actual running costs are very similar to the modelled running costs. This would not be possible if the heating hours were vastly different.

³⁸ Respondents to the SHCS are asked how long they heat their rooms on a winter weekday and a winter weekend. The response will depend on the nature of the heating system (eg. storage heaters are on all the time whereas a gas boiler can be more easily switched on or off). For this reason the question asks how many hours the household heats their room, rather than for how many hours the household operates the heating source.

Figure 36 *Distribution of Heating Hours per Room per Week*



- 241 No significant difference in heating hours was reported between fuel poor and non-fuel poor, and income poor and non-income poor groups. However, when these groups are combined, the ‘fuel poor, not income poor’ households emerge as using their heating significantly more (243), an additional 8 hours per week compared to the national average. This is not surprising, given that this group tends to live in the most inefficient homes, as shown in Figure 29. The corresponds to the finding that fuel poor not income poor also spend more on their fuel bills as shown in Figure 33.
- 242 For groups considered vulnerable in the model, actual usage is substantially lower than the modelled 112 hours per week (Figure 38). This could be for reasons of economy or patterns of habitation, but it is likely that the heating assumptions in the model are set too high for certain vulnerable groups (see Chapter 6).
- 243 By the same measure, the elderly and households with small children use their heating significantly more than “non-vulnerable” households. This is most likely due to these households spending more time in the home than other household groups. The higher rate of LTSD heating usage is not statistically significant (see Figure 38).

Figure 37 *Modelled and surveyed heating hours per week*

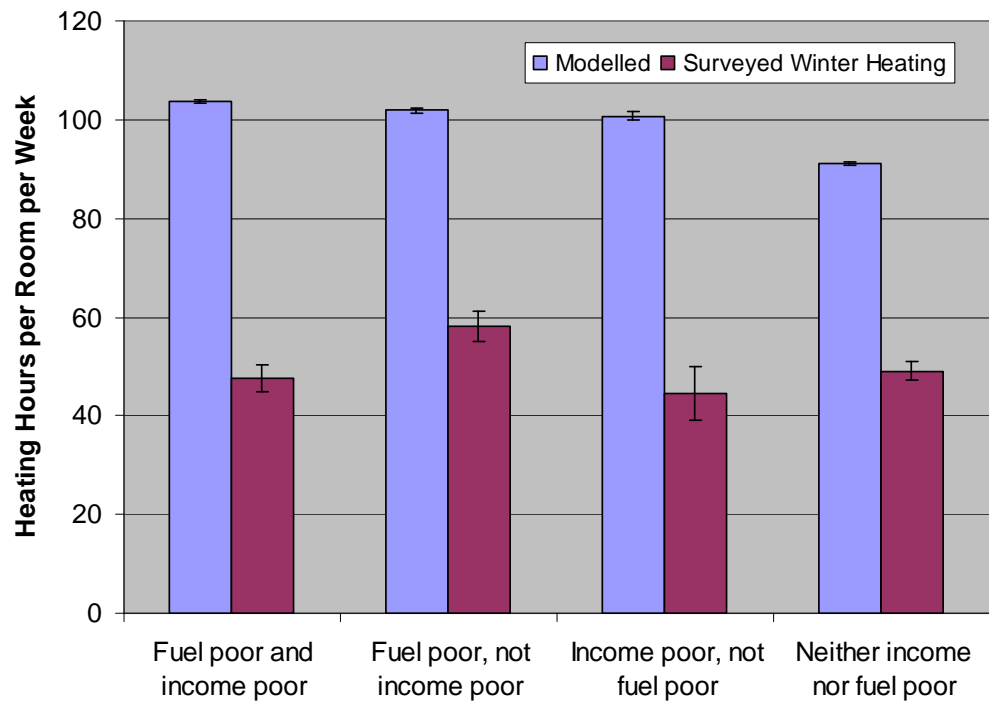
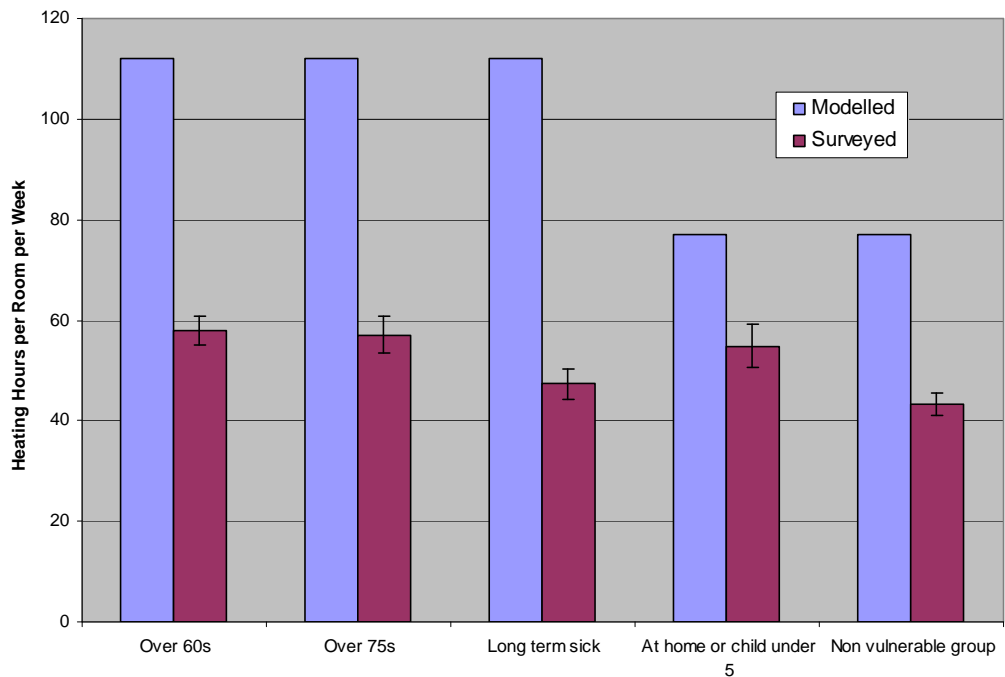


Figure 38 *Vulnerable groups: modelled and surveyed heating hours*

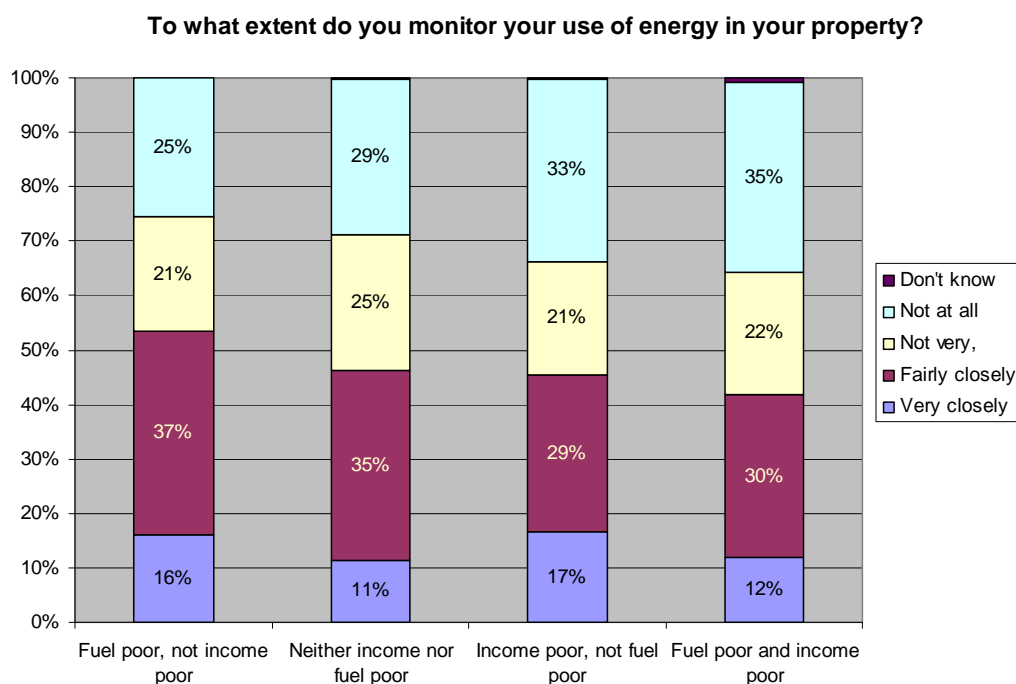


4.5 Monitoring of Energy Use

244 The “fuel poor, not income poor” group is more likely to monitor their energy use “very” or “fairly closely” than the others (Figure 39).

245 This is in line with Figure 33, which showed that these households exhibit the largest spending gap between actual and modelled running costs i.e. **fuel poor but not income poor households are more likely to monitor how much energy they use and spend less on energy than the model estimates.**

Figure 39 *Monitoring of energy use by fuel and income poverty combined grouping*



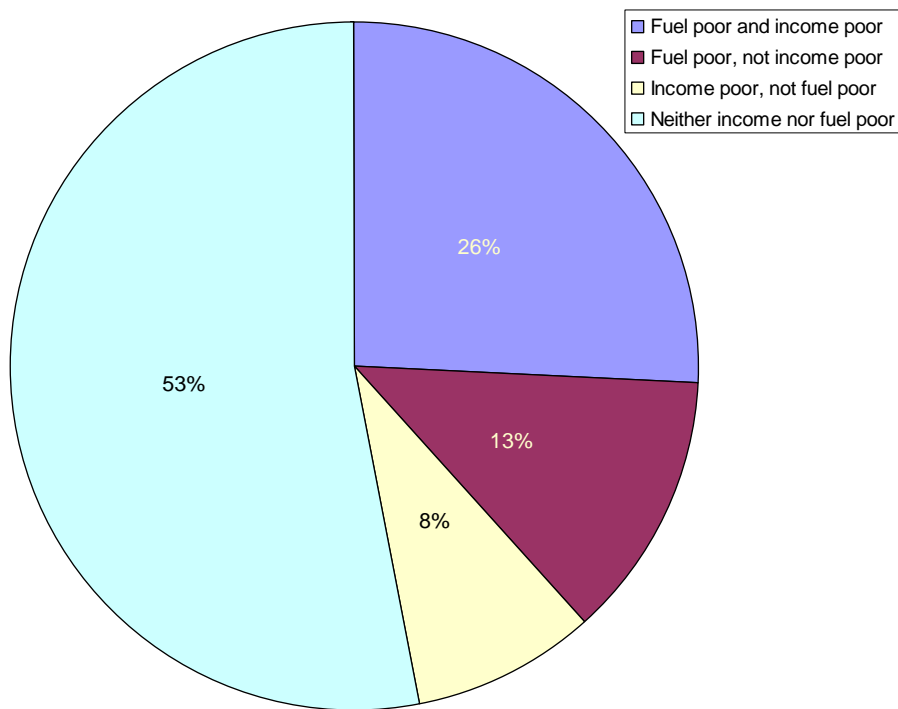
4.6 Dwelling Satisfaction and Heating Affordability

246 In relation to satisfaction with their homes, all households display a similar pattern, with 90% or more very satisfied or fairly satisfied with their homes, regardless of fuel or income poverty. **This suggests that neither fuel nor income poverty, singularly or combined, affects people’s levels of satisfaction with their homes.**

247 Of those who said that they were not able to afford to keep their homes warm³⁹, the majority were neither income nor fuel poor by the current measure.

³⁹ Based on question HT14 in the SHCS Social module: “Which of these things, if any, make it difficult to heat your home?” response 15 “Can’t afford to heat house”. 6%, equivalent to 144,000 households, answered in the affirmative.

Figure 40 *Fuel and/or Income Poverty among those self-identifying fuel poor*



SHCS 2008-2010

4.7 Summary of Fuel Poverty and Income Poverty

248 The analysis appears to reveal **something distinct about households that are 'fuel poor but not income poor'**. When compared to the other household categories, this group:

- demonstrate the highest fuel spend gap (actual vs. modelled)
- has the highest rate of under-occupancy (86%)
- heat their homes for longer (hours)
- is more likely to live in inefficient housing
- is more likely to monitor their energy usage
- is more likely to own their homes outright
- tend to be classified as 'vulnerable' (82%)
- are mostly pensioners (55%) and adult only households (29%)

249 More often than not, those self-identifying as fuel poor are not classed as such the current measure. This suggests that thermal comfort and operation of heating systems is to a large extent determined by an individual household's priorities and lifestyles.

4.8 References

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http://www.decc.gov.uk/en/content/cms/funding/Fuel_poverty/Hills_Review/Hills_Review.aspx

Chapter 5 Identifying and Targeting Fuel Poor Households

250 This chapter covers:

- Identifying fuel poor households
- Identifying fuel poor houses
- Identifying fuel poor areas

Key Messages

- Given the complexity of fuel poverty, it is very difficult to identify ‘types’ or ‘typologies’ of fuel poor households from the general population using statistical analysis techniques.
- A number of typologies are identified among the fuel poor but the likelihood of a specific household with the identified characteristics being fuel poor is in many cases less than 50%. This makes it a less than effective approach in targeting fuel poor households for interventions.
- Dwellings were categorised in order to examine their potential for energy efficiency improvements. The analysis reveals a broad spectrum of energy efficiency variables for each dwelling type, with no clear message for prioritising one type over another.
- Mapping fuel poverty at a sub-local authority area level may be one way to target area-based programmes.

5.1 Introduction

251 The debates about fuel poverty have traditionally been maintained at quite a theoretical level whilst fuel poverty programmes on the ground attempt to operationalise fuel poverty into a practical concept using proxy variables to identify target households.

252 One particular issue when levels of fuel poverty within the general population become very high is that ‘the average’ becomes the problem, which makes it increasingly difficult to target programmes. However, it should be remembered that fuel poverty is the result of a complex relationship between the household income level and the dwelling’s fuel requirements.

5.2 Identifying Fuel Poor Households

253 In an effort to understand the interlocking factors which put a household at risk of fuel poverty, further analysis was undertaken to identify those ‘clusters’ of (social or dwelling) characteristics which best explain or predict fuel poverty.

254 Typologies are a useful way to describe groups of people, or in this case households, that share certain characteristics such as behaviours and attitudes.

However, they work on the assumption that behaviours and attitudes are stable phenomena, and may therefore not be reliable over the long-term. Fuel poverty is a fluid phenomenon and these typologies may naturally change over time.

Description of Statistical Methods

- 255 The aim of this exercise was to identify a number of “natural types” within the fuel poor population. To do so a range of risk factors known to correlate with fuel poverty were extracted from the SHCS data. These factors are listed in Table 11. They are encoded as binomial variables, equivalent to “Yes or No” questions, to streamline the analysis.
- 256 Hierarchical and K-means cluster methods were used to identify the number and characteristics of the typologies.⁴⁰

Table 11 *Variables used to identify fuel poor typologies*

<i>Social Characteristics</i>	in receipt of means tested benefits, tax credits or Disability Living Allowance
	economically inactive householder and spouse
	has children
	single adult (with or without children)
	long term sick or disabled (LTSD)
	older - aged 60+
<i>Dwelling Characteristics</i>	under-occupied - exceeds the bedrooms standard by 2 or more
	flat or house
	home owners – own their homes outright
	off gas grid
	energy inefficient house (SAP lower than national median (67))
	rural/urban

- 257 Variables from this list that are closely correlated to each other (e.g. rural/urban and gas grid coverage) dropped out of the cluster analysis and are excluded from the final descriptions.
- 258 Proxy measures of income were utilised, namely employment (economically inactive) and receipt of means-tested benefits, tax credits or disability living allowance (DLA).

⁴⁰ The number of natural groups was derived using a Ward method hierarchical cluster analysis using the variables in Table 11. This result was used to seed a K-means cluster analysis. These are iterative methods which attempt to minimise the “distance” between cases in a variable-space. E.g. for three variables, this can be imagined as a 3-dimensional space where cases (households) are distributed along the axes.

Fuel Poverty Typologies

Describing Fuel Poor Households

259 The typologies in Table 12 provide good ‘coverage’ of the fuel poor (as a subset of the population). Typologies A-H account for over 80% of the fuel poor.

Table 12 *Fuel Poverty Typologies*

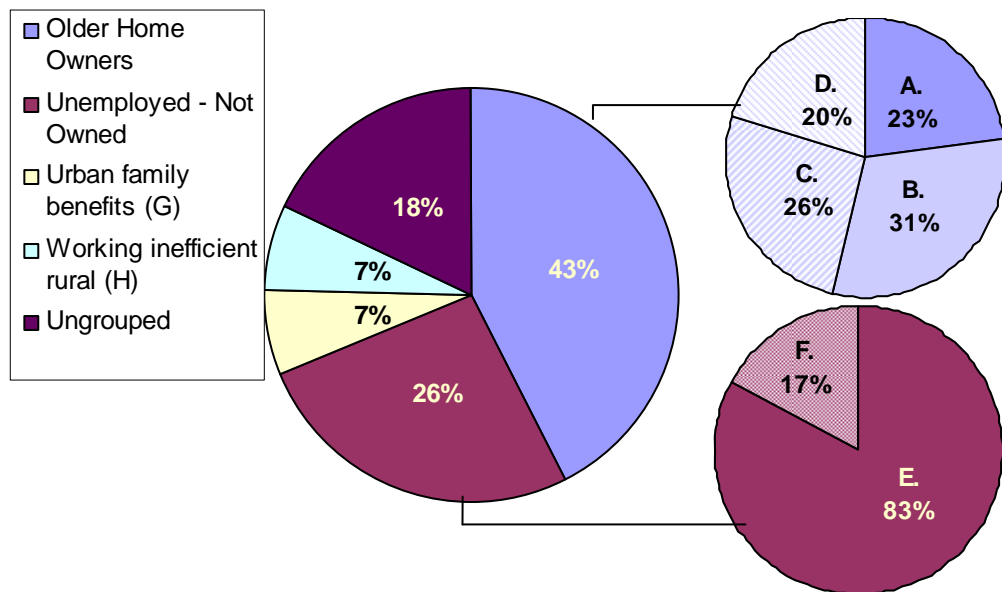
<i>Grouping</i>	<i>Households</i>	<i>% of Fuel Poor</i>
A. Older Home Owners - Energy Inefficient dwellings, Rural	66,000	10%
B. Older Home Owners - Long Term Sick or Disabled, Urban	90,000	13%
C. Older Home Owners - under-occupied, no benefits	75,000	11%
D. Older Home Owners - other	59,000	9%
E. Unemployed - Not Owned - single adult, no children	147,000	22%
F. Unemployed - Not Owned - multiple Long Term Sick Disabled adults, - no children	31,000	4%
G. Urban - on benefits with children	46,000	7%
H. Working - energy inefficient rural house	45,000	7%
U. Ungrouped/Other	123,000	18%
Total	681,000	100%

Perhaps not surprisingly, given the analysis in the previous section, the most prevalent groups appear to be ones that contain **older people who own their own homes** (Typologies A-D).

Typology E, which comprises **single unemployed adults**, accounts for approximately a fifth of the fuel poor within this model. This is an interesting result, given that most fuel poverty interventions focus on older people and/or families. However, as noted earlier, single adults are the second most prevalent type of fuel poor workless households (after older people) (see paragraph 156).

Inefficient housing does not correlate significantly with enough additional factors to feature in many of the typology groups (only A and H). This indicates that fuel poor households, when analysed in combination with other risk factors, can live in homes at any level of efficiency.

Figure 41 Fuel Poverty Typologies



Diagnosing Fuel Poor Households

260 Applying these typologies to the general population to ‘diagnose’ fuel poverty shows that while the fuel poor population is described well, a large number of non-fuel poor households also fall into these categories (see Table 13).

Table 13 Typologies as diagnoses of fuel poverty

Grouping	Fuel Poor	Not Fuel Poor
A. Older Home Owners - Inefficient, Rural	75%	25%
B. Older Home Owners - LTSD, Urban	52%	48%
C. Older Home Owners - under-occupied, no benefits	58%	42%
D. Older Home Owners - other	54%	46%
E. Unemployed - Not Owned - single adult, no children	50%	50%
F. Unemployed - Not Owned - multiple LTSD adults, no children	26%	74%
G. Urban - household on benefits with children	15%	85%
H. Working - inefficient rural household	28%	72%
U. Ungrouped/Other	13%	87%
Total	29%	71%

261 Policies aimed at older home owners and unemployed single adults (A-E) can be fairly confident that the households they target are likely to experience fuel poverty. However, these policies would also permit entry to thousands of additional households that are not fuel poor. The risk of this is much higher for the other typologies.

General Population Clustering

262 It was not possible to create typologies that effectively diagnose fuel poverty from the general population.

263 The above methodology was repeated, but this time attempting to cluster in the population as a whole, rather than just within the fuel poor. If successful, this approach, could enable more effective identification of fuel poor households.

264 The previous variable list, and many more besides, were included in this approach. Additional variables included:

- private rented tenure
- frail elderly (75+), single parents, young householders
- other degrees of over-crowding (1 and 3 rooms over the bedroom standard)
- householder not in employment, education or training
- older properties (pre-1919) and variables relating to wall construction and difficulty of treatment

265 The result was that **no combination of these variables produced viable groupings which could reliably identify fuel poor households in the general population.**

266 This underlines the complex nature of fuel poverty. The groups prone to fuel poverty as defined by a set heating regime and income can only be reliably diagnosed by those vectors. Other risk factors appear to be so diverse within the fuel poor population that they can equally apply to the population as a whole.

5.3 Identifying Fuel Poor Dwellings

267 Combining social and dwelling risk factors into fuel poverty typologies does not deliver a clear sense of direction on which to basis future targeting of fuel poverty programmes. It may, however, be useful to analyse dwellings in more depth, and in particular to identify those types that may be suitable for energy efficiency improvements.

268 The house types in Scotland have been broadly categorised into 11 types, again using a clustering methodology. The primary fuel poverty interest with dwellings is whether they are energy efficient and whether basic measures could improve the energy efficiency of the dwelling. Hence rather than try to

develop further typologies this section concentrates on describing the improvement potential of the dwelling types.

Table 14 *Dwelling Typology of Fuel Poor Households*

<i>Dwelling typology for fuel poverty 08/10</i>	<i>Count</i>	<i>Fuel poverty Rate</i>	<i>Unweighted count</i>
<i>Pre 1919 solid wall house</i>	97,000	14%	448
<i>Pre 1919 solid wall flat</i>	54,000	8%	177
<i>1919 - 82 solid/other house</i>	31,000	5%	164
<i>1919 - 82 solid/other flat</i>	26,000	4%	89
Total solid wall	207,000	31%	
<i>Pre 45 cavity wall house</i>	42,000	6%	178
<i>Pre 45 cavity wall flat</i>	33,000	5%	116
<i>1945 - 64 cavity wall house</i>	104,000	16%	471
<i>1945 - 64 cavity wall flat</i>	43,000	6%	159
<i>1965 - 82 cavity wall house</i>	115,000	17%	531
<i>1965 - 82 cavity wall flat</i>	32,000	5%	103
Total 1945-1982 cavity wall	367,000	55%	
<i>Post 82 dwellings</i>	91,000	14%	379
Total	667,000	100%	2,815

Pre 1919 solid wall house

269 From this table it is worth noting that **14% of all fuel poor dwellings are pre-1919 solid wall houses with two thirds of these found in rural areas (64%)**. Just under half of these dwellings are heated by oil, coal or LPG gas and only 18% have inadequate central heating systems (ie. would fail SHQS on this measure). Because of the wall type these dwellings are classified as **'hard to treat'** and few of the insulation programmes run by UK or Scottish Government (with the limited exception of the Energy Assistance Package) have tackled solid walls. However 56% of such dwellings also have less than 100mm of loft insulation which has been tackled by previous schemes. In terms of upgrades **72% (70,000) could benefit from installing/upgrading loft insulation plus solid wall insulation** and 20% (19,000) could benefit from installing/ upgrading loft insulation plus solid wall insulation plus a new heating system.

Pre 1919 solid wall flat

270 A further 8% of fuel poor households live in pre-1919 solid wall flatted dwellings. Unlike houses the vast majority of the pre-1919 flats are found in urban areas (96%) with 75% using gas as the primary heating fuel and 24% electricity. Over one fifth of these dwellings have a very poor standard of energy efficiency (NHER 0-2). Because of the wall type all of these dwellings are classified as hard to treat. However in most cases they already have a full and efficient central heating element (only 17% fail these element of the Scottish Housing Quality Standard). In terms of upgrades 68% (37,000) could benefit

from installing/upgrading loft insulation plus solid wall insulation and 17% (9,000) could benefit from an upgraded heating system.

