

Northern Ireland fuel price ready reckoner for fuel poverty

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Table of Contents

Introduction	2
Methodology	2
Results	3
Ready Reckoner	4
Assumptions	5
Appendix 1 Number and percentage of households in fuel poverty for various fuel price scenarios	6
Appendix 2 User guide	7

This report is based on the findings of the House Condition Survey 2016 which is published on the Housing Executive's website.

https://www.nihe.gov.uk/house_condition_survey_main_report_2016.pdf

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Introduction

In 2016 160,000 households (21.5%) in Northern Ireland were calculated to be fuel poor using data from the 2016 Northern Ireland House Condition Survey.

A household is defined as being fuel poor if it has to spend more than 10% of its income to heat the dwelling to a given standard as well as to power non-heating appliances. Changes to fuel prices have a large impact on the level of fuel poverty seen in Northern Ireland. The predominant fuel used to heat homes in Northern Ireland is heating oil. Changes in fuel poverty are tied closely to changes in the price of this fuel, along with changes in the price of electricity. However, since the introduction of mains gas to Northern Ireland in 1990s, the proportion of homes using gas as their main heating fuel has risen. Therefore, changes to the price of natural gas as the market develops are increasingly important.

Using the above base position of 2016 NIHCS fuel poverty levels, fuel prices have been altered to investigate how various scenarios would alter the number of households in fuel poverty and used to create a 'ready reckoner' for the effect of fuel price changes on fuel poverty. The method and results are outlined below.

Methodology

Thirty five fuel price scenarios have been created and applied to the 2016 modelled position of fuel poverty. The scenarios include percentage changes which range from -25% to +50% in electricity, oil, mains gas and solid fuel prices. These scenarios are listed below in Table 1. Note that some fuels have been grouped with other fuels which show similar characteristics in fuel price changes.

Table 1: Fuel price scenarios applied to the 2016 Northern Ireland fuel poverty position

		Percentage Change in Fuel Price							
		-25%	-10%	-5%	BASE	5%	10%	25%	50%
Fuel Type	Mains Gas**	S1	S2	S3	BASE	S4	S5	S6	S7
	Electricity	S8	S9	S10	BASE	S11	S12	S13	S14
	Solid Fuel***	S15	S16	S17	BASE	S18	S19	S20	S21
	Oil*	S22	S23	S24	BASE	S25	S26	S27	S28
	All Above	S29	S30	S31	BASE	S32	S33	S34	S35

*Includes LPG and bottled gas

** Includes communal

*** Including coal, wood, anthracite and smokeless fuels

Results

The results of the scenarios introduced in Table 1 are shown in Figure 1 (number of households) and Figure 2 (percentage of households). Tables of these results are given in Appendix 1.

The largest changes to fuel poverty can be seen in the scenarios with changes made to electricity and oil prices. This reflects the dominance of these fuels within the fuel mix in Northern Ireland.

The smaller changes in fuel poverty relating to solid fuel and gas price changes reflect the relative rarity of these fuels within the overall fuel mix in Northern Ireland.

Figure 1: Fuel poverty variability (number of households) due to fuel price changes for all households using 2016 Northern Ireland fuel poverty figures as a base

