Fuel Poverty Dataset Documentation

2005

Contents

1.   Introduction & Background Information

The 2005 Fuel Poverty database represents the outcome of analysis conducted in order to produce estimates of the number of households living in fuel poverty (see Annex A1 for definition) in England, in 2005. The figures produced form the basis of the Government's fuel poverty figures and are used to measure progress towards the Government's targets for the reduction and eradication of fuel poverty. The intention of this guide is to list (and provide a basic description of) the fuel poverty variables so that they may be used to inform the user of the components of the Government's figures. This guidance should be supplemented with information from the DTI and DEFRA websites and other fuel poverty publications, for example "The Fuel Poverty Strategy 5th Annual Progress report".

The fuel poverty data set is derived from, and linked to, the 2005 English House Condition Survey (EHCS) database created by the DCLG. This database is constructed from fieldwork carried out between April 2004 and March 2006. The results are presented in terms of the survey midpoint, April 2005. A detailed explanation of all the EHCS variables and the analysis conducted upon them can be found in the guidance documentation accompanying the 2005 EHCS database, available on request from CLG (ehcs@communities.gsi.gov.uk). Full information about the survey is available on the EHCS web site at http://www.communities.gov.uk/ehcs . The guidance on use of EHCS data given by CLG should also be applied to the fuel poverty data set.

All variables are presented for households and each case on the data set is uniquely identified by the variable **aacode**. This is the key variable used to link data when matching together more than one data file. The variables are presented in Table 1 below and are discussed in more detail later.

Variable Name	Variable Label
aacode	EHCS case number
fuelexpn	Total fuel cost (£)
fpbasinc	Annual basic household income (£)
fpfullinc	Annual full household income (£)
wathcost	Cost of energy to heat water (£)
spahcost	Total space heating cost (£)
litecost	Total cost for lights and appliance use (£)
cookcost	Total energy cost for cooking (£)
elecMOP	Method of payment - electricity
gasMOP	Method of payment - gas
fpindb	Fuel poverty index - basic income definition
fpflgb	Fuel poverty flag - basic income definition
fpindf	Fuel poverty index - full income definition
fpflgf	Fuel poverty flag - full income definition
fpvuln	Vulnerable flag - fuel poverty definition
unoc	Under occupancy
Aagch45	Household weight (core cases 04/05 & 05/06)

Table 1 - FP 2005 Variables

The EHCS builds a picture of the English housing stock by surveying a sample of dwellings from around the country. A grossing factor needs to be applied to the data to obtain figures that reflect the whole English stock. Fuel poverty is a condition experienced by dwelling *occupants* and so the grossing factor used is the *household* grossing factor (**aagch45**), which is present in the fuel poverty data set. Once the grossing factor is applied, the total number of households in England comes to 21,134,219. Generally this and other estimates from the data set are rounded so as not to imply a false sense of precision when presenting results.

2. The 2005 Fuel Poverty Variables

aacode - The 2005 EHCS address number

This variable is the unique identifier of the survey unit. As well as identifying the dwelling/household it enables 2005 EHCS SPSS data files to be matched together, ensuring that the integrity of the data set is maintained. The variable is an eight-character code. Address codes prefixed with a 'C' denote surveys conducted in the financial year 2004/05, whereas those prefixed with a 'D' denote surveys conducted in 2005/06.

fpbasinc - Annual basic household income (£)

This variable is used in the derivation of 'fpflgb'. It describes the basic income of the household, which is net income, excluding housing benefit, Income Support for Mortgage Interest (ISMI), Mortgage Payment Protection Insurance (MPPI) and net council tax payments. This measure of income takes as its base the 'hhincx' variable (see CLG data set) and adds the reported incomes of any additional benefit units and income from the Winter Fuel Payment if appropriate.

fpfullinc – Annual full household income (£)

This variable is used in the derivation of 'fpflgf'. It describes the full income of the household, which is based on the net income, including housing benefit, ISMI, MPPI and net council tax payments. This includes income for the whole household from all sources, including benefits and savings & investments.

fuelexpn – Total fuel cost (£)

This variable gives a value in £/year for the cost to the household of the fuel they use for space heating, water heating, lights & appliances energy use and cooking energy use. Energy consumption is estimated using the BRE's Domestic Energy Model (BREDEM-12). The cost is based on BREDEM-12 modelled consumption and fuel costs, which vary by region and method of payment. Variables detailing amounts for each of these components and the different methods of payment used, are included in the data set (see below).

