



Commission for Energy Regulation

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**Appendices**  
**Electricity Smart Metering Customer Behaviour**  
**Trials (CBT) Findings Report**

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## **APPENDICES**

## Appendix 1: Experimental design of residential electricity trial

### A1.1 Introduction

The general objective of the Customer Behaviour Trial was as follows:

*“to ascertain the potential for smart meter technology to effect measurable change in consumer behaviour, which will result in the reduction of peak demand and overall energy use, when operated with appropriate Demand Side Management initiatives(DSM).”*

The specific objective of the Trial was to detect a reduction in usage of 2% or more (*the effect*) at a 90% confidence level, among consumers who are supplied with a smart meter and time of use tariffs and DSM stimuli. the Trial included a *control group* of individuals with smart meters but without exposure to ToU tariffs or DSM stimuli. In order to optimise the objectives of the Trial the design within the parameters of time and number of meters available .

In answering these questions, it was essential to design the Trial in a manner most likely to produce a statistically reliable and robust conclusion. An experimental design is the detailed plan for the structure of the experiment (the Trial in this case). The objective of any experimental design is to maximise the amount of useful information that can be obtained for a given amount of experimental data (in the case of the Customer Behaviour Trial, this is the number of meters, the frequency of data recording and the length of the Trial). Useful information is information that addresses the objective and delivers conclusions which are accurate and robust (as measured by significance).

The experimental design matrix set out the combinations of ToU tariffs and DSM stimuli which the participants would be exposed to. To deliver the objective of detecting a 2% change over the entire trial at a 90% confidence level, the number of participants in each cell of the matrix had to be established from a statistical analysis of the variation in electricity usage present without the interventions. As well as defining the structure and size of the experimental design matrix, other decisions needed to be made as part of the experimental design:

1. The need for and duration of a benchmarking period during which usage data could be collected by installed smart meters before any ToU tariffs and DSM stimuli were applied.
2. The duration of the Trial – related to the duration of the benchmark with the duration of both set at the minimum period required to deliver reliable results within the tolerance of a minimum of 2% detection at a 90% confidence level, and with a reasonable number of deployed meters.

These decisions are all related to the assessment of variability usually present in electricity usage.

Finally, the experimental design also needed to incorporate the following dimensions of the Trial

- The management of meter installation and key transition or communication points in the Trial in a manner which would not distort the overall result. For instance, it was agreed that those participants on time of use tariffs should not receive a bill which mixed the flat rate tariff and the ToU tariffs. As Electric Ireland bills different customers at different points throughout a two monthly billing cycle, this meant all participant bills during the Customer Behaviour Trial had to be calendarised (i.e., each bill comprised a discrete bi-monthly or monthly billing period from the first day of the month to the last day of the month). All test group participants received a short bill covering their usage to the end of December 2009. From 1<sup>st</sup> January, therefore, the bills of all test group participant issued on approximately the 10<sup>th</sup> day of the month following the bill period. Similarly, credits, such as the Thank you payment or the balancing credit were made outside of the Test period, so as to ensure any impact on customer behaviour was minimised.
- Calculation of appropriate incentives and credits such as the Overall Load Reduction incentive and the balancing credit.

### A1.2. The Experimental Design Matrix

The Trial tested four time of use tariffs and a weekend tariff structure. It also tested four DSM stimuli derived from billing frequency and content and the addition of an electricity monitor and an incentive to reduce overall load during the trial period. The experimental design matrix is shown in **Table Ax. 1: Experimental Design Matrix**. The analysis outlined in the next sections established the number of participants in each cell and in the control group which was necessary to deliver the required accuracy of results.

	Bi-Monthly Detailed Bill	Monthly Detailed Bill	Bi-Monthly Detailed Bill + Electricity Monitor	Bi-Monthly Detailed Bill + Overall Load Reduction	Total	
Tariff A						
Tariff B						
Tariff C						
Tariff D						
Control group						
					Total	

**Table Ax. 1: Experimental Design Matrix**

### A1.3 Determining the structure of the Trial

The accuracy of the results is determined by the number of the participants in the Trial and the natural variability associated with the phenomenon under investigation. There are three

sources of variation which tend to mask detection of the effect by increasing the variability in the data not associated with the impact of the ToU tariffs and DSM stimuli:

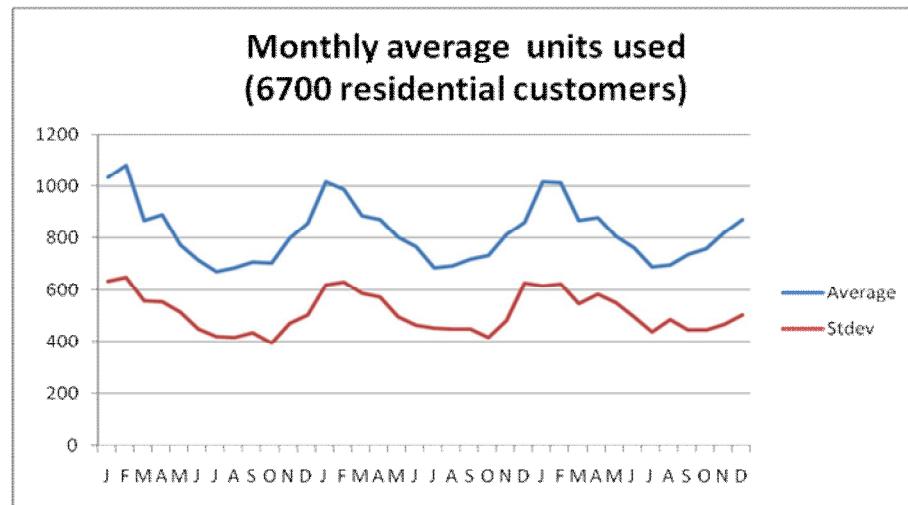
- a) **Temporal variation:** The level and pattern of usage varies over time driven by economic, cultural and weather variations. Cultural events such as the timing of Easter will also impact usage levels between years.
- b) **Individual variation:** The level and pattern of usage varies greatly between individual consumers due to individual economic circumstance, life-styles, household size and method of home heating.
- c) **Seasonal variation:** The level and pattern of usage varies within each year with day length and climate.

The methodology used for the Trail removes these sources of variation in order to allow measurement of the underlying effect.

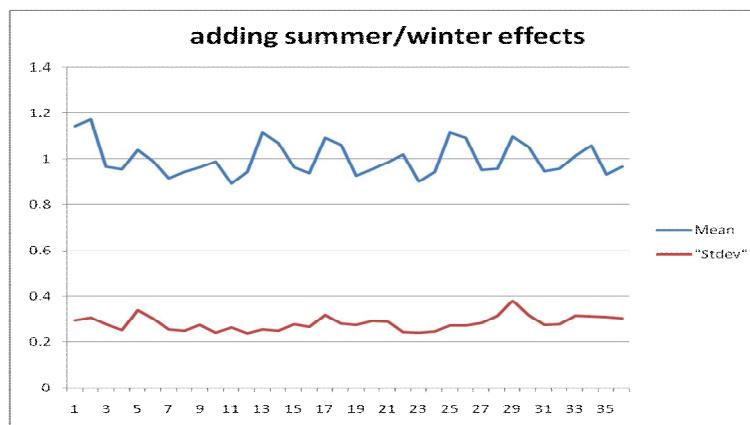
- a) **Controlling temporal variation:** Temporal variation was controlled by examining the change in usage in a group of consumers who are equipped with smart meters but remain on their existing tariff (*the control group*) and a group of consumers who are equipped with smart meters and moved to time of use tariffs and DSM stimuli (*the test group*). This allowed the temporal variations to be removed to expose the effect. For example: If there is a period of low temperatures, usage in both control and test group would rise. If smart meters in combination with time of use tariffs and DSM stimuli impact usage, the usage in the test group should be lower *when compared* to the Control Group.
- b) **Controlling individual and seasonal variation:** Individual and seasonal variation are closely linked and were controlled by comparing each individual's usage against their historic usage. In an ideal situation, data would be available for each participant for one year or more in order to provide a robust estimate of 'normal' usage against which to measure usage during the Trial. However, no data was available on usage by time of use and limited data (at a two monthly meter reading level) was available for overall usage for trial participants.

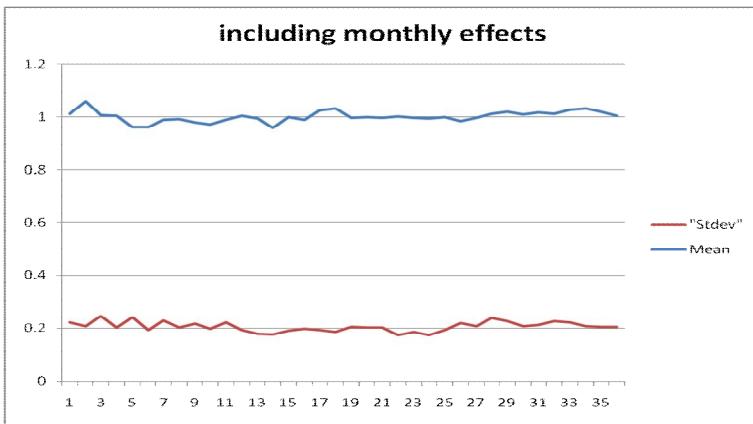
Moreover in order to determine the required number in each experimental cell, an estimate of variability had to be reached. This estimation process used quarter hour usage data from 6,700 residential consumers for a period of three years. These meters were already installed for profiling purposes and this data was available to establish normal individual variability and seasonal variation. It should be stressed that this set of meters is distinct from the meters installed for the purposes of the Customer Behaviour Trial.

The average usage across the time period is shown in **Figure Ax. 1** with associated standard deviation across the set of consumers shown (as a red line). The research estimated that any test group would need to consist of 4,500 consumers (with a matching control cell size) would be required to detect a 2% effect with 90% confidence.

**Figure Ax. 1: Average Usage across the time period**

In order to reduce the level of variability and hence the required number of participants, ratios were calculated of each consumer's usage during the current year compared against an average summer or winter usage and of the consumption compared against the consumption for the same period in the previous year. **Figure Ax. 2** clearly shows the reduced levels of variability (represented by the standard deviation scores) in each case. The required trial size when using summer/winter based ratios was estimated to be 750 in the test group and 750 in the control. The required trial size when using summer/winter based ratios was estimated to be 750 in the test group and 130 in the control.

**Figure Ax. 2: Average Ratio based on summer and winter effects**

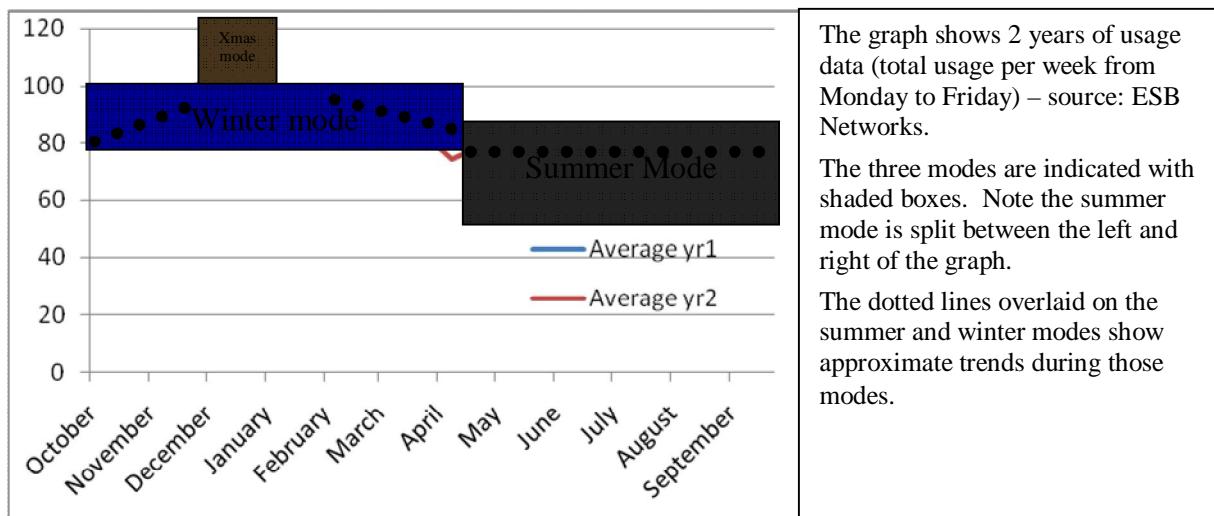


**Figure Ax. 3: Average ratio based on monthly effects**

Therefore, to control this variation data had to be collected at the start of the Trial after the smart meters had been installed for both control and test groups but prior to the transition of the test group to the new ToU tariffs and associated DSM stimuli (*the benchmarking period*).

To determine the appropriate length of the benchmark period, it was necessary to analyse available usage data to determine how usage varied across the year. This analysis highlighted three usage modes (Summer, Winter and Christmas). Each mode exhibited a distinct pattern of variation (shown on the graph below):

- Winter mode: Exhibits increasing usage up to the Christmas mode and then a broadly symmetric decline in the period after the Christmas mode.
- Summer mode: The summer shows approximately flat usage.
- Christmas mode: The Christmas mode increases rapidly and then declines rapidly.



**Figure Ax. 4: Seasonality within usage ratios**

The existence of the three modes allowed the estimation of 12 months of seasonality from a period shorter than the 12 months. For example, usage levels for specific three week periods in November are comparable with similar time slots in March (**Figure Ax. 4**). To achieve

this, the benchmarking period was configured to provide sufficient data from each of the modes to allow estimation across each mode.

Therefore it was established that as a minimum the benchmark period should include the Christmas mode, two months of the winter mode and two months of the summer mode. The approach was validated from the available usage data by taking the first six months of the available usage data to simulate a benchmark period and the remaining 18 months to simulate the trial period. Analysis of the results suggested that the approach did not introduce any systematic error and did reduce seasonal variation across the full 18 month period. To provide a contiguous measurement period, this translated into a benchmark which ran from either July to December or January to June. The final decision was to select the first period.

#### A1.4 Estimating the trial size in order to achieve the sensitivity

Based on the conclusions of the previous section, the experimental design matrix was populated to ensure required levels of accuracy of testing (**Table Ax. 2**). **Table Ax. 3** shows the approximate sensitivity of the potential hypotheses to be tested. It should be noted that these approximate figures did not take into account corrections for multiple tests.

An important decision in any experimental design is the confidence level at which testing should occur. For the purposes of the Trial 90% was set as the ‘cut-off’ confidence level.

	Stimulus 1	Stimulus 2	Stimulus 3	Stimulus 4	Total	
Tariff A	200	200	200	200	800	800
Tariff B	75	75	75	75	300	300
Tariff C	200	200	200	200	800	800
Tariff D	75	75	75	75	300	300
Tariff E	200	200	200	200	800	800
	750	750	750	750		
CPR						300
Control group						1,000
				Total		4,300

**Table Ax. 2: Experimental design matrix with required cell populations shown**

	Existing Matrix			Existing Matrix		Incl Web at 10% Max	
				Overall Reduction	Peak Reduction	Overall Reduction	Peak Reduction
Combination of TOU tariffs and Stimuli v's control group	3300	v's	1000	2%	2%	2%*	3%
Tariff (A, C, E) v's control	800	v's	1000	3%	3%	3%	3%
Tariff (B, D) v's control	300	v's	1000	4%	4%	4%	4%
Any of Tariff (A, C, E) v's Any of Tariff (A, C, E)	800	v's	800	3%	3%	3%	3%
Any of Tariff (A, C, E) v's Any of Tariff (D, E)	800	v's	300	4%	4%	4%	4%
Any of Tariff (D, D) v's Any of Tariff (B, D)	300	v's	300	4%	4%	4%	5%
Any Stimulus versus control	750	v's	1000	3%	3%	3%	3%
Any Stumulus versus Any stimulus	750	v's	750	3%	3%	3%	3%
Cell v's Cell (Tariff A, C, E)	200	v's	200	5%	5%	5%	6%
Cell v's Cell (Tariff B, D)	75	v's	75	8%	8%	8%	10%
Cell v's Cell (any of Tariff A, B, C, D, E)	200	v's	75	7%	7%	7%	8%
							* borderline

**Table Ax. 3: Approximate accuracy of potential hypotheses**

## A1.5 Other considerations in the experimental design

### i) Impact of communications

It was important to distinguish between the impact of smart metering and ToU tariffs and DSM stimuli directly enabled by smart metering and DSM stimuli which could be applied independent of smart metering. For example, the energy usage statement provides additional information enabled by the smart meter such as half-hourly usage, daily usage and usage at different times. This information is only available if smart meters are deployed thus allowing half hourly data to be translated into graphical form for the customer. The consumer communications avoided providing additional advisory information that would be available independent of smart meters (for instance general information on appliance usage). Finally, participants in the test groups were not targeted with any additional energy efficiency advice (other than the DSM stimuli) which might have encouraged usage reduction or shifting, but would not have been available to the control group.

This decision was made in order to allow the true effect of ToU tariffs and DSM stimuli to be measured. It does not preclude such activities as part of any national rollout where the effectiveness could be demonstrated.

**ii) Calendarisation**

A significant challenge in producing the experimental design for the Trial was to ensure that the twelve month trial period identified as closely as possible individual behaviour changes (and consequential reduction in total energy used across the population).

It also sought to minimise any impact of participants receiving a bill at the start of the Trial which contained a mix of the flat tariff and the new time of use tariffs. A decision was, therefore, made to place all test participants in the Trial (i.e., the Control Group was excluded) on a calendar month bill cycle with the majority continuing to receive bi-monthly bills and one group receiving monthly bills.

Prior to the Trial, participants were on a two-monthly billing cycle with bills issuing to consumers on a phased basis over a two-monthly period. From 1<sup>st</sup> January 2010 all participants were “calendarised” i.e., their bills covered discrete months and issued approximately 10 days after the month end. The transition to calendarisation involved all participants receiving a final ‘part’ bill up to 31<sup>st</sup> December 2009 which covered the period from their last bill until that date. This also meant that bills issued in 2010 related only to usage in 2010. The change to calendarisation also meant payment due dates changed for some participants

The structure of the Trial was based on a nested measure where the change in usage associated with the ‘before’ and ‘after’ (benchmark versus test usage) of the test group was compared with the change in usage of a comparable group (the control group) for the same time period. This measurement model was selected as it was the one where measured volatility was lowest thus the number of meters required to measure the effect was minimised.

The design of the measurement was derived from the requirement to assess overall and peak-time energy reduction as the result of the application of different ToU pricing and DSM stimuli. In order for the maximum benefit to be derived from an experimental design (i.e. a true and accurate measurement of the ToU tariffs and DSM stimuli in combination), it was critical to control as much variability as possible and to operate within the constraint of the design.

Calendarisation was recommended in the context of the residential measurement because it controls the impact of the bill arrival on behaviour as a source of variability between the test and control groups. Research to date has indicated that the arrival of the bill can act as a trigger for behaviour change. Qualitative research highlighted the amplified reaction to the arrival of the bill. This is particularly the case if the bill is unexpectedly high as might be the case with the first Time of Use based bill. The response to such a bill might be increased vigilance in household energy usage with immediate effect, for example, switching off lights or reducing shower time. The increased vigilance among some can last for a short period of time, amongst others for slightly longer. It is this effect, in association with the Trial ToU prices and DSM stimuli which was measured.

A secondary benefit of calendarisation is associated with the clarity of the bill. If the first bill under the new tariff includes both ToU prices and the flat rate tariff, it is likely to be very confusing to consumers and partially mask the impact of the tariff by mixing it with pre-trial tariffs. The alternative of issuing the bill at the same time but including only ToU tariff prices and hence not corresponding to a full billing period (i.e. one or two months) would lead to an

artificially reduced bill size and distort the impact of the tariff and stimulus. It should be noted that the first bill would have arrived during the winter peak usage period.

Therefore by synchronising all billing around calendarisation, all test cell participants were given bills based only on time of use tariffs and for a full billing period.

**iii) Changes in supplier during the Trial**

As outlined elsewhere, the Residential Customer Behaviour Trial involved Electric Ireland customers and the SME Trial involved those of Electric Ireland and Bord Gáis. It was decided that changing supplier would be considered as a reason for excluding a participant from the Trial. This is because the alternative suppliers were offering tariffs with lower prices and switching tariff corresponded to a price change.

## Appendix 2: Methodology for Analysis of Customer Behaviour Trial Data

### A2.1 Introduction

This appendix sets out the approach used in analysing the data for the Customer Behaviour Trial (CBT). Specifically it outlines the hypotheses required to be tested; the analytical approach used to test the hypotheses, including a discussion on alternative methodologies considered; a description of how the raw data was prepared in advance of running the statistical tests, including treating for missing values; and details of the outputs generated from the data.

### A2.2 Hypothesis Tests

The Customer Behaviour Trial aims to measure consumer response (behaviour change) to ToU tariffs and a range of other DSM stimuli, which are enabled by the introduction of a smart meter over the period of the Trial. The findings from the CBT are then used to make predictions about how the wider consumer base may respond to time of use pricing and DSM stimuli. This requires testing a number of hypotheses at an overall level and both across and within the various test groups.

#### A2.2.1 Residential CBT

Four ToU tariffs (A, B, C and D) are mixed with four DSM stimuli (bi-monthly bill and energy statement, monthly bill and energy statement, bi-monthly bill, energy statement and electricity monitor, and bi-monthly bill, energy statement and the OLR incentive) are used in the residential CBT. An additional tariff group (weekend - W/E) (with bi-monthly bill and energy statement) is included in the Trial, although it is treated separately for testing purposes and is not used to look at within DSM stimuli effects.

The following hypothesis is to be tested for both overall and peak electricity usage:

- $H_0^{\text{RES}}$ : the imposition of ToU tariffs and other DSM stimuli during the trial period have no effect on energy usage when compared to the benchmark period;

In addition to the above the following hypotheses are to be tested *across all* DSM stimuli for both overall and peak electricity usage:

- $H_0^{\text{A}}$ : tariff group A has no effect on energy usage;
- $H_0^{\text{B}}$ : tariff group B has no effect on energy usage;
- $H_0^{\text{C}}$ : tariff group C has no effect on energy usage;
- $H_0^{\text{D}}$ : tariff group D has no effect on energy usage;
- $H_0^{\text{W/E}}$ : tariff group W/E has no effect on energy usage;
- $H_0^{\text{AB}}$ : tariff group A is no different to tariff group B;
- $H_0^{\text{AC}}$ : tariff group A is no different to tariff group C;

- $H_0^{AD}$ : tariff group A is no different to tariff group D;
- $H_0^{BC}$ : tariff group B is no different to tariff group C;
- $H_0^{BD}$ : tariff group B is no different to tariff group D; and
- $H_0^{CD}$ : tariff group C is no different to tariff group D.

Likewise, the following hypotheses are to be tested *across all* tariff groups and *within each* tariff group for both overall and peak electricity usage:

- $H_0^{\text{RES},1}$ : the bi-monthly bill and energy statement has no effect on energy usage;
- $H_0^{\text{RES},2}$ : the monthly bill and energy statement has no effect on energy usage;
- $H_0^{\text{RES},3}$ : the bi-monthly bill, energy statement and electricity monitor has no effect on energy usage;
- $H_0^{\text{RES},4}$ : the bi-monthly bill, energy statement and OLR incentive has no effect on energy usage;
- $H_0^{\text{RES},12}$ : a bi-monthly bill and energy statement is as effective as a monthly bill and energy statement;
- $H_0^{\text{RES},13}$ : a bi-monthly bill and energy statement is as effective as a bi-monthly bill, energy statement and electricity monitor;
- $H_0^{\text{RES},14}$ : a bi-monthly bill and energy statement is as effective as a bi-monthly bill, energy statement and the OLR incentive;
- $H_0^{\text{RES},23}$ : a monthly bill and energy statement is as effective as a bi-monthly bill, energy statement and electricity monitor;
- $H_0^{\text{RES},24}$ : a monthly bill and energy statement is as effective as a bi-monthly bill, energy statement and the OLR incentive; and
- $H_0^{\text{RES},34}$ : a bi-monthly bill, energy statement and electricity monitor is as effective as a bi-monthly bill, energy statement and the OLR incentive.

The residential CBT was initially designed to detect changes in behaviour in relation to overall usage and peak time usage and to detect a minimum effect of 2% on hypotheses conducted on the overall sample of participants and 2%, 3% or 4% on hypotheses conducted on subsets of the overall participating sample, where such changes occur.

#### A2.2.2 SME CBT

Two tariff groups (F and G) are mixed with four DSM stimuli (bi-monthly bill and energy statement, monthly bill and energy statement, bi-monthly bill, energy statement and electricity monitor, and bi-monthly bill with web access) are used in the SME Trial.

The main hypothesis for the SME CBT is broadly the same as that used for the residential CBT and is required to be tested for both overall and peak electricity usage:

- $H_0^{\text{SME}}$ : the imposition of ToU tariffs and other DSM stimuli during the trial period have no effect on energy usage when compared to the benchmark period;

Likewise, the following hypotheses are to be tested for both overall and peak electricity usage:

- $H_0^{\text{SME},1}$ : the bi-monthly bill and energy statement has no effect on energy usage;
- $H_0^{\text{SME},2}$ : the monthly bill and energy statement has no effect on energy usage;
- $H_0^{\text{SME},3}$ : the bi-monthly bill, energy statement and electricity monitor has no effect on energy usage;
- $H_0^{\text{SME},4}$ : the bi-monthly bill, energy statement and web access has no effect on energy usage;
- $H_0^{\text{SME},12}$ : a bi-monthly bill and energy statement is as effective as a monthly bill and energy statement;
- $H_0^{\text{SME},13}$ : a bi-monthly bill and energy statement is as effective as a bi-monthly bill, energy statement and electricity monitor;
- $H_0^{\text{SME},14}$ : a bi-monthly bill and energy statement is as effective as a bi-monthly bill, energy statement and web access;
- $H_0^{\text{SME},23}$ : a monthly bill and energy statement is as effective as a bi-monthly bill, energy statement and electricity monitor;
- $H_0^{\text{SME},24}$ : a monthly bill and energy statement is as effective as a bi-monthly bill, energy statement and web access; and
- $H_0^{\text{SME},34}$ : a bi-monthly bill, energy statement and electricity monitor is as effective as a bi-monthly bill, electricity monitor and web access.

Statistical testing for the SME CBT is considered to be a secondary objective, with the primary objective being to gain an understanding of the impact of the ToU tariffs and DSM stimuli through the analysis of data.

### A2.3 Statistical Significance

The interpretation of a statistically significant result in the context of the overall test is to reject the null hypothesis and conclude that “*there is evidence from the CBT data that the deployment of ToU tariffs in conjunction with DSM stimuli results in a change in energy consumption*”. The outcome of this test should not be interpreted as specific to a tariff but is across all tariffs.

