

**Sustainability** *first*

**Review of the UK fuel poverty measure**

**Report for Ofgem**

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## **Introduction from Ofgem**

As part of our work to drive forward debate and facilitate discussion around fuel poverty issues and targeting, Ofgem commissioned Sustainability First to produce this discussion paper on the current UK fuel poverty measure. The paper draws together a range of research and information relating to the advantages and disadvantages of the current definition and examines a number of other possible measures. It usefully brings together the key evidence sources on a number of pertinent issues including thermal comfort, income poverty, affordability, alternative measures of fuel poverty and the definition and measurement of fuel poverty in a number of international settings. We did not set out to make any firm recommendations for change but rather to explore the issues in some detail. We hope that stakeholders will find the paper a useful stimulus to debate.

## **Brief and methodology**

Ofgem has commissioned a discussion paper that examines the advantages and disadvantages of the current fuel poverty measure and considers other measures that might be used (not necessarily mutually exclusive).

The paper considers three types of measures of fuel poverty :

- Need to spend – i.e. households who would need to spend more than 10% of their income on fuel to achieve recognised heating standards . This is the current official, Government definition of fuel poverty in the UK.
- Actual spend – i.e. households who actually spend more than a specified percentage of their income on fuel.
- Feel fuel poor – i.e. households who report difficulties in affording sufficient energy for their needs.

Because of the differences between the four administrations (England, Northern Ireland, Scotland and Wales) in terms of the fuel poverty definition and its application this paper concentrates on England, although most of the issue raised are relevant to all four administrations.

The methodology for this review has consisted largely of desk research using the following sources :

- relevant Government documents on fuel poverty and fuel poverty statistics
- relevant research on fuel poverty (mostly that conducted since the mid-1990s)
- information on the definition and measurement of fuel poverty in a number of other countries – mostly Ireland, but also, to a more limited extent, other countries in the European Union, the United States, Australia and New Zealand.

## **Executive summary**

This paper examines the advantages and disadvantages of the current fuel poverty measure and considers whether any alternative or supplementary measures or benchmarks might offer any advantages. Because of differences between the four administrations (England, Northern Ireland, Scotland and Wales) the paper concentrates on England.

### **Fuel poverty – current measure**

Fuel poverty was first recognised as a problem in the UK and the US in the late 1970s although it was not until 1997 that the UK Government officially adopted the term. The Warm Homes and Energy Conservation Act (WHECA, 2001) requires the Secretary of State to publish and implement a strategy for reducing fuel poverty and set targets for implementation. The UK Fuel Poverty Strategy defines households as being in fuel poverty if they would need to spend more than 10% of their income on all household fuel use and to heat the home to an adequate standard of warmth. Using the “need to spend” definition thus includes those who under heat their homes as well as those with very high fuel bills.

Fuel poverty numbers in England fell substantially from 5.1 million in 1996 to 1.2 million in 2004, but by 2007, the numbers had risen again to around 2.8 million households. These changes are due to three key factors - changes in income; changes in energy consumption (including energy efficiency measures impacts); changes in energy prices. So, whilst rising incomes and reductions in consumption between 1996 and 2007 reduced the numbers in fuel poverty, rising energy prices in the latter part of that period caused the number to rise again.

Energy price changes also alter the income distribution of households in fuel poverty. In 2003, 96 per cent of households in fuel poverty on the official definition were in the lowest three income deciles, but this proportion fell to 91 per cent in 2007.

The prevalence of fuel poverty amongst different types of household can be affected by the income definition used. Using basic income instead of full income leads to more households with children (particularly lone parent households) being classed as fuel poor and a reduction in the number of over 60s (single and couples) who are defined as fuel poor. Using equivalised income rather than full income also leads to changes in the types of household classified as fuel poor – notably away from single pensioners to couples with children.

### **Alternative measures of fuel poverty**

There are two main alternative forms of measure of fuel poverty which could be used:

- actual spending on fuel rather than a “need to spend” estimate;
- feel fuel poor – i.e. householders’ own perceptions of whether they can afford to heat their homes adequately.

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There is limited up to date analysis of the numbers of households who actually spend substantial amounts of their income on fuel (as opposed to average actual spending at different income levels). Using 2000/01 data, Sefton found that 8-10% of households actually spent more than 10% of their income on fuel. The main advantage of the current “need to spend” official definition of fuel poverty (as opposed to one based on actual spending) is that it includes those who under-heat their homes as well as those with very high fuel bills. Because of this it is possible that it could lead to higher numbers being classified as being in fuel poverty, but this does seem to reflect the *raison d’etre* of the fuel poverty legislation and strategy – to identify those who live in a colder home to keep their spending affordable, as well as those who have bills that cause them problems.

Subjective measures sometimes show only a limited correlation between low income and household perception of affordability. Palmer et al found that a third of households who said they did not heat their homes fully due to cost had average or above-average incomes, and concluded “this measure is clearly picking up something other than income (e.g. attitudes to expenditure)...not heating the home for reasons of cost is not necessarily the same as not being able to afford it.” A subjective measure may therefore be a useful cross-check on fuel poverty but would not be a satisfactory substitute. The results depend very much upon what questions are asked and some people may just be more sensitive to prices than others.

Thus it would seem that actual spending or a subjective measure of “feeling fuel poor” would not provide advantages over the current fuel poverty definition based on “need to spend”. Indeed, in some important respects they could be less useful measures.

A possible alternative would be to move away from a ratio and instead to assess the affordability of necessary energy spending (i.e. to achieve recognised temperatures and heating durations). People on higher incomes would clearly have less difficulty affording necessary energy spending than people on lower incomes. The methodology for such an assessment could be based on work that has been done to define necessary minimum income standards.

### **Additional benchmarks**

A number of options could be considered to supplement the fuel poverty measure, for targeting assistance and monitoring progress towards tackling fuel poverty. These could include the incorporation of additional benchmarks on income and housing energy efficiency.

An **income benchmark** could be used to better focus help on fuel poor households who are also income poor (e.g. 30% on lowest incomes) and to monitor the impact of policy on this group in addition to the fuel poor as a whole.

Using a benchmark based on affordability of necessary energy spend could have two advantages :

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- better targeting of help on those who are poor as well as fuel poor
- overcoming the problem that the current ratio creates in terms of treatment of changes in income and fuel expenditure – i.e. an affordability target could mean that a £200 change in income would have the same effect as a £200 reduction in fuel bills.

Reaching agreement on necessary minimum income levels (a necessary component of an affordability target) is by no means straightforward, but does seem to be an area worthy for further examination.

Around 27% of the most energy inefficient properties are occupied by fuel poor households. There may therefore be good reasons for targeting low SAP rated properties (Bands F and G), via a **housing energy efficiency benchmark**, even though many in such properties are not fuel poor, because :

- help is directed to those most in need of it – i.e. in the worst properties
- it would of course be possible to provide different levels of financial assistance (for example as the Warm Zones schemes do, with eligible households getting Warm Front grants and “able to pay” households being offered help through CERT)

**Another useful benchmark could be persistent fuel poverty** – i.e. those households who remain in fuel poverty for long periods as opposed to those who move out of it fairly quickly. Single pensioners, pensioner couples, single parent households, the lowest income households (bottom 20%), and those living in the lowest SAP rated properties in particular, experience a relatively high share of persistent fuel poverty compared with other sub-groups.

### **Further analysis and research**

It would be useful to repeat the analysis undertaken by Sefton on the 1991 and 1996 EHCS :

- comparing actual spend and need to spend
- examining persistence of fuel poverty using a longitudinal sample
- comparing subjective measures with objective measures

It would also be useful to get a better understanding of the breakdown of the numbers of households who do not qualify for Warm Front (and other help) because they do not get the qualifying benefits into : those who would be eligible but are not claiming ; those who are ineligible for the passport benefits.

Very little recent research has been done into actual indoor temperatures and heating durations. The last time that the EHCS included temperature measurements was 1996. At that time most households (even those on high incomes and in energy efficient homes) heated their homes to a lower temperature than assumed in modelling, although there is some evidence to suggest that indoor temperatures have been rising since then. It would therefore be very useful for some more large-scale research to be

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undertaken to establish current actual patterns of indoor temperatures and heating durations. This would help with monitoring progress in tackling fuel poverty and assessing the likely impact of improvements. It would also have a wider benefit in terms of the likely impact of energy efficiency policies and programmes on household energy bill savings and carbon reductions.

### **Conclusion**

The main advantage of the current “need to spend” official definition of fuel poverty, as compared to a measure based on actual spending or a subjective assessment of “feeling fuel poor”, is that it includes those who under heat their homes. This does seem to reflect the *raison d’être* of the fuel poverty legislation and strategy – to identify those who live in a colder home to keep their spending affordable, as well as those who have bills that cause them problems.

However, a number of options could be considered to supplement the fuel poverty measure, for targeting assistance and monitoring progress towards tackling fuel poverty. These could include the incorporation of additional benchmarks related to housing energy efficiency standards, income and affordability. Monitoring actual spending and periodic subjective assessments might provide useful additional data on fuel poverty. Some more up to date analysis and research in a number of key areas would also be helpful.

## 1. Fuel Poverty – history, policy, definition and measure development

### 1.1 Introduction to fuel poverty in the UK

Fuel poverty was first recognised as a problem in the UK and the US in the late 1970s in the wake of oil price increases. In the UK, although a number of policy responses to rising energy prices were developed in the 1980s and early 1990s (e.g. special heating cost related welfare benefits and help with insulation for low income households), use of the term “fuel poverty” was largely confined to campaigning and pressure groups. Indeed, it was not until 1997 that the UK Government officially adopted the term and started to develop a specific fuel poverty strategy. In 2000 the Warm Homes and Energy Conservation Act (WHECA, 2001) was passed and this required the Secretary of State for England and National Assembly for Wales to publish and implement a strategy for reducing fuel poverty and set targets for the implementation of that strategy. Similar legislation was passed in Scotland in 2001; Northern Ireland has set policy targets but not legislated for them.

The WHECA says that “a person is to be regarded as living “in fuel poverty” if he is a member of a household living on a lower income in a home which cannot be kept warm at reasonable cost.” It is up to the Secretary of State and Welsh Assembly to define (in regulations) what is to be regarded as a lower income or a reasonable cost, or to substitute another definition in the regulations. The Act also required the Secretary of State and Welsh Assembly to set a target date (not later than 15 years from publication of the strategy) for achieving the objective of ensuring that as far as reasonably practicable persons in England or Wales do not live in fuel poverty.”