1945-1964 cavity wall house and 1965-1982 cavity wall house

271 Both of these categories of dwelling have high levels of fuel poor households; however, the dwellings themselves are not difficult to treat. They tend to be relatively standard brick or block work cavity built with only 10% failing the heating element of the SHQS. As the industry standard for boilers is roughly 10 years we could expect that in any one year around 10% of heating systems would be inefficient prior to replacement. However, **despite not being difficult to treat, only 31% of the 1945-64 houses are adequately insulated and 23% of the 1965-1982.** Of the 1945-64 fuel poor homes 45% need loft insulation and 55% need cavity wall insulation. Of the 1965-1982 fuel poor houses two thirds need cavity wall insulation and 40% need loft top-ups. It is quite likely that some of these dwellings will have been improved in recent years due to UK and Scottish Government insulation programmes. The SHCS data used is from 2008-2010 and UK/SG programmes have fitted roughly 10% of all Scottish dwellings since 2008 (117,000 cavity wall insulation and 164 loft insulation). However, it is likely that there is still a considerable number of the 160,000 inadequately insulated homes within this category.

Post 1982 dwellings

272 The final category with a high level of fuel poverty prevalence is post 1982 dwellings. By this stage new homes were being built with a certain level of insulation and heating systems so it is perhaps surprising that this category accounts for 14% of fuel poor dwellings. Indeed 80% of the homes have over 100mm of loft insulation and cavity wall insulation and 69% have a good energy rating (NHER 7 or above). Almost **one third of these are found in rural areas and one third use electricity which is generally a more expensive fuel.** However apart from loft top-ups for some homes there is little that can be done in terms of conventional measures.

5.4 Identifying Fuel Poor Areas

273 Most fuel poverty analysis is undertaken at a national level with some statistics available at local authority area. However, a much more fine grained analysis is required to identify households for the effective targeting of fuel poverty programmes.

274 The current definition of fuel poverty requires knowledge of household income, household energy requirement and dwelling location. This level of data is not available except through the SHCS which cannot be modelled below the Local Authority spatial level. Hence there are two options for moving forward, either using existing data to attempt to model the current definition of fuel poverty at local level, or to identify proxy variables.

275 This report uses the second method and identifies variables that are available at a local level which, combined, could help to identify areas where fuel

poverty prevalence is likely to be higher. The variables chosen were the income domain from the Scottish Index of Multiple Deprivation (SIMD), the income data from the CACI Paycheck Database and the mean Energy Performance Certificate (EPC) collected with home reports and held by the Energy Saving Trust.

- 276 Potential sub-local authority geographies include electoral wards (353 in Scotland), intermediate geographies (1,235 in Scotland), datazones (6,505 in Scotland), Census output areas (42,604 in Scotland) and postcode units (139,045 in Scotland).
- 277 A trial mapping exercise was conducted using existing datasets and mapping software. Two types of mapping were carried out: at datazone level using the income domain of SIMD and EPC data, and at intermediate geography level using CACI income data and EPC.

Mapping using SIMD and EPC

- 278 The first mapping exercise used the income domain from SIMD⁴¹. It is relatively well understood that SIMD can disadvantage rural areas because it works by identifying concentrated poverty. There are 6505 datazones in Scotland, of which 1175 (18.1%) are rural areas. However, of the 1,301 datazones that are in the most deprived 20% of all datazones (as per the income domain of the 2009 SIMD), only 32 datazones (2.5%) were rural areas.
- 279 In order to create a better balance for both urban and rural areas, the datazones were separated for urban and rural areas and rate of income deprivation was re-ranked within the two groups. The most deprived 20% of datazones from each of the urban and rural areas was then identified (Figure 42).
- 280 Mean SAP scores by datazone were obtained from the HEED-EPC (Homes Energy Efficiency Database) database from the Energy Savings Trust. This data shows the mean EPC for those dwellings that have been surveyed rather than all dwellings in the locality. It is therefore a crude measure of energy efficiency in the area which assumes that the homes that have been surveyed are reasonably representative of the all homes in the area. Further work is needed to establish whether this is a reasonable assumption or not. The EPC database will continue to grow such that the map will become more accurate over time.
- 281 When overlaying the calibrated income deprived map with the EPC rating map, it was found that **the most income deprived areas often have high EPC rating i.e. homes with good energy efficiency**. This is particularly the case in the urban areas (Figure 43). Many income deprived areas have a high proportion of

⁴¹ The SIMD income domain is a proxy measure of income. It measures the number of people, both adult and children, who are in receipt or dependent on benefits related to income or tax credits. This includes Income Support, Guarantee Pension Credit, Job Seeker Allowance, Employment Support Allowance, Child Tax Credit and Working Tax Credit.

social rented homes, which often have reasonably good energy efficiency due to improvements related to the Scottish Housing Quality Standards⁴².

- 282 Analysis using SHCS data found that only 8% of outright owners of pensionable age households claimed pension credit while 58% of this type of household were found to be fuel poor in 2008/10. This suggests that the outright owners of pensionable age would be under-represented in the mapping if using SIMD income domain as a proxy for low income. This would particularly be the case in the rural areas where a higher level of pensioner households could be found.

Mapping using CACI and EPC

- 283 Income data is collected by CACI⁴³ by collating a range of sources at the postcode level⁴⁴. This data is aggregated to Intermediate geography level for comparison with the energy efficiency data (Figure 42). The low income threshold was set where 30% or more of the population of an Intermediate Geography region are on less than the lower national quartile.
- 284 This low income variable is mapped over the EPC ratings of houses, collect by the EST at Intermediate Geography level (Figure 45).

5.5 Summary

- 285 This Chapter has trialled various techniques and methods to assist policy-makers in identifying fuel poor households, dwellings and areas. Unfortunately the results are generally inconclusive. The development of typologies to assist in targeting specific household circumstances did not produce conclusive results. The development of dwelling typologies did not assist in targeting fuel poverty, however the analysis of measures that could be installed to improve energy efficiency may assist policymakers in their considerations. The mapping of proxy variables does show some promise in targeting areas for fuel poverty programmes although further work would be required on the data sources and basis of the proxy variables. This pilot analysis may prove to stimulate further interest in these areas and further work combining some of the trialled approaches may lead to a more useful workable solution.
- 286 The quality of EPC data will improve as more dwelling go through the home report process and the blank spaces in Figure 45 are filled out. Forthcoming

⁴² For more information on the SHQS, see the Scottish House Conditions Survey Key Findings Report 2010, available from <http://www.scotland.gov.uk/Topics/Statistics/SHCS/Downloads>

⁴³ <http://www.caci.co.uk/paycheck.aspx>

⁴⁴ CACI income data also has weaknesses. It is modelled data from consumer purchase history databases. One of CACI's key selling points is that the size of their sample means that analysis can be undertaken to small geographic levels and retain its robustness. However, CACI data are not an official source of data and the full methodology is not available to the Scottish Government. This should only be seen as an indicative picture of income.

census data from 2010 will provide income and other demographic data at 1:1 resolution; an excellent source for future efforts at mapping fuel poverty.

Figure 42 Map of Calibrated 2009 SIMD and Income Domain

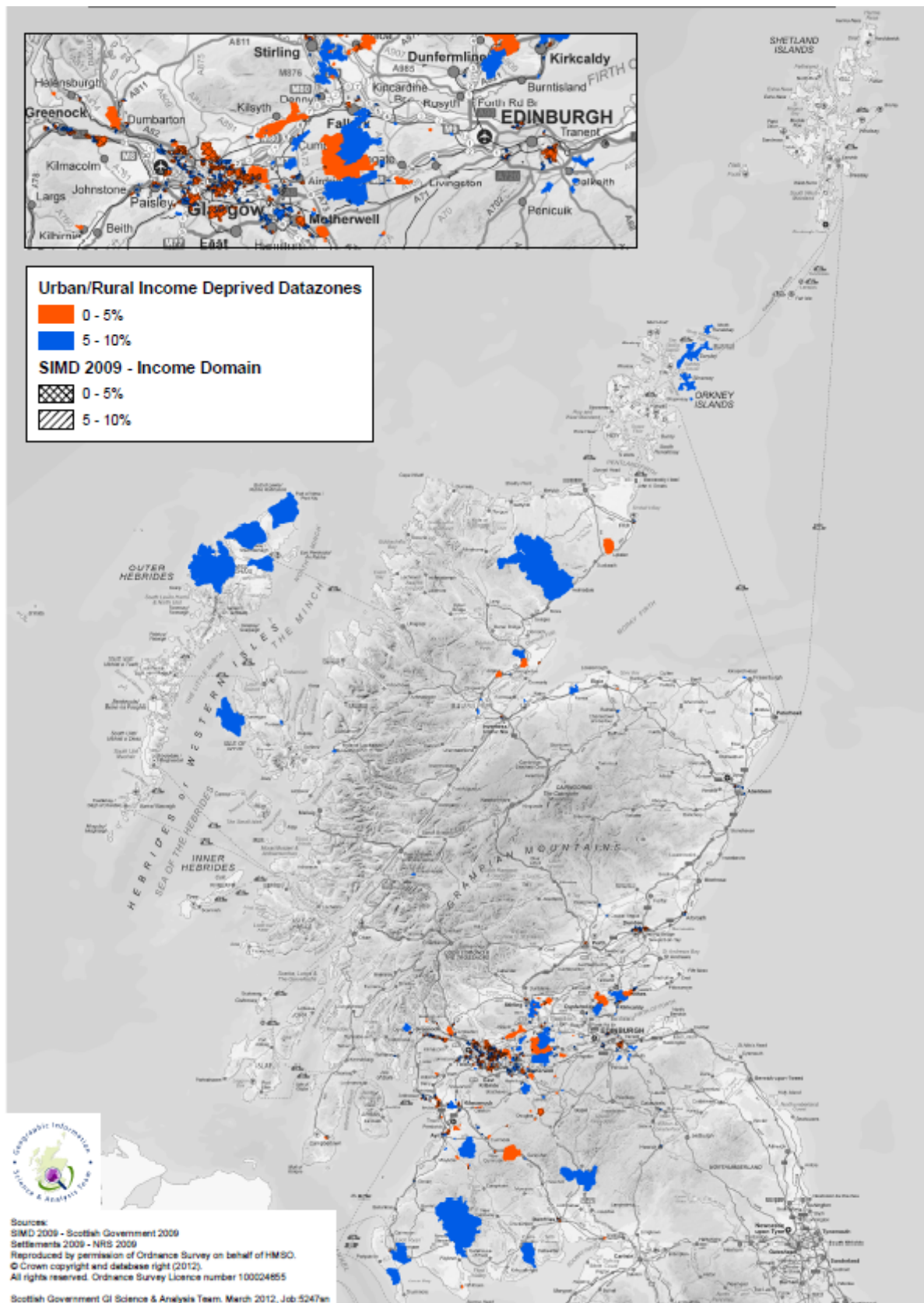


Figure 43 Energy efficiency by datazone overlaid with SIMD low income zones

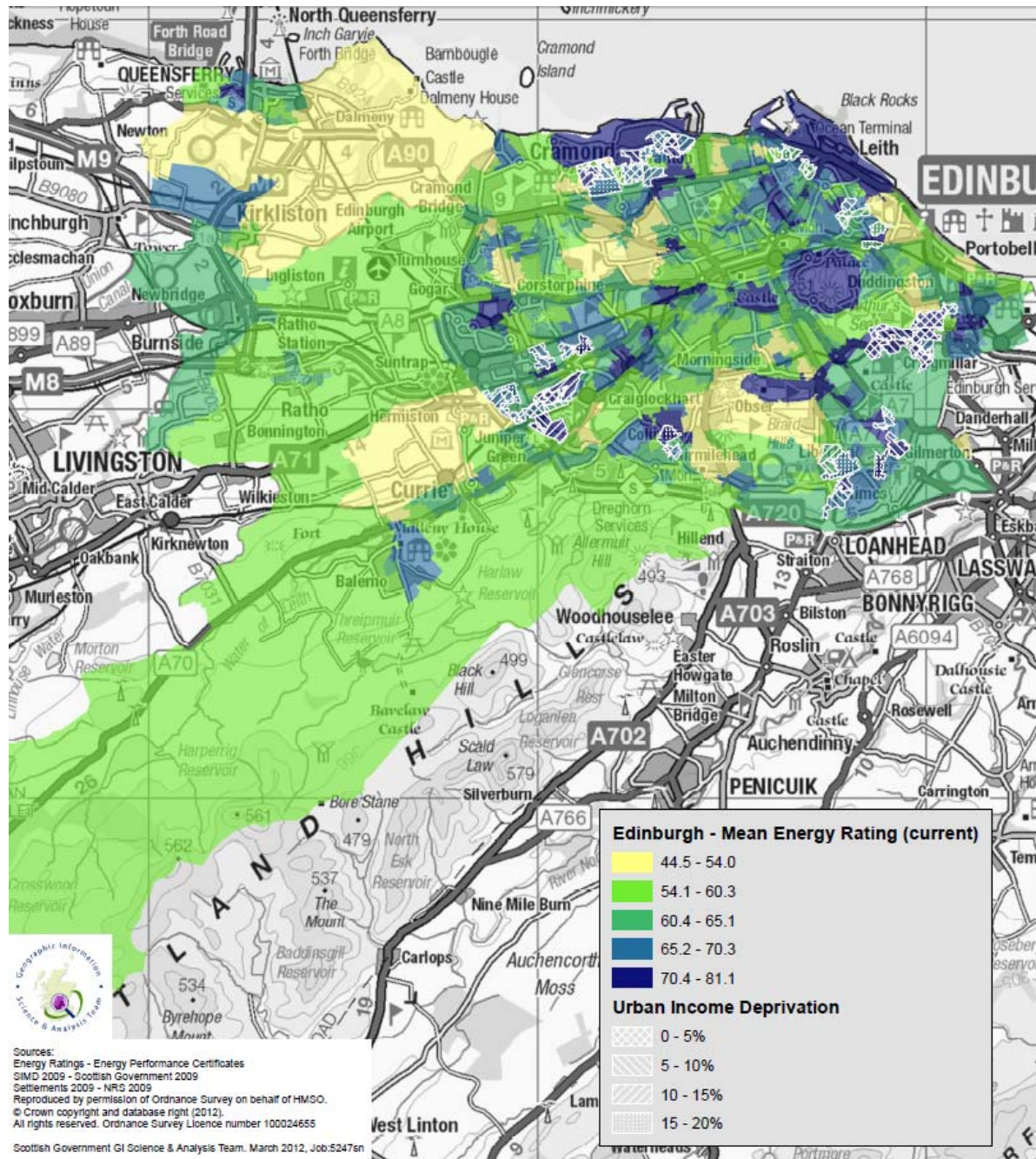


Figure 44 *Proportion of intermediate geography population in the lowest national income quartile*

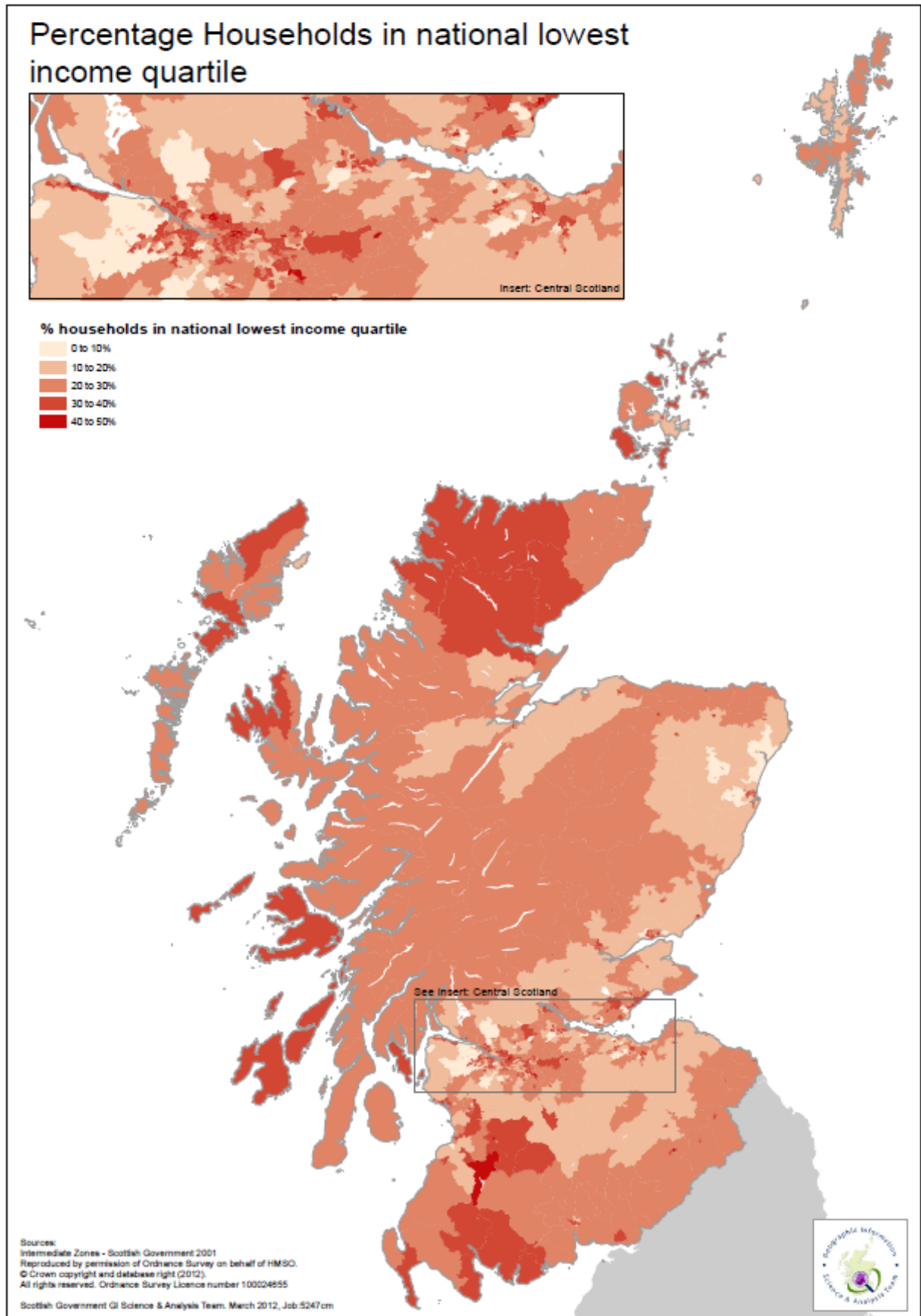
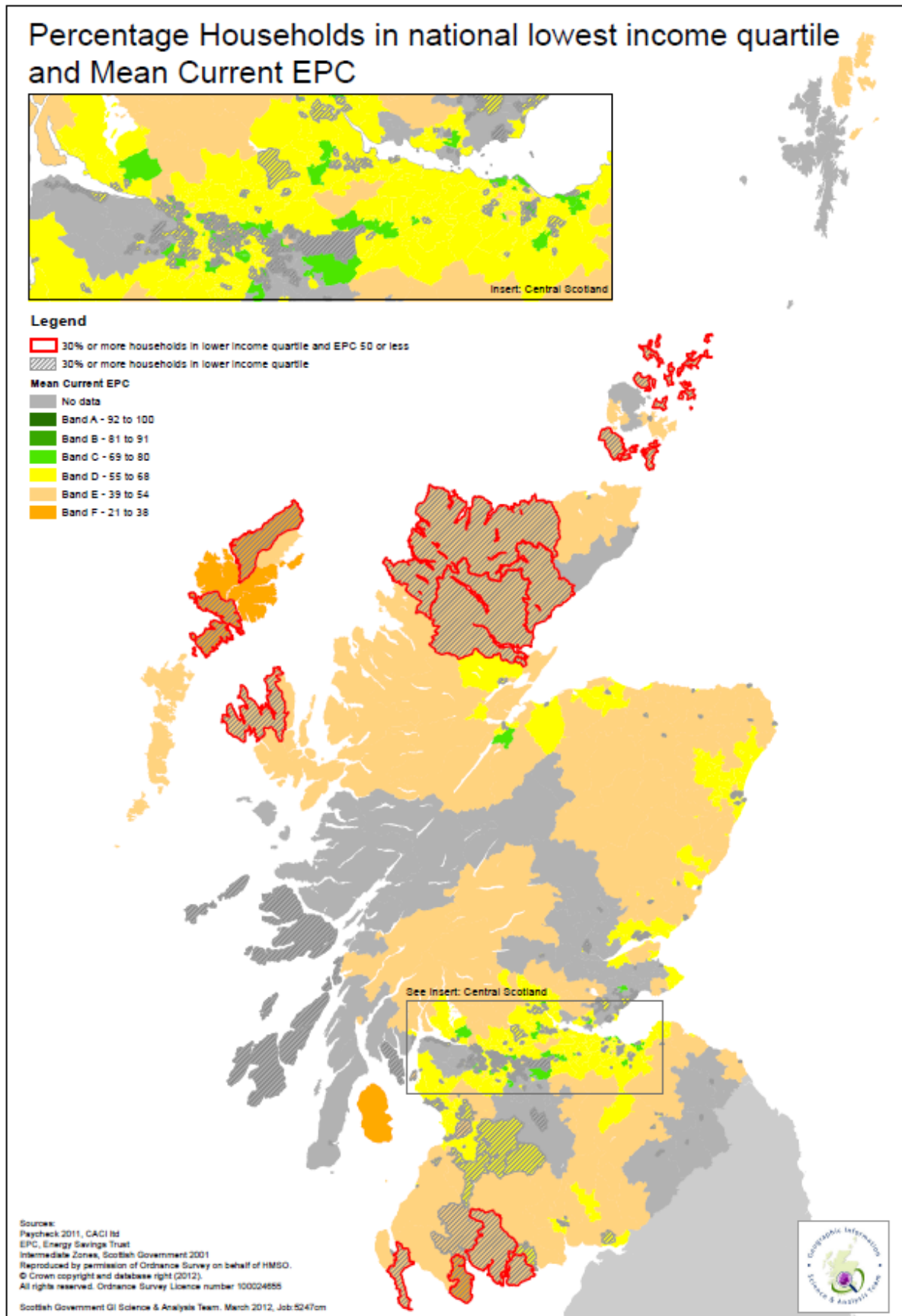


Figure 45 Map of combined low income and housing efficiency Intermediate Geography level



Chapter 6 Alternative Approaches to Measuring Fuel Poverty

287 This chapter covers:

- The John Hills Fuel Poverty Review 2011-12
- Hills' Alternative Definitions of Fuel Poverty
- Amendments to the Current Measure in Scotland

Key Messages

- In 2011 an independent review of fuel poverty in England was conducted (the Hills Review). This examined the current definition of fuel poverty and considered six alternative approaches.
- The key strength of the current definition was considered to be its focus on required energy costs rather than actual energy spend. Its weaknesses tended to be around the fixed threshold and sensitivity to certain assumptions which make it vulnerable to surges in fuel prices, and may mask the real problem.
- Under the current measure for a household on the margins of fuel poverty, for every increase of £10 in fuel bills an increase in income of £100 would be needed to avoid that households falling into fuel poverty.
- The alternative approaches were all found to have weaknesses and so, the Review proposed a new definition which is based on required fuel costs (above the median level) and low residual income (after housing and fuel costs), augmented by calculation of the 'fuel poverty gap'.
- The new (Hills) definition would result in substantially lower levels of (modelled) fuel poverty in Scotland; fuel poverty in 2010 would be halved from 28% to 13%. The distribution of fuel poverty would move away from older people.
- The fuel poverty gap, the total difference between modelled bills and 10% of household incomes in Scotland, is calculated at over £480 million in 2010.

288 The following adjustments to the Scottish definition are considered:

- modifying the base temperature for the heating model (a 3° decrease to 18°C would result in a drop in fuel poverty to 20%)
- removing "high-income" homes currently counted as fuel poor (results in a reduction in fuel poverty depending on income threshold)
- accounting for additional adults not included in the current calculation of annual household income (results in a reduction in fuel poverty)
- updating the definition of "elderly" to account for changes to pensionable age & reducing the heating regime for under-occupied dwellings (results in a reduction in fuel poverty)

- amending the treatment of the winter fuel allowance within the current definition (results in a 4% reduction in fuel poverty)
- using only the cost of space heating and hot water to determine fuel poverty rather than all energy uses (results in a drop in fuel poverty to 11%)

6.1 The Hills Fuel Poverty Review

- 289 In March 2011 Professor John Hills of the Centre for Analysis of Social Exclusion, London School of Economics was commissioned to conduct an independent review of fuel poverty and the way it is measured in England.
- 290 His interim report examined whether fuel poverty is a problem distinct from low income, how best to measure it, and whether the current approach captures the problem effectively.
- 291 **The interim report concludes that fuel poverty is a distinct problem** and discusses the strengths and weaknesses of the current metric (Hills, 2011). Six alternative measurements are considered, each designed to mitigate some of the identified weaknesses. A new measure was proposed (see Box 3).
- 292 The final report (Hills, 2012) discusses the implications of the proposed measure in more detail and the effectiveness of a range of policy approaches in reducing fuel poverty.

