



ScotPHN

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Scottish Public Health Network (ScotPHN)

Fuel Poverty: Overview

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1 Introduction

Fuel poverty is an inability to pay for heating in order to adequately heat one's home and the latest official fuel poverty statistics for Scotland suggest that it is a problem that impacts on more than one third of households.

The aim of this report is to raise awareness of the extent of fuel poverty in Scotland by providing an overview of some of the key issues associated with fuel poverty as they relate to Scotland, and how the UK and Scottish Governments, local authorities and health professionals, among others, are responding or can respond to it.

Fuel poverty is a complex issue and clearly a full assessment of the nature of the problem in Scotland is not possible here. Therefore, the intention of the accompanying fuel poverty bibliography is to highlight a wide range of UK sources in order to point readers to further current, relevant research.

This report is based on a broad sweep of the literature, relies heavily on UK generated 'grey literature', and seeks to outline the causes and definitions of fuel poverty, the population groups more likely to be fuel poor or at risk of fuel poverty as well as the health impacts of living in a cold home.

The connection between cold homes and ill-health is established and the concomitant financial costs to the NHS in the UK may extend to several billions of pounds each year. There is a clear rationale therefore for reducing these costs.

In Scotland, and the rest of the UK, the literature base relating to fuel poverty is substantial but there is a dearth of evidence that identifies the form of energy efficiency measure or intervention that is successful in addressing fuel poverty, and in contributing to improvements in health. This report seeks to encourage the development of activities to support future research as well as the evaluation of schemes and measures aimed at tackling fuel poverty.

2 Background

The most recent Scottish House Condition Survey (SHCS),¹ the source of official fuel poverty statistics, estimates that a substantial swathe (34.9% or 845,000) of Scottish

¹ SHCS is a continuous Scottish Government survey of 3,000 households. Survey questions focus on issues such as heating, fuel bills and income. Interview and questionnaire data is weighted to create Scotland-wide, and some local authority area estimates for various indicators, including fuel poverty. Source: Liddell G. (2015) Financial Scrutiny Unit Briefing: *Fuel poverty in Scotland*. Edinburgh: Scottish Parliament. Available from: www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S4/SB_15-13_Fuel_Poverty_in_Scotland.pdf

households are fuel poor. (1) By comparison, 39% of all households were estimated to be fuel poor in Scotland in 2013 (recently revised down to 35.8%). (2)

The methodology and modelling used to estimate fuel poverty in Scotland has changed since 2010, making comparisons between current estimates and those generated prior to 2010 more difficult. Irrespective of these changes, the available statistics show that since 2011 (and possibly before), around one third of all households in Scotland were fuel poor. (1, 3)

The proportion of Scottish households experiencing fuel poverty, has risen exponentially since 2002 and a key driver of this has been fuel price increases of 78% between 2002 and 2010. (4) Domestic fuel bills rose further by 27% (gas by 32%, electricity by 22%, liquid fuels by 31%) between 2010 and 2013. Fuel poverty increased in the same period, and while median incomes rose and the energy efficiency of homes has improved, this did not offset the impact of rising fuel prices. (5) Fuel prices continued to rise by 3.5% during 2013 and 2014 but this may have been mitigated by a 2.7% nominal increase in average household incomes, housing stock energy efficiency improvements and fuel rebates. (3)

Fuel poverty is a complex issue that overlaps with income, housing, health, carbon reduction, energy costs and efficiency and is a product of a range of factors including:

- Household income
- High fuel prices
- Energy efficiency² and home quality³ which determines how expensive it will be to heat
- Inefficient heating or lack of heating, e.g. central heating
- Under occupancy
- Attitudes to energy use
- The ability of householders to use energy efficiently
- Belonging to a group that spends more time at home, requiring greater fuel use (e.g. pensioners, disabled people, those with chronic health conditions). (6,7,8)

² The SHCS for 2014 suggests that around 47.5% of homes in Scotland failed the Scottish Housing Quality Standard, the Scottish Government's principal measure of housing quality. Around one third fail because of lack of energy efficiency. Source: Scottish Government. (2014) *Scottish House Condition Survey: 2014 Key Findings*. Edinburgh: Scottish Government. Available from: <http://www.gov.scot/Resource/0049/00490947.pdf>

³ The *Scottish House Condition Survey* estimates that around 53% of all dwellings have disrepair to critical elements. These are highest in pre-1919 built dwellings and those owned by local authorities and are lowest in post-1982 built dwellings and housing association properties. Source: Scottish Government. (2014) *Scottish House Condition Survey: 2014 Key Findings*. Edinburgh: Scottish Government. Available from: <http://www.gov.scot/Resource/0049/00490947.pdf>

The problem of fuel poverty has been recognised since at least the 1970s but the term was not officially adopted by government until 1997 (9). There is now a greater acknowledgement of fuel poverty and this is reflected in policy at both Scotland and national level. (10)

The introduction of the *Warm Homes and Energy Conservation Act 2000*, which applied to England and Wales only, sought to define the problem and required the UK government to prepare a strategy to set a legally binding target, to be not more than 15 years following publication of that strategy, to ensure that 'as far as reasonably practical no persons should live in fuel poverty'. A *UK Fuel Poverty Strategy* was subsequently published in 2001. The *Housing (Scotland) Act 2001* placed a statutory duty on Scottish Ministers to do the same and a *Scottish Fuel Poverty Statement* (2002) set out the ambition to tackle fuel poverty by November 2016. (11, 12, 13)

Additionally, to meet the targets of the *Climate Change (Scotland) Act 2009* (to reduce greenhouse gas emissions by 80% below a 1990 baseline by 2050), Scottish Government priorities as set out in '*Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013-2027*' contains commitments to ensure that by 2030 'there will be a step change in provision of energy efficient homes...through retrofit of existing housing and improved building regulations'. (14) There is a vision for 'warm, high quality, low carbon homes', with, where possible, gas central heating, efficient boilers and loft and cavity wall insulation for all by 2020 (as set out in the *Sustainable Housing Strategy*). (15, 16)

Scottish Government expenditure to tackle fuel poverty has increased (from £55.9m in 2008 to a planned budget of around £119m for 2015/2016) and the goal to eradicate fuel poverty by November 2016 remains in place although it is doubtful that this can be achieved. (3, 17)

3 Measuring fuel poverty

In Scotland a household has been considered fuel poor if in order to maintain a satisfactory heating regime it would be required to spend more than 10% of its income on all household fuel use. This is defined as 21°C in the living room and 18°C in other rooms for 9 hours a day during the week for all households, with higher temperatures for longer periods for the elderly and infirm. (18)

The 10% definition has its origins in work by Brenda Boardman in the early 1990s and was subsequently adopted by the *UK Fuel Poverty Strategy* in 2001 but as Liddell *et al* point out, as the prevalence of fuel poverty has increased and targets

are likely to be missed, the definition has become contested and deconstructed to the point of 'obfuscation'. (8)

In England the 10% definition has been superseded by the 'low income, high cost' (LIHC) method of measuring fuel poverty. LIHC defines a household as fuel poor if they have required fuel costs that are above average (the national median level), and were they to spend that amount, would be left with a residual income below the official poverty line. (19)

Definition change, adopted following publication of the Hills review (20), has been contentious and critics have claimed that it artificially lifts a substantial number of households out of fuel poverty (2.4m households in England were deemed to be fuel poor in 2011 using LIHC, 3.2m under the 10% measure). (21, 22, 23)

The 2013 estimate of fuel poverty in England, using the LIHC method, is 10.4% of all households. This is a considerably smaller proportion of households thought to be experiencing fuel poverty than in Scotland, Wales (30% of all households) and Northern Ireland (42% of all households) where the 10% definition is used. (24)

The 10% definition has itself been subject to criticism and Hills, while identifying its strengths, particularly that it models fuel requirements, does not use actual consumption data and is sensitive to some degree to people's incomes, energy requirements and energy costs, makes a number of in-depth and technical criticisms of its use. (20, 25)

Hills argues that a figure of 10% of income spent on fuel is an arbitrary figure, based on a 1988 calculation that the median net spend on fuel was 5%. Additionally, actual spend on domestic energy has varied a good deal for median households since 1988. The threshold of 10% is therefore fixed, and does not move as household spending and behavioural patterns change. Hills suggests that the 10% indicator counts those with moderate and even higher incomes as 'fuel poor' at times when energy prices are high, while some households in poverty and with relatively high energy costs are counted as not being fuel poor at times when fuel prices are low. Hills also questions if, as the 10% indicator has shown, there really was a rapid decline in fuel poverty during 1996-2003 (fuel poverty was reduced by four fifths), followed by an equally rapid rise between 2003-2009. Hills states that his recommendation to move away from the 10% indicator, to a LIHC method, refocuses measurement of the problem on those 'living on a lower income that cannot be kept warm at reasonable cost' as set out in the *Warm Homes and Energy Conservation Act* (2000). LIHC is described as focussing directly on the overlap of high fuel costs and low income. This overlap is thought not to be captured successfully by the 10% measure, nor is the extent and the depth of the problem. LIHC therefore contains twin indicators:

- Low Income, High Costs indicator (to measure the extent of the problem)
- Fuel poverty gap (to measure its depth).

This approach means setting two thresholds, one for income and one for costs. A fuel poor household fails both, and the fuel poverty gap is the reduction in required spending which would take a household out of fuel poverty. As Hills points out, identifying the fuel poor is problematic with no single characteristic or proxy such as the receipt of certain benefits, to accurately pinpoint this group, and the expense and intrusion rendering the gathering of evidence about properties and household income impossible. The LIHC framework identifies several household and dwelling characteristics associated with risk of fuel poverty and these include any low-income households living in an E, F or G Energy Performance Certificate rated home, and the combination of means-tested benefits receipt and certain dwelling characteristics (oil/ solid fuel heating system, rural off gas grid properties, solid walls or pre-1945 construction) as a means of identifying much of the fuel poverty gap. Finding the rest would involve more detailed screening of income levels. Hills states that the shift to an alternative form of measurement it is not aimed at underestimating the problem of fuel poverty, but is an attempt to better gauge fuel poverty because the 'gravity of the problem is so great'. (20, 26, 27)

The Scottish Fuel Poverty Forum, set up to work with the Scottish Government to tackle fuel poverty, has described the new definition, which has not been adopted in Scotland, as 'overly complex', 'immune to any movement in energy prices' and one that does not contribute to the identification or support of the fuel poor. The Forum did not recommend the adoption of the new definition, but it does suggest that existing Scottish 10% methodology be scrutinised and potentially changed. (28)

4 Who are Scotland's fuel poor?

A range of social and economic characteristics, being a pensioner, 'older', economically inactive or on a low income, predispose these groups to fuel poverty. A 2012 SHCS review of fuel poverty evidence estimated that 78% of low income households are fuel poor, and 73% of fuel poor households are economically inactive (retired, unemployed, disabled or have family commitments). By comparison, only 7% of people in full-time employment were estimated to be fuel poor. (10)

4.1 Household Type

As Table 1 below shows, being a single adult household, whether pensioner, parent or of working age, or a smaller older household is associated with higher rates of fuel poverty.

Table 1: Fuel Poverty by Household Type, 2014

Household Type	Fuel Poverty %
Single Pensioner	58%
Older Smaller	44%
Single Adult	41%
Single Parent	33%
Large Adult	29%
Large Family	26%
Small Adult	21%
Small Family	15%

Source: Scottish Government. (2014) *Scottish House Condition Survey: 2014 Key Findings*. Edinburgh: Scottish Government. Available from: <http://www.gov.scot/Resource/0049/00490947.pdf>

Given that the available SHCS fuel poverty statistics are not disaggregated by gender, ethnicity or disability, it is not possible to determine how far fuel poverty is more likely to impact on female pensioners and women in general, but it is important to note that two thirds of Scotland's poorest pensioners are women and of all single pensioner households, 71% are women. (10, 29) Up to 33% of single parents were thought to be fuel poor in 2014, as shown on Table 1. The vast majority (93%) of single parents are women, and they are estimated to be nearly three times more likely to experience fuel poverty than couples with children. (10)

4.2 Housing Tenure

As Table 2 below shows, outright home owners are estimated to be most at risk of fuel poverty of all house tenure types. Outright owners tend to be pensioners, often with lower incomes, living in less energy efficient, often detached, properties.