### 1.2 UK fuel poverty definition

The UK Fuel Poverty Strategy defines households as being in fuel poverty if they would need to spend more than 10% of their income on all household fuel use and to heat the home to an adequate standard of warmth (see section 1.3 below).<sup>1</sup> This percentage was originally chosen by fuel poverty campaigners at a time (1980s) when average household spend on energy was 5% of income – it was considered that needing to spend more than twice this amount would have a significant negative impact on welfare.<sup>2</sup> It also reflected findings from work by Government economists in the late 1970s, that expenditure at twice the median was disproportionate – they found that households in the lowest three deciles were spending at this level.<sup>3</sup>

When the UK Government launched its Fuel Poverty Strategy in 2001, it was a deliberate choice to base its definition of fuel poverty on what households would need to spend and not what they actually spend, because many fuel poor households cannot afford to spend 10% of their income on fuel. Using the “need to spend” definition thus includes those who under heat their homes as well as those with very

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<sup>1</sup> DEFRA, The UK fuel poverty strategy. 2001, p.6

<sup>2</sup> Boardman, B. Fuel poverty. From cold homes to affordable warmth. 1991, Bellhaven

<sup>3</sup> Isherwood, B. C and Hancock, R. M. Household expenditure on fuel : distributional aspects. 1979. Economic Adviser’s Office, DHSS (quoted in Boardman, B. Fixing fuel poverty, 2009)

high fuel bills. There are differences in the application of the definition between England and the devolved administrations (in terms of the income basis used – e.g. before or after certain welfare benefits; and whether the definition includes all energy use or just heating). In England the definition includes all home energy use and the numbers in fuel poverty are calculated on two bases – full income which includes help with housing costs and basic income which excludes help with housing costs. To arrive at the numbers in fuel poverty, data from the English House Conditions Survey are used.

In England there is a distinction between vulnerable and non-vulnerable households. Vulnerable households are those containing children, or those who are sick, disabled or elderly. Non-vulnerable are healthy, adult only (non pensioner) households. 80% of the fuel poor are vulnerable households. In the 2001 Fuel Poverty Strategy the Government set a target to remove vulnerable households from fuel poverty by 2010 and to remove all households from fuel poverty by 2016.

### **1.3 Thermal comfort and temperature standards**

#### 1.3.1 Thermal comfort in the fuel poverty definition

The thermal comfort standards included in the definition of fuel poverty are :

- 21C in main living rooms and 18C in other rooms for 9 hours on weekdays and 16 hours at weekends for households assumed to be out during weekdays,
- 21C and 18C for 16 hours every day for those assumed to be at home on weekdays.

It is assumed that the whole house is heated to these levels except for households deemed to be under-occupying, where it is assumed that only half the house is heated to these levels.<sup>4</sup>

These assumed heating demand temperatures and heating durations come from the main UK household energy model – BREDEM (the Building Research Establishment's Domestic Energy Model) The large scale actual data on thermostat settings, indoor temperatures and central heating durations, are now considerably outdated (the last time the EHCS included temperature measurements was 1996). Reviewing these data (for the 2005 Fuel Poverty Methodology Review) Sefton and Chesshire found that “most households (even those on high incomes and in energy efficient homes) under-spend relative to the standard and heat their homes to a lower temperature than assumed, although the gap is likely to have narrowed since the data on which our analysis is based was collected in 1996.” As a result of the Fuel Poverty Methodology Review, the heating regimes assumed for under-occupied properties were modified but no other changes were made.

As Shipworth et al say “ There is currently little alternative to using BREDEM's default heating demand temperatures and durations because there have not been the comprehensive studies which could provide the necessary data for the models.”<sup>5</sup>

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<sup>4</sup> Under occupancy is based on assumptions about living space and bedrooms required according to the number of people in a household.

Based on some actual monitoring (see Annex 4 for details) Shipworth et al found that whilst the assumed temperatures and hours of heating on weekdays were similar to those assumed in BREDEM, the hours of heating at weekends were notably lower – 8 rather than 16 hours. Oreszczyń et al (see Appendix) surveyed dwellings undergoing Warm Front energy efficiency improvements and found that the median daytime living room temperatures post Warm Front intervention were also similar to those assumed in BREDEM (but around 2C lower in unimproved properties).<sup>6</sup>

Oreszczyń et al noted that older people had higher living room temperatures but lower bedroom temperatures than younger people, which may largely reflect personal choice.

### 1.3.2 Indoor temperatures and health

During the early 1980s the World Health Organisation (WHO) developed recommended minimum indoor temperatures - 18C but 2-3C warmer for elderly persons.

Collins (whose work in the 1980s is still the main work on health impacts of low indoor temperatures) identified the following health impacts<sup>7</sup> :

- 18-24C – no health risk to sedentary healthy people
- below 16C - increased risk of respiratory disorders
- below 12C – increased risk of cardiovascular strain

### 1.3.3 Conclusions on thermal comfort

**The thermal comfort standard in the fuel poverty definition is based on World Health Organisation recommendations for those vulnerable in cold conditions – e.g. who are less mobile or more at risk of health problems (older people, young children, people with chronic sickness and disability).** Although the non-vulnerable might not suffer any adverse health effects from slightly lower temperatures (and shorter heating durations), these are temperatures at which many people will feel comfortable and so provide for a reasonable standard of living. However, it would seem that many households live at lower temperatures and particularly that many may heat their homes for fewer hours at weekends than are assumed in BREDEM (this issue and its implications for research is dealt with in Section 4.5).

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<sup>5</sup> Shipworth, M, Firth, S K., Gentry, M, Wright, AJ, Shipworth, D T. 1 and Lomas K J. Central heating thermostat settings and timing: building demographics. *Building Research and Information* (2010) 38(1), 50–69

<sup>6</sup> Oreszczyń, T. and Lowe, R. (2004) Memorandum. House of Lords Select Committee on Science and Technology

Minutes of Evidence, The Stationery Office, London. (quoted in Shipworth, M et al)

<sup>7</sup> Collins, K. Low indoor temperatures and morbidity in the elderly. Age and Ageing. Minutes of Evidence, The Stationery Office, London. (quoted in Shipworth, M et al) Volume 15 No. 4. (1986) pp 212-20

## 1.4 Fuel poverty in England on the official definition

Fuel poverty numbers in England are calculated on the basis of two main inputs : income and fuel costs.

Two definitions of income are used in the official fuel poverty definition :

- Basic income excludes income related directly to housing;
- Full income includes income related directly to housing, e.g. housing benefit.

Full income is the main definition used, although numbers are also monitored based on the basic income definition.

Fuel costs are modelled, rather than based on actual spending. They are calculated by combining the fuel requirements of the household (for space and water heating, lights, appliances and cooking) with fuel prices. The modelling assumes that the household achieves the adequate level of thermal comfort (warmth) set out in the definition of fuel poverty (see 1.3 above)

Fuel poverty numbers in England :

- fell substantially from 5.1 million in 1996 to 1.2 million in 2004,
- they have since risen and in 2007, there were around 2.8 million households living in fuel poverty (around 13.2 per cent of all households) in England.
- fuel poverty in vulnerable households fell from 4 million in 1996 to 1 million in 2004 and increased to 2.3 million by 2007.

These changes in numbers of households in fuel poverty are due to three key factors - changes in income; changes in energy consumption (including energy efficiency measures impacts); changes in energy prices. So, for the period 1996-2007 we can see:

- If only income changes had taken place between 1996 and 2007 (i.e. consumption and fuel prices remained constant), the rate of fuel poverty would have been reduced by around 24 percentage points.
- The reduction in energy consumption since 1996 reduces the rate of fuel poverty by around a further 2 percentage points;
- Taking into account the effect of rising prices adds around 13 percentage points to the rate of fuel poverty.<sup>8</sup>

**Adding these factors together thus produces the 13% figure for fuel poverty in England in 2007.**

**The changes between 2006 and 2007 highlight clearly the differing impacts of the three variables, as show in the Table below.**

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<sup>8</sup> DECC Annual Report on Fuel Poverty Statistics 2009.

**Table 1 – Fuel poverty change, 2006 to 2007<sup>9</sup>**

	Fuel poor	Change in %	Fuel poor	Change in fuel poverty
<b>2006</b>	<b>2.4m</b>	<b>11.5</b>		-
Prices	+ 3.6			+ 0.82m
Income	- 1.5			- 0.33m
Energy consumption	- 0.4			- 0.10m
<b>2007</b>	<b>2.8m</b>	<b>13.2</b>		+0.39m

### 1.5 Income poverty and fuel poverty - are the fuel poor all poor ?

In assessing the correlation between fuel poverty and income poverty, it is important to be clear what definition of low income is being used. Most commonly this is assumed to be the bottom 30% of the income distribution (deciles 1, 2 and 3). This is because the official Government definition of fuel poverty has its roots based on those in the lowest 30 per cent of income groups.<sup>10</sup>

Of the 2.8 million households in fuel poverty in England in 2007 :

- 1.6 million were in the first (lowest) decile
- 0.6 million were in the second decile
- 0.3 million were in the third decile
- 150,000 were in the fourth decile
- 70,000 were in the fifth decile
- 70,000 were in deciles 6-10

Thus 2.5 million out of 2.8 million were in bottom 30 per cent of the income distribution. In terms of percentages :

- the lowest income decile accounted for 56 per cent of all households in fuel poverty in England in 2007,
- decile 2 accounted for 24%
- decile 3 for 11%.
- deciles 4-10 accounted for 9%.

Various other definitions of low income can be used however, as outlined in Annex 1. Equivalised incomes are used by the Department for Work and Pensions (DWP) to measure the ability of households to afford a range of goods and services. Equivalised incomes will be lower than full incomes for larger households, and higher than full incomes for small, or single person households. However, whilst larger households require more income for their total household needs, the amount of energy required is

<sup>9</sup> Table from : DECC Annual Report on Fuel Poverty Statistics 2009.

<sup>10</sup> DECC. Fuel poverty monitoring indicators 2009. Annex to the Annual Report on Fuel Poverty Statistics 2009. This report also points out that “Taking the bottom 3 deciles reduces the risk of sampling fluctuations showing false trends compared with using a narrower band such as just the lowest decile.”

only affected to a limited extent by the number of people in the household.<sup>11</sup> Reviews in 2004 and 2009 concluded that using equivalised incomes in the fuel poverty definition might over compensate in favour of larger households.<sup>12</sup>

Using households with equivalised household income of less than 60% of the average (median), as a definition of income poverty, Palmer et al calculate that, of 3 million households in fuel poverty in England in 2007, 1.1 million would be in fuel poverty but not in income poverty. **Thus the equivalised income definition would result in significantly smaller numbers of fuel poor households being considered to be in income poverty, as compared with the current definition of low income.**

**Different definitions of “low income” can therefore have a significant impact on the proportion of the households in fuel poverty that are counted as being also in income poverty.**

### 1.6 Characteristics of fuel poor households

The prevalence of fuel poverty amongst different types of household can be affected by the income definition used as the Tables below demonstrate.

**Table 2 : comparison of full income and basic income - 2007<sup>13</sup>**

Household type	Full income % total fuel poor in group	Basic income % total fuel poor in group
Couple, below 60, no dependent children	6.7	5.8
Couple, 60 or over, no dependent children	15	12
Couple with dependent children	9.4	8.7
Lone parent with dependent children	8.8	14.4
Other multi-person households	6.3	6.1
One person under 60	19.6	20.2
One person aged 60 or over	34.3	32.8
<b>Total</b>	100	100

<sup>11</sup> DECC. Annual Report on Fuel Poverty Statistics 2009. Note : The fuel poverty methodology makes some assessment of the size of household when determining the adequate standard of warmth, this is largely to cover circumstances (e.g. If three adults live in a property but are at work during weekdays, they are likely to have a lower heating requirement than a single, unemployed person.

<sup>12</sup> Sefton, T and Chesshire, J. Peer review of the methodology for calculating the number of households in fuel poverty in England. 2005. and DECC. Annual Report on Fuel Poverty Statistics 2009.