A 90% confidence level is applied to all tests conducted, which is consistent with the approach followed in other relevant international benchmark studies and facilitates statistical testing within the individual groups given the sample size and an acceptable margin of error.

The trials are powered differently, which means they are likely to class different ‘effect sizes’ as statistically significant. Statistical testing can be done with smaller groups, but failure to find significance must be interpreted with caution.

## A2.4 Data Processing and Dealing with Missing Data

The data set was analysed using a mix of software packages, with the main statistical tests carried out on the disaggregated data using R and further analyses on aggregated data at varying levels using SPSS and MS Excel.

Half-hourly reads of volume of usage were provided for meters participating in the Trial from July 2009 up to December 2010.

Although the benchmark period was due to start on 1st July 2009, the active data flows from the meters were not complete during the first two weeks of the study. In order to deal with this, the days where there was substantial missing data across multiple meters are excluded from the analysis.

While complete data is available for 4,069 meters in the residential CBT (meters subject to attrition due to participants leaving the CBT are excluded from the analysis), it was found that data was missing for some meters. Data are said to be missing where no value has been recorded (as opposed to zero usage being recorded). This was primarily due to failures in the hardware used during the Trial. While a number of steps were subsequently taken to minimise the impact of this on the Trial, this issue nonetheless needs to be dealt with during the analysis in order to make best use of the recorded data.

Specifically, data is missing for a single day of the study for 114 meters and for two days for 42 meters. Meters with data missing for more than two days are excluded from the analysis.

Where this data is available directly from the data provider, then missing data do not impact on the analysis. Where it is not possible to obtain or derive the aggregate summary for a particular period of interest due to missing data, these were obtained by taking an inferential approach. Two different strategies are applied: (a) multiple imputation; and (b) case deletion.

### a) Multiple Imputation

The justification for the use of multiple imputation rather than simple imputation is well developed in the statistical literature. In outline, it is essential that the uncertainty in the estimate, as well as the point estimate, is properly accounted for during an analysis.

The approach taken involves, as a first step, estimating a mean for the missing value of interest. This is done by taking an average of the values obtained as close as possible to one week after and one week before the value of interest. The second parameter which needs estimation is the uncertainty associated with the missing value. This is done by using a standard deviation for the period one week before and one week after the period in which the data are missing.

The multiple imputation step involves replicating the data series for the missing meters, completing the data with values obtained by reference to the distributions given by the mean and standard deviation described above. These were done five times and then the completed data were used for the analysis.

It was necessary to carry out multiple imputation for 156 meters in the Trial. The total missing number of days for each of these meters did not exceed two for each meter.

### **b) Case Deletion**

The second approach is to delete meters from the analysis where there are missing values, which cannot be completed using multiple imputation. This strategy is termed ‘case deletion’ and was carried out for 28 meters.

## **A2.5 Analytical Approach**

The level of effect is measured by estimating the change in consumption between the test period and the benchmark period and comparing that outcome with the equivalent change among the control group, in the first instance and other groups, as the hypotheses being tested require, in the second instance. The analysis is required to provide evidence of test group effects over sampling variability (p-values), as well as an estimate of the size of the effect (confidence intervals for parameters).

### **A2.5.1 Calculating Volumetric Ratios of Usage**

The approach used in calculating the percentage change in the volume of usage for the test groups during the trial period relative to the control group is to calculate volumetric ratios for each group. At an overall level, the ratio of total volume of electricity usage for the test group during the trial period relative to the benchmark period is calculated ( $R_T$ ). This is then compared to the corresponding ratio for the control group ( $R_C$ ). The formula used to calculate the ratio is as follows:

$$R_j = \frac{\sum \alpha_{i,j}}{\sum \beta_{i,j}}$$

where  $\alpha_{i,j}$  is the volume of usage for meter i in group j during the trial period and  $\beta_{i,j}$  is the volume of usage for meter i in group j during the benchmark period.

This ratio is also calculated for the ToU tariff/DSM stimuli groups within the test group and again compared to the ratio for the control group. This is then repeated for the time periods night, day and peak, the usage data for which are calculated (based on the notation and classification contained in Table 5.3) as follows:

- Tariffs A-D (residential) and E-F (SME):
  - Night =  $SSA_1 + SSA_0$
  - Day =  $SSB_1 + SSB_0 + SSC_0$
  - Peak =  $SSC_1$
- Tariff W/E (residential)
  - Night =  $SSA_1 + SSA_0 + SSB_0 + SSC_0$
  - Day =  $SSB_1$
  - Peak =  $SSC_1$

	23.00-07.59		08.00-16.59 and 19.00-22.59		17.00-18.59	
	Mon-Fri (excl holidays)	Sat & Sun (incl. holidays)	Mon-Fri (excl holidays)	Sat & Sun (incl. holidays)	Mon-Fri (excl holidays)	Sat & Sun (incl. holidays)
	$SSA_1$	$SSA_0$	$SSB_1$	$SSB_0$	$SSC_1$	$SSC_0$
Tariffs A-D and F	Night	Night	Day	Day	Peak	Day
Tariff W/E	Night	Night	Day	Night	Peak	Night

**Table Ax. 4: Classification of night, day and peak ToU tariffs**

Peak period (17.00-18.59) rates are not charged on weekends and holiday periods, with the latter comprising all public holidays, plus Good Friday. While peak period rates were also not charged during Christmas week, i.e. Monday 27th to Friday 31st December 2010 inclusive, a view was taken that the majority of participants would have been unaware of this fact and therefore only Monday 27th and Tuesday 28th December 2010 are classified as holidays (with the actual Christmas public holidays occurring on Saturday 25th and Saturday 26th December).

The percentage difference in the ratios between the test and control groups quantifies the extent to which the ToU tariffs and DSM stimuli impact on electricity usage for those meters participating in the Trial.

Statistical procedures and tests are required to make inferences about the likely impact on the wider residential consumer population. The first step in this requires estimating a measure of variance around the total volume usage figures using a statistical procedure known as bootstrapping. The second step is to calculate a p-value to test the hypotheses detailed above. This can be done directly using the bootstrap replicates.

#### A2.5.2 Bootstrap Re-sampling

In comparing the groups, a 90% confidence interval of volumetric change in each of the groups is derived. Since this is done by aggregating the data within each cell, it is not possible to come up with an asymptotic estimate of uncertainty for this change. However, using bootstrap replications of the data, the underlying sampling distribution of these statistics can be derived.

Bootstrap re-sampling is a method used to enable an assessment of the uncertainty associated with a sample statistic. It involves taking repeated draws of samples of the same size from the original sample and recalculating the statistic of interest on these new samples. This distribution can then be used for statistical testing. The standard deviation of this sampling distribution was used for statistical testing.

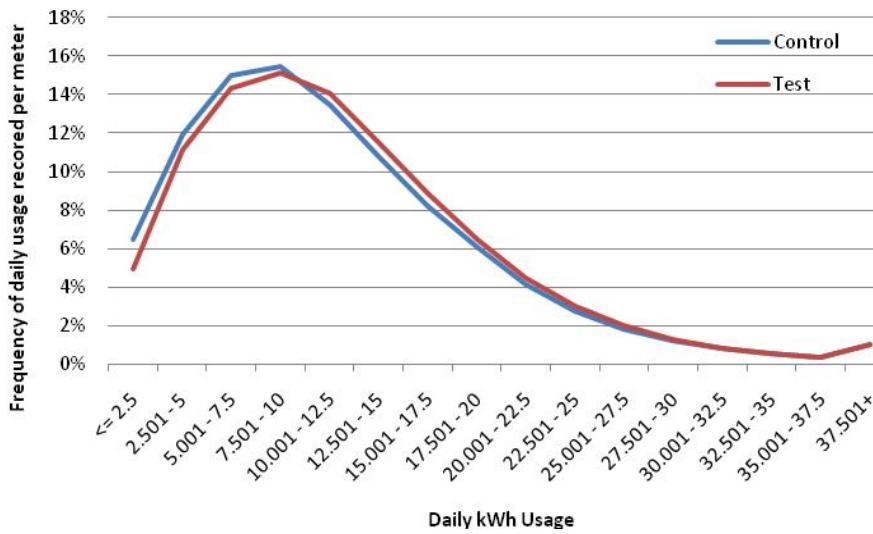
#### A2.5.3 Alternative Approaches

Two alternative approaches were considered when analysing the results. The first was to calculate the average (median and mean) volume of usage for each of the test groups and the control group during the benchmark and trial periods and use these to calculate the ratios.

	Number of Participant Meters	Total Usage (kWh)	Average (Mean) Daily Usage (kWh)
Test	3,296	21,430,618	12.1
Control	929	5,817,193	11.7
<b>Total</b>	<b>4,225</b>	<b>27,247,811</b>	<b>12.0</b>

**Table Ax. 5:** Summary statistics for the cleaned data set

The average daily usage based on the arithmetic mean is provided in **Table Ax. 5**. However, given the skewed nature of the distribution of usage (**Figure Ax. 5**) a more appropriate measure of central tendency is in fact the median, which represents the mid-point of usage within the overall distribution. Therefore, the average daily usage as measured by the median is 10.8kWh for the test group and 10.2kWh for the control group.



**Figure Ax. 5:** Frequency distribution of daily usage (kWh)

Using a measure of central tendency, which yielded a marginally lower reduction in usage at both peak and overall level, it was considered to underestimate the overall impact on the test

group, particularly given that it did not sufficiently capture the effect of changes in usage by high-volume participants.

The second approach considered was to trim the data, excluding meters that recorded extreme usage ratios (i.e. low volumes of usage in the benchmark period and comparatively high levels of usage in the trial period and vice versa). The exclusion of these meters was found to have relatively little impact on the overall results. They were, therefore, included in the final analysis.

## A2.6 Results

An analysis of the results generated from the data is contained within the main body of this report. The detailed tables containing the percentage difference between ratios of volume usage, confidence intervals and p-values for the Residential CBT are set out over the following pages. Specifically, they show:

- the imposition of ToU tariffs and DSM stimuli are found to reduce overall electricity usage by 2.5% and peak usage by 8.8%;
- there is no single tariff group that stands out as being more effective than the others in reducing either overall or peak electricity usage;
- there is no single DSM stimulus that stands out as being more effective than the others in reducing overall electricity usage, while the bi-monthly bill, energy statement and electricity monitor is found to be more effective than the other DSM stimuli in reducing peak usage;
- the statistical evidence suggests that the bi-monthly bill, energy statement and electricity monitor is more effective than the other DSM stimuli in reducing peak usage amongst tariff groups A, C and D.

	Overall	Peak	Day	Night
All excluding control	-2.5	-8.8	-2.6	0.1
Tariff A	-2.7	-7.2	-2.7	-1.0
Tariff B	-3.4	-9.8	-3.4	-0.3
Tariff C	-1.9	-9.0	-2.0	1.3
Tariff D	-2.4	-10.9	-2.6	2.1
Tariff W/E	-3.7	-11.6	-4.8	-3.4
Bi-monthly bill and energy statement	-1.1	-6.9	-1.1	1.5
Monthly bill and energy statement	-2.7	-8.4	-2.6	-0.5
Bi-monthly bill , energy statement and electricity monitor	-3.2	-11.3	-3.3	0.4
Bi-monthly bill, energy statement and OLR incentive	-2.9	-8.3	-3.1	-0.1
A1	-1.4	-6.4	-1.2	0.0
A2	-2.7	-5.5	-2.6	-1.7
A3	-3.2	-10.1	-3.4	0.1
A4	-3.6	-6.7	-3.5	-2.6
B1	-3.0	-8.7	-3.2	0.4
B2	-3.9	-10.6	-3.6	-1.8
B3	-2.5	-8.9	-3.0	1.9
B4	-4.3	-10.8	-4.0	-1.9
C1	-0.2	-6.5	-0.3	2.5
C2	-2.5	-9.0	-2.3	-0.5
C3	-3.3	-12.5	-3.3	0.7
C4	-1.8	-8.2	-2.2	2.5
D1	-0.8	-7.8	-1.1	3.6
D2	-2.0	-11.8	-2.5	3.5
D3	-3.9	-13.9	-3.3	-1.1
D4	-3.2	-10.4	-3.7	1.9

**Table Ax. 6: Observed percentage difference between ratios of volume usage for the test groups and control group in the residential electricity CBT**

	Overall			Peak			Day			Night		
	Lower Bound	Point Est	Upper Bound	Lower Bound	Point Est	Upper Bound	Lower Bound	Point Est	Upper Bound	Lower Bound	Point Est	Upper Bound
All excluding control	-3.5	-2.5	-1.5	-9.9	-8.8	-7.7	-3.5	-2.6	-1.6	-2.0	0.2	2.0
Tariff A	-3.9	-2.7	-1.6	-8.5	-7.2	-5.9	-3.8	-2.7	-1.6	-3.3	-0.9	1.1
Tariff B	-4.9	-3.4	-1.9	-11.8	-9.8	-7.8	-4.9	-3.5	-2.0	-3.1	-0.3	2.4
Tariff C	-3.1	-1.9	-0.8	-10.4	-9.0	-7.6	-3.0	-2.0	-0.9	-1.0	1.3	3.5
Tariff D	-3.9	-2.4	-0.9	-12.8	-10.9	-9.0	-4.1	-2.6	-1.2	-0.6	2.2	4.7
Tariff W/E	-6.9	-3.8	-0.2	-15.7	-11.6	-7.3	-8.4	-4.8	-0.9	-7.1	-3.4	0.6
Bi-monthly bill and energy statement	-2.3	-1.1	0.2	-8.5	-6.9	-5.4	-2.3	-1.1	0.2	-0.9	1.6	3.9
Monthly bill and energy statement	-4.0	-2.7	-1.4	-9.9	-8.4	-6.8	-3.8	-2.6	-1.4	-3.0	-0.5	1.9
Bi-monthly bill , energy statement and electricity monitor	-4.4	-3.2	-2.0	-12.8	-11.3	-9.7	-4.5	-3.3	-2.1	-1.9	0.5	2.7
Bi-monthly bill , energy statement and OLR incentive	-4.2	-2.9	-1.7	-9.8	-8.3	-6.9	-4.3	-3.1	-1.9	-2.5	0.0	2.3
A1	-3.2	-1.4	0.5	-8.5	-6.4	-4.3	-3.0	-1.2	0.7	-3.2	0.1	3.3
A2	-4.2	-2.7	-1.1	-7.5	-5.5	-3.6	-4.1	-2.6	-1.0	-4.6	-1.7	1.3
A3	-4.8	-3.3	-1.6	-12.1	-10.1	-8.1	-5.0	-3.4	-1.9	-2.7	0.1	3.0
A4	-5.3	-3.6	-1.8	-8.5	-6.6	-4.8	-5.2	-3.5	-1.8	-5.6	-2.5	0.5
B1	-5.7	-3.0	-0.2	-12.8	-8.7	-4.6	-5.9	-3.2	-0.4	-4.1	0.4	5.3
B2	-6.9	-3.9	-1.0	-13.9	-10.6	-7.4	-6.3	-3.6	-1.0	-6.9	-1.7	3.6
B3	-4.9	-2.5	0.1	-12.6	-8.9	-4.9	-5.6	-3.0	-0.3	-2.4	1.9	6.5
B4	-6.5	-4.3	-2.0	-14.5	-10.7	-7.0	-6.3	-4.0	-1.7	-5.4	-1.8	1.5
C1	-1.8	-0.2	1.5	-8.7	-6.5	-4.3	-1.8	-0.2	1.4	-0.4	2.5	5.5
C2	-4.3	-2.5	-0.7	-11.2	-9.0	-6.8	-4.0	-2.3	-0.6	-3.6	-0.5	2.5
C3	-4.9	-3.3	-1.6	-14.8	-12.5	-10.2	-4.9	-3.2	-1.6	-2.2	0.7	3.6
C4	-3.4	-1.8	-0.1	-10.2	-8.2	-6.2	-3.7	-2.2	-0.6	-0.8	2.5	6.0
D1	-2.7	-0.8	1.2	-10.7	-7.8	-4.9	-2.9	-1.1	0.8	-0.2	3.6	7.7
D2	-5.4	-1.8	1.2	-16.1	-11.7	-7.6	-5.9	-2.4	0.8	-1.3	3.6	8.5
D3	-6.1	-3.9	-1.6	-17.7	-13.9	-10.1	-5.6	-3.4	-1.0	-4.8	-1.1	2.8
D4	-5.5	-3.2	-0.8	-13.1	-10.4	-7.8	-6.3	-3.7	-1.2	-1.6	1.9	5.5

Lower and upper bounds represent 5th and 95th bootstrapped percentiles

**Table Ax. 7: Bootstrap point estimates and 90% confidence intervals for percentage difference between volume ratio of test group and control group in residential electricity CBT**

		All DSM stimuli		Bi-monthly bill and energy statement		Monthly bill and energy statement		Bi-monthly bill, energy statement and electricity monitor		Bi-monthly bill, energy statement and OLR incentive	
		Pt Est	p-value	Pt Est	p-value	Pt Est	p-value	Pt Est	p-value	Pt Est	p-value
Overall	Tariff A	-2.7	<0.01	-1.4	0.23	-2.7	0.01	-3.2	<0.01	-3.6	<0.01
	Tariff B	-3.4	<0.01	-3.0	0.08	-3.9	0.02	-2.5	0.12	-4.3	<0.01
	Tariff C	-1.9	0.01	-0.2	0.83	-2.5	0.02	-3.3	<0.01	-1.8	0.08
	Tariff D	-2.4	0.01	-0.8	0.50	-2.0	0.33	-3.9	0.01	-3.2	0.03
	Tariff A-D			-1.1	0.18	-2.7	<0.01	-3.2	<0.01	-2.9	<0.01
	Tariff W/E	-3.8	0.08								
	All Tariffs	-2.5	<0.01								
Peak	Tariff A	-7.2	<0.01	-6.4	<0.01	-5.5	<0.01	-10.1	<0.01	-6.7	<0.01
	Tariff B	-9.8	<0.01	-8.7	<0.01	-10.6	<0.01	-8.9	<0.01	-10.8	<0.01
	Tariff C	-9.0	<0.01	-6.5	<0.01	-9.0	<0.01	-12.5	<0.01	-8.2	<0.01
	Tariff D	-10.9	<0.01	-7.8	<0.01	-11.8	<0.01	-13.9	<0.01	-10.4	<0.01
	Tariff A-D			-6.9	<0.01	-8.4	<0.01	-11.3	<0.01	-8.3	<0.01
	Tariff W/E	-11.6	<0.01								
	All Tariffs	-8.8	<0.01								
Day	Tariff A	-2.7	<0.01	-1.2	0.30	-2.6	0.01	-3.4	<0.01	-3.5	<0.01
	Tariff B	-3.5	<0.01	-3.2	0.06	-3.6	0.03	-3.0	0.07	-4.0	0.01
	Tariff C	-2.0	<0.01	-0.3	0.80	-2.3	0.03	-3.3	<0.01	-2.2	0.02
	Tariff D	-2.6	<0.01	-1.1	0.33	-2.5	0.22	-3.3	0.02	-3.7	0.02
	Tariff A-D			-1.1	0.16	-2.6	<0.01	-3.3	<0.01	-3.1	<0.01
	Tariff W/E	-4.8	0.04								
	All Tariffs	-2.6	<0.01								
Night	Tariff A	-0.9	0.46	0.0	0.96	-1.7	0.35	0.1	0.95	-2.6	0.17
	Tariff B	-0.3	0.86	0.4	0.89	-1.8	0.59	1.9	0.47	-1.9	0.38
	Tariff C	1.3	0.33	2.5	0.15	-0.5	0.81	0.7	0.71	2.5	0.22
	Tariff D	2.2	0.20	3.6	0.12	3.5	0.23	-1.1	0.64	1.9	0.37
	Tariff A-D			1.6	0.30	-0.5	0.75	0.5	0.74	0.0	>0.99
	Tariff W/E	-3.4	0.16								
	All Tariffs	0.2	0.87								

Bootstrap p-values based on testing the hypothesis  $H_0$ : the change relative to the control group for the population is equal to zero. Results statistically significant in bold using a 90% confidence level (i.e. p-value<0.10)

**Table Ax. 8: Residential electricity CBT observed % difference between volume ratios for test groups and the control group with bootstrap p-values**

		Bi-monthly bill and energy statement	Monthly bill and energy statement	Bi-monthly bill, energy statement + electricity monitor
Overall	Monthly bill and energy statement	<b>0.04</b>		
	Bi-monthly bill, energy statement and electricity monitor	<0.01	0.48	
	Bi-monthly bill, energy statement +OLR incentive	<b>0.01</b>	0.72	0.72
Peak	Monthly bill and energy statement	0.16		
	Bi-monthly bill, energy statement + electricity monitor	<0.01	<b>0.01</b>	
	Bi-monthly bill, energy statement +OLR incentive	0.15	0.96	<0.01
Day	Monthly bill and energy statement	<b>0.04</b>		
	Bi-monthly bill, energy statement + electricity monitor	<0.01	0.36	
	Bi-monthly bill, energy statement +OLR incentive	<b>0.01</b>	0.50	0.81
Night	Monthly bill and energy statement	0.12		
	Bi-monthly bill, energy statement + electricity monitor	0.37	0.45	
	Bi-monthly bill, energy stateemnt +OLR incentive	0.22	0.72	0.70

Results statistically significant in **bold** using a 90% confidence level (i.e. p-value<0.10)

Table Ax. 9: P-values for tests of cross-effects for DSM stimuli derived from residential CBT data

		Tariff A	Tariff B	Tariff C	Tariff D
Overall	Tariff B	0.43			
	Tariff C	0.18	<b>0.08</b>		
	Tariff D	0.71	0.34	0.55	
	Tariff W/E	0.60	0.86	0.36	0.51
Peak	Tariff B	<b>0.03</b>			
	Tariff C	<b>0.03</b>	0.54		
	Tariff D	<0.01	0.46	0.11	
	Tariff W/E	<b>0.09</b>	0.53	0.33	0.82
Day	Tariff B	0.37			
	Tariff C	0.23	<b>0.08</b>		
	Tariff D	0.95	0.45	0.44	
	Tariff W/E	0.36	0.57	0.21	0.36
Night	Tariff B	0.62			
	Tariff C	<b>0.02</b>	0.27		
	Tariff D	<b>0.02</b>	0.14	0.53	
	Tariff W/E	0.28	0.21	<b>0.04</b>	<b>0.03</b>

Results statistically significant in bold using a 90% confidence level (i.e. p-value<0.10)

Table Ax. 10: P-values for tests of cross-effects for tariff group derived from CBT data

	Overall			Peak			Day			Night		
	A1	A2	A3	A1	A2	A3	A1	A2	A3	A1	A2	A3
A2	0.31			0.57			0.26			0.41		
A3	0.15	0.63		<b>0.02</b>	<b>&lt;0.01</b>		<b>0.07</b>	0.47		0.99	0.35	
A4	<b>0.099</b>	0.47	0.80	0.86	0.43	<b>0.01</b>	0.08	0.46	0.96	0.23	0.69	0.18
	B1	B2	B3	B1	B2	B3	B1	B2	B3	B1	B2	B3
B2	0.68			0.52			0.84			0.59		
B3	0.81	0.51		0.95	0.56		0.91	0.75		0.67	0.34	
B4	0.51	0.87	0.33	0.54	0.96	0.56	0.69	0.84	0.60	0.47	0.96	0.20
	C1	C2	C3	C1	C2	C3	C1	C2	C3	C1	C2	C3
C2	<b>0.06</b>			0.15			<b>0.09</b>			0.13		
C3	<b>0.01</b>	0.55		<b>&lt;0.01</b>	<b>0.05</b>		<b>0.01</b>	0.44		0.32	0.57	
C4	0.19	0.56	0.22	0.28	0.63	<b>0.01</b>	<b>0.08</b>	0.95	0.38	0.96	0.18	0.41
	D1	D2	D3	D1	D2	D3	D1	D2	D3	D1	D2	D3
D2	0.61			0.18			0.55			0.99		
D3	<b>0.06</b>	0.39		<b>0.03</b>	0.52		0.17	0.69		0.10	0.17	
D4	0.16	0.58	0.69	0.23	0.65	0.19	0.14	0.60	0.85	0.53	0.61	0.26

Results statistically significant in bold using a 90% confidence level (i.e. p-value<0.10)

**Table Ax. 11: P-values for tests of cross-effects for DSM stimuli combinations within tariff groups derived from CBT data**

	Overall			Peak			Day			Night		
	A1	B1	C1	A1	B1	C1	A1	B1	C1	A1	B1	C1
B1	0.39			0.40			0.28			0.93		
C1	0.37	0.13		0.98	0.41		0.47	0.11		0.23	0.47	
D1	0.68	0.25	0.67	0.49	0.76	0.52	0.96	0.27	0.51	0.16	0.33	0.65
	A2	B2	C2	A2	B2	C2	A2	B2	C2	A2	B2	C2
B2	0.51			<b>0.02</b>			0.55			0.99		
C2	0.89	0.46		<b>0.03</b>	0.46		0.79	0.45		0.55	0.72	
D2	0.70	0.42	0.77	<b>0.02</b>	0.73	0.32	0.92	0.62	0.96	<b>0.09</b>	0.19	0.19
	A3	B3	C3	A3	B3	C3	A3	B3	C3	A3	B3	C3
B3	0.63			0.63			0.79			0.50		
C3	0.98	0.62		0.16	0.17		0.88	0.87		0.76	0.65	
D3	0.66	0.45	0.67	0.13	0.11	0.58	0.97	0.84	0.94	0.61	0.34	0.48
	A4	B4	C4	A4	B4	C4	A4	B4	C4	A4	B4	C4
B4	0.63			<b>0.08</b>			0.72			0.79		
C4	0.14	<b>0.096</b>		0.28	0.28		0.28	0.21		<b>0.02</b>	<b>0.07</b>	
D4	0.82	0.54	0.37	<b>0.04</b>	0.90	0.23	0.90	0.87	0.37	<b>0.06</b>	0.14	0.84

Results statistically significant in bold using a 90% confidence level (i.e. p-value<0.10)

**Table Ax. 12: P-values for tests of cross-effects for tariff groups within DSM stimuli derived from CBT data**

## Appendix 3: Profile of Residential Participation

### A3.1 Introduction

In order to ensure that the trial results were truly representative of the entire population, it was necessary to ensure representivity across the trial participants from recruitment to completion of the Trial. Representivity was assessed and interventions or corrections executed at the following points:

- **Recruitment to the Trial:** To ensure that the consumers invited to participate in the Trial were representative of the entire population of electricity consumers. This is assessed through analysis of the profile of the entire population and the invitation set. The recruitment was undertaken in multiple waves to allow for correction in the subsequent invitation sets.
- **Acceptance into the Trial:** To ensure that the set of participants was representative of the entire population of electricity consumers. This is assessed through analysis of the profile of set of acceptances and comparison with the population of non-respondents to the Trial (captured through a non-response survey). It should be noted that no participant was excluded from the Trial on the basis of lack of representivity. However, representivity issues were noted for consideration in the final analysis of results.
- **Allocation:** To ensure that the participants in each experimental cell were representative of the entire population of electricity consumers. The allocation algorithm profiled participants across all available survey and usage data to assign participants across the experimental cells. Corrections were made to improve representivity across each factor.
- **Attrition:** To ensure that attrition did not impact on the representivity of the Trial. This was assessed through comparison of the profile of attritors and non-attritors and an attrition survey.
- **Expectations of the Trial:** To examine the motivations of the participants

### A3.2 Recruitment

Recruitment to the Customer Behaviour Trial was on a voluntary basis (with a small financial incentive associated with the completion of the survey). It has been noted in other smart meter trials and more generally in trials of technical innovations in the energy field that there is a significant risk of over-representation of more highly educated or affluent consumers. As has been described in Section 4 above, the invitation communication was carefully designed and tested to minimise this tendency. This was achieved through the use of accessible language and addressing of concerns that might disproportionately discourage recruitment from less educated or less affluent groups. However, it was recognised that the recruitment process needed to be structured to further control for this type of bias and other potential biases such as disproportionate participation among higher or lower electricity users.

