



## Report 11: Methodology

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# 1 Introduction

The last large-scale national survey to consider the detailed use of heating systems and other sources of energy use in homes was the 1998 Energy Follow-Up Survey (EFUS 1998). In that survey, householders were asked questions about the type and usage patterns of the main and secondary heating systems in their homes, the water heating system and usage, dwelling insulation, lighting, indoor temperatures and use of appliances. Although now more than ten years old, the information collected from that survey is still among the most up-to-date data on dwelling and household energy use available.

The main aim of the 2011 Energy Follow-Up Survey (EFUS) was to collect new data in these areas, in order to update the current modelling assumptions about how energy is used in the home. The 2011 EFUS consisted of a follow-up interview survey of a sub-set of households first visited as part of the 2010/2011 English Housing Survey (EHS). Additionally, a sub-sample of these households was selected to have temperature loggers and electricity monitors installed. A further stage of the EFUS involved the collection of gas and electricity consumption data from meter readings.

This report outlines the survey methodology used in the EFUS including sampling, data collection weighting and data quality.

## 2 The English Housing Survey and the Energy Follow Up Survey

The EFUS is a follow-up to the English Housing Survey. The EHS is a continuous annual survey commissioned by the Department of Communities and Local Government (DCLG). It was created in 2008 through the merger of the Survey of English Housing (SEH) and the English House Condition Survey (EHCS).

The EHS has two primary components:

- A household interview survey
- A physical survey of a subsample of occupied and vacant dwellings.

In 2010 (the EHS year of which the EFUS sample is a subset) approximately 17,000 households were sampled for the main interview survey, and an ~8,000 dwelling sub-sample of these were selected for the physical assessment<sup>1</sup>. The interview covered topics such as demography, employment, incomes and housing tenure. The physical survey collects information on dwelling conditions, energy efficiency, disrepair & other physical metrics.

For more information regarding the EHS please see:

<https://www.gov.uk/government/organisations/department-for-communities-and-local-government/series/english-housing-survey>

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<sup>1</sup> Note that the sample size of the EHS was reduced in 2011

The EFUS 2011 uses a subsample of households who had received both the physical and interview survey. During the EHS interview, households were asked if they would be willing to participate in a further DCLG or DECC study. Those who agreed were selected as potential households for the EFUS.

### **3 The 2010 EFUS pilot study**

The requirement for the 2011 EFUS was first highlighted by BRE in 2007 and 2008. BRE proposed to members of the Department of Environment and Rural Affairs (DEFRA) that a survey, similar in nature to the 1998 EFUS, was required to reflect changing patterns in home energy use. Developments in technology would also allow for the collection of physical data on home temperatures and electricity consumption more easily than in 1998.

Following a process of assessing the feasibility of such a survey, an EFUS pilot was conducted, using a clustered sample of EHS cases, from January to September 2010. The pilot survey was carried out for three main reasons. Firstly, it allowed the testing of the full 'follow-up' procedure. This required the rapid acquisition of the EHS sample, re-contact with households, and subsequent matching of the returned data with the EHS. Secondly, it enabled the trialling of the temperature loggers and electricity monitors, and an examination of the performance of this equipment in the field. Thirdly, it allowed the testing and development of the initial draft of the EFUS questionnaire.

- a) All feedback on the pilot survey was collated and assessed by the survey development team through series of project development meetings and discussions. These included BRE, GfK NOP and DECC. Feedback was obtained through four main mechanisms:
- b) Direct experience of the survey teams at BRE and GfK NOP. The EFUS survey teams at BRE and GfK NOP were able to draw on their experiences in delivering the pilot survey to improve the main stage of the survey. Interviewer observations in the field. At the interviewer briefing, it was stressed that as this was a pilot survey, interviewers should actively record notes for enhancing the survey in the 'notes' field which was part of the CAPI software (the computer assisted personal interviewing).
- c) Specific analysis of the pilot survey data. On receipt of the pilot survey data, BRE examined it to determine the quality of data returned, as well as that the required data was in fact being obtained and to examine the quantity of the data.
- d) Interviewer debriefing. Immediately following the fieldwork period a full debrief was held with all pilot survey interviewers. This involved assessing the pilot questionnaire question-by-question and gathering comments from the interviewers directly. Comments were made on individual questions, with suggestions from both respondents and interviewers for ways to improve the questionnaire for the main stage of the survey. The session was recorded to ensure that the interviewer's observations were fully captured.
- e) Questionnaire review. The pilot survey was then reviewed by the project steering group. This included members of DECC's customer insight team, BRE's social research team and DECC's science team.

## 4 Interview survey methodology

### 4.1 Questionnaire design

The final interview survey questionnaire used in the 2010/11 EFUS is shown in Appendix A, together with the scorecards as Appendix B.

The questionnaire for the 2010/11 EFUS has been designed using a mixture of existing questions from relevant published large scale surveys and new questions (integrated into the pilot). Prior to the pilot, an early draft was sent for consultation to DECC and GfK NOP and questions were reviewed by the steering group and social research teams (although direct cognitive testing of the questionnaire was not done). Testing of the questionnaire took place using the 2010 pilot study, with feedback on new questions integrated through the process described above.

For the pilot a total of 106 households were interviewed from a sample of 166 chosen from the first three quarters of the EHS 2009/2010 (April to December 2009). The Interviewers contacted householders first by letter and then by a visit to the home, achieving a response rate of 64%. For the main survey telephone numbers were supplied to the interviewers to boost this response rate.

After the pilot, BRE social researchers conducted a detailed analysis of the pilot interview data. This gave an indication of questions that were not working in their current form. This analysis included an expert review of question form and structure, analysis of the ranges used for ordinal scales, and the investigation of verbatim responses to questions.

In order to maintain the quality of responses, the interview was intended to take an average of 45 minutes. In the field, however, the average length of the pilot survey interview was approximately 60 minutes. The lighting and appliances sections were considered particular time consuming, and respondents and interviewers described them as being quite repetitive. Following the workshops with DECC it was agreed that reductions should be sought in the areas of the questionnaire relating to appliances, lighting and cooking. The appliances section was adjusted to remove questions on use of home computers. The cooking section was simplified to only ask about hobs, ovens, grills and microwaves and the lighting section was greatly reduced in length by using a simpler question structure.

Questions were also reviewed by DECC social researchers (post pilot) who suggested alternatives. At DECC's request, an attitudes section of the main stage questionnaire was added, which is aligned with pre-existing energy efficiency attitude questionnaires. This was done to enable comparative analysis between surveys, should this be required in the future. A monitoring study of hot water use had recently been completed by the Energy Saving Trust at the time of the EFUS survey, therefore this did not form part of the pilot survey questionnaire. A small section on hot water use, however, was added subsequent to the pilot to aid interpretation of energy consumption and electricity monitoring sample selection process (see section 5.2 below).

The EFUS questionnaire was conducted using a CAPI system. This system was tested extensively by BRE and GfK NOP staff prior to the survey starting. Using CAPI allows the interviewer to run through the questionnaire most efficiently and this is especially important for some of the more complex sections such as heating and lighting. The interviewer also has the option to go back and correct

entries after discussion with the interviewee. All the surveys were downloaded and sent to GfK daily allowing monitoring of survey progress.

Several parts of the interview involved topics that interviewers may be less familiar with (e.g. types of heating system). There were a number of questions where interviewers were able to access extra information through the CAPI system such as definitions, or the key differences between different answer options.

As the EFUS took place several months after the EHS, there was a possibility that the previous occupant had moved and a new household occupied the property. The interviewers were instructed that the new households could still be interviewed but that additional data would need to be recorded. Towards the end of the questionnaire, extra questions are asked of the new households to gain information about the age, sex, employment status etc.

## ***4.2 The Briefings***

All interviewers attended a full day briefing prior to starting field work. Ten briefings were conducted in total between 24th November 2010 and 7th January 2011. The briefings were led by a GfK NOP researcher, with active participation throughout from BRE staff providing expert input into interview topics as required.

The briefing began with an outline of the purpose of the survey, and a brief explanation of the sample. Instructions were given on handling the sample, including strategies for dealing with such a dispersed sample and techniques to maximise response. Interviewers were given a broad overview of the coverage of the questionnaire and then BRE staff explained some of the technical terms that it would be helpful for interviewers to understand, and which they may need to explain to respondents and how to access the additional support information

Interviewers then went through a dummy interview using the CAPI system; with each interviewer taking it in turn to ask a few questions, and all had the chance to raise queries at any time. At the end of the dummy interview BRE staff explained the purpose of the temperature loggers and the process of installing them.

## ***4.3 Sampling and response rates***

The EFUS interviews were carried out by GfK NOP between December 2010 and April 2011 with a total of 2,616 interviews being completed.

BRE supplied 3,288 addresses drawn from the first two quarters of the EHS (April to November 2010) to GfK. This represented all cases from these quarters where the respondent had previously agreed to a further interview (84% of cases). The EHS 2010 is a simple random sample of addresses from across England, with each quarter being a random quarter of the full sample (i.e. there is no clustering by survey period). The quarters passed to the EFUS survey team were chosen as they were available in time to conduct the survey, and were as close as possible to the start of the EFUS interview to minimise the chance of changes to the dwelling or household.

When this sample was considered to be exhausted, BRE supplied an additional 400 cases from the third quarter of the EHS. As the number of interviews had been capped at approximately 2,600, this second sample was not fully utilised before fieldwork was complete. In all 135 interviewers were

used on the project, and they were allocated cases based on proximity to where they lived. Interviewers were supplied with names, addresses and telephone numbers for the households in their assigned sample.

An advance letter was sent by the interviewers a few days before they intended to visit. These included the interviewer's name and telephone number, so that those who wished were able to make an appointment to be interviewed. The householder was then telephoned by the interviewer a few days after sending out a letter.

Interviewers were able to start sending out their letters immediately after the briefing, and interviewing started on 1st December 2010 and ran until 8th April 2011. The interview took an average of just under 50 minutes.

The response rate for the interview sample was 75.7% and is summarised in Table 1. Splits of the unweighted sample by a number of key dwelling and household characteristics are shown in Table 6 in Appendix C.

Table 1 - Sample issued to GfK NOP

Outcome	Frequency	% of issued sample	% of effective sample
Sample issued to GfK NOP	3,688	100.0	-
Ineligible (vacant, derelict etc.)	64	1.7	-
Not fully worked at time of cap	166	4.5	-
Effective sample put forward	3,458	93.8	100.0
Refused	511		14.8
Non-contact	210		6.1
Too ill/away	66		1.9
Interpreter required	2		0.1
Other	50		1.4
Final Number of Interviews	2,616		75.7

#### **4.4 Weighting**

To enable the EFUS data to be scaled up to represent the national population and to correct for non-response, weighting factors have been calculated to align with national totals for tenure, Government Office Region and dwelling type (weighted frequencies and percentages split by key dwelling and household characteristics are shown in Table 7 in Appendix C).

There are three sets of weights available, for the interview data, temperature logging sample and for the meter read sample. Due to the very small sample size, no weighting variables for the electricity monitors have been produced.

#### 4.4.1 Interview data weighting

For the EFUS interview survey, data was weighted back to the population targets for tenure, Government Office Region and dwelling type, using the rim weighting process<sup>2</sup>.

The data available comprised the sample of cases that took part in the EHS physical survey. Initially a range of household and residential information was examined to determine how similar the achieved EFUS interviewed sample was to the physical survey sample.

There were three steps involved between the physical sample, and the achieved EFUS interview sample, and so the profiles were examined at each stage. This process starts with stage 10 of the EHS physical survey weighting methodology (see [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/211306/Sampling\\_and\\_Weighting.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211306/Sampling_and_Weighting.pdf) for full details).

Firstly the weight from stage 10 of the EHS physical survey was applied. The profiles of information on the household and household reference person included in the physical survey were then compared for each stage that corresponded to a sampling stage:

1. All physical survey respondents,
2. All respondents eligible to take part in the EFUS
3. All respondents issued for the EFUS
4. All respondents who took part in the EFUS

The profiles of respondents from one stage to the next were fairly similar, and so it was decided to weight back directly from the EFUS respondents to the physical survey profile (rather than weighting each stage). The variables used were chosen based on those where the profile of respondents deviated from the physical survey, as well as those where key survey outcomes varied within subgroups. Key survey outcomes examined included the number of lights in the living room; the number of times the heating came on, on a typical Monday; whether the respondent can normally keep comfortably warm in their living room & the number of hours the TV in the living room would be on, on a typical weekday. Questions which varied across all the key outcomes and at the various sampling stages of the EFUS interview were used in the weighting.

Once the rim weights were derived, they were examined for extreme weights. Very large or very small weights tend to increase the design effects of the data, and consequently, the margin of error. By trimming (or capping) weights, the design effect due to weighting can be reduced, whilst ensuring that profiles of the weighted targets do not deviate too much from their desired proportions. For the EFUS interview survey, the weights were trimmed at the 0.5th percentile and the 99.5th percentile. Weights were then rescaled so that they give a weighted total equal to that of the weighted total from the physical survey.

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<sup>2</sup> Rim weighting uses a characteristics of a sample to weight a dataset in order to represent the target population. For more details see *Statistics for Real-Life Sample Surveys: Non-Simple-Random Samples and Weighted Data* (Dorofeev & Grant, Cambridge University Press 2006).

For a comparison of population totals for the EHS and the components of the EFUS, interview survey, temperature loggers, meter readings and electricity monitoring, see Table 6 and Table 7 in the Appendix C. The population totals are presented both weighted and non-weighted.

#### **4.4.2 Temperature monitoring weighting**

All respondents who took part in the interview survey were asked if they would install temperature loggers in three rooms in their house.

For the weighting of this element of the survey, CHAID (chi-squared automatic interaction detection) was used to look at which household and residential variables were associated with non-installation of a temperature logger in the household. Those which were found to be significant in CHAID were used in a logistic regression, so that the marginal totals of the variables used remained in line with the target profiles.

The variables used in the logistic regression were GOR, Tenure, Dwelling type & working status of Household (Working household, workless household).

These response probabilities were inverted to give a weight, and multiplied by the untrimmed weight from the EFUS interview survey. Weights were then trimmed at the 0.5th and 99th percentiles and scaled to the same total number of households as in the EFUS interview survey.

#### **4.4.3 Meter reading and combined meter reading / temperature monitoring weighting**

For the EFUS interview survey sample, data was weighted to population targets for Government Office Region (GOR), Tenure & Dwelling type. For the meter reading and combined meter reading / temperature monitoring subsamples, the data is weighted back to the profile of respondents for the GOR, Tenure & Dwelling type & working status of household using logistic regression, based on whether or not the meter reading (and monitoring data for the combined weights) were obtained.

### ***4.5 EFUS data quality***

#### **4.5.1 Survey errors**

Like all estimates based on samples, the results of the EFUS are subject to various possible sources of error. Systematic errors from interviewer difference have been minimised by applying an upper limit for the number of interviews undertaken by each of the 136 interviewers was set. On average the EFUS interviewers completed 20 interviews (0.8%).

Estimates of household characteristics produced from a sample survey such as the EFUS may differ from the true population figures because they are based on a sample rather than a census. This difference is known as sampling error, and it is important to be able to estimate the size of this error when interpreting the survey results. A frequently used method of assessing the magnitude of sampling errors is to calculate a confidence interval for an estimate which gives the interval within which one can be fairly certain that the true value lies.

For calculating the 95% confidence interval for a percentage estimate (p), the following formula has been used:

$p \pm 1.96 * se(p)$  where  $se(p)$  represents the standard error of the percentage, calculated by

$se(p) = \sqrt{p(100-p)/n}$  where  $n$  is the unweighted sample size

For data that are normally distributed, the mean has been used to express central tendency. However, for some variables e.g. metered consumption values, inspection of the histograms showed that the distribution was positively skewed and therefore median values have been used to express central tendency. 95% confidence intervals have been calculated and presented throughout the reports

The 95% confidence intervals around a mean value have been calculated using

$$X \pm 1.96 * s/\sqrt{N}$$

Where  $X$ =mean (weighted) value,  $s$ =standard deviation (weighted population) and  $N$ =unweighted sample size.