<sup>13</sup> Data taken from Table 17 and Table 55 in DECC. Fuel poverty 2007 Detailed tables. Annex to the Annual report on fuel poverty statistics. 2009

**Using basic income instead of full income leads to more households with children (particularly lone parent households) being classed as fuel poor and a reduction in the number of over 60s (single and couples) who are defined as fuel poor.**

The two definitions also lead to some significant differences when some other household characteristics are considered,:

- Households on means tested benefits, disability living allowance or tax credits make up 50% of the fuel poor on the full income definition but 70% on the basic income definition<sup>14</sup>
- Households in rented accommodation make up 34% of the fuel poor on the full income definition, but 50% on the basic income definition<sup>15</sup>

**Table 3 : comparison of full income and equivalised income - 2005<sup>16</sup>**

Household type	Full income % of total fuel poor in group	Equivalised income % of total fuel poor in group
couple with dependent child(ren)	5%	31%
couple, no dependent child(ren)	21%	27%
lone parent with dependent child(ren)	8%	12%
one person aged 60 or over	36%	11%
one person under 60	25%	10%
other multi-person household	5%	9%
Total	100%	100%

**Using equivalised income rather than full income leads to more dramatic shifts in the types of household classified as fuel poor – notably away from single pensioners to couples with children.**

<sup>14</sup> DECC. Fuel poverty 2007 Detailed tables. Annex to the Annual report on fuel poverty statistics. 2009 (Tables 28 and 66)

<sup>15</sup> DECC. Fuel poverty 2007 Detailed tables. Annex to the Annual report on fuel poverty statistics. 2009 (Tables 15 and 53)

<sup>16</sup> Data taken from Table 11 in DECC. Annual report on fuel poverty statistics. 2009

### 1.7 Impacts of changing energy prices on fuel poverty

Changes in energy prices can have two main impacts on the measure of fuel poverty. Firstly, rising energy prices will increase the numbers of households who fall into the fuel poverty definition, whilst falling energy prices will have the opposite effect. Fuel poverty numbers in England fell from 5.1 million in 1996 to 1.2 million in 2004 as energy prices fell, but as energy prices have risen so too have the numbers of households in fuel poverty - in 2007, there were around 2.8 million households living in fuel poverty in England.

Secondly, energy price changes alter the income distribution of households in fuel poverty :

- In 2003, 96 per cent of households in fuel poverty on the official definition were in the lowest three income deciles, but this proportion fell to 91 per cent in 2007.
- Thus the proportion of fuel poor households in income deciles 4 to 10 rose from 4 per cent in 2003 to 9 per cent in 2007 (numerically this is an increase from 48,000 to 252,000).<sup>17</sup>

Looking at more restricted definitions based on the lowest incomes :

- The overall proportion of fuel poor households in the lowest income decile fell from 71 per cent in 2003, to 56 per cent in 2007.
- There was a corresponding rise in the overall proportion of fuel poor households that are in the second and third income deciles, up from 17 per cent to 24 per cent for income decile 2, and from 8 per cent to 11 per cent for those in income decile 3.<sup>18</sup>

**Thus, as the figures above show, the proportion of households in fuel poverty who are in the higher income groups (deciles 4-10) has been increasing as fuel prices have risen.**

### 1.8 Persistent versus temporary or intermittent fuel poverty

Households in fuel poverty at any one point in time may not necessarily be so at a later date due to changes in income, personal circumstances, changes to the property they live in, moving house or changes in fuel prices.

Sefton analysed movements into and out of fuel poverty (according to the official Government definition) using the longitudinal sample of the 1991 and 1996 English House Condition Surveys.<sup>19</sup> He found that :

- Around 28% of households were fuel poor in 1991, falling to 26% in 1996.

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<sup>17</sup> DECC. Annual report on fuel poverty statistics. 2009

<sup>18</sup> DECC. Annual report on fuel poverty statistics. 2009

<sup>19</sup> Sefton, T. (2004) Aiming high – An evaluation of the potential contribution of Warm Front towards meeting the Government's fuel poverty target in England.

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- Of those dwellings occupied by a fuel poor household in 1991, 57% were still occupied by a fuel poor household five years later.
- Around 12% of dwellings that did not contain a fuel poor household in 1991 were occupied by one five years later.

Sefton found that single pensioners were the group most likely to experience persistent fuel poverty, followed by single parents and pensioner couples. Couples with children were least likely to experience persistent fuel poverty. Those living in properties with the lowest SAP ratings and on the lowest incomes were also more likely to experience persistent fuel poverty.

Sefton has also examined the British Household Panel Survey (BHPS – see Annex 3 for more information on the BHPS) evidence (using actual spending of more than 10% of income on fuel as the definition of fuel poverty) to identify persistence of fuel poverty. The BHPS showed that persistent fuel poverty was most common amongst single pensioners, pensioner couples, single parent households and households on the lowest incomes.<sup>20</sup>

### **1.9 Conclusions on Section 1**

Under the official fuel poverty definition the numbers and types of household classified as being in fuel poverty can vary according to the income definition chosen. As energy prices rise, a more significant proportion of the fuel poor are households on middle and higher incomes, which can seem counter-intuitive. Some types of household remain in fuel poverty for long periods, whereas others move in and out of the definition. The next chapter will explore whether alternative definitions might deal with these issues and also what issues they would raise.

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<sup>20</sup> Sefton, T (2004) op.cit.

## 2. Alternative measures of fuel poverty

There are two main alternative forms of measure of fuel poverty which could be used:

- actual spending on fuel rather than a “need to spend” estimate;
- feel fuel poor – i.e. householders’ own perceptions of whether they can afford to heat their homes adequately.

The Government’s annual report on fuel poverty statistics includes a brief examination of actual spending (using data from the Expenditure and Food Survey) and a subjective “feeling fuel poor” measure - self reported ability to keep warm (as recorded in the EHCS).<sup>21</sup>

### 2.1 Actual spending

There are three main sources of data on actual household spending on fuel : the Expenditure and Food Survey; the British Household Panel Survey; a survey by Waddams Price et al.

#### 2.1.1 Actual spending on energy based on Expenditure and Food Survey (EFS) data

The annual Expenditure and Food Survey (EFS) is a survey of around 6,000 households in the UK (see Annex 3 for more information).

According to the EFS, :

- In the mid 1990s, the lowest 30 per cent of income groups spent just over 9 per cent of their income on energy but this decreased steadily and was between 5 and 6 per cent from 2002-05, rising to around 7 per cent in 2006 and 2007.
- By contrast, spending by those in the highest income 30 per cent was just under 3% in the mid-1990s, falling to a low of just over 1% from 2002-05 and just below 2% by 2007.<sup>22</sup>

#### 2.1.2 Actual spending as recorded in the British Household Panel Survey (BHPS)

Sefton has analysed data on actual spending on fuel in the annual British Household Panel Survey.<sup>23</sup> Sefton’s analysis was restricted to waves 7-10, covering the period from 1997/98 to 2000/01 (because consistent data on fuel expenditure is only available since wave 7).

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<sup>21</sup> DECC. Annual report on fuel poverty statistics 2009. October 2009. See Annex ? for details of the data collection methods.

<sup>22</sup> DECC. Annual report on fuel poverty statistics 2009. October 2009.

<sup>23</sup> See Appendix for more information on the BHPS.

Using a 10% fuel poverty threshold, around 10% of households were expenditure fuel poor in 1997/98 - falling to 8% in 2000/01. Sefton found substantial overlap between those who were fuel poor based on their actual expenditure - “expenditure fuel poor” and the official definition of fuel poverty (need to spend). However, some groups, notably single pensioners, made up a smaller proportion of the ‘expenditure fuel poor’ than of the official fuel poor, whilst single parent households, in particular, made up a greater proportion of the expenditure fuel poor.

### 2.1.3 Actual spending in the Waddams Price survey

Using data from a large scale survey of low income consumers in 2000, Waddams Price et al found that 28% of households in the sample actually spent more than 10% of their income on fuel <sup>24</sup>

## 2.2 Feel fuel poor

### Subjective measure of fuel poverty based on EHCS questions

**Table – Subjective thermal comfort and fuel poverty by year, 2003-2007<sup>25</sup>**

Year	Percentage of households that could not keep comfortably warm	Percentage of households fuel poor
2003	6.8	5.9
2004	6.4	5.9
2005	6.6	7.2
2006	7.2	11.5
2007	7.7	13.2

As the table above shows, 13.2 per cent of all households in England were officially classified as fuel poor in 2007. This compares with 7.7 per cent that reported themselves unable to keep comfortably warm in their living room. Of this 7.7 per cent, one in four were actually fuel poor by the Government definition. Therefore, only 1.8 per cent (0.4m) of all households in 2007 were fuel poor both according to the official definition and in the view of the occupier.<sup>26</sup>

What is also noticeable about the above table is the increase in the size of the gap between the Government definition of fuel poverty and a subjective householder definition, since 2005. Higher fuel prices are leading to many more households being

<sup>24</sup> Waddams Price, C et al. Identifying fuel poverty using objective and subjective measures. CCP Working Paper 07-11. UEA, 2007

<sup>25</sup> DECC. Annual report on fuel poverty statistics 2009. October 2009.

<sup>26</sup> DECC. Annual report on fuel poverty statistics 2009. October 2009.

defined as fuel poor, but, on the questions asked in the EHCS, the increase in the numbers of households considering themselves to be fuel poor is much lower.

Palmer et al have also compared the subjective measure of fuel poverty in the EHCS, with the Government measure and the overlaps in terms of income poverty. Of the 450,000 households who said that their living rooms were not warm in winter because of the cost, less than half were in income poverty and a third had average or above-average incomes. Pensioners were less likely to say that they were not able to keep their living rooms warm than working-age households.<sup>27</sup>

Palmer et al concluded that there was very little overlap between fuel poverty using the subjective measure and fuel poverty using the Government (objective) measure. They also concluded that there was much less overlap between this subjective measure and income poverty, than there was between the Government measure of fuel poverty and income poverty.

### **2.3 Actual spending and a subjective measure compared**

Waddams Price et al have compared an objective measure of actual expenditure on fuel with a subjective measure of whether households feel fuel poor, using data from a large scale survey of low income consumers in the summer of 2000.<sup>28</sup>

Using consumers' estimated expenditure on gas and electricity, the team assessed "Expenditure Fuel Poverty" (EFP - i.e. households who actually spent more than 10% of income on fuel) and households were asked "In general, do you feel that you are able to heat your home adequately?" If respondents replied 'no', they were asked whether this was because it was difficult to heat or because they found it difficult to afford the fuel. Respondents who gave the latter answer were classified as 'Feeling Fuel Poor' (FFP). So were those who responded negatively to another question "Do you feel that you can afford enough fuel for all your water heating and cooking needs?"

To explore the correlation between the subjective and objective measures they identified households who were fuel poor by both measures, by one, and by neither. The subjective measure of feeling fuel poor gave somewhat different results from the objective 10% of expenditure.

- 16% of households in the sample felt fuel poor (FFP)
- Of the 16% who felt fuel poor, 44% spent more than 10% of their income on fuel and 56% spent less than 10%
- 74% of households who spent more than 10% of their income on fuel did not feel fuel poor.