To address these concerns, a framework for the selection of consumer for receipt of the recruitment communications was developed. The aim of this framework was to maximise the representivity of the participants in the pilot. To allow for correction of representivity issues during recruitment a multi-wave approach was chosen with invitations dispatched in five groups.

#### **A3.2.1 Selection of the population for invitation and acceptance into the Trial**

The primary objective was that the set of potential recruits would be representative of consumers across the available demographic, behavioural and usage profiles. This objective was constrained by limitations associated with the type of data held by electricity suppliers and in a minority of cases technical limitations.

The information available on the recruitment population included:

- **Contact details:** name of the participant, telephone number and contact address;
- **Location of the meter:** address, county, urban/rural location and region. It was assumed that the location of the meter matched the location of the respondent.
- **Behaviour and usage information:** Overall consumption for 2007 and 2008, payment method (direct debit, at local post office, etc), score representing history of payments and supplier CRM segment.

It should be noted that no information was available prior to recruitment on demographics, household profile or indications of factors such as discretionary use of electricity.

Additional constraints were placed on the recruitment:

- Participation was limited to customers of Electric Ireland: At the point of recruitment in Q4-2008, the decision was made to limit participation to consumers who were then customers of Electric Ireland. At this time, Electric Ireland represented 100% of the residential electricity market (by number of customers) and therefore this limitation did not impact on the representivity of the Trial. However, during the period of the Trial competition in the residential electricity market increased with associated implications on attrition. The implications of this attrition on the on-going representivity are dealt with in the A3.4 below.
- Participation was limited to those who had been at their current address for at least 12 months prior to the recruitment. This restriction was put in place to exclude residential consumers most likely to move during the period of the Trial and hence attrite.
- Consumers who had opted out of sales and marketing contact from their supplier. It should be stressed that this was done as a precaution as invitation letters would not be considered part of this opt-out.
- Consumers who used Night Saver rate electricity (typically associated with storage heaters which charge using cheaper night-rate electricity measured by a second meter).
- Consumers classified by Electric Ireland to be in arrears or liable to disconnection were also excluded.

### A3.2.2 Methodology

A population set of 345,645 residential consumers provided by Electric Ireland was used from which to select invitees. A two step methodology was adopted:

1. Select consumers on the basis of usage profile
2. Assess acceptances against usage and other available profiling information (e.g. location). Adjust next wave of invitations to compensate for any discrepancies

Profile No	Lower barrier	usage	Upper barrier	usage	% of total	Standard deviation of profile
1	Lower 1		Lower 2		23%	534
2	Lower 2		Medium 1		31%	501
3	Medium 1		Medium 2		24%	501
4	Medium 2		Higher 1		14%	565
5	Higher 1		Higher 2		6%	821
6	Higher 2		Higher 3		2%	2772

**Table Ax. 13: Distribution of usage profiles**

Usage profiles were generated which allowed the population to be divided into six slices and the distribution of profiles and slices verified as similar against available data as is shown in **Table Ax. 13**. Note that actual boundary values are not included for commercial confidentiality reasons.

Using this methodology, four waves of invitations were selected and dispatched. Representivity of the acceptances were verified after each wave and adjustments to the subsequent waves made to maximize the overall representivity of the set of acceptances.

Installation data							
Profile	Lower bound	Upper bound	% of population	6th Oct	14th Apr	11th May	4th June
1	Lower 1	Lower 2	23%	15%	22%	21%	22%
2	Lower 2	Medium 1	31%	31%	29%	29%	29%
3	Medium 1	Medium 2	24%	27%	26%	27%	27%
4	Medium 2	Higher 1	14%	17%	18%	17%	17%
5	Higher 1	Higher 2	6%	7%	4%	4%	4%
6	Higher 2	Higher 3	2%	3%	1%	1%	1%

Initial set of responses 

**Table Ax. 14: Representivity of acceptances of invitations across recruitment waves**

The effectiveness of the approach can be seen in **Table Ax. 14** which shows the proportion of the entire population in each usage slice and the running proportion after inclusion of acceptances from each invitation wave. It can be clearly seen that initial acceptances under-represented low usage band consumers in the 14<sup>th</sup> April wave and subsequent waves. However, this imbalance was successfully addressed as can be seen in

Figure Ax. 6 which compares the usage distribution between the set of consumers who agreed to participate on the Trial (approximately 5,000 consumers) and the full recruitment population (approximately 345,000 consumers).

Through the recruitment process representivity by location, house-type and Electric Ireland segment<sup>1</sup> was also monitored to ensure no representivity issues emerged.

### A3.2.3 Results

As has been outlined in the previous section, the respondent set was compared with the entire population set of 345,000 residential consumers and this analysis was repeated on completion of recruitment.

The primary factor included in recruitment was the usage information about each potential recruit (the recorded usage for 2008). **Figure Ax. 7** shows the usage distribution among the recruited set (in red) and among the entire population (blue). It is clear than even with the adjustments made during the recruitment process, there is under-representation among lower usage consumers and over-representation among medium to high consumption consumers. There are some clear variations among the participant set, with differences in standard deviation (recruited: 2,338; population: 2,771) and skew (recruited: 1.39; population: 2.55).

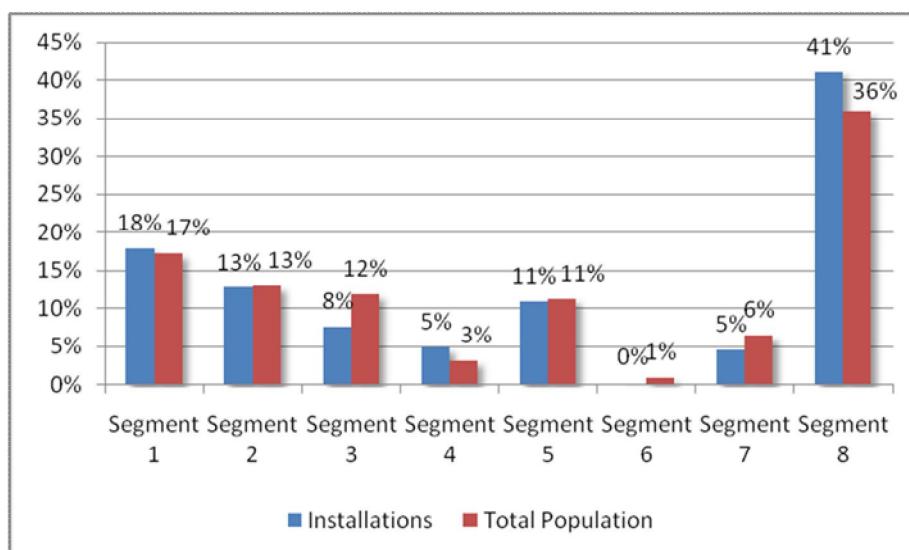
This representation issue was expected as those with lower consumption have less incentive to participate. However, the level of over- and under-representation is relatively low and has a minimal impact on estimates of volumetric changes as the under-represented low usage consumers contribute proportionately less to the total quantity of electricity consumed.

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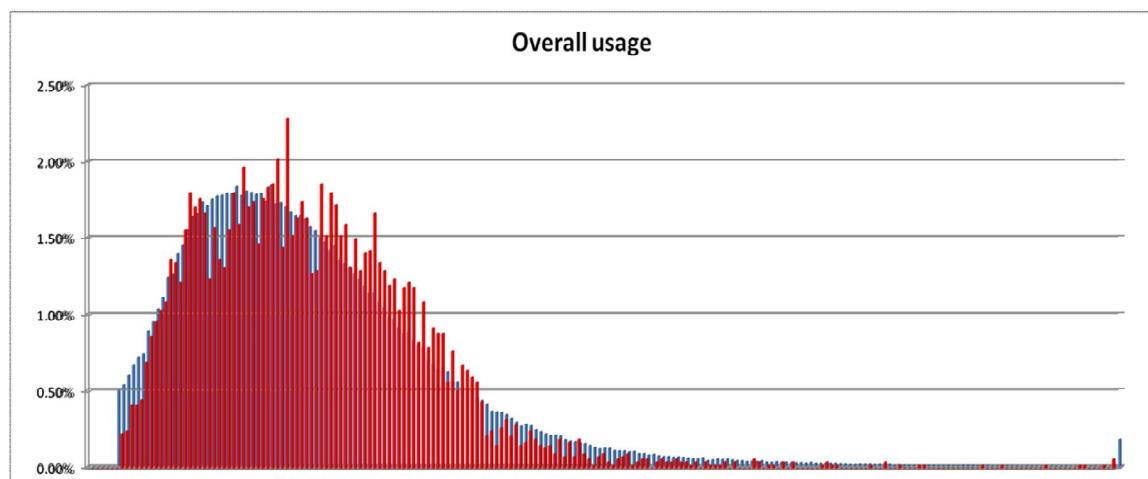
<sup>1</sup> Electric Ireland segments its customers into a number of behavioural segments which capture usage profiles, payment behaviours and other recorded attributes. Segment names are commercially sensitive information and therefore not included in this report.

Representivity across available behavioural (as captured in Electric Ireland segments) and demographical information (such as location and house type) was also assessed. The first assessment across segments (

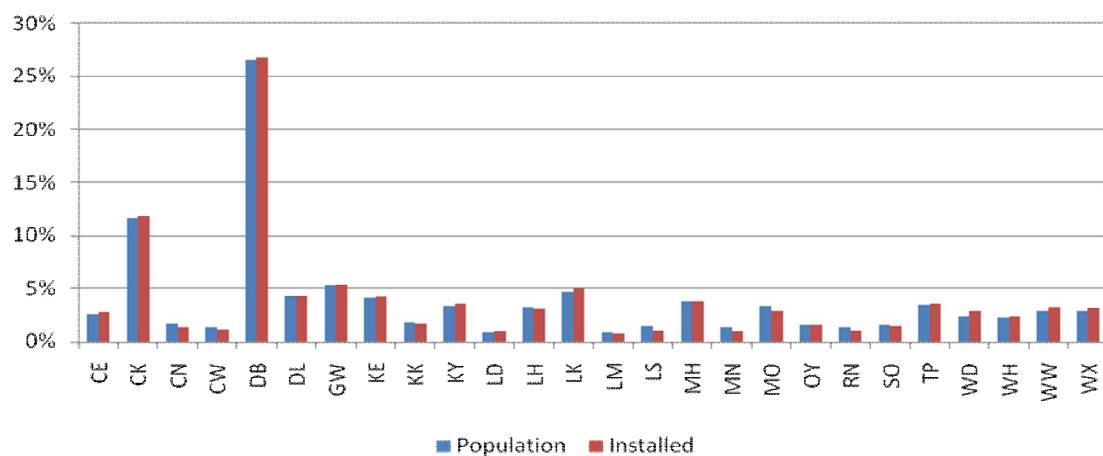
Figure Ax. 6) shows discrepancies in representation in Segment 3 and Segment 8. Further analysis determined that these discrepancies were related to the selection criteria (exclusion of consumers with arrears and night-savers). Assessment of representivity by location (**Figure Ax. 7**) summarises this by county) shows a close match between recruited set and population.



**Figure Ax. 6: Comparison in segment proportions between final acceptances and population of ESB Customer Supply residential consumers**



**Figure Ax. 7: Comparison in usage distribution between recruitment population (blue bars) and final acceptances onto the trial (red bars)**



**Figure Ax. 8: Comparison in county level distribution between acceptances (red bars) and total population (blue bars)**

Analysis of other available profiling information also reflected the representivity of the set of acceptances. This included:

- Payment method (i.e. direct debit, post, cash payment at post office etc)
- Credit worthiness score (i.e. record of timely payment)
- Urban/rural split
- Representation of consumers in receipt of Free Electricity Allowance

#### A3.2.4 Conclusions

The recruitment process successfully delivered a set of residential consumers, representative of the entire population of consumers. Issues identified are unlikely to impact on the overall assessment of behaviour change and overall usage reduction in the Trial.

### A3.3 Acceptance into the Trial

To ensure that the set of consumers wishing to participate in the Trial was similar to the whole population, a non-response survey was completed and the profile of responses among non-respondents and trial participants compared.

Note that this comparison was only possible once the recruitment process was completed (as the pre-trial survey was undertaken immediately prior to allocation to ensure that information used was as accurate as possible). Therefore, the results of this analysis were exclusively used to adjust final analysis of the results of the Trial.

#### A3.3.1 Methodology

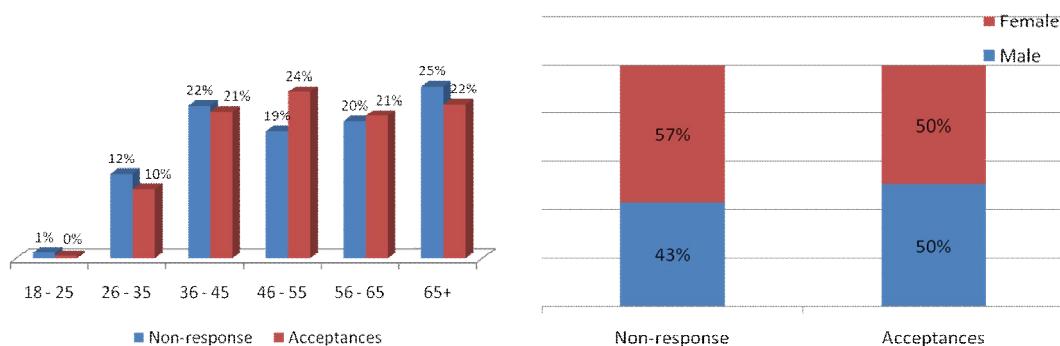
The non-response survey was conducted using Computer Assisted Telephone Interviewing (CATI) once recruitment had been completed in July 2009.

The non-response survey matched the pre-trial survey across the following dimensions:

- Demographic profile of respondent across age, occupation and social classification of chief income earner. This includes participation of individuals deemed to be fuel poor (using the behaviour definition rather than the financial definition).
- Domestic profile across number and age profile of residents
- Attitudinal profile across energy usage at societal and personal level
- Experiential profile across efforts and impact of home energy reduction
- Profile of home across size, age, heating method
- Use of electricity for heating and appliances
- Recall of the invitation letter and assessment of impact of the communication

##### i) Representativity across demographic and household profiles

Across age and gender, some divergence emerges between acceptances into the Trial and the respondents to the non-response survey (shown in **Figure Ax. 9**).

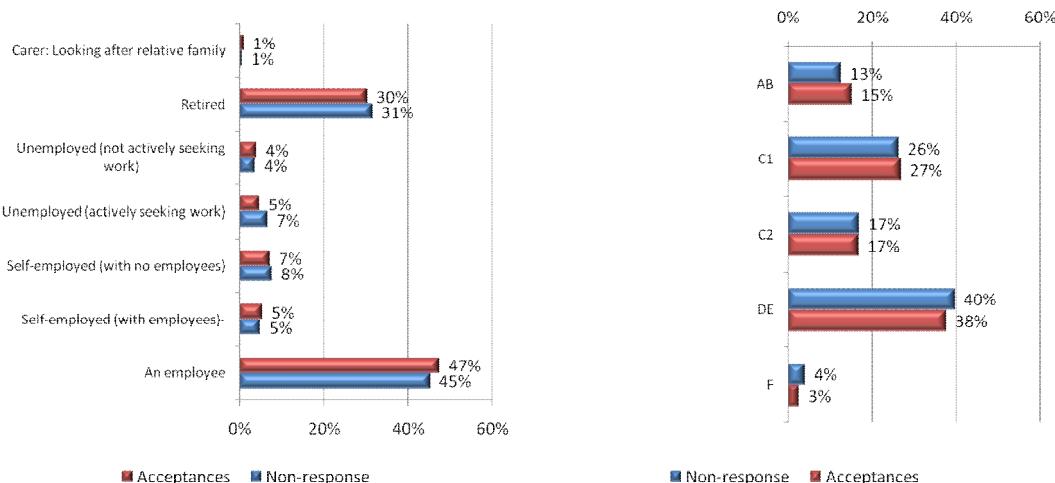


**Figure Ax. 9: Age and gender distribution of trial participants and non-respondents to invitation letter**

The under representation in the under 35 age profile reflects the exclusion of residential consumers with short residency at the address. This is more likely to be from this age profile. The higher proportion of females among non-respondents is not amenable to immediate

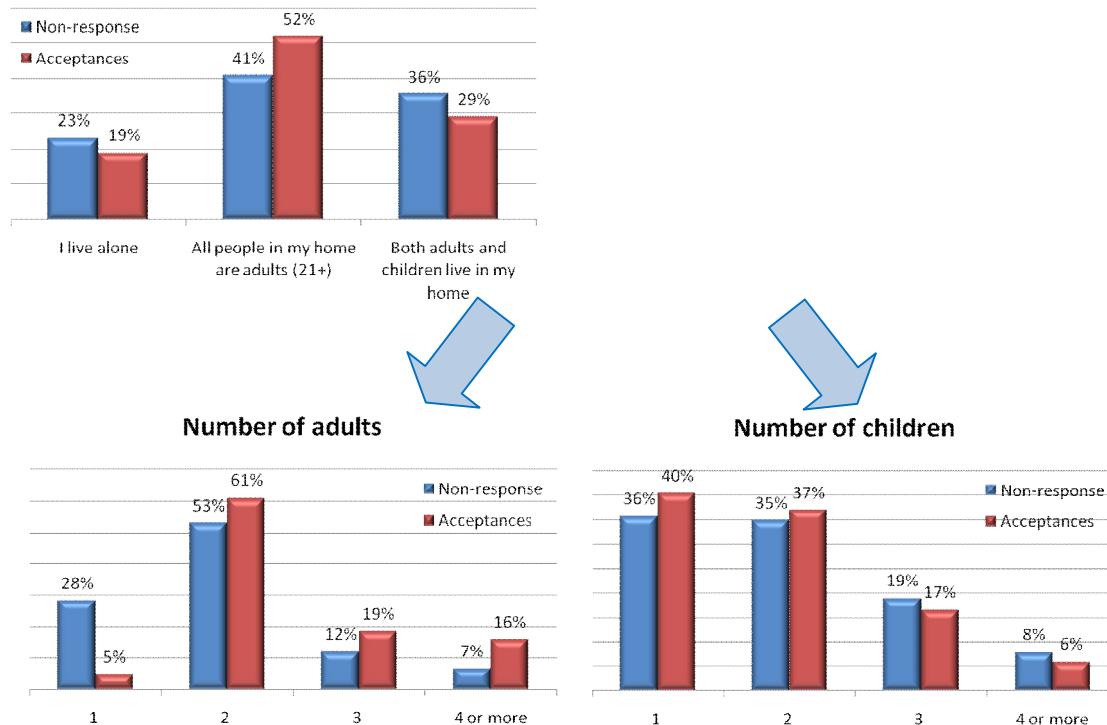
explanation. However, it should be noted that an imbalance in the gender of respondents does not imply an imbalance in the profile of the household members as the respondent corresponds to the customer as named on the bill. Therefore, while it should be noted, it does not impact on the level of electricity usage or potential reduction and hence the trial outputs.

**Figure Ax. 10** shows the differences in employment status and social classification between acceptances to the Trial and respondents to the non-response survey. As was noted in the A.3.2 above, a challenge associated with smart meter trials is to address over representation of consumers with higher levels of usage; consumers who are more affluent; and more educated consumers. These consumer categories are more liable to engage with and respond to this type of trial. Through the wave-based model of invitation, the Trial was able to address under-representation among lower usage levels. Although not directly included within the recruitment process, social grade and employment status can be seen to be representative. This is probably due to associations between usage level and these dimensions.



**Figure Ax. 10: Profile of trial participants and non-respondents by occupation of chief income earner and social classification**

Household structure was also investigated as a key driver of overall usage. **Figure Ax. 11** compares the household structure among acceptances and respondents to the non-response survey.



**Figure Ax. 11: Proportion of single and multiple person households with breakdowns of number of adults and children among trial participants and respondents to non-response survey**

Differences in these populations emerge with smaller households under-represented in the trial population (both single person and two person households) and households with three or more children also under-represented to a minor degree. The reduced participation of smaller households reflects the lower impact of potential savings and the general under-representation of lower usage consumers. On that basis, the impact on the analysis of overall reduction would be low. However, this under-representation was considered in the analysis of behavioural impacts.

## ii) Participation by fuel poor households

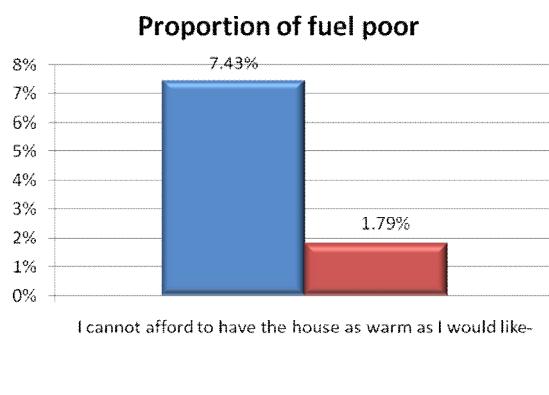
Fuel poor households are defined to be households which cannot afford to keep their home adequately warm. There are two potential definitions:

- **A financial definition:** A fuel poor household is one which needs to spend more than 10% of its income on total fuel use<sup>2</sup>. This definition does not consider the level of actual spend on fuel.
- **A behavioural definition:** A fuel poor household is one which reports behaviours consistent with the definition (stated inability to afford the home adequately, or behaviours associated with an inadequately warm home).

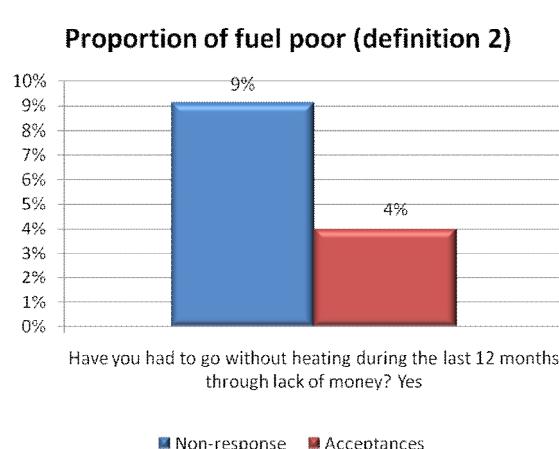
<sup>2</sup> Definition first used in “Fuel poverty: from cold homes to affordable warmth”, B. Boardman, Belhaven Press, London 1991

The Trial adopted the second definition while recognising that self-reporting introduces a degree of subjectivity. However, it has the advantage that it can be easily incorporated within the market research element of the Trial. In contrast, assessment of fuel poverty using the first definition would require estimation of household energy needs in order to estimate the associated cost and hence the percentage of total income required to meet this heating need.

The participation by fuel poor households in the Trial is an important component of the Trial as this group could be adversely impacted by Time of Use tariffs and therefore assessment of this impact is an objective of the Trial. **Figure Ax. 12** shows a much lower level of participation in the Trial among those matching the stated definition of fuel poor. However, use of the behavioural definition (the additional requirement that the individual states that they have gone without heating during the previous 12 months due to lack of money) narrows the distinction between the two populations to a degree (shown in **Figure Ax. 13**). It should be noted that the proportion reported in this research is lower than that estimated by the Institute of Public Health in Ireland (10% in 2007<sup>3</sup>) or ESRI (19.4% in 2008<sup>4</sup>) – using different approaches to measurement



**Figure Ax. 12: Proportion of fuel poor in trial participants and among respondents to non-response survey**

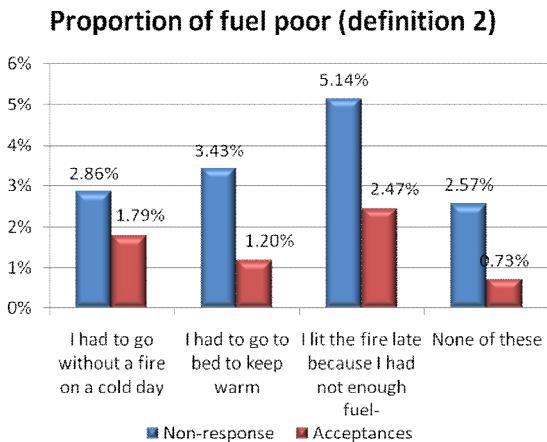


<sup>3</sup> "Annual Update on fuel poverty and health 2009", Institute of Public Health in Ireland

<sup>4</sup> ESRI reference

**Figure Ax. 13: Proportion of fuel poor using stricter definition among trial participants and respondents to non-response survey**

The behaviour exhibited by fuel poor participants and non-response survey respondents also reflects these different levels (**Figure Ax. 14**).



**Figure Ax. 14: Behaviours exhibited by fuel poor (percentages on base of entire population)**

Therefore, it is concluded that fuel poor residential consumers were recruited in a lower proportion than exists in the general population as represented by the respondents to the non-response survey. As with other groups under-represented, the impact of this under-representation does not impact on the overall reduction associated with the Trial. However, it is considered in the analysis of impact of fuel poor households on participation in the Trial and the potential impact in any national roll-out of smart meters.