The 95% confidence intervals around a median value have been calculated following the 'notched' method described by McGill et al, 1978<sup>3</sup>. A value of 1.7 was used as the constant and therefore the confidence intervals around the median have been calculated as:

$$M \pm 1.7(1.25R/1.35\sqrt{N})$$

Where  $M$  = median (weighted) value,  $R$  = interquartile range (weighted value) and  $N$ =unweighted sample size.

A measure of the impact of the variation introduced by the weighting is the design factor (DEFT<sup>4</sup>) which has been estimated to account for the effect of weighting of the data. Four factors have been generated for each set of weights, as shown in Table 2.

Table 2 – Design effect factors for weighted data

Weighting	Design Effect Factor (DEFT)
Interview survey	1.1
Temperature subsample	1.2
Meter reading subsample	1.1
Combined temperature and meter reading subsample	1.2

The relevant factor is multiplied by the Standard Error, acting to increase the size of the confidence intervals<sup>5</sup>.

<sup>3</sup> McGill, R, Tukey, J.W. and Wayne, A. 1978. Variations of Box plots. The American Statistician, 32 (1) pp.12-16.

<sup>4</sup> See Kish, L. (1992). Weighting for unequal  $P_i$ . Journal of Official Statistics, volume 8 pp 183 - 200.

<sup>5</sup> For further information on calculating confidence intervals for weighted survey data see the EHS data quality guide and ESDS guidance.

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/211305/Data\\_Quality.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211305/Data_Quality.pdf)  
[http://www.esds.ac.uk/doc/6804/mrdoc/pdf/6804significance\\_and\\_confidence\\_intervals.pdf](http://www.esds.ac.uk/doc/6804/mrdoc/pdf/6804significance_and_confidence_intervals.pdf)

Measurement error may also occur during a survey, for instance interviewers entering incorrect values. This was minimised through extensive training of interviewers, who all had experience of using CAPI previously.

Due to the small sample size in the EFUS, when using weighting, all figures that were based on less than 30 responses are replaced by an asterisk (\*) in reporting.

The CAPI system used for data collection minimised the amount of missing data. Missing data was not imputed, but the analysis conducted only on cases where valid data existed.

#### **4.5.2 Uncorrected biases in the weighted data**

Weighting is designed to reduce the effect of non-response bias on survey results. For practical reasons, weighting can only control for a very few factors at a time. As a result biases will exist among groups which have not been controlled for as part of the weighting process. By considering the weighted totals of other splits of the data (and comparing these against reference totals) we can identify some of these. Table 7 in the Appendix C below shows the percentages of different household groups in each of the weighted EFUS samples, and in the EHS.

It can be seen that the temperature and meter reading samples both slightly under-represent the very youngest (HRP age 16-34), and very oldest (HRP >75) households, and over represent those aged 66-75.

#### **4.5.3 EHS dwelling and household variables**

For the analysis presented in these reports, the majority of the dwelling and household variables are derived from the EHS. Readers are advised to refer to the EHS documentation on the gov.uk website for more information on these data.

## **5 Energy and temperature monitoring.**

Practical reasons of cost and the acceptable levels of survey intrusion will always restrict the amount of monitored data that can be collected. In this type of survey, a balance needs to be achieved between the amount and type of data collected per property, the number of properties surveyed and the overall budget available. Considering all of these factors, the level and type of monitoring was selected to provide as much data in the key areas of interest as possible. This decision was informed by both the BREDEM /SAP development teams at BRE, and the EFUS steering groups in the pilot stage of the project.

### ***5.1 Temperature loggers.***

During the survey, householders were invited to take part in a temperature monitoring study. The temperatures collected can be used to produce a temperature profile for the household and investigate overheating issues and provide accurate information for updating assumptions within SAP and BREDEM. This provides additional information in support of the reported data.

In the pilot study, temperature loggers were installed in 40 homes of pilot survey participants by the interviewer, with householders receiving a small financial incentive. They were retrieved after 6

months in the property (around 95% were successfully recalled). All data obtained using the internal loggers was complete and returned data in line with the expected profile of temperatures in the homes visited. However the external loggers were not carried through to the main stage for practical issues (in particular in placement of the loggers and sunlight hitting the loggers directly) and was replaced with Met Office Land Surface Stations (MIDAS) data.

The temperature loggers used were modified TinyTag Transit 2 data loggers, produced by Gemini Data loggers. Each logger was marked for use in specific rooms. An example of a living room logger is shown in figure 1 below:

Figure 1: Modified Tinytag Transit 2 temperature logger.



The loggers chosen for this study store temperature data internally, with a memory capacity of 32,000 readings, an accuracy of  $\pm 0.2^{\circ}\text{C}$  and a resolution of  $0.01^{\circ}\text{C}$ . The temperature range of the loggers is from  $-70^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$ . To maximise the number of readings possible in a period of a year, each logger was programmed to record data every 20 minutes until reaching capacity. All loggers were new and calibrated at manufacture, but BRE performed some additional tests on a sample of loggers before the survey began. This included testing of battery life, recording frequency and verification that the loggers had been set up with the correct starting dates and recording frequencies. All of the tested loggers operated as expected.

Of the 2,616 households interviewed, around 943 households received three temperature loggers to be placed in the living room, hallway and bedroom. A small number of households without all three rooms (e.g. bedsits) received only two loggers.

Interviewers were given instructions on proper placement of the loggers during the interview briefings, this was essentially emphasising the need for the loggers to be placed on an internal wall, away from heat sources and out of direct sunlight and at a height that could be reached by the occupant for removal of the logger (but out of the reach of small children). Because of practical issues placing loggers into the diverse circumstances found in homes, guidance on logger placement could not be overly prescriptive. Occasionally, the householder put the loggers up with instruction from the interviewer, for example in a private room like a bedroom which they were unwilling to allow access to.

Following successful trialling during the pilot survey, adhesive strips were selected to attach the temperature loggers to a solid surface. The interviewers were provided with six strips, three to install each logger and three for the householder to reinstall should they wish to redecorate and so need to take down the loggers.

The interviewer placed the loggers after the conclusion of the interview. The interviewers installed the loggers at each interview until all their allocation of loggers (typically 6 or 7 sets) was installed. There was no prior selection of households other than the need to gain consent.

Each logger has a serial number printed on the front which was entered by the interviewer into the CAPI system so the logger can be easily matched to the other collected EFUS data. Vouchers were given to the householder as an incentive for taking part in the temperature monitoring.

The temperature loggers were set to record from November 2011 until they reached capacity in February 2012. They were in the dwellings from the day of the EFUS interview (December 2010 – April 2011). After the loggers reached capacity they loggers were recalled by GfK and sent to BRE.

For the temperature analysis, the internal temperature data has been combined with external temperature data from the Met Office using 139 weather stations around the country (the MIDAS dataset). The cases with temperature loggers have been found to be on average 7.4 miles from the nearest station weather station and 75% of the cases can be found less than 15 miles from the nearest weather station. The weather data is available only hourly, so when used with the internal temperature data, from the loggers (recorded every 20mins), the missing data was imputed.

The data was downloaded into CSV format, one dwelling set at a time, using magnetic USB induction pads. The final CSV files contained all three sets of internal data plus the external weather data.

A total of 118 sets of loggers failed to be returned by householders and two sets were returned with all three loggers faulty. Thus the total number of sets of loggers adequate for analysis is 823. Of the 823 sets returned to BRE, 763 households returned three loggers, 57 households returned two, and three households returned one logger. On processing the logger outputs, it was found that 15 dwellings had one or more loggers that became faulty during the monitoring period; three dwellings had one or two loggers that failed to record from the outset and three households returned their loggers early (one in October 2011 and two in December 2011). See Table 3 for a summary.

No imputation was undertaken for missing loggers or missing data. Where no loggers were returned, the case was not carried forward into the grossing and weighting procedure.

Table 3: Summary of loggers returned and analysed

Number of households with logger installed	943
Number of households with no loggers returned (including all loggers faulty)	120
No. of households with 1 or 2 loggers returned	60
No. of households with all 3 loggers returned	763
Total Households Analysed	823
Of the 823 households analysed	
All returned loggers correct	802
1 or 2 loggers failed to record at all	3
Loggers returned early	3
1 or more loggers became faulty during recording	15

## 5.2 Electricity monitors

The objective of the electricity monitoring was to monitor electricity consumption at 10 second time intervals, in order to examine the cooking, lighting and appliance use of households.

This component of the study was trialled in the pilot survey. BRE staff installed 7 monitors in separate visits to surveyed households. A further two interviewers were allocated 5 electricity monitors to install after their interview was completed.

Three types of electricity monitor were trialled in the pilot survey: two types of GSM / GPRS monitors which transmit data daily using the mobile phone network (one which was mains powered and one battery powered), and a third type of monitor which stores data locally on a flash memory card (an SD card – as used in many digital cameras). All three types of monitor recorded data by attaching a current clamp on to the electricity meter cable

The trialling of the electricity monitors indicated that the battery powered monitor which stored data on an SD card was the easiest to install and produced the most reliable results.

The interviewers were not able to successfully install an electricity monitor during the pilot, so for the main survey, BRE staff installed all the electricity monitors in a series of follow-up visits.

For the main study, the monitor chosen was the Micro Amper digital voltage data logger. This is a stand-alone battery powered single channel data logger with an 0-1.5V input signal range and a accuracy of 0.15%. It was combined with a 0 to 50 Amp split-core current clamp (current transformer) to record whole house electricity consumption. The current clamp was placed around

the red 'live' cable between the household electricity meter and the consumer unit and a thin data cable connected it to the monitor.

The current clamps used were ACT050-10-S (ACT 0 to 50A). The clamp has an output signal 0 to 10V AC, but the cabling was modified to include a resistor to ensure that the output of the current clamp did not overload the monitor. Configured and set-up with the 100k $\Omega$  series resistor, the current measurement range is 0 to 82 Amps representing approximately 0 to 20kW.

Spot readings of consumption were recorded every 10 seconds with the data stored on a 2 GB Secure Digital Flash Memory Card. Each daily file comprises 8,640 data readings for each full day. Before the equipment was installed, the functions of the monitors were tested and the current clamp/cable combination calibrated against some known electrical loads. The calibration scale factor was also recorded for each set of equipment which were later used to adjust the final readings when returned to BRE. The accuracy of the clamp (1% at full scale) plus fluctuations in supply voltage affect the overall accuracy of the measurements. BRE tests of this setup against known loads, indicate an accuracy of approximately 10W for this setup.

During the interview, households were asked if they would be willing to have their electricity consumption monitored using these devices<sup>6</sup>, and were offered a financial incentive for taking part. 1,239 households consented (47%).

The EFUS interview data was then filtered to identify the most suitable households to attempt installation, with all monitors installed by BRE engineers in a follow-up visit to selected households.

The principal objective of monitoring was to investigate the electricity profile of lighting, appliances and cooking use. A number of filters excluded households with these reported uses. Installation could also not be attempted in any consumer units which were potentially unsafe, or impractical for other reasons.

The following households were, for these reasons, excluded from the sampling frame for this component of the data (based on EHS and EFUS data).

- Households in flats (due to difficulties in installing monitors in shared areas).
- Cases reporting any use of electric mains heating and/or supplementary electric heating
- Cases reporting any use of electric water heating
- Cases reporting electric heating in conservatories.
- Cases without a mains electricity system
- Cases marked as difficult to access the meter cupboards in EHS physical survey, or where no meter reading was possible.
- Cases without PVC sheathed wires and yellow and green earthing wires.

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<sup>6</sup> Note that all households living in flats were not asked this question due to difficulties in installing electricity monitors in shared areas which were likely to contain the meters.

- Cases with antiquated types of consumer units.
- Cases with antiquated types of power sockets.
- Cases that EHS has flagged as having an HHSRS electrical hazard (i.e. to remove unsafe meter cupboards etc.)

The sampling was structured to ensure that monitors were placed in each region of England targeting a total of 80 households. Monitors were installed between May and August 2011. All the electricity monitors finished recording at the end of January 2012 and were collected by BRE staff. In total 79 cases returned data suitable for analysis, this is summarised in Table 4.

Table 4 - Summary of EFUS electricity monitor cases

	Total cases	% of EFUS sample
Total EFUS sample	2616	100%
Flats (unsuitable for installation)	476	18%
Declined electricity monitor	1239	34%
Rejected for other reasons	1081	41%
Total sample available for monitoring	158	6%
Final number of cases available for analysis	79	3%

The data stored on each of the logger's memory cards was extracted and processed to produce a set of raw data for each dwelling. The start and end of the data was trimmed to exclude blank data recorded in the period before and after the loggers were installed. The data from the day of installation has also been removed. The calibration scale factor (see above) was applied to each set of data to achieve the appropriate electricity consumption value in Watts. The power factor of the electrical system was assumed to be equal to 1 (it is likely to be very close to unity due to the likely predominance of resistive loads in the dwellings).

### **5.3 Meter readings**

During the EHS 2010/11 physical survey, EHS surveyors read the gas and electricity meters where possible. This reading forms the first (initial reading) of the EFUS meter reading dataset and were taken during the period April to September 2010.

To obtain the second (final) reading, a number of approaches were taken. At the end of the EFUS interview the householders were asked if they would consent to a further reading taken by a professional meter reader and around two thirds of the sample agreed to this. Follow up readings were attempted for all households by G4S, a meter reading company, in two batches: the first between February and March 2012 and the second in November 2012. A high number of readings were unobtainable in the first batch of data collection, necessitating a two stage process.

Alongside this second reading attempt by G4S, a number of further approaches were made to households to increase the size of this dataset:

1. Self-read cards were sent to remaining households.

2. During the EFUS interview, households were asked if they would consent to DECC obtaining information of electricity and gas consumption directly from their energy supplier, with over 60% of all EFUS cases agreeing. Two major energy suppliers (Eon and British Gas) supplied initial and final meter reading data. Other suppliers were unable to assist with this task.
3. A small number of meters were read by BRE staff (with the householder's permission) while installing and removing other monitoring equipment

In order to obtain a final set of cases for reporting, a validation process was applied to the meter readings from all sources. This process was assisted by comparison with the Meter Point (MPAN/MPRN) data provided to the survey team by DECC for comparison purposes<sup>7</sup>. Cases with a missing first or second reading were removed and the remaining data were inspected to decide on the validity of their consumption data, including day and night rates of electricity where applicable. Cases were dropped where the consumption was implausibly high or produced a negative figure, although in a number of cases the data could be consolidated and retained where there was clear evidence for the source of the discrepancy, e.g. a negative value resulting from a meter passing through 9999 during the consumption period. Implausibly high consumptions were identified by examination of the data close to and above 70,000 kWh for gas and 30,000 kWh for total electricity (by inspecting plots of the data, these extreme values became apparent above these points). Values at the top end of this range were then checked, looking for possible errors in the actual meter readings along with comparisons against the MPAN/MPRN estimates and dwelling and household size. Similar checks were done for apparently valid consumptions close to 0. These checks lead to around 40 cases (approx. 3%) being dropped. Following this validation process a complete set of initial and final electricity meter readings was obtained for 1,345 cases (51% of total EFUS sample). Of these, 1,197 cases had a mains gas supply and produced valid gas consumption values (89% of the meter reading sample, and 45% of the total EFUS sample). This is summarised in Table 5.

Table 5 – Summary of the EFUS meter read sample.

