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Wales Fuel Poverty Projection tool: 2011/2012 report

Wales Fuel Poverty Projection Tool – 2011 and 2012 report

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Based on work by Elaine Simpson, BRE consultant.

Views expressed in this report are those of the researcher and not necessarily those of the Welsh Government

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Glossary of acronyms

CERT	Carbon Emissions Reduction Target
CPI	Consumer Price Index
EHS	English Housing Survey
LiW	Living in Wales Survey
Ofgem	Office of the Gas and Electricity Markets
PV	Photovoltaic
RPI	Retail Price Index

Summary

Context

1. The Welsh Government's Programme for Government commits to tackling poverty, and a key action within this is to:

"Implement the Fuel Poverty Strategy, which sets out actions including the provision of a demand-led All Wales Fuel Poverty programme (Nest), advisory services for households and delivery of arbed, and a strategic area-based energy efficiency programme."

2. The percentage of households in fuel poverty is one of the key indicators in monitoring the outcomes of the tackling poverty area of the Programme for Government in Wales, and is also referenced in the chapters about creating sustainable places for people, and improving the quality of Welsh homes. The Welsh Government commissioned BRE to undertake this research to provide the indicator. This commission had 3 main requirements:

    - To develop a model to predict overall levels of fuel poverty in Wales, levels of fuel poverty in vulnerable households and levels of fuel poverty in social housing in Wales.
    - To use this model to provide estimates of fuel poverty in Wales in 2011 and 2012.
    - To use the Hills Review definition of Fuel Poverty to estimate the number and distribution of households that would be in fuel poverty if this definition were to be applied to Wales.

Key Findings

3. In 2008, 26% of all households (332,000 households) were calculated to be in fuel poverty using data from the Living in Wales 2008 survey and based on the full income definition of fuel poverty. The full income definition of fuel poverty states that a household is said to be in fuel poverty if in order to maintain a satisfactory heating regime it would

have to spend more than 10% of its income (including Housing Benefit or Income Support for Mortgage Interest) on all household fuel use[1]. This is the same definition that is used to set UK fuel poverty targets.

4. Using this position as a base, incomes, fuel prices and the energy efficiency of the stock were modelled to estimate the levels of fuel poverty in 2011 and 2012:

    - In 2011, 29% of households in Wales (365,000 households) were estimated to be in fuel poverty using projections based on the Living in Wales 2008 survey based on the full income definition of fuel poverty. This is 33,000 more households than in 2008.
    - In 2012, 30% of households in Wales (386,000 households) were estimated to be in fuel poverty. This is the equivalent to 54,000 more households than in 2008. Rising fuel prices have largely been counteracted by the increases in income and energy efficiency savings in the housing stock, and this has led to the increase in the number of fuel poor households.

Fuel Poverty in Vulnerable Households

5. Similar changes in the levels of fuel poverty are seen in vulnerable households compared to all households in both 2011 and 2012. Yet a higher proportion of vulnerable households are estimated to be in fuel poverty than in all households in both 2011 and 2012.

Fuel Poverty in Social Housing

6. The proportion of households in social housing that are projected to be in fuel poverty is similar to that of all households in 2011 and 2012.

[1] Definition from "The Fuel Poverty Indicator," Centre for Sustainable Energy (http://www.fuelpovertyindicator.org.uk/newfpi.php?mopt=1&pid=defining).

National Comparisons

7. National comparisons highlight that relative levels of fuel poverty in Wales are similar to those in Scotland. Relative levels of fuel poverty in Wales lie between those of Northern Ireland (which are higher) and England (which are lower).

Hills Review Definition of Fuel Poverty

8. The Fuel Poverty Evidence Plan stated that analysis would be undertaken to estimate the number and distribution of households that would be in fuel poverty under the new definition proposed by the Hills Review team. This was to help inform the Welsh Government's considerations of the final recommendations of the Hills Review. It should be noted that the Hills review used England data only. Using the Hills Review definition of fuel poverty:
    - The number of fuel poor households are projected to have risen from 139,000 (11%) in 2008 to 146,000 (12%) in 2011 and the average fuel gap from £583 to £658.
    - In 2012, the level of fuel poverty under the Hills Review definition remains stable at 11% (144,000 households) and the average fuel gap has risen slightly from £658 in 2011 to £688 in 2012.
9. No decision has yet been made regarding the implementation of the Hills Review Definition.