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<sup>27</sup> Palmer, G, MacInnes, T and Kenway, P. et al. Cold and poor. An analysis of the link between fuel poverty and low income. NPI, 2008.

<sup>28</sup> Waddams Price, C et al. Identifying fuel poverty using objective and subjective measures. CCP Working Paper 07-11. UEA, 2007

Thus most households who spent more than 10% of their income on energy did not feel fuel poor, and more than half of those who felt fuel poor spent less than 10% of their income on fuel.

### **2.4 Measuring fuel poverty in Ireland**

Ireland does not use the “need to spend” measure of fuel poverty. Instead, fuel poverty has been assessed using actual spending on fuel and subjective measures (feeling fuel poor).<sup>29</sup> In a national household survey in Ireland in 2001, households declaring an inability to adequately heat the home to a comfortable temperature were defined as fuel-poor. 17% of the sample (representing 226,000 households) reported some level of fuel poverty on the basis of the questions asked. The highest incidence of fuel poverty was found among the long-term ill and disabled, lone-parent households, local-authority tenants, the unemployed and lone female pensioners.<sup>30</sup>

The results of the 2001 survey were cross-compared with those based on an actual spending definition – i.e. households who spend more than 10% of their income on energy. Between 21% (housing costs and benefits included) and 25% (housing costs and benefits excluded) of homes were found to be suffering from fuel poverty using this definition.<sup>31</sup>

Scott et al have estimated that, in 2008, 301,368 (19.4%) households in Ireland were in fuel poverty, on the basis of spending more than 10% of their income on energy. Scott et al found that fuel poverty was particularly prevalent in households with a single adult, - i.e. lone parents, single pensioners and single non-pensioner adults. (more than 25% of these households spent more than 10% of income on fuel, whereas the percentages were below 15% for other types of household).<sup>32</sup>

### **2.5 Conclusion to Section 2**

#### **The existing fuel poverty measure versus the main alternatives – actual spend or feel fuel poor**

There is limited up to date analysis of the numbers of household who spend substantial amounts of their income on fuel (as opposed to data on average actual spending at different income levels). The main research available is that by Sefton and Waddams Price et al, for both of which the most recent data were from 2000/01.

Sefton found that 8-10% of households actually spent more than 10% of their income on fuel; Waddams Price et al found that 28% of their low income sample spent more than 10% of their income on fuel. An analysis based on more up to date data would therefore be useful (see section 4 below). However, it seems possible that fewer

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<sup>29</sup> See Annex 5 for more information on Ireland and on fuel poverty in some other countries.

<sup>30</sup> Scott, S. et al. Fuel poverty in Ireland : extent, affected groups and policy issues. Working Paper. ESRI. October 2008

<sup>31</sup> Healy, J.D. and J.P. Clinch, 2002. “Fuel Poverty, thermal comfort and occupancy: results of a national household survey in Ireland”, *Applied Energy*, 73 (2002) pp 329-343, Elsevier.

<sup>32</sup> Scott, S. et al October 2008 op cit.

households would be classified as fuel poor on the 10% of income definition if actual expenditure were used. This is because, as the work by Oreszczyn et al demonstrates, many households on low incomes heat their homes to standards below those assumed in the thermal comfort standard of the fuel poverty definition. Using actual spending wouldn't eliminate the inclusion of some households on middle and high incomes, as many such households might be more inclined to spend higher amounts on fuel than those on low incomes.

**The main advantage of the current “need to spend” official definition of fuel poverty (as opposed to one based on actual spending) is that it includes those who under heat their homes as well as those with very high fuel bills.** Because of this it may lead to higher numbers being classified as being in fuel poverty, but **this does seem to reflect the raison d'être of the fuel poverty legislation and strategy – to identify those who cannot afford to heat their homes**, which will encompass those who live in a colder home to keep their spending affordable, as well as those who have bills that cause them problems.

As regards a subjective measure, Palmer et al point out that “If a third of households who say they do not heat their homes fully due to cost actually have average or above-average incomes, this measure is clearly picking up something other than income (e.g. attitudes to expenditure)...not heating the home for reasons of cost is not necessarily the same as not being able to afford it. And, it is possible that some groups are less likely than others to complain about their homes being cold.” A subjective measure may therefore be a useful cross-check on fuel poverty but would not be a satisfactory substitute. The results depend very much upon what questions are asked, some people may just be more sensitive to prices than others and some may not want to identify themselves as facing any problems.

**Thus it would seem that actual spending or a subjective measure of “feeling fuel poor” would not provide advantages over the current fuel poverty definition based on “need to spend”. Indeed, in some important respects they could be less useful measures. However, monitoring actual spending and periodic subjective assessments might provide useful additional data on fuel poverty.**

### **3. Options for supplementing the fuel poverty measure**

What is the purpose of the fuel poverty definition and measure ? It can have three purposes :

- establishing numbers of households in need of assistance
- designing and targeting assistance to those households
- monitoring the impact of the assistance offered

#### **3.1 Establishing numbers of households in need of assistance**

Whilst, as noted above, the “need to spend” basis of the official definition has many advantages over the alternatives (actual spend or subjective measures), if applied purely on this basis it will include some households who are not on low incomes – they may just live in very large or very energy inefficient properties. This effect will clearly be greater when fuel prices are high rather than when they are low - the proportion of fuel poor households in England in income deciles 4 to 10 rose from 4 per cent in 2003 to 9 per cent in 2007.<sup>33</sup>

So to translate this into an actual example, should a household with a need to spend £2,000 on energy and a £20,000 income (or even with a £30,000 income and £3000 necessary spending which we may see if bills continue to rise as some predict) be treated as fuel poor ? If we compare them with a household with a need to spend £1,000 who has a £10,000 income, the poorer household would only have £9000 left after paying for adequate energy, whereas the household with £20,000 income would still have £18,000 left. The impact of needing to spend 10% of income on energy is clearly not the same for households at these two differing income levels. The differing impacts of uniform percentages on those on differing incomes, is the basis of progressive taxation policies which tax higher incomes at higher percentage rates.

##### **3.1.1 An alternative to the 10% measure – affordability of necessary energy spend**

A possible alternative would be to move away from a ratio and instead to assess the affordability of necessary energy spending (i.e. to achieve recognised temperatures and heating durations). People on higher incomes would clearly have less difficulty affording necessary energy spending than people on lower incomes. The methodology for such an assessment could be based on work that has been done to define necessary minimum income standards (see Annex 1 for details).

Necessary minimum income standards could be used to provide an affordability indicator for necessary fuel expenditure – a point which has been recognised in work

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<sup>33</sup> DECC. Annual report on fuel poverty statistics. 2009. October 2009

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on minimum income standards.<sup>34</sup> By excluding assumed necessary fuel costs (e.g. using thermal comfort standards as used at present in the fuel poverty measure) one could arrive at the level of income required for all other needs. Therefore households whose necessary spending on fuel would keep them below their total income would have affordable energy, whereas those whose energy spending needs, plus all other needs, take them above their total income, would have unaffordable energy.

Clearly however, assessing acceptable minimum income standards is not easy. There are different methodologies that can be used that can produce very different results. It may prove difficult to develop consensus on what expenditure is essential. Despite these reservations this does seem an area that would be worthy of examination, as a means of providing an additional benchmark of affordability.

### **3.2 Designing and targeting assistance**

In practice the fuel poverty measure is not really used for targeting assistance for two reasons .

- being based on modelling rather than actual identification of households in need of assistance it does not help to identify the households in need of help or where they are (although it can provide some pointers as to the characteristics of such households that can help inform targeting)
- it is practically easiest to target most forms of assistance to households on a passport basis (i.e. via eligibility for various welfare benefits) rather than having to assess whether they are actually in fuel poverty (which might require a home visit)

It is therefore not surprising that there are mismatches between the households in fuel poverty and those who receive assistance from the various programmes. It is worth examining how the measure helps with designing and targeting other help.

#### **3.2.1 The properties most in need of improvement**

Given that an important factor in fuel poverty is poor standards of energy efficiency, it is useful to examine the correlation between living in energy inefficient housing and being in fuel poverty. The SAP energy rating system rates houses into bands ranging from A to G. Band F and G properties are the worst properties and will be very expensive to heat .

- In 1996 there were 1,837,000 properties in Band G;
- By 2007 there were 881,000 Band G properties
- Private rented properties accounted for almost 50% of Band G rated properties; about 25% were owner occupied and the other 25% in local authority or RSL ownership.

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<sup>34</sup> Bradshaw, J. Comparisons and uses of Minimum Income Standards.

[Hhttp://www.minimumincomestandard.org/downloads/launch/MIS\\_comparisons%20and%20uses%20-%20Jonathan%20Bradshaw.ppsH](http://www.minimumincomestandard.org/downloads/launch/MIS_comparisons%20and%20uses%20-%20Jonathan%20Bradshaw.ppsH)

Band F property numbers have also fallen :

- There were 521,000 Band F properties in 1996
- This was down to 3,389,000 Band F properties in 2007.
- Owner occupied properties accounted for around 40% of Band F rated properties, private rented for around 35% with the remaining 25% in local authority or RSL ownership.<sup>35</sup>

Thus in 2007 there were around 4.2 million very energy efficient properties, about 27% of which (1 million) were occupied by fuel poor households.<sup>36</sup> So, as Boardman notes, targeting the worst homes faces some of the same problems as other means of targeting, in terms of an imperfect match with fuel poverty. However, as Boardman points out there may be some good reasons for targeting low SAP rated properties despite this imperfect match due to:

- the propensity of fuel poor households to stay put, or for properties to remain occupied by fuel poor households even when tenancy/ownership changes<sup>37</sup>
- help is directed to those most in need of it – i.e. in the worst properties
- it would of course be possible to provide different levels of financial assistance (for example as the Warm Zones schemes do, with eligible households getting Warm Front grants and “able to pay” households being offered help through CERT)

### 3.2.2 Targeting the Warm Front scheme

Warm Front, which is the major energy efficiency programme for tackling fuel poverty, has been criticised for not being sufficiently well targeted on fuel poor households. Analysis for the National Audit Office (based on the 2006 EHCS) indicates that the Scheme is only available to approximately 35 per cent of all fuel poor households.

Sefton found that a similar proportion of private sector fuel poor households (Warm front is only available to the private sector) would not benefit from Warm Front. Sefton’s analysis suggests that of the 65% of fuel poor households who would not benefit from Warm Front :

- 10% are non-vulnerable households who would otherwise be eligible (get means tested benefits);
- around 10% need higher cost measures that WF does not fund;
- The other 80% (i.e. 52% of all fuel poor households) are a mixture of those not claiming the passport benefits that would make them eligible and those

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<sup>35</sup> All data from : EHCS 2007 Annual Report Figure 1.13, p.30. Department of Communities and Local Government, September 2009.

<sup>36</sup> Boardman, B Fixing fuel poverty. Challenges and Solutions. Earthscan, 2010. p. 143

<sup>37</sup> Sefton, T. (2004) Aiming high – An evaluation of the potential contribution of Warm Front towards meeting the Government’s fuel poverty target in England.

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who would not qualify for one of the passport benefits (i.e. fuel poor but probably not poor – though many could have incomes not much above means tested benefit levels). He did not have the data to break down the 80% into these two categories (although noting that around 20% were single pensioners in the bottom fifth of the income distribution).