### iii) Profile of electricity usage

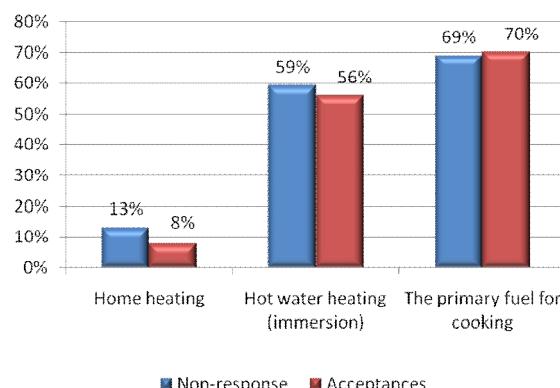
Total usage does not indicate the level of discretionary usage available to households from both time shifting and overall reduction. In particular, UK research has suggested that wet appliances (such as washing machines, dish washers, clothes dryers) are the largest component of discretionary usage<sup>5</sup>. Therefore, levels of ownership among acceptances and respondents to the non-response survey would indicate if the acceptances are representative and have similar levels of discretionary usage. It should be recognised that the risk of self-exclusion based on levels of discretionary usage is low as research has indicated that consumers have low awareness of the actual contribution of discretionary usage to their overall usage.

With regard to non-appliance use of electricity, **Figure Ax. 15** demonstrates the similarity between the acceptances and respondents to the non-response survey apart from the use of electricity as a heating method. This reflects the exclusion from the Trial of consumers using NightSaver as this is the most common tariff for home heating using electricity. These uses

<sup>5</sup> “Smart tariffs and household demand response for Great Britain. March 2010” (2010) G. Owen and J. Ward, SustainabilityFirst

of electricity are not typically less discretionary with regard to overall usage but are potential sources of discretionary time shifting of usage.

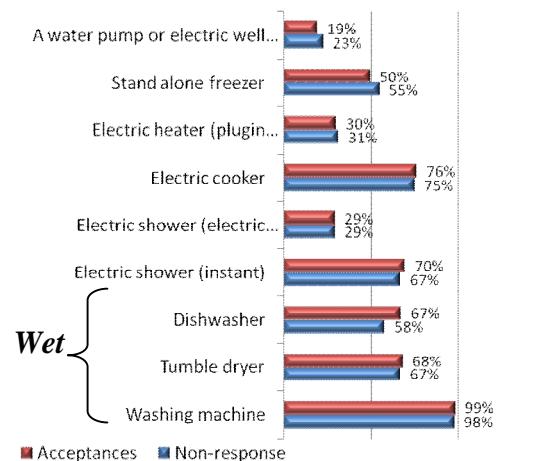
#### Non-appliance uses of electricity



**Figure Ax. 15:** Non-appliance use of electricity among trial participants and respondents to non-response survey

**Figure Ax. 16** compares the presence of general appliances in the acceptances and respondents to the non-response survey. Both tumble dryer and washing machines (two out of the three “wet” appliances) are equally represented in both populations. The lower rate of presence of dishwashers is associated with the lower representation of smaller households (as the need for a dishwasher increases with household size). Across other general appliances (not including appliances primarily used for entertainment purposes), rates of presence are similar.

#### General appliance use of electricity

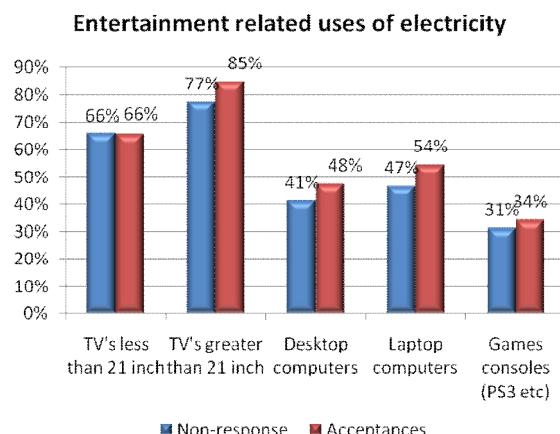


**Figure Ax. 16:** General appliance use of electricity among trial participants and respondents to non-response survey

The final dimension of electricity usage measured was the presence of entertainment focused appliances (**Figure Ax. 17**) among the Trial participants and respondents to the non-response survey. This class of appliance is regarded as less open to discretion in UK research (a

conclusion that will be verified in this research) but still represents a significant proportion of overall household electricity usage.

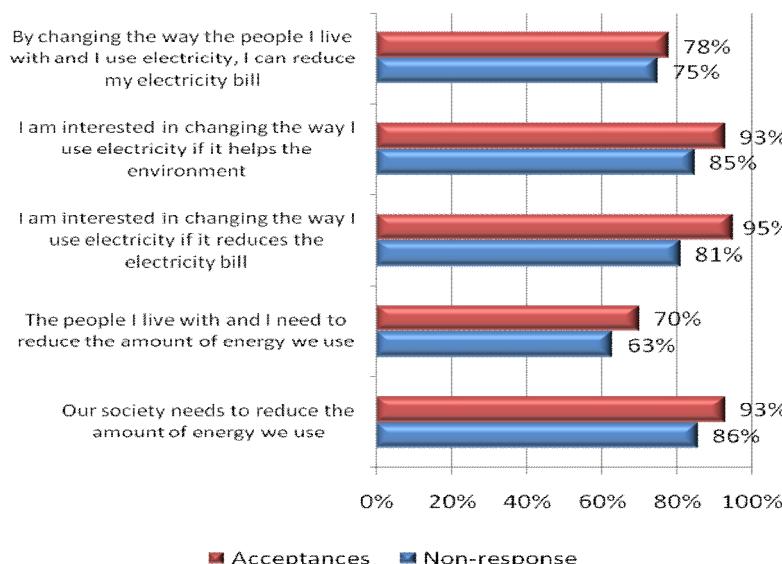
There is a greater prevalence of these devices among the Trial participants than among the respondents to the non-response survey. This is again a reflection of the demographic and household make-up differences already identified.



**Figure Ax. 17: Entertainment uses of electricity among trial participants and respondents to non-response survey**

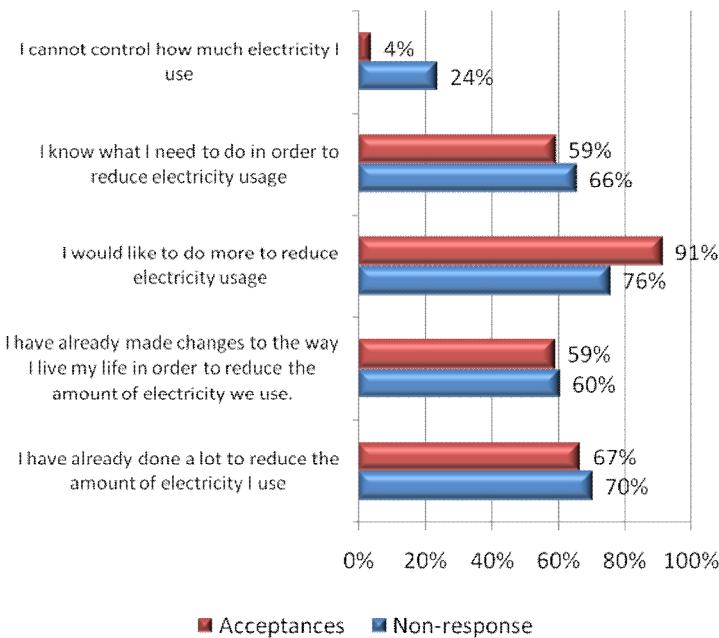
#### iv) Attitudes towards and experience of energy reduction

The purpose of measuring the representivity of trial participants across attitudinal and experiential dimensions was to investigate whether trial participants are likely to be more engaged with the topic of energy reduction and potentially respond to the ToU tariffs and DSM stimuli to a greater degree than the general population. It should be noted that any tendency to reduce usage in response to societal pressures exerted external to the Trial is incorporated within the experimental design as the control group is drawn from the same population as the test groups and hence should exhibit the same tendencies.



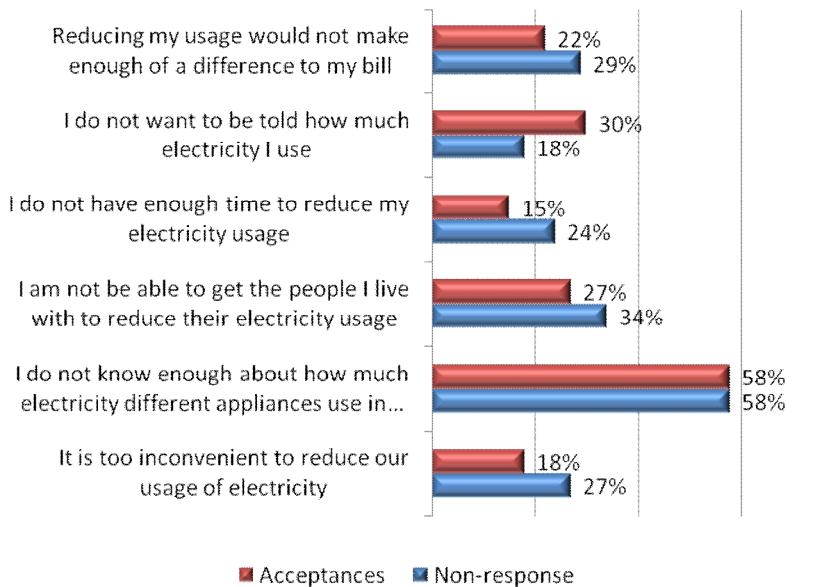
**Figure Ax. 18: Comparison of attitudes towards energy reduction among trial participants and respondents to non-response survey**

**Figure Ax. 18** shows that across general assessment of engagement with the topic of energy at both societal and individual level, the responses of the non-response survey are lower than those of trial acceptances. The difference is greatest for the questions which are most closely related to the behaviour changes (“*I am interested in changing the way I use electricity if it helps the environment*” and “*I am interested in changing the way I use electricity if it reduces the electricity bill*”).



**Figure Ax. 19: Comparison of engagement with energy reduction among trial participants and respondents to non-response survey**

However, across many measures of potential or actual engagement with energy reduction there is little difference between the two groups (shown in **Figure Ax. 19**). For instance, reported historic change is similar (“*I have done a lot to reduce the amount of electricity I use*” and “*I have already made changes to the way I live my life ...*”). In contrast, respondents to the non-response survey are less likely to feel empowered to reduce electricity (24% stated that they could not control how much electricity they use) and less engaged (76% state that they would like to do more to reduce electricity usage). Therefore, the analysis of actual reduction will compare those respondents who stated that they could not control usage and those respondents who stated that they would not like to do more to reduce their electricity usage.



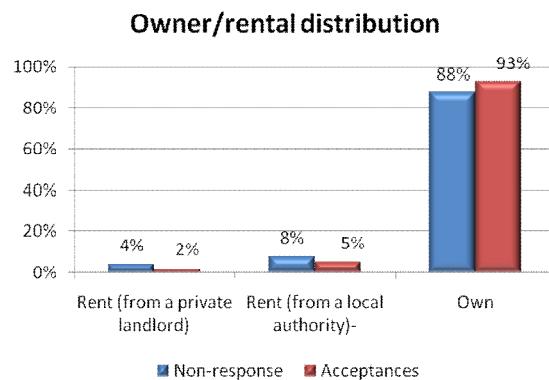
**Figure Ax. 20: Perceived barriers to engagement with energy reduction among trial participants and non-response survey respondents**

Considering potential barriers to engagement with the topic of energy reduction, acceptances are less likely to perceive barriers to energy reduction than non-response survey respondents in most areas and less likely to believe that energy reduction is inconvenient.

Therefore, it can be summarised that non-respondents are less likely to be engaged with the topic of energy reduction and less likely to believe that they can effect change in their usage through energy reduction. However, they are not more likely to be individuals already engaged in energy reduction behaviours. To ensure that this does not bias the results of the Trial, the analysis will include comparisons between the actual energy reduction by groups reporting these perceptions.

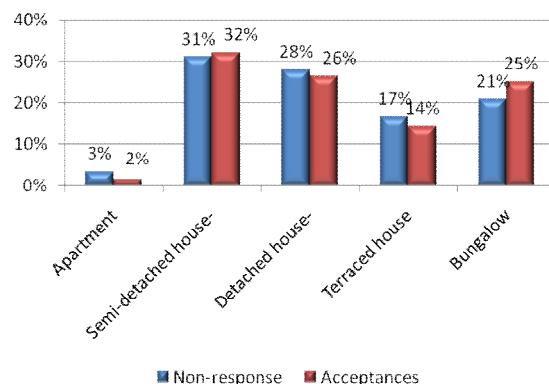
#### v) Profile of homes

Home profile was also assessed among trial participants and respondents to the non-response survey to ensure that the two populations were similar. Aspects such as home owner/renter status may impact on the occupant's ability to reduce energy use as might the age of the house, house size and heating method used.



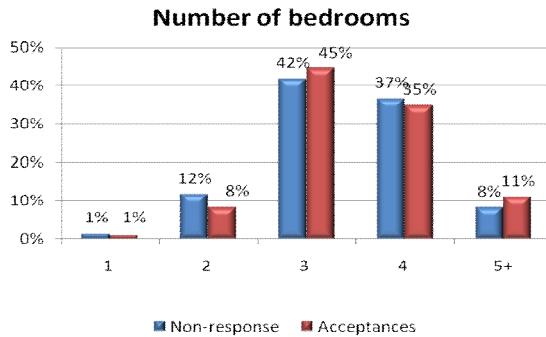
**Figure Ax. 21: Distribution of owner/renter among trial participants and respondents to non-response survey**

**Figure Ax. 21** shows that 93% of acceptances own their own homes in comparison with 88% of the respondents to the non-response survey. This is higher than the national figure of 80% and reflects the exclusion of consumers who have recently changed address as these are more likely to be non-owners.



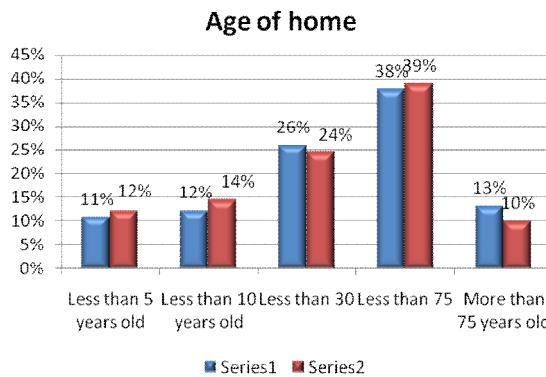
**Figure Ax. 22: Distribution of home types among trial participants and respondents to non-response survey**

The distribution of home types is also similar across semi-detached and detached houses but differs for terraced houses and bungalows (**Figure Ax. 22**). The level of difference is relatively small and may again reflect deviations in total usage levels among the two populations.



**Figure Ax. 23: Distribution in the number of bedrooms among trial participants and respondents to non-response survey**

**Figure Ax. 23** shows the distribution in the number of bedrooms between the two populations. These do vary but show no systematic pattern suggesting bias.

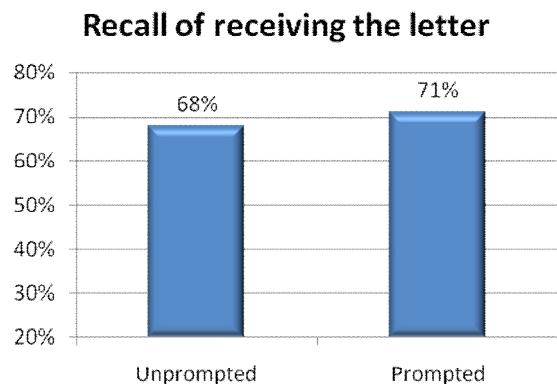


**Figure Ax. 24: Distribution of home age among trial participants and respondents to non-response survey**

**Figure Ax. 24** shows the distribution of home age among acceptances and respondents to the non-response survey. It should be noted that home age should not have a large impact on electricity use as most consumers do not use electricity for space heating. Nevertheless, it is supportive of the overall representivity claim that the home age distribution is similar between the two groups.

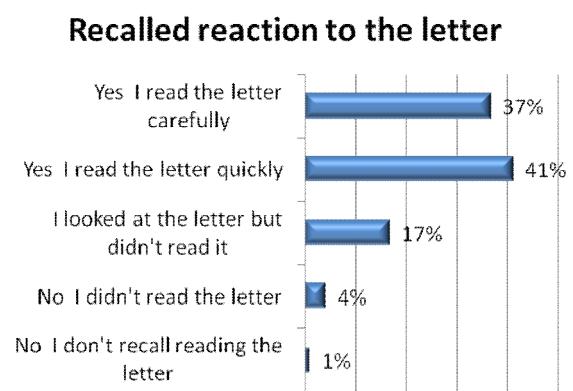
#### vi) Recall and impact of invitation communications

It should be stressed that the effectiveness of the communication can be accessed through the acceptance levels achieved. In the context of determining the factors associated with the communication which might have led to the decision not to participate, non-respondents were asked about their recall and reaction to the letter. This information should be used to enhance any future communication related to the potential national roll-out of smart meters.



**Figure Ax. 25: Prompted and unprompted recall of the arrival of the letter among respondents to the non-response survey**

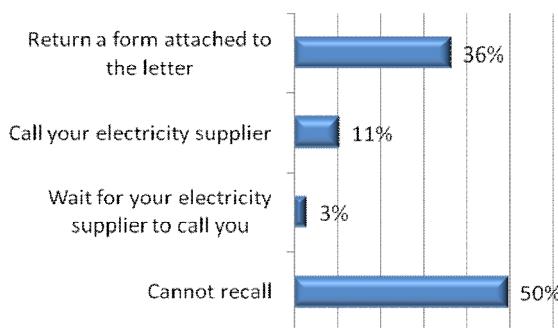
Recall of the letter (**Figure Ax. 25**) was satisfactory as the survey was carried out approximately up to four weeks after receipt of the letter. Most respondents claimed to have read the letter (**Figure Ax. 26**) with 78% either reading the letter carefully or quickly. Therefore, the method of delivery of the communication and the content should be deemed to be effective.



**Figure Ax. 26: Recalled reaction to the receipt of the letter among respondents to non-response survey**

Among the 78% who recalled the letter, 47% correctly recalled the call to action (**Figure Ax. 27**) with 50% not recalling the call to action. It should be stressed that low recall of the call to action is expected given the participants did not act on the call.

### Recall of call to action



**Figure Ax. 27: Recall of call to action on invitation letter**

Among respondents who recalled the invitation letter, 39% stated that they had made a decision not to participate (**Figure Ax. 28**). This represents 27% of all non-respondents.

### Reasons for non-participation



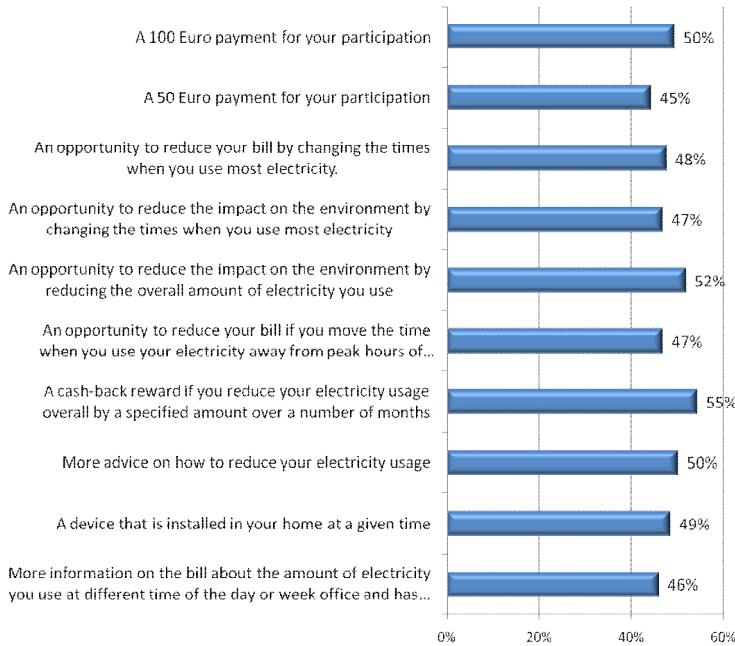
**Figure Ax. 28: Stated reason for non-participation among respondents to non-response survey**

Among respondents who had made a decision not to participate concerns about the inconvenience of meter installation (40%) and lack of benefit to the participant (45%) were the reasons most commonly cited (**Figure Ax. 29**). The concern about inconvenience of installation was identified as a significant concern in the pre-recruitment qualitative research and impacted upon 11% of all non-respondents.

### Reasons for decision not to participate



**Figure Ax. 29: Stated reason for decision not to participate**



**Figure Ax. 30: Changes in trial proposition which would have impacted on decision not to participate**

In order to verify that the approach to recruitment did not lead to disproportionate representation of consumers with an interest in reducing usage, the non-response survey asked if changes to the Trial as understood by the non-responders would have encouraged them to participate.

Of the tested ‘changes’ (shown in **Figure Ax. 30**), only the proposal to increase the payment was not already part of the trial design. Approximately half of the invited consumers who decided not to participate would have been encouraged to participate if the features of the Trial had been fully explained. This is consistent with the finding that 45% of participants did not see any benefit from the Trial as presented (**Figure Ax. 29**). It should be stressed that the communications deliberately did not provide details of the Trial in order to minimize the impacting on the profile of respondents and for the operational reason that the participants were only allocated after the benchmark period was completed (and therefore participants could not be told they were getting an electricity monitor).

#### vii) Conclusions

There are a number of differences between the set of participants and the population of consumers who were invited to participate but decided not to. These divergences should not impact on the analysis of the level of overall reduction. However, they need to be incorporated into the analysis of the behaviour changes.

### A3.4 Analysis of attrition

Reasons for attrition included a consumer request to withdraw (or in some cases medical incapacity or death of the participant), change of tenancy where the participant moves home and changes of supplier.

At the point of recruitment in Q4-2008, the decision was made to limit participation to consumers who were then customers of ESB Customer Supply. During the lifetime of the Trial, significant market changes resulted in Electric Ireland's share of the residential electricity market falling to 64.95% (by number of customers) by the end of 2010. Switching was deemed to be a reason for removal from the Trial because:

- For test group participants, switching supplier results in price changes which could not be accommodated within the Time of Use tariffs
- For control group, switching supplier may result in behaviour change due to the price change

Within the experimental design, it was assumed that there would be a certain level of attrition (as outlined in Section 4). Analysis of attrition was conducted along two dimensions:

1. Assessment of the level of attrition at a cell level within the experimental design to identify prior to the completion of the Trial whether the ability of the Trial to identify the target effect was impacted.
2. Assessment of the attritors to determine if the act of attrition was an impact of the Trial which would need to be incorporated within the analysis; or random events unconnected with the Trial. This analysis is completed across the complete set of attrition to determine the proportion of attrition that can be identified as a trial impact.

The second dimension assessed through the attrition survey investigated the degree to which tariff, technology or the additional information might result in attrition.

#### A3.4.1 *Methodology*

Attrition levels were reported to the programme by the supplier (Electric Ireland) at regular intervals and compared to the level of attrition incorporated within the experimental design.

The attrition survey was conducted using Computer Assisted Telephone Interviewing (CATI) periodically throughout the Trial with attrition since the previous survey included within the subsequent wave.

### A3.4.2 Attrition

The total attrition since the start of the Trial (i.e. post recruitment) is shown in **Table Ax. 15**. The attrition threshold<sup>6</sup> for the Trial was 20% overall or in any cell. Therefore, the level of attrition is within that original target.

	Bi-Monthly Detailed Bill	Monthly Detailed Bill	Bi-Monthly Detailed Bill + IHD	Bi-Monthly Detailed bill + Overall Load Reduction	
Tariff A	23.4%	21.4%	19.8%	20.9%	21.4%
Tariff B	17.9%	19.8%	14.9%	21.5%	18.0%
Tariff C	19.0%	19.6%	20.3%	19.3%	19.5%
Tariff D	17.8%	14.9%	23.0%	18.7%	18.6%
	20.3%	19.4%	19.8%	20.1%	
Weekend					14.9%
Control group					24.7%
				<b>Total</b>	<b>20.9%</b>

**Table Ax. 15:** Percentage attrition since the start of the Trial (pre-allocation to cells in the experimental design)

Of more relevance to the assessment of whether attrition is an impact of the Trial is the level of attrition after the deployment of the ToU tariffs and DSM stimuli **Table Ax. 15**. The level of attrition does vary by tariff. However, the degree of difference is similar to that prior to deployment of the ToU tariffs and stimuli (the difference between the scores in **Table Ax. 15** and **Table Ax. 16**) and therefore cannot be ascribed to the impact of the ToU tariffs and DSM stimuli without additional support from the survey. Similarly, it is not possible to examine the rate of attrition in the period after deployment of the ToU tariffs and DSM stimuli as the Trial occurred during a period when there was increased switching among residential electricity consumers. Therefore, the conclusion of impact can only be made based on analysis of the attrition survey.

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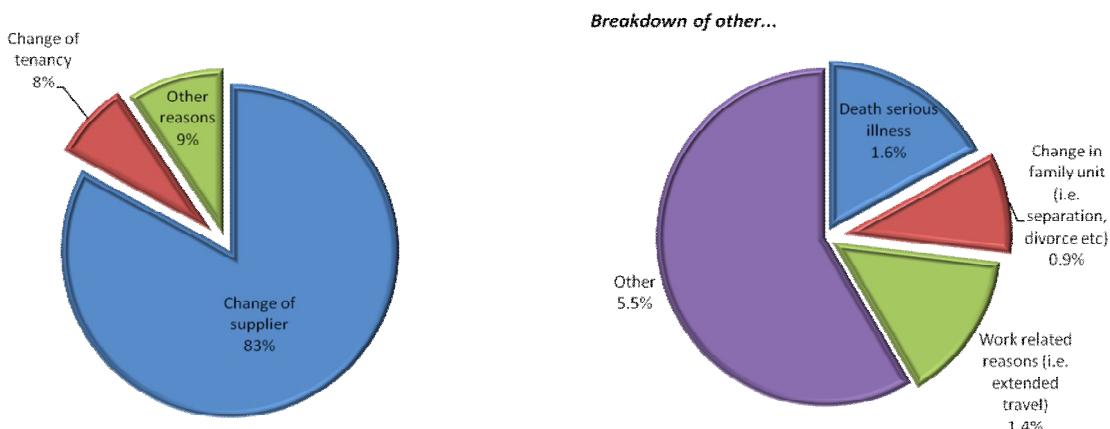
<sup>6</sup> The attrition threshold is the rate of attrition beyond which the power of the trial to detect the level of reduction required would be impacted if the variability was equal to the level estimated prior to the trial. The overall level and the level in the cell corresponding to the combination of Tariff A and a bi-monthly bill. However, the degree of variability was also lower and therefore the power of the trial was not negatively impacted.