Caveats To Be Aware Of

10. The terms of the agreement between BRE and the Welsh Government have resulted in some assumptions being made in the calculating of fuel poverty estimates within the bespoke fuel poverty projection model. The areas where such assumptions have been made have been highlighted. In some areas further investigation of external data could be made which may lead to alternative assumptions being made, which would alter the estimates for fuel poverty.

11. Care should therefore be taken in interpretation of the results which are based on the assumptions outlined in the report.

1 Methodology

1.1 The fuel poverty figures were produced using a bespoke interactive Excel tool (available on request) that allows users to test the level of fuel poverty for various scenarios. The methodology it uses and the source of the input data are described in more detail in the Documentation of Model document (which is available on request). In summary, the Living in Wales 2008 survey was used as a base to project the level of fuel poverty in 2011 and 2012 using derived changes in income, fuel prices and the number of energy efficiency upgrades applied to the stock between 2008 and 2011, and 2008 and 2012. The input data are described below.

Income and Fuel Prices

1.2 In the model, income is split into two components: Earned and Other (including benefits, additional adults (household members over 16 years old that are not in the same benefit unit as the household reference person of their partner), savings etc.) The changes between 2008 and 2011 are shown in Table 1. The projected income rises between 2008 and 2012 are shown in Table 2.

Table 1: Income rises between 2008 and 2011[2]

Income	2008-2011
Earned	5.4%
Other	6.3%

[2] http://www.ons.gov.uk/ons/taxonomy/index.html?nscl=Earnings Data Section: EARN01: Average Weekly Earnings: AWE Regular Pay tab. Table KAI9.

Table 2: Income rises between 2008 and 2012[3]

Income	2008-2012	2011-2012
Earned	7.4%	1.9%
Other	11.9%	5.2%

1.3 A 5.4% increase in earned income was seen between September 2008 and September 2011 whereas other income sources rose by 6.3%.

1.4 Earned Income is assumed to change in line with the average weekly earnings, which has increased by 7.4% between September 2008 – September 2012[4] and between September 2011- September 2012 increased by 1.9%.

1.5 Other income, which is linked to the RPI and CPI, rose by 5.2% between September 2011 – September 2012 and 11.9% between September 2008 – September 2012. Since April 2011, benefit income has been linked to the CPI rather than the RPI, and percentage change in benefit income is defined as the annual change in the CPI from the previous September. Table 3 details the compound annual changes used to calculate Other Income.

Table 3: Components used to calculate the change in Other Income[5]

Source	Year	Value
RPI	Sept 2008 - Sept 2009	-1.4%
RPI	Sept 2009 - Sept 2010	4.6%
CPI	Sept 2009 - Sept 2010	3.1%
CPI	Sept 2010 - Sept 2011	5.2%

[3] http://www.ons.gov.uk/ons/taxonomy/index.html?nscl=Earnings Data Section: EARN01: Average Weekly Earnings: AWE Regular Pay tab. Table KAI9.
[4] http://www.ons.gov.uk/ons/taxonomy/index.html?nscl=Earnings Data Section: EARN01: Average Weekly Earnings: AWE Regular Pay tab. Table KAI9
[5] http://www.ons.gov.uk/ons/taxonomy/index.html?nscl=Consumer+Price+Indices Data Section: CPI and RPI Reference Tables. Table 21.

1.6 In the model, fuel prices are split into four components: gas, electricity, oil and solid fuels and are projected independently. The changes between 2008 and 2011 are shown in Table 4.

Table 4: Fuel Price rises between 2008 and 2011[6]

Fuel	2008-2011
Gas	18.4%
Electricity	9.3%
Oil	22.2%
Solid	23.3%

1.7 Fuel prices have risen substantially between 2008 and 2012 and gas prices in particular have risen sharply between 2011 and 2012. These are shown in Table 5.