Fuel Poverty as a Distinct Problem

- 293 The key distinguishing issues considered in the report related to income, health and energy efficiency, and are summarised below:
- Households face widely varying costs to achieve the same level of warmth and **have very little control over these costs**, unlike other essential goods such as food and clothes.
 - The condition and locality of the homes, the age and physical characteristics of the buildings, and the energy efficiency of the building and appliances all impact on energy consumption. However **households have little control and often lack resources to improve the energy efficiency of their homes**.
 - **The poor often pay more for their fuel usage** due to the payment methods and contracts they subscribe to (e.g. they are the least likely to be on the cheapest direct debit tariffs). In addition, many 'green' government schemes are funded by energy companies, the costs of which are passed onto all energy customers including fuel poor households.
 - Current policies aimed at improving the energy efficiency of appliances and homes can both increase and decrease fuel bills. "Product policies" which enforce better energy efficiency standards on producers of appliances would reduce energy costs for all households, particularly low income households that only have access to lower efficiency (older or cheaper) appliances.

- On the other hand, the energy and climate change policies that lead to higher energy prices will have a regressive impact. The DECC analysis in 2010 reported that the **poorest fifth of households could be worse off by the introduction of these policies** when comparing the fuel bill savings with the implementation costs.

Measurement of Fuel Poverty – Strengths and Weaknesses

- 294 The interim report found that the current concept of **the threshold ratio is easy to understand**. However, the 10% threshold appears to derive from the 1988 calculation that the median household spent 5% of its net income on fuel.
- 295 The decision to fix fuel poverty based on twice this median spend appears to be a rather arbitrary choice, and the 10% figure has remained fixed rather than being adjusted in line with changing spending patterns.
- 296 The basis and, as Hill argues, the strength of this measure is that it **focuses on required fuel costs** through an independent assessment rather than actual energy use. This is particularly important for low income households, which (Hills argues) tend to rationalise their energy use in order to meet the needs of other essentials.
- 297 The interim report highlighted **the current definition’s sensitivity to low reported income**. Misreporting of incomes may seem a technical issue, but for an indicator based on a ratio, where very low incomes imply a very high ratio, this could potentially have a sizeable effect.
- 298 Furthermore, the current measurement does not include a threshold for income. **People on relatively high income can still be classed as fuel poor** if they have high modelled fuel costs. This is not in line with the concept established in the Warm Homes and Energy Conservation Act 2000 (WHECA), which states that a household should have “lower income” if it is to be classified as fuel poor.
- 299 **The current measurement is very sensitive to fuel prices**. The recent spike in fuel poverty levels between 2005 and 2010 coincides with a period of rapid rise in fuel prices, despite a relatively stable level of income poverty and the fact that the number of households in low income and low energy efficient homes reduced noticeably over the same period.
- 300 The interim report provides an interesting example from Dr Richard Moore to illustrate the relationship between fuel price and income under the current measurement. A household with an annual fuel bill of £1,000 and income of £10,500 would not be fuel poor (fuel poverty ratio of 0.095). However, the same household, following a bill rise of £200 and an income rise of £1,000 would be counted as fuel poor (fuel poor ratio of 0.104), despite having £800 of additional income remaining after paying the bigger bill.
- 301 In households on the margins of fuel poverty, **for every increase of £10 in fuel bills, an increase in income of £100 would be needed** to maintain a constant fuel poverty ratio.

- 302 **Lastly, the model is very sensitive to the heating regime applied to households.** The calculations for the review suggested that each reduction of 1°C in the target temperature for the main living room would reduce the extent of fuel poverty by 300,000 households in 2009. The basis of the temperatures used in the modelling (21°C for main living room and 18°C for other rooms) is less clear-cut than often supposed in terms of health risks and they do not appear to correspond to contemporary behaviour as we saw in Section 4.3 e.g. households tend to spend less than the model assumes.
- 303 The current indicator is said to measure the *extent* (the number of households) but not the *depth* of fuel poverty. The current definition therefore “incentivises” interventions that lift people across the fuel poverty threshold, i.e. benefiting most those who are only just fuel poor, while risking neglecting those who experience severe or extreme fuel poverty.

Hills’ Alternative Definitions of Fuel Poverty

- 304 The interim report considers six alternative methods for measuring fuel poverty:
- **Option A** - A fuel poverty ratio with income measured *after* housing costs
 - **Option B** - A fuel poverty ratio with a dynamic threshold based on twice median spending
 - **Option C** - Using the fuel poverty ratio to measure a fuel poverty gap
 - **Option D** - After fuel costs poverty
 - **Option E** - Low income and low SAP overlap
 - **Option F** - Subjective measurement of fuel poverty
- 305 Table 15 to Table 20 provide summaries of the Hills Review’s alternative indicators and the effects these have when applied to Scottish fuel poverty data. A more detailed analysis is provided in Annex C.
- 306 Figure 46 provides a summary of the proportion of fuel poor households in Scotland as defined by the current definition and the 6 options in the interim report.

Figure 46 Fuel poverty rates as defined by the current definition and the 6 proposed options in the Hills Review (interim report)

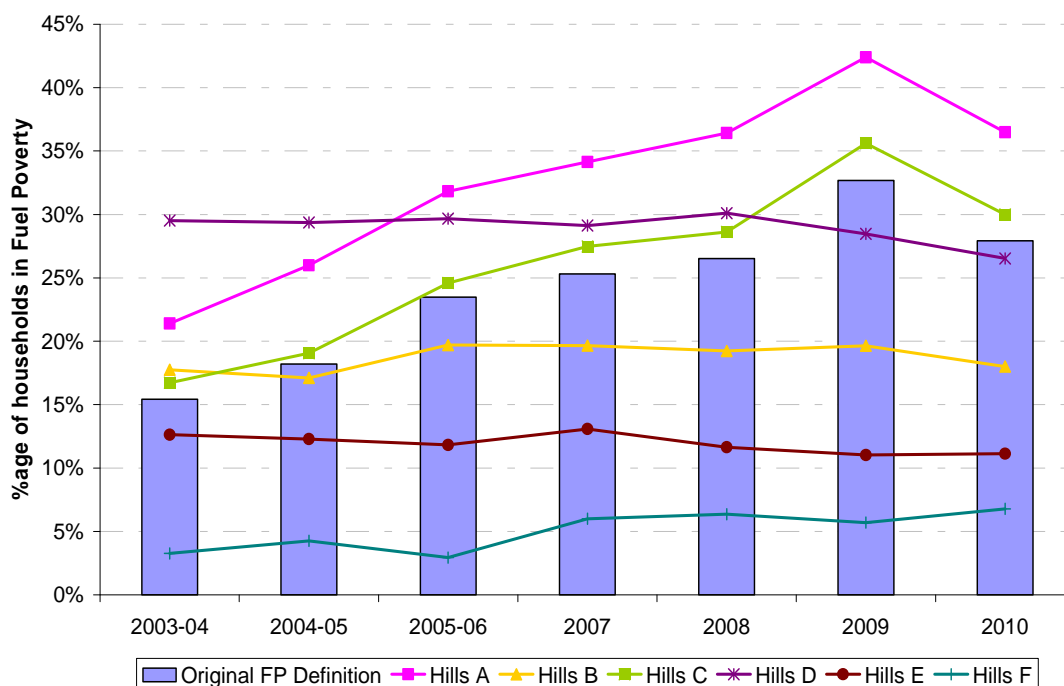


Table 15 Hills Option A - Fuel Poverty Ratio after Housing Costs

Fuel Poverty Ratio after Housing Costs	
An alternative fuel poverty ratio with income measured after housing costs. The review suggested that measuring income in this way would give a truer picture of a household's disposable income and therefore the affordability of fuel bills.	
Pros	Cons
It reflects affordability more accurately as income needed to cover housing costs cannot be spent on heating and powering the home.	It inherits many of the weaknesses of the current indicator. It becomes even more sensitive to low reported incomes. Areas with high housing costs, such as London, become more vulnerable to fuel poverty. The element of choice in housing is not considered. For example, a household may choose lower housing costs and increased transport costs to get to work. The calculation requires accurate recording of housing costs, such as separating the mortgage interests and repayment.
Implications for Scotland	
Same issues as above.	
Main findings from analysis for Scotland	
The percentage of fuel poor households in Scotland under Option A would increase to 37% in 2010 , from 28% under the current indicator.	

Table 16 Hills Option B - Dynamic Threshold

Dynamic Threshold	
<p>A fuel poverty ratio where the fuel poverty threshold is based on twice the required median fuel spend. The current threshold of 10% is based on twice of the median spend in 1988. This option uses the median spend from the year concerned.</p>	
Pros	Cons
<p>It follows the same logic of the current indicator. It is less sensitive to large shifts in energy prices. The relative stable trend would help to identify the underlying issues that lead to fuel poverty.</p>	<p>Still based on an arbitrary multiple of the median spend</p> <p>High income households may still be classed as fuel poor.</p> <p>It requires collection of data on actual energy bills at a national level.</p> <p>The “relative” approach “masks the fact that a great many more households will have had genuine difficulty in meeting their fuel costs” in years of high fuel prices.</p> <p>It implicitly assumes that the median is acceptable.</p>
Implications for Scotland	
<p>To be reasonably accurate the median should perhaps be refined for Scotland. For example, what would be an acceptable median for a one bed flat in Bristol would not be an acceptable median for a family house in Stornoway due to colder external temperatures and exposure to high winds. The impact of such a refinement is not known, nor whether the data on actual bills would be available in Scotland.</p>	
Main findings from analysis for Scotland	
<p>The percentage of fuel poor households varied between 18 and 20% during the period of 2003-04 to 2010. This is in contrast to the great increase from 15% to 28% under the current indicator. This option is therefore more stable. It would result in a decrease in modelled fuel poverty levels in Scotland.</p>	

Table 17 Hills Option C - Fuel Poverty Gap

Fuel Poverty Gap	
<p>Using the fuel poverty ratio to measure a fuel poverty gap. The ‘fuel poverty gap’ is effectively the difference between what modelled running costs are and what they should be to avoid fuel poverty, i.e. one-tenth of household incomes.</p>	
Pros	Cons
<p>It helps to measure the depth of fuel poverty.</p> <p>It helps to put a figure in monetary terms on how households are affected by fuel poverty.</p> <p>It can be calculated by household, by population group or for a region as a whole.</p> <p>It is theoretically possible to isolate the impact of both energy efficiency and pricing factors and present them separately in pounds and pence.</p>	<p>It is highly reactive to changes in fuel prices and sensitive to low reported incomes.</p> <p>Modelling is sensitive to the model assumptions and temperature standards.</p>

Implications for Scotland
Assuming that the modelling is sensitive to the Scottish climate (NHER equivalent) and fuel prices in Scotland, the same issues as above.
Main findings from analysis for Scotland
The percentage of Scottish households in fuel poverty has increased from 17% in 2003/04 to 30% in 2010 by this measure.
The fuel poverty gap for Scotland is said to be over £480 million in 2010. The median gap for an individual household is £456.

Table 18 Hills Option D - Income Poverty after Fuel Costs

Income Poverty after Fuel Costs	
Under this measure, a household is fuel poor if its comparable household income is less than 60% of the median household income after housing and modelled fuel costs, adjusted for household size and composition.	
Pros	Cons
<p>It helps to identify those who are most likely to be making trade-offs between essential goods. It shows which households are in poverty and those that are pushed into poverty by their fuel costs.</p> <p>It provides information on both the number of people who are poor after allowing for fuel costs and the depth of their poverty. This might enable better targeting of policies, because they could be focused on those who have the greatest 'poverty gap'.</p>	<p>It is more sensitive to household income than energy efficiency of the home, which is another key driver of fuel poverty.</p> <p>People who have unreasonably high costs compared to what an average household should be spending, based on its size and composition, will be classed as fuel poor.</p>
Implications for Scotland	
Assuming that the model is sensitive to the Scottish climate (NHER equivalent) and fuel prices, then the same issues as above apply. One additional issue is around whether the whole house should be heated to prevent dampness. As noted, in Scotland current modelling does not adjust for under-occupancy, and does not calculate total "real" household income. Furthermore, income is not equalised.	
Main findings from analysis for Scotland	
Little changes on the percentage of fuel poor households over the years. It varied between 27% and 30% during the period of 2003-04 to 2010.	

Table 19 Hills Option E - Low income and low SAP overlap

Low income and low SAP overlap	
<p>This option identifies households</p> <ul style="list-style-type: none"> • below 60% of national median income (after housing cost) <i>and</i> • below national median SAP <p>where the medians pertain to the specific year.</p>	
Pros	Cons
It provides alignment of the concept of fuel poverty and recent government actions on tackling fuel poverty.	SAP rating is an imperfect indicator of what constitutes "reasonable costs".

	It does not measure the depth of fuel poverty.
Implications for Scotland	
SAP is a suitable indicator to rate properties against each other but may be less suitable for measuring the “real” running costs of the properties. SAP does not take into account different weather conditions, so the real costs will differ markedly between properties in different locations.	
Main findings from analysis for Scotland	
Percentage of fuel poor households under this option changes little. However, percentage of “low income” households as defined in Option E has reduced from 27% in 2003/04 to 23% in 2010.	
The trend is smoothed by taking year-by-year median values as thresholds.	

Table 20 Hills Option F - Self-Reported Fuel Poverty

Subjective	
A measurement of fuel poverty based on the householder’s opinion of their ability to afford to keep the house warm.	
Pros	Cons
It focuses on problem as perceived by householders. It allows households to define their own thermal comfort.	People may be reluctant to admit that they struggle to afford their fuel bills.
It can be used to cross-check the trends shown by other measurement approaches.	Responses can be very different depending on precisely what and how a question is asked.
	It does not help to identify energy inefficient homes in terms of carbon emissions.
Implications for Scotland	
Same issues as above.	
Main findings from analysis for Scotland	
Significantly fewer households saw themselves as fuel poor than the current and other alternative indicators suggested, though it has been increasing over the years from 3% in 2003-04 to 7% in 2010 .	
The current indicator found that pensioner households are most likely to be fuel poor but these households are least likely to say that they are fuel poor. Single adult households and single parent households are most likely to describe themselves as fuel poor.	

- 307 Option A and Option C follow the same pattern of fuel poverty over time as the current indicator, but with higher levels. This is not surprising as both options apply similar concepts and are heavily driven by fuel costs and household income.
- 308 Option B and Option D produce percentages that are close to that of the current indicator but with a flatter trend over time. Both options provide a relative comparison with the fuel spend (and income) of the population as a whole, and thus are less sensitive to the actual change of fuel costs over time.
- 309 Option E and F provide percentages that are much lower than the current indicator. Fuel costs do not factor in the calculation in option E. Option F is

entirely subjective and encompasses a wide range of potential issues of perception.

Hills' Recommended Option

- 310 After testing the 6 alternatives, the interim and final report propose an indicator that aims to mitigate as many weaknesses identified (from the current and alternative indicators) as possible.
- 311 The proposed indicator tries to capture those where “their household income is low and where their required energy spending in order to achieve an adequate standard of warmth is above a specified threshold” (Hills, 2011, p135).
- 312 Using an indicator like this requires setting thresholds for ‘lower’ income and ‘unreasonable’ costs. The review set the income threshold as the DWP’s (after housing costs) poverty line *plus* the household’s modelled fuel costs. If this sum is higher than the household’s income after housing costs, then the household is said to be on a **low income** (see Box 3). This threshold ensures that a household’s income after housing costs is sufficient to cover the modelled fuel costs and basic essentials as set by the income poverty line. If not, then the household is poor due to fuel costs.

Box 3 “Low Income Household” as defined by Hills’ proposed indicator

A = DWP’s (After Housing Costs) Poverty Line + Household’s Modelled Fuel Costs

B = Income After Housing Costs

If A is greater than B, a household is on “Low Income”.

If A is less than B, a household is not on “Low Income”, thus not considered to be fuel poor.

- 313 The threshold for energy costs is set as the median modelled fuel costs. Hills suggested that, as with income, modelled fuel costs should also be adjusted for household size and proposed a set of factors to equalise the energy use for different household types in the final report.
- 314 If a household is defined as “low income” *and* its modelled energy costs is higher than the national median (the *energy costs threshold*), it is said to be fuel poor.
- 315 Using a similar approach⁴⁵, 13% of Scottish households would have been reported as fuel poor in 2010, compared to the 28% under the current indicator.

⁴⁵ Household income was not adjusted for additional adults, etc. (See paragraph 11). As income is not adjusted, modelled energy use is also unadjusted.

Table 21 *Percentage of Scottish household in fuel poverty under current definition and Hills' proposed definition*

<i>Year</i>	<i>Current Measure</i>	<i>Proposed Measure</i>
2003-2004	15%	14%
2004-2005	18%	12%
2005-2006	24%	12%
2007	25%	13%
2008	27%	12%
2009	33%	13%
2010	28%	13%

6.2 Amending the Current Fuel Poverty Measure in Scotland

316 Analysis was undertaken to consider the impact of amending the current calculation of fuel poverty based on perceived (additional) weaknesses in the definition. These include:

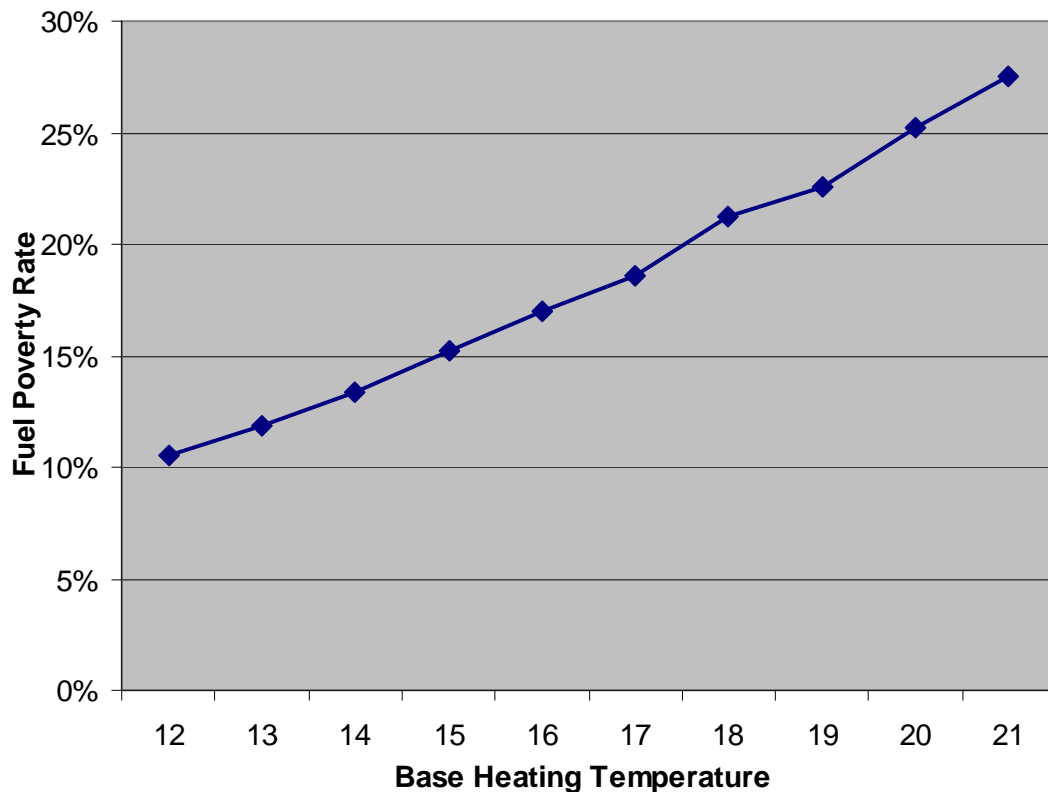
- modifying the base temperature for the heating model;
- removing high-income homes currently counted as fuel poor;
- accounting for additional adults not included in the current calculation of annual household income;
- updating the definition of “elderly” to account for changes to pensionable age and reducing the heating regime for under-occupied dwellings;
- amending the treatment of the winter fuel allowance within the current definition;
- using only the cost of space heating and hot water to determine fuel poverty rather than all energy uses.

Changing the Temperature Regime

317 As summarised in Table 3, the definition of a “satisfactory heating regime” is set in the domestic energy model, which determines heating costs. The zone 1 base temperatures for non vulnerable groups is 21°C, and 23°C for the vulnerable. The zone 2 base temperatures are always 3 degrees below zone 1 temperatures.

318 Changing this base temperature will of course alter the cost of heating the dwelling. Fuel poverty’s dependence on this modelled temperature is illustrated in Figure 47 i.e. any decrease in modelled temperature will result in a decrease in fuel poverty rates.

Figure 47 *Temperature dependence of fuel poverty*



SHCS 2010

- 319 This near linear relationship is not effected by demographic factors i.e.. the distribution of the fuel poverty by household type does not change significantly.

Box 4 *Modelled Temperature Dependence - Summary*

The temperature to which houses are heated in the Scottish Government calculations of fuel poverty appear to be fairly arbitrary. As noted in Section 2.2, little research measuring actual indoor temperature and its effect on health has been done. The 21°C base temperature is based on a 1987 WHO review which reported 'safe' indoor temperatures as lying between 18°C and 24°C (WHO, 1987), with 21°C presumably the midpoint of this range.

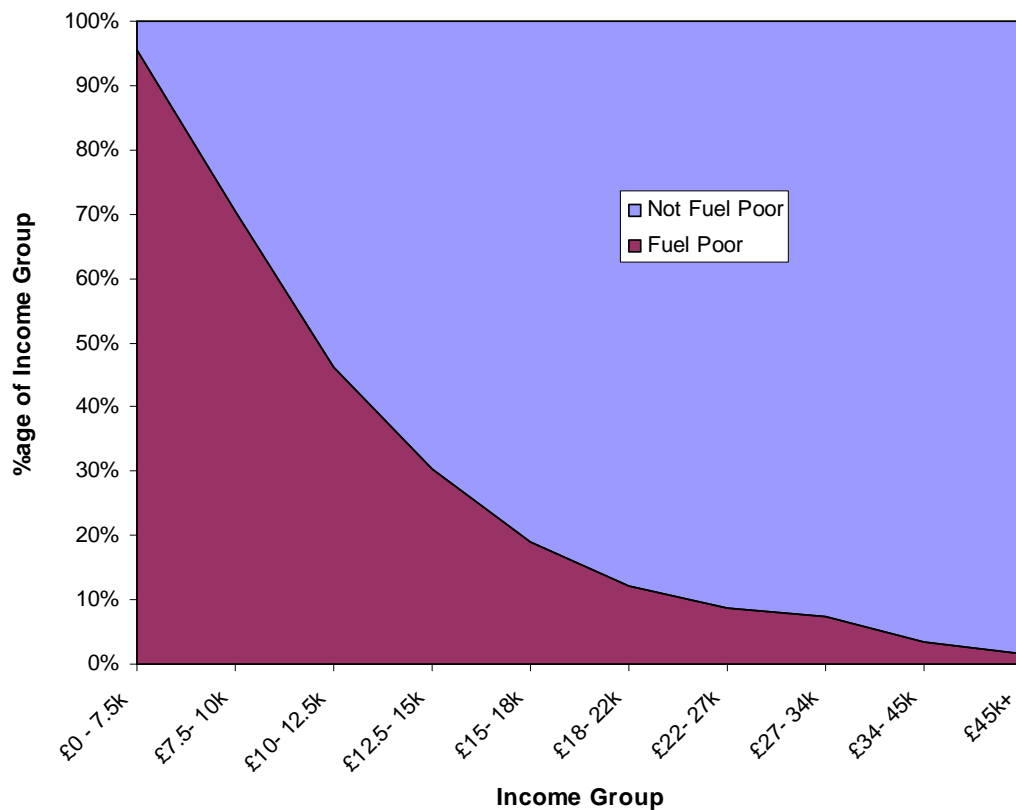
Reducing the base modelled temperature naturally reduces our figures for fuel poverty. However, a 3° decrease still shows fuel poverty at over 20%, which is still a substantial proportion of the Scottish population.