	Total cases	% of EFUS sample	% of meter read sample
All EFUS interviewed cases	2,616	100	-
Missing 1st or 2nd meter reading	1,162	44%	-
Consumption data considered implausible.	109	4%	-
Final meter reading cases	1,345	51%	100%
Electricity readings only	148	(6%)	11%
Electricity and gas readings	1,197	(46%)	89%

This dataset covered a range of consumption periods from around 15 months to around 30 months depending on the date of the EHS survey and the source of the second reading. The final dataset required annual consumptions for each case in which the difference in start and end dates, and therefore difference in seasonal energy use, was accounted for.

<sup>7</sup> Note the meter readings used in this analysis are not those in the DECC Meter Point dataset, which were only used for comparison with the EFUS data to assist validation where necessary.

A simple method to correct for this would have involved multiplying the fuel consumption calculated from the start and end readings by the ratio of one year compared to the actual time period. For example, if the period is 400 days, then the consumption would be multiplied by 365/400. However, this clearly does not take account of the seasonal variation, and a geometrical analysis of a notional heating profile suggests that the error in fuel consumption using this method would result in overestimates and underestimates of up to around 15%. The error depends on the season in which the time before and after the common year occurs.

An alternative method is to use a measure of seasonality to correct the consumption at the same time as annualising the total figure. For this study, degree days were used to make that correction. Ideally this should be applied only to the space heating part of the fuel consumption, typically around 70% of the total fuel consumption. However it was not possible to apply this proportion to the metered fuel consumption, since the time before (or after) the common year may be a period of high or low consumption depending on the season. So a degree day correction was applied to the total fuel consumption. Sensitivity testing of this assumption (by applying the correction to 70% of consumption) showed that the impact of this assumption is very small (resulting in a difference of <1% to the stock average consumption, and approximately 3-4% for the most extreme individual cases).

A common year was found that covered part of the consumption period for the vast majority of cases, which ran between the 15<sup>th</sup> November 2010 and 14<sup>th</sup> November 2011. To represent the variation in England's outside temperatures over the periods before and after this common year, using one location, daily degree days for a Midlands location (Waddington) was used (regional degree day factors were considered too complex to apply given the small effect likely to result from using them). The following method was applied to the data:

1. Calculate the total degree days 'D' between the start and end dates for the common year.

Then, for each dwelling:

2. Calculate the total degree days 'd' between the start and end meter readings
3. The corrected fuel consumption is then 'E x D/d' where E is the fuel consumption for the full period.

It should be noted that this does not constitute a "weather correction", as the degree days were for a particular period, rather than for a 'typical' year – i.e. the data represent consumption in the common year period (Nov 2010 to Nov 2011). Comparisons of final consumption at the stock level compare well to data sources such as NEED 2009, NEED 2010<sup>8</sup> and the Home Energy Use Survey<sup>9</sup> (HEUS). The EFUS mean consumption, however, is higher than that reported by the Energy Consumption in the UK<sup>10</sup> for 2011. However, these differences can largely be explained through the

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<sup>8</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/65969/6861-need-report-nov-2012.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/65969/6861-need-report-nov-2012.pdf)

<sup>9</sup> <http://www.energysavingtrust.org.uk/Publications2/Corporate/Research-and-insights/Powering-the-nation-household-electricity-using-habits-revealed>

<sup>10</sup> <https://www.gov.uk/government/collections/energy-consumption-in-the-uk>

different periods covered by these datasets, and in particular the inclusion of the cold December 2010 in the EFUS data.

For some cases, the source used for the second gas reading was different to that for the second electricity reading and therefore the consumption periods differed, so the annualisation method was applied to each fuel separately.

#### ***5.4 Gas and electricity supplier name and tariff data***

Ahead of the interview, householders were asked to have their gas and/or electricity bills available. During the interview householders were asked who their current electricity and gas supplier was and the name of their tariff they were on. Data quality on the name of supplier was generally good, but the tariff name information was often difficult to interpret. Households were also asked to fill in and sign a consent form that instructs the supplier to provide information on household consumption and tariff in support of the survey and in total 1,878 households agreed (72%).

Suppliers were contacted to provide details of the tariffs for these households. However, the majority of suppliers were unable to provide this information because of the effort required in extracting these data (particularly in the case of complex tariff structures). To allow tariff data to be incorporated into the analysis, therefore, additional data tables on tariffs were also obtained from Consumer Futures. These data tables listed tariffs from each supplier, split by method of payment and supply region. This is a simplification of the total number of tariffs available (many different tariffs are available from each supplier), but it does provide an indication of typical tariffs available in each region for each method of payment. Using the information on supplier names and the method of payment data from the EHS, each EFUS case was then able to be matched to a Consumer Futures tariff.

## **6 Scope of the reporting.**

### ***6.1 Objectives and scope of the headline EFUS reporting.***

The EFUS provides a rich source of new data on energy use in England, to be published for use by the energy research community. BRE have produced a number of headline reports which outline key results from initial analysis of the data.

The scope of the BRE reporting has been limited to reporting key findings, primarily of interest for energy modelling and the development and use of energy models such as SAP and BREDEM. The BREDEM and SAP development teams at BRE were integrated into the process of survey and experimental design, and subsequent analysis of the data. They acted as key reviewers for all reports, and provided guidance on key outcomes. It should be noted that the purpose of the survey was not simply to update the existing *inputs* to BREDEM, but also to challenge existing structures and approaches within BREDEM. Where data showed that the existing inputs into BREDEM may be too simple, the reporting aims to describe what was actually happening, rather than forcing the results into the pre-existing data structure.

These reports should be considered the beginning of the process of data analysis, and a mechanism of placing some of the most important findings into the public domain. This reporting is, however, necessarily limited by the desire to report on findings in a timely manner. Further analysis is expected in the future, using the publicly available data, by researchers from across the research community which will add greatly to these initial findings.

# Appendix A

## *EFUS 2010-11 Interview questionnaire*

### Dwelling information **01 Rooms.sav**

*Internal question to interviewer.*

[q0] Is this a house or a flat?

- (1) House
- (2) Flat

[q01] In which of these ways do you and your household occupy this accommodation?

- (1) Own it outright
- (2) Buying it with the help of a mortgage or loan
- (3) Pay part rent and part mortgage (shared ownership)
- (4) Rent it
- (5) Live here rent-free (including rent-free in relative's/ friend's property; excluding squatting)
- (6) Squatting

Ask [q02] if [q01] is 3, 4 or 5.

[q02] Who is you and your household's landlord?

*(Individual prompt, code first that applies)*

- (1) The local authority/council/Scottish Homes?
- (2) A housing association, charitable trust or Local Housing Company?
- (3) Employer (organisation) of a household member?
- (4) Another organisation?
- (5) Relative/friend (before you lived here) of a household member?
- (6) Employer (individual) of a household member?
- (7) Another individual private landlord?

[q03] Are all the people that are living in this home today, the same people as were living here when an interview was held in this home as part of the English Housing Survey? This interview took place on the *(insert date from EHS interview survey)*.

- (1) Yes
- (2) No

[q04] Could you indicate how many of each these rooms you have in your home? (Please do not include rooms that you share with other households).

*([Refer to show card 01] - code as many as present)*

*For 'open plan' arrangements split the rooms up into separate areas of use and code separately (e.g. kitchen area, living room area, dining area) If the hallway and landing are on separate levels code as separate rooms)*

- (1) Kitchen (not used for dining)
- (2) Kitchen diner
- (3) Living room
- (4) Dining room
- (5) Combined living and bedroom (bed-sit)
- (6) Bedrooms
- (7) Bathrooms with a WC
- (8) Bathrooms without a WC (including shower rooms)
- (9) Separate WCs
- (10) Conservatory
- (11) Hallway or landing
- (12) Study or home office
- (13) Other (cellars, attics, outbuildings etc. if habitable and with a power supply from the home)

## Main heating systems 02 Main heating.sav

*"The survey carried out earlier this year showed that your main heating system was (External reference - Central heating/Storage radiators/Gas fires/Electric heaters/Coal , wood , smokeless fuel fires or stoves)."*

[q05] Is this the heating system that your household uses to heat the majority of your home in the winter?

- (1) Yes (Go to [q07])
- (2) No

[q06] What is the heating system that your household uses to heat the majority of your home in the winter?

- (1) Central heating
- (2) Storage radiators
- (3) Gas fires
- (4) Electric heaters
- (5) Coal / wood / smokeless fuel fires or stoves
- (6) Other . . . state (including type of fuel)

[q07] In a typical year, in which month does your household begin heating your home every day using your (main heating system)?

*(Clarify that this means a typical year – not just this year. If all year round heating code January start dates for heating)*

[q08] In a typical year, in which month does your household finish heating your home every day using your (main heating system)?

*(Clarify that this means a typical year – not just this year. If all year round heating code December end date for heating)*

Do not ask [q09] to [q29] if answered "no regular heating pattern" in [q07]

Ask [q09] for central heating systems only – otherwise go to [q24]

[q09] Do you have a timer that controls your central heating?

- (1) Yes
- (2) No (Go to [q24])
- (3) Don't know (Go to [q24])

[q10] When you are heating your home every day, does your household use the timer to control the times that the central heating is switched on and off?

- (1) Yes (Go to [q12])
- (2) No

[q11] When you are heating your home every day, how does your household switch your central heating on and off (running prompt)?

- (1) Switch on and off manually when it is needed using a switch or at the control panel (Go to [q24])
- (2) Switch on and off by turning the thermostat up and down (Go to [q24])
- (3) Other . . . . (Go to [q24])

[q12] When you are heating your home every day, how many times does your central heating come on, on a typical Monday (24 hours)? For example, if it comes on once in morning and once in the evening then there are two periods. If on all day enter 1 period. Enter number of periods.

- (1) 1
- (2) 2
- (3) 3
- (4) 4
- (5) 5
- (6) 6
- (7) Don't know/no typical heating pattern (Go to [q24])
- (8) 0 (Go to [q15])

[q13] What is the (Insert period – first, second, third etc.) time that your central heating comes on?

*(Enter time using 24 hour clock e.g. 8pm code 20. If on all day enter 0000)*

[q14] What is the *(Insert period – first, second, third etc)* time that your central heating goes off?

*(Enter time using 24 hour clock e.g. 8pm code 20. If on all day enter 2400)*

*Repeat on/off times as necessary for each period*

[q15] When you are heating your home every day, how often does your household switch on your central heating manually for an additional period of 'boost' heating?

[Refer to show card 02]

- (1) Every day
- (2) Every couple of days
- (3) At least once a week
- (4) At least once a month *(Go to [q21])*
- (5) Less than once a month *(Go to [q21])*
- (6) Never *(Go to [q21])*

*Ask [q16] if answered 1, 2 or 3 for [q15]*

[q16] Does your household switch on and off this 'boost' heating on regular days of the week, and at regular times of the day?

- (1) Yes *(Go to [q18])*
- (2) No *(Go to [q17])*

[q17] In a typical week, when you are heating every day, how many hours of 'boost' heating does your household use?

*(Numeric to 2 decimal places - Go to [q21])*

[q18] When you are heating every day, how many times does your household use 'boost' heating, on a typical Monday?

*(For example, if it is used once in morning and once in the evening then there are two periods. Each day covers 24hrs.)*

- (1) 1
- (2) 2
- (3) 3
- (4) 4
- (5) 5
- (6) 6
- (7) Don't know (spontaneous only) (*Go to [q21]*)
- (8) None (*Go to [q21]*)

[q19] What is the (*Insert period – first, second etc.*) time that your household turns your boost heating on?

*(Enter time using 24 hour clock e.g. 8pm code 20. If on all day enter 0000)*

[q20] What is the (*Insert period – first, second etc.*) time that your household turns your boost heating off?

*(Enter time using 24 hour clock e.g. 8pm code 20. If on all day enter 2400)*

[q21] Do the times that your timer turns your central heating on and off, or the times that your household uses 'boost' heating, change on any other weekdays (Tuesday to Friday)?

- (1) Yes central heating on/off times change (*Repeat questions [q12] to [q14] for Tuesday to Friday*)
- (2) Yes 'boost' heating times change (*Repeat questions [q18] to [q20] for Tuesday to Friday*)
- (3) No (*Go to [q22]*)
- (4) Don't know (*Go to [q22]*)

[q22] Do the times that your (main heating) turns on and off, or the times that your household uses 'boost' heating, change at the weekend (Saturday & Sunday)?

- (1) Yes central heating on/off times change (*Repeat questions [q12] to [q14] for Saturday and Sunday*)
- (2) Yes 'boost' heating times change (*Repeat questions [q18] to [q20] for Saturday and Sunday*)
- (3) No (*Go to [q23]*)
- (4) Don't know (*Go to [q23]*)

[q23] When you are heating your home every day, how often does your household manually switch off your central heating (either at the controls or by turning the thermostat down) during the periods it is timed to be on?

[Refer to show card 02]

- (1) Every day
- (2) Every couple of days
- (3) At least once a week
- (4) At least once a month
- (5) Less than once a month
- (6) Never

*If questions [q12] to [q23] have been answered go to question [q31]*

[q24] When you are heating your home every day, does your household have your (*Insert type of main heating*) on (*For storage radiators add . . ., by this I mean actually giving out heat, rather than charging up*) at regular times of the day?

- (1) Yes
- (2) No (*Go to [q30]*)
- (3) Don't know (*Go to [q30]*)

[q25] When you are heating your home every day, how many times does your household turn your (main heating) on, on a typical Monday?

*(For example, if it is used once in morning and once in the evening then there are two periods. If on all day enter 1 period)*

- (1) 1
- (2) 2

- (3) 3
- (4) 4
- (5) 5
- (6) 6
- (7) Don't know (spontaneous only) (Go to [q30])
- (8) None (Go to [q28])

[q26] What is the (*Insert period – first, second etc.*) time that your household turns your (main heating) on, on a Monday?

(Enter time using 24 hour clock e.g. 8pm code 20. If on all day enter 0000)

[q27] What is the (*Insert period – first, second etc.*) time that your household turns your (main heating) off, on a Monday?

(Enter time using 24 hour clock e.g. 8pm code 20. If on all day enter 2400.)

*Repeat on/off times as necessary for each period*

[q28] Do the times that your household

turns your (main heating) on and off change on any other weekdays (Tuesday to Friday)?

- (1) Yes (*Repeat [q25], [q26], [q27] for Tuesday to Friday*)
- (2) No (*Go to [q29]*)
- (3) Don't know (*Go to [q29]*)

[q29] Do the times that your household turns your (main heating) on and off change at the weekend (Saturday and Sunday)?

- (1) Yes (*Repeat [q25], [q26], [q27] for the weekend*)
- (2) No (*Go to [q31]*)
- (3) Don't know (*Go to [q31]*)

*If questions [q24] to [q29] have been answered go to question [q31]*

[q30] How many hours do you think your (main heating) is on in a typical week in winter (December to February)?

*Only ask [q31] if main system is central heating (not storage radiators), else go to [q33]*

[q31] Do you have a working thermostat on the wall?

- (1) Yes
- (2) No (*Go to [q33]*)

[q32] What temperature is it typically set to?

*(Record and confirm if F or C).*

## Alternative heating **03 Alternative heating.sav**

[q33] Which room(s) (if any) does your household typically not heat using the (main heating system)? Please include rooms where a radiator or heater is turned off.

*(Use rooms named in response to [q04], go to [q49] if none)*

*Ask questions [q34] to [q47] for all rooms named in the response to question [q33]*

[q34] Are there any (main heating/for central heating add: 'radiators') in the (*insert room*) that are turned off?

- (1) Yes
- (2) No

[q35] Is the (*insert room*) heated by another type of heater (including towel rails and Aga/Rayburn cookers)?

- (1) Yes
- (2) No (*Go to [q48]*)

[q36] What type of heater is used in the (*insert room*)?