Table 2: Fuel Poverty by Tenure Type, 2014

Tenure	Fuel Poverty %
Owned	47%
Local Authority / Public	42%
Private Rented Sector	37%
Housing Association / Co-op	36%
Mortgaged	17%

Source: Scottish Government. (2014) *Scottish House Condition Survey: 2014 Key Findings*. Edinburgh: Scottish Government. Available from: <http://www.gov.scot/Resource/0049/00490947.pdf>

As Table 2 shows, mortgage holders are considerably less likely than those living in the private rented and social housing sectors to be fuel poor. Fuel poverty is estimated to be higher in the latter (housing association and local authority properties combined) although, those living in housing association properties may be less likely to be fuel poor than those in local authority and private rented housing, reflecting better housing energy efficiency.

4.3 Income

There is a direct correlation between fuel poverty and income, those with lower incomes experience higher rates of fuel poverty. It is estimated that 90% and 61% of those earning less than £200 per week or £200-300 per week are fuel poor respectively. The figure for those earning £400-500 is 24%. (1) However, the SHCS also estimates that in 2012, 59% of those experiencing fuel poverty were not in receipt of tax credits, benefits or disability allowances, and, as already noted, many were outright home owners. (10)

There is debate around how far fuel poverty is simply an extension of income poverty and while there is a significant overlap between those who are income poor and those who are fuel poor (as SHCS estimates below show), fuel poverty may not necessarily be synonymous with income poverty. Hills for example points to a range of factors, as well as income, including the energy efficiency of a home, its size and being off the gas grid, that lead to significant variations in the ability of households to achieve adequate warmth, and that also contribute to fuel poverty. (20)

Income poverty, officially defined as having an equivalised net household income below 60% of the median income, is linked to fuel poverty but the link between income and fuel poverty may not be straightforward. The SHCS attempts to determine how far fuel poverty and income are interconnected, although various caveats are attached to this approach. The available estimates for 2014 suggest that of 845,000 households thought to be fuel poor, a significant proportion of those households were also income poor but a greater proportion were thought to be fuel but not income poor:

- 377,000 households were estimated to be both fuel and income poor (45% of all fuel poor households)
- 468,000 households were estimated to be fuel but not income poor (55% of all fuel poor households)
- 76,000 households were estimated to be income but not fuel poor (5% of all households not in fuel poverty) (1)

Fuel poverty, according to these estimates, impacts on a broader group of households than the income poor. Nevertheless, the majority of households deemed income poor are also fuel poor and while those with lower incomes are more likely to

live in smaller homes or more energy efficient social housing, they are more likely to spend a larger proportion of their income on fuel. They are least likely to pay for their fuel in the cheapest way, i.e. via direct debit, or paying higher tariffs as a consequence of using pre-payment meters.⁴ Among those who are fuel but not income poor, the contributory factors will likely include living in a low energy property, being off the gas grid, using non-gas fuels and living in a rural area. (1, 20)

4.4 Welfare Reform and Fuel Poverty

How far the existing challenges associated with fuel poverty are further compounded by changes to welfare provision and entitlement is unclear. Recent research indicates that post 2010 and 2015 welfare reforms may have cost, and will continue to cost, Scottish claimants around £1bn each year (approx. £300 per year per adult of working age, in line with the UK average).⁵ Analysis has shown that the ‘bedroom tax’ has affected 72,000 households in Scotland, with housing benefit recipients losing approximately £12 per week. These have tended to be single person households, followed by households with children. The majority of all affected households contain a disabled adult. Benefit sanctions (loss, suspension or reduction) are likely to affect the most vulnerable in society, including lone parents, disabled people and young people. The latter (aged 16-24) are especially likely to be effected by Jobseeker’s Allowance sanctions. (30) Welfare reform therefore is impacting on the income received by Scottish claimants, and the inference is that those groups most affected by welfare reforms include some of those more likely to be at risk of fuel poverty.

4.5 The Experience of Fuel Poverty

The statistics alluded to throughout this report, derived almost wholly from the Scottish House Condition Survey, provide a useful indication of who is more likely to

⁴ The proportion of prepayment meter customers increased in the UK from 7% in 1996 to 16% currently. Use tends not to be a customer choice but are installed where customers have poor payment histories or are in student accommodation for example. Almost all customers are on more expensive standard variable tariffs. Prepayment customers may also be less likely to consider switching energy suppliers in comparison with direct debit customers, and lack access to information about switching. Source: Competition and Markets Authority. (2016) *Energy market Investigation: summary of provisional decision on remedies*. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/506578/Summary_of_provisional_decision_on_remedies.pdf

⁵ This reflects freezes or reductions to working-age benefits, work allowances within Universal Credit, Tax Credits, the Benefits Cap and the shift from Disability Living Allowance to Personal Independence Payments. Losses are more likely to hit the most deprived regions of Scotland hardest, particularly the city of Glasgow. Changes in tax allowances, the minimum wage, and childcare provision may help to offset financial losses for some claimants. Source: Beatty, C. and Fothergill, S. (2016) *The Impact on Scotland of the Welfare Reforms. A report to the Social Security Committee of the Scottish Parliament*, Centre for Regional Economic and Social Research. Sheffield Hallam University. Available from: <http://www4.shu.ac.uk/research/cresr/sites/shu.ac.uk/files/impact-scotland-new-welfare-reforms.pdf>

be fuel poor but it is less clear how individuals and households in Scotland actually experience and respond to fuel poverty, cold homes and energy efficiency measures and schemes. A handful of small scale studies with a focus fully or partly on Scotland, identify the strategies individuals use to stay warm, the health related concerns respondents attribute to cold homes, choices such as 'eat or heat' imposed by income and fuel poverty, difficulties in using heating systems deemed inefficient, expensive and problematic to use and attitudes to switching energy tariffs. (31, 32, 33, 34, 35)

Such issues are explored in a recent Department of Energy and Climate Change review of UK and international research focussed on the behaviours of the fuel poor. The review suggests that while many at risk households are likely to be very engaged with their energy use and bills, 'energy efficiency' may be understood by some households solely as cutting back on heating rather than living in energy efficient properties or adopting cost-effective energy efficient behaviours. Much better awareness among at risk and vulnerable groups is needed of basic energy efficiency measures and schemes as well as wider recognition of the barriers (e.g. costs, fear of change) these groups face in engaging with such measures and schemes.⁶ The review advocates better identification of the fuel poor and the need for good proxy indicators based on information that can be easily and robustly collected by researchers. (36)

Further exploration of these issues and the challenges and barriers faced by the fuel poor in Scotland could be useful in informing considerations about what interventions and strategies are more likely to be successful.

4.6 Where are Scotland's fuel poor?

Fuel poverty levels are higher among those groups who live in the most deprived 15% Scottish Index of Multiple Deprivation (SIMD) areas and 38% of dwellings in these areas were thought to be fuel poor by the SHCS in 2014. For those out with these areas, the figure was 34%. However, the highest levels of fuel poverty are experienced by those living in dwellings in rural areas and the SHCS for 2014 estimates that:

- 50% of those in rural areas are fuel poor, the comparable figure for urban areas is 32%

⁶ A recent London based switching advice intervention focussed on barriers to switching tariffs among a small sample of residents, most in receipt of benefits, identified high levels of apathy, scepticism as well as loyalty to current providers. The authors identified a need for consumer advice and advocacy in complex markets such as the energy market. Source: Lorenc A, Pedro L, Badesha B, Dize C, Fernow I and Dias L. *Tackling fuel poverty through facilitating energy tariff switching: a participatory action research study in vulnerable groups*. Public Health. 2013; 127(10):894-901.

The absence of access to the gas grid contributes to higher rates of fuel poverty in remote and rural areas and 59% of dwellings in rural areas are off the gas grid; the figure for urban areas is 6%. 43% of dwellings not on the gas grid are thought to be fuel poor, for those on the gas grid the figure is 34%. For those whose primary source of fuel is oil or electricity, 49% and 60% are estimated to be fuel poor respectively, for gas users the figure is 30%. (1)

There is tremendous variability in fuel bills across Scotland. Remote and rural customers in the north of Scotland receive some of the highest energy bills, reflecting the higher costs associated with providing electricity in these areas and reliance on oil. (2, 10) The harsher climate in many rural and remote areas of Scotland and the concomitant longer heating season contributes to the problem.

Those living in rural areas, tend to be older (45+) and to own their homes outright, particularly those in remote rural areas. Dwellings in rural areas tend to be detached, older, with solid walls, and therefore less energy efficient and the proportion of homes in rural areas deemed 'hard to treat' is higher than in urban areas at 42% and 27% respectively. SHCS data for 2010 suggests that around 30% (704,000) of all dwellings in Scotland are 'hard to treat' in terms of reducing energy consumption. There is no formal definition, but typical features include solid walls, flat roofs, off the gas grid, tenements and multi-storeys. The majority of 'hard to treat' dwellings have solid walls. While there have been energy efficiency improvements across the Scottish housing stock, particularly in the extent of loft and cavity insulation, only 11% of solid wall houses have wall insulation. (37, 38)

There is a legacy of properties in Scotland built before the introduction of legislation to improve insulation and warmth. Much of this housing stock, built when greater emphasis was placed on fresh air and ventilation within homes, predates efforts in the latter half of the 20th century to improve thermal efficiency and now forms much of the stock now viewed as 'hard to treat'. (25) For example, one fifth of all dwellings were built prior to 1919 (with higher concentrations of stock in Edinburgh, Moray, Orkney, Perth and Kinross and the Scottish Borders), 34% between 1919-1964, 23% between 1965-1982 and 25% were built post-1982, with lower levels of fuel poverty likely to be found in the latter with the highest in pre-1919 built dwellings. In terms of house type, those living in terraced, detached and semi-detached housing (the problem may be particularly acute in larger properties of these types), are more likely to be fuel poor than those living in tenements or 'other flats'. (1, 39)

As Table 3 below shows, higher than Scottish average (34.9%) fuel poverty rates are experienced across primarily rural areas, but not exclusively so. At local authority level, SHCS identifies the Orkney Islands as experiencing the highest levels of fuel poverty in Scotland, much of this is attributable to the factors noted above. 100% of dwellings are off the gas grid (as are all dwellings on the Shetland Islands), the

Scottish average is 16%. Eilean Siar experiences the second highest levels of fuel poverty (with 86% of all dwellings off the gas grid). (40)

Table 3: Above average rates of fuel poverty in local authority areas

Local Authority Area	% of Fuel Poor Households
Orkney Islands	63%
Eilean Siar	62%
Highland	55%
Shetland Islands	53%
Dumfries & Galloway	46%
Inverclyde	43%
Angus	42%
Dundee City	41%
Moray	40%
North Ayrshire	40%
Argyll and Bute	40%
Scottish Borders	39%
Aberdeenshire	39%
Perth and Kinross	38%
East Ayrshire	38%
Fife	36%
South Ayrshire	35%

Source: Scottish Government. (2016) *Scottish House Conditions Survey 2012-2014*: local authority analyses. Available from: <http://www.gov.scot/Topics/Statistics/SHCS/keyanalyses/LAtables2014>

The areas of Scotland, often central and urban, that display rates of fuel poverty on or below the Scottish average are shown on Table 4 below.

Table 4: Below average rates of fuel poverty in local authority areas

Local Authority Area	% of Fuel Poor Households
Stirling	34%
North Lanarkshire	34%
Glasgow City	34%
East Lothian	33%
Clackmannanshire	32%
East Renfrewshire	32%
Midlothian	30%
South Lanarkshire	30%
Aberdeen City	29%
West	29%

Dunbartonshire	
Renfrewshire	29%
West Lothian	29%
East Dunbartonshire	28%
Falkirk	28%
Edinburgh City	25%

Source: Scottish Government. (2016) *Scottish House Conditions Survey 2012-2014*: local authority analyses. Available from: <http://www.gov.scot/Topics/Statistics/SHCS/keyanalyses/LAtables2014>

As Tables 3 and 4 show, of the major Scottish cities, Dundee experiences higher levels (41%) of fuel poverty than Glasgow (34%), Aberdeen (29%) and Edinburgh (25%). It is assumed that the average rates for both rural and urban local authority areas will mask considerable variation across rural areas and within cities.