Fuel Poor High Earners

- 320 Removing high earners from consideration when addressing fuel poverty would be a natural amendment to our analysis of the problem. Removing the top 10% of earners was considered. However, analysis of the income distribution of the fuel poor shows that the threshold for the top 10% of earners is just over £19,000. This threshold, just above national median household income, was considered too low a value for a cut off.

321 Instead, income statistics for the whole Scottish population were used to uncover the income distribution of fuel poverty.

Figure 48 Fuel poverty rate by income decile group



Scottish House Conditions Survey 2008-2010

322 We can see that **estimations of fuel poverty levels strongly correlate with income decile group**. In fact, **the top 50% of earners (over £18,000) account for 12% of the fuel poor**.

323 Removing income groups from consideration in addressing fuel poverty would reduce the reported fuel poverty figures by approximately the values in the table above. For example, if a £27,000 annual income threshold was chosen, the grey-shaded cells in 323 would be removed from the fuel poverty total, reducing the number of fuel poor households to around 647,000 (28%).

Table 22 Fuel Poor and Not Fuel Poor by income group (SHCS 2008-10)

Income	Not Fuel Poor	Fuel Poor		
	1000s	1000s	% of the Fuel Poor	Cumulative Percentage
£0 - 7k	10	210	31%	9.0%
£7 - 10k	69	165	24%	16.2%
£10 - 12.5k	125	107	16%	20.8%
£12.5 - 15k	163	71	10%	23.8%
£15 - 18k	189	44	7%	25.7%
£18 - 22k	205	28	4%	26.9%
£22 - 27k	214	20	3%	27.8%
£27 - 34k	217	18	3%	28.6%
£34 - 45k	227	8	1%	28.9%
£45k+	230	3	1%	29.1%
Total	1650	676	100%	29.1%

Box 5 Fuel Poor High Earners - Summary

High to middle income households in fuel poverty must live in very fuel inefficient homes to be classed as fuel poor. Whatever cut-off threshold is set to remove these groups, the implication is that financial assistance is not required to improve these homes. However, **some form of barrier must exist that is preventing home improvements among even the wealthiest groups.** This could range from the physical difficulty of treating these particular properties to a lack of awareness that energy efficiency improvements could or should be made.

The high-income fuel poor are predominantly inhabitants of detached houses, 75% of which are in rural locations. 25% have retired permanently (largely “older smaller” households); 60% are self-employed or work full time.

*They represent a distinct group among the fuel poor, where funding is not the main barrier to energy efficiency home improvements. Their removal from or inclusion in estimates of fuel poverty is **a matter of judgement** but would result in a reduction in fuel poverty rates depending on the threshold set.*

Additional Adults

324 **Around 20% of households contain people aged over 16 whose income is not recorded.** However, their economic status is available. We undertook several methods of accounting for income from these additional adults to see the effect this had on fuel poverty levels.

325 Incomes for each additional adult were derived from the following sources:

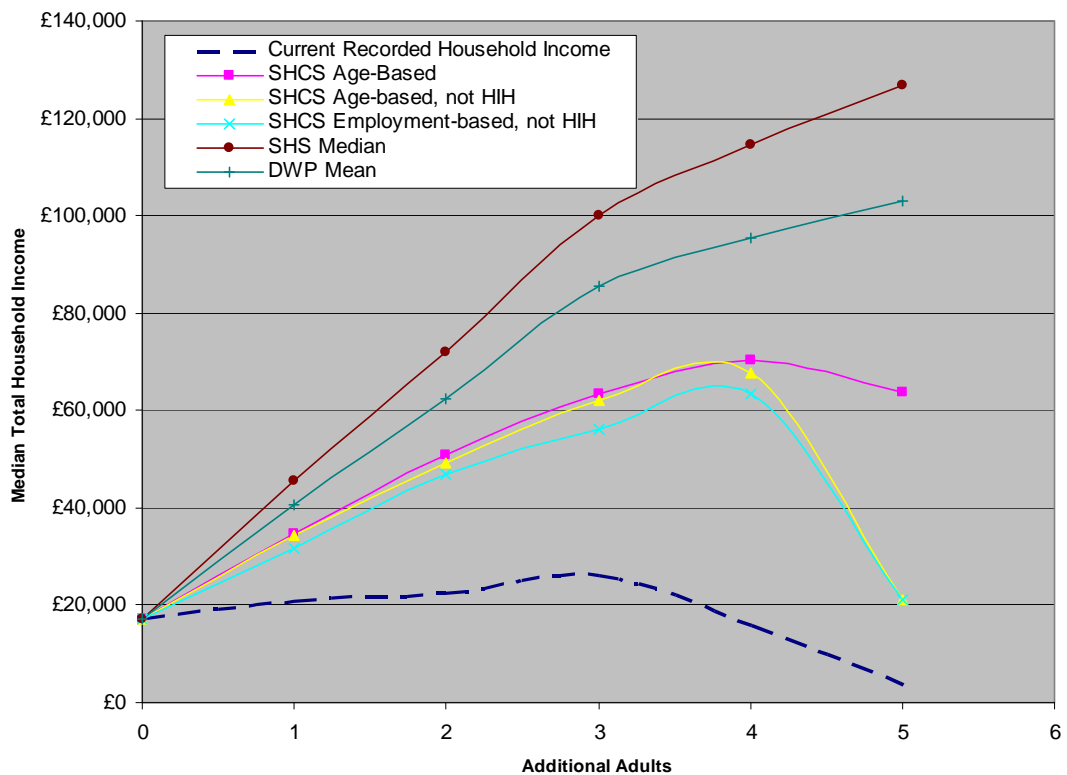
- Scottish unequivalised median income for adults using household net income before housing costs: £473.83 / week (SHS Median)

- Scottish unequivalised average income before housing costs: £382.49 / week (DWP Mean)
- the median income by age group of highest income householder was added according to the age groups of each additional adult (SHCS Age-Based) (see 146)
- the median income by economic status of highest income householders was added according to the economic status of each additional adult (SHCS Employment/Economic Activity-Based)

326 The weekly figures were multiplied by 52 to give an additional annual income value. This value was added for each adult in the household not accounted for in the SHCS (currently highest income householder and spouse).

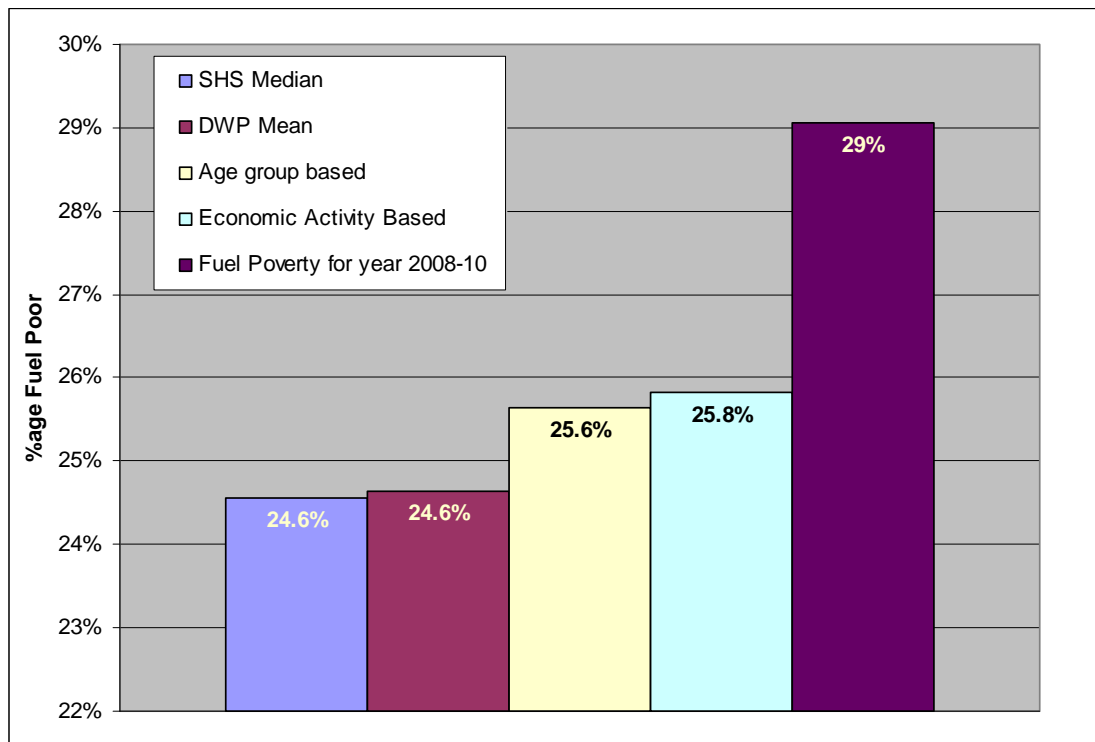
327 For the latter two calculations, the fact that the additional adults are not, by definition, the highest income householders (“not HIH”) was taken into account. Their additional incomes were reduced to the level of the highest income householder before being added to the household income total.

Figure 49 Regimes for including additional adults in household income



328 These additional incomes lead to the changes in fuel poverty levels shown in Figure 50.

Figure 50 Fuel poverty rates including additional incomes



Box 6 Additional Adults - Summary

While these statistics are based on limited data, the measure based on economic activity of additional adults is preferred. It follows that in many cases additional adults will be somewhat dependent adults: teenagers still living with parents, older relatives, etc. This means that **any average of national income would likely over-estimate the income of this group.**

The income of additional adults is based on that of the highest income householder of the same economic status. We would expect additional adults to have lower earning requirements than householders, and so this too is likely to lead to a slight over-estimate which would result in a drop in levels of fuel poverty.

Heating Regimes and the Changing Pension Age

- 329 Fuel poverty is based on a model of heating behaviour. Changes to the assumptions in this model affect the population considered fuel poor and their distribution among housing types.
- 330 The different heating models used in this section are listed in Table 23 for reference. This analysis was performed on the SHCS data for 2010 only. These changes result in fuel poverty rates listed in Table 24.

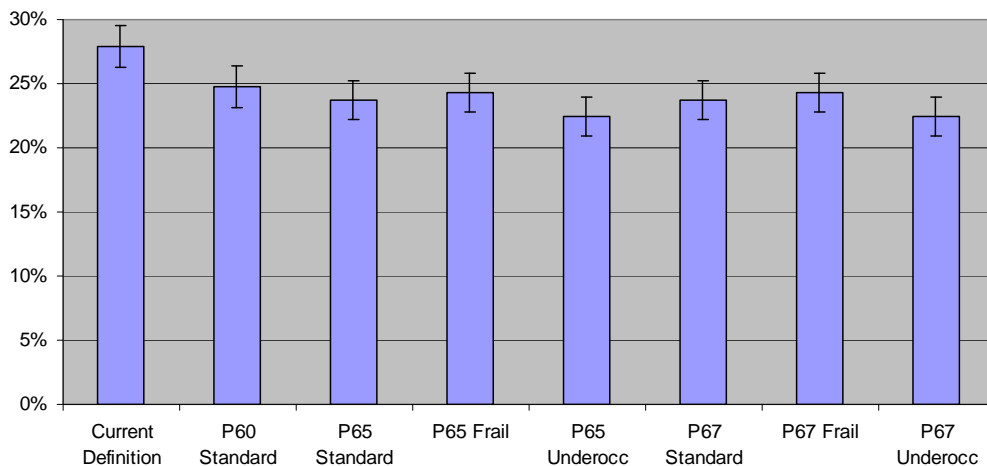
Table 23 Heating Models, Temperatures and Pension Ages

Model Name	Occupant Types	Temperatures*	Heating Pattern
P60 Standard	Standard occupants	21°C/18°C	9 hr weekdays, 16 else
	Any occupant aged 60 + or long-term sick/disabled	21°C/18°C	16 hours per day
Current Definition	Standard occupants	21°C/18°C	9 hr weekdays, 16 else
	Any occupant aged 60 + or long-term sick/disabled	23°C/18°C	16 hours per day
P65 Standard	Standard occupants	21°C/18°C	9 hr weekdays, 16 else
	Any occupant aged 65 + or long-term sick/disabled	21°C/18°C	16 hours per day
P65 Frail	Standard occupants	21°C/18°C	9 hr weekdays, 16 else
	Any occupant aged 65 – 80 or long-term sick/disabled	21°C/18°C	16 hours per day
	Any occupant aged 80+	23°C/18°C	16 hours per day
P65 Under-occupied	Standard occupants	21°C/18°C	9 hr weekdays, 16 else
	Any occupant aged 65 – 80 or long-term sick/disabled	21°C/18°C	16 hours per day
	Any occupant aged 80+	23°C/18°C	16 hours per day
	Under-occupied homes	Zone 2 heating reduced by 50%	
P67 Standard	As P65 Standard but with 67+ age cut-off		
P67 Frail	As P65 Frail but with 67+ age cut-off		
P67 Under-occupied	As P65 Under-occupied but with 67+ age cut-off		
Notes			
* Temperatures are set by zone, where zone 1 is the primary living area (usually the living room) and zone 2 is the rest of the house.			
(P65 = Pension/"vulnerable" age of 65)			

Table 24 Fuel Poverty under alternative Heating Models (SHCS, 2010)

Model Name	Number of Fuel poor	Fuel poverty rate
Current Definition	658,000	27.9%
P60 Standard	585,000	24.8%
P65 Standard	559,000	23.7%
P65 Frail	573,000	24.3%
P65 Under-occupied	529,000	22.4%
P67 Standard	559,000	23.7%
P67 Frail	573,000	24.3%
P67 Under-occupied	529,000	22.4%

Figure 51 Fuel Poverty under Alternative Heating Models



331 As shown in Table 24, the differences between models of the same pension age thresholds (e.g. P60/P65/P67) are small enough to be insignificant in most cases for this single year sample. However, **all models with an increased pension age show statistically significant reductions in fuel poverty** compared to the current model:

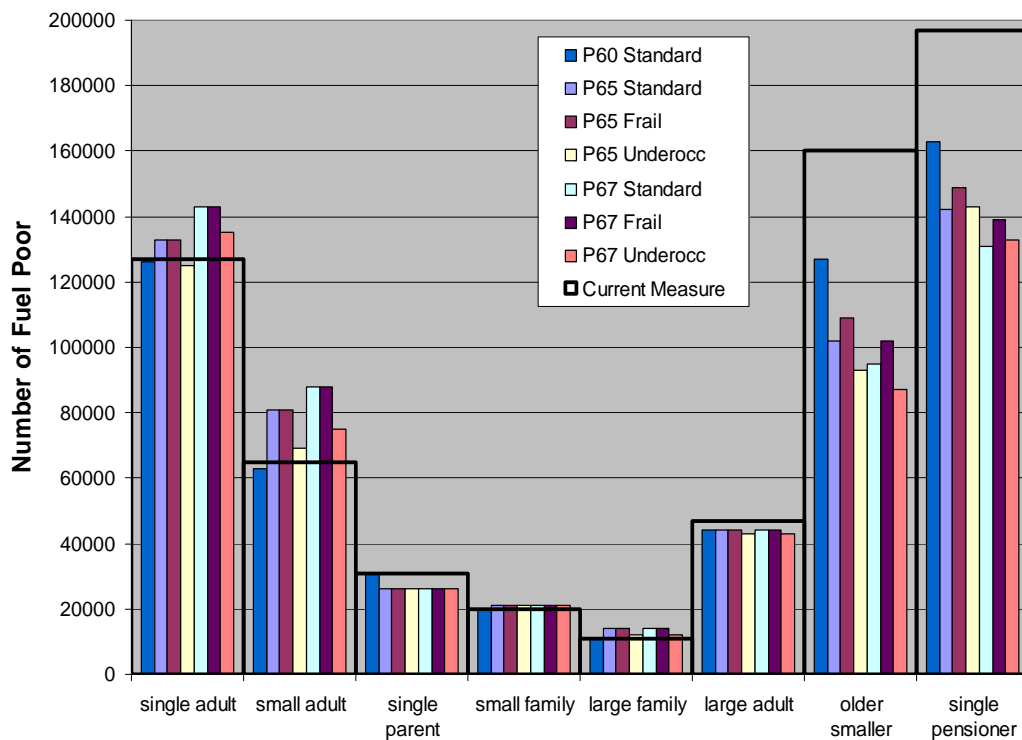
- Increasing the age at which people are considered “elderly” reduces the (modelled) heating costs for those now under the age threshold and thereby reduces fuel poverty.
- Increasing the heating temperature for the frail leads to a small increase in the number of fuel poor (by around 13,000) from the P65 and P67 standard models.
- When the under-occupancy correction is added a small reduction in heating demand results in lower heating costs and thus overall fuel poverty rates fall.

Demographic Effects

332 Some analysis was carried out to help understand the demographic effects of these changes.

333 Figure 52 shows the overall reduction but also a slight increase in single and small adult fuel poverty. This is likely due to the unchanged circumstances of those previously considered pensioner households. Some of these remain in fuel poverty despite changes to the assumptions made about their behaviour.

Figure 52 Number of Fuel Poor by Heating Regime Model



Box 7 Heating Regimes, Temperatures and Pension Age Models Summary

Compared with the current measure, as expected, **fuel poverty decreases if the age threshold for pensioners increases.**

Former “single pensioner” and “older smaller” households are now classed as “single adult” and “small adult” households under the new definitions. These households are no longer modelled as heating their houses for longer, but the estimated number of fuel poor in the groups they join still increases.

The increased (fuel poor and not fuel poor) population of these demographic groups means that the proportion that are fuel poor still falls.

The changes in fuel poverty rates between models of the same age threshold (Standard/Frail/Under-occupied) are not statistically significant. The likely demographic effects of these changes on a larger sample can be summarised as follows:

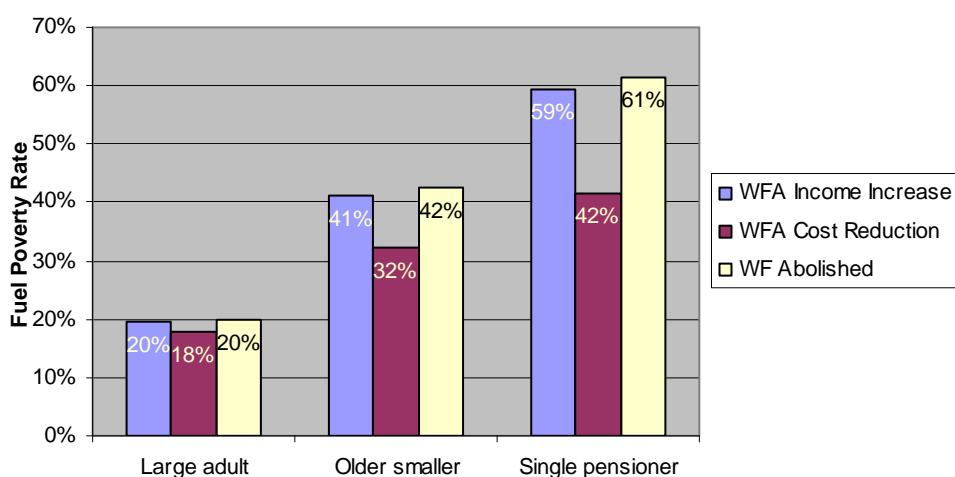
- **models which boost the temperature for the frail elderly would increase fuel poverty rates** compared with the standard models. Frail elderly people live mostly in older small households or alone.
- **models accounting for under-occupancy will reduce fuel poverty** relative to “Standard” and “Frail” models, primarily affecting small adult and pensioner households.

The heating pattern and temperature is therefore a matter of judgement, as is accounting for under-occupation. From a physical point of view it is detrimental to the housing stock to heat half a dwelling due to cold-spots, however the fuel poverty model is not a statement of recommended heating patterns.

Winter Fuel Payment

- 334 The Winter Fuel Payment (WFP) is a non means-tested benefit distributed to the over 60s to help keep their homes warm in the winter. 60 to 80-year olds receive £250 and over-80s receive £400 per year.
- 335 According to SHCS data for 2008-10, around **38% of households are eligible for the WFP.**
- 336 As shown in section 6.1, fuel poverty is far more responsive to fuel cost than income changes. As a benefit aimed at reducing fuel costs, it is a valid proposition to count the WFP as a cost reduction rather than as an increase to income.

Figure 53 *Fuel poverty rate: Demographic effect of including WFP as a cost reduction*



SHCS 2008-2010

- 337 **Considering the Winter Fuel Payment as a reduction in fuel costs rather than an increase in income will result in a 5% reduction in fuel poverty,** equivalent to around 111,000 households.
- 338 This reduction falls predictably among the elderly household types, also effecting those large adult households which contain one or more pensioners (see Figure 53).

Box 8 *Winter Fuel Payment Summary*

Treating the Winter Fuel Payment as a cost reduction rather than an income increase would lead to a 4% reduction in our estimate of fuel poverty due to the greater sensitivity of the measure to fuel price than to income. This reduction would be observed in the elderly population.

Removing the Winter Fuel Payment altogether from the current measure would appear as a 1% increase in fuel poverty, pushing 12,000 additional households into fuel poverty.

Energy Vulnerability - Isolating Heating and Hot Water Fuel Costs

- 339 Chapter 1 discussed the concept of energy vulnerability rather than fuel poverty.
- 340 Fuel poverty is traditionally perceived as relating to heating, but its measure includes other energy costs. For example, **in Scotland space heating accounts for less than half of the average modelled fuel bill used to calculate fuel poverty (49%)**; a sizeable proportion is attributed to lighting and appliances (31%) (based on SHCS 2010 data). It may therefore be more appropriate to describe people as **energy poor** rather than fuel poor; not only can they not afford to heat their homes but they also cannot afford other energy demands e.g. cooking, lighting, TV etc.
- 341 Seen in this way, energy poverty is much wider than the effects of cold housing; it impacts on many aspects of people's lives perhaps overlooked in some fuel poverty policy, such as their dietary, social and leisure needs and overall quality of life. There is some evidence that suggests that it is possible for (older) people to be energy poor but not be classified as fuel poor (e.g. Day & Hitchings, 2009).
- 342 In this case, one might **consider widening fuel poverty initiatives beyond heating improvements**. For example, low income households are more likely to buy second-hand appliances and tend to opt for cheapness over performance when it comes to buying new appliances (see Boardman, 2010 p114). One suggestion might be to consider extending scrappage schemes to other electrical appliances such as fridges. Traditional fuel poverty schemes might also be further enhanced if combined with **practical energy saving advice** for householders. Clearly, this is an area that warrants further research and consideration.
- 343 In an attempt to inform the debate around energy vulnerability, the costs from heating and hot water energy use alone were modelled and these values were used to quantify fuel poverty as a measure of inability to sufficiently heat the home.

Isolating Heating and Hot Water Fuel Costs

- 344 Under the heating model used to calculate fuel use from the SHCS 2010, **heating and hot water accounted for 68% of fuel spend on average**.
- 345 Using only heating and hot water costs to calculate fuel poverty rates leads an overall reduction in fuel poverty in Scotland (see Table 25)

Table 25 Heating and hot water fuel poverty

Fuel Poverty Ratio	Current Model		Heating and HW only	
	Count	Percentage	Count	Percentage
Not Fuel Poor	1,699,000	72%	1,978,000	84%
Fuel Poor	473,000	20%	267,000	11%
Extreme Fuel Poor	185,000	8%	112,000	5%
Total	2,357,000		2,357,000	

346 This overall reduction is not shared equally through the population; more efficient dwellings tend to be removed from fuel poverty while inefficient housing feels only a small reduction (Table 26).

Table 26 Heating and hot water fuel poverty by building efficiency

Energy Efficiency Rating (where B is most efficient & G is least)	%age Fuel Poor		% Reduction
	<i>All Energy</i>	<i>Heating and HW</i>	
<i>B</i>	33%	7%	78%
<i>C</i>	17%	5%	71%
<i>D</i>	25%	14%	45%
<i>E</i>	44%	32%	27%
<i>F</i>	59%	50%	15%
<i>G</i>	70%	64%	9%
All EERs	28%	16%	42%

347 Since overall costs are reduced under this measure, this leads to a small demographic shift as shown in Table 27. At risk groups are more like the “Extreme Fuel Poor” described in section 3.5, who tend to be the rural elderly in less efficient housing.

Table 27 Distribution of heating and hot water fuel poverty by household type

Household Types	%age of Fuel Poor		Rank (1 Most fuel poor, 8 least)
	<i>All Energy</i>	<i>Heating and HW</i>	
<i>Single pensioner</i>	30%	34%	1 (1)
<i>Older smaller</i>	24%	27%	2 (2)
<i>Single adult</i>	19%	18%	3 (3)
<i>Small adult</i>	10%	8%	4 (4)
<i>Large adult</i>	7%	7%	5 (5)
<i>Small family</i>	3%	3%	6 (7)
<i>Single parent</i>	5%	2%	7 (6)
<i>Large family</i>	2%	1%	8 (8)
Total	100%	100%	

Box 9 Heating and hot water fuel poverty – Summary

Calculating fuel poverty using only the heating and hot water costs for a dwelling serves to emphasise the energy efficiency of the household.