Table 5: Fuel price rises between 2008 and 2012[7]

Fuel	2008-2012	2011-2012
Gas	31.0%	10.6%
Electricity	15.5%	5.7%
Oil	25.4%	2.6%
Solid	27.6%	3.5%

Energy Efficiency Upgrades

1.8 Between 2008 and 2012 the energy efficiency of the stock improved as upgrades were installed in dwellings e.g. cavity wall insulation and loft insulation. The number of upgrades estimated to have been installed under the different schemes between 2008 and 2011 is shown in Table

[6] https://www.gov.uk/government/statistical-data-sets/monthly-domestic-energy-price-stastics Monthly Tables: Retail prices index: fuels components monthly figures (QEP 2.1.3)
[7] https://www.gov.uk/government/statistical-data-sets/monthly-domestic-energy-price-stastics Monthly Tables: Retail prices index: fuels components monthly figures (QEP 2.1.3)

6. The number of upgrades estimate to have been installed under the different schemes between 2008 and 2012 is shown in Table 7.

1.9 Ofgem data in solar PV installations shows that the uptake in PV rose substantially from 4,642 installations between 2008-2011 to 19,364 installations between 2011-2012. The number of upgrades estimated to have been installed in this period is shown in Table 7. These are applied evenly across the housing stock.[8]

Table 6: Energy Efficiency measures installed between 01 Sept 2008 and 31 Aug 2011 split by scheme.[9]

Measure	CERT	Fuel Poverty	Welsh Schemes	Other	Total
Loft Insulation	130,311	797			131,108
Cavity Wall Insulation	79,737	206			79,943
Solid Wall Insulation	982		2,409		3,391
Tank Insulation	2,083	4			2,087
Double Glazing				57,379*	57,379
Solar HW	992		1,043		1,053
Condensing Boiler				299,633*	299,633
Central Heating				0*	0
Solar PV				4,642†	4,642

[8] Whilst this assumption may not reflect the actual impact across households of Solar PV installations, there is little evidence on which to make a different assumption.
[9] Data is taken from the HEED 3 database (https://homeanalytics.est.org.uk/heedonline) unless otherwise stated.
* Projections using data from EHCS/EHS and LiW surveys
† Feed-in Tariff Installation Report

Table 7: Energy efficiency measures installed between 01 Sept 2008 and 31 Aug 2012[10]

Measure	2008-2012	2011-2012
Loft Insulation [11]	164,000	32,892
Cavity Wall Insulation [8]	100,000	20,057
Solid Wall Insulation [8]	4,200	809
Tank Insulation [8]	2,600	513
Double Glazing [12]	70,881	13,502
Solar HW [8]	1,300	247
Condensing Boiler [9]	366,128	66,495
Central Heating [9]	0	0
Solar PV [13]	24,006	19,364

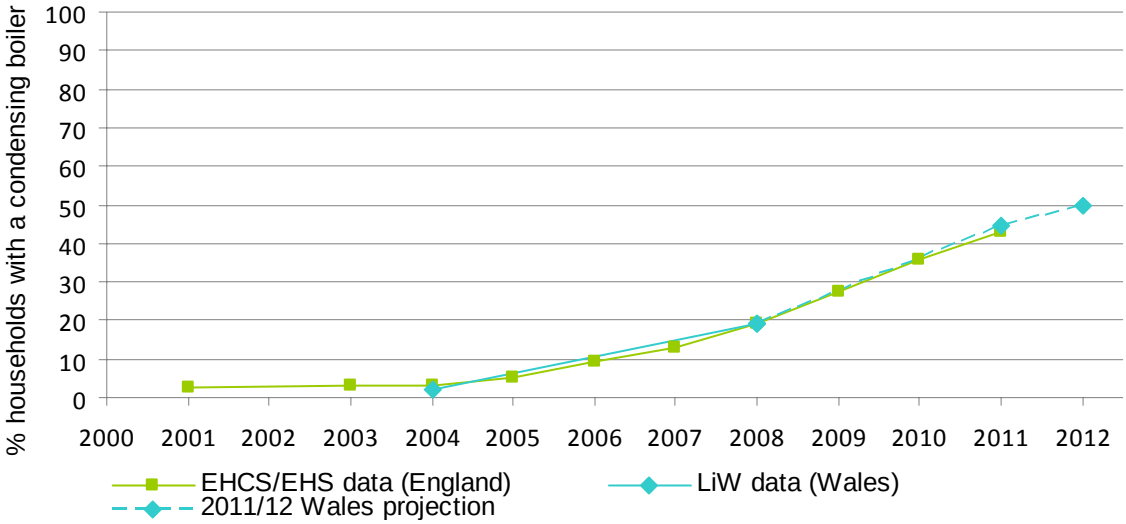
1.10 As the Living in Wales property survey was only carried out in 2004 and 2008, there is limited data available about the number of installations of double glazing, condensing boilers and central heating, so a projection method was used to estimate the number of upgrades applied using data from the 2001 to 2011 English Housing survey as well as the 2004 and 2008 Living in Wales surveys (see figure 1).