	Bi-Monthly Detailed Bill	Monthly Detailed Bill	Bi-Monthly Detailed Bill + IHD	Bi-Monthly Detailed bill + Overall Load Reduction	
Tariff A	17.1%	14.2%	12.5%	13.1%	13.5%
Tariff B	12.7%	14.6%	10.2%	15.2%	12.2%
Tariff C	12.1%	12.4%	11.7%	11.9%	11.5%
Tariff D	11.9%	13.0%	16.1%	13.5%	12.4%
Weekend Control group	13.1%	12.8%	11.8%	12.0%	14.9%
					18.0%
				Total	14.3%

**Table Ax. 16: Percentage attrition since the deployment of ToU tariffs and DSM stimuli across experimental cells**

#### A3.4.3 Reasons for attrition

The stated reason for attrition among 83% of respondents was change of supplier with change of tenancy (where the participant had moved home) the second most common reason as shown in **Figure Ax. 31**. However, it should be noted that 20% of respondents were not aware that they were no longer in the Trial with 17% of participants who had switched supplier unaware that this had excluded them from the Trial. This was despite that fact that from April 2010 any participant who attrited was sent a final bill and reconciliation by Electric Ireland.

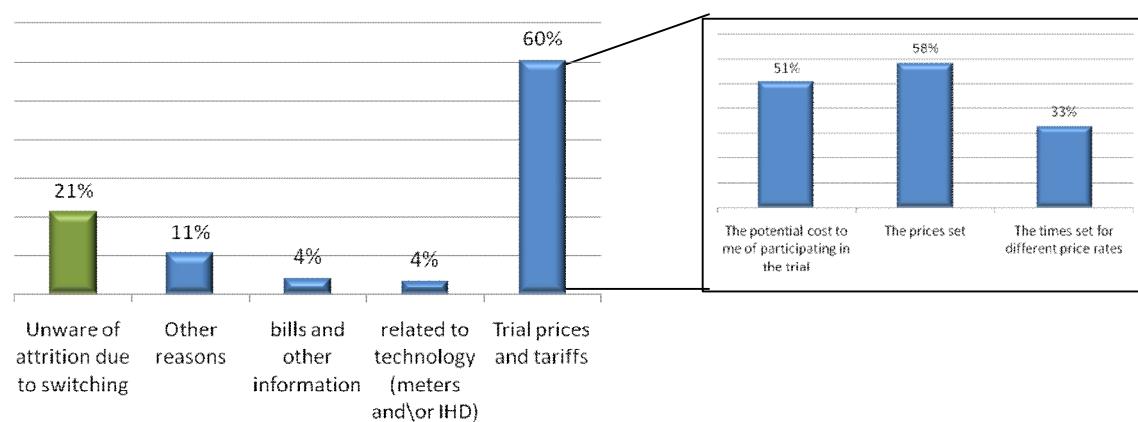


**Figure Ax. 31: Reason for attrition**

The objective is to determine whether this attrition represents normal market movements or reflects an impact of the Trial which should then be incorporated within the measurement.

Among attritors who changed supplier, the reason for the switch appears to have been independent of any potential impact of the Trial. None of these switchers stated that the tariffs and or technology were a factor in this decision. 5% stated that the consumption reports and other information contributed to the decision.

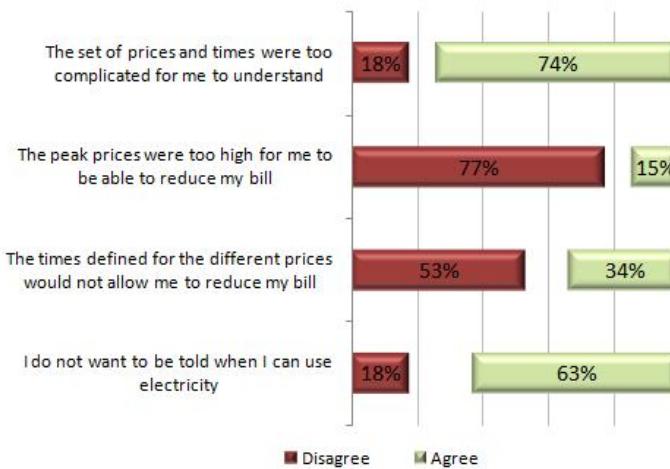
However, among those who left the Trial for reasons other than changes in living circumstances or personal reasons (such as extended travel, death or changes in family unit), ToU tariffs and DSM stimuli were a concern for 73% compared to 4% who stated the installed technology (meters and/or the electricity monitor) and 5% who stated bills and other information were concerns.



**Figure Ax. 32: Concerns about trial among leaving the trial for non-personal reasons or changes in living circumstances**

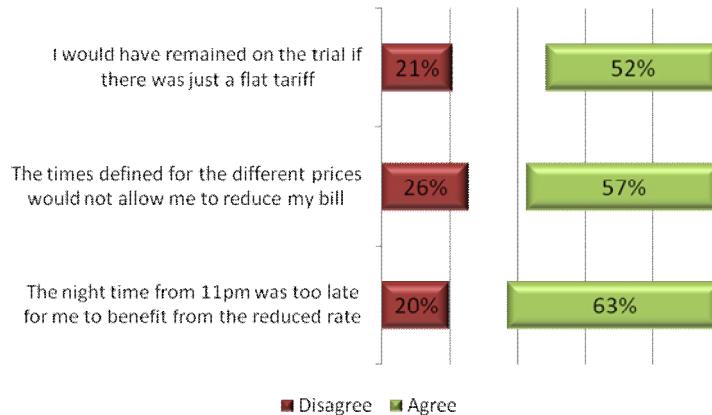
Among those concerned with the trial ToU tariffs and DSM stimuli, the potential costs and actual tariffs were of greater concern than times set (**Figure Ax. 32**). Of the 51% who were concerned about trial tariffs and DSM stimuli, 87% were not able to estimate the scale of the potential cost and 24% were unaware of the balancing payment at the end of the Trial. It should be stressed that the question explicitly referenced the purpose of the balancing payment to reimburse any additional costs and therefore it is reasonable to assume that increased awareness would have reduced the level of concern among attritors.

Among those concerned about the tariffs set, the level of peak prices set was most commonly identified (77%). This is in line with outputs of qualitative research which highlighted the ‘sticker shock’ associated with peak prices reflecting the lack of analytic ability to translate peak unit prices into the overall electricity bill.



**Figure Ax. 33: Significance of factors in switching decision among attritors who specified prices set as an area of concern**

However, responses to the impact of potential adjustments to the tariffs (**Figure Ax. 33**) suggest that it was the combination of peak price and the times set. Over half state that they would have remained part of the Trial if the times were defined in a way that would have allowed them to reduce their bill and 63% citing a change in the start time for the night rate (from 23.00 to earlier).



**Figure Ax. 34: Impact of changes to tested tariff on attritors with concerns about the prices set**

No other reasons were rated as significant by participants. Tested reasons and levels of concern are shown in **Figure Ax. 35**.

Potential reason	% stating this as a concern leading to attrition
The electricity use target set for me (OLR only - small sample)	0%
The potential of saving costs made me look around for cheaper prices more generally.	0%
The physical smart meter installed in my home	5%
The IHD	0%
The paper bill that is sent out	4%
The lack of information about the trial	6%
The amount of time required for me to participate in the trial	0%
My ability to change my usage of electricity	6%
Others having access to my electricity usage data	1%

**Figure Ax. 35: Other reasons for tested for impact among attritors**

#### A3.4.4 *Conclusions*

The timing of the Trial meant that it coincided with a period of greatly increased price driven competition and consequential switching. Therefore, even in cases where the stated reason for attrition is the impact of the Trial, it is not easy to separate the impact of the increased price awareness from the impact of a tested tariff.

The analysis of attrition by tariff tested provides more insight because it allows the impact of difference price points to be assessed.

## Appendix 4: Allocation of participants

### A4.1 Residential Allocation

#### A4.1.1 Introduction

Allocation of the trial participants into one of the experimental cells or the control group was performed in December 2009. Allocation occurred after the completion of the pre-trial survey and used this information as well as actual smart meter usage data captured since installation.

Participants were allocated to each experimental cell using an algorithm which ensured that each cell was representative across the measurable dimensions. The allocation achieved this by characterising the set of participants across multiple dimensions and then allocating similar individuals into each test cell and the control group.

The dimensions available for characterisation varied as some individuals did not respond to the survey. Therefore the allocation algorithm also allowed allocation based on non pre-trial data only.

The population of 5,375 acceptances onto the Trial were allocated into 17 test cells with 1,000 allocated to the control group.

#### A4.1.2 Constraints and Exclusions

In addition, there were a number of constraints in place on allocation to ensure:

- Distribution of participants who use e-billing approximately across each cell.
- Distribution of participants who are in receipt of fuel allowances (such as the Free Electricity Allowance) approximately equally across each cell.
- Distribution of participants who pay by Electric Ireland's Equaliser payment option (where total annual bill is spread evenly across each bi-monthly bill based on actual usage in the previous year and corrected through the year based on actual usage). It was important to include these individuals as they are representative of the entire population. These participants were removed from the Equaliser option for the duration of the Customer Behaviour Trial.
- Allocation of consumers in non-electricity monitor (EM) cells where technical issues precluded the use of an electricity monitor.

Additional exclusions were applied during allocation:

- GPRS network strength issues: Four participants were excluded due to lack of sufficient GPRS network strength at the meter location.

- Pending or completed change of supplier: 168 participants had switched supplier by the point of allocation, 39 participants were in the process of switching supplier and 41 participants had moved home (all specified reasons for exclusion from the Trial).

#### **A4.1.3 Allocation**

The population to allocate was made up of approximately 4,300 respondents to the pre-trial survey and approximately 1,000 participants who had not responded to the survey.

Each participant was assigned to one of a set of “categories”. Each category was defined such that:

- Each category was sufficiently *coherent* to ensure representivity when participants are randomly allocated across the cells
- Each category had sufficient members to allow placement of members into each of the 17 experimental cells and the control group in the required ratios. This meant that each category must have at least 21 members.

Therefore, the maximum number of categories was 215. This in turn limited the potential dimensions that could be used in profiling to four factors with three levels and one factor with two levels.

The factors considered for inclusion in the allocation for survey respondents included:

1. 2007 usage
2. Pay by direct debit
3. Region (county level)
4. Overall Usage level measured during 13 weeks of usage data available at allocation
  - o Divided into 6 categories (categories 1 to 4 containing 20% of the population + categories 5 & 6 containing 10% at top)
5. Splits across time bands (the % in each of the bands – high peak usage will be most impacted by ToU)
  - o Peak usage splits – 4 bands (<6%, <9%, <12%, >12%)
  - o Night usage splits – 4 bands (<14%, <19%, <25%, >25%)
6. Level of variation of usage (as percentage of usage level) between weekly usage overall and also peak usage
  - o Week to week std in usage – 4 bands (<12%, <17%, <25%, >25%)
  - o Week to week std in peak usage – 3 bands (<1.6%, <2.4%, >2.4%)
7. Size of household:
  - o Number of occupants
  - o Number of bedrooms
  - o Size of house
  - o Type of house
8. Social and demographic classification

- Socio-economic classification
  - Income coded into 5 bands
  - Reported education
  - Employment status: outside of the home, carer/retired or unemployed
9. Level of discretionary usage across categories (this methodology is explained in greater detail in the section on trial participant profiles)
- Percentage of total usage classified as Wet (including washing machines, dishwashers and driers)
  - Percentage of total usage classified as Electronics
10. Investment in energy saving as an indicator of likelihood to invest further in change
11. Interest in behaviour change in order to reduce usage
12. Engagement in energy usage reduction

Each dimension of classification was tested to determine whether it was orthogonal to the other dimensions of measurement using **Proper Orthogonal Decomposition** (also known as **Principal Component analysis**). This analysis identified five combinations of factors which explained 50% of variability in usage. The definition of the vectors is shown below:

Composition of Eigen vectors	Eigen Vectors				
Factors	V1	V2	V3	V4	V5
Peak band	-0.178	0.577	-0.065	0.085	-0.087
Night band	0.103	-0.526	0.101	0.142	0.153
Overall Weekly Usage Variance	-0.039	0.1	0.133	0.164	0.485
Overall Peak Usage Variance	-0.152	0.53	0.01	0.193	0.207
Number in house	-0.395	-0.003	-0.11	-0.288	-0.276
# of bedrooms	-0.312	-0.119	-0.078	-0.247	-0.197
Internet access	-0.414	-0.119	0.006	0.095	-0.078
Income band	-0.463	-0.12	0.043	0.039	0.094
Education classification	-0.361	-0.178	0.071	0.196	0.288
Employment status	-0.401	-0.087	0.036	0.1	0.125
Wet	0.013	0.006	0.028	0.582	-0.304
Electronics	-0.004	-0.092	0.044	0.568	-0.398
Energy reduction engagement band	0.022	-0.047	-0.646	0.08	0.103

**Table Ax. 17: Definition of Vectors**

It can be seen that V1 is linked to home participants profile, V2 is linked to usage profile, V3 is linked to interest and engagement with energy reduction, V4 is associated with appliance usage profile and V5 is less clearly interpretable.

Examination of the correlation structured exposed strong correlation between V4 and V5 (0.723) and on that basis V5 was dropped from the allocation.

The value of each Eigen vector was calculated for each participant and then allocated to a level to classify participants into the profiles.

Using this classification, participants for each profile were randomly allocated to each experimental cell.

To ensure that the cells were representative across each factor included in the Eigen vectors and all other available factors, distributions were examined. Where significant discrepancies were identified participants were reallocated to ensure representativity at an individual factor level. Participants who had not responded to the pre-trial survey were allocated using the same algorithm using factors 1 to 6 identified above.

## A.4.2 SME Allocation

### A.4.2.1 Introduction

Allocation of the trial participants into one of the experimental cells or the control group was performed in December 2009. Allocation occurred after the completion of the pre-trial survey and used survey information as well as actual smart meter usage data captured since installation.

The SME Trial included participants who were customers of both Electric Ireland and Bord Gais Energy. The available stimuli and the tariffs differed by supplier:

- Electric Ireland customers were allocated across the four DSM stimuli (Bi-monthly bill with energy usage statement; monthly bill with energy usage statement; bi-monthly bill, energy usage statement and electricity monitor; and bi-monthly bill, energy usage statement and access to on-line usage information).
- Bord Gáis Energy customers were all allocated to the bi-monthly bill and energy usage statement DSM stimulus

Participants were allocated to each experimental cell using an algorithm which ensured that each cell was representative across the measurable dimensions. The allocation achieved this by characterising the set of participants across multiple dimensions and then allocating similar individuals into each test cell and the control group.

The dimensions available for characterisation varied as some individuals did not respond to the survey. Therefore the allocation algorithm also allowed allocation based on non pre-trial data only.

From the population of 650 participants in the trial, 382 were allocated into four test cells with 268 allocated to the control group.

#### A.4.2.2 *Constraints and Exclusions*

In addition, there were a number of constraints in place on allocation to ensure:

- Participants were drawn from the following sectors: Light industrial manufacturing, entertainment (hotels, bars, restaurants etc), Office and business services, Retail
- All participants were using meters requiring manual reading (i.e. all quarter or half-hour meters were excluded. There are meters which record usage for each a 15 minute or 30 minute time slice).
- Any participant with a 3-phase supply was also excluded due to technical issues.

Additional exclusions were applied during allocation:

- GPRS network strength issues: Four participants were excluded due to lack of sufficient GPRS network strength at the meter location.
- Pending or completed change of supplier

#### A.4.2.3 *Allocation*

The primary allocation requirements were that

- Sufficient representation across each sector was allocated to each experimental cell
- Sufficient representation across each category (GP24 or Nightsaver) was allocated to each experimental cell

Given the smaller population size compared to the Residential Trial, these requirements meant that allocation focused on the two primary factors with other factors being used to validate representivity. When necessary, adjustments were made in the allocation to improve representivity across these secondary factors through switching of allocated participants between experimental cells.

Secondary factors included were:

- Usage profile based on available benchmark and historic data including
  - Overall and peak usage level
  - Usage splits across time bands
  - Weekend/weekday usage split
  - Level of variation of usage across weeks and bands
  - Week to week overall and peak usage
- Total reported business turnover
- Reported level of electricity spend as a percentage of total cost base
- Total Hours of business operation per week
- Length of tenure in current location
- Adoption of Energy efficiency measures
- Usage profiles across types such as cooling, heating, office, manufacturing, lighting
- Engagement with energy efficiency.

## **Appendix 5: Outcome of Focus Groups conducted during the Customer Behaviour Trial**

### **A5.1 Introduction to Consumer Research**

During the Customer Behaviour Trial a number of focus groups were conducted by The Research Perspective Ltd to explore different aspects of the trial design with relevant consumer groups including:

Detailed from each of these is outlined in the following pages.

The Smart Meter Customer Behavioural Trial sought to incorporate consumer feedback for critical consumer impacting decisions during the project. The objective of enlisting consumer support at these stages was to ensure the efficient deployment of communications, ToU tariffs and DSM stimuli that would be understood from a consumer perspective. Those selected for participation in the qualitative research were selected to mirror the usage and socio-economic attributes of the trial participants. The trial participants themselves were specifically excluded from this research initiative.

Aspect requiring Research	Approach
<b>Communication:</b>	Focus Groups on the Invitation Letter and supporting documentation (Residential) – August 2008
<b>Tariff Design</b>	Focus groups on the Time of Use Tariff (Residential) – October 2008
<b>Electricity Monitor Interface design</b>	Focus Groups on Design of the Electricity Monitor (Residential) – October 2008
<b>Detailed Bill Design</b>	Focus Groups on Design of the Detailed Bill (Residential and SME) – February 2009
<b>Time of Use Tariff Design</b>	Focus Groups to examine Consumer reaction to Time of Use Tariffs (Residential) – August 2009- 6.7%

## A5.2 Focus Groups on the Invitation Letter (Residential) – August 2008

Four customer focus groups were conducted in August 2008 by The Research Perspective Ltd in order to assist in the design of the Letter of Invitation to participate in the Trial. Given that the objective of the Trial was to assemble a group of consumers that was nationally representative, among others, from the perspective of location, usage level and variation, socio-economic profile, household type, size and composition.

The approach to the focus group research recruitment mirrored the representivity requirement of the Trial in general and thus represented a mix of urban, rural, age, usage level, ages, gender, social class and household type.

The objective of these focus groups was to determine the need for modifications to the invitation letter in order to maximise:

- the initial response to the letter in terms of uptake of the invitation to participate
- sustained commitment to participate in the Trial.

The suite of proposed communications was tested in order to assess impact and success, specifically:

- The proposed envelope,
- Three variations on the letter and
- The FAQ brochure.

### *A5.2.1 Envelope*

Findings from the research show that the design of the envelope will ensure it will be opened. The current design was, therefore, found to achieve its objective.

### *A5.2.2 Invitation Letter*

The response to the letter of invitation was positive as it was concluded by the research group participants that the impact of the Customer Behaviour Trial, conveyed by the design of the letter, was positive.

While the invitation was of interest to both male and female participants, acceptance of the invitation was considered to be a male decision. Where a household comprised both males and females such as a husband/wife or spouses/partners, the female research group participants indicated that they would typically consult husbands/partners on matters related to energy and its usage.

The letter of invitation appealed in different ways: males were more interested in information that related to the physical meter (as a gadget) and the extra information which it could provide, while females were more interested in the potential for bill reduction and the information that would be provided to support this objective.

The letter itself was found to be complex and required reading several times before participants understood the message being communicated and the associated call to action. Research group participants identified information gaps from their perspective. This perceived lack of comprehensible information caused all groups to ‘fill the void’ by extrapolating from the presented facts, based on their aspirations for such a meter. Interpretations included:

*“It’s a prepaid card” (like a pay-as-you-go card)”*

*“It is a thing the size of a cigarette box which will tell you room by room what you are using”*

*“If you plug in the kettle and look at it will tell you how many units you are using”*

*“It will replace my old fuse board”.*

	Urban ABC1	Urban C2D	Rural - medium usage	Rural – high usage
A smart meter is:	A great energy efficiency gadget	A new type of physical meter	A new type of physical meter	A new type of meter and monitoring system
Focus	<ul style="list-style-type: none"> <li>• The device will provide high-tech assistance (displays etc) to help minimise usage</li> </ul>	<ul style="list-style-type: none"> <li>• The installation of the meter as disruption/ cost</li> <li>• Some negative linkage to previous experiences of different gas tariffs</li> <li>• The long term cost to the individual beyond trial period</li> </ul>	<ul style="list-style-type: none"> <li>• An imposition on consumers and should be treated with suspicion</li> <li>• €40 not sufficient - Why not €50?</li> <li>• Concern that the technology won’t work (like Broadband)</li> </ul>	<ul style="list-style-type: none"> <li>• Meter readers will lose their jobs</li> <li>• €40 not sufficient – made it seem not serious and prefer not to have reference to €40</li> <li>• The long term cost to the individual beyond trial period.</li> </ul>
Views on time based pricing	Mixed – some concerns about actionability but remain positive on the transparency	Concerned about actionability of tariff. Caveat participation on an evaluation of assigned tariff	Liked flexibility and control but less dependent on gas/electric heating and cooking and greater time flexibility	Liked time based prices – less dependent on gas/electric heating and greater time flexibility

**Table Ax. 18: Perceptions of invitation letter by different socio-economic groups**

The overall impact of the letter in terms of its objective to recruit participants to the Trial by the different demographic and gender groups may be summarised as follows:

Group	Response	Mitigate by
Urban ABC1	Likely to participate through interest in the concept of energy efficiency	Letter achieves objective
Urban C2D	Likely to participate through acceptance of authority and expectation of benefit	Highlight benefit and lack of financial risk and disruption
Rural medium usage	Not likely to participate due to concerns inconvenience or an unwillingness to change without perceived benefit to self	Focus on benefits: allow to control energy usage and reduce bill
Rural high usage	Not likely to participate due to unwillingness to change, inadequacy of incentive payment and suspicion of motivation	Focus on the prestige of participating and the value of the information they will get

Group	Response	Mitigate by
Male	Likely to participate through interest in the concept of energy efficiency	Focus on the gadget itself and the extra information provided the Smart Meter
Female	Likely to participate through acceptance of authority and expectation of benefit	Focus on the bill reduction and information provided

**Table Ax. 19: Likelihood of response by demographic group and gender**

Urban respondents indicated they were more likely to participate in the Trial than rural respondents. It should be noted, however, that the responses outlined below indicate a willingness to participate in the Trial rather than a predictor of the response rate to the invitation letter.

	Urban ABC1	Urban C2DE	Rural medium users	Rural high users
Stated interest (%)	85%	85%	40%	33%

**Table Ax. 20: Willingness to participate by urban and rural groups**

*i) Invitation Letter – Detailed Analysis*

In terms of the initial letter presented for consumer assessment, the following guidance and areas for re-consideration were given in order that the letter could be revised to ensure that it achieved the recruitment and information objectives:

- The text should inform the reader of what a smart meter is in more accessible and relevant detail. The absence of this leads to speculation and extrapolation.
- The €40 payment is noticed by everyone.
- The “reduce your bill” message is good, but was not picked up by most participants because it was at the end of a paragraph.
- Males, in particular, felt the reference to the national roll-out enhanced the positive prestige of being a ‘trail blazer’ and a ‘source of expertise’ when the national roll-out occurs.
- References to the installation of the meter raised concerns about disruption.
- Some indication of the length of the Trial was required. However, this would need to be phrased carefully so as not to undermine the value of €40 over 18 months.
- The free-of-charge installation raised questions and concerns around the long-term costs of the meter, while multiple mentions of the questionnaire raised concerns about the amount of effort required.

*ii) Summary*

In summary, the structure of the offer tested in the focus groups appealed to Urban ABC1s. While Urban C2Ds would initially exhibit similar response rates to Urban ABC1s, it was predicted that they were more likely to drop-out on assignment to the tariffs. Furthermore, it was felt that rural unprompted response rates were likely to be lower and that they would be less likely to participate without significant communications efforts.

The research groups highlighted the fact that the form of the initial letter as tested did not supply sufficient information to deliver the required response rates. It was also open to significant and diverse interpretation due to a lack of specific information. This would give rise to diverse concerns, which may be difficult to counter in a single communications strand. It was also found that there was a significant risk of follow-on calls in response to the initial letter.

Response rates could be improved, however, through revisions of the letter and additional communications to reinforce the request to participate.

*iii) Recommendations on the Invitation Letter*

As a result of the research a number of recommendations were made. These included:

- Highlight the role of the smart meter as an enabler of individual understanding and control
- Underscore the opportunity for consumers to reduce their bill
- Address concerns re disruption of the meter installation (i.e. advise that it is a replacement for the old meter)
- Mention words such as ‘prestige’ and ‘exclusive’ and add reference to ‘international trials’.

- Emphasise that information will be provided to understand and control your own electricity usage.
- Specify the duration of the Trial, but in terms of usage patterns over a year.
- Refer to the €40 as a thank-you payment and refer to a “short 10 minute questionnaire” once.

#### *iv) Terminology*

During the focus groups the terminology of the letter was also analysed. This found the term “time-of-use” was confusing and liable to incorrect interpretation. In addition, the word “**allocated** to time-of-use groups” implied to many respondents that each individual would be allocated their own usage hours.

The opportunity to make savings on the bill through energy reduction, as well as the €40 thank you payment credit was not immediately understood.

**Recommendations** on the terminology included:

- Change the terminology around “allocated time of use tariffs”
- Balance the message re any financial loss with the opportunity to save
- Substitute reference to climate change targets, with the individual’s contribution to improvements in the environment.

#### *A5.2.3 FAQ brochure*

The FAQ was tested as it was part of the proposed initial suite of communication that would be presented to the potential participants. Overall it was found that the FAQ document did not have an impact on the participant’s understanding and decision making process. While it acted as a reference material for those already committed, it did not deliver sufficient information to be effective.

Those who did not understand the concept of smart meters referred to in the letter were unlikely to use the FAQ brochure.

It was recommended that as an alternative approach, information contained in the FAQ document should be included in the first letter or a subsequent letter, rather than in a separate document.

#### *A5.2.4 Recommended Communication Timeline*

Based on inputs from the focus group and a review of participants’ likely understanding and response to the communications, the following phased communications timeline was recommended. This timeline would seek to maximise initial commitment and minimise drop-outs without statistically biasing the Trial.