Since costs are reduced overall, **the rate of fuel poverty drops significantly**. However, the relatively higher threshold and removal of appliances from consideration means that these fuel poor households are more likely to be unable to keep their homes at a satisfactory level of thermal comfort. **This may be the population that are most at risk of underheating their homes and experiencing the health problems** described in Chapter 2. This group displays similar characteristics to the extreme fuel poor.

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Chapter 7 Policy Implications and Conclusions

348 This chapter covers:

- Policy implications of the report findings on the nature of fuel poverty.
- Policy implications of the report findings on the definition, assumptions and drivers of fuel poverty measurement.
- Policy implications of the report findings on identifying fuel poor households by household type, dwelling type and area.
- Consideration of reducing fuel poverty – policy outcomes modelling and programme appraisal.

349 Further details of regulations and policy programs encouraging fabric upgrades and providing advice and assistance are included in Annex D.

7.1 Key Messages

- Fuel poverty is an important concept which is distinct from poverty per se, with this difference being related to the fact that some households are required to spend more on fuel due to the condition of their home, their location or their access to reasonable energy tariffs.
- Fuel poverty is modelled using a defined standard heating regime. Little is known about people's actual preferred thermal comfort levels, and how this may vary by householder type. This may mean that real fuel poverty is very different from modelled fuel poverty in size, depth and the nature of households included.
- The origins of fuel poverty were around heating a home and 'heat poverty' is a distinct concept. However, less than half of the fuel bill is required for this purpose with the remainder related to heating water as well as use of lights, appliances and cooking. There is perhaps a less clear narrative that other elements of fuel poverty are distinct from income poverty.
- The way that the fuel poverty concept is articulated into a 'definition' or 'metric' impacts on the type of households and household circumstances that are considered to be fuel poor.
- Based on the current definition the mean fuel spend will exceed the 10% fuel poverty threshold by 2015 and a wide range of social factors point to continued rise in fuel poverty. These factors include an ageing population, changes to the benefit system, impact of climate change legislation on fuel bills, and increased number of single person households.
- A much lower proportion of households than one might expect, given the (modelled) level of fuel poverty in Scotland, actually say that they are unable to maintain their home at a satisfactory level of thermal comfort (7%

in 2010). There are many reasons why someone may not wish to admit difficulties; however, there may also be some households who genuinely feel they do not have a problem heating their home.

- An outcome modelling approach is identified as an option to consider in developing programmes to reduce fuel poverty.

7.2 The Nature of Fuel Poverty

350 Chapters 1 and 2 set out the background to fuel poverty in the UK and explain how it started in the late 1970s when high and rising fuel prices were combined with a prevalence of cold, damp homes that households could not afford to heat. It can be argued that in 2012, almost 40 years later, times have changed. The condition of most housing has improved substantially and an increasing proportion of fuel bills are attributable to lighting and appliances as much as they are to heating and hot water. This concept of 'energy poverty' is being taken forward by academics who tend to refer to 'energy vulnerability' rather than 'fuel poverty'.

351 This report provides an overview of the nature and current definition of fuel poverty in Scotland. It clearly shows how fuel poverty is a subjective concept and that **the way that this concept is articulated into a 'definition' impacts on the type of households and household circumstances that are considered to be fuel poor.**

352 **The report concurs with Hills' review of fuel poverty in England and Wales that fuel poverty is an important issue which is distinct from poverty per se.** The report also agrees with Hills that the distinguishing feature of fuel poverty as opposed to income poverty revolves around the fact that households may need to pay different heating costs dependent on a number of circumstances such as the physical characteristics of their property, the type of fuel available to them, and the energy tariff that they can achieve. Poorer households also lack the capital to invest in measures that would reduce their heating costs.

353 Nevertheless, there are several factors which challenge this concept of fuel poverty:

- **Poor energy efficiency but high income** - some people are classed as fuel poor because they would need to spend a lot of money to reach the standard heating regime in their home, but they actually have a moderate to high income. These households could afford to install (some) energy efficiency measures to reduce their costs, or potentially 'choose' a home with a different fuel profile. These households are classed as fuel poor, but it is questionable whether it is a social justice issue such that public money should be used to assist them. Of course, in the interest of climate change, there is clearly still a drive to improve the energy efficiency of their homes which would also have the impact of protecting current or future occupants should their economic circumstances worsen.

- **Good energy efficiency but low income** – some households already live in a home which is energy efficient but because of their low income levels they continue to be classed as fuel poor. The report shows that if every dwelling in 2009 was improved to a minimum NHER of 10 (everyone had an exceptionally efficient house) then 14% of dwellings would still be fuel poor. The problem of “fuel poverty” for this group is of a distinctly different character with different potential solutions.
- **Heat poverty or fuel poverty** - heating only accounts for half of the total fuel bill of a household. The rest relates to cooking, lighting and use of appliances, and hot water. Fuel poverty debates tend to centre around a cold home; however, it could be argued that fuel poverty is as much about whether the TV, fridge, computer, lights can be utilised as it is about turning the central heating on. Evidence shows that measuring **heat poverty** reduces the rate of ‘fuel poverty’ significantly (see Chapter 6). Evidence in Chapter 4 also shows that the more energy efficient the home the more likely it is that households will use more energy than modelled due perhaps to choosing higher levels of thermal comfort or greater use of appliances.
- **Affordable warmth and thermal comfort** - a much lower proportion of households than one might expect, given the (modelled) level of fuel poverty in Scotland, actually say that they are unable to maintain their home at a satisfactory level of thermal comfort (7% in 2010). This measure has risen over time (from 3% in 2003/4). There are many reasons why someone may not wish to admit difficulties; however, there may also be some households who genuinely feel they do not have a problem heating their home. Chapter 4 presents analysis that shows how people actually heat their homes compared to the modelled assumptions. Households that are **fuel poor but not income poor spend much less on energy** than we model them to, perhaps reflecting a lower thermal comfort level and a rational calculation on the economy of excessively heating an inefficient house. Other groups have different patterns of energy use. There is very **sparse evidence on what temperature each household requires to reach their own level of thermal comfort**. As Levins and Lowontin (quoted in Roaf et al , 2009) conclude “*our temperature is not a simple consequence of thermal needs but rather a product of social and economic conditions*”. This suggests that not only is there useful research to be conducted around current notions of thermal comfort in the home, but also research into how views and behaviour of thermal comfort can be changed.

7.3 **Future Trends in Fuel Poverty**

354 Independent of fuel prices, which are generally predicted to continue to increase, and given the range of characteristics prevalent in fuel poor households, there are a range of mostly **social factors** which are likely to contribute to a rising fuel poverty trend.

- An ageing population: the report shows that older households have a higher prevalence of fuel poverty;
- Various drives towards enabling people to stay in their homes when elderly, frail, or ill. This may have the effect of sustaining fuel poverty and vulnerability to its impacts;
- Changes to the benefits system and consequent shifts in household income;
- Impacts of climate change on seasonal temperatures. For example, the demand for summer cooling systems;

(for all the above points see Walker et al., 2011)

- A cultural inclination for older housing which tends to be less energy efficient than modern housing;
- The rise in consumption of leisure services and appliances in the home and associated increase in energy usage;

(for the latter 2 points see Hamza & Gilroy, 2011)

- Increasing unemployment due to the economic downturn and associated impact on household income;
- Increasing number of single person households. Some single households are more likely to be fuel poor than other household types e.g. elderly single person households.

355 When viewed against this backdrop it is clear that the scale of the challenge in reducing fuel poverty is immense. With **fuel poverty forecast to rise to 35% in 2011**, the 2016 target to eradicate fuel poverty as it is currently defined will require significant action if it is to be met.

7.4 The Current Definition of Fuel Poverty

356 The report has looked at various definitions and 'tweaks' to the current definition. Chapter 6 shows how making slight adjustments to the assumptions used in measuring fuel poverty changes the level of fuel poverty in Scotland. However, choices of assumptions are hindered by three factors:

- **There is often a lack of clear evidence to justify one set of assumptions over another.** For example in 2002 the heating regime was changed for pensioners so that anyone over pensionable age in Scotland is assumed to require to heat their home to 23 degrees rather than 21 degrees. They also are assumed to need to heat their home for longer (run 16 hours, 7 days a week). **If heating was reduced to 21 degrees then overall fuel poverty would reduce by 2%** with a decrease of 6% for older smaller households, 7% for single pensioners and 3% for large adult households (where someone is of pensionable age). However, there is a lack of evidence on the impact of temperature on health on which to base any changes to this assumption.

- **There is lack of agreed conceptual definition of fuel poverty to guide decisions.** For example, a key issue is whether a household income should be measured before or after housing costs. It could perhaps be argued that using after housing costs gives a better picture of total residual income available to pay bills. But there is a question around household choice and social justice. If the household chooses to have high housing costs which then means that they fall into fuel poverty is this a social justice issue? However if the household is forced to pay that level of housing costs because there are no other options then perhaps it is.
- **There is a lack of clarity on required outcomes from resolving fuel poverty.** The original political driver to reduce fuel poverty was related to health outcomes however more recent years have seen a shift towards social justice motivations. This dimension is important because it will impact on how fuel poverty should be defined. If it is a health concern then perhaps heat poverty should be the focus. If it is social justice then the broader energy poverty is more useful.

357 Any definition of fuel poverty and subsequent measurement is a complex combination of factors which will result in different households falling above or below a fuel poverty line. However, across all of the definitions fuel poverty prevalence is higher in certain groups

- **Any household type which typically experiences poverty is likely to experience modelled fuel poverty** unless they live in a highly energy efficient home. There is a trade off between energy requirement and income level with the most efficient energy requirement being too expensive for the poorest households. Household types who generally have a higher prevalence of poverty are **single pensioners**, older couples, single economically inactive adults and lone parents.
- Many households who typically experience **very high energy requirements** due to the nature of the dwelling are likely to experience fuel poverty unless their income is relatively high. This would include households in larger, traditional houses and flats, un-insulated homes with inefficient heating systems and particularly those who through necessity or choice use a primary heating fuel other than gas.
- The marginal fuel poor do not have the same profile as those who are extreme fuel poor or fuel poor. It will therefore be **important for Policymakers to consider whom they wish to target** – those on the margins who could easily fall into fuel poverty or those already experiencing fuel poverty or extreme fuel poverty.
- As Chapter 3 noted fuel poor households may be poor but that does not mean that they are in receipt of benefits.

7.5 *How to Identify and Target Fuel Poor Households*

- 358 One particular issue when the levels of fuel poverty become very high is that ‘the average’ becomes the problem which makes it increasingly difficult to target programmes. To assist in targeting programmes it is necessary to understand the types of dwelling and the types of household where fuel poverty is likely to be more prevalent. However, it should be remembered that fuel poverty is a complex relationship between the household income level and the dwelling’s fuel requirements.
- 359 It is therefore not as straightforward as it might seem to target fuel poverty. One (popular) targeting strategy would be to focus on low income. However, in practice low incomes become synonymous with benefit eligibility. The report has shown that **a majority of fuel poor households are not in receipt of means-tested benefits** which suggests that other ways of targeting would be more appropriate.
- 360 However, as Chapter 5 showed, identifying the fuel poor is an extremely complex and inconclusive process. Chapter 5 described attempts to combine fuel poverty risk factors to assist in identifying fuel poor households, dwellings or areas with high prevalence of fuel poverty, but was largely unsuccessful in formulating a workable model that predicts fuel poverty with a reasonable level of confidence.
- 361 Targeting also depends on the nature of the programme. Chapter 4 described the differences between income poor and fuel poor households and it is clear that whilst some programmes will benefit the income poor as much as the fuel poor (e.g. tariff changes); others will only be of relevance to the fuel poor. Chapter 6 also showed that incentives that reduce costs will be considerably more effective at reducing fuel poverty than those that increase income.
- 362 Given the characteristics of the fuel poor, **alternative targeting strategies** might include:
- All households containing someone over retirement age (65) who live off the gas grid
 - All households containing someone over 65 whose home is below an EPC of D
 - Using the winter fuel allowance (or equivalent allowance available to younger low income households) as a trigger
 - Using social landlords to identify the fuel poor social tenants
 - Using EPC and income mapping to identify higher prevalence areas.

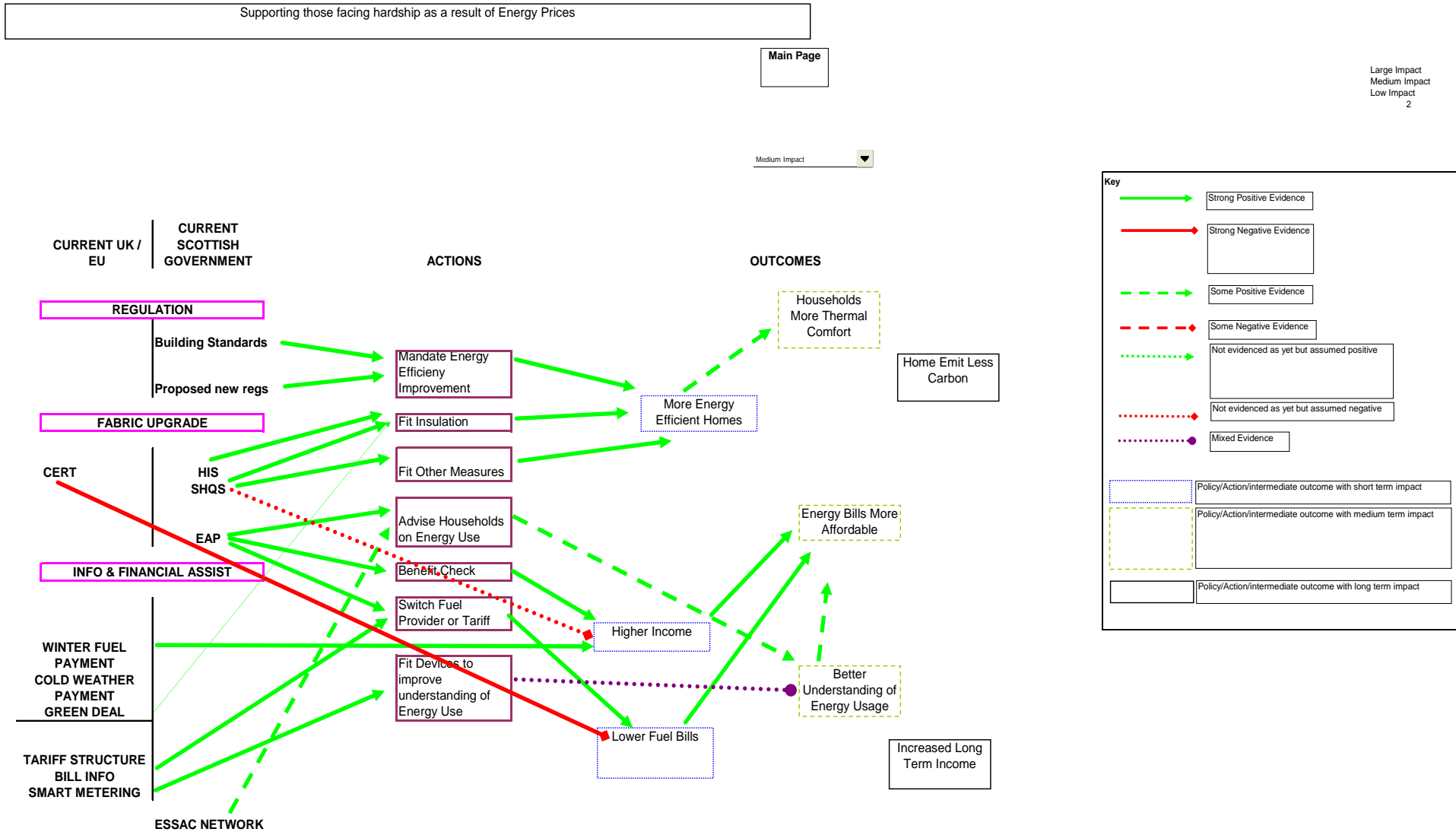
7.6 *Reducing Fuel Poverty – Outcome Modelling*

- 363 As fuel poverty is such a complex concept with different capacity for definition and measurement, one approach to considering how to reduce fuel poverty might be the articulation of tangible outcomes. A draft logic model (see Figure

54) developed for the *Tackling Poverty Board* is presented below which has been adapted to focus more specifically on fuel poverty and to include current fuel poverty policies and programmes. These are examples and do not represent an agreed Scottish Government position.

- 364 The identified short to medium term outcomes (1-5 years) to support households have been identified as:
- Outcome 1 – All households are able to enjoy adequate thermal comfort
 - Outcome 2 - Energy bills present less hardship to lower income households (defined as lowest 3 deciles of income)
 - Outcome 3 – There is increased understanding by households of energy usage in the home
- 365 The identified long term (5-10 years) outcomes to support households have been identified as:
- Increased long term income for fuel poor households
 - Dwellings occupied by fuel poor households have lower carbon emissions
- 366 A further outcome to consider (not included in the model) is one relating to health and well-being outcome(s). Whilst, the evidence on the effects of fuel poverty is inconclusive, it may be useful to incorporate this into future fuel poverty intervention evaluations to help build the evidence base. Outcomes related to health and well-being are likely to vary depending on the household and dwelling type e.g. whether the household contains children or is an elderly household.
- 367 Outcome 3 could also be extended beyond an understanding of energy saving usage to an increase in energy saving behaviours.

Figure 54 Fuel Poverty Policies and Programmes – Outcome Mapping



7.7 Policies and Programmes to Alleviate Fuel Poverty

- 368 This report has shown that there are broad poverty issues and any policy initiative that reduces income poverty will more than likely reduce fuel poverty. However the report has suggested that there are two aspects that differentiate fuel poverty from income poverty, namely energy efficiency and fuel costs over which fuel poor households tend to have little control.
- 369 The current fuel poverty programmes in Scotland do concentrate on these two issues e.g. the Energy Assistance Package offers tariff and benefit checks (to reduce fuel costs and maximise income) and installation of relevant efficiency measures. The Home Insulation Scheme offers advice and installation of energy efficiency measures.

Climate Change and Fuel Poverty Programmes

- 370 The importance of fuel poverty targets have been noted above. However, another policy area which as a by-product may assist fuel poor households is the climate change targets at Scottish, UK and EU level. The requirement to reduce carbon emissions from the domestic sector necessitates households to improve the energy efficiency of their dwellings which should reduce the household's fuel bills. Over the last 8 years there have been numerous schemes to assist households to reduce emissions. The logic model (Figure 54) outlines many of these schemes and the likely impacts on fuel poor households.
- 371 The key EU, UK and Scottish policy and programme activities identified have been grouped together for the purpose of the logic model. A full description of programmes (as per those in Figure 54) and their associated activities and outcomes is provided in Annex D. However it must be remembered that energy is a complex area and other policies and programmes will drive change.

KEY CURRENT EU and UK POLICY

Regulation

EU product standards for lighting and appliances

EU Requirement for Energy Performance Certificates (EPC) for prospective buyers and tenants

Fabric upgrades in social housing (and potentially private housing)

Carbon Emissions Reduction Tariff (CERT) until October 2012

ECO from October 2012

Financial assistance

Winter fuel payment

Cold weather payment

Green Deal finance

<p>Social tariffs</p> <p>Renewable tariffs and loans</p> <p>Prepayment cards</p> <p>Improved bill information to help customers monitor fuel use</p> <p>SMART meters</p> <p>CURRENT SCOTTISH GOVERNMENT POLICY</p> <p>Regulation</p> <p>Building Standards for new homes and major conversion or refurbishment</p> <p>Scottish Housing Quality Standard (SHQS)</p> <p>Proposed Energy Efficiency Standard for Social Housing (consultation June 2012)</p> <p>Potential energy efficiency regulation for the domestic sector</p> <p>Fabric upgrades</p> <p>Universal Home Insulation Scheme (uHIS)</p> <p>Energy Assistance Package (EAP)</p> <p>Incentives for private landlords (LESA)</p> <p>Financial assistance</p> <p>Benefits checks through EAP</p> <p>Information</p> <p>Energy Saving Scotland Advice Centres (ESSACs) and LA-run schemes</p>

7.8 Relating Policies and Programmes to Outcomes

Outcome 1: Improving Thermal Comfort

372 There is an established evidence base on the beneficial impact of fitting basic energy efficiency measures in a home to reduce energy usage and therefore reduce fuel bills and carbon emissions⁴⁶. There is also a range of evidence on the impact of specific programmes in delivering those measures. However there are areas where there is still some uncertainty:

- Whether fuel bills actually reduce or whether households choose to take additional thermal comfort, known as '**rebound**'. For all households it is

⁴⁶ Scottish Government, 2009, Conserve and Save <http://www.scotland.gov.uk/Publications/2009/10/16124856/7> or WWF, 2009 How Low report http://assets.wwf.org.uk/downloads/how_low_report.pdf backed by considerable academic literature

usually assumed that around 15% of any saving in energy used is actually lost by households taking greater thermal comfort. For households in fuel poverty where additional heating is often required to reach an adequate level of thermal comfort, it is thought that this figure could be nearer 40%⁴⁷.

- The **cost effectiveness of upgrades**. This will be a key issue for lower income households who will not be able to invest in upgrades that do not pay back within a short timescale. Only virgin loft insulation and cavity wall insulation currently pays back within 2 years, although the vast majority of lower income and fuel poor households would be eligible to receive a wider range of measures free through the current and future supplier obligation (CERT/ECO) programmes and Scottish Government complementary programmes (EAP/UHIS). Green Deal finance may also assist in the uptake of measures by spreading payment over a number of years.
- Whether **switching central heating systems** will always lead to reduction in fuel bills. This is thought to be a problem where households currently use low levels of energy or use energy at off-peak times, then switch to a different source which places them on a different tariff structure. For example, switching from night storage heaters to an air source heat pump might not lead to reduced bills because of the switch from a night-time to a day-time tariff⁴⁸. Likewise switching from an oil fired central heating system to an air source heat pump may not lead to lower bills if the household takes increased thermal comfort or uses the system inefficiently. This may be an issue for fuel poor households who live in dwellings off the gas grid. It also emphasises the importance of providing accessible energy advice and encouraging pro-environmental behaviour.
- The **cost effectiveness of programmes**. uHIS and EAP were established to tackle fuel poverty and reduce carbon emissions and have had many positive impacts. Various reports have tended to favour local or area-based rather than centrally run programmes but there is little evidenced consensus on the optimum way forward. This is important as there will be a continued requirement to improve and streamline Scottish programmes and maximise their interaction with UK programmes.
- Around one in ten lower income households are **private tenants** which means they sometimes have less power over their energy circumstances. Landlords, because they do not live in the homes, have less incentive to make improvements leaving the tenant with large bills. There are schemes available to encourage private landlords although there is no evidence currently available on up-take. Tenants also tend to move house faster than

⁴⁷ Cambridge Econometrics, 2010, Modelling price elasticity of demand and direct rebound effects, <http://www.scotland.gov.uk/Topics/Built-Environment/Housing/supply-demand/chma/marketcontextmaterials/DEMSCOTfuelpricemodelling>

⁴⁸ Energy Savings Trust report Field trials for Heat Pumps, 2010

owners meaning that they are often ineligible for programmes (such as the Energy Assistance Package which requires residence of at least 12 months).

- Most lower income households are in the **social rented sector** where the SHQS should be ensuring moderate standards of energy efficiency. There are many examples of good practice and innovation in the sector with different forms of cladding and insulation, innovative district heating and heat pump schemes. However, half of all social rented properties still fail the social housing standard on the energy efficiency criteria, which suggests that more can be done to dwellings to cut fuel bills for these households.
- For many households the package of required cost effective measures is well known and available from various programmes; however, with **hard to treats** or expensive to treat building types, there is often no clear consensus on the technical solution required.