*([Refer to show card 03] - code only one, if multiple heaters code the main one)*

- (1) Gas fire (mains gas)
- (2) Gas fire (bottled gas)
- (3) Electric heater (including electric towel rails and oil filled radiators)
- (4) Open fire burning coal/wood/smokeless fuel
- (5) Enclosed fire or stove burning coal / wood / smokeless fuel
- (6) Aga or Rayburn stove (any fuel)
- (7) Radiator connected to hot water system (not the central heating system)
- (8) Other (specify).

If [q36] is 4 go to [q38], else go to [q37]

[q37] Approximately how old is this heater?

(If < 1 year code as = 1 year, if same as dwelling code as = 100, if don't know code as 101).

[q38] In a typical year, which months do your household use the (*insert heating type*) in the (*insert room*)?

[q39] During these months, would your household typically use this ...(*Running prompt*)

- (1) Every day (*Go to [q40]*)
- (2) More than once a week (*Go to [q40]*)
- (3) More than once a month (*Go to [q49] unless other rooms to cover in which case go back to [q35]*)
- (4) Less than once a month (*Go to [q49] unless other rooms to cover in which case go back to [q35]*)
- (5) Only in unusual circumstances e.g. if very cold weather (*Go to [q49] unless other rooms to cover in which case go back to [q35]*)

[q40] In the winter (December to February) does your household typically switch on and off this heater on regular days of the week (if open fire Does your household usually light this fire), and at regular times of the day?

- (1) Yes (*Go to [q43]*)
- (2) No (*Go to [q41]*)

*Only ask [q41] and [q42] if [q40] is 2 (no regular heating pattern)*

[q41] In a typical week in the winter (December to February) how many hours would this heater/fire be on for?

(Code 169 for less than 1, 170 for don't know)

[q42] How often is the (*main heating*) on in the rest of the house at the same time as this (*other heating type*) is on?

- (1) The (*main heating*) is always on at the same time that this (*other heating type*) is on. (*Go to [q49] unless other rooms to cover in which case go back to [q35]*)
- (2) The (*main heating*) is on for more than half of the time that this (*other heating type*) is on. (*Go to [q49] unless other rooms to cover in which case go back to [q35]*)
- (3) The (*main heating*) is on for less than half of the time that this (*other heating type*) is on. (*Go to [q49] unless other rooms to cover in which case go back to [q35]*)
- (4) The (*main heating*) is never on at the same time that this (*other heating type*) is on. (*Go to [q49] unless other rooms to cover in which case go back to [q35]*)

Ask [q43] to [q47] only for households that have said 1 (YES) to [q40] (*regular heating pattern*)

[q43] When you are heating your home everyday, how many times does your household turn your (*insert heating type*) on {if open fire light your fire}, on a typical Monday?

(*For example, if it is used once in morning and once in the evening then there are two periods. if on all day enter 1 period*)

- (1) 1
- (2) 2
- (3) 3
- (4) 4
- (5) 5
- (6) 6
- (7) Don't know/no typical heating pattern (spontaneous only) (*Go to [q49]*)
- (8) None (*Go to [q46]*)

[q44] What is the (*insert period – first, second etc.*) time that your household turns this (*insert heating type*) on, (if open fire: lights this fire) on a Monday?

(*Enter time using 24 hour clock e.g. 8pm code 20. If on all day enter 0000*)

[q45] What is the (*insert period – first, second etc.*) time that your household turns this (*insert heating type*) off, (if open fire that this fire goes out), on a Monday?

*(Enter time using 24 hour clock e.g. 8pm code 20. If on all day enter 2400)*

[q46] Do the times that your household uses this (heating type) change on other weekdays (Tuesday to Friday)?

- (1) Yes (*Repeat [q40] to [q60] for Tuesday to Friday*)
- (2) No (*Go to [q47]*)
- (3) Don't know (*Go to [q47]*)

[q47] Do the times that your household uses this (heating type) change at the weekend (Saturday and Sunday)?

- (1) Yes (*Repeat [q40] to [q60] for the weekend*)
- (2) No (*Go to [q49]*)
- (3) Don't know (*Go to [q49]*)

*Ask [q48] if answered no to [q35]*

[q48] Why is the room not heated?

*([Refer to show card 04] - code all that apply)*

- (1) Too expensive
- (2) Room stays warm enough already
- (3) Room not used/hardly ever used
- (4) No heating system in place
- (5) Heating system doesn't work
- (6) Room too small to require heating
- (7) Room too small to fit a heater inside
- (8) Other (please specify)

*Go back to [q34] for all other rooms. If a portable heater is being moved from room to room needs to answer for all rooms.*

## Supplementary heating **04 Supplementary heating.sav**

[q49] Does your household ever use any other types of heaters in the rooms that are heated by the (main heating)?

- (1) Yes
- (2) No (*Go to [q64]*)

[q50] Which rooms do your household use these heaters in? (*Identify from rooms as in [q04]*)

*Ask [q51] to [q63] for all rooms named in response to [q50]*

[q51] Apart from your (main heating) what type of heater does your household use in the (*insert room*)

*([Refer to show card 05] - code only one – if multiple heater code main one)*

- (1) Gas fire (mains gas)
- (2) Gas fire (bottled gas)
- (3) Electric heater (including electric towel rails and oil filled radiators)
- (4) Open fire burning coal/wood/smokeless fuel
- (5) Enclosed fire or stove burning coal / wood / smokeless fuel
- (6) Aga or Rayburn stove (any fuel)
- (7) Radiator connected to hot water system (not the central heating system)
- (8) Other (specify).

*If [q51] is coded 4 go to [q53], else go to [q52]*

[q52] Approximately how old is this heater?

*(Lowest value is 1 year – if < 1 year code as = 1 year).*

[q53] In a typical year, which months does your household use the (insert heating type) in the (insert room)?

[q54] During these months, would your household typically use this heater...*(Running prompt)*

- (1) Every day (*Go to [q55]*)
- (2) At least once a week (*Go to [q55]*)
- (3) At least once a month (*Go to [q63] unless other rooms to cover in which case go back to question [q51]*)
- (4) Less than once a month (*Go to [q63] unless other rooms to cover in which case go back to question [q51]*)
- (5) Only in unusual circumstances e.g. if very cold weather (*Go to [q63] unless other rooms to cover in which case go back to [q51]*)

[q55] In the winter (December to February) does your household typically switch on and off this heater (if open fire, light this fire) on regular days of the week or at regular times of the day?

- (1) Yes (*To either regular days or regular times; go to [q58]*)
- (2) No (*Go to [q56]*)

*Only ask [q56] if [q55] is 2 (no regular heating pattern)*

[q56] In a typical week in the winter (December to February) how many hours would this heater be on for?

*(Numeric to 2 decimal places)*

[q57] How often is the (main heating) on at the same time at the same time as this (other heating type)?

- (1) The (main heating) is always on at the same time that this (other heating type) is on (*Go to [q64] unless other rooms to cover in which case go back to [q51]*)
- (2) The (main heating) is on for more than half of the time that this (other heating type) is on (*Go to [q64] unless other rooms to cover in which case go back to question [q51]*)
- (3) The (main heating) is on for less than half of the time that this (other heating type) is on (*Go to [q64] unless other rooms to cover in which case go back to [q51]*)

(4) The (main heating) is never on at the same time that this (other heating type) is on (Go to [q64] unless other rooms to cover in which case go back to [q51])

Ask [q58] to [q62] only for households that have said 1 (yes) to [q55] regular heating pattern

[q58] When you are heating your home every day, how many times does your household turn your (insert heating type) on (if open fire; light your fire) on a typical Monday?

(For example, if it is used once in morning and once in the evening then there are two periods. If on all day enter 1 period)

- (1) 1
- (2) 2
- (3) 3
- (4) 4
- (5) 5
- (6) 6
- (7) Don't know (spontaneous only) (Go to [q63])
- (8) None (Go to [q61])

[59] What is the (insert period – first, second etc.) time that your household turns this (insert heating type) on if open fire, lights this fire, on a Monday?

(Enter time using 24 hour clock e.g. 8pm code 20. If on all day enter 0000)

[q60] What is the (insert period – first, second etc.) time that your household turns this (insert heating type) off (if open fire; that this fire goes out}, on a Monday?

(Enter time using 24 hour clock e.g. 8pm code 20. If on all day enter 2400)

[q61] Do the times that your household uses this (heating type) change on other weekdays (Tuesday to Friday)?

- (1) Yes (repeat [q58] for Tuesday to Friday)
- (2) No
- (3) Don't know

[q62] Do the times that your household uses this (heating type) change at the weekend (Saturday and Sunday)?

- (1) Yes (*repeat [q59] for the weekend*)
- (2) No
- (3) Don't know

[q63] Do you use this heating?

*(Running prompt)*

- (1) To provide extra heat when the heating system is on
- (2) To provide heat when the heating system is not on
- (3) Both of the above
- (4) Other (specify)

*Go back to [q51] for all other rooms with supplementary heating as noted in [q50].*

*Interviewer guidance - if a portable heater is being moved from room to room need to answer for the same heater for all room.*

## Method of payment and tariffs **05 MOP and tariffs.sav**

[q64] "In the letter you were sent about this interview, you will have been asked to have ready some information on your electricity supplier and tariff. Were you able to do this?"

[q65] *(Record name of electricity supplier – if refused / not available note in response)*

[q66] *(Record name of electricity tariff – if refused / not available note in response)*

[q67] Has your household changed electricity supplier in the last twelve months?

- (1) Yes
- (2) No (*Go to [q69]*)
- (3) Don't know (*spontaneous*) (*Go to [q69]*)

[q68] What is the name of the old electricity supplier?

[q69] Are you connected to mains gas?

- (1) Yes
- (2) No (*Go to [q75]*)

Ask [q70] to [q74] *if answered 1 for [q69]*

[q70] "In the letter you were sent about this interview, you will have been asked to have ready some information on your mains gas supplier and tariff. Were you able to do this?"

[q71] *(Record name of gas supplier – if refused / not available note in response)*

[q72] *(Record name of gas tariff – if refused / not available note in response)*

[q73] Has your household changed gas supplier in the last twelve months?

- (1) Yes
- (2) No (*Go to* [q75])
- (3) Don't know (spontaneous) (*Go to* [q75])

[q74] What is the name of the old gas supplier?

[q75] Does your household use any of the following types of fuel for heating your home, heating water, or for cooking?

([Refer to show card 05] - *code all that apply*)

- (1) Heating Oil
- (2) House Coal
- (3) Smokeless fuel / coke
- (4) Anthracite
- (5) Wood
- (6) Bulk LPG
- (7) Bottled LPG / Calor gas
- (8) Kerosene / Paraffin
- (9) Other (please specify)
- (10) None used (*Go to* [q77])

*Ask question [q76] for each fuel type in [q75]*

[q76] On average, how much does your household spend on (*insert fuel type*) per year? Please include any delivery or standing charges).

[Refer to show card 06]

- (1) Nothing (fuel is obtained or provided free)
- (2) Less than £100
- (3) £100 to £299
- (4) £300 to £499

- (5) £500 to £699
- (6) £700 to £899
- (7) £900 to £1099
- (8) £1100 to £1299
- (9) £1300 to £1499
- (10) £1500 to £1699
- (11) £1700 to £1899
- (12) £1900 to £2099
- (13) More than £2100 . . . (please specify)
- (14) Don't know or refused (spontaneous)

## Overheating and cooling 06 Overheating and cooling.sav

[q77] During a typical winter (December to February), can you normally keep comfortably warm in your living room?

- (1) Yes (*Go to [q79]*)
- (2) No
- (3) Don't know (*Go to [q79]*)

Ask [q78] if answered 2 for [q77]

[q78] Is this because...

- (1) It costs too much to keep your heating on
- (2) OR because it is not possible to heat the room to a comfortable standard
- (3) BOTH of the above (spontaneous only)
- (4) Neither

[q79] During a typical summer (June to August), do you find it difficult to keep any of these rooms comfortably cool?

*(Code all that apply)*

- (1) Main living room
- (2) Main bedroom
- (3) Other bedrooms
- (4) Other rooms (specify)
- (5) None of the above (*Go to [q82]*)

[q80] Why is this/these room(s) difficult to keep comfortably cool?

*([Refer to show card 07] – code all that apply)*

- (1) Inadequate ventilation through windows

- (2) Too much heat from internal sources
- (3) Poor air circulation around the home
- (4) Little or no shade/tree coverage around home
- (5) Inadequate blinds/curtains to keep direct sunlight out
- (6) Other (please specify)

[q81] In a typical summer (June to August) how often do this/these rooms get uncomfortably hot?

- (1) Every day
- (2) 5 - 6 days a week
- (3) 1 - 4 days a week
- (4) Less than once a week
- (5) Don't know (spontaneous only)

[q82] Does your household use any of the following to keep your home cool?

[Refer to show card 08]

- (1) Portable fans
- (2) Other fixed fans e.g. ceiling fans
- (3) Fixed Air conditioning
- (4) Portable air-conditioning units
- (5) None of these

*Ask question [q83] for each cooling appliance from [q82]*

[q83] In a typical summer (June to August), how often does your household use (*insert type of cooler from [q82]*) to help keep your home cool?

- (1) Every day
- (2) 5-6 days a week
- (3) 1-4 days a week
- (4) Less than once a week
- (5) Don't know (spontaneous only)

## Cooking and appliances 07 Cooking and appliances.sav

[q84] Could you please tell me how many of the following you have in your home? If an appliance is not working please do not include it.

( [Refer to show card 09] – *allow for multiple appliances*)

- (1) Combined washing machine and tumble drier
- (2) Automatic washing machine
- (3) Other type of washing machine
- (4) Separate tumble dryer
- (5) Dishwasher
- (6) Fridge-freezer (with large freezer)
- (7) Separate fridge (with small 'ice box' freezer)
- (8) Separate fridge (without a small 'ice box' freezer)
- (9) Separate freezer

*Ask questions [q85] to [q87] if coded 1, 2 or 3 (washing machine) in [q84]*

[q85] How old is your washing machine/washer-dryer?

( [Refer to show card 10] - *If multiple appliances then choose the one that is used most often*)

- (1) Less than 1 year old
- (2) At least 1 but less than 2 years old
- (3) At least 2 but less than 4 years old
- (4) At least 4 but less than 6 years old
- (5) At least 6 but less than 8 years old
- (6) At least 8 but less than 10 years old
- (7) 10 years old or more
- (8) Don't know/cannot estimate (spontaneous only)

[q86] On average, how many loads of washing does your household do (from all washing machines)?

*(Clarify is answer is: (1) per week (2) per fortnight (3) per month)*

[q87] Typically, what temperature does your household run your washing machine(s) at?

- (1) 20 degrees or less
- (2) 30 degrees
- (3) 40 degrees
- (4) 50 degrees
- (5) 60 degrees
- (6) 70 degrees
- (7) 80 degrees
- (8) 90 degrees
- (9) Other ...( please state)
- (10) Don't know (spontaneous)

Ask [q88] to [q90] if coded 4 (separate tumble dryer) in [q84]

[q88] How old is your tumble dryer?

( [Refer to show card 10] - *If multiple appliances then choose the one that is used most often*)

- (1) Less than 1 year old
- (2) At least 1 but less than 2 years old
- (3) At least 2 but less than 4 years old
- (4) At least 4 but less than 6 years old
- (5) At least 6 but less than 8 years old
- (6) At least 8 but less than 10 years old
- (7) 10 years old or more
- (8) Don't know/cannot estimate (spontaneous only)

[q89] Thinking about the winter months (December to February), how many times does your household use the tumble dryer(s)?

*(Clarify is answer is: (1) per week (2) per fortnight (3) per month)*

[q90] Thinking about the summer months (June to August), how many times does your household use the tumble dryer(s)?