- First communication:** An invitation to participate (revised invitation letter and stamped addressed letter).
- Second communication:** A reminder and further information. The letter should restate the offer, reinforce the positive aspects of the Trial and provide further information on areas of concern, such as installation of the meter.
- Third communication:** Directed to those allocated to tariff groups in the Trial. This could include a personalised information pack showing usage over the benchmarking period with an indication of the likely opportunity to save during the Trial. It should also include general energy saving information and support this will links to on-line and printed resources.

## A5.3 Focus groups on the Time of Use Tariff Concept (Residential) October 2008)

### A5.3.1 Introduction

The introduction of time of use tariffs as part of the National Smart Customer Behaviour Trial was significant from a consumer perspective as the concept of time of use was at that stage novel in the context of electricity usage. The objective of the research by The Research Perspective Ltd was to assess research group's participants' potential response to the concept. This was necessary in order to understand the level and nature of support and explanation that would be required ensure the trial participants would have sufficient knowledge and understanding to work with the tariff to which they may eventually be assigned, should they choose to participate in the Trial in that way.

At the outset of the research it was very clear that the concept and associated terminology associated with time of use tariffs were unfamiliar to consumers and that the understanding and acceptance of a time of use tariff was dependent on the context of the consumer which spans

- the general economic and cultural context,
- their understanding of the current mechanisms for charging and
- their ability to understand the structure and mechanism of a time of use tariff.

This research set out to assess:

- The general context and consumers' understanding of current charging mechanisms
- Consumers' understanding of the term "time of use tariff"
- Consumers' capacity to understand the terminology/concepts associated with TOU tariffs (peak, day and off-peak)
- Consumers' expectations around what a TOU tariff would consist of (i.e. duration of peak, day and off-peak) and rates.
- Consumers' expectations of potential savings associated with TOU tariff.

To this end a total of four customer focus groups were conducted. The groups covered a mix of ages, locations, social class and gender, consistent with the representative sample that would participate in the national trial. As with the other focus group research, all trial participants were specifically excluded from participating in the research. The results of the focus group research was to be structured in order to:

- Inform tariff design
- Identify the areas and concepts associated with time of use that need specific explanation/consideration. This will allow better explanation of tariffs in consumer language
- Inform communications in relation to the initial introduction of time of use tariff concept and as well as detailed explanations (such as FAQs).

- Inform further detailed research into communication strategies associated with national roll-out.
- Allow pre-emption of responses of specific consumer sub-groups
- Consumers' perceptions of fairness of time of use tariffs and impact on specific 'vulnerable' groups e.g. Low income, fuel 'poor'

#### **A5.3.2 Consumer Understanding of energy usage**

In general it was found that there is a latent desire and demand among consumers to engage more strongly with managing their electricity bills. However, this is significantly impacted in two ways:

- Limited understanding of the way in which the cost of their electricity consumption is measured
- Perceived limited capability to impact or control usage

In the case of limited understanding, it was clear from the research that consumers focus on the total cost of the electricity bill over the billing period as opposed to other information on the bill such as the number of units used and the associated cost per unit. Consumers demonstrated limited understanding of what a unit of electricity is, how much it costs and do not typically analyse the incoming bill in terms of energy consumption behaviours. The billing of electricity consumption in units used was perceived as very distant from the nature of usage in the context of the household, which is typically appliance based. The absence of understanding of the number of units a particular appliance uses and the associated cost was a barrier in consumer understanding of their bill in aggregate and therefore a barrier to usage reduction.

In the case of the control of usage, consumers demonstrated very little knowledge of the actual level of usage or even the relative level of use of different appliances. Consumers treated phone chargers on standby as a similar priority as long life bulbs or dryers. Previous attempts to reduce usage were reported to be hampered by the lack of tools in terms of measurement of impact, effect and influence.

Therefore, their lack of knowledge in understanding how changes in usage or behaviour will affect their bill, combined with a lack of clarity on what is discretionary and what is unavoidable represents a considerable challenge to effective behaviour change and may lead to a lack of empowerment.

An additional challenge to behaviour change is motivating other members of the household to participate in energy reduction - often leading to the bill payer to make their own erratic efforts to reduce usage, which may also in time lead to disaffection.

- "*I went around the house one night and turned off 26 different things!*"
- "*The things that you have to use constantly is what adds up*"

Their lack of knowledge around usage and its affect on the bill leads consumers to perceive success in energy efficiency in terms of whether their total bill has reduced. As the total bill amount will change for those testing time of use tariffs, it was determined that trial participants would need additional information to help them determine if their behaviour change has been effective.

#### **A5.3.3 Consumer Understanding of time of use tariffs**

The research concluded that consumers did understand the concept of time of use tariffs relatively clearly:

- “*It would be good because it would give us better options*”; “*It makes sense: At certain times of day electricity will be more expensive.*”

Furthermore, when time of use tariffs were discussed as a mechanism for reducing usage, the focus group participants were often more enthusiastic. This enthusiasm manifested itself in terms of an appetite for more information on usage.

- “*If your peak time usage was shown up in red [on the bill] you would be more aware of it*”; “*You would be able to show your teenagers – look how much you are using.*”
- “*The ESB should explain if you leave your TV on standby overnight, it will add this amount. It is a bit like going to weight watchers*”

Within the time of use concept, however, consumers exhibited some confusion in relation to the concept of peak pricing, which would be necessary to address as part of the communications to the trial participants. Specifically, many respondents could not understand why peak pricing was necessary.

- “*A unit of electricity is a unit of electricity – it must cost the same to generate, so why would you charge more at certain times*”

While existing price plans in the telecoms sector provided some reference point to understand time of use pricing, it also caused confusion where focus groups participants expected peak charges should be lower than off-peak prices.

In addition, the night rate was also a source of some confusion and concern. In the first instance, some participants through the structure of the current night saver tariff (a tariff option available to some consumers with specific patterns of usage) was the same. In the second instance focus group participants believed that the reduced night rate would encourage people to use appliances at night and expressed concern about the safety of leaving electrical appliances unsupervised (e.g. running washing machine late at night was considered a fire hazard).

#### **A5.3.4 Conclusions on the time of use concept**

The overall findings from the focus groups were that consumers will understand the basic concepts of a time of use tariff and that the concept will be welcomed in general. This is because time of use tariffs are perceived as giving greater control to the consumer and it is expected that ‘electricity packages’ to suit their needs will be offered.

The research noted that focus group research participants’ expectations of the duration of periods (for example the peak period) and the unit price are quite different to what would be offered in the actual trial (the peak period is expected to be longer and the unit price, lower). Similarly, focus group participants’ expectation of the level of savings which may be achievable could be out larger than the actual savings. This is largely due to the fact that they have little understanding of their discretionary use. Both of the above may lead to stronger reactions to the prices associated with peak periods.

Some aspects of the proposed time of use tariffs were confusing and may prove too complex for consumers. This includes multiple periods and different summer, winter and week-end definitions. The terminology peak, shoulder and off-peak were also not particularly understood. ‘Peak’ can be interpreted in two ways: “Cheaper prices because more people are using it” or “Premium price to discourage use”.

#### **A5.3.5 Suggested Actions**

Based on the findings from the time of use tariff concept focus groups, a number of actions were proposed in relation to time of use tariffs and communications were proposed:

- Time of use prices should be defined and simplified so as to encourage and support behaviour change. In addition, alternative ‘impact driven, consumer friendly terminology should be used to define the tariffs (respondents suggested ‘premium’, ‘economy’ and ‘standard’).
- Communications should focus on the likely scope of time of use pricing and avoid implications that different tariffs will exist for different participants.
- They should also seek to bring expectations in line with the actual situation and manage expectations about usage of different appliances.
- Participants should be equipped with knowledge required to translate behaviour change (e.g. turning off the lights) into a meaningful measure of the actual reduction in usage. This information should be more than just general energy efficiency advice. It should be customised and actively and specifically inform.
- Finally, safety concerns on using appliances unsupervised should be addressed.

## A5.4 Focus Groups on Design of the Electricity Monitor (Residential)

### October 2008

#### A5.4.1 Introduction

One of the DSM stimuli to be deployed in the Customer Behaviour Trial participants was an electricity monitor. The manufacturer offered significant scope for customisation of this product. In order to propose the most customer supportive customisation options which would facilitate users achieve the goals of reducing overall and peak usage, a series of customer focus groups was conducted.

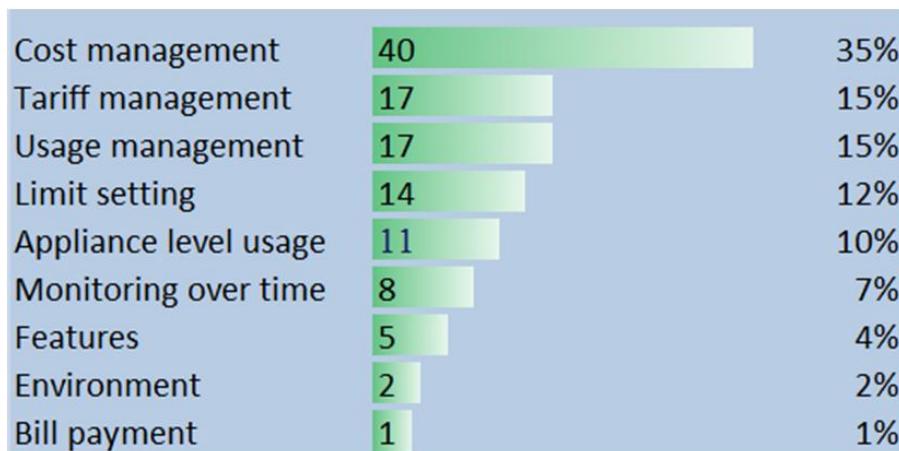
Four customer focus groups were conducted by The Research Perspective Ltd - two groups representing urban consumers and two representing rural consumers. The groups covered a mix of ages, social class and gender. The research was structured to provide the following outputs:

- Insight to consumers' preferred functionality and expectations of an electricity monitor
- Possible designs to meet consumer needs
- Prioritisation of functionality
- Insight to consumer preferred interface look and feel

#### A5.4.2 Analysis of the Electricity Monitor

In the initial discussion on the role of an electricity monitor most participants found it difficult to differentiate between the function of the smart meter and the role of the electricity monitor – ‘*do they talk to one another?*’ They tended to move immediately into the realm of control and monitoring, but were unfocused – ‘*can I set it to tell me what is being used in the house and how I can save?*’ ‘*it should tell us what room is using most*’

When asked to design the functionality of their ideal electricity monitor and to consider information that would help them reduce their overall and peak time usage, initial responses rated the following broad areas of functionality as key to the success of the energy reduction objectives:



### ***Cost Management***

- Energy reduction motivation is primarily driven by cost – hence the focus on cost based functionality.
- A key consumer requirement is to see the level of usage (in cost terms) and how that translates into the next bill.

### ***Tariff Management***

- Consumers want to immediately recognise the current tariff level – at a glance. ‘Traffic light’ imagery was the most frequently cited as facilitating immediate recognition.

### ***Usage Management***

- The ABC1 groups were very interested in have a graphical representation of their use of energy over time. An understanding of the daily use, across the tariff time periods was presented as the preferred view.

### ***Limit Setting***

- There was significant interest in the possibility of limit setting, particularly amongst the cost aware. This capability included the opportunity to set limits at a tariff zone level or across the day.
- This functionality would be accompanied by an alarm/ light /beeper that would indicate when the limit had been exceeded.

### ***Appliance Level Usage***

- Consumers demonstrated a striking lack of knowledge as to the relative consumption of different appliances. The inclusion of this information on the electricity monitor was seen as significantly improving their ability to manage their usage.

### ***Monitoring***

- The ability to compare usage over different time periods was cited as valuable, although there was no common view on the preferred time period. This requirement was more typical of the urban ABC1C2 groups.

### **Specific Requirements included:**

- Cumulative cost of electricity over time (week/ month/ billing period)
- Different colour lights for different tariff times
- Cost per unit (peak/day/off peak) with tariff times
- Limit setting capability with alarm/red light to let user know if they are using over pre set limit
- Cost of electricity used per day of usage

#### **A5.4.3 Features**

Consumers identified the following features they would like to see:

- Clock with current time/date
- Screen showing carbon number/emissions
- Ability to pay or part pay bill/credit card slot
- Connection to telephone line/turn off appliances/update on usage remotely

#### **A5.4.4 Integrated Design**

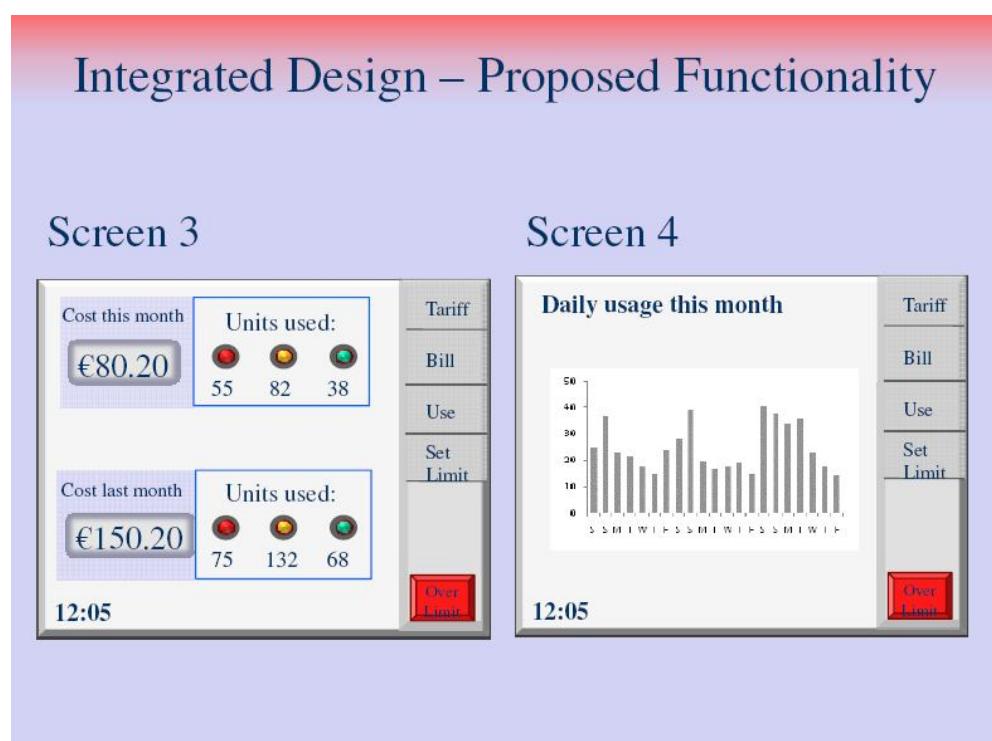
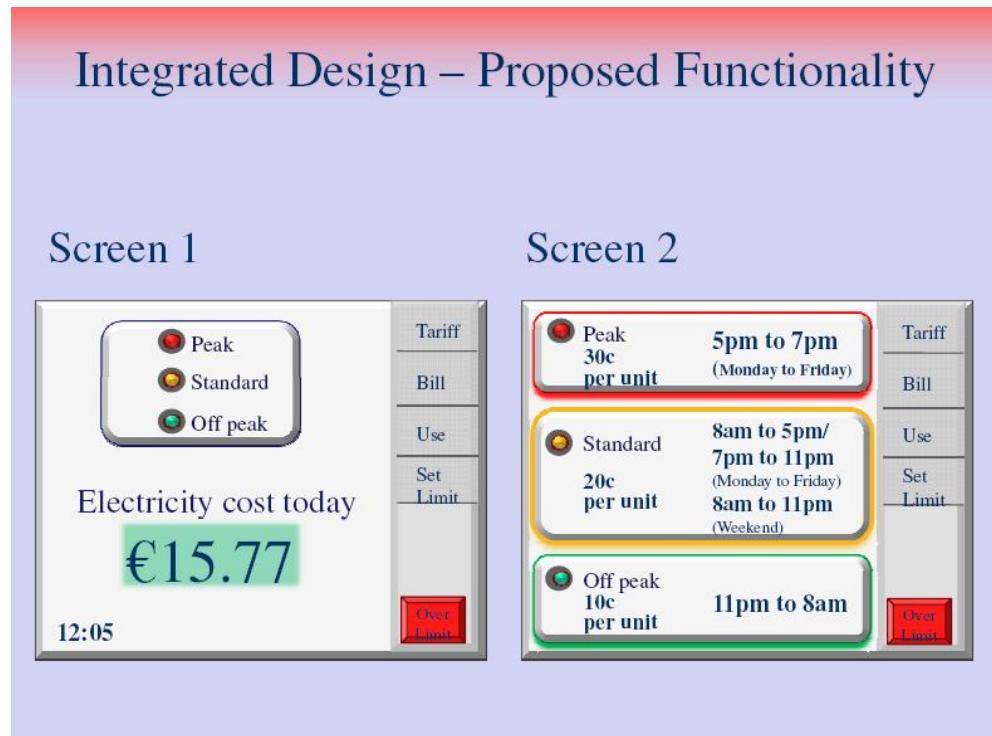
Four alternative group designs were produced in the course of the research focus groups. These designs focused on simplicity, cost consciousness, use of colour, active management with actionable information and comparisons over time. In summary, the main requirements for an electricity monitor included:

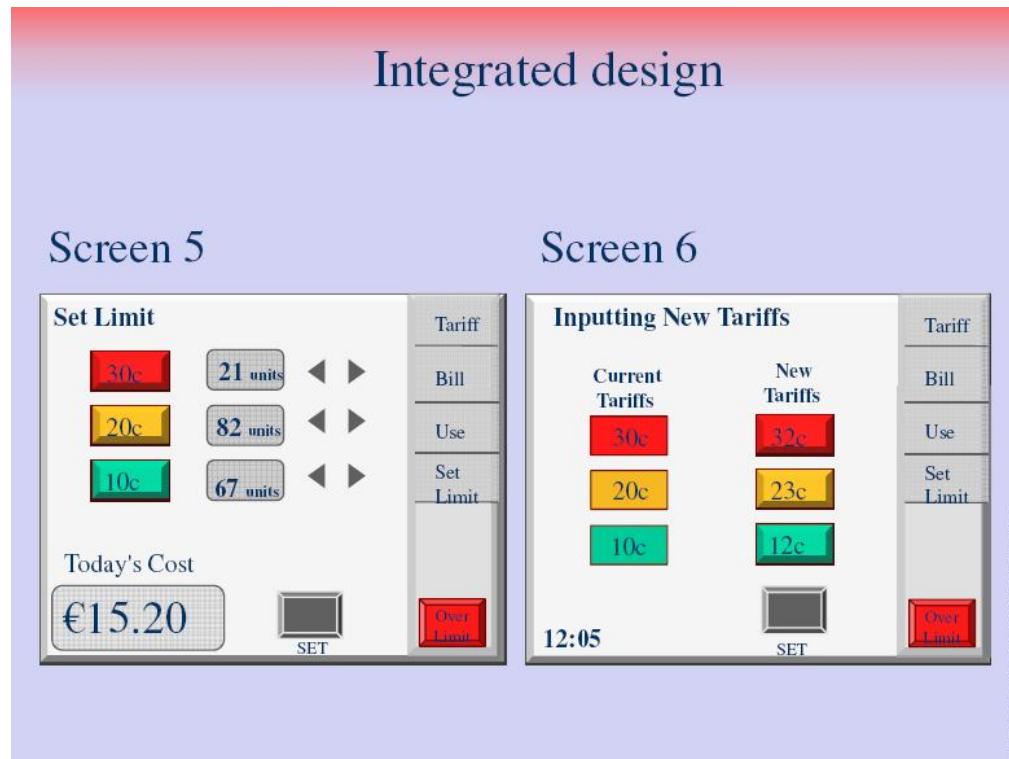
- A cost estimate of electricity used
- Simple, uncluttered screens
- Relationship to specific bill metrics

Following the focus groups an integrated design proposal based on the four group designs was developed for consideration by the Electricity Monitor Technical Team. This design was characterised by the following:

- Use of colour and images
- Minimal information
- Integration of ‘Unit’ and ‘Cost’ measurements
- Comparison over time
- Leveraging limits to control consumption
- Cost based counters/cost imperative
- Need for actionable and frequent information
- Active energy management

Screens developed based on this consumer integrated design are outlined below. This design was delivered to the Technical Team for consideration in development of the electricity monitor to be used in the Trial. The final version of the Electricity Monitor that was deployed as part of the National Smart Meter project encompassed many of the elements both prioritised and designed by consumers.





**Figure Ax. 36: Integrated design options for the electricity monitor based on focus groups**

## A5.5 Focus Groups on Design of the Bill and Energy Usage Statement (Residential and SME) – February 2009

### A5.5.1 Introduction

All of the participants in the Customer Behaviour Trial were to receive an energy usage statement in association with their allocated tariff. This information source was envisaged to provide participants with incremental information to their bill which would enable them to manage their energy usage and understand changes in that usage over time.

In order to propose the most consumer supportive design and associated information which would facilitate users achieve the goals of reducing overall and peak usage, a series of SME and Residential customer focus groups was conducted by The Research Perspective Ltd.

A total of eight customer focus groups were conducted – in the case of the residential groups, these focus groups covered a mix of ages, social class, location, usage categories in order to reflect the diversity of participants in the Customer Behaviour Trial. In the case of the SME groups, a range of organisations from different sectors, locations, usage levels and sizes were recruited in order to capture the range of views of the SME sector.

### A5.5.2 Residential Focus Groups

In the case of the residential consumer, the objective of reduced energy usage (peak or overall usage) requires a transition from passive acceptance of the bill to engaged and effective behaviour change. Understanding this journey is central to designing the detailed bill as consumers are at different stages of the journey and therefore have different needs.

#### **Stage 1: Just pay the bill (cost is outside of my control)**

At Stage 1 consumers have little knowledge about what different appliances use. Some think switching on and off an immersion is more expensive than leaving it on continuously, while others understand they should unplug chargers, but may think all plugs must be taken out. Also at this stage discretionary usage is perceived to be small, there is limited interest in saving “small” amounts and it is believed there is little opportunity to shift usage. Finally, there is a belief that they have already done a lot, but have not seen this translated into tangible results. (“I already put in the low energy bulbs, but the bills haven’t changed”).

#### **Stage 1: Just pay the bill**

- ❖ Cost is outside of my control

#### **Stage 2: What can I do?**

- ❖ Understand the objective

#### **Stage 3: How did I do last month?**

- ❖ Actively engaged in usage reduction

**Stage 2: What can I do? (understand the objective)**

At this stage participants understand the desirability of the objective and accept that in principle they could reduce usage and their bill. However, they still have little knowledge of how to effect behaviour change and rely on urban myths or unsustainable responses in deciding on their actions. Frequently this results in the wrong action being taken, or the consumer giving up if they do not get any assistance with their objective.

**Stage 3: How did I do last month? (actively engaged in usage reduction)**

In Stage 3 participants focus on the impact of the activities they have undertaken and want to understand how this has impacted on their bill. At Stage 3 individuals are more engaged and learn how to increase the impact of their change. They also have enough knowledge to “adjust” for changes such as changing temperature from month to month or the impact of a price increase.

**The Energy Usage Statement**

In order to be effective the energy usage statement must support the consumer in the journey from “Just pay the bill” to “What can I do” and on to “How did I do last month”. Once at Stage 3 the objective is to support and sustain the consumer in their behaviour change.

**A5.5.3 Structure of the Focus Groups**

The structure of the focus groups were based on requesting participants to review page 1 of the bill and subsequently review six versions of the energy usage statement. Page 1 of the bill mirrors the current standard bill issued to residential consumers, but was revised to include additional lines reflecting the different periods of consumption (number of day, peak and night units consumed).

In general participants found page 1 of the bill to be clear. Although their focus was on the overall amount of the bill, the detail provided by the three additional lines (one for each time of use tariff) was considered to be useful insight. The research concluded that given the importance of the area on the bill around the total amount owing, any bill design should place high priority information near this space.

In general it was found the bill should focus on information elements, such as hours associated with tariffs. It should, however, clearly link to page 2 in order to maintain interest. Other information that could be provided included:

- advisory information (energy tips)
- encouragement to change
- links to the second page (energy usage statement)

**A5.5.3 Development of the Ideal Energy Usage Statement**

Following analysis of page 1, participants reviewed six different options for Page 2 and from these and other information prioritised as part of the focus group discussion were asked to

design their own ideal energy usage statement. Each format incorporated common design elements:

- An upper panel with usage information including dates of highest/lowest usage
- A lower panel with energy advice

The main design requirements identified were:

- Actionable information to promote energy reduction (for example, appliance comparison)
- Customised energy cost based hints and tips supported with slogans (e.g. using dishwasher in the evening saves)
- Motivational information which recognises effort and results (e.g. how much you have saved).
- Clear presentation of easily interpreted data so that participants can immediately identify the scope for further change.
- Advice and guidance should be placed most prominently.

#### **A5.5.4 Consolidated Designs**

Two design options based on the consolidated outputs of the focus groups were developed based on the combined assessments of all the focus group participants and presented to the bill design team.

##### **In Option 1**

- Energy awareness and tips are the primary focus of the page. An awareness section provides information, while a “Tips” section motivates behaviour change.
- A graph shows the consumer’s daily average usage history. This allows easy comparison of the daily cost of peak, day and night. It includes summaries clearly highlighting trends.
- There is a linkage to a webpage for expert engaged consumers who want more information.