373 In terms of **future programme targeting**, the prevalence of fuel poverty was higher in the following dwelling types:

- Pre-1919 solid wall houses - 72% (70,000) occupied by fuel poor households could benefit from installing/ upgrading loft insulation plus solid wall insulation and 20% could benefit from installing/ upgrading loft insulation plus solid wall insulation plus a new heating system.
- Pre-1919 solid wall flats - 68% (37,000) occupied by fuel poor households could benefit from installing/ upgrading loft insulation plus solid wall insulation and 17% could benefit from an upgraded heating system
- 1954-82 houses - Despite not being difficult to treat, only 31% of the 1945-64 houses in 2010 were adequately insulated and 23% of the 1965-1982 houses leaving 160,000 inadequately insulated homes. It is quite likely that some of these dwellings will have been improved in recent years due to UK and Scottish Government insulation programmes. However, there may still be a considerable number of uninsulated homes within this category
- A final category with high level of fuel poverty prevalence was post 1982 dwellings. 80% of these homes have over 100mm of loft insulation and cavity wall insulation and 69% have a good energy rating (NHER 7 or above). Apart from loft top-ups for some homes, there appears little that can be done in terms of conventional measures to the fabric of these dwellings.

Outcome 2: Affordability – reducing fuel costs

374 These programmes focus on encouraging and supporting householders to switch utility provider and/or tariff to reduce fuel bills.

375 In Scotland the Energy Assistance Package helps households to consider switching provider or tariff to reduce their bills. However tariff structures

themselves are set by Energy Supply Companies and regulated by OFGEM. It is not a devolved responsibility⁴⁹.

- 376 **Prepayment meters** tend to be more prevalent amongst lower income households because they assist with budgeting and prevent households running up large utility debts. Information from the SHCS 2008-10 shows that 25% of the lowest three income decile households use a pre-payment meter. It was estimated by Ofgem in 2008 that households on prepayment meters could pay up to £88 more per year than those on standard meters. New rules were put in place by Ofgem such that prices charged must reflect differences in cost of provision to the utility companies. It is not yet known the impact of this on pre-payment meters.
- 377 In 2007 energy companies began to introduce a new **social tariff** for more vulnerable households. For example the British Gas website in 2011 suggested that *“the tariff will mean a vulnerable dual fuel customer with a prepayment meter can save 24.6% (an average of £285 per year). Those who pay by cash or cheque will be £245 better off each year, on average⁵⁰”*. The full impact on this change is not yet known. From 2009 to Sept 2011 55,000 households were referred from the Energy Assistance Package to utility companies with 7,800 changing to a social tariff rebate or discount and 700 changing to a cheaper payment type⁵¹.
- 378 Although energy companies are required by OFGEM to provide free or low cost **energy efficiency improvements** to lower income households (see above), this work is funded by a pro rata **increase to all fuel bills**. It is not yet clearly evidenced that the savings in fuel bills due to energy efficiency measures will always outweigh the losses due to increased bill prices for fuel poor households.
- 379 Likewise some of the programmes to improve energy measures such as the Scottish Housing Quality Standard for social housing, changes to Building Regulations for new housing and improvements to homes by private landlords may increase the **cost of the housing product**. For fuel poor households that are tenants, again it is not clearly evidenced that the savings in fuel bills due to better energy efficiency measures will always outweigh the losses that might be incurred due to increased rents.

⁴⁹ Scottish Government may be able to take a leadership/influencing role to ensure that energy providers have clear understanding of the expectations that they will provide fair and affordable pricing policies.

⁵⁰ <http://www.energychoices.co.uk/british-gas-launches-social-tariff.html>

⁵¹ <http://www.energysavingtrust.org.uk/scotland/Media/Take-action/Misc/EAP-Update-to-30-September-2011-EST-PDF>

Outcome 2: Affordability – maximising income

- 380 These measures include those that provide benefit checks and government payments to increase income. These also relate to the longer-term outcome aimed at maximising income of fuel poor households.
- 381 The Scottish Government’s Energy Assistance Package, which takes referrals from the area based Home Insulation Scheme as well as through many other agencies including the EESAC network, provides a **benefit check** for households. Programme statistics demonstrate that the programme does assist some households to increase their income by accessing the full range of benefits to which they are entitled. The latest figures (April 09 to Sept 11) suggest that around 38,000 people were referred for benefit/income assistance with 2,700 helped (Energy Savings Trust).
- 382 The UK Government also has two specific financial policies for households to help with energy bills; the **winter fuel payment and the cold weather payment**. All pensioners over 60 are granted a winter fuel payment of £250 whilst over 80s receive £400 and, in extreme winter conditions, there is an additional cold weather payment⁵².
- 383 However, there are a number of issues with the UK’s winter fuel payment when applied to households in Scotland:
- They are targeted at all older people rather than fuel poor households who may potentially be in greater need of assistance. Just over half of households in the lowest three income deciles contain a pensioner, the rest do not get any help with winter fuel costs.
 - They are received as an income rather than a voucher specifically to reduce fuel bills. Hence while raising income they may not be used in the way intended, that is to reduce fuel bills.
 - They are paid in December rather than when households receive their largest quarterly bill in March.
 - They do not take any account of regional differences in weather, so a household in Devon would receive exactly the same fuel payment as a household in Grampian with a much colder climate and longer heating season.
 - The cold weather payment is based on average temperatures whereas household fuel bills are severely influenced by wind chill effects rather than absolute temperature.

⁵² The cold weather payment is an additional £25 paid to eligible low income households when the average temperature is recorded as, or forecast to be, zero degrees Celsius or below over seven consecutive days during the period from 1 November to 31 March. Specified Meteorological Office weather stations are used to obtain this information.

- 384 There are also disbenefits from some current **policies that may improve a dwelling's energy efficiency but reduce income** for fuel poor households. The key UK policy to improve energy efficiency is the **supplier obligation** whereby energy suppliers earn carbon points for providing energy measures to homes. This policy has substantial impact to assist lower income households, of which many may be fuel poor, and who may get the measure for free; however, the picture is not simple.
- The cost of the **CERT** scheme (figures quoted vary from £38-£42 per bill per household) **increases energy bills**. Current analysis by DECC suggests that domestic retail gas prices are estimated to be 18% higher and retail electricity prices 33% higher in 2020 due to energy and climate change policies (compared to prices in 2020 without policies)⁵³.
 - **The current CERT scheme and future ECO scheme tends to use benefit eligibility as a proxy for low income**. As the report has shown in Scotland **more than half of fuel poor are not in receipt of a means tested benefits** and therefore may not qualify for assistance.
 - The average SAP in Scotland is around 8 SAP points better than in England. Carbon points are therefore often higher for measures installed in England. If climate was taken into account in carbon calculations then Scotland would probably receive a larger share of the obligation and more households would receive help.
- 385 In addition work to increase energy efficiency in the social rented and private rented sector may lead landlords to increase property rental costs which will have a detrimental impact on income for households. There is no clear evidence on this issue yet.

Outcome 3: Energy Use – improve understanding to change behaviours

- 386 These include programmes that aim to advise households so that they have a better understanding of energy usage in the home. They also relate to the longer-term outcome of reducing domestic carbon emissions.
- 387 As noted above the development of policies and programmes based on fuel poverty, layered with policies and programmes focused on carbon emissions has led to a plethora of advice and information agencies at a local, regional and national level. An independent review of energy efficiency found that the landscape for delivering advice was in need of simplification⁵⁴.
- 388 In response, the Scottish Government established the **Energy Saving Scotland** advice network, providing a '**one-stop-shop**' for advice on a range of issues, including energy efficiency, microgeneration, personal transport and fuel

⁵³ http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/markets/impacts/impacts.aspx

⁵⁴ Halcrow, 2008 Review of energy efficiency and microgeneration support in Scotland
<http://www.scotland.gov.uk/Publications/2008/05/30140737/0>

poverty through the Energy Assistance Package. The network received around £4 million from the Scottish Government for advice provision in 2009/10, and plays a key role in helping to increase Scotland's share of the supplier obligation. It uses the single Energy Saving Scotland brand which aims to help develop long-term relationships with consumers. In addition to this there is a range of locally run schemes.

- 389 There has been **no further evaluation** of how the ESSac network is settling down and whether it is now providing a clear and simple route to advice. There is some evidence that advice is generally more effective if given face to face and by a known and trusted local source. So there is a clear balance to be reached here between a suitably simple route for low income households to navigate, and an approach where households are comfortable in approaching and acting on advice given.
- 390 Research consistently reports that most people are **unaware of how much energy they use, what tariff they are on** (82% do not know this) (EST, Green Barometer 4, March 2008) **and how they can reduce their personal carbon footprint**. A literature review commissioned by Defra focuses on the effectiveness of feedback to householders, and specifically the literature on metering, billing and displays.

“Domestic energy consumption is still largely invisible to millions of users and this is a prime cause of much wastage”

(Darby, 2006, p17)

- 391 In this review, Darby distinguishes between two types of feedback:
- **direct**: energy consumption information is provided immediately at point of usage (e.g. a display monitor or ‘smart meter’), and
 - **indirect**: information is processed and issued to the user after energy use (e.g. via billing).
- 392 Approximately 85% of electricity consumers and 90% of gas consumers in the UK pay for their energy in arrears (NEA, 2004 cited in Darby, 2006). The minimum requirement for a meter reading in the UK is every 2 years, so most bills are based on estimated consumption. Most action that could influence feedback is in reserved areas.
- 393 Overall, the Defra review makes a strong case for feedback as an effective and necessary tool in reducing domestic energy consumption. It suggests that sustained behaviour change is likely to be most effective where immediate (direct) feedback e.g. via a smart meter display, is combined with frequent, accurate billing (a form of indirect feedback). The report concludes that smart metering has the potential to deliver energy savings quickly and at relatively low cost. These recommendations appear to be supported by other evidence sources which consistently report the proven effectiveness of feedback in

encouraging consumers to save energy. However more recent findings⁵⁵ show that smart meters may not be as effective in reducing energy consumption as originally envisaged.

- 394 The UK Government is requiring a programme of rolling-out smart meters across all homes in the UK as one way to try to provide households with greater feedback. This is in response to the *EU Energy End-use Efficiency and Energy Services Directive (2005)* which requires improved information for energy consumers⁵⁶. There are also efforts to improve billing information for households. Some evidence suggests that savings from direct feedback could range from 5-15%, with savings from simple (electricity) displays typically in the order of 10%. However evidence also suggests that high energy users appear to be more likely to respond to direct feedback than lower users.
- 395 However as well as people not understanding energy usage in the home they may not know how to reduce energy usage. There is evidence that many households do not know how to manage their heating, especially if they are using newer forms of heating such as heat pumps (EST, 2010).

7.9 Summary of Fuel Poverty Programmes and Future Potential

- 396 As noted above there are many schemes in place to support fuel poor households. However many schemes have been developed from the perspective of reducing carbon emissions or reducing poverty as well as assisting the fuel poor. This paper has considered these activities through the specific lens of fuel poor households and has identified several challenging areas:
- How to make carbon saving energy efficiency improvements without further driving up fuel bills, rent or other payments for lower income households.
 - How to provide a clear path to energy advice which is also accessed and trusted by lower income and/or vulnerable households.
 - How to ensure fuel poor households in Scotland are treated equitably given the climatic differences across the UK.
 - How to ensure that there are clear expectations on energy suppliers to provide fair and affordable energy prices to Scottish households

⁵⁵ Relevant articles can be found at <http://www.informaworld.com/smpp/title~content=g926280309~db=all>

⁵⁶ See Articles 11 and 13 which promote improved metering and informative billing that provide actual energy consumption and, where appropriate, comparisons of consumption with previous years and with (other) benchmarked energy users.

- How to ensure that fuel poor households understand how to operate their heating systems to provide them with adequate thermal comfort at lowest cost.
- 397 It has introduced a logic modelling approach to considering the impact of various policies and programmes but this could be more fully tailored to the various characteristics of fuel poor households and their homes.
- 398 The report has also identified several research gaps where further research would enlighten the fuel poverty debate. These include:
- thermal comfort ; what households currently consider to be adequate thermal comfort and how this behaviour could be changed
 - persistent rather than intermittent fuel poverty
 - older people’s views of the impact of interventions given that they are more likely to suggest that their home is already warm
 - impact of carbon requirements (through bills and rent increases etc.) on household disposable income
 - relationship of fuel bill tariffs to fuel poverty
 - fuel poverty and ethnicity
 - the nature and direction of the effects of fuel poverty and/or cold housing on people’s physical health
 - the nature and direction of the effects of fuel poverty and/or cold housing on people’s mental health
 - the relationship between cold homes and negative outcomes for children.

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List of Annexes

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Annex A Numerical Values for Figures in this Report

400 Included in this annex are the values from which the figures in the main body of this report are derived.

Chapter 1: What and where is fuel poverty?

Table 28 Figure 1: Percentage of Households in Fuel Poverty 1996-2010

Thousands of Household by Year										
Fuel Poverty - 5-fold indicator	1996	2002	2003/4	2004/5	2005/6	2007	2008	2009	2010	
Not Fuel Poor	1220	1728	1752	1679	1562	1519	1474	1349	1463	
Marginal Fuel Poor	239	171	165	201	209	209	239	230	236	
Fuel Poor	246	123	110	166	200	205	210	242	233	
Severe Fuel Poor	259	100	128	134	170	208	227	282	240	
Extreme Fuel Poor	159	71	111	119	173	172	182	242	185	
Total	2123	2192	2266	2299	2315	2314	2331	2344	2357	
Share of Population										
Fuel Poverty - 5-fold indicator	1996	2002	2003/4	2004/5	2005/6	2007	2008	2009	2010	
Not Fuel Poor	57%	79%	77%	73%	67%	66%	63%	58%	62%	
Marginal Fuel Poor	11%	8%	7%	9%	9%	9%	10%	10%	10%	
Fuel Poor	12%	6%	5%	7%	9%	9%	9%	10%	10%	
Severe Fuel Poor	12%	5%	6%	6%	7%	9%	10%	12%	10%	
Extreme Fuel Poor	7%	3%	5%	5%	7%	7%	8%	10%	8%	
Sample	14929	14789	2906	2911	3103	2996	2958	3291	3027	

Table 29 Figure 2: Projection of average fuel spend per income to 2015

Survey Year	Average		Sample
	FP Ratio	Standard Error	
2003/4	7.39%	0.81%	2906
2004/5	7.58%	0.67%	2911
2005/6	8.81%	0.74%	3103
2007	8.84%	0.70%	2996
2008	9.62%	0.84%	2958
2009	10.76%	0.86%	3291
2010	9.58%	0.80%	3027

Projection

Mean change 2005-2010 0.4%

Year	FP Ratio
2010	9.58%
2011	9.98%
2012	10.38%
2013	10.78%
2014	11.18%
2015	11.58%

Table 30 Figure 3: Fuel poverty rates by local authority (SHCS, 2008-10)

Local Authority Area	Number of Households (000s)					Fuel Poverty	
	Not Fuel Poor	Marginal Fuel Poor	Fuel Poor	Severe Fuel Poor	Extreme Fuel Poor	Rate	Sample
Aberdeen City	70	10	11	8	6	24%	350
Aberdeenshire	64	8	8	14	10	31%	245
Angus	29	5	6	3	6	31%	259
Argyll and Bute	22	3	3	8	5	38%	231
City of Edinburgh	144	20	18	17	17	24%	229
Clackmannanshire	17	2	2	1	1	15%	253
Dumfries and Galloway	33	7	9	9	11	42%	236
Dundee City	43	8	7	6	4	26%	237
East Ayrshire	33	5	6	6	4	29%	245
East Dunbartonshire	27	5	4	3	4	25%	239
East Lothian	27	4	4	4	3	26%	237
East Renfrewshire	22	4	3	3	3	27%	610
Eilean Siar	4	1	1	2	3	56%	311
Falkirk	48	7	5	6	4	21%	258
Fife	95	15	14	20	16	31%	426
Glasgow City	174	33	25	27	20	26%	709
Highland	51	12	14	15	9	38%	269
Inverclyde	23	5	4	4	2	26%	223
Midlothian	22	4	2	4	3	28%	270
Moray	22	4	3	4	6	34%	250
North Ayrshire	37	6	6	7	6	31%	259
North Lanarkshire	93	15	15	15	8	26%	381
Orkney Islands	3	1	1	2	2	49%	264
Perth and Kinross	36	6	7	10	6	36%	245
Renfrewshire	57	8	7	6	3	19%	275
Scottish Borders	28	5	5	6	8	36%	234
Shetland Islands	5	1	1	1	2	38%	230
South Ayrshire	31	6	7	5	4	29%	235
South Lanarkshire	75	10	15	18	17	37%	338
Stirling	23	3	4	4	3	29%	229
West Dunbartonshire	27	6	3	4	2	20%	246
West Lothian	45	6	8	8	7	31%	253
Scotland	1428	235	228	250	203	29%	9276

Table 31 Figure 5: Fuel poverty, income poverty, energy efficiency and fuel prices, 2003 – 2010

Survey Year	Number of Households (000s)				Index (1996 = 100)	
	Fuel Poor	Low Income	Inefficient (Rated E, F or G)	Low income and inefficient	Fuel Price	Median Income
2003/4	350	535	858	201	86	155
2004/5	418	550	809	187	94	157
2005/6	543	551	724	160	121	163
2007	586	593	708	171	123	175
2008	618	581	675	150	139	176
2009	766	562	642	128	159	178
2010	658	494	446	96	149	176

Table 32 Figure 7: Indexed increase in fuel costs and household income 2003/4 to 2010

Year	Running Costs Index		Income Index	
	Mean	(2003 = 100)	Mean	(2003 = 100)
2003/4	£867	100.0	£19,674	100
2004/5	£977	112.7	£19,929	101.3
2005/6	£1,162	134.1	£20,987	106.7
2007	£1,251	144.4	£22,436	114.0
2008	£1,359	156.7	£22,758	115.7
2009	£1,590	183.4	£23,343	118.6
2010	£1,402	161.7	£23,327	118.6

Table 33 Figure 8: Rate of fuel poverty within income decile groups

Households per Year (000s)								
Household Income	2003/4	2004/5	2005/6	2007	2008	2009	2010	
Lowest 10%	156	170	206	198	203	221	214	
10-20%	80	97	119	148	151	173	175	
20-30%	41	48	84	89	99	117	97	
30-40%	36	25	48	57	54	85	71	
Median Group	16	40	55	60	62	94	62	
Top 40%	5	19	29	30	45	69	33	
Share of Fuel Poor								
Household Income	2003/4	2004/5	2005/6	2007	2008	2009	2010	
Lowest 10%	82%	81%	90%	86%	97%	96%	96%	
10-20%	37%	44%	52%	64%	65%	74%	74%	
20-30%	19%	22%	36%	39%	42%	51%	42%	
30-40%	16%	11%	21%	25%	23%	36%	28%	
Median Group	4%	9%	12%	13%	13%	20%	14%	
Top 40%	1%	2%	3%	3%	5%	7%	3%	

Table 34 Figure 9: Fuel poverty by income and energy efficiency

		Fuel Poor		
		No (000s)	Yes (000s)	Rate
Low Income	No	1547	261	14%
	Yes	116	420	78%
NHER	<5	193	195	50%
	5+	1471	486	25%

Chapter 2: The Effects of Fuel Poverty

Table 35 Figure 10: Percentage of households with any respiratory illness by Fuel Poverty, Energy Efficiency and Tenure (SHCS, 2008-10)

		Respiratory Illness				Total	Sample	Row CI
		No		Yes				
		000s	Row %	000s	Row %			
Energy Efficiency Rating	EFG	524	89%	64	11%	588	2639	1.2%
	A - D	1506	86%	250	14%	1756	6764	0.9%
	Total	2030	87%	314	13%	2344	9403	
Fuel Poor	No	1429	86%	235	14%	1663	6461	0.9%
	Yes	600	88%	81	12%	681	2815	1.1%
	Total	2028	87%	316	13%	2344	9276	
Tenure	Private	1520	89%	181	11%	1700	6965	0.8%
	Social	510	79%	134	21%	644	2511	1.5%
	Total	2030	87%	314	13%	2344	9476	

Table 36 Figure 11: Percentage of households with child(ren) with respiratory problems

		Respiratory Illness in Children				Total	Sample	Row CI
		No		Yes				
		000s	Row %	000s	Row %			
Energy Efficiency Rating	EFG	564	95.9%	24	4.1%	588	2639	1.9%
	A - D	1673	95.2%	83	4.8%	1756	6764	1.1%
	Total	2237	95.4%	108	4.6%	2344	8964	
Fuel Poor	No	1570	94.4%	93	5.6%	1663	6461	1.0%
	Yes	665	97.6%	16	2.4%	681	2815	1.7%
	Total	2235	95.3%	109	4.7%	2344	8837	
Tenure	Private	1628	95.7%	72	4.3%	1700	6965	1.1%
	Social	608	94.5%	36	5.5%	644	2511	1.9%
	Total	2236	95.4%	108	4.6%	2344	9033	

Table 37 Figure 14: Fuel payment types by income group

Income Decile Group	Direct Debits			Pre-payment meter			Sample
	No (000s)	Yes (000s)	Yes %	No (000s)	Yes (000s)	Yes %	
Bottom 10%	149	84	36%	176	57	24%	893
2	150	82	35%	177	55	24%	917
3	133	100	43%	173	60	26%	944
4	133	106	44%	184	55	23%	973
5	114	115	50%	181	49	21%	926
6	106	124	54%	184	45	20%	913
7	97	136	59%	191	42	18%	952
8	82	150	65%	209	24	10%	978
9	74	159	68%	217	16	7%	967
Top 10%	60	171	74%	225	6	2%	939
Total	1099	1226	53%	1918	407	18%	9402

Table 38 Figure 15: "Cold housing health issues" and Income Poverty

Health Problem	Not Income Poor			Income Poor		
	000s	%	CI	000s	%	CI
Any respiratory problems	245	13.7%	0.8%	68	12.6%	1.5%
Adult Respiratory Problems	162	9.1%	0.7%	62	11.4%	1.3%
Arthritis	163	9.1%	0.7%	71	13.2%	1.5%
Heart, blood pressure or circulation problems?	187	10.5%	0.7%	76	14.0%	1.5%
Mental health problem?	63	3.5%	0.5%	32	5.9%	0.9%
Total/Sample	1784	7279		542	2123	

Chapter 3: Fuel Poor Households and Their Homes

Table 39 Figure 17: Fuel Poverty by Household Type

	Fuel Poor Household Types	
	000s	% of the Fuel Poor
Single adult	114	17%
Small adult	64	9%
Large adult	45	7%
Single parent	32	5%
Small family	26	4%
Large family	20	3%
Older smaller	160	23%
Single pensioner	221	32%
Total Fuel Poor	681	100%
Sample	9276	

Table 40 Figure 18: Fuel Poverty by Householder Age and Income

Age of oldest occupant	% Fuel Poor	Average Income (£k)
16-25	31%	£14.7
25-34	14%	£24.8
35-49	16%	£30.0
50-59	21%	£27.2
60-74	43%	£18.0
75-84	55%	£14.1
85+	58%	£12.2

Table 41 Figure 19: Fuel poverty among the long-term sick or disabled

Fuel Poverty	Long-term sick or disabled				Scotland	
	No (000s, %)		Yes (000s, %)			
Not Fuel Poor	1136	74%	528	64%	1663	71%
Fuel Poor	267	18%	211	26%	478	20%
Extreme Fuel Poor	123	8%	80	10%	203	9%
Total	1526	100%	819	100%	2344	100%
Sample	6050		3226		9276	

Table 42 Figure 20: Economically inactive fuel poor by household type

Households Types	Economically Inactive Fuel Poor		
	000s	%	Sample
Single Adult	70	14.2%	264
Multiple Adults	40	8.1%	146
Households with Children	31	6.2%	117
Single Pensioners	214	43.1%	879
Multiple Pensioners	141	28.5%	616
Total Economically Inactive Fuel Poor	496	100%	2022

Table 43 Figure 21: Low income households by fuel poverty

Of Low Income Households		Fuel Poor		
		%	No (000s)	Yes (000s)
Low NHER (0-3)	No	78%	117	403
	Yes	100%	0	18
Single Person Household	No	80%	82	328
	Yes	73%	35	96
Owns Outright	No	70%	108	251
	Yes	95%	10	173
Underoccupied	No	73%	109	303
	Yes	94%	8	121
Rural	urban	76%	110	355
	rural	90%	8	69
Low Income Total		78%	118	424

Table 44 Figure 22: Fuel poverty by NHER band

NHER Band	Fuel Poor			
	Not (000s)	Poor (000s)	% of Not	% of Poor
Poor	26	46	2%	7%
Moderate	603	361	36%	53%
Good	1023	269	62%	40%
Total, Sample	1653	677	6461	2815

Table 45 Figure 23: Average NHER by Dwelling Type and Age

Type of dwelling	NHER		Sample
	Mean NHER	Std Error	
<i>detached</i>	5.45	0.04	2294
<i>semi</i>	6.02	0.04	2138
<i>terrace</i>	6.79	0.04	2057
<i>tenement</i>	7.19	0.05	1719
<i>4-in-a-block</i>	7.19	0.06	866
<i>tower/slab</i>	7.17	0.14	193
<i>flat conversion</i>	5.70	0.17	136
Total	6.47	0.02	9403