5 Key fuel poverty and energy efficiency schemes and interventions

There is no UK wide approach to tackling fuel poverty and improving home energy efficiency, and strategies diverge across the constituent countries. (41) The range and breadth of schemes and interventions in Scotland is complex. This must also be the perception of many consumers, and a number of agencies (government, non-profit, private sector, local authority, housing associations) fund, deliver or manage fuel poverty and energy efficiency advice, benefits, measures and loans.

Schemes and measures typically revolve around the provision of energy efficiency, billing, tariff switching, income maximisation and benefits advice; the installation of insulation, central heating and new boilers; access to grants and loans to install measures, and the provision of targeted and non-targeted benefits that contribute to the payment of fuel bills.

5.1 Targeted and Non-Targeted Heating Benefits

The following apply to the whole of the UK:

- The **Cold Weather Payment**⁷ can be accessed by those in receipt of certain benefits and provides £25 for each 7 day period of very cold weather during November to March.
- The non-targeted **Winter Fuel Payment** (WFP)⁸ provides those born prior to May 1953 with up to £300 to pay towards fuel bills although there is no obligation to spend the payment on fuel bills. WFP is not without its critics who argue that it only temporarily lifts some people out of fuel poverty, that it is poorly targeted, at

⁷ See: www.gov.uk/cold-weather-payment

⁸ See: www.gov.uk/winter-fuel-payment

a cost of several billions of pounds each year, in that most of its recipients are not fuel poor, and that payments fail to reflect regional differences in climate and heating season duration. (20, 42) Nevertheless, a recent econometric estimation of the impact of WFP in England and Wales suggests that it may be responsible for a reduction in winter mortality. (43)

5.2 Energy Suppliers

The following financial and non-financial support is provided by energy suppliers:

- The **Warm Home Discount**⁹ scheme is funded by suppliers who then pass the cost onto all consumers and provides discounts on electricity bills during the winter months. Up to £140 is paid to those whose supplier is part of the scheme or where individuals receive certain benefits. Suppliers offer the discount to vulnerable groups, with suppliers determining who falls into that group to some extent. (44)
- **Energy Trust Funds**, such as those provided by British Gas¹⁰ and Scottish Power¹¹ offer grants to fuel poor customers unable to pay fuel debts.
- Under the terms of their licences, suppliers and electricity distributors (but not gas) must maintain a **Priority Services Register** and place consumers from eligible groups (e.g. pensioners, sick, disabled) on the register when they request it. Only non-financial support is provided such as advice and priority reconnection. Recent work by Ofgem suggests that customer awareness of the register is low, especially among lower social groups, a small proportion of those eligible are on the register with no requirement on suppliers and distributors to identify those who should be on the register. (45)

The Smith Commission has proposed devolution to the Scottish Parliament of certain elements of the Warm Home Discount scheme, Winter Fuel Payments, Cold Weather Payments and the Energy Company Obligation. (16)

5.3 Home Energy Efficiency Programmes for Scotland (HEEPS)

Various Scottish and UK Government loans and schemes are, or have been, offered to homeowners, tenants, landlords or communities such as incentives to support individual or community use of renewables and district heating (e.g. Home Renewables Loan, Renewable Heat Incentive, Feed in Tariffs, Community and Renewable Energy Scheme and the District Heating Loan Fund) and the now defunct UK wide market led 'Green Deal' loans to fund energy efficiency improvements with little or no upfront costs.

⁹ See: www.gov.uk/the-warm-home-discount-scheme/overview

¹⁰ See: www.britishgasenergytrust.org.uk

¹¹ See: www.energypeopletrust.com/content/

However, the key source of Scottish Government funded activity, designed to work with other sources of funding, with a focus on fuel poverty and carbon emissions reduction is Home Energy Efficiency Programmes for Scotland (HEEPS). Of approximately 67,000 energy efficiency measures installed in Scotland in 2014-15 by both HEEPS and the Energy Company Obligation (ECO), which places a legal obligation on larger energy suppliers in the UK to deliver measures, 32,000 were delivered by HEEPS. 40% of these were for solid wall insulation, 20% for gas central heating and 14% for cavity wall insulation. HEEPS supersedes the Home Insulation Scheme, Boiler Scrappage Scheme and the Energy Assistance Package and is comprised of schemes that provide measures in existing properties (i.e. 'retrofit') (46). Recent research undertaken for Citizens Advice Scotland presents a mixed picture in terms of the success of these now defunct schemes and points to little formal evaluation of each scheme having taken place. (47)

Current HEEPS¹² activity includes:

Area Based Schemes (ABS):

- Run by local authorities, ABS receives the major share of funding (£65m for 2015-16) and delivers energy efficiency measures to private sector and mixed (private and social) tenure blocks primarily in fuel poor areas.
- Approximately 18,500 households received an efficiency measure during 2014-2015, frequently solid wall insulation and, less frequently, cavity wall insulation (often in hard to treat properties).
- It levers in further funds from the ECO, although changes to the ECO passed by the UK Parliament in 2014 have reduced ECO funds.
- It is estimated that ABS measures installed during 2014-2015 have helped to save roughly 12,000 tonnes of Co2 annually, with annual savings of around £3m to households. (3, 46, 48, 49)

No formal evaluation of ABS has taken place, but delivery of the scheme by local authorities, who bring local knowledge, is thought to be perceived positively by many stakeholders. Funding is equitably distributed across Scotland. There is some targeting of fuel poverty and there are higher rates of solid wall insulation than elsewhere in the UK. Uncertainties around ECO funding and its lack of focus on solid wall insulation is thought to have undermined ABS / HEEPS schemes. (47)

HEEPS Cashback:

- Offers owner-occupiers, tenants and registered private sector landlords a rebate (up to £5,800, more for those in rural areas) towards installing energy efficiency measures for properties in council tax bands A to C.

¹² For information about HEEPS and other loans and schemes see Energy Savings Trust: <http://www.energysavingtrust.org.uk/home-energy-scotland>

- The scheme has provided funding to households and social landlords for the installation of energy efficiency measures. It has now closed as funding capacity has been reached.

HEEPS cashback appears to be popular with consumers and provides some support for hard-to-treat properties in the form of solid wall insulation but how many fuel poor households have benefitted from the scheme is unclear. (47)

HEEPS Loans:

- Offers interest free loans to owner occupiers and registered private sector landlords of up to £10,000 for measures such as boilers and solid wall insulation.

The scheme is thought to be beneficial in that a range of measures are covered, a competitive finance package is offered, and gas infill loans in areas close to or on the gas grid are available. No formal evaluation of the scheme has taken place. (47)

Warmer Homes Scotland:

- Provides a range of measures (e.g. insulation, central heating, draught proofing) to vulnerable homeowners and private sector tenants with various eligibility criteria set.

Warmer Homes is provided by a consortium of Changeworks, the Energy Saving Trust and Everwarm. It is intended to run for seven years with around £224m committed to the scheme. The use of grants, and community liaison officers, is deemed more likely to reach those most in need, although the eligibility criteria may be too broad to allow all households in fuel poverty to benefit from the scheme. (47)

The ECO¹³ has focussed primarily on installing cavity wall and loft insulation, boilers, and less frequently, solid wall insulation, delivered primarily to owner occupiers, in urban areas deemed to have medium, high or very high poverty rates.¹⁴ A higher proportion of households in Scotland have received ECO measures than in the rest of the UK. (49)

¹³ ECO funds are directed via the Carbon Emissions Reduction Obligation (CERO) (focussed on hard to treat homes), the Carbon Saving Community Obligation (CSCO) (focussed on low income areas) and Affordable Warmth (Home Heating Cost Reduction Obligation) to target vulnerable consumers. More measures per household have been delivered in Scotland for CERO and CSCO than in England or Wales, possibly due to the funding made available by the Scottish Government to work alongside ECO. Source: Bradley C. (2015). *Energy Companies Obligation Final Report, January 13 – March 15*. London: Ofgem. Available from: https://www.ofgem.gov.uk/sites/default/files/docs/2015/09/eco_final_report_0.pdf

¹⁴ A total of 139,050 properties in Scotland received ECO measures during 2013-2015. Source: *Energy Efficiency Measures Installed in Scotland Under the Energy Company Obligation (ECO1) Between 1 January 2013 and 31st March 2015*. Edinburgh: Scottish Government, 2016. Available from: <http://www.gov.scot/Resource/0049/00498004.pdf>

The rate at which the ECO, and the Green Deal, have installed energy efficiency measures has been criticised in a recent House of Commons Energy and Climate Change Committee report. The former is thought to have much lower and less ambitious energy installation targets than previous energy supplier obligations, and the use of energy suppliers who then pass the costs of delivering ECO measures onto customers via fuel bills, to tackle fuel poverty viewed as inappropriate and 'misguided'. Likewise, the Green Deal has been perceived as complex and a failure in terms of not increasing demand for energy efficiency measures significantly.¹⁵ The following examples show how HEEPS and ECO work across an urban (Dundee) and rural (Eilean Siar) local authority area in the installation of measures:

Dundee: Dundee City Council received more than £1.7m of HEEPS ABS funding during 2014-15. It has been used to pay for improvements to private sector housing stock, such as ex-council houses. HEEPS is typically spent on multi-tenure blocks of four properties (e.g. two socially rented, two privately owned) requiring external wall cladding. The council's capital budget pays for the rented homes while HEEPS / ECO funds pay for the treatment of private homes. Wall insulation costs are around £8,000 per property, which many owner-occupiers are unable to pay. HEEPS means that low income owner occupiers do not need to pay upfront costs for improved insulation. 260 properties have received solid-wall insulation treatment at a total cost of £2.6m. Approx. £720,000 of this came from the council's capital budget, £1.5m from HEEPS and £260,000 from ECO.

Eilean Siar: In the Eilean Siar, fuel-poor homes tend to be detached, privately-owned and off the gas grid. The local authority contracts not for profit Tighean Innse Gall (TIG) to deliver a fuel poverty programme. During 2013-14 TIG helped treat 100 houses with external wall insulation plus several hundred more with various forms of insulation. The average cost per house of external wall insulation was £17,500, compared to £8,000 in Dundee, with larger wall areas to cover, added logistics costs and less opportunity for 'economies of scale' savings. For external wall insulation, TIG requires HEEPS spend per house of £7,500, a customer contribution of £1,750, a recycled administrative/enabling fee from TIG of £3,000 and average ECO spend of around £5,000. This funding ratio differs from the £3 ECO to £1 HEEPS ratio anticipated by the Scottish Government.

Source: Liddell G. (2015) Financial Scrutiny Unit Briefing: *Fuel poverty in Scotland*. Edinburgh: Scottish Parliament. Available from: www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S4/SB_15-13_Fuel_Poverty_in_Scotland.pdf

¹⁵ For an appraisal of recent energy policy in the UK including the Green Deal and the ECO see House of Commons Energy and Climate Change Committee. *Home energy efficiency and demand reduction*. Fourth Report of Session 2015–16. Available from: <http://www.publications.parliament.uk/pa/cm201516/cmselect/cmenergy/552/552.pdf>

5.4 Impact on Fuel Poverty

Energy efficiency schemes, whether free or paid for by householders, have improved the modelled energy efficiency of Scotland's homes, although consumer demand for insulation and other energy efficiency measures is low. (47) The estimated gain in household income for 2013-2014, from the Energy Assistance scheme (now closed), Affordable Warmth and Area Based Schemes was £223.6m and carbon dioxide savings were estimated at 35,200 tonnes. (48)

However, the extent to which this activity has successfully targeted and alleviated fuel poverty is not clear and lack of evaluation and metrics or indicators to assess fuel poverty outcomes have not been incorporated into schemes. This makes it difficult to track progress and determine what works. (47, 50)

The combination of large scale area based delivery with nationally available targeted support for fuel poor households is viewed as a worthwhile model. However, concerns exist around the complexity of the funding and delivery of schemes and the ECO, financial barriers for low income groups undermining take up of measures, the ability of HEEPS and other schemes, to serve rural and off gas grid populations, as well as the need for better identification of the fuel poor in general. Worthwhile activities are thought to include the use of heat networks (see below) and should include, as the Scottish Fuel Poverty Forum advises, Scottish Government promotion of community owned renewable energy assets in deprived areas and the use of appropriate existing measures to tackle pre-1919 built properties, thereby generating a significant work programme and economic benefits. An activity deemed worthwhile is the single point of access one-stop-shop model, for advice and signposting but with a need for more in-depth face to face advocacy, a multi-agency approach, integration of services (e.g. energy advice and benefits or tariff checks) and for income maximisation to be embedded in all energy efficiency and fuel poverty programmes. (16, 28, 47, 51)

5.5 Local Authorities

Local authorities play a significant role in delivering energy efficiency measures and in identifying and tackling fuel poverty. They are required by the *Housing (Scotland) Act 2001* to develop strategies to address fuel poverty across all housing tenures, and to define the nature of locally experienced fuel poverty and how its causes (social, economic, and environmental) differ or correspond with national trends. (52) In addition to this, all social landlords are encouraged to improve the energy efficiency of social housing and to address fuel poverty, to attain the Energy Efficiency Standard for Social Housing (EESH) by 2020. (53)

Local authority activities tend to revolve around:

- The identification of fuel poor households.