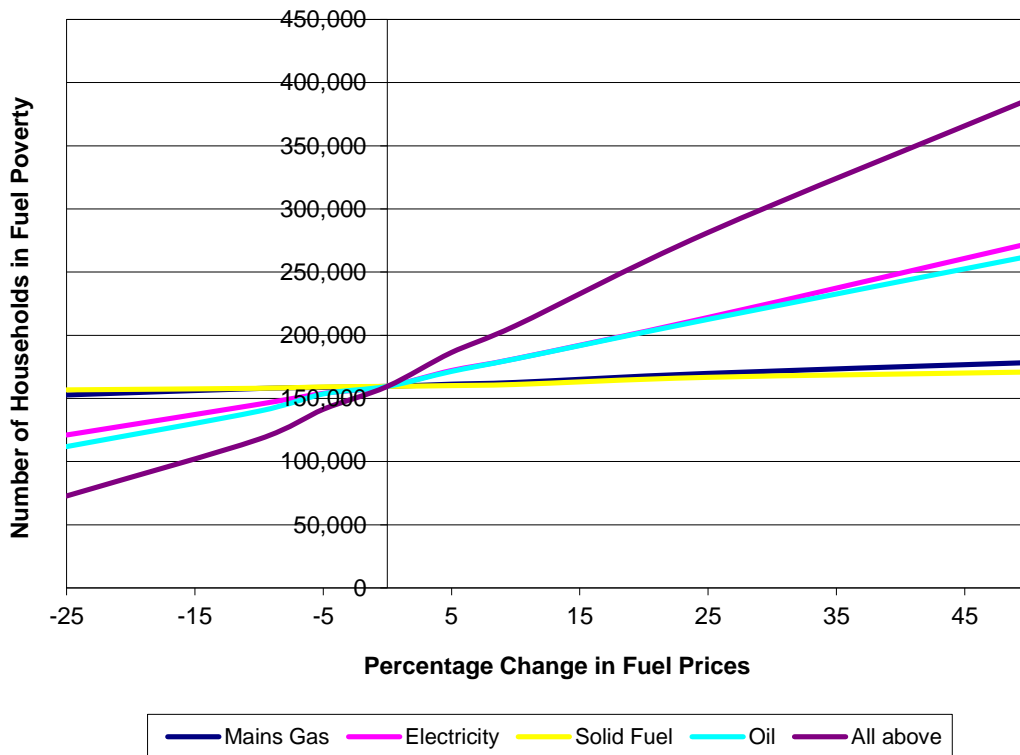
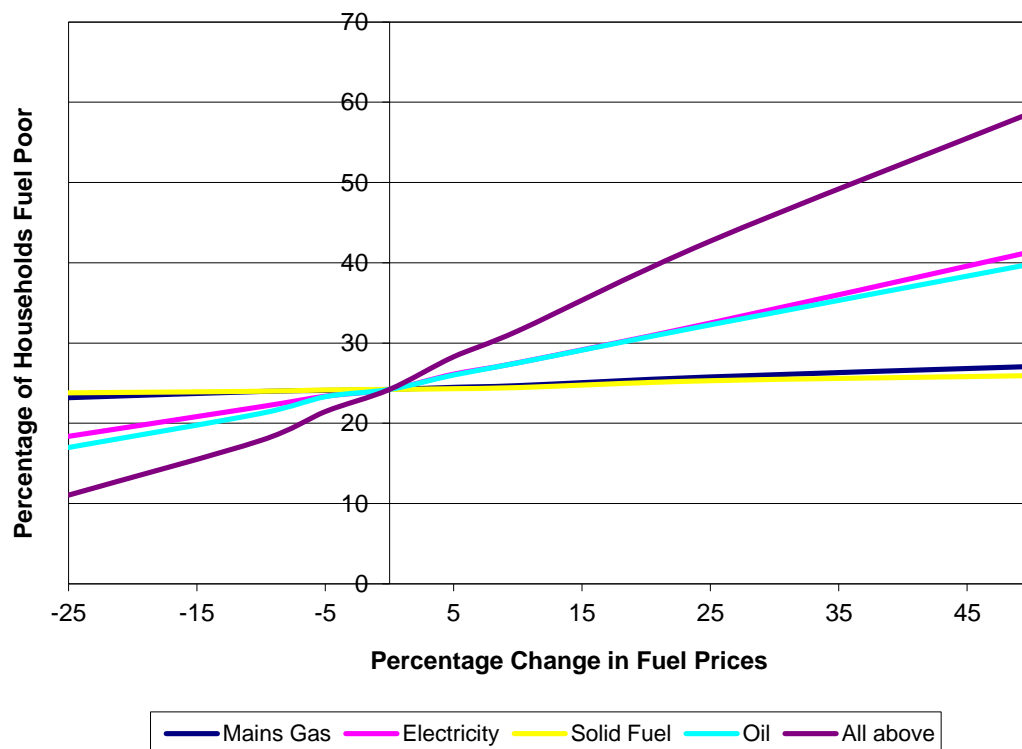


Figure 2: Fuel poverty variability (percentage of households) due to fuel price changes for all households using 2016 Northern Ireland fuel poverty figures as a base



Ready Reckoner

The best estimates of fuel poverty for different fuel price scenarios are obtained by using the values from the tables in Appendix 1. These give a variety of scenarios, and the graphs above can be used to interpolate further points. It is important to note that these scenarios represent the overall change in fuel prices from an annual 2016 price, rather than a price at any particular point in that year (as fuel poverty is based on annual fuel cost/ annual income).

Applying a change of 10% to the base represents an increase of that amount in the average fuel price over the whole year from current levels. A 10% rise in fuel price has more effect on annual figures when it is applied earlier in the year than one applied towards the end. This is because a 10% rise in fuel prices at the beginning of the year would be effective for the whole of the year, therefore this represents a fuel price rise overall of 10% for the year.

A 10% fuel price rise half way through the year would only be effective for half the year, therefore this represents a fuel price rise overall of 5% for the year.