Age of dwelling	NHER		Sample
	Mean NHER	Std Error	
<i>pre-1919</i>	5.30	0.05	1678
<i>1919-1944</i>	6.28	0.06	1278
<i>1945-1964</i>	6.56	0.04	2251
<i>1965-1982</i>	6.50	0.04	2193
<i>post-1982</i>	7.50	0.03	2003
Total	6.47	0.02	9403

Table 46 Figure 24: Extreme Fuel Poverty by dwelling and household type

		Not Extreme FP		Extreme FP		Scotland	
		000s	Col %	000s	Col %	000s	Col %
Urban/Rural	<i>urban</i>	1804	84%	139	68%	1943	83%
	<i>rural</i>	336	16%	65	32%	401	17%
Age of dwelling	<i>pre-1919</i>	380	18%	66	33%	446	19%
	<i>1919-1944</i>	288	13%	30	15%	318	14%
	<i>1945-1964</i>	492	23%	43	21%	535	23%
	<i>1965-1982</i>	500	23%	41	20%	541	23%
	<i>post-1982</i>	481	22%	23	11%	504	22%
Household type	<i>Single adult</i>	320	15%	34	17%	354	15%
	<i>Small adult</i>	402	19%	15	7%	416	18%
	<i>Single parent</i>	112	5%	3	1%	115	5%
	<i>Small family</i>	310	14%	7	3%	317	14%
	<i>Large family</i>	148	7%	6	3%	153	7%
	<i>Large adult</i>	220	10%	13	6%	233	10%
	<i>Older smaller</i>	334	16%	53	26%	386	16%
	<i>Single pensioner</i>	297	14%	73	36%	370	16%
Long-term Sick or Disabled	<i>No</i>	1778	83%	178	88%	1956	83%
	<i>Yes</i>	363	17%	25	12%	389	17%
Under-occupied	<i>No</i>	1549	72%	107	53%	1656	71%
	<i>Yes</i>	593	28%	96	47%	689	29%
Tenure	<i>Owned - outright</i>	544	25%	124	61%	668	28%
	<i>Owned - mortgage</i>	775	36%	22	11%	798	34%
	<i>LA/SH/NT/Other public</i>	340	16%	20	10%	360	15%
	<i>Housing association</i>	268	12%	16	8%	284	12%
	<i>PRS</i>	213	10%	22	11%	235	10%
Type of dwelling	<i>detached</i>	412	19%	73	36%	485	21%
	<i>semi</i>	454	21%	40	20%	495	21%
	<i>terrace</i>	476	22%	35	17%	511	22%
	<i>tenement</i>	506	24%	34	17%	539	23%
	<i>4-in-a-block</i>	209	10%	13	6%	222	9%
	<i>tower/slab</i>	56	3%	3	1%	58	2%
	<i>flat conversion</i>	29	1%	5	3%	34	1%
Low Income	<i>No</i>	1761	83%	32	16%	1794	77%
	<i>Yes (<60% national median)</i>	363	17%	169	84%	532	23%
NHER band	<i>Poor</i>	48	2%	24	12%	72	3%
	<i>Moderate</i>	842	40%	120	60%	963	41%
	<i>Good</i>	1233	58%	57	28%	1290	55%
Sample			8384		892		9276

Chapter 4: Fuel Poverty, Income Poverty and Energy Behaviour

Table 47 Figure 26: Extent of fuel poverty by Fuel and Income Poverty group

Fuel Poverty Category	Fuel poor and income poor		Fuel poor, not income poor		Income poor, not fuel poor		Neither income nor fuel poor		Total	
	000s	Col %	000s	Col %	000s	Col %	000s	Col %	000s	Col %
Not Fuel Poor					53	46%	1375	89%	1428	60.9%
Marginal Fuel Poor					63	54%	172	11%	235	10.0%
Fuel Poor	98	23%	131	50%					229	9.7%
Severe Fuel Poor	152	36%	98	37%					250	10.7%
Extreme Fuel Poor	170	41%	33	13%					203	8.7%
Total	420	100%	262	100%	116	100%	1547	100%	2345	100%
Sample		1636		1179		419		6042		9276

Table 48 Figure 27: NHER band by Income and Fuel Poverty

			NHER Band			Total	Sample
			Poor	Moderate	Good		
Income Poor	No	000s	54	753	965	1772	
		Row %	3%	42%	54%	100%	2815
	Yes	000s	18	203	317	538	
		Row %	3%	38%	59%	100%	6461
Fuel Poor	No	000s	26	603	1023	1653	
		Row %	2%	36%	62%	100%	2815
	Yes	000s	46	361	269	677	
		Row %	7%	53%	40%	100%	6461

Table 49 Figure 28: Average NHER by tenure

Tenure	NHER	Std Error	Cases
Owned Outright	5.73	0.04	2866
Mortgaged	6.29	0.03	3167
LA	6.90	0.04	1413
HA	7.16	0.06	1078
Private Rented	5.77	0.08	879
Scotland	6.26	0.02	9403

Table 50 Figure 29: Energy efficiency profile of income and fuel poor groups

NHER			Fuel poor and income poor	Fuel poor, not income poor	Income poor, not fuel poor	Neither income nor fuel poor	Total	Sample
			000s	000s	000s	000s		
0-1	000s		5	10	0	8	23	
	Row %		23%	43%	0%	34%		118
2	000s		13	19	0	18	50	
	Row %		26%	37%	0%	37%		270
3	000s		26	35	1	52	116	
	Row %		23%	31%	1%	45%		541
4	000s		36	51	2	110	199	
	Row %		18%	26%	1%	55%		893
5	000s		50	52	5	178	285	
	Row %		18%	18%	2%	62%		1240
6	000s		70	43	11	246	371	
	Row %		19%	12%	3%	66%		1478
7	000s		91	33	18	342	484	
	Row %		19%	7%	4%	71%		1831
8	000s		81	15	38	387	522	
	Row %		16%	3%	7%	74%		1902
9	000s		41	3	31	174	250	
	Row %		17%	1%	13%	70%		856
10	000s		6	0	9	31	45	
	Row %		13%	0%	19%	68%		147
Total	000s		420	261	116	1547	2344	
	Row %		18%	11%	5%	66%		9276

Table 51 Figure 30: Household types by Fuel and Income Poverty

		Fuel Poor		Income Poor	
		No	Yes	No	Yes
Adults	000s	773	223	787	208
	Col %	46%	33%	44%	38%
with Children	000s	514	78	536	51
	Col %	31%	11%	30%	9%
Pensioners	000s	377	380	475	287
	Col %	23%	56%	26%	53%
Total	000s	1664	681	1798	546
Sample		6461	2815	7279	2123

Table 52 Figure 31: Tenure share of fuel and income poverty combined groups

Tenure Group		Income and Fuel Poverty Combined Group				Scotland
		Fuel poor, not income poor	Fuel poor and income poor	Income poor, not fuel poor	Neither income nor fuel poor	
Owned	000s	157	167	9	316	650
	Col %	61%	41%	8%	21%	28%
Mortgage	000s	48	37	5	700	790
	Col %	19%	9%	4%	46%	34%
Social Housing	000s	31	166	87	350	634
	Col %	12%	40%	76%	23%	28%
Private Rented	000s	21	40	13	150	224
	Col %	8%	10%	12%	10%	10%
Total		256	411	114	1515	2297
Sample		1636	1179	419	6042	9276

Table 53 Figure 32: Modelled and actual energy running costs by fuel and income poverty

		Average Fuel Spend	
		Modelled	Reported
Fuel Poor	Not	£1,241	£1,209
	Yes	£1,749	£1,220
Income Poor	Not	£1,429	£1,259
	Yes	£1,257	£1,053
Scotland		£1,389	£1,211

Table 54 Figure 33: Difference between actual and modelled energy running costs by fuel and income poverty combined groupings

Fuel and Income Poor Combined Groups	Average Fuel Spend	
	Modelled	Reported
Fuel poor, not income poor	£2,356	£1,444
Fuel poor and income poor	£1,370	£1,080
Neither income nor fuel poor	£1,272	£1,227
Income poor, not fuel poor	£826	£960
Scotland	£1,388	£1,212

Table 55 Figure 34: Rate and level of under-occupancy among income and fuel poor groups

Bedroom Standard Occupancy Level	Fuel and Income Poor Combined Groups								Scotland	
	Fuel poor and income poor		Fuel poor, not income poor		Income poor, not fuel poor		Neither income nor fuel poor			
	000s	Col%	000s	Col%	000s	Col%	000s	Col%	000s	Col%
3 or more bedrooms above	26	6%	53	21%	1	1%	105	7%	185	8%
2 bedrooms above	91	22%	87	34%	6	6%	307	20%	492	21%
1 bedroom above	162	39%	79	31%	32	28%	569	38%	841	37%
Compliance with standard	128	31%	32	12%	72	63%	481	32%	712	31%
Below standard	4	1%	5	2%	3	2%	53	4%	65	3%
Total	411	100%	256	100%	114	100%	1515	100%	2297	100%
Sample	1636		1179		419		6042		9276	

Table 56 Figure 35: Modelled and actual fuel costs by NHER

NHER	Modelled Costs		Reported Spend	
	Mean	Std Error	Mean	Std Error
0-1	£3,179	£193	£1,402	£74
2	£2,702	£92	£1,507	£44
3	£2,426	£57	£1,481	£32
4	£1,998	£31	£1,367	£21
5	£1,687	£21	£1,328	£18
6	£1,391	£14	£1,215	£15
7	£1,212	£10	£1,158	£12
8	£1,035	£7	£1,157	£12
9	£849	£8	£1,023	£17
10	£668	£10	£862	£32
Overall	£1,387	£9	£1,211	£6

Table 57 Figure 36: Distribution of Heating Hours per Room per Week

	000s	Sample	Col %
0-20	65	246	27%
20-40	63	295	26%
40-60	44	212	18%
60-80	30	142	13%
80-100	9	62	4%
100-120	9	45	4%
120-140	5	25	2%
140-167	6	42	3%
Always on	10	64	4%
Total	241	1,133	100%
Missing	2,103	8,343	

Table 58 Figure 37: Modelled and surveyed heating hours per week

Fuel and Income Poverty Combined Groups	Average Winter Heating Hours per Room per Week	
	Modelled	Surveyed
Fuel poor and income poor	104	48
Fuel poor, not income poor	102	58
Income poor, not fuel poor	101	45
Neither income nor fuel poor	91	49
National Average	95	50
Sample	9276	1083

Table 59 Figure 38: Vulnerable groups: modelled and surveyed heating hours

Vulnerable group categories	Average Winter Heating	
	Modelled	Surveyed
Over 60s	112	58
Over 75s	112	57
Long term sick	112	47
At home or child under 5	77	55
Non vulnerable group	77	43
Total	95	50
Sample	9276	1083

Table 60 Figure 39: Monitoring of energy use by fuel and income poverty combined grouping

		es4a To what extent do you monitor your use of energy in your property?					Total
		Very closely	Fairly closely	Not very	Not at all	Don't know	
Fuel poor and income poor	000s	49	123	92	143	4	411
	Row %	12%	30%	22%	35%	1%	100%
Fuel poor, not income poor	000s	41	96	54	65	-	256
	Row %	16%	37%	21%	25%	-	100%
Income poor, not fuel poor	000s	19	33	24	38	0	114
	Row %	17%	29%	21%	33%	0%	100%
Neither income nor fuel poor	000s	171	529	378	433	4	1515
	Row %	11%	35%	25%	29%	0%	100%
Overall	000s	279	782	548	680	8	2297
	Row %	12%	34%	24%	30%	0%	100%

Table 61 Figure 40: Fuel and/or Income Poverty

	Population 000s	Of the Subjectively Fuel Poor			Subjectively Fuel Poor of Fuel and Income Groups		
		Col %	Col Cl	Sample	Row %	Row Cl	Sample
Fuel poor and income poor	37	26%	3.5%	158	9%	1.5%	1636
Fuel poor, not income poor	18	13%	2.9%	96	7%	1.2%	1179
Income poor, not fuel poor	12	8%	2.4%	45	11%	2.9%	419
Neither income nor fuel poor	77	53%	4.0%	315	5%	0.6%	6042
Total	144	100%		614	6%	0.5%	9276

Chapter 6: Alternative Approaches to Measuring Fuel Poverty

Table 62 Figure 46: Percentage of fuel poor households in Scotland as defined by the current definition and the 6 proposed options in the Hills Review (interim report)

Fuel Poverty Definition	Fuel Poor by Year							
	2003-04	2004-05	2005-06	2007	2008	2009	2010	
Current Def.	000s	350	418	543	586	618	766	658
	%	15%	18%	23%	25%	27%	33%	28%
Hills A	000s	485	597	737	790	849	994	860
	%	21%	26%	32%	34%	36%	42%	36%
Hills B	000s	427	415	461	461	457	467	437
	%	18%	17%	20%	20%	19%	20%	18%
Hills C	000s	379	438	569	636	667	835	707
	%	17%	19%	25%	27%	29%	36%	30%
Hills D	000s	669	675	687	674	702	667	626
	%	30%	29%	30%	29%	30%	28%	27%
Hills E	000s	286	283	274	303	271	259	262
	%	13%	12%	12%	13%	12%	11%	11%
Hills F	000s	74	98	68	139	148	134	160
	%	3%	4%	3%	6%	6%	6%	7%
Hills Conclusion	000s	309	285	288	298	287	311	300
	%	14%	12%	12%	13%	12%	13%	13%

Table 63 Figure 47: Temperature dependence of fuel poverty

Base Model Temperature (°C)	Households Fuel Poor (000s)	Fuel Poverty Rate
12	248	11%
13	280	12%
14	315	13%
15	358	15%
16	401	17%
17	439	19%
18	500	21%
19	533	23%
20	594	25%
21	650	28%

Table 64 Figure 48: Fuel poverty rate by income decile group

Income Decile	Fuel Poor	
	000s	%
Lowest 10%	213	96%
20%	166	75%
30%	105	47%
40%	70	32%
50%	46	21%
60%	27	12%
70%	20	9%
80%	17	8%
90%	8	4%
Top 10%	3	2%

Table 65 Figure 49: Regimes for including additional adults in household income

Additional Adults	Current Recorded Household Income	SHCS Age-Based	SHCS Age-based, not HIH	SHCS Employment-based, not HIH	SHS Median	DWP Mean
0	£17,120	£17,120	£17,120	£17,128	£17,120	£17,120
1	£20,872	£34,720	£34,354	£31,600	£45,511	£40,761
2	£22,610	£50,762	£49,240	£46,865	£71,888	£62,389
3	£26,000	£63,528	£62,116	£56,108	£99,917	£85,668
4	£16,000	£70,484	£67,780	£63,438	£114,557	£95,558
5	£3,500	£63,600	£21,000	£21,000	£126,696	£102,947
National Median	£18,088	£21,600	£20,790	£20,400	£22,364	£22,272

Table 66 Figure 50: Fuel poverty rates including additional incomes

Fuel Poverty Rate by Additional Adults Method	Fuel Poor Households (000s)	Fuel Poverty Rate
SHS Median Income	576	24.6%
DWP Median Income	578	24.6%
Age-group Based	601	25.6%
Economic Activity Based	606	25.8%
Current Fuel Poverty Rate	681	29.1%

Table 67 *Figure 51: Fuel Poverty under Alternative Heating Models*

Model Variant	Fuel Poverty	
	000s	%
Current Measure	658	27.9%
P60 Standard	585	24.8%
P65 Standard	563	23.9%
P65 Frail	576	24.5%
P65 Underocc	531	22.5%
P67 Standard	563	23.9%
P67 Frail	576	24.5%
P67 Underocc	531	22.5%

Table 68 *Figure 52: Number of Fuel Poor by Heating Regime Model*

Model Variant	Fuel Poverty Rate by Household Type								Total
	single adult	small adult	single parent	small family	large family	large adult	older smaller	single pensioner	
Current Measure	35.1%	15.0%	30.5%	6.5%	6.8%	19.5%	40.3%	56.0%	27.9%
P60 Standard	35.0%	14.6%	30.5%	6.5%	6.8%	18.1%	31.9%	46.1%	24.8%
P65 Standard	32.4%	16.0%	26.1%	6.8%	8.3%	18.2%	31.7%	46.6%	23.9%
P65 Frail	32.4%	16.0%	26.1%	6.8%	8.3%	18.2%	33.7%	48.9%	24.5%
P65 Underocc	30.5%	13.7%	26.1%	6.8%	7.2%	17.8%	28.7%	46.8%	22.5%
P67 Standard	33.2%	16.2%	26.1%	6.8%	8.3%	18.2%	33.6%	46.6%	23.9%
P67 Frail	33.2%	16.2%	26.1%	6.8%	8.3%	18.2%	35.9%	49.1%	24.5%
P67 Underocc	31.2%	13.8%	26.1%	6.8%	7.2%	17.8%	30.7%	47.0%	22.5%

Table 69 *Figure 53: Fuel poverty rate: Demographic effect of including WFP as a cost reduction*

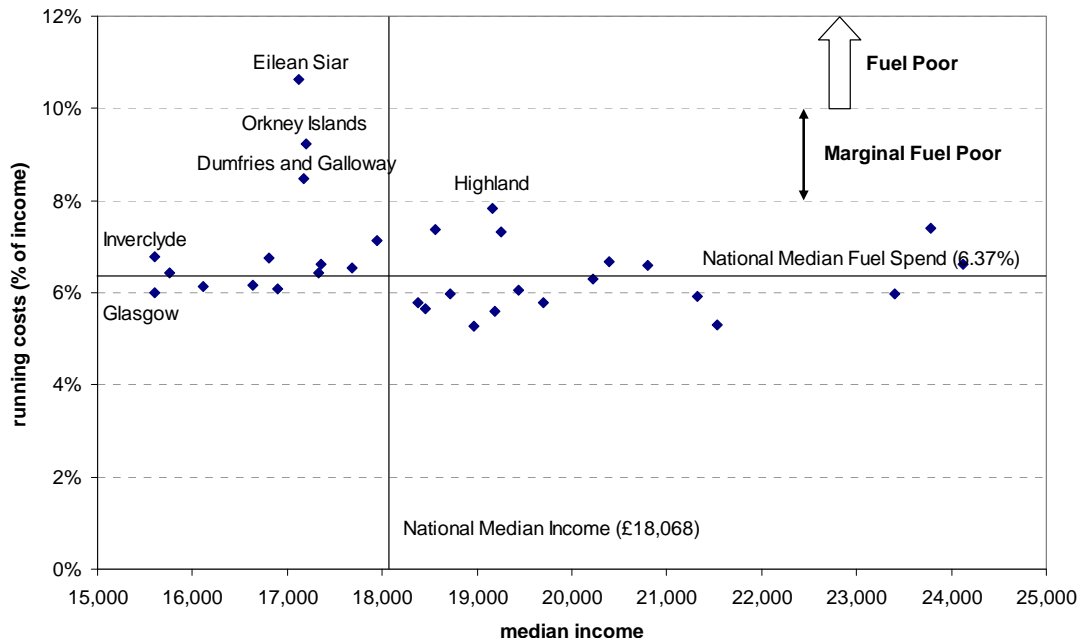
Household Type	Current Fuel Poor		With Winter Fuel Payment Modification	
	000s	%	000s	%
Single adult	114	32%	111	32%
Small adult	64	15%	62	15%
Single parent	32	28%	32	28%
Small family	26	8%	25	8%
Large family	20	13%	20	13%
Large adult	45	20%	41	18%
Older smaller	160	41%	131	34%
Single pensioner	221	59%	167	45%
Overall	681	29%	590	25%

Figure 1

Annex B The Distribution of Fuel poverty at Local Authority Level

- Figure 55 shows the median income and median spend on fuel costs (as a proportion of income). A typical household – who has median income and has median spend on fuel costs – in the Western Isles is classed as fuel poor, whilst a typical household in the Orkney Islands and Dumfries and Galloway are classed as marginal fuel poor.
- Although the typical household in Highland has an income higher than the national median, it is the most likely to fall into marginal fuel poverty. A typical household in Glasgow and Inverclyde has the lowest income compared to other local authorities but they are at lower risk of falling into near fuel poverty than households in Highland, as they spend a lower percentage of income on fuel costs.

Figure 55 Median income and median spend on fuel costs by local authority



- Figure 56 illustrates similar information as Figure 55 but examines the percentage difference between the median income and median spend in each local authority compared to the national medians.
- There are 10 local authorities who have a median income below the national median and a median fuel spend higher than the national median. They are the local authorities with the blue bars on the left of the zero line and pink bars on the right of the zero line. Households in these local authorities are probably more likely to be fuel poor under the national context. On the other hand, there are 11 local authorities with a median income above the national median and a median fuel spend below the national median (blue bars on the right of the zero line and pink bars on the left of the zero line). These local authorities are probably the least likely to be fuel poor under the national context.

Figure 56 Comparison of local authorities' and national median income and median spend on fuel costs

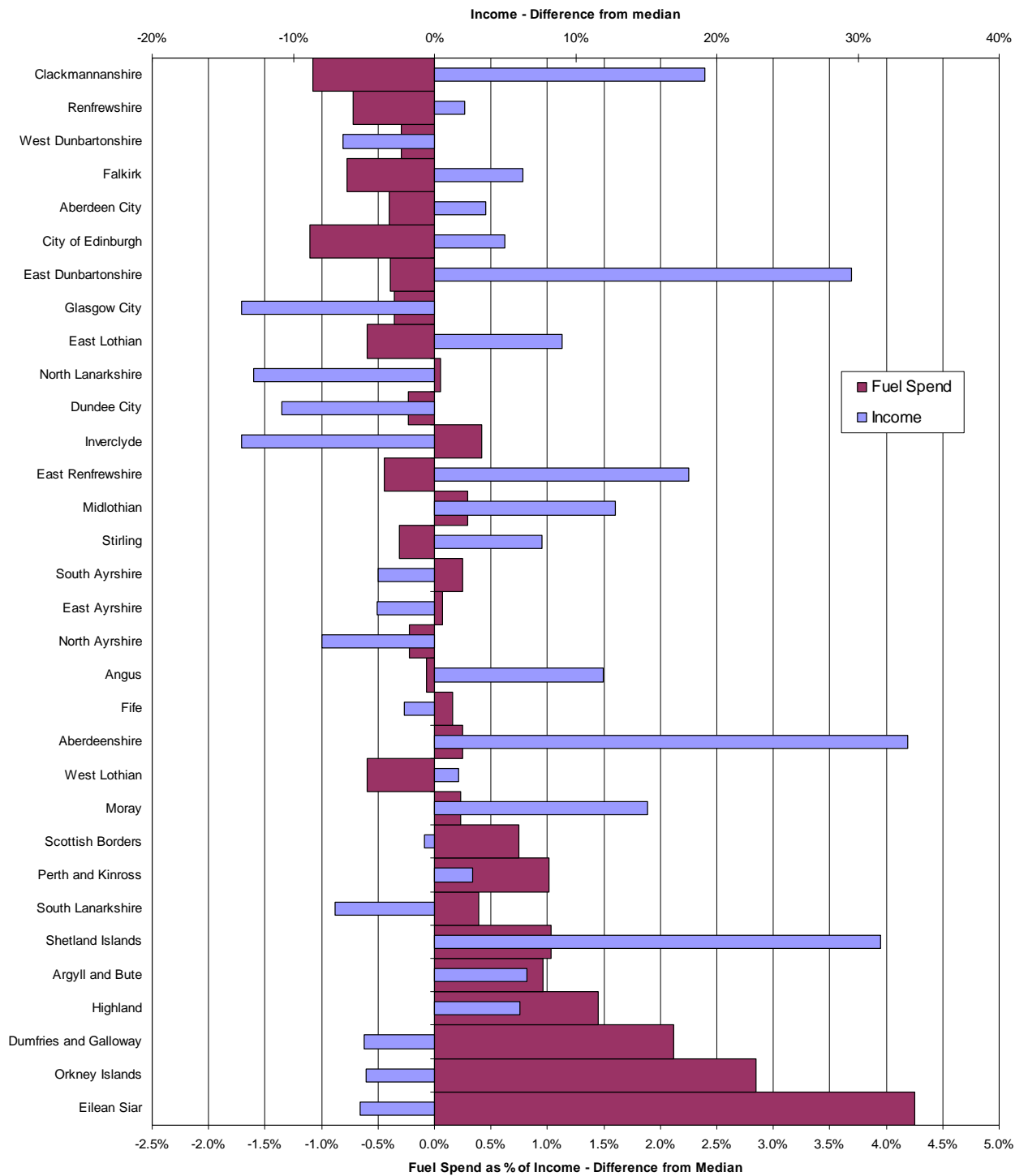


Table 70 *Local authorities by difference from national median income and national median fuel spend*

<i>Local Authorities with low income and high proportion of fuel spend</i>	<i>Local Authorities with high income and high proportion on fuel spend</i>	<i>Local Authorities with low income and low proportion on fuel spend</i>	<i>Local Authorities with high income and low proportion on fuel spend</i>
Dumfries & Galloway	Aberdeenshire	Dundee City	Aberdeen City
East Ayrshire	Argyll and Bute	Glasgow City	Angus
Eilean Siar	Highland	North Ayrshire	Clackmannanshire
Fife	Midlothian	West Dunbartonshire	East Dunbartonshire
Inverclyde	Moray		East Lothian
North Lanarkshire	Perth and Kinross		East Renfrewshire
Orkney Islands	Shetland Islands		City of Edinburgh
Scottish Borders			Falkirk
South Ayrshire			Renfrewshire
South Lanarkshire			Stirling
			West Lothian

Annex C Hills Review’s Fuel Poverty Measurements and their Implications for Scotland

401 This annex contains a more in-depth analysis of the 6 alternative fuel poverty definitions provided in Hills’ interim report.