- The provision of advice, energy efficiency awareness raising, referrals and signposting.
- Income maximisation and debt advice.
- Improving the fuel and energy efficiency of all homes.
- Ensuring energy efficiency in council properties meets the Scottish Housing Quality Standard (the Scottish Government's principal measure of housing quality).
- Using ECO and other sources of private and Scottish Government sector funding.

At national level, Home Energy Scotland, funded by the Scottish Government and managed by the Energy Saving Trust, provides a telephone helpline and advice and referrals to energy efficiency schemes from local centres across Scotland. (54) The comprehensiveness of provision of advice at local authority level is not clear but providers include:

- Glasgow's Home Energy Advice Team delivered by Glasgow City Council, housing associations and the Wise Group, among others, offers advice to tenants and owners on fuel bills, tariffs, benefits, grants, white goods and referral to financial advisors¹⁶
- Argyll and Bute Council's ALLenergy¹⁷
- Dundee City Council's Energy Efficiency Advice Project (DEEAP)¹⁸
- TIG Energy Advisory Service in the Eilean Siar¹⁹
- Save Cash and Reduce Fuel, a social enterprise that delivers Home Energy Scotland in the north east of Scotland²⁰
- Changeworks, an environmental charity and provider of energy advice services in the Edinburgh area.²¹

Evidence of local authority and housing association led interventions and measures is often very patchy, with impacts on fuel poverty unclear. They are however using various methods of generating heat and hot water for tenants and residents in domestic settings and there are pockets of activity especially around the provision of district heating networks. These have been slower to develop in Scotland than in other parts of Europe, such as Scandinavia, and use a single heat source to supply hot water or steam to a cluster of properties, such as for heating and hot water. The source of fuel can be renewable (e.g. biomass, using wood/pellets that are biological in origin) or fossil fuel. Using renewable resources, systems can be based on a boiler

¹⁶ See: www.g-heat.org.uk/

¹⁷ See: www.alienergy.org.uk/

¹⁸ See: www.dundee.gov.uk/housing/energyadvice

¹⁹ See: www.tighean.co.uk/

²⁰ See: www.scarf.org.uk/

²¹ See: www.changeworks.org.uk/what-we-do/energy-and-fuel-poverty

or a combined heat and power system (CHP) fuelled by biomass, e.g. woodchips. (55, 56)

Examples of boilers using woodchip, often a felling and saw-milling by-product, are provided by the West Highland Housing Association (Oban), Fyne Homes Housing Association (Lochgilthead and Campbelltown) and Hanover Housing Association (Fort William). Woodchip biomass is expected to be used by West Whitlawburn Housing Co-operative²² across high and low rise buildings in Cambuslang, South Lanarkshire, with the aim of reducing residents heating bills by around 20% and to replace existing, expensive, electric storage heating. The project is funded by the Energy Savings Trust's Warm Homes Fund (now closed). (57, 58, 59, 60)

Three gas fired CHPs are operated by Aberdeen Heat and Power Ltd (AHP), an Aberdeen City Council, non-profit organisation set up in 2002 to improve energy efficiency in 1970s multi-storey housing stock, increase housing revenues and address social welfare issues. AHP generates electricity for 2,000 flats, public buildings and 26 of the city's 59 multi-storey blocks, with further blocks due to be connected. Carbon savings are estimated at 45% in comparison with the previous electric heating systems in the multi-storeys. Heat tariffs for tenants are cost and not market based, which is estimated to save 25% to 45% on electric heating. The National Home Energy Efficiency Rating of housing stock connected to the network, and with improved insulation, has been reported by the City Council as having risen significantly. (61, 62)

In Glasgow, a CHP has been installed across tower blocks and maisonettes by Cube Housing Association in Maryhill. A centralised boiler generates heat, electricity and hot water, replacing electric storage heating. The gas driven CHP is provided alongside over-cladding and new windows for 1,300 tenants and 300 owners; Cube estimate that the scheme will reduce heating costs by an average of 25%, and save 7,000 tonnes of carbon emissions each year. (62, 63) The views of 154 residents, a 10% sample, of the Wyndford estate have been captured by research group, Heat and the City. Many residents were found to have been dissatisfied with electric heating and fuel poverty was prevalent. Half reported a longstanding illness or disability, and almost two thirds were taking prescribed medicines. A follow up study

²² For further information about Whitlawburn and several other schemes including Castlehill Housing Association's use of solar panels and wood-fuelled biomass in off gas grid areas in the Grampians to reduce resident fuel bills, and Renfrewshire Council's proposed use of hydro and district heating systems, see the following case studies:
<http://www.energysavingtrust.org.uk/sites/default/files/reports/West%20Whitlawburn%20Case%20Study.pdf> <http://www.energysavingtrust.org.uk/sites/default/files/reports/Castlehill%20Case%20Study.pdf> <http://www.energysavingtrust.org.uk/sites/default/files/reports/Renfrewshire%20Case%20Study.pdf>

of residents, post installation, reports that satisfaction with heating has risen sharply with a dramatic fall in the proportion of residents reporting that they felt cold at home in winter. Heating costs have not necessarily fallen for all residents, however, far fewer report using extreme ways of coping with cold homes. It may be too soon to determine if there has been an improvement in residents' health although there may be a modest improvement in reported respiratory conditions. (35, 64, 65)

Further examples include Dundee City Council's district heating system for flats and multi-storey blocks (Lochee, Dallfield, Whorterbank, Lansdowne) that are anticipated to reduce fuel bills by at least 30%. (66, 67) In Grampian, the Albyn Housing Society district heating system in Aviemore provides heat and hot water from a single boiler for 100 rented and shared ownership homes. The scheme is deemed to provide lower and more stable heating costs for residents. (68) Edinburgh City Council have installed district heating systems in areas of deprivation including to concrete built multi-storey blocks at Leith (Cables Wynd) dating from the 1960s, at a cost of around £2.5m and for 172 flats in Niddrie at a cost of around £3m. It is estimated that the heating system will reduce fuel bills for residents by 50%. (69, 70)

District heating using woodchip has been installed by Dunedin Canmore Housing Association in Edinburgh for residents on several sites, while a Dunedin Canmore sheltered housing complex has adopted a range of measures (underfloor heating, solar roof panels, insulation, gas-fired heating system and a passive solar corridor) to promote 'well-being' and cut fuel bills. The £7m development has been part funded by the City Council and has been a finalist in the UK Sustainable Housing Awards. (71, 72)

6 Fuel Poverty, Cold Homes and Health

The basic entitlement to live in a warm, dry and healthy home is not being upheld for millions of individuals and families in England and across the UK. They cannot afford the energy required to heat their home adequately and, consequently, many suffer in cold, damp conditions that blight their health and wellbeing and significantly diminish their quality of life and life chances.

Source: UK Health Forum. (2014) *Fuel poverty: how to improve health and wellbeing through action on affordable warmth*. Available from: http://www.fph.org.uk/uploads/UKHF-HP_fuel%20poverty_report.pdf

Fuel poverty will be among a range of factors that contributes to many households experiencing cold indoor temperatures. A growing body of literature links cold homes with ill-health and recent appraisals of fuel poverty evidence and its relationship with health have been published by the Marmot Review Team, Public Health England

and the UK Health Forum. (7, 73, 74) This work points to higher morbidity and mortality rates associated with cold homes; a range of physical and mental health conditions linked to or exacerbated by cold homes; a wide range of population groups likely to be more susceptible to the health impacts of cold homes and the contribution of fuel poverty and cold homes to health inequalities.

6.1 Excess Winter Deaths (EWDs)

There is a 'longstanding body of evidence' that describes the relationship between cold temperatures and higher winter mortality and morbidity rates. (7) Many factors link EWDs and cold temperatures, such as an individual's age, health condition, income, heating affordability and effectiveness, external and internal temperatures, attitudes to cold and wearing appropriate clothing. (6) Most EWDs are caused by respiratory and circulatory disease, cold homes contribute to this, and the Marmot Review Team has estimated that EWDs in the coldest quarter of housing are almost three times as high as in the warmest. EWDs do not necessarily relate to socio-economic deprivation. One reason for this may be that many deprived people live in social housing likely to be more energy efficient. (7) The UK has one of the highest rates of EWDs in Europe, thought to be 23% higher than Sweden's although the UK experiences milder winters. (73) Colder countries where building standards have been higher than the UK's have much lower rates of EWDs. (7)

John Hill's recent review of fuel poverty, *Getting the Measure of Fuel Poverty*, estimates that 10% of EWDs, possibly more, are directly attributable to fuel poverty, representing thousands of deaths. (20) A World Health Organisation estimate, thought to be conservative, indicates that 30% of all EWDs can be attributed to cold indoor temperatures. Therefore 9,300 of the 31,000 EWDs in England and Wales during 2012-2013 can be attributed to cold indoor temperatures. (74) If applied to the 4,060 EWDs in Scotland during 2014-2015 (the highest figure since 1999-2000) and considerably higher than the figure of 1,600 for 2013-2014, (75) there were 1,218 deaths as a consequence of cold indoor temperatures.

6.2 Cold Homes and Ill-Health

Cold homes are associated with circulatory, respiratory and mental health problems, may slow recovery times post hospital discharge and exacerbate conditions including arthritis, rheumatism, flu, diabetes, asthma and bronchitis. (7) Groups more susceptible to cold homes include the already vulnerable such as young children, older people, those with pre-existing or long term conditions, pregnant women and disabled people, many of whom will spend more time at home. (73)

In infants, children and young people, cold homes have been linked to asthma, chest, breathing and mental health problems, slowed physical growth and cognitive development. (73) Children living in cold homes are more than twice as likely to suffer from respiratory problems in comparison with those living in warm homes and

negative indirect impacts of cold homes include those on children's educational attainment, emotional well-being and resilience. (7) In older people cold homes are linked to an increased risk of circulatory and respiratory problems with the greatest increases in EWDs occurring in this group. (7, 74) Further associations are with reduced strength and dexterity and an exacerbation of arthritis symptoms, linked to increased risk of falls and injury. (73) Indirect impacts may include social isolation in that costly fuel bills restrict opportunities beyond the home and undermine social activities within the home (presumably a feature of life for many fuel poor people). (7)

Cold homes are also linked to mental health, with an increase in temperature associated with reduced risk of anxiety and depression. (73) In adolescents more than 1 in 4 living in cold homes are at risk of multiple mental health problems compared to 1 in 20 who have always lived in warm housing. Where fuel poverty has been eliminated, studies have recorded significant improvements in mental health and wellbeing. Breaking the link between fuel poverty and associated stress has the potential to reduce risks to physical health. (74)

A subsequent (2015) review of international studies from high income countries focussed on the connection between cold and damp homes with mental health and well-being, where heating and insulation improvements had taken place and impacts on well-being assessed, suggests that even while the evidence is limited, cold and damp housing contributes to mental health stressors. The conclusion drawn from the included studies is that stressors are varied and tend to revolve around worry about low income, heating costs, debt, social isolation, stigma, thermal discomfort and the impact of cold and damp on health and household belongings. The review points to there being enough evidence, drawn from nine studies thought to be sufficiently rigorous, to suggest that improvements in energy efficiency are often associated with significant improvements in mental well-being. (76)

6.3 Health Inequalities

Lower income groups are more likely to be at risk of fuel poverty and the social gradient that exists in fuel poverty contributes to health inequalities. (73) The associated financial stress of fuel poverty can impact on health and can lead to choices between heating ones homes and eating, 'eat or heat'. (7) It may undermine opportunities to participate in society, leading to isolation and exclusion, with a concomitant detrimental impact on health. Therefore strategies to address inequalities are important in tackling the causes of fuel poverty, and vice versa. (77) As has been pointed out by Public Health England, 'interventions that address fuel poverty and cold home related health problems are likely to help local areas reduce health inequalities, save local and national services money and help level up the social gradient in health.' (78)

6.4 Interventions and Impacts on Health

..while it is highly probable that interventions to improve household energy efficiency have had a positive effect on fuel poverty and household temperatures, there is little evidence that demonstrates positive health impacts and a reduction in the cost of fuel bills or fuel poverty. Greater effort needs to be made to evaluate a range of interventions to establish health outcomes and the impact on health inequalities in the short and long term.