It would be very useful to be able to break down this 52% into those who are not claiming the passport benefits and those who would not be eligible for them. Whatever the outcome of such further analysis however, it suggests that the problem is not really with the criteria for eligibility for Warm Front but instead :

- the need for a greater effort to improve take up of the passport benefits
- that a proportion of fuel poor households are not poor by the recognised definition of poverty

### **3.2.3 Reducing fuel bills versus increasing income**

It costs more to remove households from fuel poverty (on the official Government measure) through an increase in income than a reduction in fuel expenditure. For example, if someone with a £10,000 income has an energy need of £1,200 they require a £201 reduction in energy costs or a £2001 increase in their income to be officially out of fuel poverty. Using a measure based on actual spend would face the same issues.

This issue is very well illustrated by looking at the winter fuel payment, which is treated as an addition to income for the purposes of the Government's fuel poverty statistics. Counted in this way, the winter fuel payment removed 100,000 households in England from fuel poverty in 2007. However, if the payment was instead treated as a means of reducing energy bills, this would have removed an additional 600,000 from fuel poverty in England in 2007.<sup>38</sup>

Although there is no research evidence on this, it is also possible that reducing fuel expenditure (e.g. through lower energy prices and/or heating/insulation improvements) may be more likely to lead to an improvement in subjective measures of fuel poverty – i.e. households may be less likely to feel fuel poor if their bills are reduced than if they have more income (even if the income increase is much more significant than the fuel bill reduction). However, if offered a choice of a £2000 increase in income or £200 of their energy bill it is obvious what households would choose, even if this meant they still felt fuel poor.

Using a measure based on affordability of necessary energy spend ( see section 3.1.1. above) could help to overcome the problem that the ratio creates – i.e. a differential in treatment of changes in income and fuel expenditure. A worked example (purely hypothetical in terms of assumed necessary spending on fuel and other needs) :

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<sup>38</sup> DECC. UK Fuel Poverty Strategy . 7th Annual Progress Report 2009 p. 9

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Using the Pension Credit Guarantee income level (March 2010) for a single pensioner:

- Income before winter fuel payment = £6760
- Assumed necessary non-fuel spending = £6100
- Assumed necessary fuel spending - £700

$£700 + £6100 = £6800$  (£40 more than income £6760) = fuel spend not affordable

- Add £200 Winter fuel payment to £6760 income = £6960
- minus £6800 necessary spend = £160 surplus = fuel spend is now affordable
  
- **Or** deduct £200 (bill reduction) from £700 fuel spend = £500
- $£6100 + £500 = £6600$  (£160 surplus) so fuel spend now affordable

**This example thus results in equal treatment of additional income or money off fuel bills.**

### 3.3 Monitoring progress

#### Timeliness of data

As one of the main purposes of the fuel poverty measure is to monitor progress towards the eradication of fuel poverty, and thus adjust policies and programmes to achieve this as needed, timeliness of data is clearly an important factor. The need to spend measure relies on data from the English House Conditions survey. The EHCS is conducted every year and the data are typically available for use about two years after the survey has been undertaken. For example, the 2009 Fuel Poverty Statistics Report used data from 2007. This reporting lag is due to the time it takes to administer and validate the survey results.

The main surveys of household spending that measure actual spending on fuel – the Expenditure and Food Survey and the British Household Panel Survey are also annual surveys. Data from the EFS are made available about one year after they are collected (e.g. data for the calendar year 2008 were available on the Office for National Statistics web site in January 2010). The data from each wave of the BHPS is available within a year of the completion of fieldwork. In terms of practical use, it is likely that a few months would be required to analyse and administer the data from the EFS or BHPS. **So the actual spend measure, using the EFS or BHPS data sets, would probably not greatly improve the timeliness of data for measuring fuel poverty.**

However, there may be other ways of measuring actual spending on energy. Energy suppliers clearly know how much their customers are spending on gas and electricity and receive such data on a quarterly basis. But matching up these data with the households on low income and/or in expensive to heat property who therefore might be fuel poor would not be straightforward (without access to data from DWP and

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data sources on energy efficiency - e.g. Energy Performance Certificates, local authority data bases) And given that many households do not have dual fuel contracts, energy suppliers would only have data on electricity and/or gas for most customers. Furthermore, data on spending on other fuels (e.g. oil and coal) would not be covered.

Under the proposed Energy Rebate Scheme, electricity suppliers will receive data from the DWP on some Pension Credit recipients (those aged 70 or over on the guarantee credit – i.e. the lowest income group), to enable the suppliers to provide such households with an automatic credit of between £80 and £100 on their electricity bill. Suppliers (without needing detailed information on the households concerned) will thus know that this group is on a low income. They will also have data on electricity spending by these households. It would therefore potentially be possible to assess spending by this group to assess how far they might be likely to be fuel poor. However, as the credit will be paid via electricity bills (and most home heating is gas) this could be of limited usefulness.

The Energy Rebate Scheme could also potentially be used to identify high spending households and target assistance to them – but again its restriction to electricity may limit the value of this.

Subjective measures of “feeling fuel poor” could potentially be provided much more quickly than some of the data on actual and need to spend if undertaken as separate surveys specifically limited to energy questions. But there is a question over how useful these data would be in isolation.

## 4. Additional benchmarks and research

**Additional benchmarks, that might be considered for use as a supplement to the fuel poverty measure, could be :**

Income or affordability related :

- households who are also in income poverty (i.e. lowest 30% of the income distribution) **or**
- households whose energy needs are unaffordable (e.g. in relation to a Minimum Income Standard)

Housing related :

- households living in the worst properties – F and G rated

Household related :

- households likely to be in persistent as opposed to transient fuel poverty (i.e. pensioners, single parent families)

### 4.1 An income or affordability benchmark

As shown in this report , the vast majority of fuel poor households have low incomes, but in recent years between 4-10% of the fuel poor have been in income deciles 4-10. Aside from a large property, the main reason higher income decile households come into the fuel poverty definition will be energy inefficiency and there is a range of incentives available to enable them to improve this (e.g. CERT, FITs, RHI, Green Deal). Measures to improve income (welfare benefits) and means tested help to reduce prices (e.g. social price support) will be of little relevance to the non-poor “fuel poor” group.

**Thus an income benchmark might be a useful addition to the fuel poverty measure.** An income benchmark could be used to better focus help on fuel poor households who are also income poor (e.g. 30% on lowest incomes). An income benchmark could be used to monitor the impact of policy on this group in addition to the fuel poor as a whole.

**Using a benchmark based on affordability of necessary energy spend ( see section 3.1.1. above) could help with :**

- **better targeting of help on those who are poor as well as fuel poor**
- **overcoming the problem that the current ratio creates in terms of treatment of changes in income and fuel expenditure – i.e. an affordability target could mean that a £200 change in income would have the same effect as a £200 reduction in fuel bills.**

As noted in Section 3.1.1, reaching agreement on necessary minimum income levels (a necessary component of an affordability target) is by no means straightforward, but does seem to be an area worthy for further examination.

## 4.2 A housing energy efficiency benchmark

**A housing energy efficiency benchmark might focus on households living in Bands F and G properties. Energy efficiency programmes (such as Warm Front) might be specifically targeted to these properties.** Progress in such properties occupied by fuel poor households in moving up the SAP ratings could also be specifically monitored as an additional measure of progress in tackling fuel poverty.

## 4.3 A household related benchmark

**Another useful benchmark could be persistent and transient fuel poverty – i.e. those households who remain in fuel poverty for long periods as opposed to those who move out of it fairly quickly.** This could potentially be more useful than the vulnerable and non-vulnerable distinction, particularly as the “vulnerable” category is so wide. **Single pensioners, pensioner couples, single parent households and the lowest income households (bottom 20%), in particular, experience a relatively high share of persistent fuel poverty compared with other sub-groups. Those living in the lowest SAP rated properties will also be more likely to experience persistent fuel poverty** so there would be a good correlation between persistent fuel poverty and a housing energy efficiency benchmark.

## 4.4 Some further and more up to date analysis

It would be useful to repeat the analysis undertaken by Sefton on the 1991 and 1996 EHCS :

- comparing actual spend and need to spend
- examining persistence of fuel poverty using a longitudinal sample
- comparing subjective measures with objective measures

In terms of actual spending on fuel, some modelling could be undertaken to assess the numbers of households who would be defined as fuel poor based on actual spending at different thresholds (e.g. 5%, 10%). In the future, smart meters could help in terms of providing real data on fuel spending (subject to data privacy issues)

There is also a need to get a better understanding of the breakdown of the numbers of households to do not qualify for Warm Front (and other help) because they do not get the qualifying benefits into :

- those who would be eligible but are not claiming (this group is likely to be in income poverty as well as fuel poverty and/or to have disabilities)
- those who are ineligible for the passport benefits (this group may not be in income poverty even though they are fuel poor)

### **4.5 New research on thermal comfort standard**

Very little up to date research has been done into actual indoor temperatures and heating durations. The last time that the EHCS included temperature measurements was 1996. At that time it was clear that most households (even those on high incomes and in energy efficient homes) under-spent relative to the standard and heated their homes to a lower temperature than assumed. As Sefton and Chesshire noted in 2005, however, “Evidence from BREHOMES and more recent, though smaller-scale surveys, suggests that temperatures in people’s homes have been rising gradually over time, so the standard may now be more in line with the average temperature in people’s homes.”

It would therefore be very useful for some research to be undertaken to establish current actual patterns of indoor temperatures and heating durations. This would help with monitoring progress in tackling fuel poverty and assessing the likely impact of improvements. It would also have a wider benefit than for fuel poverty purposes. If actual indoor temperatures (and hot water uses) and heating durations are different from those assumed in the model then this could have a major impact on the actual savings that will be achieved through the installation of energy saving measures and renewable energy technologies. For example, if average temperatures and durations are lower than assumed, then energy efficiency measures could result in lower energy bill reductions than are assumed (as households may take more of the benefits in improved comfort), payback on installation costs could take longer (a particularly important consideration for schemes such as Green Deal) and carbon emissions reductions may be lower than assumed. Conversely, if actual temperature and heating duration standards have risen compared to the assumptions, then energy, carbon and cost savings could be higher than assumed.

## **5. Conclusions**

The main advantage of the current “need to spend” official definition of fuel poverty is that it includes those who under heat their homes as well as those with very high fuel bills. This does seem to reflect the *raison d’être* of the fuel poverty legislation and strategy – to identify those who cannot afford to heat their homes, which will encompass those who live in a colder home to keep their spending affordable, as well as those who have bills that cause them problems.

Actual spending or a subjective measure of “feeling fuel poor” would not provide advantages over the current fuel poverty definition based on “need to spend”. Indeed, in some important respects they could be less useful measures. However, a number of options could be considered to supplement the fuel poverty measure, for the purposes of targeting assistance and monitoring progress towards tackling fuel poverty. These could include the incorporation of additional benchmarks related to housing energy efficiency standards, income and affordability. Monitoring actual spending and periodic subjective assessments might provide useful additional data on fuel poverty. Some more up to date analysis and research in a number of key areas would also be helpful.

## ANNEX 1 : Income related issues

### A.1.1 Income definitions

#### A.1.1.1 The official fuel poverty definition - full and basic income

Two definitions of income are used in the official GB fuel poverty definition ; ‘basic’ income and ‘full’ income.