Option A: A fuel poverty ratio with income measured after housing costs

402 This option helps to reflect affordability more accurately as income needed to cover housing costs cannot be spent on heating and powering the homes. However it inherits many of the weaknesses of the current indicator and becomes even more sensitive to low reporting incomes.

403 Using the income after housing costs for fuel poverty ratio would increase the percentage of fuel poor households in Scotland to 36 per cent in 2010, compared to the 28% using the current indicator.

Table 71 *Percentage of Scottish household in fuel poverty using Hills Review Option A*

<i>Year</i>	<i>Current Indicator</i>	<i>Option A Indicator</i>
2003-2004	15%	21%
2004-2005	18%	26%
2005-2006	24%	32%
2007	25%	34%
2008	27%	36%
2009	33%	42%
2010	28%	36%

404 The Hills Review found that areas with high housing costs, such as London, became more subjective to fuel poverty. Table 72 below illustrates the extent of fuel poverty using income after housing costs and the variation of housing costs in different local authorities. The calculation for this option also requires accurate recording of housing costs, such as separating the mortgage interests and repayment for homeowners when comparing housing costs to that of renters.

Table 72 Fuel poverty using Hills Review Option A with housing cost details

	Current Indicator	Hills A	% Change	Median Housing Costs	Median Income	Ratio of Housing Costs to Income
Aberdeen City	24%	35%	12%	£2,784	£18,720	15%
Aberdeenshire	31%	38%	7%	£2,400	£24,120	10%
Angus	31%	39%	8%	£2,340	£20,228	12%
Argyll and Bute	38%	47%	9%	£2,280	£19,250	12%
Clackmannanshire	15%	26%	11%	£2,760	£21,532	13%
Dumfries and Galloway	42%	46%	4%	£1,924	£17,170	11%
Dundee City	26%	42%	16%	£2,704	£16,110	17%
East Ayrshire	29%	35%	5%	£2,756	£17,336	16%
East Dunbartonshire	25%	33%	8%	£1,440	£23,400	6%
East Lothian	26%	36%	10%	£2,400	£19,700	12%
East Renfrewshire	27%	40%	13%	£2,268	£21,320	11%
City of Edinburgh	24%	33%	9%	£2,880	£18,972	15%
Eilean Siar	56%	63%	7%	n/a	£17,116	0%
Falkirk	21%	30%	9%	£2,520	£19,195	13%
Fife	31%	42%	10%	£2,184	£17,680	12%
Glasgow City	26%	39%	13%	£3,000	£15,600	19%
Highland	38%	48%	10%	£2,640	£19,160	14%
Inverclyde	26%	40%	14%	£2,772	£15,600	18%
Midlothian	28%	37%	9%	£2,236	£20,388	11%
Moray	34%	41%	8%	£1,860	£20,800	9%
North Ayrshire	31%	42%	11%	£2,400	£16,630	14%
North Lanarkshire	26%	34%	8%	£2,640	£15,754	17%
Orkney Islands	49%	57%	8%	n/a	£17,198	0%
Perth and Kinross	36%	41%	5%	£624	£18,562	3%
Renfrewshire	19%	30%	10%	£3,120	£18,450	17%
Scottish Borders	36%	42%	6%	£1,768	£17,940	10%
Shetland Islands	38%	43%	4%	n/a	£23,777	0%
South Ayrshire	29%	37%	7%	£1,560	£17,350	9%
South Lanarkshire	37%	43%	6%	£2,400	£16,800	14%
Stirling	29%	40%	11%	£2,520	£19,440	13%
West Dunbartonshire	20%	30%	9%	£2,652	£16,900	16%
West Lothian	31%	37%	6%	£2,880	£18,382	16%
Scotland	29%	38%	9%	£2,600	£18,068	14%

Note: No median housing costs are available for Eilean Siar, Orkney Islands and Shetland Islands, as more than 50% of the households in the local authorities are outright owners or households living rent free, thus no housing costs.

Top five under the headings of “Percentage Difference”, “Median Housing Costs” and “Ratio of Housing Costs to Household Income” have been highlighted for comparison.

SHCS 2008-2010

- 405 The review stated that if income after housing costs is used to calculate the fuel poverty ratio, people living in areas with high housing costs will become more subjective to fuel poverty. However Table 72 above shows that areas with the highest housing costs do not always have the highest percentage increase in fuel poverty when changing the definition to use income after housing costs. One of the possible reasons is that people living in areas with high housing costs may also have high household incomes and may spend similar proportion of their incomes on fuel as their counterparts in areas with low housing costs. When we compare the ratio of housing cost to household income across the local authorities, once again, areas with the highest ratio do not always have the highest percentage increase in fuel poverty when changing the definition to use income after housing costs.

Option B: A fuel poverty ratio with a dynamic threshold based on twice median spending

- 406 This option uses a dynamic threshold which is equal to twice the median fuel spending in the period concerned, instead of the 10% which was twice of the median fuel spending in 1988.
- 407 This option follows the same logic as the current indicator but is less sensitive to large shifts in energy prices. The relatively stable trend could help to identify the underlying issues that lead to fuel poverty. However, if Scotland is to adopt this indicator, it would require collection of data on actual energy bills and household income on Scottish level (aggregating from individual households) for the calculation to work.
- 408 It does not change the arbitrary multiple of the median fuel spend and implies the use of median is acceptable. The variation of house types, house sizes and location of homes impact on the amount of fuel use. It may be inappropriate to use a nationwide median to establish what is deemed to be a “reasonable”/ an “unreasonable” costs on fuel spend. High income households with high modelled fuel costs would still be classed as fuel poor.
- 409 This “relative” approach would also mask the fact that many households will have had genuine difficulty in paying their fuel bills in the years where fuel prices are high.

Table 73 *Percentage of Scottish household in fuel poverty using Hills Review Option B*

Year	Current Indicator	Option B Indicator
2003-2004	15%	18%
2004-2005	18%	17%
2005-2006	24%	20%
2007	25%	20%
2008	27%	19%
2009	33%	20%
2010	28%	18%

Option C: Using the fuel poverty ratio to measure a fuel poverty gap

- 410 One problem with the current indicator is that it only measures the extent of fuel poverty but not the depth of the problem, that is how fuel poor are the people. Option C provides a measure on the depth of fuel poverty by calculating the “fuel poverty gap”. The “fuel poverty gap” is the difference between what modelled bills are and what they should be to avoid fuel poverty. Under the current definition, it would mean the difference between a household’s modelled energy bill and a bill representing 10% of income (where the former is greater; if the former is smaller, the household is not in fuel poverty).

- 411 This option helps to put a figure in money term on how households are affected by fuel poverty. It also allows measurement to be done on a single number per household, or aggregate to represent the depth of fuel poverty on a population group or for a country as a whole. It is also said to be theoretically possible to isolate the impact of both energy efficiency (through the modelled bills) and price (through the 10% threshold) factors and present them separately in money terms.
- 412 However, as the current indicator, this alternative is highly reactive to changes in fuel prices and sensitive to low reporting incomes. It is also very sensitive to the model assumptions and the temperature standards used in calculating the modelled fuel bills.

Table 74 *Percentage of Scottish household in fuel poverty using Hills Review Option C*

<i>Year</i>	<i>Current Indicator</i>	<i>Option C Indicator</i>
2003-2004	15%	17%
2004-2005	18%	19%
2005-2006	24%	25%
2007	25%	27%
2008	27%	29%
2009	33%	36%
2010	28%	30%

- 413 The fuel poverty gap for Scotland is said to be over £480 million in 2010. The average (mean) difference between the modelled bills and 10% of household incomes was £697, and the median difference was £456 in 2010.

Table 75 *Scottish fuel poverty gap using Hills Review Option C*

<i>Year</i>	<i>Aggregate fuel poverty</i>	<i>Mean fuel poverty gap per</i>	<i>Median fuel</i>
2003-2004	£174,400,000	£531	£365
2004-2005	£216,600,000	£521	£339
2005-2006	£339,400,000	£600	£385
2007	£394,600,000	£630	£391
2008	£471,500,000	£713	£437
2009	£654,000,000	£793	£508
2010	£481,500,000	£697	£456

Option D: After fuel costs poverty

- 414 Under Option D, a household is said to be fuel poor if it has less than 60% of the median household disposable income after housing and modelled fuel costs, with adjusted household size and composition. This follows the concept of (income) poverty, where a household is said to be living below the poverty line if it has income less than 60% of the median.

Box 10 *Definition of Option D in the Hills Review*

A =	Individual household income after housing costs and after fuel costs
B =	National median household income after housing costs and after fuel costs
C =	Fuel Poverty Threshold = B x 60%
	If A is less than C, a household is in fuel poverty.
	If A is greater than C, a household is not in fuel poverty.

- 415 This would theoretically disregard those high income households as fuel poor, who would need to spend more than 10% of the household income on the modelled fuel costs but their household income after fuel and housing costs are still above 60% of the corresponding median. This option also helps to identify those who are most likely to be making trade-offs between energy use and other essential goods. It shows which households are in poverty and which are pushed into poverty by their fuel costs.
- 416 The option provides information on both the number of people who are poor after allowing for fuel costs and the depth of their poverty by calculating the difference between the household income and the fuel poverty threshold. This might help better targeting of policies, which focus on those who have the greatest “poverty gap”.
- 417 As the option emphasises more income poverty (after housing and fuel costs), it is extremely sensitive to reported income and has less focus on energy efficiency of homes.
- 418 It should be noted that the Hills Review adjusted household size and composition for the calculation in England but the analysis with the SHCS does not make these adjustments, which impact specifically on households who have adults other than the Highest Income Householder and his or her spouse/partner and who are under-occupied.

Table 76 *Percentage of Scottish household in fuel poverty using Hills Review Option D*

Year	Current Indicator	Option D Indicator
2003-2004	15%	30%
2004-2005	18%	29%
2005-2006	24%	30%
2007	25%	29%
2008	27%	30%
2009	33%	28%
2010	28%	27%

Option E: Low income and low SAP overlap

- 419 This fifth option tested in the Hills Review looks at those who have low incomes, defined as having less than 60% of median income (after housing costs) and who live in homes with low SAP rating, defined as below the median SAP of all dwellings in the year concerned.
- 420 The option provides the best alignment to the concept of fuel poverty by capturing low incomes and low energy efficiency homes (the main driver of “unreasonable” costs). It also reflects recent government actions on tackling fuel poverty.
- 421 It should, however, be noted that SAP rating is an imperfect indicator of what constitutes “reasonable” costs. It provides a comparison of energy efficiency of homes against each other but does not consider the costs of fuel use. Nor does it take into account the different weather a home is subject to due to its location, which in turn impacts on the modelled and real fuel costs. And as the current indicator, this option does not measure the depth of fuel poverty.
- 422 Under this option, half of the households would always be defined as living in low energy efficient homes, as median SAP is used as a threshold. Despite the fact that the percentage of households that were found to be on low incomes reduced slightly from 27% in 2003-2004 to 23% in 2010, the percentage of households that were found to be fuel poor remained stable over the same period.

Table 77 *Percentage of low income households and households in low energy efficient homes*

<i>Year</i>	<i>Household defined as on low incomes by Option E</i>	<i>Households defined as in fuel poverty by Option E</i>
2003-	27%	13%
2004-	28%	12%
2005-	28%	12%
2007	31%	13%
2008	29%	12%
2009	26%	11%
2010	24%	11%

Option F: Subjective measurement of fuel poverty

- 423 The final option tested in the Hills Review is a subjective measure of fuel poverty. It considers whether households state that they have a problem with affording their energy need.
- 424 The advantage of this indicator is that it focuses on problem where people themselves feel it and allows households to define their own thermal comfort. It can also be used to cross-check the trends shown by other measurement approaches.

- 425 This option, however, does not help to identify energy inefficient homes in terms of carbon emission. It is also a concern that responses can be very different depending on precisely what question is asked and individual perceptions may be very different from those of society as a whole. There is also the risk of stigma attached to “admitting” to having difficulties in meeting energy bills and needs.
- 426 There is currently no such data available in England through the EHCS, however, in the SHCS social survey all respondents are asked what makes heating their home difficult⁵⁷. The data in Table 78 shows the proportion of households who stated that they generally find they are unable to keep their dwelling warm for reasons of affordability.

Table 78 *Percentage of Scottish household in fuel poverty using Hills Review Option F*

Year	Current Indicator	Option F Indicator
2003-2004	15%	3%
2004-2005	18%	4%
2005-2006	24%	3%
2007	25%	6%
2008	27%	6%
2009	33%	6%
2010	28%	7%

- 427 While only a small proportion of households describe themselves as fuel poor, according to Table 78 a gradually increasing proportion of them did so from 2003 until 2010. The limitation of this proposal is that it is not possible to work out what drives this increase without introducing further questions on the topic into the social interview questionnaire.
- 428 The composition of these households does also offer some interesting findings. Single parent households were in the highest proportion who described themselves as fuel poor, followed closely by single adults. Interestingly older smaller households (household contains one adult of working age and one of pensionable age and no children, or two adults of pensionable age and no children) were in the lowest proportion who thought of themselves as living in fuel poverty, followed by large adult and small adult households.

⁵⁷ Question HT14, response 15, SHCS Social Module.

Table 79 *Percentage of Scottish household in fuel poverty using Hills Review Option F by Household Types*

Household Type	Current Indicator	Option F Indicator
Single adult	32%	10%
Small adult	15%	5%
Single parent	28%	12%
Small family	8%	7%
Large family	13%	7%
Large adult	20%	5%
Older smaller	41%	5%
Single pensioner	59%	6%
All households	29%	7%

- 429 When the subjective indicator is compared with the other Hills options, it has been found that Option A has the highest alignment with Option F, meaning the percentage of households who were assessed as fuel poor under both Option A (using income after housing costs) and the subjective assessment under Option F was the highest. Option E (low income and low SAP overlap) has the least alignment with Option F.

Annex D Regulations

Table 80 *Building Standards*

Activity	Building Standards for new homes and major refurbishment or conversion
Description	Sets the standard that all homes should comply with. New standards were agreed in 2010 and further new standards will be considered in 2013 and 2016 in line with the Sullivan Report which set a road map for sustainable development.
Action	Compliance standards for housing when newly built or materially changed
Effect <i>Positive and negative impact on fuel poor group</i>	<p>Most fuel poor households are unlikely to be buying a new owner occupied home .</p> <p>The standards will improve the quality of new homes built in the social rented sector but numbers of new build are such that this will have limited impact on the group.</p> <p>For households that do live in a new social rented home the energy efficiency standard should be high enough to reduce fuel bills significantly.</p> <p>Increasing standards also increases costs of dwellings. Building Standards estimate that the 2010 standards cost £4,000 on average. This will reduce numbers of new social homes from a fixed budget</p>
Result	Beneficial for a few lower income households in new (probably socially rented) homes where high energy efficiency standards should reduce fuel bills and increase disposable income.
Short term Outcome	<p>For small number of households</p> <p>Reduction in fuel bills</p> <p>Increased thermal warmth</p>
Long term outcome	Reduction in long term poverty

Table 81 *Scottish Housing Quality Standard*

Activity	Scottish Housing Quality Standard (and new Energy Efficiency Standard for Social Housing)
Description	Standard established for the social sector to meet where practicable by 2015. A new Energy Efficiency Standard will be put to consultation in 2012 for a new energy efficiency standard to 2020.
Action	Compliance with quality standard for all social rented homes
Effect Positive and negative impact	Encourage planned improvements in the stock. Improvements may increase rents in some cases
Result	For households in the social rented sector whose homes are improved this should help reduce fuel bills and increase disposable income. However it will depend whether social landlords increase rents in order to do the improvements and the resultant balance of cost and benefit.
Short term outcome	For around one quarter of social rented households Reduction in fuel bills Increased thermal comfort
Long term outcome	Reduction in long term poverty Reduction in carbon emissions

Table 82 *Climate Change Act 2008*

Activity	Regulation – Climate Change Act proposed new regulation for energy efficiency of homes
Description	The Climate Change Act required Scottish Government to consider regulation to enforce energy efficiency upgrades in all housing.
Action	Compliance to any new regulation would improve energy standards in all homes but the potential for and shape of regulation is not yet decided.
Effect Positive and negative impact	The standards could force improvements in quality of homes in the private rented sector which would influence some lower income households but it could have negative impact on owners if they are required to fund upgrades
Result Which working well, which not so well	For some households this should help reduce fuel bills and increase disposable income
Short term Outcome	For small number of households Reduction in fuel bills Increased thermal warmth
Long term outcome	Reduction in long term poverty

Annex E Policy and Programmes

Policies and Programmes to Promote Fabric Upgrades

Table 83 *Energy Assistance Package (EAP)*

Activity	Energy Assistance Package
Description	The Energy Assistance Package is a four stage energy efficiency programme that aims to focus enhanced measures on the least energy efficient homes, lived in by the most fuel poor households. Programme statistics are published on the EST website - http://www.energysavingtrust.org.uk/scotland/Take-action/Grants-and-savings/Home-Energy-Scotland/Energy-Assistance-Package/Programme-statistics .
Action	Households checked for eligibility and then offered energy advice at stage 1, tariff and benefit checks at stage 2, loft and cavity insulation at stage 3 and if eligible more enhanced measures at stage 4.
Effect Positive and negative impact	Programme is targeted specifically at lower income households and all aspects should have a positive impact on participating households.
Expected Result	Increased income through benefit checks Reduced fuel bills through better tariffs Reduced fuel bills through more energy efficient homes Increased economic activity if services are not displaced?
Short term outcome	Reduction in fuel bills Increased thermal comfort
Long term outcome	Reduction in long term poverty Reduction in carbon emissions

Table 84 *Universal Home Insulation Scheme (UHIS)*

Activity	Universal Home Insulation Scheme
Description	The area-based Home Insulation Scheme (HIS) is being supported with funding from Scottish Government, with matching funds from other sources, including energy companies, local authorities, housing associations and private householders. The scheme aims to improve the energy efficiency of houses through an intensive area-based approach to promoting and installing insulation and other energy saving measures. This area-based approach has been found to be effective in other schemes. The scheme is administered by Local Authorities representing a mix of geographic locations across Scotland, selected on the basis of bids invited from local authorities. These are assessed on the basis of criteria agreed with COSLA, including factors such as levels of fuel poverty and potential for emission reductions and uptake of measures.
Action	The scheme is area based. Trained assessors knock on doors in a local area to offer energy checks and if the household is interested refer them

	<p>for insulation measures.</p> <p>Insulation is free of charge. The vast majority of low income households that are not in social rented housing should qualify for free insulation.</p> <p>Households that are likely to be priority groups are referred from UHIS to EAP where they get a more holistic service.</p>
Effect	<p>Will contact more households and make them aware of offers available.</p> <p>Should increase referrals to EAP.</p> <p>May not entice private landlords to improve their stock given that the cost will fall to them and the benefits to the tenant</p>
Result	For households who receive insulation this should help reduce fuel bills and increase disposable income
Short term Outcome	<p>Reduction in fuel bills</p> <p>Increased thermal comfort</p>
Long term outcome	<p>Reduction in long term poverty</p> <p>Reduction in carbon emissions</p>

Table 85 *Carbon Emissions Reduction Target (CERT)*

Activity	CERT - (UK GOVERNMENT POLICY TO BE REPLACED IN 2012 BY ECO and GREEN DEAL)
Description	<p>Obligation of large electricity and gas suppliers to achieve a specified amount of carbon savings across homes in Great Britain. The scheme is set up to be as cost effective as possible because essentially it is paid for through household bills (average around £38 increase per bill). The CERT scheme required that 40% of all measures must be targeted at priority groups that is low income households and households containing a person aged over 70. The ECO contains a number of elements including a carbon target and an affordable warmth target, however final detail is still being developed within DECC. The Green Deal is a market based mechanisms developed to complement the ECO programme and assist home owners to undertake cost effective energy efficiency improvements.</p>
Action	Energy suppliers required to reach a specified carbon emissions reduction by installing insulation and other measures in homes.
Effect Positive and negative impact	<p>CERT has led to improved rate of take-up of loft and cavity wall insulation at cheaper rates than available before. This is a cost effective measure and will reduce fuel bills.</p> <p>This has been accompanied by an increase in fuel bills.</p> <p>Uptake in Scotland was lower for the first few years than for the rest of the UK but has reached pro rata in the last 18 months</p>
Effect (Main and other beneficiaries)	All private households can benefit from CERT although it is more difficult for private tenants because they will have to get owners agreement.

Result	CERT data suggests that in densely populated areas where there is an easy to insulate built form CERT works well. However rates have tended to be lower in Scotland due to the number of flats, hard to treat properties and remote communities. Numbers in the private rented sector are also not known. The method for carbon counting does not take into account weather so there is no incentive to make considerable efforts in remoter areas of Scotland. It is expected that the new programmes will take these issues into account.
Evidence	Where measures are fitted there is good evidence that they will reduce the heating load required within a dwelling (reference DEMScot) and therefore reduce fuel bills. However this assumes that households continue to heat their home to a standard rate and do not take additional thermal comfort.
Short term outcome	For priority households More thermal comfort Reduction in fuel bills
Long term outcome	Reduced poverty Reduced carbon emissions

Policy and Programmes to Promote Energy Advice and other related assistance

Table 86 *Provision of advice through Energy Saving Scotland Advice Centers (ESSacs)*

Activity	Provision of advice through ESSacs
Description	To provide advice to households to help households improve the energy efficiency of their home, access grants and loans and seek cheaper fuel bills through fuel switching etc.
Theory of Change	Giving households information and advice will help them to change their behaviour and reduce energy usage.
Positive and negative impact	Should assist fuel poor households to access support, primarily EAP, and receive information to change their energy behaviours. However there is little current evidence that such action leads to reduction in energy usage. In general it is very difficult to assess this aspect of programmes.
Result	Not currently evidenced
Short term Outcome	If advice helps the household reduce energy consumption then it could lead to lower fuel bills
Long term outcome	Reduced poverty Reduced carbon emissions

Table 87 *Energy Performance Certificates (EPC)*

Activity	Requirement to have and display EPCs
Description	Energy Performance Certificates (EPC) were introduced in May 2007 for new buildings as part of the building warrant process; in December 2008 accompanying the Home Report for sales of existing dwellings; and from January 2009 for all socially or privately rented new tenancies. EPCs fulfil a requirement of the Energy Performance of Buildings Directive for which the European Commission has now consulted on proposals for a recast. The EPC provides residents with information on energy rating of their home and average energy bills in their home so that consumers can include this in the moving decision. The EPC will take on a key role in the development of the new UK Greens Deal programmes and may lead to further work to ensure that it is easy to understand and leads to real behaviour change.
Action	Provides households with information on energy performance and likely energy bills
Effect (Positive and negative impact)	Aim is to assist choice by households when buying or renting. However given that many fuel poor are in the social rented sector where there is very limited choice because of the lack of stock, and the rest will probably not have enough money to turn down housing on the basis of energy alone it is unlikely to have much impact for this group.
Result	Raised awareness of energy performance but potentially limited impact for fuel poor households
Short term outcome	If EPC helps household choose a better rated home then Improved thermal warmth Lower fuel bills
Long term outcome	Reduced poverty Reduced carbon emissions