wathcost – Total water heating cost (£)

This variable gives a value in £/year for the modelled cost to the household of heating their hot water.

spahcost – Total space heating cost (£)

This variable gives a value in £/year for the modelled cost to the household of space heating (see Annex A3). This value includes standing charges for gas and any additional standing charge for off-peak electricity (if present), over and above the standard rate electricity standing charge.

litecost – Total cost for lights and appliance use (£)

This variable gives a value in £/year for the modelled cost to the household of powering their lights and appliances. This value includes standing charge amounts for electricity not related specifically to heating (i.e. all standard rate standing charges).

cookcost – Total cost for cooking (£)

This variable gives a value in £/year for the cost to the household of cooking.

elecMOP – Method of payment - electricity

This variable indicate which method the household uses to pay for their electricity. Possible values are Direct Debit, Standard Credit and Pre-Payment

gasMOP – Method of payment - gas

This variable indicate which method the household uses to pay for their gas. Possible values are Direct Debit, Standard Credit and Pre-Payment

fpindb – Fuel poverty index – basic income definition

This variable contains the result of the fuel poverty calculation (see Annex A1) for each household. A value greater than 0.1 indicates that a household is fuel poor. This variable can be used to determine the severity of fuel poverty. It uses the basic income definition described in Annex A4.

fpflgb - Fuel poverty flag - basic income definition

This is a boolean (i.e. true/false) variable. A value of 1 indicates that the household *is* in fuel poverty, 0 indicates that they are *not* in fuel poverty. This uses the index variable 'fpindb' and is based on basic income as described above and in annex A4.

fpindf – Fuel poverty index – full income definition

This variable contains the result of the fuel poverty calculation (see Annex A1) for each household. A value greater than 0.1 indicates that a household is fuel poor. This variable can be used to determine the severity of fuel poverty. It uses the full income definition described in Annex A4.

fpflgf - Fuel poverty flag - basic income definition

This is a boolean (i.e. true/false) variable. A value of 1 indicates that the household *is* in fuel poverty, 0 indicates that they are *not* in fuel poverty. This uses the index variable 'fpindf' and is based on full income as described above and in annex A4.

fpvuln – Vulnerable – Fuel Poverty Strategy definition

This is a boolean true/false variable. A value of 1 indicates that the household *is* vulnerable, 0 indicates that it is *not* vulnerable. This relates to the Government's target of reducing the number of vulnerable households living in fuel poverty to zero by 2010, as far as is reasonably practicable. A vulnerable household is defined for the purposes of fuel poverty as being any household with a member aged 60 or over, a child under the age of 16 or a member who is disabled or has a long-term illness. This differs somewhat from the CLG definition of vulnerable but is the correct one to use when considering fuel poverty.

unoc – Under Occupancy

This is a boolean true/false variable. A value of 1 indicates that the dwelling *is* under occupied, 0 indicates that it is *not* under occupied (see annex A2 & A3).

Aagch45 – Household weight (core cases 2004-5 & 2005-6)

This grossing factor is a weighting applied to each case to make the data set representative of the national picture of fuel poverty, taking account of the sampling techniques used and issues of non-response within the EHCS.

Annex A – Definitions

A1.   Fuel Poverty

A household is defined as being fuel poor if they spend more than 10% of their income on fuel. The amount spent on fuel is modelled to account for the fact that households may not spend enough to reach the established standards for comfort (for example they may not heat their house to the required temperature). Fuel poverty is in essence calculated using the equation below.

$$\frac{\underline{\textbf{Fuel Costs}}}{\textbf{Income}}$$

A2.   Under Occupancy

A dwelling is considered under occupied if it is more than large enough for the number (and type) of occupants living there. The Parker-Morris standard and the Bedroom Standard are used to define what size of dwelling is large enough for a given type of household.   The Parker-Morris Standard gives a minimum floor area for a home depending on the number of occupants and the Bedroom Standard allocates a separate bedroom to each person (or combination of people – for example a couple) requiring one. It is assumed that all homes where the floor area is over twice the minimum set down in the Parker-Morris Standard and the number of bedrooms is in excess of the Bedroom Standard are under occupied.