Source: Public Health England. (2014) *Local action on health inequalities: Fuel poverty and cold home-related health problems*. Available from:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/357409/Review7_Fuel_poverty_health_inequalities.pdf

Given the prevalence of fuel poverty in the UK, the body of literature focussed on the health impact of energy efficiency interventions in domestic settings remains somewhat limited. Intervention and evaluation studies have generally been small scale, with the exception of, for example, Warm Front, a key UK government strategy, the Scottish Central Heating Programme and the Kirklees Warm Zone Project. (79, 80, 81)

Consequently, it is difficult to draw conclusions about the types of interventions that might be more successful in addressing fuel poverty and studies that have been able to identify a positive impact on fuel poverty post intervention are sparse. However, the larger scale studies present generally positive findings and, for example, an evaluation of Warm Front, which offered energy efficiency grants to vulnerable households in fuel poverty in the private rented and owner occupied sectors in England until 2005, found that while various benefits were associated with the intervention (e.g. indoor temperature rise, positive impacts on mental health, child respiratory disease and mortality among older people), fuel consumption seems actually to have increased post intervention although fewer recipients reported difficulties in paying fuel bills. (79)

Likewise, an assessment of the Scottish Central Heating Programme found that in relation to 'perceived financial strain', those acquiring central heating through the programme were less likely, than a comparison group, to report any degree of inability to 'manage financially'. (80) The health impacts of the Kirklees Warm Zone, which supplied loft insulations across more than 50,000 homes between 2007-2010, were thought not to be on physical health (although post installation surveys may have allowed insufficient time for health impacts to emerge), but on mental well-being, primarily as a consequence of better thermal comfort, reduced bills and home safety improvements. (81, 82)

6.5 Scottish Studies

There is a dearth of Scottish intervention studies with a focus on fuel poverty, cold homes and health and existing studies of warmth interventions (e.g. central heating, insulation), focussed primarily on social housing, are only broadly suggestive of some positive health impacts, although follow up of study participants may have been insufficient to fully identify further positive health impacts. For example, the Glasgow Warm Homes Study in 2001, cited by Platt *et al* (80) evaluated housing improvements including energy efficiency on Glasgow City Council housing stock. The study identified positive impacts on symptoms associated with dampness, dwellings were warmer, less humid and damp and easier to heat and improvements were achieved with no increase in energy costs. (83)

Effects on health deemed significant, but small, were self-reported in a large scale prospective controlled study of mainly elderly recipients of central heating (the Scottish Central Heating Programme). Reduced damp, cold and likelihood of reporting financial strain was identified for the intervention versus control group but the study found little clear and systematic evidence of impact on health outcomes and health service use and the authors urge caution, due to self-report, in their finding linking heating and reduced probability of receiving first diagnosis of heart disease or high blood pressure. (80, 84)

A study of the 'Heatfest' intervention in the Easterhouse area of Glasgow to supply measures (insulation, double glazing, central heating) to flats experiencing significant problems with cold, damp and mould found that statistically significant falls in systolic and diastolic blood pressure were identified for the intervention versus control group, with self-reported general health improvements, reduced heating costs, medication use and hospital admissions. (85)

A subsequent RCT of mainly elderly COPD patients in Aberdeen found that many study participants would not take up energy efficiency measures (insulation, central heating) when offered amid concerns about costs, loans and disruption. However, significant respiratory health improvements were identified for recipients of the intervention outwith original randomisation although this was thought not to be associated with increased indoor warmth but with psychosocial benefits from reduced fuel costs impacting on health. (86)

Conflicting evidence is similarly provided by recent GoWell findings, focussed on the impact of housing regeneration, demolition and improvements in deprived areas of Glasgow, which suggest that the installation of new gas or electric heating was associated with positive mental health impacts but not physical health. This may be reflective of disruption caused by installation and the presence, in the main, of heating in recipient homes already, thereby reducing 'potential to benefit'. The installation of electric storage heating in high rise buildings awaiting demolition may

also have been insufficient to tackle the underlying trend of worsening health. (87) Despite this, warmth related fabric works (e.g. cladding, insulation) were positively associated with mental and physical health, and possibly because they also improved the external appearance of buildings, and self-reported data suggests links between higher likelihood of recovery from mental health due to fabric works, and circulatory conditions due to fabric with heating works. (88)

6.6 Systematic Reviews

At systematic review level, although there is no obvious consideration of how fuel poverty might be tackled and what interventions work well, much of the work undertaken in the UK with a focus on energy efficiency improvements within domestic settings has recently been appraised by a systematic review that sought to identify studies that assessed change in any health outcome following improvements to the physical fabric of housing. Within this, 17 studies (primarily UK focussed, including most of the Scottish studies already alluded to, as well as New Zealand, Germany and Denmark based studies) assessed the health impacts of warmth and energy efficiency improvements, typically delivered to low income households and including central heating, insulation, double glazing, welfare benefits advice or a combination of these. The findings suggest that improvements to housing conditions can lead to improvements in health; investments that improve thermal comfort in the home can lead to health improvements, especially where the improvements are targeted at those with inadequate warmth and those with chronic respiratory disease; housing that is affordable to heat and an appropriate size for householders is linked to improved health and may promote improved social relationships within and outside the home. Furthermore, the provision of adequate, affordable warmth may reduce absences from school or work. (89)

A further recent systematic review of studies reporting costs and economic analysis of housing improvements, the majority of which were UK focussed, found that most of the studies provided data on intervention and / or recipient costs but missed opportunities to run economic analysis, even where there has been data to support this. The authors conclude that there is a need for future studies to plan an economic evaluation alongside the intervention as a means of allowing for the identification of those policies and interventions that provide good value for money. (90)

6.7 Further Research

There is a need for further UK and Scotland focussed research to determine the impact and affordability of energy efficiency and fuel poverty interventions and measures on recipients. To fill some of the gaps in the evidence base, Public Health England has identified a number of specific research areas requiring further attention within the UK and recommends that future activity focus on:

- The evaluation of interventions to monitor effectiveness and health outcomes.

- Considering if programmes that increase household income to reduce fuel poverty show that those increases positively impact on fuel poverty, temperature and health.
- Establishing if programmes that aim to help households reduce energy costs show that savings on energy bills positively impact on fuel poverty and cold home-related health.
- Identifying the impact of interventions on the number of GP visits or hospital admissions and keeping a record of these to provide data to calculate potential healthcare savings.
- Fuel poverty and cold home-related ill health in the private rented sector and how local authorities can enforce effective regulation in this sector.
- Identifying the optimum indoor temperature for good health for different age groups and health status to resolve uncertainty about current guidance (21°C for living room and 18°C for all other occupied rooms). (73)

6.8 Health Professionals and Fuel Poverty

The cost to the NHS of cold related ill-health is likely to be in excess of £1 billion per year. (7) The cost of housing-related ill health, where poor housing conditions are a main contributor, is estimated to cost the NHS £2.5bn annually, including those costs accrued by primary care services, treatment, hospital stays and outpatient visits. (73) It has also been estimated that for every £1 spent on affordable warmth, a saving of 42p is delivered to the NHS. (74) There is a clear rationale therefore for delivering interventions and measures that allow recipients to heat their homes within their means and to reduce the pressure cold homes and attendant ill health places on health and social care providers.

Greater importance has recently been placed on how health practitioners can better identify and support those in, or at risk of, fuel poverty and contribute to the development of service provision based on a single point of contact model to link with other services. Much of this guidance applies to England and reflects the shift of public health responsibilities to local authorities, and the establishment of Health and Wellbeing boards as the accountable body to improve local population health and reduce health inequalities.

UK Health Forum advice to Directors of Public Health (DsPH) and Health and Wellbeing Boards recognises the critical role of the DsPH in advising partners on the link between fuel poverty and health and in embedding a preventative and social determinants approach to improving health. It recommends that DsPH:

- Identify and prioritise, with the NHS and partners, those in need of affordable warmth interventions.
- Use sophisticated data and intelligence to identify issues, trends and needs.

- Enable frontline staff to integrate affordable warmth into everyday practice and have knowledge and skills to identify the vulnerable and provide advice, support and referral.
- Identify how public health staff can assimilate issues relating to fuel poverty and cold homes into wider community health improvement programmes.
- Factor evaluation into the commissioning and delivery of interventions from the start (measuring outcomes, not just the numbers reached or measures provided)
- Improve, develop and commission referral systems or networks to ensure that the vulnerable and those in need receive interventions.
- Appoint a health improvement specialist from the public health team as an affordable warmth advocate. (74)

The Forum's guidance for primary care encourages practitioners to develop knowledge and skills to identify, advise and refer patients who may be fuel poor or living in a cold home and to question patients, such as those with certain conditions, about how warm they are during cold weather. It is recommended that fuel poverty and cold homes be included in patient care and assessment with consideration of its role as a precipitating or aggravating factor for frail or vulnerable patients and those with long term conditions, among others. (91)

Likewise, NICE stresses a need for primary health, social care and home care practitioners (e.g. voluntary sector, energy companies, housing staff) to identify those in cold homes, regularly assess heating needs of service users, provide information and refer.²³ A person's record, with consent, would detail this information and be shared with other practitioners. NICE recommends that those responsible for discharging vulnerable people from health or social care settings should assess if the person is likely to be susceptible to the cold well before discharge. NICE envisages a wide range of organisations (statutory, voluntary, NHS) working together, applying a 'one-stop' model. They recommend that Health and Wellbeing Boards identify those at risk, assess heating needs, identify local interventions and ensure that a local single-point-of-contact health and housing referral service is commissioned to help

²³ A recent study points to the lack of research on the role of healthcare practitioners in relation to fuel poverty. Evidence drawn from a small study of 9 GPs and nurses in England suggests an underestimation of the health consequences of fuel poverty and a lack of desire to discuss personal issues with clients. Fuel poverty was perceived as something that could be observed in material circumstances (and presumably ignored if not observable). Preference was to help patients make the link between their circumstances and their health and to help them access further help, but not deal directly with the issue. The authors point to further sources of evidence that come to broadly similar conclusions and state that their study supports the need for clinical training to better focus on social issues and health outcomes and for clinicians to be encouraged and supported to engage patients in ways that help them tackle such issues. Source: McConalogue D, Kierans C and Moran A. *The hidden practices and experiences of healthcare practitioners dealing with fuel poverty*. J Public Health(Oxf). (2016) 38 (2): 206-211.

the vulnerable and those in contact with them. This would link with relevant services, offer face to face contact if required and tailored measures. (6)

6.9 Examples of Partnership Working – England

The following England based interventions provide examples of the types of activity, both current and recent, underway involving health service providers, such as clinical commissioning groups, among a range of partners. The following are just a handful of examples (many drawn from the *Catalogue of health-related fuel poverty schemes*, DECC, 2015) (92) and include one stop shops, referral schemes, ‘boilers on prescription’, provision of advice within GP surgeries and service co-location:

- The **Seasonal Health Interventions Network (SHINE)**, operated by Islington Council aims to reduce winter deaths and hospital admissions. A network of housing, health, social care, children’s services and voluntary sector frontline staff refer residents to a single point of contact where they are assessed and provided with advice on energy saving techniques and keeping warm, and, where necessary, referred to appropriate interventions (e.g. health, energy, benefits and debt advice). Those aged over 75 or with long term health conditions and low income families with young children are prioritised (residents can also self-refer). It is estimated that £450,000 is saved yearly on energy bills through measures accessed through SHINE (there have been around 19,100 interventions since 2010). The scheme also provides emergency credit for prepayment meter customers. A similar SHINE scheme also runs in Hackney. (78, 93, 94)
- **GP Surgery Advice, Coventry** allows the local authority to use GP practices to offer energy advice to patients while waiting for their GP appointments although this location is thought to limit information sharing and so the use of consulting rooms is planned. Initial correspondence with GP surgeries, endorsed by the Director of Public Health, identified 7 practices, of 78 contacted, willing to participate in the scheme. Practice managers have been viewed as the most useful contacts within surgeries. To encourage participation it is thought that framing arguments within the context of fuel poverty interventions lessening surgery workloads and improving patient health has been productive. Practices have been targeted for advice provision on days when clinics are held for specific health conditions, e.g. COPD (92)
- **Liverpool Healthy Homes** is a Liverpool City Council referral scheme that visits properties in areas with greater housing and health needs and gathers information about the occupants, their health and condition of their homes. Clients can be referred to the scheme by a range of partners, or referred by the scheme to these partners. ‘Healthy Homes on Prescription’, an extension to the programme works with GPs who are prompted to ask patients about their housing conditions. Housing improvements made in year 1 of the programme are

estimated to have saved the NHS in the region of £439,405 per year, from 2013 onwards. (95, 96)

- **Winter Wellness and Boilers on Prescription** (Public Health, Cornwall Council/ Isles of Scilly) was set up in 2011 to provide a single point of contact call line for vulnerable households to access a range of housing, health and welfare services. One-off payments are provided of up to £300 for fuel relief, e.g. for payment of bills, using emergency local welfare spending with the aim of reducing avoidable winter hospital admissions. Households are then channelled into further forms of support and advice provided by partners (e.g. debt, unemployment, energy efficiency works, health issues). The fuel poverty intervention aims to improve working-age household income and for them to progress into 'sustainable and independent work-life pathways'. NHS Kernow Clinical Commissioning Group cascades information about the scheme to front line health workers, but GPs have been difficult to engage and referrals from them to the scheme have been low. The scheme assumes a prevention rate of 25% for every household supported by the emergency fund, which equates to an estimated saving to the NHS of nearly £2 from avoided hospital admissions for every £1 spent on the scheme. (92)
- A **Boilers on Prescription** (Sunderland) scheme, has been piloted by social housing provider, Gentoo, working with Sunderland's Clinical Commissioning Group. Various measures were installed across 6 poorly insulated properties housing COPD sufferers (a control group of 6 homes not receiving measures). After 18 months of the trial, patient data showed a reduction in GP, outpatient and A&E department visits. With this has been a reduction in energy bills and increases in room temperatures. (97, 98, 99, 100)
- A further **Boiler on Prescription** (Surrey Downs Clinical Commissioning Group) scheme is targeting those who are disabled, have a health condition (e.g. COPD) or are elderly. Potential recipients of support are identified by a health care professional or health body, although there have been 'challenges with getting healthcare professionals on board'. (92)
- **AWARM** (Affordable Warmth Access and Referral Mechanism) pilot was a partnership of Salford City Council and Primary Care Trust, funded by the Department of Health and operated in Manchester, using a 'central clearing house' model, a local area partnership approach linking health, housing and fuel poverty services, with the aim of increasing referrals to a one-stop-shop from various sectors (local authority, Primary Care Trusts, GPs etc.). Services included energy efficiency, benefits and debt advice, support for home repairs and insulation measures. More than £600,000 was invested in central heating and insulation and almost 1,400 professionals were trained in 12 months from all

sectors. The programme was evaluated, and a cost-benefit analysis conducted on 52 household interventions found that the cost of the interventions was estimated to be £88,800 with an estimate of 2.55 life years gained from living longer. The evaluation also identified a dramatic increase in referrals from across the social and care sectors. (7, 78, 101)

- **Citizens Advice Bureau, Derbyshire** provides 98 GP practices with access to CAB, which can advise on a range of issues, such as fuel poverty, with GPs able to refer patients to accessible co-located CAB services. The scheme is viewed as taking pressure off GPs and is focussed on the vulnerable and disadvantaged (95)
- **Warm Homes Oldham** has been funded by Oldham Clinical Commissioning Group with Oldham Council and Oldham Housing Investment Partnership, with the aim of generating cost savings for the partners involved. Home energy improvements, energy and income maximisation advice are provided to those at risk of fuel poverty. Households had to meet age, income-based or health criteria. A recent interim evaluation of the project states that there has been a statistically significant change in almost all key change variables such as improvements in fuel poverty, general health and wellbeing. (102)
- **Cornwall Together** aims to help individuals switch energy tariffs, reduce fuel bills, alleviate fuel poverty and improve public health. It is estimated to have saved Cornish residents £3.7m in fuel bills since its launch in 2012. Partners include the NHS, Eden Project, Cornwall Council, Community Energy Plus (CEP), Age UK, CAB, uSwitch, energyshare, Unison and the St. Austell Brewery. The scheme, which invests in a fuel poverty fund for the county, overseen by the NHS and other partners, aims to use sustainable and environmentally friendly energy and has delivered an awareness raising campaign targeted at the hard to reach, fuel poor and vulnerable. (78)
- **Financial Health and Wellbeing Service in Northampton** is a 13-month pilot project funded by British Gas Energy Trust targeting mental health service users experiencing problems with fuel poverty. It is delivered by an advice charity, Community Law Service. Their debt, housing and benefits advisors use health venues to target households in financial hardship. Community Law Service has established referral pathways with 15 health teams and an on-site presence at five locations. There has been a focus on engaging GP and mental health services, such as within a large mental health hospital. It is thought that encouraging health professionals to get involved is best achieved via highlighting the links between improved patient wellbeing brought about by addressing energy and financial issues and the resultant reduction in staff workloads. (92)

- **Warm and Well in Tower Hamlets** (Global Action Plan, a charity/ Barts Health NHS Trust) has been running with the aim of targeting vulnerable fuel poor households by delivering 'energy packs' through community based nurses and clinicians who visit patients in their homes. The pack contains tips on keeping warm and saving energy, a plastic thermometer, signposting to services and an opportunity to apply for a radiator key and reflector panel (the key/ panel depend on completing and returning a postcard with basic information about the household and its energy behaviours). The pack was co-developed and branded by Barts Health NHS Trust, as part of their work focussed on local air quality and carbon emissions. It is thought that the scheme, described as 'simple' for busy health professionals to engage with, has been useful in that clinicians can be witness to patient housing conditions, make links between housing and patient health and raise the issue of energy needs with patients. Clinicians are identified via Mile End Hospital and the Director of Public Health. (92)

6.10 Examples of Partnership Working – Scotland

Information about broadly equivalent projects in Scotland is considerably harder to identify from the published literature, making the sharing of any evidence about how health service professionals in Scotland are working with partners in relation to fuel poverty more problematic. Nevertheless, there are several examples of health sector collaborative work with partners seeking to address the problems associated with cold homes, fuel poverty and debt:

- The **Healthy Homes for Highland partnership** is comprised of Home Energy Scotland, NHS Highland, Highland Council, Citizens Advice Scotland and the Scottish Fire and Rescue Service. Staff refer clients to the scheme via Home Energy Scotland who link with services. It supports vulnerable and hard-to-reach householders by working with agencies that have face to face contact with those groups and by providing energy efficiency advice and measures, income maximisation, money and home safety advice. (103)²⁴
- A **National Links Worker Programme** funded by the Scottish Government, is being delivered as a partnership between the Health and Social Care Alliance Scotland and 'GPs at the Deep End' who serve deprived populations. The programme aims to help GP patients link with potentially beneficial community services as a means of mitigating the impact of the social determinants of health for those living in deprived areas amid recognition that poverty and financial difficulties, among other major social problems, are responsible for a significant number of GP consultations. The programme recognises the lack of time available for GPs to refer patients to community based services, as well as a

²⁴ For further information see the following Healthy Homes for Highland E-Learning Module: www.changeworks.org.uk/resources/elearning/healthy-homes-for-highland

need expressed by GPs for a bio-psychosocial model of care (that also places emphasis on socio-economic circumstances, psychological factors, as well as biology). The approach uses 'Community Links Practitioners' to work directly with clinical and non-clinical staff and with GP patients, particularly those individuals with complex problems to enable them to access further support within the community (104)

- **Craigmillar Medical Centre**, working with a **Home Energy Scotland** advisor, engaged with 656 service users attending appointments during late 2015. Evaluation indicates that service users viewed advice as helpful and some benefitted from 'tips' on how to keep warm within the home. The evaluation suggests that this form of advice may be more useful in areas where there is a high prevalence of more energy efficient social housing or where incomes are low rather than advice on installing energy efficiency measures. There was little evidence of any links between any improvements in household warmth and improved health. (105)
- The **Scottish Government** also plans to take forward work to determine how it can supplement the activities of Home Energy Scotland to get its literature and messages to patients and visitors across NHS locations. (106)

7 Conclusion and Recommendations

7.1 Conclusion

The available evidence suggests that in spite of a range of energy efficiency measures and loans, fuel poverty is acute among a range of groups, particularly those living in rural areas, on a low income or of pensionable age.

There is a dearth of research at Scottish level focussed on how people actually experience fuel poverty, what interventions and measures work to tackle fuel poverty and contribute to improvements in health. Without better evidence of the types of interventions and measures that improve health, are affordable and that those in fuel poverty or at risk of fuel poverty are able to engage with, it is difficult to envisage how fuel poverty and the health risks attendant with living in a cold home can be fully addressed. This is further compounded by significant problems in relation to successfully and realistically identifying the fuel poor.

There is little to indicate at present that in the medium to long term, gas and electricity prices will fall. Factors such as dependence on gas imports, environmental targets and the replacement of old power stations are likely to impact on energy prices. There has been pressure on domestic energy suppliers to reduce fuel prices,

as wholesale energy prices have fallen, but price cuts have been smaller than price rises. (107, 108)

In addition to this, the need for less expensive measures (cavity wall and loft insulation) have largely been met in Scotland and this now requires greater investment in more expensive measures (solid wall insulation) as well as better support and advice to complement physical measures and a clearer understanding of energy use post installation of measures. (47)

Scotland has been successful in leveraging a disproportionate amount of UK-wide energy efficiency and fuel poverty funding but this is not assured and future public funds are unlikely to be sufficient. (47) It could be against this backdrop, as well as reductions in public spending, welfare reform and projections that indicate that median incomes will grow by 1.5% to 2021, viewed as modest by historic standards, with no growth in real incomes at the bottom of the distribution of household incomes, due in part to cuts in benefits (109) that fuel poverty and cold homes will continue to impact on the physical and mental health of individuals and families in Scotland and place a significant financial burden on health and social care providers.

7.2 Recommendations

As an initial step, it is recommend that:

- Scottish Directors of Public Health agree that the problem of fuel poverty and cold homes are a public health priority

It is recommended that Directors of Public Health:

- Identify a named representative to provide public health leadership and strategic input on fuel poverty and cold homes within their NHS Board area who would:
 - Link with appropriate local and national partners such as primary care, local authorities, Integration Joint Boards, Community Planning Partnerships, third sector (e.g. Energy Action Scotland) and housing association representatives
 - Advise partners on the links between fuel poverty, cold homes and ill-health
 - Work with local authorities and partners to identify who and where those most vulnerable to fuel poverty reside within NHS board areas
 - Work with partners to identify how data and intelligence can best identify those at risk, or in fuel poverty
 - Provide specialist public health advice and guidance on monitoring and evaluating interventions and measures and to be an advocate for the inclusion of evaluation in fuel poverty interventions to better determine what works
 - Investigate the potential for fuel poverty and cold home related activities to be welded onto other health improvement / health promotion activities

- Consider the feasibility and potential benefits of developing training for frontline staff to support their understanding of fuel poverty
- Consider barriers to health service professional engagement with issues related to fuel poverty
- Link with fuel poverty leads across NHS Boards, sharing experience and knowledge of local measures and activities to address fuel poverty.