*(Clarify is answer is: (1) per week (2) per fortnight (3) per month)*

Ask [q91] and [q92] if coded 5 (dishwasher) in [q84]

[q91] How old is your dishwasher?

([Refer to show card 10] - *If multiple appliances then choose the one that is used most often*)

- (1) Less than 1 year old
- (2) At least 1 but less than 2 years old
- (3) At least 2 but less than 4 years old
- (4) At least 4 but less than 6 years old
- (5) At least 6 but less than 8 years old
- (6) At least 8 but less than 10 years old
- (7) 10 years old or more
- (8) Don't know/cannot estimate (spontaneous only)

[q92] How many times does your household use your dishwasher?

(Clarify is answer is: (1) per week (2) per fortnight (3) per month)

Ask [q93] if coded 6 (fridge-freezer) in [q84]

[q93] How old is your fridge-freezer?

([Refer to show card 10] - *If multiple appliances then choose the one that is used most often*)

- (1) Less than 1 year old
- (2) At least 1 but less than 2 years old
- (3) At least 2 but less than 4 years old
- (4) At least 4 but less than 6 years old
- (5) At least 6 but less than 8 years old
- (6) At least 8 but less than 10 years old
- (7) 10 years old or more
- (8) Don't know/cannot estimate (spontaneous only)

Ask [q94] if coded 7 or 8 (separate fridge) in [q84]

[q94] How old is your fridge?

( [Refer to show card 10] - *If multiple appliances then choose the one that is used most often*)

- (1) Less than 1 year old
- (2) At least 1 but less than 2 years old
- (3) At least 2 but less than 4 years old
- (4) At least 4 but less than 6 years old
- (5) At least 6 but less than 8 years old
- (6) At least 8 but less than 10 years old
- (7) 10 years old or more
- (8) Don't know/cannot estimate (spontaneous only)

Ask [q95] if coded 9 (separate freezer) in [q84]

[q95] How old is your freezer?

( [Refer to show card 10] - *If multiple appliances then choose the one that is used most often*)

- (1) Less than 1 year old
- (2) At least 1 but less than 2 years old
- (3) At least 2 but less than 4 years old
- (4) At least 4 but less than 6 years old
- (5) At least 6 but less than 8 years old
- (6) At least 8 but less than 10 years old
- (7) 10 years old or more
- (8) Don't know/cannot estimate (spontaneous only)

### **Cookers and microwaves**

[q96] Please look at the card and tell me which of the following you have in your home? If an appliance is not working please do not include it

( [Refer to show card 11] -*A normal standard cooker will have an oven, a hob and a grill as part of it so you should code 'yes' to all three of these*)

- (1) Oven (not part of an Aga or Rayburn style "range" cooker)
- (2) Hob (not part of an Aga or Rayburn style "range" cooker)
- (3) Grill (including plug in "George foreman" type grill)
- (4) Aga or Rayburn style "range" cooker
- (5) Microwave

Ask [q97] and [q98] if coded 1 in [q96]

[q97] How old is your oven? If it is second-hand please give me an estimate of the total age

( [Refer to show card 10] - *If multiple appliances then choose the one that is used most often*)

- (1) Less than 1 year old
- (2) At least 1 but less than 2 years old
- (3) At least 2 but less than 4 years old
- (4) At least 4 but less than 6 years old
- (5) At least 6 but less than 8 years old
- (6) At least 8 but less than 10 years old
- (7) 10 years old or more
- (8) Don't know/cannot estimate (spontaneous only)

[q98] Does the oven use...

- (1) Gas
- (2) Electricity
- (3) Solid fuel
- (4) Oil
- (5) LPG/calor gas
- (6) Other fuel (state)
- (7) Don't know (spontaneous)

Ask [q99] if coded 2 (hob) in [q96]

[q99] Do the rings/burners of the hob use

*(Code 1 only)*

- (1) Mains gas
- (2) Electricity
- (3) Both gas and electricity
- (4) LPG/calor gas
- (5) Don't know

*Ask [q100] if coded 3 (grill) in [q96]*

[q100] Does the grill use...

- (1) Mains gas
- (2) Electricity
- (3) Solid fuel
- (4) Oil
- (5) LPG/calor gas
- (6) Other fuel (state)
- (7) Don't know

*Ask [q101] if coded 4 (aga) in [q96]*

[q101] Does the Aga / Rayburn cooker use...

- (1) Mains gas
- (2) Electricity
- (3) Solid fuel
- (4) Oil
- (5) LPG/calor gas
- (6) Other fuel (state)
- (7) Don't know

*Ask question [q102] for each of the components asked in [q96].*

[q102] In a typical week how many times would your household use the (insert appliance) for cooking or reheating a meal?

[Refer to show card 12]

- (1) Never
- (2) 1 or 2 times a week
- (3) 3 or 4 times a week
- (4) 5 or 6 times a week
- (5) 7 or 8 times a week
- (6) 9 or 10 times a week
- (7) 11 or 12 times a week
- (8) 12 or more times a week

### **Televisions and other leisure equipment**

[q103] How many televisions (not including portable TVs) do you have in your home?

*Loop through [q104] to [q108] for up to three televisions.*

*[First loop] "Beginning with the TV which is used the most by your household..."*

*[Second loop] "And now the TV which your household uses the second most ..."*

*[Third loop] "And now the TV which your household uses the third most..."*

[q104] What type of TV is it?

( [Refer to show card 13] - *If flat screen LCD – uncertain of type code standard*)

- (1) Standard (CRT)
- (2) Flat screen LCD – Standard
- (3) Flat screen LCD – LED
- (4) Flat screen plasma
- (5) Flat screen unsure of type

[q105] How big is the screen (measured from the bottom left-hand corner to the top right-hand corner)?

[Refer to show card 14]

- (1) Small (less than 19")
- (2) Medium (between 19" and 30")
- (3) Large (between 31" and 42")
- (4) Very large (greater than 42")

[q106] How many hours a day would this TV be on for on a typical weekday (For somebody to watch/play games etc....not just on standby)?

[q107] How many hours a day would this TV be on for on a typical Saturday (For somebody to watch/play games etc....not just on standby)?

[q108] How many hours a day would this TV be on for on a typical Sunday (For somebody to watch/play games etc....not just on standby)?

[q109] Please look at the card and tell me which, if any, of these items your household has in your home

([Refer to show card 15] – *allow multicode*)

- (1) Barbecue
- (2) Patio heater
- (3) Chiminea
- (4) Electric or petrol lawnmower
- (5) Greenhouse heaters
- (6) Heated swimming pool
- (7) Heated Jacuzzi or Hot tub
- (8) Sauna
- (9) Heavy workshop machinery
- (10) Pottery Kiln

Ask [q110] and [q111] for each of the appliances coded in [q109]

[q110] What fuel does (*insert appliance*) run on or how is it powered?

[Refer to show card 16]

- (1) Mains electricity
- (2) Mains gas
- (3) Wood
- (4) Solid fuel (coal, coke, charcoal)
- (5) Oil
- (6) LPG/Calor gas
- (7) Paraffin
- (8) Petrol/diesel
- (9) Solar
- (10)None – manual
- (11)Don't know (spontaneous only)

[q111] In a typical year, how often would your household use this item?

*(For heated swimming pools we are interested in how many days the pool is heated)*

- (1) Less than 5 days per year
- (2) 5 to 10 days per year
- (3) 11 to 20 days per year
- (4) 21 to 50 days per year
- (5) More than 50 days per year

## Lighting 08 Lighting.sav

Ask [q112] to [q119] for living room, main bedroom, kitchen in turn. For open plan arrangements treat as one room. A set of lights is a group of lights that are all turned on by flicking one switch.

[q112] How many different individual lights or sets of lights are there in your (*insert room*)? Please include table lamps or any other electrically powered lights.

- (1) 1
- (2) 2
- (3) 3
- (4) 4
- (5) 5
- (6) 6
- (7) 7
- (8) Room not lit – *go to next room*

Ask [q113] to [q119] for each set of lights in turn identified in [q112]

[q113] How many bulbs are in (*insert set 1, set 2 etc.*)?

[q114] What types of bulbs are in (*insert set 1, set 2 etc.*)?

[Refer to show card 17]

- (1) Ordinary bulb (standard tungsten bulb)
- (2) Low energy CFL bulb
- (3) Low energy LED
- (4) Low energy – unknown type
- (5) Halogen bulb
- (6) Fluorescent strip
- (7) Mix of different types of bulb
- (8) Don't know (spontaneous only)

*Do not ask [q115] for first set of lights.*

[q115] Thinking now about (*insert set 2, set 3 etc.*) are they usually on for about the same amount of time as any of the previous sets or are they completely different?

- (1) Same as 1<sup>st</sup> set (*do not ask [q116] to [q119] for this set of lights*)
- (2) Same as 2<sup>nd</sup> set (*do not ask [q116] to [q119] for this set of lights*)
- (3) Same as 3<sup>rd</sup> set (*do not ask [q116] to [q119] for this set of lights*)
- (4) Same as 4<sup>th</sup> set (*do not ask [q116] to [q119] for this set of lights*)
- (5) Same as 5<sup>th</sup> set (*do not ask [q116] to [q119] for this set of lights*)
- (6) Same as 6<sup>th</sup> set (*do not ask [q116] to [q119] for this set of lights*)
- (7) Completely different (*repeat [q116] to [q119] for this set of lights*)

[q116] During a typical summer (June to August) when the evenings are brighter, how many hours is this set of lights on for on a typical weekday?

[q117] And during a typical summer (June to August), how many hours is this set of lights on for on a typical Saturday or Sunday?

[q118] During a typical winter (December to February) when the evenings are darker, how many hours is this set of lights on for on a typical weekday?

[q119] And during a typical winter (December to February) how many hours is this set of lights on for on a typical Saturday or Sunday?

### **Overnight lights**

[q120] Are there any lights inside the house (including corridors, halls and landings) that are typically left on overnight? (*for flats do not include lights in common areas of the building*)

- (1) Yes
- (2) No – (*Go to [q124]*)

[q121] Which rooms are typically lit overnight (*use rooms from question [q04]*)?

Ask [q122] and [q123] for each room mentioned in [q121].

[q122] How many bulbs are in this or these lights?

[q123] What type of bulbs are in this or these lights?

[Refer to show card 17]

- (1) Ordinary bulb (standard tungsten bulb)
- (2) Low energy CFL bulb
- (3) Low energy LED
- (4) Low energy – unknown type
- (5) Halogen bulb
- (6) Fluorescent strip

- (7) Mix of different types of bulb
- (8) Don't know (spontaneous only)

### External lights

[q124] Are there any lights outside of your home that are powered from your electricity supply?

- (1) Yes
- (2) No – (*Go to [q128]*)

[q125] How many bulbs (in total) are there in this or these lights?

[q126] What type of bulbs are in this/these lights?

[Refer to show card 17]

- (1) Ordinary bulb (standard tungsten bulb)
- (2) Low energy CFL bulb
- (3) Low energy LED
- (4) Low energy – unknown type
- (5) Halogen bulb
- (6) Fluorescent strip
- (7) Mix of different types of bulb
- (8) Don't know (spontaneous only)

[q127] How are these lights controlled? Do they....

*(Allow multicode)*

- (1) Have a sensor so they come on when it is dark
- (2) Have a movement sensor so they only come on when someone/something comes near
- (3) Have a timer so they go on and off at set times
- (4) You switch them on and off when you need to
- (5) Permanently on
- (6) Other...specify

## Hot water use 09 Hot water.sav

[q128] How many baths does your household take in a typical week?

[q129] How many showers does your household take in a typical week?

Ask [q130] if [q129] is greater than zero.

[q130] What type of shower does your household use most often?

[Refer to show card 18]

- (1) Electric shower
- (2) Shower drawn through a hose attached to the bath taps
- (3) Non electric stand-alone shower

[q131] How often does your household wash up at the sink?

- (1) Never
- (2) 1-3 times per week
- (3) 4-6 times per week
- (4) 7-9 times per week
- (5) 10-13 times per week
- (6) 14-17 times per week
- (7) 18-20 times per week
- (8) 21-24 times per week
- (9) More than 25 times per week

[q132] Do you have an electric immersion heater?

- (1) Yes
- (2) No (*Go to* [q135])
- (3) Don't know (*Go to* [q135])

[q133] How often does your household use the electric immersion heater in a typical week in the winter (December to February)?

- (1) Every day
- (2) 5-7 days per week
- (3) 3-4 days per week
- (4) 1-2 days per week
- (5) Less than once per week
- (6) Never

[q134] How often do you use the electric immersion heater in a typical week in the summer (June to August)?

- (1) Every day
- (2) 5-7 days per week
- (3) 3-4 days per week
- (4) 1-2 days per week
- (5) Less than once per week
- (6) Never

## Conservatories 10 Conservatories.sav

[q135] Is there a conservatory in this dwelling?

- (1) Yes
- (2) No – (Go to [q153])

Ask [q136] to [q152] if answered 1 to [q135], if 2 go to [q153]

[q136] Which room does the conservatory open into?

*(If it opens into more than one room record the entrance that is used most often. If more than one conservatory then ask about the one which is used most often. Use list of rooms from [q04] excluding conservatory)*

[q137] Is there a door or doors that can be closed between the conservatory and the *(insert room mentioned in [q136])*?

- (3) Yes
- (4) No – (Go to [q144])
- (5) Don't know (spontaneous only) (Go to [q144])

[q138] On a typical day in the winter (December to February) how long is the door between the conservatory and the *(insert room mentioned in [q136])* left open?

- (1) Open 24 hours per day
- (2) Open for 18 to 24 hours per day
- (3) Open for 12 to 18 hours per day
- (4) Open for 6 to 12 hours per day
- (5) Open for less 6 hours per day
- (6) Only opened and shut when someone enters or leaves the conservatory (Go to [q142])
- (7) Shut all day (Go to [q142])
- (8) Don't know (spontaneous only)

[q139] On a typical day in the summer (June to August) how long is the door between the conservatory and the *(insert room)* left open?

- (1) Open 24 hours per day
- (2) Open for 18 to 24 hours per day
- (3) Open for 12 to 18 hours per day
- (4) Open for 6 to 12 hours per day
- (5) Open for less 6 hours per day
- (6) Only opened and shut when someone enters or leaves the conservatory (*Go to [q142]*)
- (7) Shut all day (*Go to [q142]*)
- (8) Don't know (spontaneous only)

Ask [q140] if coded 1, 2, 3, 4, 5, or 8 for [q138]

[q140] Generally, why is the door left open in winter (December to February)?

([Refer to show card 19]- *Allow multicode*)

- (1) Convenience
- (2) Children/others don't close it
- (3) Makes (insert room) bigger/feel bigger or more spacious
- (4) Makes (insert room) lighter
- (5) Makes (insert room) warmer
- (6) Let the heat from the (insert room) go into the conservatory
- (7) Let the heat from the conservatory go into the (insert room)
- (8) Other (please specify)

Ask [q141] if coded 1, 2, 3, 4, 5, 8 for [q139]

[q141] Generally, why is the door left open in summer (June to August)?

([Refer to show card 19]- *Allow multicode*)

- (1) Convenience
- (2) Children/others don't close it
- (3) Makes (*insert room*) bigger/feel bigger or more spacious
- (4) Makes (*insert room*) lighter
- (5) Makes (*insert room*) warmer
- (6) Let the heat from the (*insert room*) go into the conservatory

- (7) Let the heat from the conservatory go into the (*insert room*)
- (8) Other (please specify)

Ask [q142] if coded 6 or 7 for [q138]

[q142] Why is the door generally kept closed in winter (December to February)?