1.11 It is important to note that these assumptions do not take into account the 24,375 new homes built between April 2008 and April 2012, which represents 2% of all housing stock. As this report highlights energy efficiency upgrades, these new builds could impact the profile of housing stock as new building is undertaken with more stringent energy efficiency standards than older properties.

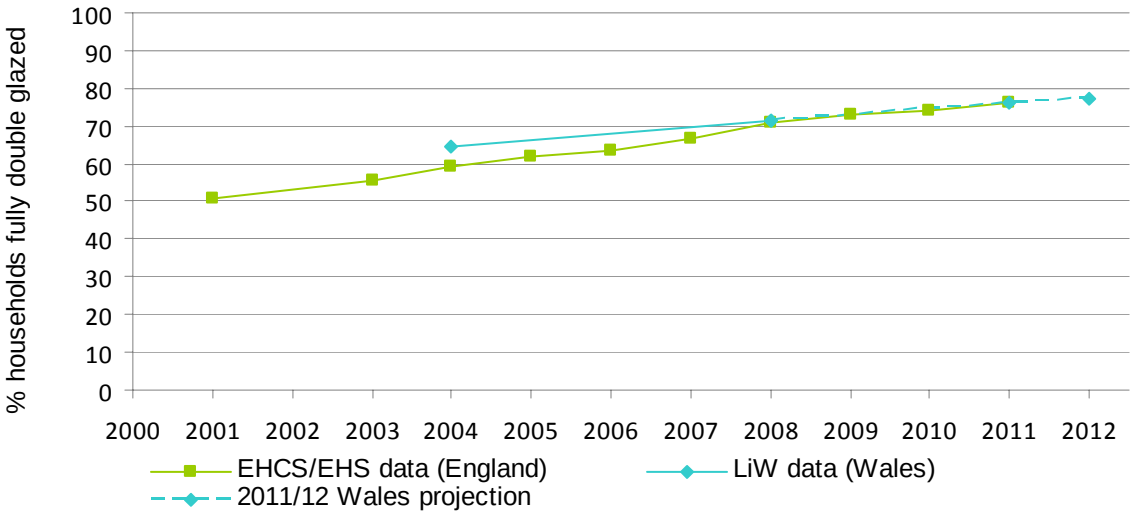
[10] Data is taken from the HEED 3 database (https://homeanalytics.est.org.uk/heedonline) unless otherwise stated**.**
[11] 2011 data from taken HEED 3 database (https://homeanalytics.est.org.uk/heedonline) and projected to 2012 values.
[12] Values projected using EHS and LiW survey data.
[13] Data from Ofgem Feed-in Tariff Installation Report (http://www.ofgem.gov.uk/Sustainability/Environment/fits/Pages/fits.aspx)

Figure 1: Projection method for estimating the number of installations of:

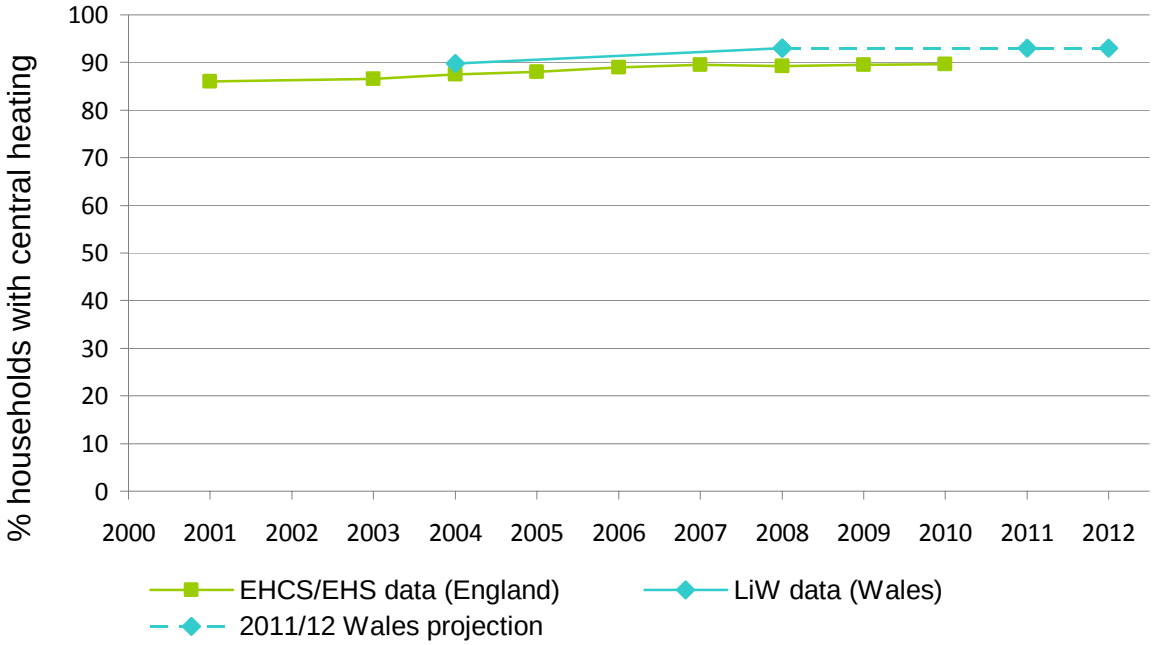
(a) condensing boilers as a percentage of those that have a boiler installed



(b) double glazing



(c) central heating [14]



Source: BRE, 2013

1.12 There has been a steady increase in the number of condensing boilers in the stock and if this trend continues then around 370,000 new boilers will have been installed in Wales between 2008 and 2012. Upgrades of double glazing appear to be levelling off and around 70,000 are projected to have been installed between 2008 and 2012.

1.13 Most homes in the stock have central heating so it is not surprising that there is little change in the number over time. There does not appear to have been a significant number of installations (more than 1,000) into houses that previously did not have central heating between 2008 and 2012. Given the sampling error of the data, it is not possible to determine with certainty whether the small change is real or due to the sampling. As a result no central heating measures have been assumed.

1.14 Post-April 2012 energy efficiency measure figures from CERT and other schemes have yet to be released so the number of installations of solar hot water, loft, tank, cavity wall and solid wall insulation in 2012 were estimated by taking the average growth in the installation of measures in the previous 3 years.

[14] No 2011 EHS data on households with central heating was available.

Assumptions

1.15 It is assumed, for the purpose of these projections, that there have been no changes in the household demographics, housing stock or income sources between 2008 and 2012 and that the total number of households remains constant at 1.268 million. The assumption made here is that the housing stock and household demographics do not change significantly over time. This assumption is reasonable when projecting from one year to the next, although the margin of error will increase over time.

1.16 The model could be adapted to take account of changes to the number of households and household demographics. Additional data would be required about changes, such as numbers of houses demolished and built in the time period. This is a development of the tool that could be pursued in the future if required.

2 Results

Fuel Poverty in All Households

2.1 The 2011 and 2012 Wales fuel poverty indicators have been estimated by projecting incomes, fuel prices and adding energy efficiency measures to the stock as detailed previously. Table 8 shows the predicted number and percentage of fuel poor households for 2012, with the 2011 projection and the 2008 base position for comparison.

Table 8: Projected number of households in fuel poverty following scenarios to 2011 and 2012 from a 2008 base

Year	Number of fuel poor households	% of total
2008	332,000	26%
2011	365,000	29%
2012	386,000	30%

Source: BRE, 2012

2.2 Since 2008, rising fuel prices have outstripped increases in household income and improvements in energy efficiency leading to an estimated 54,000 more households in fuel poverty by 2012. The percentage of households in fuel poverty has risen from 26% to a projected 30% in 2012. It is assumed that the housing stock has not changed significantly over time and the total number of households in 2011 remains the same as in 2008 (1.268 million) (as highlighted in 1.15).

2.3 Including energy efficiency measures in these projections is important. By projecting changes in income and fuel prices only, the fuel poverty figure is estimated to be 33% (422,000) households). Therefore the modelling of the energy efficiency installations in 2012 reduces the projected number of households in fuel poverty by 3 percentage points or 36,000.