8 Bibliography

1. Scottish Government. (2014) *Scottish House Condition Survey: 2014 Key Findings*. Edinburgh: Scottish Government. Available from: <http://www.gov.scot/Resource/0049/00490947.pdf>
2. Scottish Government. (2014) *Progress Report on the Scottish Fuel Poverty Statement 2002*. Edinburgh: Scottish Government. Available from: www.gov.scot/Resource/0046/00468801.pdf
3. Liddell G. (2016) Financial Scrutiny Unit Briefing: *Fuel Poverty in Scotland*. Edinburgh: Scottish Parliament. Available from: http://www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S4/SB_16-18_Fuel_poverty_in_Scotland_2016.pdf
4. Lodge U, Hudson N and Liddell G. (2012) Financial Scrutiny Unit Briefing: *Fuel poverty*. Edinburgh: Scottish Parliament. Available from: www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S4/SB_12-07.pdf
5. Liddell G. (2015) Financial Scrutiny Unit Briefing: *Fuel poverty in Scotland*. Edinburgh: Scottish Parliament. Available from: www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S4/SB_15-13_Fuel_Poverty_in_Scotland.pdf
6. NICE. (2015) *Excess winter deaths and morbidity and the health risks associated with cold Homes*. NICE. Available from: www.nice.org.uk/guidance/ng6/resources/excess-winter-deaths-and-morbidity-and-the-health-risks-associated-with-cold-homes-51043484869
7. Marmot Review Team. (2011) *The Health Impacts of Cold Homes and Fuel Poverty*. London: Friends of the Earth England, Wales and Northern Ireland. Available from: www.instituteofhealthequity.org/projects/the-health-impacts-of-cold-homes-and-fuel-poverty/the-health-impacts-of-cold-homes-and-fuel-poverty-full-report.pdf
8. Liddell C, Morris C, McKenzie P, and Rae G. (n.d.) *Defining Fuel Poverty in Northern Ireland: a preliminary review*. University of Ulster. Available from: [http://eprints.ulster.ac.uk/19994/1/FuelPovertyReport\(WEB\)-5Sept2011.pdf](http://eprints.ulster.ac.uk/19994/1/FuelPovertyReport(WEB)-5Sept2011.pdf)
9. Lenny Koh S C, Marchand R, Genovese A and Brennan A. (2011) *Fuel poverty: perspectives from the front line*. Sheffield: University of Sheffield. Available from: www.shef.ac.uk/polopoly_fs/1.272226!/file/Fuel_Poverty_perspectives_from_the_front_line.pdf

10. Scottish Government. (2012) *Fuel Poverty Evidence Review: Defining, Measuring and Analysing Fuel Poverty in Scotland*. Edinburgh: Scottish Government. Available from: www.scotland.gov.uk/Resource/0039/00398798.pdf
11. *Warm Homes and Energy Conservation Act 2000*. Available from: www.legislation.gov.uk/ukpga/2000/31/contents
12. *Housing (Scotland) Act 2001*. Available from: http://www.legislation.gov.uk/asp/2001/10/pdfs/asp_20010010_en.pdf
13. Scottish Executive. (2002) *Scottish Fuel Poverty Statement*. Edinburgh: Scottish Executive. Available from: www.gov.scot/Resource/Doc/46951/0031675.pdf
14. Scottish Government. (2013) *Low carbon Scotland: meeting the emissions reduction targets 2013-2027. The second report on proposals and policies*. Edinburgh: Scottish Government. Available from: <http://www.gov.scot/Resource/0042/00426134.pdf>
15. Scottish Government. (2013) *Scotland's Sustainable Housing Strategy*. Edinburgh: Scottish Government. Available from: <http://www.gov.scot/Resource/0042/00425697.pdf>
16. National Energy Action. (2015) *UK Fuel Poverty Monitor 2014- 2015*. Newcastle Upon Tyne: National Energy Action. Available from: <http://www.nea.org.uk/wp-content/uploads/2015/06/UK-Fuel-Poverty-Monitor-2015.pdf>
17. Scottish Parliament, Economy, Energy and Tourism Committee. (2014) *Report on the draft budget 2015-2016*. Edinburgh: Scottish Parliament. Available from: www.scottish.parliament.uk/S4_EconomyEnergyandTourismCommittee/Reports/ee15-DraftBudget.pdf
18. Scottish Government. (2013) *Scottish House Conditions Survey 2012 - Key Findings*. Edinburgh: Scottish Government. Available from: www.gov.scot/Resource/0043/00439879.pdf
19. Department of Energy and Climate Change. (2013) *Annual Report on Fuel Poverty Statistics*. London: DECC. Available from: www.gov.uk/government/uploads/system/uploads/attachment_data/file/199833/Fuel_Poverty_Report_2013_FINALv2.pdf
20. Hills J. (2012) *Getting the measure of fuel poverty: Final Report of the Fuel Poverty Review*. London: Centre for Analysis of Social Exclusion, LSE. Available from: <http://sticerd.lse.ac.uk/dps/case/cr/CASEREport72.pdf>

21. BBC. *Fuel poverty: Ministers 'shifting goalposts'*. 2 December 2013. Available from: www.bbc.co.uk/news/uk-politics-25180992
22. The Independent. *800,000 people 'lifted' out of fuel poverty - by redefining it*. 2 December 2013. Available from: www.independent.co.uk/news/uk/politics/800000-people-lifted-out-offuel-poverty--by-redefining-it-8976232.html
23. House of Commons Environmental Audit Committee. (2013) *Energy Subsidies*. Ninth Report of Session 2013–14, Vol. 1. London: TSO. Available from: <http://www.publications.parliament.uk/pa/cm201314/cmselect/cmenvaud/61/61.pdf>
24. Barton C. and Hough D. (2016). *Fuel Poverty*. Briefing Paper: Number SN05115, 18 February 2016. London: House of Commons Library. Available from: <http://www.parliament.uk/briefing-papers/SN05115.pdf>
25. Walker R, Thomson H and Liddell C. (eds.) (2013) *Fuel poverty 1991 – 2012, Commemorating 21 years of action, policy and research*. University of Ulster. Available from: <http://fuelpoverty.eu/wp-content/uploads/2013/03/Fuel-poverty-anniversary-booklet.pdf>
26. Hills J. (2011) *Fuel poverty: the problem and its measurement: Interim report of the fuel poverty review*. London: Centre for Analysis of Social Exclusion, LSE. Available from: <http://sticerd.lse.ac.uk/dps/case/cr/CASEREport69.pdf>
27. Centre for Analysis of Social Exclusion. (2012) *Getting the measure of fuel poverty: Executive Summary*. CASE brief 31. London: Centre for Analysis of Social Exclusion, LSE. Available from: <http://sticerd.lse.ac.uk/dps/case/cb/CASEBrief31.pdf>
28. Scottish Fuel Poverty Forum. (2014) *Final report on the review of the Scottish Government's fuel poverty strategy*. Available from: www.scotland.gov.uk/Resource/0044/00446911.docx
29. McKendrick J H. (2014) Who lives in poverty. In: McKendrick J H, Mooney G, Dickie J, Scott G and Kelly P. (eds.) *Poverty in Scotland: The independence referendum and beyond*. London: Child Poverty Action Group.
30. Scottish Government. (2016) *Welfare Reform (Further Provision) (Scotland) Act 2012: Annual Report – 2016*. Edinburgh: Scottish Government. Available from: <http://www.gov.scot/Resource/0050/00502470.pdf>
31. Consumer Focus Scotland. (2009) *Switching Off: Attitudes to switching energy suppliers among disadvantaged consumers*. Available from: <http://www.consumerfocus.org.uk/scotland/files/2010/10/CFS-Switching-Energy.pdf>

32. Anderson W and White V. (2010) “*You just have to get by*”: Coping with low incomes and cold homes. Bristol: Centre for Sustainable Energy. Available from: https://www.cse.org.uk/downloads/reports-and-publications/fuel-poverty/you_just_have_to_get_by.pdf
33. Shetland Islands Citizens Advice Bureau. (2013) *Fuel Bills Survey Report*. Available from: <http://www.cas.org.uk/system/files/Fuel%20Bills%20Survey%20Report.pdf>
34. De Haro M T and Koslowski A. *Fuel poverty and high-rise living: using community-based interviewers to investigate tenants' inability to keep warm in their homes*. Journal of Poverty and Social Justice. 2013;21(2):109-121
35. Heat and the City. (2014) Findings from a Survey of Wyndford Households and Experiences of New District Heating. University of Edinburgh. Available from: www.heatandthecity.org.uk/_data/assets/pdf_file/0005/166919/Heat_and_the_City_-_2014_-_Wyndford_survey_final_report.pdf
36. Department of Energy and Climate Change. (2014) *Understanding the behaviours of households in fuel poverty*. London: DECC. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332122/understanding_behaviours_households_fuel_poverty_review_of_research_evidence.pdf
37. Scottish Government. *Equality Evidence*. Available from: www.gov.scot/Topics/People/Equality/Equalities/DataGrid/Age/AgeRuralEnv
38. Scottish Government. (2012) *Energy Use in the home: Measuring and Analysing Domestic Energy Use and Energy Efficiency in Scotland*. Edinburgh: Scottish Government. Available from: www.gov.scot/Resource/0039/00398667.pdf
39. Scottish Government. (2014) *Scottish House Conditions Survey 2010-2012: Local Authority Analyses*. Edinburgh: Scottish Government. Available from: www.gov.scot/Topics/Statistics/SHCS/LAtables2012
40. Scottish Government. (2016) *Scottish House Conditions Survey 2012-2014: local authority analyses*. Edinburgh: Scottish Government. Available from: <http://www.gov.scot/Topics/Statistics/SHCS/keyanalyses/LAtables2014>
41. National Energy Action/ Energy Action Scotland. (2013) *UK fuel poverty monitor*. Available from: <http://www.nea.org.uk/wp-content/uploads/2015/07/Fuel-Poverty-Monitor-2013-FINAL.pdf>

42. Howard R. (2015) *Warmer Homes: Improving fuel poverty and energy efficiency policy in the UK*. London: Policy Exchange. Available from: <http://www.policyexchange.org.uk/images/publications/warmer%20homes.pdf>
43. Iparraguirre J. (2015) *Have winter fuel payments reduced excess winter mortality in England and Wales?* *Journal of Public Health*. 2015;37(1):26-33.
44. House of Commons Library. (2015) *Warm Home Discount*. Briefing Paper No. SN 05956. Available from: www.parliament.uk/briefing-papers/SN05956.pdf
45. Ofgem. (2014) *Review of the Priority Services Register*. London: Ofgem. Available from: https://www.ofgem.gov.uk/sites/default/files/docs/2014/06/condoc_psr_review_1.pdf
46. Scottish Government. (2014) *Home Energy Efficiency Programmes for Scotland, summary delivery report 2014/15*. Edinburgh: Scottish Government. Available from: <http://www.gov.scot/Resource/0049/00497703.pdf>
47. Maiden, T. Baker, K. and Faulk, A. *Taking the Temperature: A review of energy efficiency and fuel poverty schemes in Scotland*. Consumer Futures Unit Publication Series 2016: A report by CAG Consultants in association with Glasgow Caledonian University, Andrew Faulk and the Energy Agency. Edinburgh: Consumer Future's Unit, 2016. Available from: http://www.cas.org.uk/system/files/publications/taking_the_temperature_-_a_review_of_energy_efficiency_and_fuel_poverty_schemes_in_scotland.pdf
48. Scottish Government. HEEPS Area Based Schemes. Available from: www.gov.scot/Topics/Built-Environment/Housing/warmhomes/uhis
49. Ofgem. *Energy Company Obligations (ECO)*. Available from: www.ofgem.gov.uk/environmental-programmes/energy-companies-obligation-eco
50. Sustainable Urban Environments Research Group, Glasgow Caledonian University. (2013) *Review of the Energy Assistance Package*. Glasgow: GCU. Available from: www.gov.scot/Resource/0044/00448108.pdf
51. Energy Action Scotland/ Scottish Fuel Poverty Forum. (2015) *Reaching the Target to End Fuel Poverty by 2016*. Available from: www.theclaymoreproject.com/uploads/associate/365/file/EAS%20Publications/Reaching%20the%20Target%20to%20End%20Fuel%20Poverty%20by%202016.pdf
52. Scottish Government and COSLA. (2009) *Guidance to local authorities on fuel poverty*. Available from: www.gov.scot/Resource/Doc/273879/0081848.pdf