([Refer to show card 20]- *Allow multicode*)

- (1) Security
- (2) Peace and quiet
- (3) Stop children/animals/others going in there
- (4) To keep heat in the (*insert room*) (including stopping draughts from the conservatory)
- (5) To prevent the (*insert room*) getting too warm
- (6) To prevent the (*insert room*) getting too bright/avoid glare
- (7) Habit/used to having a door there
- (8) Other (please specify)

Ask [q143] if coded 6 or 7 for [q139]

[q143] Why is the door generally kept closed in summer (June to August)?

([Refer to show card 20]- *Allow multicode*)

- (1) Security
- (2) Peace and quiet
- (3) Stop children/animals/others going in there
- (4) To keep heat in the (*insert room*) (including stopping draughts from the conservatory)
- (5) To prevent the (*insert room*) getting too warm
- (6) To prevent the (*insert room*) getting too bright/avoid glare
- (7) Habit/used to having a door there
- (8) Other (please specify)

[q144] How many days a week would your household use (*stay in there for at least half an hour*) the conservatory during a typical summer (June to August)?

- (1) Less than 1 day a week (*Go to [q148]*)
- (2) 1 day a week
- (3) 2 days a week
- (4) 3 days a week
- (5) 4 days a week
- (6) 5 days a week
- (7) 6 days a week
- (8) 7 days a week

[q145] How many days a week would your household use (*stay in there for at least half an hour*) the conservatory during a typical winter (December to February)?

- (1) Less than 1 day a week (*Go to [q148]*)
- (2) 1 day a week
- (3) 2 days a week
- (4) 3 days a week
- (5) 4 days a week
- (6) 5 days a week
- (7) 6 days a week
- (8) 7 days a week

*Skip [q146] if answered 1 for [q144]*

[q146] What times of the day is the conservatory typically used in the summer?

([Refer to show card 21] – code all that apply)

- (1) Morning (6am- 12pm)
- (2) Afternoon (12pm – 6pm)
- (3) Evening (6pm – 12am)
- (4) Overnight (12am – 6am)

*Skip [q147] if answered 1 for [q145]*

[q147] What times of the day is the conservatory typically used in the winter?

([Refer to show card 21] – code all that apply)

- (1) Morning (6am- 12pm)
- (2) Afternoon (12pm – 6pm)
- (3) Evening (6pm – 12am)
- (4) Overnight (12am – 6am)

[q148] How is the conservatory heated?

[Refer to show card 22] *(If there is more than one system choose the one that is used most often)*

- (1) Radiator connected to central heating
- (2) Underfloor heating connected to central heating
- (3) Electric storage heater
- (4) Electric underfloor heating
- (5) Other type of electric heater or fire (not storage heater or underfloor)
- (6) Mains gas heater or fire
- (7) Coal / smokeless fuel / solid fuel fire or stove
- (8) Bottled gas or LPG heater or fire
- (9) No heating (*Go to [q153]*)
- (10) Other (please specify)
- (11) Don't know (spontaneous) (*Go to [q153]*)

[q149] How often is the conservatory heated in the winter (December to February)?

[Refer to show card 23]

- (1) Every day - over 7hrs per day
- (2) Every day - less than 7hrs per day
- (3) At least one day a week
- (4) At least one day a month
- (5) Never
- (6) Don't know (spontaneous only)

[q150] How often is the conservatory heated in the summer (June to August)?

[Refer to show card 23]

- (1) Every day - over 7hrs per day
- (2) Every day - less than 7hrs per day
- (3) At least one day a week
- (4) At least one day a month
- (5) Never
- (6) Don't know (Spontaneous)

*If answered 1, 2, 3 or 4 for [q149] ask [q151]*

[q151] What temperature is the conservatory heated to in the winter (December to February)?

[Refer to show card 24]

- (1) Warmer than the rest of the house
- (2) The same temperature as the rest of the house
- (3) Cooler than the rest of the house
- (4) Just above freezing, for frost protection only-
- (5) Don't know (spontaneous)

*If answered 1, 2, 3 or 4 for [q150] ask [q152]*

[q152] What temperature is the conservatory heated to in the summer (June to August)?

[Refer to show card 24]

- (1) Warmer than the rest of the house
- (2) The same temperature as the rest of the house
- (3) Cooler than the rest of the house
- (4) Just above freezing, for frost protection only
- (5) Don't know (spontaneous)

## Dwelling improvements 11 Dwelling improvements.sav

[q153] Have there been any of these changes carried out to your home since the English Housing Survey surveyor visited this property?

[Refer to show card 25]

- (1) Extension
- (2) Loft conversion
- (3) Loft insulation
- (4) Cavity wall insulation
- (5) Solid wall insulation
- (6) Changed type of heating system
- (7) New boiler
- (8) Replacement of external doors and windows
- (9) New conservatory
- (10) None of these

*Ask [q154] to [q157] only if answered 1, 2 or 3 (homeowners) for [q01]. Also do not ask [q154] if answered 2 or 3 in [q153].*

[q154] How likely are you to install new loft insulation in the next three years?

[Refer to show card 26]

- (1) Very unlikely
- (2) Unlikely
- (3) Neither likely nor unlikely
- (4) Likely
- (5) Very likely
- (6) Don't know/Not suitable

*Do not ask [q155] if answered 7 for [q153].*

[q155] How likely are you to install a new energy efficient boiler in the next three years?

[Refer to show card 26]

- (1) Very unlikely
- (2) Unlikely
- (3) Neither likely nor unlikely
- (4) Likely
- (5) Very likely
- (6) Don't know/Not suitable

*Do not ask [q156] if answered 4 for [q153].*

[q156] How likely are you to install cavity wall insulation in the next three years?

[Refer to show card 26]

- (1) Very unlikely
- (2) Unlikely
- (3) Neither likely nor unlikely
- (4) Likely
- (5) Very likely
- (6) Don't know/Not suitable

*Do not ask [q157] if answered 5 for [q153].*

[q157] How likely are you to install solid wall insulation in the next three years?

([Refer to show card 26])

- (1) Very unlikely
- (2) Unlikely
- (3) Neither likely nor unlikely
- (4) Likely
- (5) Very likely
- (6) Don't know/Not suitable

[q158] If fuel prices were to rise by 10% would you be more likely to...:

- (1) Carry on using energy in your home in the same way, and pay the extra
- (2) Try to cut down on the amount of energy used in the home (*Go to [q161]*)
- (3) Don't know

[q159] If fuel prices were to rise by 30% would you be more likely to...

- (1) Carry on using energy in your home in the same way, and pay the extra (*Go to [q161]*)
- (2) Try to cut down on the amount of energy used in the home
- (3) Don't know

[q160] Which of these would you try to cut down the use of?

(*Allow multicode*):

- (1) Room heating
- (2) Water heating
- (3) Household appliances
- (4) Cooking appliances
- (5) Lighting
- (6) Don't know (spontaneous only)

[q161] Turning to your views on climate change, how concerned, if at all, are you about climate change, sometimes referred to as 'global warming'?

[Refer to show card 27]

- (1) Very concerned
- (2) Fairly concerned
- (3) Not very concerned
- (4) Not at all concerned
- (5) No opinion/not stated (spontaneous)

[q162] Thinking now about the causes of climate change, which one of the following statements best describes your own opinion?

[Refer to show card 28]

- (1) I think climate change is entirely the result of human activity
- (2) I think climate change is largely the result of human activity
- (3) I think climate change is roughly equally the result of human activity and natural processes
- (4) I think climate change is largely the result of natural processes but partly because of human activity
- (5) I think climate change is entirely the result of natural processes
- (6) I do not believe in climate change
- (7) I don't know (spontaneous)

[q163] To what extent do you agree or disagree with the following statements?

([Refer to show card 29] *Agree strongly, tend to agree, neither agree nor disagree, tend to disagree, disagree strongly*)

- (1) The Government is taking sufficient action to tackle climate change
- (2) People say they're concerned but at the end of the day they're not prepared to make big sacrifices for the environment
- (3) In my area, trying to reduce your carbon footprint is the 'normal' thing to do
- (4) It would embarrass me if my friends thought my lifestyle was purposefully environmentally friendly
- (5) Being green is an alternative lifestyle – it's not for the majority
- (6) I find it hard to change my habits to be more environmentally-friendly
- (7) It's not worth me doing things to help the environment if others don't do the same

(8) Investment in energy efficiency and renewable energy is a good way to boost the local economy

[q164] How often, if at all, do you personally do any of the following?

([Refer to show card 30] - *Always, very often, quite often, occasionally, Never, DK, N/A*)

- (1) Avoid flying
- (2) Switch off lights when you are not in the room
- (3) Boil the kettle with more water than you are going to use
- (4) Leave your TV or PC on standby for long periods of time
- (5) Run the dishwasher only when it's full
- (6) Leave a mobile phone charger switched on at the socket when not in use
- (7) Wash clothes at 30 degrees or lower
- (8) Make your own compost
- (9) Recycle
- (10) Drive in a fuel efficient way

[q165] Thinking now about your overall attitudes towards energy usage and climate change, which of these statements best reflects how you currently feel?

([Refer to show card 31] – *single code only*)

- (1) I don't believe there are climate change problems caused by energy use and I'm not willing or able to change my behaviour with regards to energy use
- (2) Whether there are climate change issues or not, I am not willing or able to change my behaviour with regards to energy use
- (3) Climate change is caused by energy use and I'm beginning to think that I should do something
- (4) Climate change is caused by energy use and I'm doing a few small things to help reduce my energy use and emissions
- (5) Climate change is caused by energy use and I'm doing quite a number of things to help reduce my energy use and emissions
- (6) Climate change is caused by energy use and I'm doing lots of things to help reduce my energy use and emissions
- (7) Don't know (Spontaneous)

## Household information **12 Household information.sav**

The majority of this section will only be asked when the household has changed since the earlier EHS interview.

### Composition

*Ask questions [q166] to [q180] if answered 'no' for question [q03] others go to [q181]*

[q166] Please can you tell me the total number of people in your household including yourself? Only include those who normally live at this address.

*Ask [q167] to [170] for each person in the house.*

[q167] What is the sex of (*insert person 1, 2, 3 etc.*)

[q168] What is the age of (*insert person 1, 2, 3 etc.*)

*If exact age is refused or unknown in [q168], ask [q169]*

[q169] Which age band does (*insert person 1, 2, 3 etc.*)fit into?

- (1) Under 5
- (2) 5 – 10
- (3) 11 – 15
- (4) 16 – 24
- (5) 25 – 34
- (6) 35 - 44
- (7) 45 – 54
- (8) 55 – 64
- (9) 65 - 69
- (10)70 – 74
- (11)75+

(12)Refused

[q170] Whether the accommodation is owned or rented in the name of (*insert person 1, 2, 3 etc.*)

*Ask question [q171] if there is more than 1 joint householder*

[q171] Which of you who jointly own/rent the property has the highest income or do you see as the chief income earner?

*(If they cannot say/refuse then take the oldest person, this person is defined as the Household Reference Person (HRP)).*

*Ask question [q172] if there are more than 2 people in the household*

[q172] Ask relationship between each person in household (e.g. Relationship between person 1 and 3 etc.). The following options are available:

1. Spouse
2. Cohabitee
3. Son/daughter (include adopted)
4. Step-son / daughter
5. Foster child
6. Son in law/daughter in law
7. Parent / guardian
8. Step parent
9. Foster parent
10. Parent in law
11. Brother / sister (include adopted)
12. Step-brother / sister
13. Foster-brother / sister
14. Brother / sister in law
15. Grand-child
16. Grand parent
17. Other relative
18. Other non-relative
19. Civil Partner
20. Not answered/Refused

### **Income and benefits**

*Ask questions [q173] to [q180] for the HRP and partner only and separately.*

[q173] Looking at this card, how would you (HRP) describe your Employment Status?

([Refer to show card 32] - *Code all that apply for the HRP*)

- (1) Working: 30 hours a week or more
- (2) Less than 30 hours a week
- (3) Government Training Scheme
- (4) Not working because of long term sickness or disability
- (5) Registered unemployed
- (6) Not registered unemployed but seeking work
- (7) At home/not seeking work (including looking after the home or family)
- (8) Retired (including retired early)
- (9) Full-time student
- (10) Other (Spontaneous)

[q174] Looking at this card, how would you (partner) describe your Employment Status?

([Refer to show card 32] - *Code all that apply for the Partner*)

- (1) Working: 30 hours a week or more
- (2) Less than 30 hours a week
- (3) Government Training Scheme
- (4) Not working because of long term sickness or disability
- (5) Registered unemployed
- (6) Not registered unemployed but seeking work
- (7) At home/not seeking work (including looking after the home or family)
- (8) Retired (including retired early)
- (9) Full-time student
- (10) Other (Spontaneous)

[q175] This card shows various possible sources of income. Can you (HRP) please tell me which kinds of income you personally receive?

([Refer to show card 33] - *Code all that apply for the HRP*)

- (1) Earnings from employment

- (2) Earnings from self-employment
- (3) Pension from former employer
- (4) Personal Pension
- (5) State Pension
- (6) State Benefits
- (7) Interest from savings/investments
- (8) Other kinds of regular allowance from outside the household
- (9) Income from rent
- (10) Other sources
- (11) No source of income

[q176] This card shows various possible sources of income. Can you (partner) please tell me which kinds of you personally receive?

([Refer to show card 33] - *Code all that apply for the partner*)

- (1) Earnings from employment
- (2) Earnings from self-employment
- (3) Pension from former employer
- (4) Personal Pension
- (5) State Pension
- (6) State Benefits
- (7) Interest from savings/investments
- (8) Other kinds of regular allowance from outside the household
- (9) Income from rent
- (10) Other sources
- (11) No source of income

*'Now I would like to ask you about receipt of state benefits and allowances that you/and your partner receive...'*

[q177] Are you or your partner receiving any state benefits or allowances shown on this card?

([Refer to show card 34] - *Code all that apply (If they said no to benefits in question [q175] or [q176] still probe them on this question.)*)

- (1) Income support
- (2) Job-seekers allowance contribution based (satisfy national insurance contributions, payable for a maximum of six months)
- (3) Job-seekers allowance income based (registered unemployed for 6 months or more or do not qualify for contribution based)

- (4) Pension credit
- (5) N.I. retirement pension
- (6) Working Tax Credit
- (7) Child Tax Credit
- (8) Child benefit
- (9) Income-related Employment and Support Allowance
- (10) Contributions based Employment and Support Allowance
- (11) Incapacity benefit
- (12) Housing Benefit or Local Housing Allowance
- (13) Council Tax Benefit
- (14) None of these

[q178] And do you or your partner receive any of the following ....

([Refer to show card 35] - Code all that apply (If they said no to benefits in question [q175] or [q176] question still asked .)

- (1) Maternity Allowance
- (2) Widows/Widowers Pension, Bereavement Allowance or Widowed Parents (formerly Widowed Mothers) Allowance and War Widows pension
- (3) War disablement pension
- (4) Severe Disablement Allowance
- (5) Industrial Injuries disablement benefit
- (6) Attendance allowance
- (7) Carers Allowance
- (8) Disability living allowance: mobility
- (9) Disability living allowance: care
- (10) Statutory sick pay
- (11) A disability premium with your Income Support/Housing benefit
- (12) Any other disability benefit
- (13) None of these

[q179] Thinking of the income sources you (HRP) have mentioned, what is your total personal income before deductions for income tax, National Insurance etc.

([Refer to show card 36] – code for HRP)

[q180] Thinking of the income sources you (partner) have mentioned, what is your total personal income before deductions for income tax, National Insurance etc.

([Refer to show card 36] – *code for partner*)

### **Changes to benefits**

*Ask questions [q181] to [q185] if answered 'yes' for question [q03]*

[q181] Since our last interview are you or your partner now receiving additional benefits or no longer receiving a particular benefit?

- (1) Yes – now receive a benefit
- (2) Yes – no longer receive a benefit
- (3) Yes – both
- (4) No change
- (5) Don't know (spontaneous)

*Ask question [q182] and [q183] if coded 1 or 3 to question [q181]*

[q182] Could you please indicate which additional benefits you and your partner now receive?