Fuel Poverty in Vulnerable Households

2.4 In the Living in Wales 2008 survey, 980,000 households (77% of total) are identified as being vulnerable. These households are ones that contain children, the elderly or someone who is disabled or has a long term illness, whether in private or social housing.

2.5 Table 9 shows the predicted number and percentage of vulnerable households in fuel poverty in 2011 and 2012. A larger proportion of vulnerable households are estimated to be in fuel poverty compared to all households but a similar percentage rise in the level of fuel poverty is seen. Of the 33,000 additional households projected to be in fuel poverty in 2011, 26,000 (79%) of these are from vulnerable households.

Table 9: Projected number of vulnerable households in fuel poverty following scenarios to 2011 and 2012 from a 2008 base.

Year	Number of fuel poor households	% of total
2008	285,000	29%
2011	311,000	32%
2012	328,000	33%

Source: BRE, 2013

Fuel Poverty in Social Housing

2.6 The Living in Wales 2008 survey identified 18% of households (224,000) to be living in social housing. Table 10 shows the projected number and percentage of households in fuel poverty in 2012 who live in social housing. The proportion of fuel poor households in social housing is similar to that of all households but shows a slightly higher percentage rise in 2011 and 2012. An estimated 4,000 households from social housing entered fuel poverty between 2011 and 2012.

Table 10: Projected number of fuel poor households in social housing following scenarios to 2011 and 2012 from a 2008 base.[15]

Year	**Number of fuel poor households**	**% of total**
2008	59,000	26%
2011	66,000	30%
2012	70,000	31%

Source: BRE, 2013

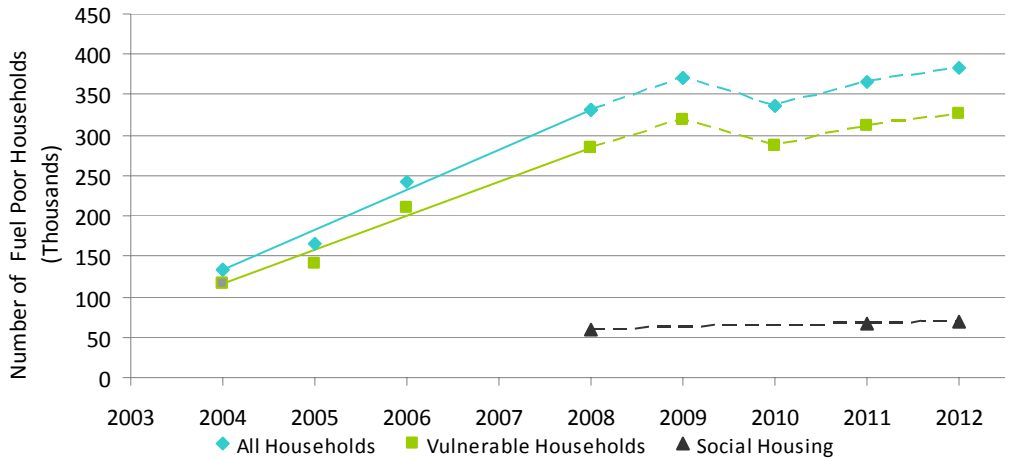
[15] WHQS improvements data was not available at the time of this report so was not included.

Fuel Poverty Timeline

2.7 Figure 2 shows the fuel poverty figures for Wales between 2004 and 2012. The 2004 and 2008 figures are from survey data and the intermediate points are projections[16], based on applying income and fuel price scenarios.

2.8 The increase in fuel poverty caused by the rapid rise in fuel prices in the mid 2000s has slowed, aided by the uptake of energy efficiency measures such as cavity wall insulation and condensing boilers (as of 2011).

Figure 2: Timeline showing the change in the levels of fuel poverty for all household, vulnerable households and social housing between 2004 and 2012.