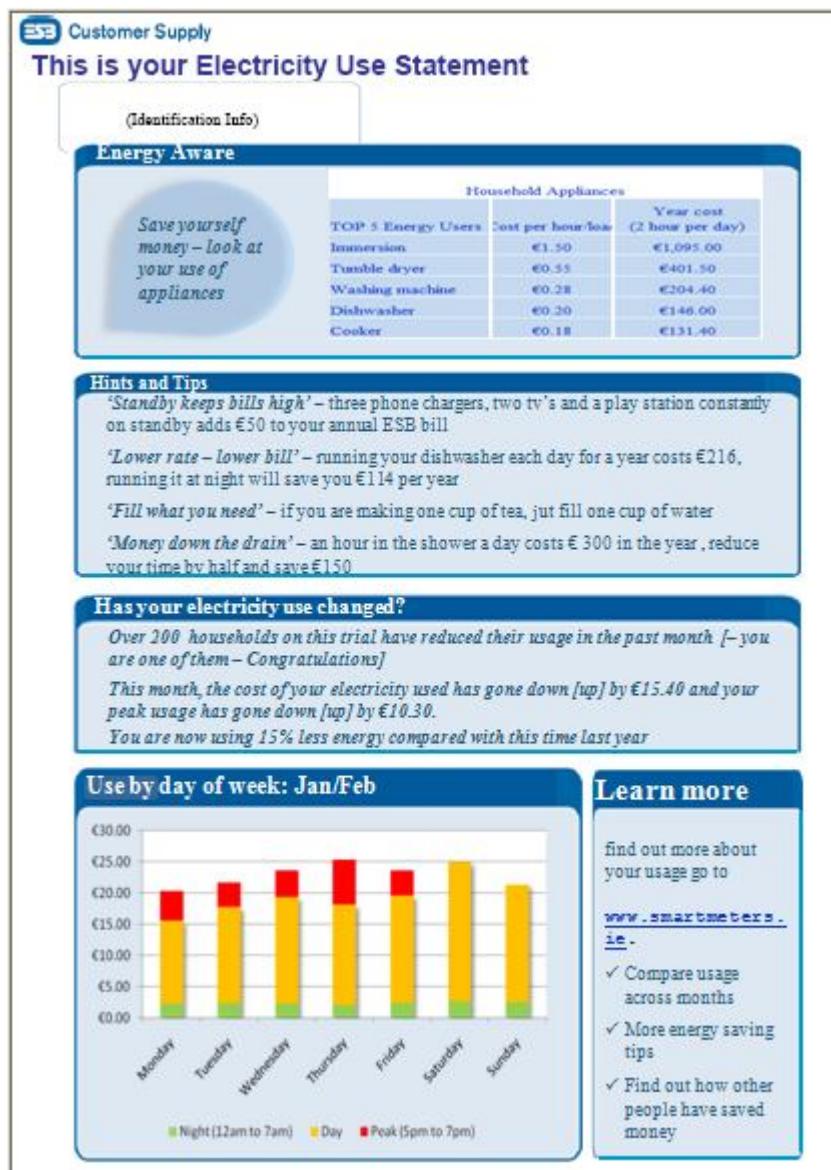


Figure Ax. 37: Consolidated Design from focus groups – Option 1

### Option 2 contains:

- A balance between tips and usage information. The “Tips” section motivates behaviour change.
- A combination of two graphs. At an introductory level a barchart provides a usage summary (€and kWh). A daily usage line graph investigating usage patterns and the impact of behaviour change is provided for advanced users.
- Simple summary information about usage patterns.
- There is a linkage to a webpage for expert engaged consumers who want more information.

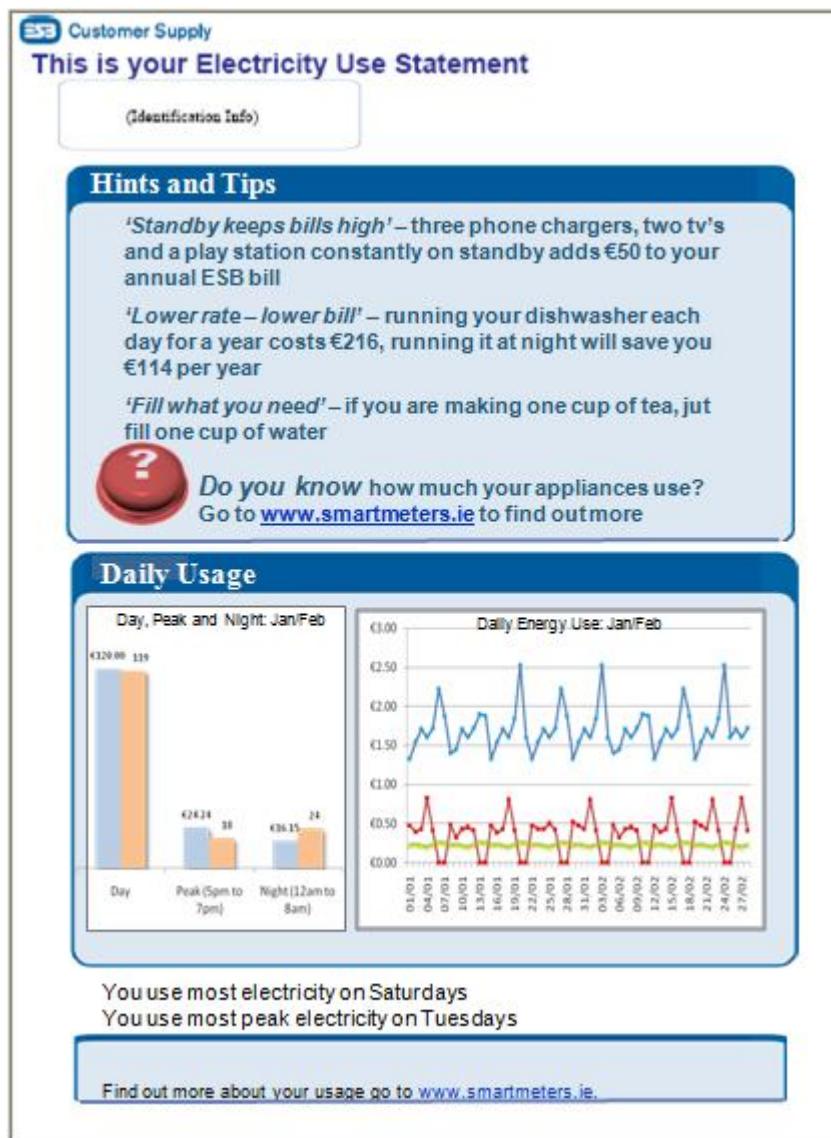


Figure Ax. 38: Consolidated design from focus groups – Option 2

#### **A5.5.5 SME Focus Groups**

Similar to the residential context, customer focus groups comprised of SME consumers were conducted in order to gain consumer input into the customisation of the electricity monitor. These groups took place in October 2008.

Approximately 80% of SMEs appear to be embedded in current energy usage behaviours, supported by their general work context. This makes initial engagement with usage reduction much more difficult.

The remaining 20% of SMEs, once engaged are typically capable of making the required changes and willing to make fundamental changes. SME's are cost and control focused in other aspects of their business dealings and are, therefore, equipped to bring these skills to bear on energy management.

Understanding the SME context is central to establishing behaviour change. It is related to the Residential context as SMEs also lack knowledge of the cost of using different equipment. They see the bill as a fixed cost.

The additional factor for SMEs is that the competitive environment focuses attention exclusively on price over usage reduction and SMEs initially do not see time of use tariffs as relevant. This combination creates a potential barrier to engagement with the smart meter concept. It was noted that a significant attribute of SME energy management was the link between energy saving attempts and supplier switching. Specifically, those participants who identified themselves as less knowledgeable in the areas of energy management switched suppliers in order to reduce bills – in these cases energy reduction was equated with unit price reduction.

#### **A5.5.6 Challenges in the SME context**

SMEs often see little scope for changing usage as they see usage as dictated by fixed hours of business (even though the bill may be a significant overhead) - "It is seen as an overhead that has to be handled". Their staff may not be as committed to energy saving - "I switch the lights off in my office during the day as an example, but it doesn't seem to have any effect."

A further complication identified is that SME's may not own their own premises and hence cannot make energy saving alterations, such as insulation. Finally, the landlord may not be interested in making these alterations as the tenant pays the running costs.

**i) Lack of Knowledge and Empowerment**

There is an accepted view with SMEs that in doing business the bill represents a fixed cost, but how they use electricity is very diverse. This reduces the presence of urban myths (common in residential), but also makes it harder for SMEs to educate themselves. As a result they tend to focus their reduction efforts on themes seeping from residential campaigns (i.e., CFL bulbs), rather than on looking at more efficient equipment. The result is a belief that their discretionary usage is low.

**ii) The competitive market**

The competitive market has focused SMEs attention on total bill size. Bill reduction is seen as something which can be achieved by switching suppliers, while behaviour change is regarded as delivering much smaller gains, if at all.

At the same time there is a perception that switching does not deliver long term gains and by extension reinforces the perception that bill reduction is not possible - “I switched and I saw a bit of saving, but then it went up and up”; “I am now back to paying exactly what I was paying before [first supplier]”

**A5.5.7 Time of Use**

Time of Use was initially regarded as not relevant by many SME participants as they perceived that usage only occurred during their core business hours of 09.00 to 17.00 - “It won’t affect most of us here because we are at home.” Reflecting the lack of perceived control over usage, participants were often unwilling to even consider disruption of established routines- this blocked appropriate analysis of the opportunity to shift usage.

**A5.5.8 Reviewing Sample Formats**

As with the residential groups, the structure of the SME focus groups were based on requesting participants to review page 1 of the bill and subsequently review six versions of the energy usage statement. Page 1 of the bill mirrors the current standard SME bill issued to consumers, but was revised to include additional lines reflecting the different periods of consumption (number of day, peak and night units consumed).

Participants reviewed an enhanced bill format with time of use information and six versions of the energy usage statement. They scored the usefulness of each version and picked an overall favourite.

In general page 1 of the bill was perceived to be cluttered and to offer information, rather than serve as a motivator. Similar to residential focus group feedback, the main area of focus is on the total amount owing. Items close to this area on the bill are most likely to be read. Therefore, the bill design should place high priority information near this space.

Participants suggested enhancing the value and impact of the bill by adding motivating information (e.g. how much you saved by reducing peak rate usage from the last month's bill). Others suggested including information on units used to allow comparison of different suppliers. They also recommended the presentation of percentage of usage against the different times of peak, day and night.

#### **A5.5.9 Energy Usage Statement**

Six versions of the energy usage statement were reviewed and participants designed their own ideal energy usage statement. Each of the six formats incorporated common design elements, which were reviewed by the participants:

- An upper panel with usage information including dates of highest/lowest usage
- A middle panel with consumer specific interpretation of the bill and advice
- A lower panel with energy advice

The upper panel with information on detailed usage appealed to SME consumers and established the document as a serious communications item.

Both the second and third panels with the consumer specific information and advice helped the SME consumer, move from lack of knowledge and empowerment to engagement.

In terms of SME's, the proposed structure and the sequence of information were deemed to be correct. Those consumers who may feel less engaged would continue to read through the statement and would not be deterred by the detailed information in the first panel.

#### **A5.5.10 Detailed bill requirements**

The detailed bill requirements of SME's may be summarised as follows:

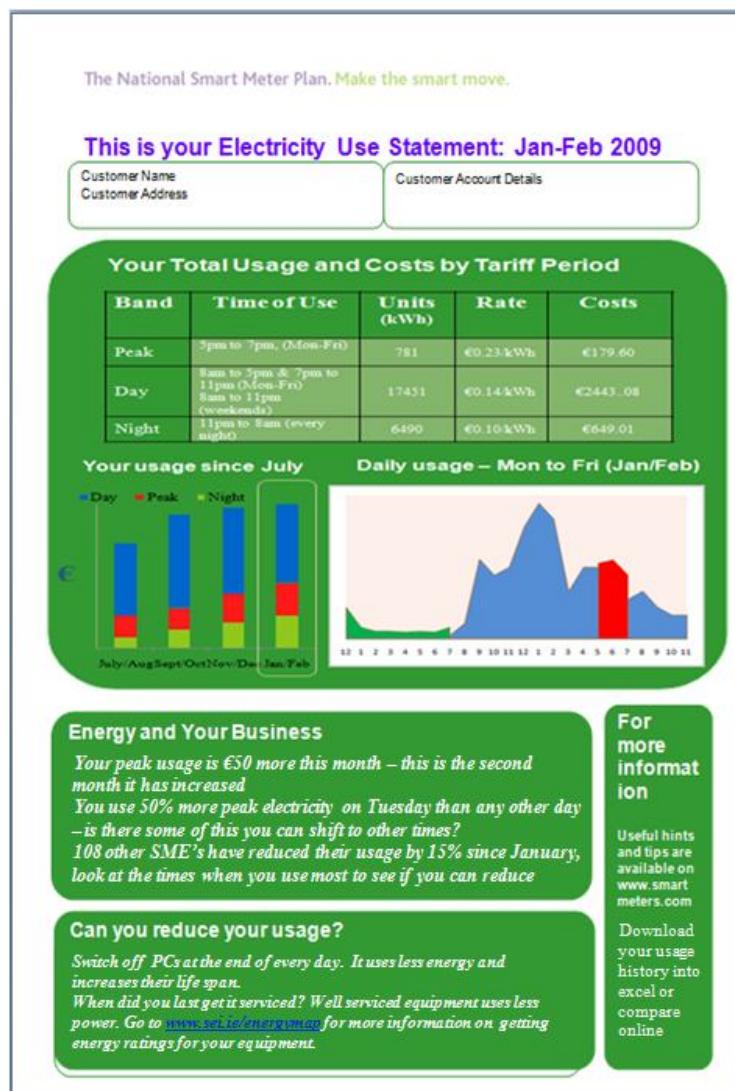
- Multiple information-rich displays that are financially driven, clearly presented and easy to interpret.
- Comparisons that enable action and are both recent and meaningful (for example, average weekly usage by time band).
- Customised interpretation relevant to their business (for example, you used most peak electricity on)
- Motivational information which reinforces the possibility of energy reduction in a business environment (for example 22% of SMEs have successfully reduced)
- Direction to website for more detailed analysis or download of data for the highly engaged.

#### **A5.5.11 Consolidated Designs**

As part of the focus groups participants developed their ideal format for the energy usage statement. Based on these inputs three consolidated design options were developed for consideration.

**Option 1 included:**

- A table including tariff information, usage and costs.
- Graphs which include historic trends and the average daily breakdown. This is seen to support long term trend analysis and identification on specific time related issues.
- An “Energy and your business” section which focuses on actual trend information and month to month comparisons.
- “*Can you reduce your usage?*” section providing suggested actions and associates rationales.

**Figure Ax. 39: Consolidated Design from SME focus groups – Option 1****Option 2 included:**

- An “*Energy and our business section*” focuses on actual trend information and month to month comparisons.

- The graph on the right shows a breakdown of weekly costs into peak, day and night timebands, which supports analysis of the impact of behaviour change during the billing period.
- The graph in the centre shows a breakdown of costs by day across the billing period, which supports analysis of the impact of the business routine on the bill
- A “*Can you reduce your usage*” section provides suggested actions and associated rationale.

## Option 2

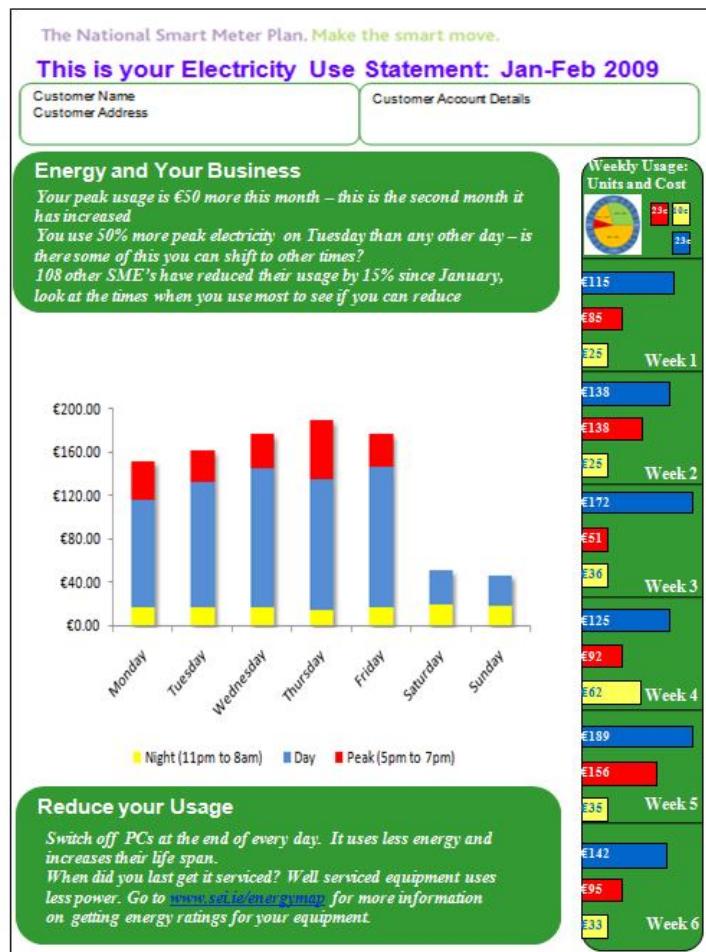


Figure Ax. 40: Consolidated design from SME focus groups – Option 2

### Option 3 includes:

- An “*Energy and your business*” section focuses on actual trend information and month to month comparisons.
- The graph on the right shows weekly costs broken down by peak, day and night timebands.
- The graph in the upper centre shows a breakdown of costs by day across the billing period
- The graph in the lower centre shows a breakdown of costs by time of day across the billing period
- A “*Can you reduce your usage*” section provides suggested actions

### Option 3:

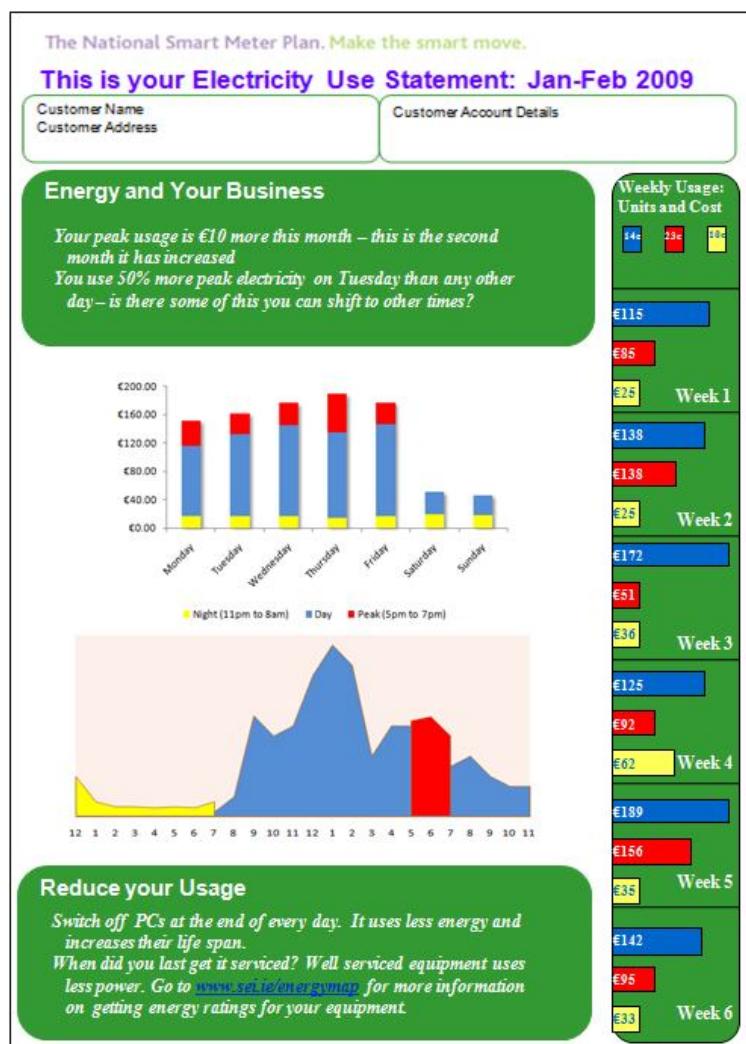


Figure Ax. 41: Consolidated design from SME focus groups – Option 3

**A5.5.12 On-line access to the bill**

Consumer attitudes and interest in on-line access to their bill and to billing information were also explored during the focus group.

Consumers already engaged in behaviour change were keen to access information online for data analysis purposes. They did not see on-line as the primary channel for advice, but rather as an opportunity for data downloads (for further analysis) and for customised comparisons across time periods.

Consumers concerned about the potential for increased bills want real time information available on-line. In this context real-time should be more frequent than the printed bill and probably weekly.

Those who are not engaged in behaviour change are unlikely to use on-line access. The printed bill must therefore be the vehicle to drive initial transition to engagement.

## **A5.6 Focus Groups to examine Consumer reaction to Time of Use Tariffs – August 2009**

### **A5.6.1 Introduction**

In August 2009 focus groups on the specific detail of the proposed time of use tariffs were held. This research had two main objectives:

- To establish consumer expectations of a time of use tariff structure (within the parameters of three time of use periods).including
  - Understanding the distance between the expected structure and actual tariffs.
  - Examining the emotional reaction to their designed tariff and the rational interpretation of the cost impact of such a tariff
- To establish the reaction to the tested tariffs including
  - Assessing the immediate reaction to tariffs
  - Understanding the expected impact on bill size
  - Estimating the impact on participation and risk of the immediate and longer term fall-out
  - Assessing the impact on participant's interpretation of trial motivation

### **A5.6.2 Structure of each Focus Group**

The approach taken in the focus group research was to explore the concept of time of use, allow then participants to develop their own time of use structure in order to achieve the dual objectives of reduced overall and peak usage and finally to have consumers assess sample time of use tariffs in order to explore the potential perceived impact, financially and in behaviour terms.

Each focus group followed a logical structure bringing participants from an understanding of usage through to identification of support requirements and recommendations. These steps were:

**Step 1:** Understanding of the use of electricity  
Appliance contribution to the bill

**Step 2:** Split the current usage into time of use structure  
Participants develop their own time of use tariff

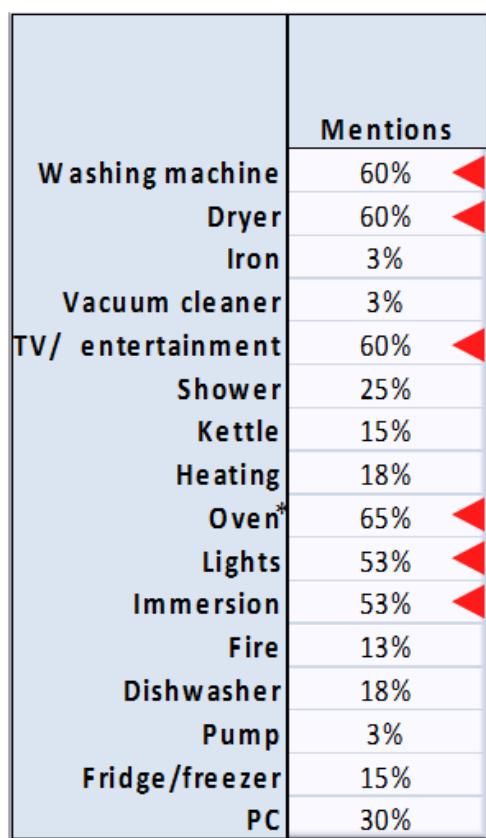
**Step 3:** Assess the time of use tariffs presented  
Assess the impact on the bill

**Step 4:** Identify support requirements  
Recommendations

#### **Step 1: Understanding of the Use of Electricity**

During the discussion on the use of electricity participants listed the five appliances contributing most to their electricity usage. Appliances most often mentioned in the top five

were cooking equipment (65%); and washing machine, tumble dryer, television and entertainment (60%)



\*: including cooker etc

**Figure Ax. 42: Participant perceptions of appliances using most electricity**

Some unusual suggestions also appeared in the top five, reflecting domestic tension rather than reality including iPod speakers, an electric fence, an air hockey machine, a sewerage tank and hair straighteners.

### **Step 2: Understanding of current usage patterns (weekday)**

During Step 2 participants were asked to estimate their current usage patterns during the week and broken down by night, day and peak and winter and summer.

Weekday	Winter (November to February)			Summer (March to October)		
	Night	Day	Peak	Night	Day	Peak
Estimated	22%	40%	38%	21%	39%	39%
actual	25%	65%	10%	25%	66%	10%

**Figure Ax. 43: Participant estimate of usage patterns**

In general peak usage was overestimated. This was due to:

1. A focus on “activity” driven usage over “background” usage

2. The association of peak usage with 17.00 until night-time
3. The fact that most participants while focusing initially on the peak period of 17.00 to 19.00 when they felt most usage occurs, forgot that “day” resumed from 19.00 to 23.00.

*Note: participants were reminded of the actual definition of night, day and peak by facilitators and on worksheets.*

### **Participants develop their own time of use tariff**

Participants were then asked to develop their own time of use tariff across the different timebands and winter and summer periods. The results of their efforts demonstrated that on average, residential consumers were capable of developing a time of use tariff that would achieve the objectives of reduces overall and peak usage. The results by groups are as follows:

	Average winter	Average Summer	Comment
Group 1	<i>Night: 10.9c Day: 13.6c Peak: 16.3c</i>	<i>Night: 10.8c Day: 13.5c Peak: 17.4c</i>	<ul style="list-style-type: none"> <li>• 1 out of 7 had a peak rate higher than current rate.</li> <li>• No summer/winter, no higher day rate.</li> </ul>
Group 2	<i>Night: 11.2c Day: 12.5c Peak: 21.3c</i>	<i>Night: 10.8c Day: 12.54c Peak: 20.9c</i>	<ul style="list-style-type: none"> <li>• 3 out of 7 had a higher peak than current rate but reduced day rate highly to “compensate”.</li> <li>• No summer/winter differences</li> </ul>
Group 3	<i>Night: 11.4c Day: 14.9c Peak: 17.2c</i>	<i>Night: 10.3c Day: 14.4c Peak: 16.2c</i>	<ul style="list-style-type: none"> <li>• 1 out of 7 had a higher a peak rate higher than current rate.</li> <li>• 3 out 7 had a summer/winter difference</li> </ul>
Group 4	<i>Night: 9.8c Day: 15.1c Peak: 22.0c</i>	<i>Night: 10.3c Day: 13.7c Peak: 20.7c</i>	<ul style="list-style-type: none"> <li>• 4 out 7 had a summer/winter difference</li> </ul>
Group 5	<i>Night: 10.9c Day: 14.8c Peak: 20.3c</i>	<i>Night: 10.6c Day: 14.5c Peak: 20c</i>	<ul style="list-style-type: none"> <li>• Even after strong guidance, 3 out of 7 created ‘incorrect’ tariff structures.</li> <li>• 1 out of 7 made Winter more expensive</li> </ul>
Group 6	<i>Night: 11.6c Day: 15.6c Peak: 21.3c</i>	<i>Night: 11.8c Day: 15.3c Peak: 18.45c</i>	<ul style="list-style-type: none"> <li>• After strong guidance, most put peak close to 20c. 1 out of 6 made winter more expensive</li> </ul>

**Figure Ax. 44: Proposed tariffs developed by focus groups**

### **Step 3: Assess the time of use tariffs presented**

During Step 3 participants were presented with the proposed time of use tariffs for the Trial.