[Refer to show card 34]

[q183] And do you or your partner now receive any of the following, which you did not previously?

[Refer to show card 35]

*Ask question [q184] and [q185] if coded 2 or 3 to question [q181]*

[q184] Could you please indicate which benefits you are no longer receiving?

[Refer to show card 34]

[q185] And do you or your partner no longer receive any of the following?

[Refer to show card 35]

### **Changes to income**

*Ask questions [q186] and [q187] if answered 'yes' for question [q03]*

[q186] Since our last EHS interview (*insert EHS interview date from external data provided by BRE*) has there been a significant change in you or your partners, income from employment? (A significant change being more than £20 a week or £80 a month or £1,000 a year)

- (1) Yes
- (2) No
- (3) Don't know (spontaneous)

*Ask question [q187] if answered 'yes' to question [q186]*

[q187] Could you please indicate the total amount of income, before tax and national insurance, of you and your partner (if you have one)? Please include all income from employment, benefits or other sources.

[Refer to show card 36]

### **Additional household earnings**

*Ask question [q188] for all households*

[q188] Apart from you and your partner (if you have one), are there any other household members who live here with you who are aged over the age of 16, who are not in full-time education?

- (1) Yes
- (2) No

*Ask question [q189] if answered 'yes' to question [q188] and if answered 'yes' to [q03]*

[q189] Since our last EHS interview has their income from employment changed significantly (a significant change being more than £20 a week or £80 a month or £1,000 a year)?

- (1) Yes
- (2) No
- (3) Don't know (spontaneous)

*Ask question [q190] if answered 1 or 3 for [q189] or if answered 'yes' to [q188] and no to [q03]*

[q190] Could you please indicate the total income received from all other adults in the household before income tax and national insurance? Please include all income from employment, benefits or other sources.

[Refer to show card 36]

## Monitoring 13 Monitoring.sav

Internal *question to interviewer*

[q191] (*Do you have any sets of temperature loggers left?*)

- (1) Yes
- (2) No (*Go to [q200]*)

*Ask questions [q192] to [q199] if answered 1 for [q191]*

[q192] Would you be prepared to take part in a survey of household temperatures? This survey involves placing three thermometers in your home which would remain there for up to 12 months. To compensate for any inconvenience this may cause you, we can offer you payment of £20; £5 now and £15 on return of the thermometers.

- (1) Yes
- (2) No (*Ask [q200]*)

[q193] to [q199] *are internal questions to the interviewer. Asked if answered 1 to [q192]*

[q193] (*Living Room logger placed successfully?*)

- (1) Yes in main living room
- (2) Yes – Other room (state) . . . .
- (3) No – No suitable location
- (4) No – Occupant refusal
- (5) No – Other . . . . (State)

[q194] (*Hallway logger placed successfully?*)

- (1) Yes in main hallway (ideal)
- (2) Yes – Other room (state) . . . .
- (3) No – No suitable location
- (4) No – Occupant refusal
- (5) No – Other . . . . (State)

[q195] (*Bedroom logger placed successfully?*)

- (1) Yes in main bedroom (ideal)
- (2) Yes – Other room (state) . . . .
- (3) No – No suitable location
- (4) No – Occupant refusal (State)
- (5) No – Other . . . . (State)

*Ask question [q200] if answered 1 (house) to [q0].*

[q200] Would you be prepared to take part in a survey of household electricity consumption? This would involve some equipment being attached close to the electricity meter which records the use of your electricity throughout each day for around 12 months and stores it. The equipment is silent and very unobtrusive. If you agree and you are selected to take part, someone would be in touch shortly to install the device and will then arrange to collect it a year from then. In recognition of the short time the installation and collection procedure will take we would give you £10 worth of high street gift vouchers when it is installed and £15 worth of high street gift vouchers when it is collected. Would you be happy to take part in this exercise?

- (1) Yes
- (2) No

*Ask [q201] to [q203] for all households*

[q201] We would also like to ask a professional meter reading company to read your electricity and gas meter (if you have one) over the next twelve months. This will be a very quick process, and exactly the same as is usually done by your gas and electricity company. This will help us understand how you use energy in your home. The information we collect will be kept secure and confidential and will not be passed to any other organisation outside of the research team. Do we have your consent to do this?

- (1) Yes
- (2) No
- (3) With qualifications (state)

[q202] It would also be very useful for us to match the information you have given to us today and in the previous surveys with information on your electricity and gas consumption and tariff from your suppliers. Do we have your consent to contact your gas and electricity supplier for this information?

- (1) Yes
- (2) No

[q203] Thank you for taking part in this survey. We might like to contact you again at some time in the future about other studies DECC or other government departments are doing. So that we can do this we would like to keep a record of your contact details. These would be kept securely, and within the rules of the Data Protection Act. We would only pass your contact details onto other research companies doing legitimate research for the government, they would never be passed to anyone else or used for commercial purposes. Would you be happy for us to keep a record of your contact details, and use them to contact you for future research?

- (1) Yes
- (2) No

## Appendix B

### *EFUS 2010-11 Interview Show cards*

#### Show card 01

- (01) Kitchen (not used for dining)
- (02) Kitchen diner
- (03) Living room
- (04) Dining room
- (05) Combined living and bedroom (bed-sit)
- (06) Bedrooms
- (07) Bathrooms with a WC
- (08) Bathrooms without a WC (including shower rooms)
- (09) Separate WCs
- (10) Conservatory
- (11) Hallway or landing
- (12) Study or home office
- (13) Other (cellars, attics, out buildings etc if habitable and with a power supply from the home)

## Show card 02

- (01) Every day
- (02) Every couple of days
- (03) At least once a week
- (04) At least once a month
- (05) Less than once a month
- (06) Never

## Show Card 03

- (01) Gas fire (mains gas)
- (02) Gas fire (bottled gas)
- (03) Electric heater (including electric towel rails and oil filled radiators)
- (04) Open fire burning coal/wood/smokeless fuel
- (05) Enclosed fire stove burning coal/wood/smokeless fuel
- (06) Aga or Rayburn stove (any fuel)
- (07) Radiator connected to hot water system (not the central heating system)
- (08) Other (please specify)

## Show card 04

- (01) Too expensive
- (02) Room stays warm enough already
- (03) Room not used/hardly ever used
- (04) No heating system in place
- (05) Heating system doesn't work
- (06) Room too small to require heating
- (07) Room too small to fit a heater inside
- (08) Other (please specify)

## Show card 05

- (01) Heating oil
- (02) House coal
- (03) Smokeless fuel/coke
- (04) Anthracite
- (05) Wood
- (06) Bulk LPG
- (07) Bottled LPG / Calor gas
- (08) Kerosene / Paraffin
- (09) Other (please specify)
- (10) None used

## Show card 06

- (01) Nothing (fuel is obtained free or provided free)
- (02) Less than £100
- (03) £100 to £299
- (04) £300 to £499
- (05) £500 to £699
- (06) £700 to £899
- (07) £900 to £1099
- (08) £1100 to £1299
- (09) £1300 to £1499
- (10) £1500 to £1699
- (11) £1700 to £1899
- (12) £1900 to £2099
- (13) More than £2100. . . (please specify)
- (14) Don't know or refused (spontaneous)

## Show card 07

- (01) Inadequate ventilation through windows
- (02) Too much heat from internal sources
- (03) Poor air circulation around the home
- (04) Little or no shade / tree coverage around the home
- (05) Inadequate blinds / curtains to keep out the direct sunlight
- (06) Other (please specify)

## Show card 08

- (01) Portable fans
- (02) Other fixed fans e.g. ceiling fans
- (03) Fixed air conditioning
- (04) Portable air conditioning units
- (05) None of these

## Show card 09

- (01) Combined washing machine and tumble dryer
- (02) Automatic washing machine
- (03) Other type of washing machine
- (04) Separate tumble dryer
- (05) Dishwasher
- (06) Fridge-freezer (with large freezer)
- (07) Separate fridge (with small 'ice box' freezer)
- (08) Separate fridge (without small 'ice box' freezer)
- (09) Separate freezer

## Show card 10

- (01) Less than 1 year old
- (02) At least 1 but less than 2 years old
- (03) At least 2 but less than 4 years old
- (04) At least 4 but less than 6 years old
- (05) At least 6 but less than 8 years old
- (06) At least 8 but less than 10 years old
- (07) 10 years old or more
- (08) Don't know/cannot estimate (spontaneous only)

## Show card 11

- (01) Oven (not part of an Aga or Rayburn style 'range' cooker)
- (02) Hob (not part of an Aga or Rayburn style 'range' cooker)
- (03) Grill (including plug-in 'George Foreman' type grill)
- (04) Aga or Rayburn style 'range' cooker
- (05) Microwave

## Show card 12

- (01) Never
- (02) 1 or 2 times a week
- (03) 3 or 4 times a week
- (04) 5 or 6 times a week
- (05) 7 or 8 times a week
- (06) 9 or 10 times a week
- (07) 11 or 12 times a week
- (08) 12 or more times a week

## Show card 13

- (01) Standard (CRT)
- (02) Flat screen LCD - Standard
- (03) Flat screen LCD - LED
- (04) Flat screen plasma
- (05) Flat screen unsure of type

## Show card 14

- (01) Small (less than 19")
- (02) Medium (between 19" and 30")
- (03) Large (between 31" and 42")
- (04) Very large (greater than 42")

## Show card 15

- (01) Barbeque
- (02) Patio heater
- (03) Chiminea
- (04) Electric or petrol lawnmower
- (05) Greenhouse heaters
- (06) Heated swimming pool
- (07) Heated Jacuzzi or Hot Tub
- (08) Sauna
- (09) Heavy workshop machinery
- (10) Pottery kiln

## Show card 16

- (01) Mains electricity
- (02) Mains gas
- (03) Wood
- (04) Solid fuel (coal, coke, charcoal)
- (05) Oil
- (06) LPG/Calor gas
- (07) Paraffin
- (08) Petrol/diesel
- (09) Solar
- (10) None – manual
- (11) Don't know (spontaneous only)

## Show card 17

- (01) Ordinary bulb (standard tungsten bulb)
- (02) Low energy - Compact fluorescent light bulbs (CFLs)
- (03) Low energy – LED
- (04) Low energy – unknown type
- (05) Halogen bulb
- (06) Fluorescent strip
- (07) Mix of different types of bulb

## Show card 18

- (01) Electric Shower
  
- (02) Shower drawn through a hose attached to the bath taps
  
- (03) Non electric stand alone shower.

## Show card 19

- (01) Convenience
- (02) Children/others don't close it
- (03) Makes connecting room bigger/feel bigger or more spacious
- (04) Makes connecting room lighter
- (05) Makes connecting room warmer
- (06) Let the heat from the connecting room go into the conservatory
- (07) Let the heat from the conservatory go into the connecting room
- (08) Other (please specify)

## Show card 20

- (01) Security
- (02) Peace and quiet
- (03) Stop children/animals/others going in there
- (04) To keep heat in the connecting room (including stopping draughts from the conservatory)
- (05) To prevent the connecting room getting too warm
- (06) To prevent the connecting room getting too bright/avoid glare
- (07) Habit/used to having a door there
- (08) Other (please specify)

## Show card 21

- (01) Morning (6am-12pm)
- (02) Afternoon (12pm-6pm)
- (03) Evening (6pm-12am)
- (04) Overnight (12midnight-6am)

## Show card 22

- (01) Radiator connected to central heating
- (02) Underfloor heating connected to central heating
- (03) Electric storage heater
- (04) Electric underfloor heating
- (05) Other type of electric heater or fire (not storage heater or underfloor)
- (06) Mains gas heater or fire
- (07) Coal/smokeless fuel/solid fuel fire or stove
- (08) Bottled gas or LPG heater or fire
- (09) No heating
- (10) Other (please specify)
- (11) Don't know (spontaneous only)

## Show card 23

- (01) Every day - over 7hrs per day
- (02) Every day - less than 7 hrs per day
- (03) At least one day a week
- (04) At least one day a month
- (05) Never

## Show card 24

- (01) Warmer than the rest of the house
- (02) The same temperature as the rest of the house
- (03) Cooler than the rest of the house
- (04) Just above freezing, for frost protection only

## Show card 25

- (01) Extension
- (02) Loft conversion
- (03) Loft insulation
- (04) Cavity wall insulation
- (05) Solid wall insulation
- (06) Changed type of heating system
- (07) New boiler
- (08) Replacement of external doors and windows
- (09) New conservatory
- (10) None of these

## Show card 26

- (01) Very unlikely
- (02) Unlikely
- (03) Neither likely nor unlikely
- (04) Likely
- (05) Very likely
- (06) Don't know/Not suitable

## Show card 27

- (01) Very concerned
- (02) Fairly concerned
- (03) Not very concerned
- (04) Not at all concerned
- (05) No opinion/not stated (spontaneous)

## Show card 28

- (01) I think climate change is entirely the result of human activity
- (02) I think climate change is largely the result of human activity
- (03) I think climate change is roughly equally the result of human activity and natural processes
- (04) I think climate change is largely the result of natural processes but partly because of human activity
- (05) I think climate change is entirely the result of natural processes
- (06) I do not believe in climate change
- (07) I don't know (spontaneous)

## Show cards 29

- (01) Agree strongly
- (02) Tend to agree
- (03) Neither agree nor disagree
- (04) Tend to disagree
- (05) Disagree strongly

## Show cards 30

- (01) Always
- (02) Very often
- (03) Quite often
- (04) Occasionally
- (05) Never

## Show card 31

- (01) I don't believe there are climate change problems caused by energy use and I'm not willing or able to change my behaviour with regards to energy use
- (02) Whether there are climate change issues or not, I am not willing or able to change my behaviour with regards to energy use
- (03) Climate change is caused by energy use and I'm beginning to think that I should do something
- (04) Climate change is caused by energy use and I'm doing a few small things to help reduce my energy use and emissions
- (05) Climate change is caused by energy use and I'm doing quite a number of things to help reduce my energy use and emissions
- (06) Climate change is caused by energy use and I'm doing lots of things to help reduce my energy use and emissions

## Show card 32

- (01) Working: 30 hours a week or more
- (02) Less than 30 hours a week
- (03) Government Training Scheme
- (04) Not working because of long term sickness or disability
- (05) Registered unemployed
- (06) Not registered unemployed but seeking work
- (07) At home/not seeking work (including looking after the home or family)
- (08) Retired (including retired early)
- (09) Full-time student

## Show card 33

- (01) Earnings from employment
- (02) Earnings from self-employment
- (03) Pension from former employer
- (04) Personal Pension
- (05) State Pension
- (06) State Benefits or Tax Credits
- (07) Interest from savings/investments
- (08) Other kinds of regular allowance from outside the household
- (09) Income from rent
- (10) Other sources
- (11) No source of income

## Show card 34

- (01) Income support
- (02) Job-seekers allowance contribution based (satisfy national insurance contributions, payable for a maximum of six months)
- (03) Job-seekers allowance income based (registered unemployed for 6 months or more or do not qualify for contribution based)
- (04) Pension credit
- (05) N.I. retirement pension
- (06) Working Tax Credit
- (07) Child Tax Credit
- (08) Child benefit
- (09) Income-related Employment and Support Allowance
- (10) Contributions based Employment and Support Allowance
- (11) Incapacity benefit
- (12) Housing Benefit or Local Housing Allowance
- (13) Council Tax Benefit
- (14) None of these