- Basic income is calculated by adding the personal incomes of every member of the household together plus any benefit payments that the household receives (from private sources, state benefits and savings) but excludes income related directly to housing;
- Full income is the official headline figure and in addition to the basic income measure, it includes income related directly to housing (i.e. Housing benefit, Income Support for Mortgage Interest (ISMI), Mortgage Payment Protection Insurance (MPPI) and Council Tax Benefit (CTB).

Full income is the main definition used, although numbers are also monitored based on the basic income definition.

There are some alternative income definitions that could be used as outlined below.

#### A.1.1.2 Households below average income

The Government’s Households Below Average Income (HBAI) report presents statistics for a range of low-income thresholds. This includes households that are 60 per cent below average incomes, which is a commonly used international definition.

#### A1.1.3 Equivalised incomes

Another consideration is whether any attempt is made to equivalise incomes. Equivalising household incomes is a way of incorporating the size of a household into the overall measure of income for that household. Equivalised incomes are widely used in the calculation of income poverty by the Department for Work and Pensions (DWP). They measure household poverty by the ability to afford the whole range of goods and services for the size and type of household. Equivalised incomes will be lower than full incomes for larger households, and higher than full incomes for small, or single person households.

However, whilst larger households require more income for their total household needs, the amount of energy required is only affected to a limited extent by the number of people in the household (e.g. some more appliance and hot water use and heating extra bedrooms) as all members of a household can benefit from the same

level of heating in the main living rooms.<sup>39</sup> The 2004 peer review of fuel poverty methodology discussed using equivalised incomes in a measure of fuel poverty, although it concluded that it was not intuitive and may over compensate in favour of larger households.<sup>40</sup> The work undertaken for the 2009 report on fuel poverty statistics reinforced this finding.

Using households with equivalised household income of less than 60% of the average (median), as a definition of income poverty, Palmer et al calculate that, of their estimate of 3 million households in fuel poverty in England in 2007, 1.1 million would be in fuel poverty but not in income poverty.<sup>41</sup>

### A.1.2 Minimum income standards

A number of researchers have studied the concept of necessary minimum income standards. Most notably there is the major project on minimum income standards (the MIS project) funded by the Joseph Rowntree Foundation.<sup>42</sup> This is a collaboration between the Centre for Research in Social Policy (CRSP) at Loughborough University and the Family Budget Unit at York University. It brings together two approaches to setting budget standards: the "consensual" negotiation of budgets by panels of ordinary people, and budgets based on research evidence and expert judgements. In the MIS project, members of the public negotiate budgets and experts check these decisions and advise where they think there is a case for amending them. The first results of MIS were launched in July 2008 and updated in July 2009. The project is now funded for four further years to continue updating the standard.

The fuel budget standard derived from this work produces levels of necessary expenditure much lower than actual spending, as found in the EFS.<sup>43</sup> The researchers point out that this is due to the selection of housing type and tenure for the standard, through the consensual process. The standard is based on social housing (which on average is better insulated than the private sector) and also it is assumed that people live in properties relevant to household size (e.g. one or two bed flats for pensioners when in fact most pensioners live in bigger properties). The work will be updated to take account of these issues and rising fuel costs.

A study by the London School of Hygiene and Tropical Medicine in 2005 sought to define necessary spending (Minimum Income for Healthy Living – MIHL) for the full

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<sup>39</sup> DECC. Annual Report on Fuel Poverty Statistics 2009. Note : The fuel poverty methodology makes some assessment of the size of household when determining the adequate standard of warmth, this is largely to cover their particular circumstances (e.g. If three adults live in a property but are at work during weekdays, they are likely to have a lower heating requirement than a single, unemployed person.

<sup>40</sup> Sefton, T and Chesshire, J. Peer review of the methodology for calculating the number of households in fuel poverty in England. 2005.

<sup>41</sup> Palmer, G, MacInnes, T and Kenway, P. et al. Cold and poor. An analysis of the link between fuel poverty and low income. NPI, 2008.

<sup>42</sup> See : [Hwww.minimumincomestandard.org](http://www.minimumincomestandard.org)H

<sup>43</sup> Oldfield, N. The fuel budget standard. Minimum Income Standard Working Paper. University of York. Department of Social Policy and Social Work. 2008.

[Hhttp://www.minimumincomestandard.org/downloads/working\\_papers/MIS\\_working\\_paper\\_on\\_fuel.pdf](http://www.minimumincomestandard.org/downloads/working_papers/MIS_working_paper_on_fuel.pdf)H

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range of personal and household needs, for the healthy living of people aged 65 and over with no defined disability, living in private households in England.<sup>44</sup> The researchers had previously conducted a similar exercise for a younger age-group.<sup>45</sup>

The Pension Credit Guarantee (i.e. the Government's minimum income standard for pensioners), was the benchmark for comparison with the MIHL. The study was undertaken using established national data sets such as the Expenditure and Food Survey (EFS), General Household Survey (GHS) and English House Conditions Survey (EHCS). Necessary fuel costs were assessed using EHCS data and the standard heating regime. They excluded some housing costs (council tax, mortgage and rent) because those on low incomes without significant savings are able to claim additional benefits to cover these costs.

The study found that the MIHL was higher than Pension Credit Guarantee (single pensioners would need an extra £12 per week and pensioner couples would need an extra £25 per week)

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<sup>44</sup> Morris J, Dangour A, Deeming C, Fletcher A, Wilkinson P. Minimum income for healthy living : older people. Age Concern England, 2005.

<sup>45</sup> Morris JN, Donkin AJ, Wonderling D, Wilkinson P, Dowler EA. A minimum income for healthy living. *J Epidemiol Community Health* 2000;54(12):885-9. and 5. Morris JN, Deeming C. Minimum Incomes for Healthy Living (MIHL): next thrust in UK social policy? *Policy & Politics* 2004;32(4):441-54.

### ANNEX 2 : Persistent versus temporary or intermittent fuel poverty

Households in fuel poverty at any one point in time may not necessarily be so if assessed at a later date. There are many reasons why households can move in and out of fuel poverty due to changes in income, changes in personal circumstances (e.g. moving into retirement or in or out of employment), changes to the property they live in (e.g. installation of insulation or efficient heating), moving house or changes in fuel prices.

Sefton analysed movements into and out of fuel poverty (on the official Government definition) using the longitudinal sample of the 1991 and 1996 English House Condition Surveys.<sup>46</sup> He found that :

- Around 28% of households were fuel poor in 1991, falling to 26% in 1996.
- Of those dwellings that were occupied by a fuel poor household in 1991, 57% were still occupied by a fuel poor household five years later.
- Around 12% of dwellings that did not contain a fuel poor household in 1991 were occupied by one five years later.

Sefton concluded that “fuel poverty is, therefore, a moving target. Furthermore, these flows into and out of fuel poverty are not driven by small upward or downward movements across the 10% threshold. Many households who escape fuel poverty move well below the threshold and vice-versa.”

Sefton also analysed the rate of persistent fuel poverty (percentage of households remaining fuel poor after five years) amongst different types of households. He found :

- Single pensioners were the group most likely to experience persistent fuel poverty - 75% of those who were fuel poor in 1991 were still fuel poor in 1996.
- Single parents were the next most likely to experience persistent fuel poverty at 58%, followed by pensioner couples at 52%
- Couples with children were least likely to experience persistent fuel poverty – 37%

Perhaps not surprisingly he also found that those living in properties with the lowest SAP ratings and on the lowest incomes were also more likely to experience persistent fuel poverty.

Sefton also found that changes in income accounted for the majority - around two thirds - of all movements into and out of fuel poverty between 1991 and 1996. There was a fall in real fuel prices over this period, which is why changes in required fuel expenditure account for a greater proportion of exits from fuel poverty than entries into fuel poverty.

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<sup>46</sup> Sefton, T. (2004) *Aiming high – An evaluation of the potential contribution of Warm Front towards meeting the Government’s fuel poverty target in England.* Sefton did not have a consistent measure of standardised fuel expenditure for more recent longitudinal samples (i.e. 1996 and 2001).

Sefton has also examined the BHPS evidence on persistence of fuel poverty (based on a definition of actual spending of 10% or more on energy) .

- 18% of households experienced fuel poverty at some point over the four “waves” (annual surveys) of the BHPS from 1997-2001.
- At least half these households – (9%) experienced fuel poverty in only one wave out of the four, whilst 4.3% of households were fuel poor in at least three out of four waves.
- Single pensioners, pensioner couples, single parent households and low income households (the bottom 20% of the income distribution), in particular, experienced a relatively high share of persistent fuel poverty compared with other sub-groups.
- Couples with children were less likely to experience fuel poverty and, if they did, it was less likely to be a persistent spell of fuel poverty.

Sefton thus concluded that, on the BHPS data, for the majority of people who experienced fuel poverty, it appeared to be a transitory phenomenon. However, cases of persistent fuel poverty accounted for a much higher proportion of those observed to be fuel poor at any given point in time - 44% of fuel poor households.

In Ireland, a distinction was also drawn in a 2001 survey between intermittent and chronic fuel poverty. The definitions here were rather different from those of the BHPS or the work done by Sefton on the EHCS. The BHPS measured whether households would be classified as persistently or transiently fuel poor depending upon how they moved in and out of fuel poverty (as defined by actual spend) over several years. Sefton’s EHCS work assessed whether households remained in fuel poverty (on the official UK definition) from one EHCS survey period to the next. The 2001 survey in Ireland assessed whether households felt unable to heat their homes most of the time or only some of the time.

The Irish study found that that 165,000 (12.7%) households suffered from fuel poverty on an “intermittent and occasional” basis (occasionally unable to heat the home adequately), whilst 62,000 (4.7%) did so on a “chronic and persistent” basis (constantly unable to adequately heat the home). Chronic fuel poverty was proportionately highest among households with four or more dependent children, single female pensioners and private tenants.<sup>47</sup>

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<sup>47</sup> John D. Healy, J. Peter Clinch. Quantifying the severity of fuel poverty, its relationship with poor housing and reasons for non-investment in energy-saving measures in Ireland Energy Policy 32 (2004) 207–220

## ANNEX 3 : Notes on data sources

### A.3.1 Information on actual household spending on fuel

The main source of data on what households actually spend on fuel is the annual Expenditure and Food Survey (EFS). The EFS is a survey of around 6,000 households in the UK. The survey asks householders to record their household expenditure in a “diary” over a two week period and is carried out continuously across the year, with different households recording expenditure during different two week slots. While the diary is very useful for regular spending (e.g. food), information about semi-regular purchases (e.g. utilities) is obtained from a household interview along with retrospective information on certain large, infrequent expenditures, such as those on repairs. These three types of spending are combined to enable annual expenditure totals to be calculated.

For the purposes of the 2009 Annual Report on Fuel Poverty Statistics, to achieve a large enough sample for analysis, three consecutive surveys were merged, those for 2005/06, 2006 and 2007 data.