53. COSLA *et al.* The Energy Efficiency Standard for Social Housing (ESSH). Available from: <http://www.energyefficientsocialhousing.org/>
54. Energy Saving Trust. Home Energy Scotland. Available from: www.energysavingtrust.org.uk/domestic/content/home-energy-scotland
55. Hawkey D. *District heating in the UK: A Technological Innovation Systems analysis*, Environmental Innovation and Societal Transitions. 2012;5:19-32. Available from: www.research.ed.ac.uk/portal/files/14773640/Hawkey_2012_UK_DH_TIS.pdf
56. Scottish Government. (2009) *Community Renewable Energy Toolkit*. Edinburgh: Scottish Government. Available from: <http://www.gov.scot/Publications/2009/03/20155542/0>
57. Community Energy Scotland Limited. (2011) *Community Renewable Energy Toolkit*. Available from: <http://www.gov.scot/Resource/Doc/917/0115763.pdf>
58. Argyll and Bute Council. *Argyll and Bute Renewable Energy Action Plan – 2010 to 2013*. Available from: www.argyll-bute.gov.uk/sites/default/files/planning-and-environment/argyll-and-bute-renewable-energy-action-plan.pdf
59. Community Energy Scotland. *Hanover Housing Association Woodfuel Project*. Available from: www.communityenergyscotland.org.uk/userfiles/file/case_studies/Case_Study_-_Hanover_-_Woodfuel.pdf
60. Energy Saving Trust. *West Whitlawburn*. Available from: www.districtheatingscotland.com/sites/default/files/West%20Whitlawburn%20case%20study.pdf
61. Aberdeen Heat and Power Ltd: www.aberdeenheatandpower.co.uk/about/
62. Webb J. *Improvising innovation in UK urban district heating: the convergence of social and environmental agendas in Aberdeen*. Energy Policy. 2015;78:265-272.
63. The Association for Decentralised Energy. Wyndford Estate, Glasgow. Available from: http://www.theade.co.uk/wyndford-estate-glasgow_1698.html
64. Cube Housing Association: www.cubehousing.co.uk/
65. Heat and the City. Wyndford Estate. Available from: www.heatandthecity.org.uk/resources/documents/wyndford_estate

66. Dundee City Council . (c2013) *Local Housing Strategy 2013-2018*. Available from: www.dundee.gov.uk/sites/default/files/publications/LHS%202013%20-%202018%20Final.pdf
67. Scottish Government. (2013) *Greener Homes Prospectus*, 3rd Edition. Edinburgh: Scottish Government. Available from: www.gov.scot/Resource/0041/00416501.doc
68. Forestry Commission Scotland. *Albyn Housing Society*. Available from: www.usewoodfuel.co.uk/media/303744/fcs_albyn_housing_111011_screen.pdf
69. Heat and the City. DH Vanguard Projects. Available from: www.heatandthecity.org.uk/dh_vanguards_network/dh_projects
70. Edinburgh City Council . (2014) *Green dykes and Wauchope House*. Available from: www.edinburgh.gov.uk/download/meetings/id/42027/item_79_-_greendykes_and_wauchope_housing_%25E2%2580%2593_update_on_district_heating_system
71. Energy Saving Trust. (2011) *Slateford Green and Lasswade Road, Edinburgh: A case study on small scale communal heating*. Available from: www.districtheatingscotland.com/sites/default/files/Slateford%20Green%20case%20study.pdf
72. Edinburgh City Council. (2011) *New green development blasts into housing finals*. Available from: www.edinburgh.gov.uk/news/article/588/new_green_development_blasts_into_housing_finals
73. Public Health England. (2014) *Local action on health inequalities: Fuel poverty and cold home-related health problems*. Health Equity Evidence Review 7: September 2014. London: Public Health England. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/357409/Review7_Fuel_poverty_health_inequalities.pdf
74. UK Health Forum (2014). *Fuel poverty: how to improve health and wellbeing through action on affordable warmth*. London: UK Health Forum. Available from: http://www.fph.org.uk/uploads/UKHF-HP_fuel%20poverty_report.pdf

75. National Records of Scotland (2015). *Winter Mortality in Scotland 2014/15*. Available from: <http://www.nrscotland.gov.uk/files//statistics/winter-mortality/14-15/wm-2014-15.pdf>
76. Liddell C and Guiney C. (2015). *Living in a cold and damp home: frameworks for understanding impacts on mental well-being*. Public Health. 129;3:191-199.
77. Faculty of Public Health. (2003) *Fuel Poverty & Health: briefing statement*. London: Faculty of Public Health. Available from: http://www.fph.org.uk/uploads/bs_fuel_poverty.pdf
78. Public Health England. (2014) *Local action on health inequalities: Fuel poverty and cold home related health problems*. Health equity briefing 7, September 2014. London: Public Health England. Available from: www.gov.uk/government/uploads/system/uploads/attachment_data/file/355790/Briefing7_Fuel_poverty_health_inequalities.pdf
79. Green G and Gilbertson J. (2008) *Warm Front, Better Health: Health impact evaluation of the Warm Front scheme*. Sheffield: Sheffield Hallam University. Available from: www.shu.ac.uk/research/cresr/sites/shu.ac.uk/files/warm-front-health-impact-eval.pdf
80. Platt S, Mitchell R, Petticrew M, Hopton J, Petticrew M, Corbett J, Hope S and Martin C. (2007) *The Scottish Executive Central Heating Programme: Assessing Impacts on Health*. Edinburgh: Scottish Executive Social Research. Available from: www.gov.scot/Resource/Doc/166025/0045176.pdf
81. Liddell C, Morris C, and Lagdon S. (2011) *Kirklees Warm Zone: The project and its impacts on well-being*. University of Ulster. Available from: http://eprints.ulster.ac.uk/19116/1/KIRKLEES_PROJECT_and_COST_BENEFIT_REPORT.pdf
82. Long T B, Young W, Webber P, Goulson A and Harwatt H. *The impact of domestic energy efficiency retrofit schemes on householder attitudes and behaviours*. Journal of Environmental Planning and Management. 2015;58:1853-1876.
83. Caldwell J *et al* (2001) *Glasgow Warm Homes Study: Final Report*. Glasgow: Glasgow City Council Housing Services (A copy of this study could not be sourced for this report).

84. Walker J, Mitchell R, Petticrew M and Platt S. *The effects on health of a publicly funded domestic heating programme: a prospective controlled study*. Journal of Epidemiology and Community Health. 2009;63:12-17.
85. Lloyd E, McCormack C, McKeever M and Syme M. *The effect of improving the thermal quality of cold housing on blood pressure and general health: a research note*. Journal of Epidemiology and Community Health. 2008;62:793-797.
86. Osman L M, Ayres J G, Garden C, Reglitz K, Lyon J and Douglas J G. *A randomised trial of home energy efficiency improvement in the homes of elderly COPD patients*. Eur Respir J. 2010;35(2):303-9.
87. Curl A, Kearns A, Mason P, Egan M, Tannahill C and Ellaway A. *Physical and mental health outcomes following housing improvements: evidence from the GoWell study*. Journal of Epidemiology and Community Health 2015;69(1):12-19.
88. Curl A and Kearns A. *Can housing improvements cure or prevent the onset of health conditions over time in deprived areas?* BMC Public Health. December 2015, 15:1191
89. Thomson H, Thomas S, Sellstrom E and Petticrew M. *Housing improvements for health and associated socioeconomic outcomes (Review)*. Cochrane Database of Systematic Reviews; 2013, 2. Art. No. CD008657. Available from: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD008657.pub2/pdf>
90. Fenwick E, Macdonald C and Thomson H. *Economic analysis of the health impacts of housing improvement studies: a systematic review*. Journal of Epidemiology and Community Health. 2013;67(10):835-45.
91. UK Health Fourm. (2014) *Fuel poverty: Tackling cold homes and ill-health. A guide for primary care*. Available from: http://nhfshare.heartforum.org.uk/RMAssets/HealthyPlaces/PrimaryCareGuidance_HP.pdf
92. Department of Energy and Climate Change. (2015) *Catalogue of health-related fuel poverty schemes*. London: DECC. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/451025/DECC_FINAL.pdf
93. UK Health Forum. Islington SHINE. Available from: <http://nhfshare.heartforum.org.uk/RMAssets/Casestudies/IslingtonSHINE.pdf>

94. NHS / Hackney Council. Hackney SHINE. Available from:
www.cityandhackneyccg.nhs.uk/News-and-publications/Shine.pdf
95. Public Health England. (2015) *Local leadership, new approaches: How new ways of working are helping to improve the health of communities*. London: Public Health England. Available from:
www.gov.uk/government/uploads/system/uploads/attachment_data/file/407060/2014_712_Local_leadership.pdf
96. Public Health England. (2013) *Health and Care Integration Making the case from a public health perspective*. London: Public Health England. Available from:
www.gov.uk/government/uploads/system/uploads/attachment_data/file/268181/Health_and_care_integration.pdf
97. Burns, P. and Coxon, J. (2016) *Boiler on prescription trial. Closing report*. Gentoo. Available from: <http://www.gentoo-group.com/media/284451/boiler-on-prescription-closing-report.pdf>
98. The Guardian. (2015) *Why Sunderland GPs are prescribing boilers instead of pills*. Available from: <http://www.theguardian.com/housing-network/2015/dec/03/sunderland-gps-prescribing-boilers-pills-warm-homes>
99. Gentoo. *Gentoo Group launch Boiler on Prescription pilot*. Available from: www.gentoo-group.com/news/gentoo-group-launch-boiler-on-prescription-pilot/
100. Sunderland Clinical Commissioning Group. *Gentoo Group launch Boiler on Prescription pilot*. Available from: <http://sunderlandccg.nhs.uk/news-media/news/gentoo-group-launch-boiler-on-prescription-pilot/>
101. Threlfall A. (2011) *Understanding the costs and benefits of fuel poverty interventions: A pragmatic economic evaluation from Greater Manchester*. Salford: Greater Manchester Public Health Practice Unit. Available from:
<http://beatcold.org.uk/wp-content/uploads/2011/09/Awarm-evaluation-final-report.pdf>
102. Centre for Regional Economic and Social Research. (2014) *Warm homes Oldham: interim evaluation report*. Sheffield: Sheffield Hallam University. Available from:
www.oldham.gov.uk/download/downloads/id/3386/warm_homes_interim_evaluation_report
103. Highland Council. *Healthy Homes for Highland*. Available from:
www.highland.gov.uk/downloads/download/680/healthy_homes_for_highland

104. Health and Social Care Alliance Scotland. *National Links Worker Programme*. Available from: <http://links.alliance-scotland.org.uk/>

105. Changeworks. Health and Housing Strategy: Craigmillar Medical Centre Energy Advice. Report for the City of Edinburgh Council. Edinburgh: Changeworks, 2016. Available from: http://www.changeworks.org.uk/sites/default/files/Health_and_Housing_Strategy_Craigmillar_Medical_Centre_Energy_Advice_Report_16.pdf

106. Scottish Government. Scottish Rural Fuel Poverty Task Force. Linkages between Fuel Poverty and Health. 2016. Available from: <http://www.gov.scot/Resource/0050/00508151.pdf>

107. Dempsey N, Barton C and Hough D. (2016) *Energy Prices: Briefing Paper*. Number 04153. 26th January 2016. London: House of Commons Library. Available from: <http://www.parliament.uk/briefing-papers/sn04153.pdf>

108. Ofgem. Understanding energy prices in Great Britain. How are energy prices set? Available from: <https://www.ofgem.gov.uk/electricity/retail-market/monitoring-data-and-statistics/understanding-energy-prices-great-britain>

109. Browne, J. and Hood, A. (2016) *Living Standards, Poverty and Inequality in the UK: 2015-16 to 2020-21*. London: Institute of Fiscal Studies. Available from: <http://www.ifs.org.uk/uploads/publications/comms/R114.pdf>



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