A3.   Heating regimes

A satisfactory heating regime is considered to be one where the main living area is at 21°C, with 18°C in other occupied rooms. It is assumed that heating is available for 16 hours per day for households that contain people that are at home all day and 9 hours per day for households with members in work or full time education. It is assumed that the whole house is heated except where the household is under-occupied - in this case it is assumed that half of the house is heated.

Heating regime	Household type	Living room temperature	Other room temperature	Extent of heating	Duration of heating
All day heating for all of the dwelling	Households likely to be in during the day	21ºC	18ºC	Whole house	16 hours
Standard heating	Households in work or full-time education	21ºC	18ºC	Whole house	9 hours
All day heating for half of the dwelling	Under occupying households	21ºC	18ºC	Half house	16 hours

The heating duration applies only to weekdays. It is assumed that the dwelling is heated for 16 hours a day at weekends.

A4.   Definitions of incomes used in fuel poverty modelling

In modelling fuel poverty two definitions of income have been adopted:

▪ The first, used for targets, "full income" - is based on net income including income relating directly to housing (e.g. Housing Benefit, Income Support for Mortgage Interest (ISMI), Mortgage Payment Protection Insurance (MPPI) and net council tax payments).

- The second "basic income" - is based on income excluding income relating directly to housing.

For both definitions it is the income, net of income tax and national insurance, of the whole household i.e. it includes income from the household reference person (HRP), and any partner, and any other adult member.

Definitions of concepts such as Dwellings, Households and so on can be found in the main EHCS documentation, available from CLG.

Annex B – Methodology for calculation of Income

B1. Components of fuel poverty income

- Net annual income of household reference person (HRP) and any partner from wages, pensions, savings and benefits (I).
- Annual income from housing benefit, Income Support for Mortgage Interest (ISMI) and any payments under Mortgage Payment Protection Insurance (MPPI) (H).
- Net annual income of any additional benefit units present in household (A).
- Annual winter fuel payment (W).
- Net annual council tax payments (C).

B2. Sources of data used to derive income for fuel poverty modelling

The English House Condition Survey (EHCS) collects detailed information about the income of the HRP and any partner from different sources (wages, pensions, benefits, savings and investments and other sources e.g. rent from property). Respondents are asked separately about each source and which, if any, state benefits they receive. Annex B4 summarises the sources of income included. This information is collated and modelled to produce "basic" income for the primary benefit unit[1]. The EHCS also collects information on Housing Benefit, ISMI, MPPI and Council Tax payments, as well as information on the incomes of any additional benefit units. This information is collated and modelled and added to the "basic" income to give "full" income for the whole household.

The EHCS does not collect information about receipt of the Winter Fuel Payment. This has, however, been modelled separately and is included in the net income. It has been assumed that all eligible household members are in receipt of the appropriate amount for their circumstances. Where data on other types of benefits are missing, the reference date for imputation is taken to be the same as for the main EHCS data set.

B3. Summary of fuel poverty income calculations

(1)   Fuel poverty basic income = I + A + W

(2)   Fuel poverty full income = I + A + W + H – C

See Annex B1 for definitions.

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[1] Primary benefit unit is defined as the HRP and partner/spouse (if applicable), plus any of their children aged 18 years or under - unless 17 or 18 and studying for a degree level qualification or higher, working or registered unemployed

B4.   Components of Income

Income for Primary Benefit Unit (HRP & Partner)

<u>Income from non-benefit sources</u>
Earnings (from main job, self employment and government schemes – includes employment training, YTS and enterprise allowance scheme)
Earnings from other work
Occupational pension
Private pension or annuities
Other (including student grant, maintenance or separation allowance, rent from property or sub letting – including rent from lodgers, payments from a trust fund, income from investment)

<u>Income from benefits</u>
Income support
Jobseekers allowance (formerly unemployment benefit or income support for unemployed people)
National insurance retirement pension or old age pension
Incapacity benefit (previously sickness and/or invalidity benefits)
Child benefit
Maternity allowance
Widows pension (including widowed mothers allowance and war widows pension)
War disablement pension
Severe disablement allowance
Mobility allowance
Industrial injuries disablement benefit
Attendance allowance
Invalid care allowance
Disability living allowance (mobility component)
Disability living allowance (care component)
Statutory sick pay
Disability premium with income support/housing benefit
Any other disability benefit