### A.3.2 EHCS – subjective questions on fuel poverty

As part of the household interview survey section of the English House Conditions Survey (EHCS), there is a question about the occupant’s subjective thermal comfort in their home during winter. The question asks:

*“During the cold winter weather, can you normally keep comfortably warm in your living room?”*

If the answer is no, a second question seeking an explanation is asked with the following possible answers:

- *it costs too much to keep your heating on;*
- *because it is not possible to heat the room to a comfortable standard;*
- *both of the above; and*
- *neither*

For the purposes of the 2009 Annual Report on Fuel Poverty Statistics, analysis has been carried out for responses to this question in the 2003-2007 surveys.

### A.3.3. BHPS

The British Household Panel Survey is unique in being a longitudinal survey, where the same individuals are re-interviewed each year. A key difference between the BHPS and the EHCS is that in the latter the focus is on the dwelling, whereas for the BHPS the focus is on individuals. If an EHCS household moves home, the new occupants of the dwelling are interviewed in the follow-up survey, whereas if BHPS respondents move home, they are re-surveyed in their new home. The BHPS also gives more weight to larger households, because each individual, rather than each household, is counted as a separate observation.

### ANNEX 4 : Thermal comfort and indoor temperatures

#### A.4.1 Thermal comfort – modelled and observed

The concept of “thermal comfort” came originally more from the workplace rather than the home. Thermal comfort is defined in British Standard BS EN ISO 7730 as: ‘that condition of mind which expresses satisfaction with the thermal environment.’<sup>48</sup> In practice ‘thermal comfort’ is usually referred to in terms of whether someone is feeling too hot or too cold.

The thermal comfort standards included in the definition of fuel poverty are :

- 21C in main living rooms and 18C in other rooms for 9 hours on weekdays and 16 hours at weekends for households assumed to be out during weekdays,
- 21C and 18C for 16 hours every day for those assumed to be at home on weekdays.

It is assumed that the whole house is heated to these levels except for households deemed to be under-occupying, where it is assumed that only half the house is heated to these levels.<sup>49</sup>

These assumed heating demand temperatures and heating durations come from the main UK household energy model – BREDEM (the Building Research Establishment’s Domestic Energy Model). BREDEM uses a mixture of analytical and empirical techniques to assess the energy requirements needed in a dwelling to achieve a specified heating regime. These heating durations and temperatures are also the “default heating regime” assumed in the Standard Assessment Procedure (SAP), to establish levels of energy consumption (and cost) and predict the likely effect of energy efficiency measures (on energy consumption and fuel expenditure).

As the 2005 fuel poverty methodology review noted “One way of assessing whether these heating regimes are reasonable is to compare them with survey data on people’s actual or reported heating patterns.” The review found that :

- Reported pattern(i.e. based on what households say they do) : BRE’s analysis of heating patterns using data from the 1998 Energy Follow Up Survey (EFUS) showed that households at home during the day were heating their homes for significantly fewer than the 16 hours assumed in the fuel poverty model, but that people in under-occupied homes appeared to be heating more of their home than assumed, possibly compensating for this by having their heating on for fewer hours.
- Reported pattern : Analysis of 2001 EHCS data showed that the majority of households at home all day (particularly the retired but also the unemployed) said that they usually or always have their heating on during the winter.
- Actual pattern (i.e. based on actual temperature readings in people’s homes). The latest EHCS data is for 1996 as temperature readings were not taken in the

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<sup>48</sup> HSE web site. H<http://www.hse.gov.uk/temperature/thermal/explained.htm>

<sup>49</sup> Under occupancy is based on assumptions about living space and bedrooms required according to the number of people in a household.

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2001 survey (or in subsequent surveys). In 1996, the median temperature was 19.4C in the living room and 18.1C in the hall/passage. The median living room temperature in homes with : the highest SAP ratings (19.7C); in the highest income band (19.6C); and where occupants described the temperature as “about right” (19.5C) were still significantly below the standard.

- The 1996 EHCS data also showed that , on average, households were spending less than three-quarters of what they would have needed to spend to heat their homes adequately, according to the fuel poverty model. Even high income households and occupants of high-SAP dwellings (though to a lesser extent) were under-spending relative to the standard.

Sefton and Chesshire who undertook the review concluded that : “most of the evidence suggests that the heating regimes and temperature standards are probably quite ‘generous’. Most households (even those on high incomes and in energy efficient homes) under-spend relative to the standard and heat their homes to a lower temperature than assumed, although the gap is likely to have narrowed since the data on which our analysis is based was collected in 1996....However, the assumption that half-house heating is adequate for all under-occupied homes should be reviewed..”

As a result of the fuel poverty methodology review, the heating regimes assumed for under-occupied properties were modified but no other changes were made.

The large scale actual data on thermostat settings, indoor temperatures and central heating durations, is thus now considerably outdated (the last time the EHCS included temperature measurements was 1996). As Shipworth et al say “ There is currently little alternative to using BREDEM’s default heating demand temperatures and durations because there have not been the comprehensive studies which could provide the necessary data for the models. “<sup>50</sup> Shipworth et al also quote Oreszczyn and Lowe, who say (about BREDEM and SAP)”... there is a real dearth of hard data with which to validate these models and take account statistically of variations in occupant behaviour. . . . This difficulty in getting real data has produced an over reliance on theoretical predictions.”<sup>51</sup>

Shipworth et al’s study in 2007 in England was an attempt to provide more up to date real data. Their study is based on a sub-set of a stratified random sample in which 358 householders with gas or oil central heating were fitted with two temperature sensors for a year – one in the main living room and one in the main bedroom. The key findings from this study were that :

- thermostat settings were on average around 21C
- central heating active hours on weekdays were on average 8 hours
- central heating active hours on weekends were on average 8 hours

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<sup>50</sup> Shipworth, M, Firth, S K., Gentry, M, Wright, AJ, Shipworth, D T. 1 and Lomas K J. Central heating thermostat settings and timing: building demographics. BUILDING RESEARCH & INFORMATION (2010) 38(1), 50–69

<sup>51</sup> Oreszczyn, T. and Lowe, R. (2004) Memorandum. House of Lords Select Committee on Science and Technology

Minutes of Evidence, The Stationery Office, London. (quoted in Shipworth, M et al)

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However, they found significant variation in thermostat settings which echoed findings in many previous studies that households have widely differing winter warmth preferences. Although both the mean and median thermostat settings were 21C, 30% of the sample had settings of less than 20C and 40% had settings of 22C or higher.

In terms of the number of hours per day that the rooms were heated the range was from 4.7 to 12.7 hours/day. Shipworth et al note that other studies have also found a wide range in daily heating periods (based both on actual monitoring and householder estimates).

Whilst the assumed temperatures and hours of heating on weekdays were thus similar to those assumed in BREDEM (and hence the thermal comfort standard in the fuel poverty definition), the hours of heating at weekends were notably lower – 8 rather than 16 hours.

In 2001-02 and 2002-03, Oreszczyn et al undertook a survey of 1604 dwellings undergoing Warm Front energy efficiency improvements in five urban areas of England.<sup>52</sup> Half-hourly living room and main bedroom temperatures were recorded for 2–4 weeks over two winters. For each dwelling, they obtained estimates of daytime living room and night time bedroom temperatures under standardized conditions (outdoor temperature of 5C). They found that the median standardized daytime living room temperature was 19.1C (range: 13.5–23C) and the median standardized night time bedroom temperature 17.1C, (range: 12.1–21.8C) pre Warm Front intervention. They note that “the values we report are higher than those reported in previous studies, which may in part be attributed to the comparatively low current energy costs.” Temperatures were influenced by property characteristics, including its age, construction and thermal efficiency and also by the number of people in the household and the age of the head of household. Dwellings that received both heating and insulation measures through the Warm Front scheme had daytime living room temperatures 1.6C higher than pre-intervention dwellings, night time bedroom temperatures were 2.8 C higher.

The distributions found by Oreszczyn et al indicated some very low indoor temperatures, but also a wide variation in temperatures, which they say “may reflect a combination of factors: the efficiency of the heating system and insulation, the capacity (maximum rate of energy consumption) of the heating system and personal choice/behaviours. They noted that older people had higher living room temperatures but lower bedroom temperatures, which may largely reflect personal choice. They therefore concluded that “an efficient heating system alone does not guarantee good home heating if the user chooses not to use it. It does, however, make the choice of a warmer home much easier and hence leads to a significant increase in average temperatures.”

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<sup>52</sup> Oreszczyn, T, Hong, Sung H, Ridley, I and Wilkinson, P. Determinants of winter indoor temperatures in low income households in England. *Energy and Buildings* 38 (2006) 245–252

### A.4.2 Indoor temperatures and health

During the early 1980s the World Health Organisation (WHO) developed guidelines on recommended minimum indoor temperatures for housing to provide thermal comfort and protect against ill health. The recommended minimum was 18C but 2-3C warmer for elderly persons. At a WHO meeting of experts in 1985 a minimum temperature of 20C was agreed for “the sick, the handicapped, the very old and the very young”.<sup>53</sup>

More recently, the WHO European Centre for Environmental Health Bonn Office has developed a system of Environmental Health Indicators based on internationally agreed methodology and comparable data.<sup>54</sup> These Indicators are intended to describe the state of environmental health and so inform decisions, monitor programmes and allow for comparisons nationally and internationally. To date it has only been possible to locate indicators agreed at a meeting in December 2003. It is not clear whether they have been updated or not. The relevant indicators are :

- Temperatures between 19°C and 16°C for substantial periods of time cause only a small risk of adverse health effects.
- Below 16°C there is a serious risk to health, including increased risk of respiratory and cardiovascular conditions.
- Below 10°C there is a risk of hypothermia, especially for the elderly (65 years or older)

Collins (whose work in the 1980s is still the main work on health impacts of low indoor temperatures) identified the following health impacts<sup>55</sup> :

- 18-24C – no health risk to sedentary healthy people
- below 16C - increased risk of respiratory disorders
- below 12C – increased risk of cardiovascular strain

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<sup>53</sup> Health impact of low indoor temperatures. Report on a WHO meeting. Copenhagen 11-14 November 1985. [http://whqlibdoc.who.int/euro/ehs/EURO\\_EHS\\_16.pdf](http://whqlibdoc.who.int/euro/ehs/EURO_EHS_16.pdf)

<sup>54</sup> WHO technical meeting on "Housing-Health Indicators" Results of review and data availability screening in Member States. January 2004

<sup>55</sup> Collins, K. Low indoor temperatures and morbidity in the elderly. Age and Ageing. Volume 15 No, 4. (1986) pp 212-20

## ANNEX 5 : Fuel poverty and fuel poverty measures in other countries

### A.5.1. Fuel poverty in the Republic of Ireland

#### A.5.1.1 Affordability of energy in Ireland

It is useful to begin by examining energy prices and their significance in household budgets. By the end of 2008 it was estimated that average household spend on energy in Ireland was around €2300<sup>56</sup>. Energy prices have risen significantly in recent years - in 2006 average annual spend on energy by households was €1,767, an increase of 4% on 2005 and 70% on 1990 (3.4% per annum on average).<sup>57</sup>

As well as the absolute amount of spending, the proportion of income spent on fuel is a key determinant of the extent to which energy prices are affordable. In 2007 3.3% of the average household's total household spending was on fuel and power (excluding motor fuels).<sup>58</sup> (CIPA) This average however, conceals some significant differentials between households. On a gross income basis, the two lowest income deciles spent 9.6% and 7.6% on fuel and light, and the top two income deciles spent 2.9% and 2.4% respectively.<sup>59</sup>

Sustainable Energy Ireland (SEI) examined expenditure on energy as a percentage of disposable income in 2004/2005.<sup>60</sup> The 9<sup>th</sup> and 10<sup>th</sup> decile, that is the top two income groups, spent just under 3% and under 2% respectively. The lowest decile spent on average about 13% on fuel and light, and the second lowest between 9 and 10%.