Source: BRE, 2013

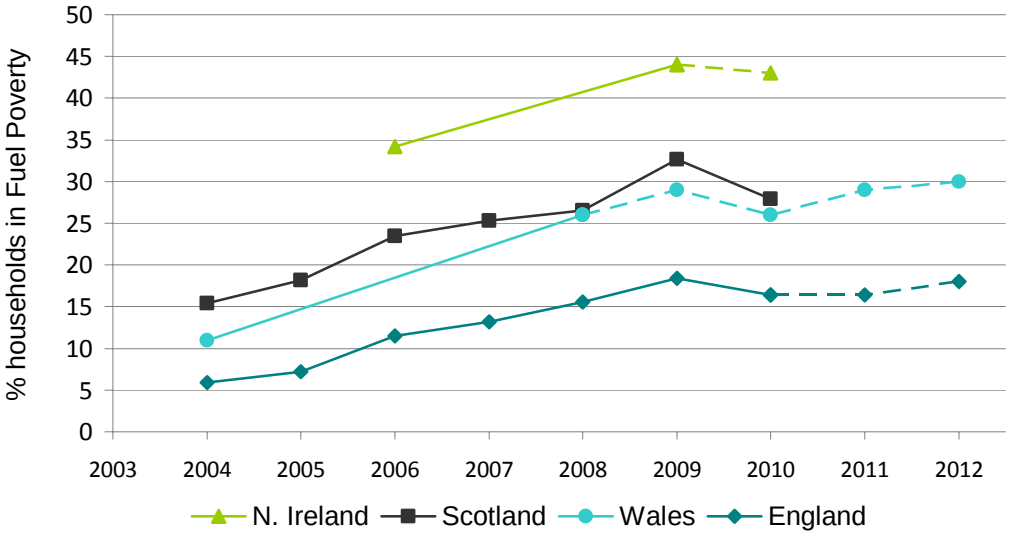
National Comparisons

2.9 As shown in figure 3, the relative levels of fuel poverty in Wales and Scotland are similar and lie between those in England and Northern Ireland. Dotted lines represent projected figures. The 2009 and 2010 Wales projections[17] do not include energy efficiency upgrades.

16 http://wales.gov.uk/docs/caecd/research/101122modelledheadlinefuelpovertystatisticsen.pdf

17 http://wales.gov.uk/docs/caecd/research/101122modelledheadlinefuelpovertystatisticsen.pdf

Figure 3: National comparisons of fuel poverty in UK



Source: BRE, 2013

Hills Review Definition of Fuel Poverty

2.10 This section indicates the impact of the Hills review definition of fuel poverty were it to be applied to Wales. It should be noted that the Hills report on looked at data for England. Under the Hills definition of fuel poverty, as published in the final Hills Review Report[18], only households that have high energy costs *and* low incomes relative to the stock are classed as fuel poor. This leads to the number of fuel poor households being lower than under the full income definition. Table 11 shows the number of fuel poor households in 2008 under the Hills definition and the projected number in 2011 and 2012. The percentage of fuel poor households is similar to that for England (approx. 11.5% 2008).

[18] "Getting the Measure of Fuel Poverty: Final Report of the Fuel Poverty Review by John Hills." (2012). https://www.gov.uk/government/publications/final-report-of-the-fuel-poverty-review.

Table 11: Projected number of households in fuel poverty under the final Hills Review definition following scenarios to 2011 and 2012 from a 2008 base

Year	All Households	Vulnerable Households	Social Housing
2008	139,000 (11%)	122,000 (12%)	26,000 (12%)
2011	146,000 (12%)	127,000 (13%)	30,000 (13%)
2012	144,000 (11%)	124,000 (13%)	28,000 (13%)

Source: BRE, 2013

2.11 The Hills definition is based on relative rather than absolute thresholds for fuel costs and income, and the number of fuel poor households is therefore more stable over time.