Below are estimates of changes in fuel poverty based on best fit lines from the fuel price changes of -25% to +50% from the 2016 base using the graphs generated in Figures 1 & 2.

From the above scenario analysis, broadly speaking, a *10% rise in all fuel prices implies a rise in the annual figures of 44,000 households in fuel poverty*. This estimate takes into account all fuel prices rising by this amount. If only certain fuels were to rise the effect seen would be smaller.

Assumptions

The following assumptions for both estimates above have been used:

- Household income has not altered.
- Energy efficiency has not altered.
- The fuel mix of households has not changed.
- Both standing charges (where applicable) and unit prices have been increased by an equal proportion.
- Number of households is assumed to remain constant.
- Household composition remains constant.

It is likely that the ready reckoner above would be a 'worst case scenario' with all fuels rising at exactly the same rate. In reality, fuel price changes vary by fuel depending on the current individual markets. Changes to dominant fuels, such as heating oil in Northern Ireland, proportionately have greater influence than less prevalent fuels.

The scenarios above only take into account changes to fuel price. It is probably more useful to think of the scenarios as a 'What if fuel prices were X% higher today?', rather than relating to a point in the future. In reality, income and energy efficiency changes would occur at future dates, along with possible changes to the fuel mix, changes to household composition and number of households.

Appendix 1

Table A1 – Number of households (thousands) in fuel poverty for various fuel price scenarios with 2016 as a base figure (742,000 households in total)

Number of Households Fuel Poor in Northern Ireland (thousands)									
Change in Price (%)		-25%	-10%	-5%	BASE	5%	10%	25%	50%
Fuel Type	Mains Gas	153	158	159	160	161	163	170	178
	Electricity	121	145	154	160	172	181	214	273
	Solid Fuel	157	158	159	160	160	161	167	171
	Oil	112	140	154	160	171	181	213	262
	All above	73	118	141	160	186	208	281	387

Table A2 – Percentage of households in fuel poverty in Northern Ireland for various fuel price scenarios with 2016 as a base figure

Percentage of Households Fuel Poor in Northern Ireland									
Change in Price (%)		-25%	-10%	-5%	BASE	5%	10%	25%	50%
Fuel Type	Mains Gas	20.6	21.3	21.4	21.5	21.7	21.9	22.9	24
	Electricity	16.3	19.6	20.7	21.5	23.2	24.4	28.8	36.7
	Solid Fuel	21.1	21.3	21.4	21.5	21.6	21.7	22.4	23
	Oil	15.1	18.8	20.7	21.5	23.1	24.4	28.6	35.4
	All above	9.8	15.9	19	21.5	25.1	28	37.9	52.1

Appendix 2

Method

Fuel costs for each NIHCS 2016 case are split by fuel (into the 4 categories as given in Table 1), then inflation factors as given in Table 1 are applied to each of these and fuel poverty status recalculated using the new total fuel costs and original household income for each case. From this a new figure for national fuel poverty is recalculated. This is repeated for each scenario within Table 1.

The NIHCS fuel poverty fuel costs were used as a base for this work. For more information regarding calculating fuel poverty and the methodology used in the NIHCS please refer to Appendix E page 136 of the main 2016 House Condition Survey report.

https://www.nihe.gov.uk/house_condition_survey_main_report_2016.pdf

Quality information

The ready reckoner model was set up to be a simple toolkit to investigate the effect of fuel price changes on fuel poverty. Therefore the QA processes applied focus on the correct functioning of the calculations performed to provide accurate, reliable and transparent results. The process of development, QA and creation of results followed an internal procedure so the work undertaken could be reviewed and assessed by project managers.

Examples of the quality assurance undertaken to validate the ready reckoner processes and results included:

- Checking of transformations undertaken and mathematical formulae.
- Internal checks of data inputs to assure translation was completed correctly.
- Checks of correct units for calculations.
- Sense check comparison to annual fuel poverty figures and previous ready reckoner results.
- Use of test cases and base cases to check the process is applied as expected.
- Internal review of results and reporting.

Strengths and weaknesses

The basis of this model is the 2016 NI fuel poverty statistics and the underlying NIHCS dataset. All ready reckoner results should be taken in the context of this background, and the survey and modelling assumptions which occur within these. See Appendix E page 136 of the main 2016 House Condition Survey report for more information on the fuel poverty model and Appendix A page 88 for the survey's user guide.

https://www.nihe.gov.uk/house_condition_survey_main_report_2016.pdf

The simplicity of the ready reckoner makes it easy to interpret; however it is important to consider the assumptions and discussion set out in this report and the main 2016 HCS report to put the results into context, and aid understanding.