#### A.5.1.2 Definition of fuel poverty in Ireland

In Ireland fuel poverty is defined as "...the inability to afford adequate warmth in a home or the inability to achieve adequate warmth because of the energy inefficiency of the home."<sup>61</sup>

There is no single measure of fuel poverty in use in Ireland and thus no established estimate of numbers of households in fuel poverty. Two measures of fuel poverty in use in Ireland are :

- the household survey method
- the percentage of income that has been spent on fuel

#### A.5.2.4 Measuring fuel poverty in Ireland

##### The Household survey method

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<sup>56</sup> CIPA. Energy affordability. September 2008.

<sup>57</sup> SEI Energy in the Residential Sector, 2008.

<sup>58</sup> CIPA. Op.cit

<sup>59</sup> CIPA. Op.cit

<sup>60</sup> SEI. Energy in the Residential Sector, 2008

<sup>61</sup> DCENR. Delivering a sustainable energy future for Ireland. 2007, p.53

A national household survey in Ireland in 2001 used a qualitative method to assess fuel poverty as part of a broader survey to elicit a variety of information on social indicators and living conditions in Ireland. The survey was funded by the Urban Institute of Ireland. It used a random sample of 1500 households across Ireland; (statistically significant in a population of 3.7 million people and 1.3 million dwellings). The definition of fuel poverty employed in this study was a qualitative definition first used by Lewis [9] and later modified by Clinch and Healy [4]: ‘the inability to heat the home adequately because of low household income and energy inefficient housing’. Households were asked a variety of questions relating to the thermal comfort of their homes - those declaring an inability to adequately heat the home to a comfortable temperature were defined as fuel-poor households. Some 17.4% of the sample (representing 226,000 households) reported some level of fuel poverty on the basis of the questions asked.<sup>62</sup> SEI have updated this figure and found that 260,000 households were in fuel poverty to some extent in 2008 on this definition.<sup>63</sup>

In the 2001 survey, the highest incidence of fuel poverty was found among the long-term ill and disabled - 45% of such households (11,000). However, this result was based on a relatively small sample of households. Lone-parent households were the second-highest group of fuel-poverty sufferers in Ireland, with over 40% declaring an inability to heat the home adequately (29,000 households). 36% (121,000) of low income households (the bottom 30% of the income distribution) were found to be suffering from fuel poverty. Other groups with high incidences included: local-authority tenants, the unemployed and lone female pensioners.<sup>64</sup>

The 2001 survey allowed a distinction to be made between long-term (chronic, persistent) sufferers from fuel poverty and short-term (intermittent and occasional) sufferers. It found that 165,000 (12.7%) suffered from fuel poverty on an “intermittent and occasional” basis, whilst 62,000 (4.7%) did so on a “chronic and persistent” basis.

The results of the 2001 survey were cross-compared with an actual spending definition - households classified as fuel-poor if they spend more than 10% of their income on energy in the home. Between 20.7% (housing costs included) and 25.0% of homes are found to be suffering from fuel poverty using this definition.<sup>65</sup>

Scott et al have also assessed the results from different surveys using subjective (householder perception) measures from 1994 to 2006. The numbers and percentages varied substantially from a low of 37,000 (3% of households) to a high of 226,000. Whilst some of the difference may be explained by rising incomes (i.e. the fall in numbers reporting fuel poverty problems from 1994-2000) much of it is also likely to be due to the different questions asked in the different surveys. The main difference is between the 2001 survey and the other subjective surveys. The 2001 survey

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<sup>62</sup> Healy, J.D. and J.P. Clinch, 2002. “Fuel Poverty, thermal comfort and occupancy: results of a national household survey in Ireland”, *Applied Energy*, 73 (2002) pp 329-343, Elsevier.

<sup>63</sup> Correspondence with SEI.

<sup>64</sup> Scott, S. et al. Fuel poverty in Ireland : extent, affected groups and policy issues. Working Paper. ESRI. October 2008

<sup>65</sup> Healy and Clinch op. cit.

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assessed those who had persistent and frequent problems and those with more intermittent problems. The numbers with the persistent problems were in the same arena as the other subjective measure surveys. However, when those with intermittent problems were included the 2001 survey totals were much higher (165,000) and also came close to the objective measure of actual expenditure.

### **The percentage of income that has been spent on fuel**

Scott et al note that 2005 data indicate that almost 16% or 229,000 households were vulnerable to fuel poverty in Ireland, on the basis that they paid more than 10% of income after housing costs towards home heating and electricity.

On the basis that households would be classified as fuel poor if they spend more than 10% of their income on energy in the home, Scott et al have estimated that, in 2008, 301,368 (19.4%) households were in fuel poverty. Scott et al found that fuel poverty was particularly prevalent in households with a single adult, - i.e. a single adult with children, a single adult aged 65 or more, and a single adult in the 14 to 64 age range (more than 25% of these households spent more than 10% of income on fuel, whereas the percentages were below 15% for other types of household). In terms of tenure, 27% of local authority tenants, 19% of those who owned their homes outright, 17% of private tenants and 6% of those with a mortgage were fuel poor, <sup>66</sup>

#### **A.5.1.3 Prevalence of fuel poverty in different income deciles in Ireland**

As Scott et al (2008) say “ It is important to note that vulnerability to fuel poverty does not bear a simple relation to income, even when one uses the expenditure approach to estimate it... Simply comparing average energy use with income by decile conceals the wide variation in energy use *within* each decile.” Key reasons for these differences within deciles will be the types of heating used and the thermal efficiency of the property – those living in a well insulated home with gas central heating will be less likely to be fuel poor than those living in an uninsulated property with a coal fire and electric on-peak heaters, for example. Another important factor is the size of property (a single pensioner still living in a three bedroom family home, for example).

Despite these caveats about variations within income deciles however, the prevalence of fuel poverty is much greater in the lowest deciles than in the higher income deciles. Scott et al have analysed the distribution of households in fuel poverty (using the 10% of income spent on fuel definition), using the CSO 2005 Household Budget Survey data, and found that :

- 61% of households in decile 1 and 42% in decile 2 were in fuel poverty in 2005 on the 10% of income definition.
- 30% in decile 3 were also in fuel poverty on this definition,

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<sup>66</sup> Scott, S. et al October 2008 op cit.

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- Thereafter the percentages in fuel poverty decline from 11% and 8% in deciles 4 and 5, to below 5% in deciles 6,7 and 8 and 0% in deciles 9 and 10.<sup>67</sup>

### **A.5.1.4 Types of households most likely to be fuel poor in Ireland**

Based on the various methods used to assess fuel poverty as described above, some conclusions can be drawn on which households are most likely to be in fuel poverty in Ireland.

A fuel poor household in Ireland is most likely to be (income)

- In income decile 1 - 61% are fuel poor
- In income decile 2 - 42% are fuel poor

A fuel poor household in Ireland is most likely to be (household type) :

- Single adult over 65 – 37% are fuel poor
- Single adult with children – 37% are fuel poor

A fuel poor household in Ireland is most likely to live (tenure) :

- Local authority tenant – 27% are fuel poor
- Own their home outright – 19% are fuel poor
- Private tenant –17% are fuel poor

Households who are least likely to be fuel poor are

- in income deciles 4 and above;
- have a mortgage
- are part of a household with more than one adult

### **A.5.2. Rest of the European Union**

There is no common EU definition of fuel or energy poverty and no common indicators. Fuel poverty (or energy poverty which is the more common term) is not defined in other EU countries (except UK and Ireland) though many of them have policies and programmes to help vulnerable households with heating bills or energy efficiency.

The European Fuel Poverty and Energy Efficiency Project (EPEE), is funded by the European Union to seek to develop a common definition across Europe, share good practice in tackling fuel poverty and evaluate action. Its members are a mixture of

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<sup>67</sup> Scott, S. et al October 2008 op cit.

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NGOs, Universities and energy efficiency agencies from several EU countries (the UK member is NEA).<sup>68</sup>

The Catalan government in Spain has recently announced that fuel poverty will be included in its revised Energy Plan for 2006- 2015, thus acknowledging for the first time that it recognised this problem and intended to take action on it during this period.<sup>69</sup>

In France a Government Fuel Poverty Working Group was established in 2009 to develop new proposals to tackle fuel poverty, particularly through energy efficiency.<sup>70</sup>

### **A.5.3. United States**

Whilst the problems that low income households have with energy bills and keeping warm in winter (and cool in summer in many states) have been recognised since the late 1970s, “fuel poverty” as such is not officially recognised in the US at state or federal level.<sup>71</sup> Therefore, there has been no attempt to set out an acceptable proportion of income to be spent on home energy use.

However, there are number of state and federal level programmes to assist low income households with their energy bills – these include subsidised or free insulation and heating improvements, payments to help with heating bills and help to pay off fuel debts.

### **A.5.4. Australia and New Zealand**

#### **A.5.4.1 Australia**

As much of energy policy is still handled by the State rather than the Federal Government, issue such as fuel poverty tend to be dealt with at state level. Fuel poverty has been recognised by campaigning groups as an issue in some parts of Australia (notably Victoria) since the early 1980s and there have been a number of state Government schemes to help low income households with energy bills, insulation measures etc.

There is no formal definition used but at a working level assessments tend to be made on the basis of actual spending – i.e. households who actually spend more than 10% of income on home energy needs (remembering that cooling is as much if not more of an issue than heating in some states). However, within state and federal governments,

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<sup>68</sup> <http://www.precarite-energetique.org>H

<sup>69</sup> EPEE Newsletter 3.February 2010

<sup>70</sup> Ibid.

<sup>71</sup> Power, M. Fuel poverty in the USA : the overview and the outlook. Energy Action Issue 98. March 2006

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the term “fuel poverty” tends not to be used very much, with the emphasis being more on “hardship”, in terms of difficulties paying bills.<sup>72</sup>

### **A.5.4.2 New Zealand**

Fuel poverty has been recognised in New Zealand and mentioned in a number of Government documents in recent years. There have been increasing concerns raised by campaigning groups due to low levels of space heating and insulation in most homes – a particular problem in the South Island which has colder winter temperatures. Some programmes have been developed since the late 1990s to improve insulation for low income households. The definition usually used in Government documents is actual spending of more than 10% of income on heating, although some academics and campaigners argue for use of the UK definition based on “need to spend”.<sup>73</sup>

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<sup>72</sup> Department of Primary Industry and Resources, Victoria. Committee of Inquiry into the Financial Hardship of Energy Consumers. Summary Report, September 2005.

[Hhttp://new.dpi.vic.gov.au/\\_data/assets/pdf\\_file/0003/10101/Hardship-Report-Summary.pdf](http://new.dpi.vic.gov.au/_data/assets/pdf_file/0003/10101/Hardship-Report-Summary.pdf)H

<sup>73</sup> Lloyd, R. Fuel poverty in New Zealand. Social Policy Journal of New Zealand. Issue 27. March 2006

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