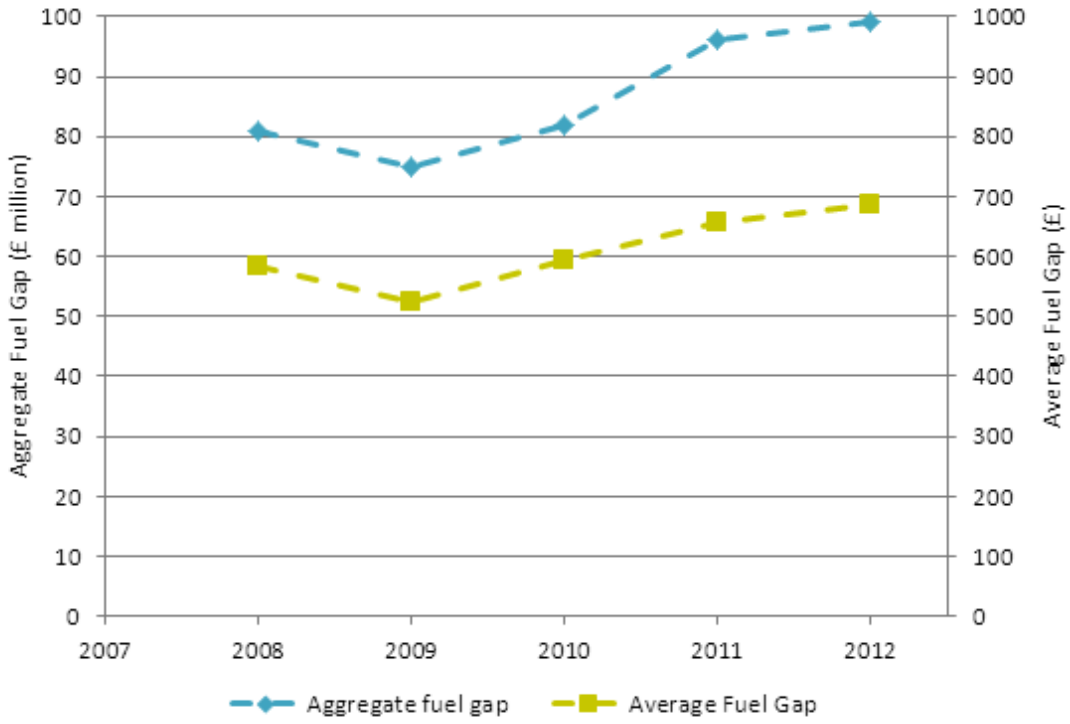
2.12 An informative indicator of fuel poverty under the Hills definition is the depth of fuel poverty or Fuel Gap. This measures the difference between a household's required fuel costs and how much they would need to be for the household not to be in fuel poverty. The aggregate fuel gap is the total cost of this for all households.

2.13 Dividing the aggregate fuel gap by the number of households in fuel poverty gives the average fuel gap, which represents the average cost of taking a household out of fuel poverty. The aggregate and average fuel gap for 2008 and projected values for 2011 and 2012 are shown in Chart 4 and Table 12.

2.14 However, it should be noted that fuel poverty action in Wales focuses on improving the energy performance of properties in order to reduce bills for the long term, and the cost of this is significantly more than the aggregate fuel gap. A report by the Energy Saving Trust has estimated that the cost to take 95% of fuel poor households out of fuel poverty by improving the performance of their homes would cost £2.4 billion at 2008 prices[19].

[19] Energy Saving Trust. 2013. "Costs and benefits of tackling fuel poverty by improving energy efficiency in Wales in 2008."

Figure 4: Timeline showing projected change in Aggregate and Average Fuel Gap under the Hills definition up to 2012.



Source: BRE, 2013

2.15 The projected figures for 2009 and 2012 were created using the income and fuel price inflation from the original report[1] and do not include the effect of energy efficiency upgrades. The thresholds are based on the median values of the stock, so changes that affect the whole stock will alter the median but not the number of fuel poor households. It should be noted that, in the Wales Fuel Poverty Tool, energy efficiency upgrades are applied evenly across the stock and it does not model schemes which target particular groups of households.

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http://www.energysavingtrust.org.uk/wales/Publications2/Organisations/Costs-and-benefits-of-tackling-fuel-poverty-by-improving-energy-efficiency-in-Wales-in-2008

Table 12: Projected aggregate and average fuel gap for households in fuel poverty following scenarios to 2011 and 2012 from a 2008 base under the Hills definition.

Year	2008	2011	2012
Aggregate Fuel Gap	£81 million	£96 million	£99 million
Average Fuel Gap	£583	£658	£688

Source: BRE, 2013

2.16 The Fuel Gap is influenced by changes in fuel prices. 2009 saw a decrease in oil prices which led to a drop in the fuel gap as there are a significant proportion of fuel poor households using oil. However, a rise in fuel prices and an increase in the number of fuel poor has led to the increase in the fuel gap since then.

2.17 Under the Hills definition it is almost impossible to reduce the number of fuel poor households to zero. However the aim is to reduce the Fuel Gap as far as possible so that fuel poor households are only just below the threshold. Thus fuel poor households that should be targeted for installation of energy efficiency measures. It should be noted that in the Wales Fuel Poverty Tool, energy efficiency upgrades are applied across the stock, which does not reflect practice.