<u>Income from tax credits</u>
Working families tax credit (discontinued in April 2003)
Disabled persons tax credit (discontinued in April 2003)
Working tax credit (introduced in April 2003)
Child tax credit (introduced in April 2003)
Pension credit (introduced in October 2003)

Additional elements for basic income

Reported additional benefit unit income
Winter Fuel Payment

Additional elements for full income

Reported additional benefit unit income
Winter Fuel Payment
Housing Benefit
Income Support for Mortgage Interest (ISMI)
Mortgage Payment Protection Insurance (MPPI)
Council Tax Charges
Council Tax Benefit

Annex C – Methodology for calculation of fuel costs

C1.   Components of Fuel Costs

Fuel poverty indicators are published for the English housing stock in 2004 based on data from the English Housing Condition Survey (EHCS). These indicators were calculated by estimating the total fuel costs using the BRE Domestic Energy Model (BREDEM).   The model includes estimates for: (i) the energy used for lights, appliances and cooking and (ii) the demand for hot water.

The main components in the calculation of energy use required to create fuel poverty indicators are:

- Space heating energy
- Domestic hot water energy
- Lights and appliances energy
- Cooking energy

These energy use components are modelled together with fuel prices to produce an overall fuel cost figure for each household.

The number of occupants (N) in a household is derived directly from data collected in the EHCS.

The calculation of energy use for hot water, lights and appliances and cooking are taken directly from BREDEM-12. These algorithms are all functions of the number of occupants in a dwelling (N).

Water Heating

Energy demand for water heating Q_U *(Watts)* is given as:

$$Q_U = (78 + 52\ N) * 1.2.$$

(1)

Most methods of water heating involve energy losses that relate to storing the water in hot water tanks and distribution losses. Therefore the total water energy demand must satisfy equation (1) and account for the energy losses inherently involved in satisfying the supply required. Hot water storage losses are mostly influenced by tank insulation and tank volume, however, a factor is applied if there is very low occupancy in a property – as generally this means that water will be stored for a longer period of time.

The energy required for water heating E_W *(GJ/yr)* is then given as:

$$E_W = k(Q_U + Q_{Loss} - Q_S)/e_W$$

where Q_{Loss} *(Watts)* are losses through water storage/distribution, Q_S *(Watts)* is solar-heating, e_W is the efficiency of the water heater and k is a constant.

Lights and Appliances

Energy demand for electrical lights and appliances $E_{LA}(GJ/yr)$ is given as:

E_{LA} = 4.47 + (0.0232 x **TFA** x **N**)   *for TFA x N < 710*

E_{LA} = 11.98 + (0.0146 x **TFA** x **N**) - 2.78 x 10^{-6} x (**TFA** x **N**) *for 710 < TFA x N < 2400*

E_{LA} = 31.01   *for TFA x N > 2400*

(2)

Where E_{LA} is electricity consumption for lights and appliances in GJ/year.
  TFA is the total floor area of the dwelling in m^2.
  N is the number of occupants in the dwelling.

Cooking

Energy demand for cooking is given as $E_K(GJ/yr)$:

$$E_K = f_{Gas} (2.98 + 0.6\ N) + f_{Electricity} (1.7 + 0.34\ N)$$

Where f_{Gas} and $f_{Electricity}$ are the proportions of demand satisfied from gas or electric cooking, respectively.[2]

Fuel Prices

Fuel prices for gas and electricity have been obtained from the DTI on a regional basis. The regional prices of other fuels have been obtained from the Sutherland comparative heating figures for October 2004 and October 2005 (produced by SALKENT ltd). The consumption and fuel price data are modelled together to produce figures for total fuel cost for the household.

Standing charges have been assigned to the most appropriate component of fuel consumption. If gas is present, the gas standing charge has been applied to the space heating costs. The same is true of any off-peak electric standing charges over and above the standard rate standing charge. The value of the standard rate standing charges have been assigned to the lights and appliances costs.

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[2] Note that the model assumes that if there is no gas in a property then all cooking energy is supplied by an electric cooker. Otherwise f_{Gas} and $f_{Electricity}$ are both assumed to be *0.5*.