## Show card 35

- (01) Maternity Allowance
- (02) Widows/Widowers Pension, Bereavement Allowance or Widowed Parents (formerly Widowed Mothers) Allowance and War Widows pension
- (03) War disablement pension
- (04) Severe Disablement Allowance
- (05) Industrial Injuries disablement benefit
- (06) Attendance allowance
- (07) Carers Allowance
- (08) Disability living allowance: mobility
- (09) Disability living allowance: care
- (10) Statutory sick pay
- (11) A disability premium with your Income Support/Housing benefit
- (12) Any other disability benefit
- (13) None of these

### Show card 36

	Amount per Week	Amount per Month	Amount per annum
1	Less than £60	Less than £250	Less than £3,000
2	£60 to £79	£250 to £330	£3,000 to £3,999
3	£80 to £99	£331 to £419	£4,000 to £4,999
4	£100 to £119	£420 to £500	£5,000 to £5,999
5	£120 to £130	£501 to £580	£6,000 to £6,999
6	£131 to £150	£581 to £669	£7,000 to £7,999
7	£151 to £170	£670 to £750	£8,000 to £8,999
8	£171 to £190	£751 to £830	£9,000 to £9,999
9	£191 to £210	£831 to £919	£10,000 to £10,999
10	£211 to £230	£920 to £1,000	£11,000 to £11,999
11	£231 to £250	£1,001 to £1,080	£12,000 to £12,999
12	£251 to £269	£1,081 to £1,169	£13,000 to £13,999
13	£270 to £289	£1,170 to £1,250	£14,000 to £14,999
14	£290 to £310	£1,251 to £1,330	£15,000 to £15,999
15	£311 to £389	£1,331 to £1,669	£16,000 to £19,999
16	£390 to £580	£1,670 to £2,500	£20,000 to £29,999
17	£581 to £769	£2,501 to £3,330	£30,000 to £39,999
18	£770 to £960	£3,331 to £4,169	£40,000 to £49,999
19	£961 or more	£4,170 or more	£50,000 or more

## Appendix C

### *Sample comparisons*

Table 6 - Unweighted comparisons between EHS and EFUS samples

	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING		ELECTRICITY MONITORS	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Government Office Region	861	6.0	168	6.4	98	7.3	57	6.9	40	7.3	7	8.9
North East	2111	14.7	419	16.0	219	16.3	130	15.8	83	15.2	14	17.7
North West	1708	11.9	342	13.1	183	13.6	106	12.9	80	14.7	10	12.7
East Midlands	1197	8.3	216	8.3	95	7.1	79	9.6	48	8.8	5	6.3
West Midlands	1386	9.6	237	9.1	128	9.5	71	8.6	50	9.2	2	2.5
East	1528	10.6	311	11.9	158	11.7	112	13.6	74	13.6	5	6.3
London	1966	13.7	268	10.2	134	10.0	62	7.5	40	7.3	13	16.5
South East	2125	14.8	375	14.3	183	13.6	125	15.2	78	14.3	13	16.5
South West	1504	10.5	280	10.7	147	10.9	81	9.8	52	9.5	10	12.7
Total	14386	100.0	2616	100.0	1345	100.0	823	100.0	545	100.0	79	100.0

	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING		ELECTRICITY MONITORS	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Dwelling type	1515	10.5	274	10.5	146	10.9	83	10.1	55	10.1	12	15.2
End terrace	2641	18.4	478	18.3	223	16.6	124	15.1	82	15.0	19	24.1
Semi detached	3553	24.7	715	27.3	387	28.8	244	29.6	164	30.1	28	35.4
Detached	1962	13.6	419	16.0	255	19.0	143	17.4	105	19.3	14	17.7
Bungalow	1333	9.3	244	9.3	141	10.5	101	12.3	76	13.9	6	7.6
Flat	3382	23.5	486	18.6	193	14.3	128	15.6	63	11.6	0	0.0
Total	14386	100.0	2616	100.0	1345	100.0	823	100.0	545	100.0	79	100.0

	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING		ELECTRICITY MONITORS	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Age of main householder												
16 - 34	2742	19.1	395	15.1	152	11.3	70	8.5	35	6.4	9	11.4
35 - 44	2732	19.0	477	18.2	234	17.4	125	15.2	78	14.3	14	17.7
45 - 54	2695	18.7	524	20.0	257	19.1	187	22.7	124	22.8	23	29.1
55 - 64	2447	17.0	494	18.9	280	20.8	181	22.0	116	21.3	14	17.7
65 - 74	1962	13.6	426	16.3	260	19.3	171	20.8	128	23.5	15	19.0
75 or more	1808	12.6	300	11.5	162	12.0	89	10.8	64	11.7	4	5.1
Total	14386	100.0	2616	100.0	1345	100.0	823	100.0	545	100.0	79	100.0

	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING		ELECTRICITY MONITORS	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Household type												
couple, no dependent child(ren) under 60	2184	15.2	415	15.9	206	15.3	131	15.9	91	16.7	13	16.5
couple, no dependent child(ren) aged 60 or over	2401	16.7	471	18.0	302	22.5	185	22.5	142	26.1	19	24.1
couple with dependent child(ren)	3152	21.9	605	23.1	315	23.4	185	22.5	118	21.7	27	34.2
lone parent with dependent child(ren)	1431	9.9	209	8.0	84	6.2	45	5.5	24	4.4	5	6.3
other multi-person households	1107	7.7	182	7.0	86	6.4	40	4.9	24	4.4	6	7.6
one person under 60	1824	12.7	287	11.0	106	7.9	90	10.9	44	8.1	4	5.1
one person aged 60 or over	2287	15.9	447	17.1	246	18.3	147	17.9	102	18.7	5	6.3
Total	14386	100.0	2616	100.0	1345	100.0	823	100.0	545	100.0	79	100.0

	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING		ELECTRICITY MONITORS	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Tenure												
Owner Occupied	6998	48.6	1486	56.8	862	64.1	524	63.7	369	67.7	56	70.9
Private rented	2822	19.6	385	14.7	144	10.7	64	7.8	43	7.9	7	8.9
Local Authority	2191	15.2	405	15.5	176	13.1	128	15.6	69	12.7	6	7.6
RSL	2375	16.5	340	13.0	163	12.1	107	13.0	64	11.7	10	12.7
Total	14386	100.0	2616	100.0	1345	100.0	823	100.0	545	100.0	79	100.0

	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING		ELECTRICITY MONITORS	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Wall Type												
cavity with insulation	5859	40.7	1122	42.9	648	48.2	383	46.5	262	48.1	36	45.6
cavity uninsulated	4358	30.3	799	30.5	398	29.6	239	29.0	160	29.4	22	27.8
other	4169	29.0	695	26.6	299	22.2	201	24.4	123	22.6	21	26.6
Total	14386	100.0	2616	100.0	1345	100.0	823	100.0	545	100.0	79	100.0

	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING		ELECTRICITY MONITORS	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Dwelling age												
Pre 1919	2650	18.4	488	18.7	206	15.3	127	15.4	79	14.5	22	27.8
1919-1944	2259	15.7	423	16.2	232	17.2	127	15.4	89	16.3	9	11.4
1945-1964	3182	22.1	600	22.9	326	24.2	209	25.4	149	27.3	24	30.4
1965-1974	2192	15.2	404	15.4	210	15.6	138	16.8	79	14.5	10	12.7
1975-1980	1030	7.2	185	7.1	92	6.8	68	8.3	42	7.7	3	3.8
1981-1990	1209	8.4	219	8.4	108	8.0	79	9.6	49	9.0	4	5.1
Post 1990	1864	13.0	297	11.4	171	12.7	75	9.1	58	10.6	7	8.9
Total	14386	100.0	2616	100.0	1345	100.0	823	100.0	545	100.0	79	100.0

	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING		ELECTRICITY MONITORS	
Energy efficiency (SAP09) rating	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
less than 30	409	2.8	83	3.2	35	2.6	20	2.4	13	2.4		
30 to 50	2723	18.9	597	22.8	293	21.8	192	23.3	124	22.8	16	20.3
51 to 70	9443	65.6	1691	64.6	902	67.1	545	66.2	375	68.8	61	77.2
more than 70	1811	12.6	245	9.4	115	8.6	66	8.0	33	6.1	2	2.5
Total	14386	100.0	2616	100.0	1345	100.0	823	100.0	545	100.0	79	100.0

Table 7 - Weighted comparisons between EHS and EFUS sample

	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Government Office Region										
North East	1,147,193	5.2	1,104,250	5.0	1,133,182	5.2	1,090,825	5.0	1,036,156	4.7
North West	2,982,324	13.6	3,200,348	14.6	3,208,216	14.7	3,262,545	14.9	3,158,894	14.4
Yorkshire and the Humber	2,266,428	10.3	2,374,910	10.8	2,350,779	10.7	2,380,265	10.9	2,347,963	10.7
East Midlands	1,910,616	8.7	1,848,373	8.4	1,867,971	8.5	1,754,403	8.0	1,815,435	8.3
West Midlands	2,285,385	10.4	2,262,494	10.3	2,234,810	10.2	2,207,785	10.1	2,195,657	10.0
East	2,442,643	11.1	2,465,832	11.3	2,508,977	11.5	2,574,071	11.8	2,710,014	12.4
London	3,102,686	14.2	2,924,710	13.4	3,003,850	13.7	2,957,641	13.5	3,016,507	13.8
South East	3,533,163	16.1	3,400,886	15.5	3,300,640	15.1	3,306,797	15.1	3,199,720	14.6
South West	2,247,925	10.3	2,312,178	10.6	2,285,556	10.4	2,359,647	10.8	2,413,634	11.0
Total	21,918,363	100.0	21,893,980	100.0	21,893,980	100.0	21,893,980	100.0	21,893,980	100.0

	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Dwelling type										
End terrace	2,220,087	10.1	2,306,033	10.5	2,383,747	10.9	2,413,519	11.0	2,458,501	11.2
Mid terrace	4,023,022	18.4	4,065,335	18.6	3,819,130	17.4	3,514,161	16.1	3,620,828	16.5
Semi detached	5,772,444	26.3	5,981,417	27.3	6,108,504	27.9	6,556,106	29.9	6,404,459	29.3
Detached	3,720,325	17.0	3,681,405	16.8	4,006,383	18.3	3,606,677	16.5	3,766,683	17.2
Bungalow	1,912,242	8.7	1,750,101	8.0	1,973,396	9.0	2,053,957	9.4	2,278,149	10.4
Flat	4,270,243	19.0	4,109,689	18.8	3,602,820	16.5	3,749,560	17.1	3,365,360	15.4
Total	21,918,363	99.5	21,893,980	100.0	21,893,980	100.0	21,893,980	100.0	21,893,980	100.0

	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Age of main householder										
16 - 34	3,858,902	17.6	3,429,170	15.7	3,109,188	14.2	2,486,760	11.4	2,157,540	9.9
35 - 44	4,202,333	19.2	4,160,267	19.0	4,062,539	18.6	3,919,424	17.9	3,694,402	16.9
45 - 54	4,373,470	20.0	4,599,222	21.0	4,334,751	19.8	5,121,861	23.4	5,272,555	24.1
55 - 64	3,851,320	17.6	4,108,927	18.8	4,325,301	19.8	4,631,058	21.2	4,325,505	19.8
65 - 74	2,974,845	13.6	3,298,999	15.1	3,704,827	16.9	3,841,151	17.5	4,389,424	20.0
75 or more	2,657,493	12.1	2,297,396	10.5	2,357,375	10.8	1,893,727	8.6	2,054,554	9.4
Total	21,918,363	100.0	21,893,980	100.0	21,893,980	100.0	21,893,980	100.0	21,893,980	100.0

	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Household type										
couple, no dependent child(ren) under 60	3,812,671	17.4	3,824,505	17.5	3,795,481	17.3	4,185,347	19.1	4,036,139	18.4
couple, no dependent child(ren) aged 60 or over	3,931,534	17.9	3,843,177	17.6	4,447,112	20.3	4,348,947	19.9	4,950,335	22.6
couple with dependent child(ren)	4,941,781	22.5	5,132,326	23.4	5,286,746	24.1	5,216,935	23.8	5,258,633	24.0
lone parent with dependent child(ren)	1,675,050	7.6	1,557,683	7.1	1,342,782	6.1	1,181,118	5.4	1,137,631	5.2
other multi-person households	1,583,040	7.2	1,563,718	7.1	1,474,192	6.7	1,111,825	5.1	999,688	4.6
one person under 60	2,830,996	12.9	2,636,662	12.0	2,024,715	9.2	2,811,870	12.8	2,098,747	9.6
one person aged 60 or over	3,143,291	14.3	3,335,909	15.2	3,522,952	16.1	3,037,938	13.9	3,412,807	15.6
Total	21,918,363	100	21,893,980	100	21,893,980	100	21,893,980	100	21,893,980	100.0

	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Tenure										
Owner Occupied	14,368,230	65.6	14,296,336	65.3	14,353,092	65.6	14,519,888	66.3	14,423,378	65.9
Private rented	3,716,487	17.0	3,486,485	15.9	3,463,307	15.8	3,325,457	15.2	3,355,373	15.3
Local Authority	1,816,049	8.3	2,208,551	10.1	2,139,342	9.8	2,168,053	9.9	2,111,650	9.6
RSL	2,017,597	9.2	1,902,608	8.7	1,938,238	8.9	1,880,582	8.6	2,003,579	9.2
Total	21,918,363	100.0	21,893,980	100.0	21,893,980	100.0	21,893,980	100.0	21,893,980	100.0

Wall Type	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
cavity with insulation	8,542,445	39.0	8,554,652	39.1	9,450,351	43.2	8,770,470	40.1	9,059,997	41.4
cavity uninsulated	6,663,742	30.4	6,939,288	31.7	6,818,291	31.1	6,993,854	31.9	7,079,506	32.3
other	6,712,176	30.6	6,400,040	29.2	5,625,338	25.7	6,129,656	28.0	5,754,477	26.3
Total	21,918,363	100.0	21,893,980	100.0	21,893,980	100.0	21,893,980	100.0	21,893,980	100.0

Dwelling age	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Pre 1919	4,490,029	20.5	4,708,499	21.5	3,920,722	17.9	4,201,650	19.2	3,863,402	17.6
1919-1944	3,692,573	16.8	3,740,345	17.1	3,856,947	17.6	3,733,111	17.1	3,859,154	17.6
1945-1964	4,362,708	19.9	4,423,087	20.2	4,871,662	22.3	4,803,860	21.9	5,329,567	24.3
1965-1974	3,182,815	14.5	3,223,286	14.7	3,184,191	14.5	3,384,091	15.5	2,935,030	13.4
1975-1980	1,421,026	6.5	1,496,388	6.8	1,497,675	6.8	1,832,751	8.4	1,828,600	8.4
1981-1990	1,836,865	8.4	1,831,941	8.4	1,809,079	8.3	1,963,362	9.0	1,877,493	8.6
Post 1990	2,932,347	13.4	2,470,434	11.3	2,753,703	12.6	1,975,154	9.0	2,200,734	10.1
Total	21,918,363	100.0	21,893,980	100.0	21,893,980	100.0	21,893,980	100.0	21,893,980	100.0

Energy efficiency (SAP09) rating	EHS		INTERVIEW		METER READING		TEMPERATURE LOGGERS		COMBINED TEMPERATURE AND METER READING	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
less than 30	660,209	3.0	761,650	3.5	663,534	3.0	575,569	2.6	518,887	2.4
30 to 50	4,624,601	21.1	5,512,757	25.2	5,011,872	22.9	5,565,672	25.4	5,145,884	23.5
51 to 70	14,260,592	65.1	13,761,474	62.9	14,273,458	65.2	13,920,102	63.6	14,606,751	66.7
more than 70	2,372,961	10.8	1,858,099	8.5	1,945,116	8.9	1,832,637	8.4	1,622,458	7.4
Total	21,918,363	100.0	21,893,980	100.0	21,893,980	100.0	21,893,980	100.0	21,893,980	100.0