The following tariffs were tested in the focus groups:

**Daily Tariff**

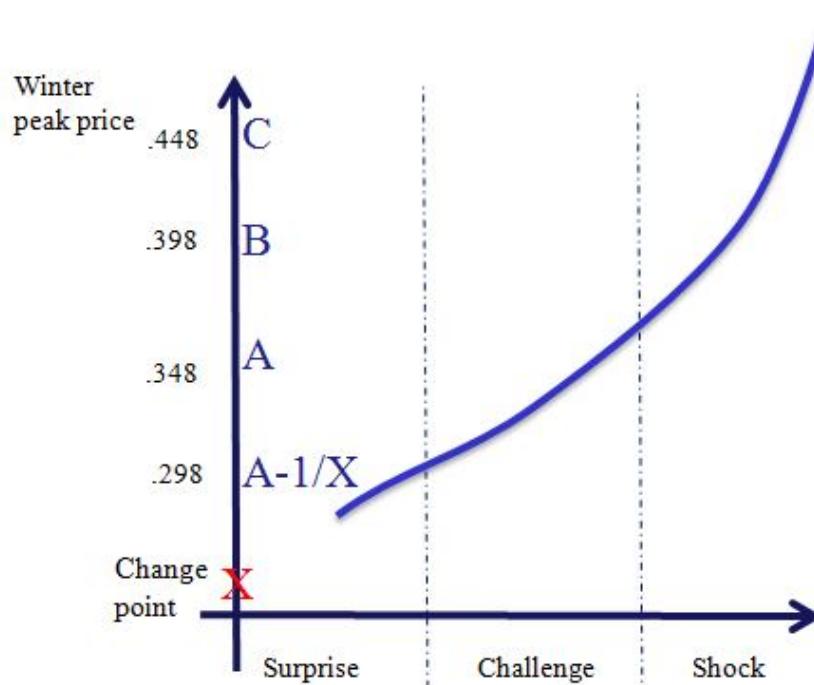
Tariff	Winter			Summer		
	Night	Day	Peak	Night	Day	Peak
TX1	0.124	0.159	0.298	0.124	0.159	0.298
TA-1	0.106	0.200	0.298	0.106	0.164	0.170
TA (Base)	0.105	0.195	0.348	0.105	0.160	0.200
TB	0.104	0.190	0.398	0.104	0.156	0.230
TC	0.102	0.184	0.448	0.102	0.151	0.260

**Weekend Tariff**

Tariff	Winter			Summer		
	Night	Day	Peak	Night	Day	Peak
Weekday	0.14	0.215	0.35	0.12	0.170	0.210
Weekend	0.140	0.140	0.140	0.120	0.120	0.120

**Table Ax. 21: Proposed Tariffs for the Trial**

Responses indicated that all tested tariffs would result in behaviour change. The winter peak charge, however, exceeded the participants' threshold for change "*I would change at 20 cent*"; "*I would change at 22 cent and would have a heart attack at greater than that.*"

**Figure Ax. 45: Response to winter peak price**

All the tested parameters exceeded the threshold of surprise and in the case of Tariffs A, B and C participants responses indicated that would result in challenge or shock among the receiving population. Such an assessment would have significant consequences for the Trial since such a response could result in complete attrition from the Trial or non-engagement in behaviour change.

In the context of the Trial it was concluded that these strong reactions could be positive, provided they did not result in attrition from the Trial. The challenge would be to retain the reaction, while educating participants sufficiently to remain motivated to participate.

Other reactions to the proposed tariffs included an exclusive focus on the winter peak cost, even when the length of the winter months and duration of peak hours was reiterated. There was also a perception of “cheating” with the different summer and winter peaks with participants wondering “*why should there be a difference*” and “*why are there different differences depending on day and night.*” Finally, despite direction participants could not interpret the value of the summer day rate.

There was significant annoyance over the comparative “increase” in the winter day rate “*users have no choice*” and very little understanding as to why the peak and day rate could be as high in winter (compared with the standard unit cost). The night rate was not seen as a mitigant to the higher winter day and peak rates and there was very little value associated with the reduced night rate – “*would I cook the dinner the night before.*”; “*we'll all be eating salads*”. For some participants, the lower night rate was interpreted as overly aggressive encouragement to use electricity only at night, which was deemed to be unacceptable. “*a tax on living – taxing when you use electricity*”.

There was also a perception that a higher peak price would have a major impact on bill size as many participants used the relative change in the peak price as a proxy to calculate the potential impact on the bill of such a tariff: “*3 x peak – three times the total bill*”; “*I can see a 50% increase for me if I made no changes. I would try to make changes, but I am limited and there would be no change.*”

Of the various tariffs presented Tariffs A-1 and Tariffs X were deemed most acceptable to participants. The shock value of the higher peak was removed and created more space for reasoned evaluation.

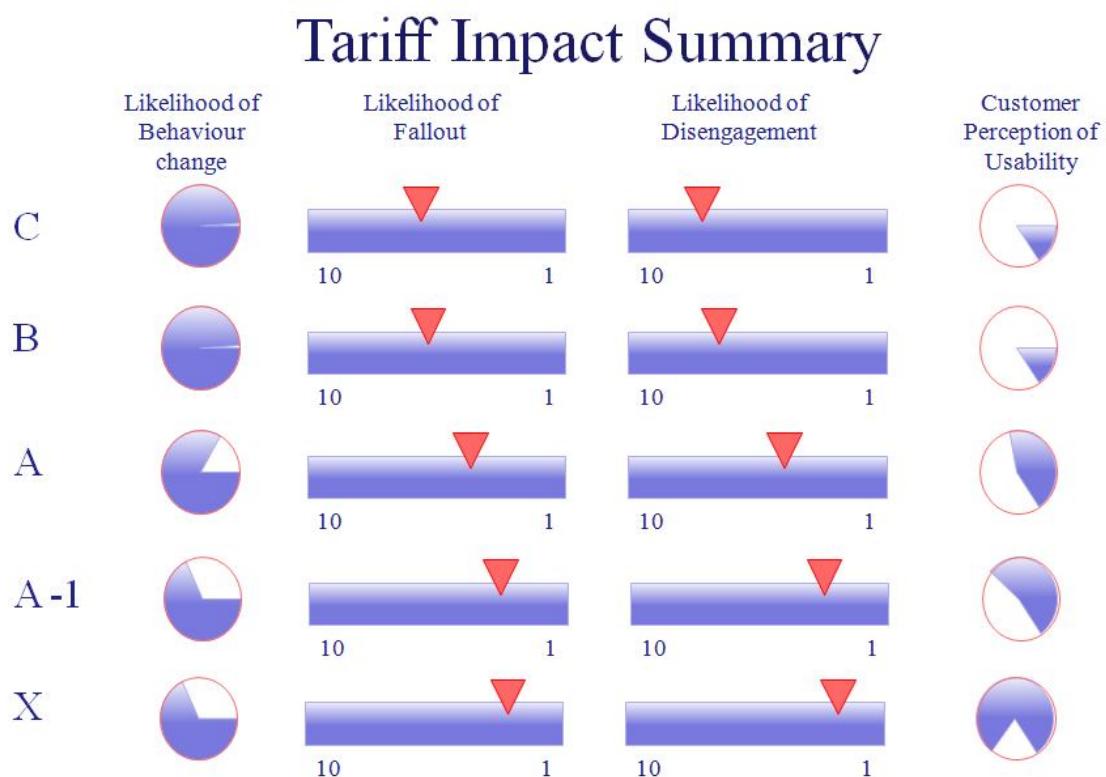
Tariff X in particular scored well in terms of consumer understanding and acceptance. The two primary benefits were the simplicity of the tariff and the summer day rate. The clarity of the tariff allowed the participants to evaluate it in a reasonable manner. In addition, the day rate, which was less than the consumer’s current standard rate, indicated a “savings” perspective to them. Finally, Tariff X was seen as actionable and more motivational “I’d use less between 17.00 and 19.00, do it earlier or later and save while I am at it.”

### A5.6.3 Summary evaluation of all proposed tariffs

All six tariffs tested were evaluated in terms of four metrics:

- Likelihood of behaviour change
- Likelihood of attrition
- Likelihood of disengagement
- Consumer perception of usability

This can be summarised as follows:



**Figure Ax. 46: Tariff Impact Summary**

#### **Step 4: Recommendations on implementation of time of use tariffs**

Recommendations on the implementation of the proposed tariffs covered a number of areas, including usage knowledge, applicability, justifiable nature of the tariff, acceptability of the tariff, rewarding behaviour change, the incremental nature of change and the calculation of the impact.

**i) Usage Knowledge:**

Lack of knowledge on how much electricity is used during the different time of use time bands will initially undermine the consumers' ability to evaluate the time of use tariff. It will be important, therefore to provide tailored information in the allocation communication.

**ii) Applicability:**

The significance of the peak may be overstated by participants and the significance of the winter period may be underestimated. Communications devices, such as the fridge magnet "clock" should aim to correct any misunderstanding and to aim to revise or clearly define winter/summer terminology.

**iii) Justifiable:**

The scale of the higher peak and daytime prices in some time of use tariffs did not seem justified to respondents. In order to support engagement, therefore, the rationale for time of use pricing levels must be explained in clear language.

**iv) Acceptability of tariffs:**

The initial reaction to the tariff will lead to attrition or disengagement. This risk reoccurs with the first bill. Communications should explain at the outset that the first bill is likely to be higher, but that there is an opportunity to save over time. Any communication on the balancing payment and duration of the Trial must, however be appropriately worded in order not to undermine genuine engagement in behaviour change.

**v) Rewarding achievable change:**

The claim of potential savings was assumed to require unachievable behaviour changes, such as only using electricity at night. Findings show the consumer must be guided and educated to identify how they can save money and that these savings are possible through achievable behaviour change.

**vi) Incremental:**

The tariff can be interpreted as an extra burden on those who had already made an effort to reduce their usage. Communication must, therefore, stress that this is an additional way to save money over and above the existing ways to reduce your usage (such as energy saving bulbs) and that the incremental nature of these changes will provide even more benefits with the time of use.

**vi) Calculation of impact:**

The typical consumer's translation of the tariff prices into impact on bill size significantly overstated the scale of this impact. Communications should provide examples of the likely impact either using "average" usage or personalised usage (for example, with your level of peak usage, your bill would increase by 10% if you did not reduce your usage during the two peak hours a day").

## A5.7 Focus groups on The Smart Prepayment Meter – Proof of Concept

### A5.7.1 Background and objective

The introduction of the prepayment proof of concept involving the testing of the process of prepayment among a diverse group of consumers. This diversity was extended to include consumers who were:

- in different stages of the debt recovery process,
- who have intermittent payment patterns
- and those who would typically be offered a token meter.

Two focus groups were conducted in total and their attendance comprised over 63% of the customer participants in the Trial.

### A5.7.2 Purpose of focus groups

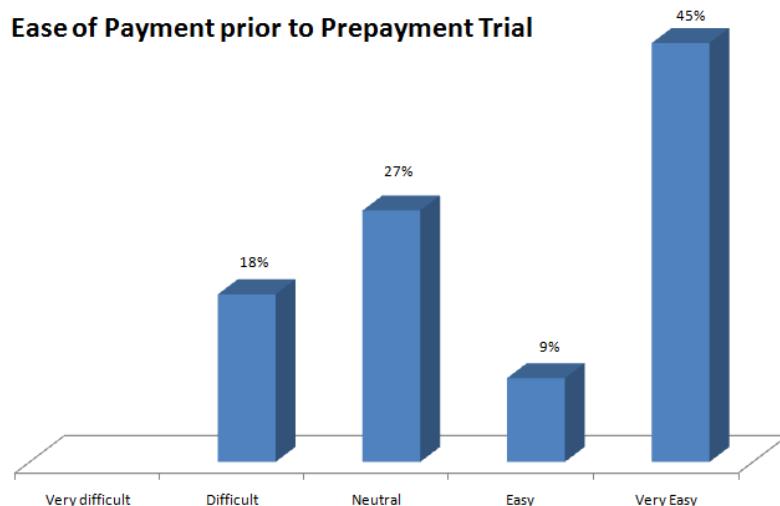
Testing real prepayment as opposed to debt recovery was a key requirement of the Trial. In structural terms this was achieved by requiring participants to maintain a minimum credit balance of €5 on their account at all times. The value to be used in this trial is €5 to replicate the existing emergency credit value.

The purpose of the focus groups was to explore the following:

- Previous payment behaviours
- Understanding of the prepayment system in place
- Impact of prepayment on payment behaviours
- Perceptions of prepayment as a support or a penalty
- Effectiveness of supports provided
- Suggestions for how to improve the system and supports

### A5.7.3 Payment patterns prior to the Trial

Participants were asked about their payment patterns prior to the Trial. Over 50% of the focus group participants indicated that they had no difficulty paying their bills prior to the prepayment trial. On further discussion it became evident that participants' perception of 'paying the bill' varied significantly. In terms of channel, over 60% paid their bill through the post office while the remainder used online options, or cheque directly to Electric Ireland.



**Figure Ax. 47: Ease of payment prior to the Prepayment Trial**

Those who used the non-post office channels can be broadly characterised as paying their bills in full, but are likely to let at least two bills accumulate before making an effort to pay. Their pattern of payment is focused on complete, but intermittent payment.

Those focus group participants who typically pay through the post office identified themselves as more financially constrained. They assessed that any amount paid off the bill should be recognised as '*fair effort*'. Their payment pattern is '*little but often*'. In the case of some of these participants, the bill payment issue arising is that they are almost always in debt to a greater or lesser degree. In many cases they engage in bill payment arbitrage, where the bill perceived as most pressing in terms of follow up by the supplier will get paid and any remaining financial resource will be split across the remaining outstanding bills.

A common characteristic of the participant's pattern of payment was their low level of planning for bills. In practice their approach to payment resulted in them always being behind in payment. When asked about forward planning, only 9% of participants indicated prepayment type behaviours such as planning for payment by putting money aside or aiming to be in credit by paying in advance.

Approaches to Payment Prior to the Trial	Frequency
I generally had enough money available to pay the bill when it arrived	27%
I put aside money every week so that I would have enough to cover the bill when it arrived	0%
I paid money in against the bill when I could so that I would already be in credit when it arrived	9%
I paid as much as I could afford when it arrived and then pay off the rest when I had the money	45%
If I didn't have enough money to pay the bill, I would leave it until the next bill arrived or I got a reminder letter	18%

Figure Ax. 48: Approaches to payment prior to the Trial

#### A5.7.4 Experience of the Trial

In general participants had a very positive assessment of the Trial. Over 85% of the trial participants declared themselves happy with the concept of prepaying their electricity bill as a result of their experience of participating in the Trial. In addition over 85% indicated that the Trial itself was either helpful or very helpful in helping them pay for their electricity.

#### A5.7.5 Benefits of the Trial

Participants were very clear in articulating the benefits of participating in the Trial. The major benefits revolved around:

i) **Bill management** – participants had one less bill to worry about.

This applied to a) categories that were financially constrained and therefore tended not to pay in full and b) those intermittent payers who were typically late in their payment. '*I was happy because I know I was not going to get the electric bill at the end of the month .....*'

ii) **Cumulative bill size** – participants were satisfied that they would not receive a large bill because they were part paying in advance.

This was particularly relevant given the comparatively inclement weather experienced during part of the prepayment trial period. '*I knew we were using more because we were in a lot, but at least I could pay bit by bit .....*'

In particular, the incremental nature of the payment was motivational to participants, who noted that if they received a large bill they would not bother to pay off small amounts such as €20 as it was perceived as making no difference. The more granular level of billing and payment was conducive to payment.

iii) **Increased awareness of energy usage** – participants felt more empowered in controlling their usage.

This was a particular benefit as the very brief lag (daily) and requirement for continuous payment with the supporting balance information and text reminders could be directly related to household usage patterns. This immediate relationship of usage to payment allowed a greater sense of control and adjustment of household energy usage. '*I was shocked at the amount you use, when the €20 is going out of your pocket immediately, you soon change what you use in the house, We are very quick to knock off the lights and switch off the machines now ..... the price matches the consumption'*

**iv) No estimated bills** – participants felt more in control.

Some participants indicated that they had previously had a bad experience of receiving a larger than expected estimated bill. The residual fear of a similar event was of significant concern to some participants and prepayment was a good way for this concern to be mitigated. '*The last time I got the huge bill it took me two years to clear it, paying it bit by bit – I know I would not have the money to do that now...*'

**v) Effective small reminders** – participants felt the benefit of the frequent texts in terms of a payment reminder ‘alarm’.

Participants in general noted how busy life has become, particularly in a household with responsibility for dependents, financial management and work commitments. Therefore a reminder was very effective in ensuring that payment was prioritised. The texts acted as an effective reminder and a schedule manager in relation to the payment of the electricity bill.

#### **A5.7.6 Drawbacks of the Trial**

While participants were very clear on the benefits of participating in the Trial, they were equally clear on the drawbacks. There was some initial ‘teething problems’ associated with the trial participants. The drawbacks related to five areas:

**i) Speed of payment registration**

Over 90% of the participants were concerned about the speed of payment registration. The issue was related to the fact that if they paid in the Post Office (this facility was used by over 65% of participants) or online it typically took three days for this payment to register with their supplier. When there is notional ‘daily billing’ a three day lag presented structural issues from the point of view of the participants in that their accounts were not real time and as such they were always behind in their payments, notwithstanding the trial objectives being driven by a prepayment imperative.

**ii) Texts arriving post payment registration**

The lag between payment and registration of payment resulted in reminder texts being sent in relation to energy that had already been consumed and paid for but was not registered. In some instances such messages causes disharmony in partnerships where one partner had advised the other that a payment had been made but the reminder text

seems to dispute this payment. This caused irritation to participants and in some cases resulted in specific texts being disregarded.

The consequence of that reaction is that subsequent tests were also ignored although they related to unpaid amounts, which should have been actioned. The confusion arising from the lag in payment and the associated reminder texts persisted during the Trial. To overcome this issue, participants were very well assisted by the supplier when they called, as they were recommended specific payment amounts that would cover current usage and a recommended amount that would compensate for usage arising from the payment lag days.

**iii) Consumption monitor/support**

A key concern highlighted by participants was the absence of immediate support in terms of knowing how much energy was being used at a specific point in time. For some participants it would have been very helpful to have a monitor or device to advise them of level of consumption at a particular point in time or for a particular day. This would have allowed them to budget for their energy bill within the constraints of their limited financial resources. Although prepayment in intent, the difficulty of establishing the appropriate amount to put aside for payment for specific days in order to ensure that their account was in credit was problematic for some participants. While the trial design allowed for participants to text an account balance service, less than 40% used this service.

**iv) Relationship between balance and usage**

Some participants identified the relationship between account balance and usage as an inhibitor to their successful use of the prepayment capability of the Trial. Their preference was to have knowledge of their usage and not their account balance, since the usage aspect was directly actionable for them. Their preference would have been to text in the meter number so that they could receive a real time consumption update as opposed to a balance statement.

**v) Dependency on a specific mobile number**

A number of the participants identified the association with a particular mobile as an issue in the Trial. In some cases the mobile phones were lost or otherwise rendered unusable and therefore the messages were not read and could not be actioned. (Note: This is despite the fact that participants were advised that they could register any number of phones to which messages could be sent.)

**A5.7.7 Behaviour changes occurring during the Trial**

It is interesting to note that the participants fell into a pattern of fixed payments after the first two weeks. A total of 86% decided to make weekly payments in the range of €15-€30.

Apart from the issue raised by participants regarding the texts and the payment lag, the reminder texts were an effective mechanism for motivating payment action. All the participants who received texts read them and sought to specifically understand what they were being advised. Over 50% paid on the same day of receiving the text and the remaining participants waited a short period until money became available. They prioritised part of this available money towards the electricity bill.

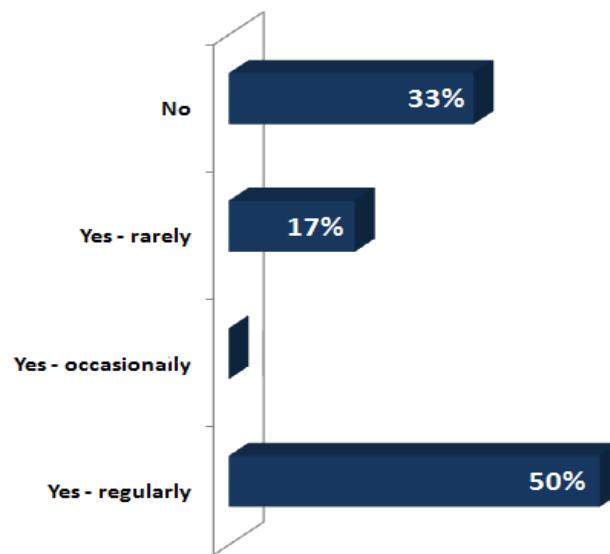
### Helpfulness of texts to remind you when you needed to pay



**Figure Ax. 49: Helpfulness of texts as a payment reminder**

No participant indicated that they ignored the text. Two participants reported that they got notification of de-energisation and they actioned the outstanding amount immediately. There was no participant in the group that was actually de-energised.

In terms of the account balance text options, the usage was polarised. One group tended to use this facility quite frequently while another group of participants chose not to avail of this option:



**Figure Ax. 50: Use of Account balance options**

The participants perceived the process of texting to get their account balance as less easy. Some cited issues with a delay in response to their request for a balance, which hampered their payment at particular moments in time. (A dial-in interactive voice recognition (IVR) service was available to provide a balance to participants 24.7).

However, in general it was considered to be a valuable and non dispensable option for those who used it:

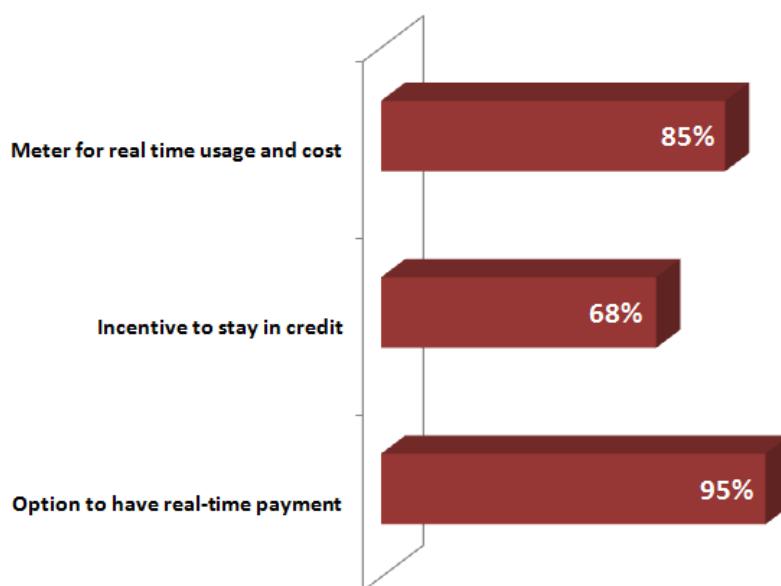


**Figure Ax. 51: Helpfulness of text service to get current account balance**

Over 80% indicated that the prepayment approach was effective in terms of them being less likely to fall behind in their bill payments.

#### A5.7.8 *Improvements to the Trial*

Participants were invited to indicate if they would suggest improvements to the Prepayment Trial. Apart from recommending that the initial issues associated with reminder texts arriving after payment had been made but not registered were improved; the primary improvements suggested related to the on-going effectiveness of such a payment option.



**Figure Ax. 52: Participant suggestions for improvements in prepayment**

Specifically, participants would value real-time payment options, where payments would be immediately credited and therefore texts would only arrive where there was truly a delay in payment or change of credit status. Secondly, participants would value a meter which would give them real-time data on their usage and credit status. It was suggested that this would facilitate a more ‘self management’ alternative. If the user had this information they would

not require texts as a reminder of non-payment, as their meter would provide them with that information. This would also mitigate the issue associated with mobile phone access and ensure that the credit and usage status information would be available to prepayment consumers at all times.

Finally participants viewed the prepayment options as very beneficial to suppliers for the following reasons:

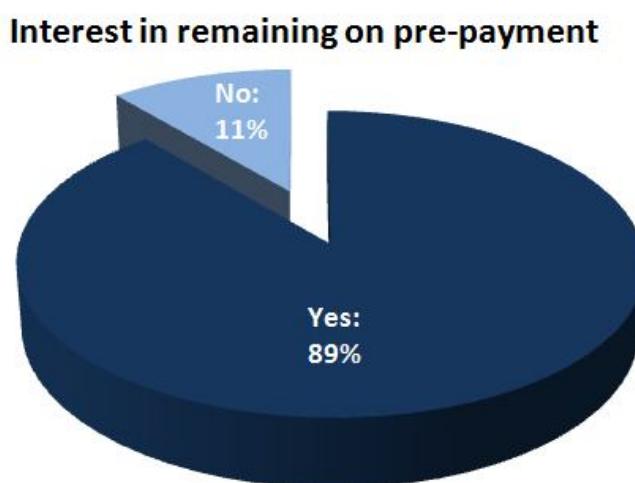
- Consumers are always in credit, therefore debt risk is reduced
- Consumers will be more ‘connected’ to the supplier with this meter and are therefore less likely to switch
- There will be no need for expenditure on meter readers, so the suppliers’ bottom line will be advantaged
- There will be no estimated bills and that should reduce customer complaints and customer debt

On the basis of the significant benefits for suppliers, participants felt that consumers should be incentivised to move to prepayment. This incentive may take the form of:

- Reduced unit cost
- Loyalty benefits (in terms of tokens, vouchers, credit)

#### **A5.7.9 Future interest in a prepayment option**

Participants were asked if they were offered an option to continue on prepayment, would they avail of that offer. On consideration, a very large number of the focus group participants indicated that they would chose the option of remaining in prepayment:



**Figure Ax. 53: Participant interest in remaining on prepayment**

## Appendix 6: The Residential pre-trial survey

### A6.1 Introduction

A survey was conducted by The Research Perspective Ltd among all residential trial participants (including those subsequently allocated to both test and control groups) in August and September 2009. The objectives of the survey included:

- Demographic and lifestyle profiling of the participants - *who has opted to participate in the Trial*
- Motivation of the participants – *why they joined*
- Reported behaviours related to the energy reduction – *how they are likely to behave during the Trial*
- Engagement with the topic of energy reduction and behaviour change – *how likely are they to stay for the entire period and become engaged in the objectives of the Trial*

The pre-trial survey outputs are used in three areas:

- (1) To compare with the consumers who were invited into the Trial but did not accept (as measured through the non-response survey) and to compare the set of participants who attrited. (Note: The main reason for attrition was change of supplier and not trial specific). This comparison was performed to identify any issues with representativity among trial participants (which would need to be factored into the analysis in order to ensure reliability) and determine any trial impact which led to attrition (which would again have to be considered in the analysis of usage change).
- (2) To compare with the post-trial survey to identify changes in stated behaviour or attitudes which might be associated with participation in the Trial.
- (3) To provide insight into the attitudes and behaviours of residential electricity consumers which can be used to inform future policies and programmes related to energy usage.

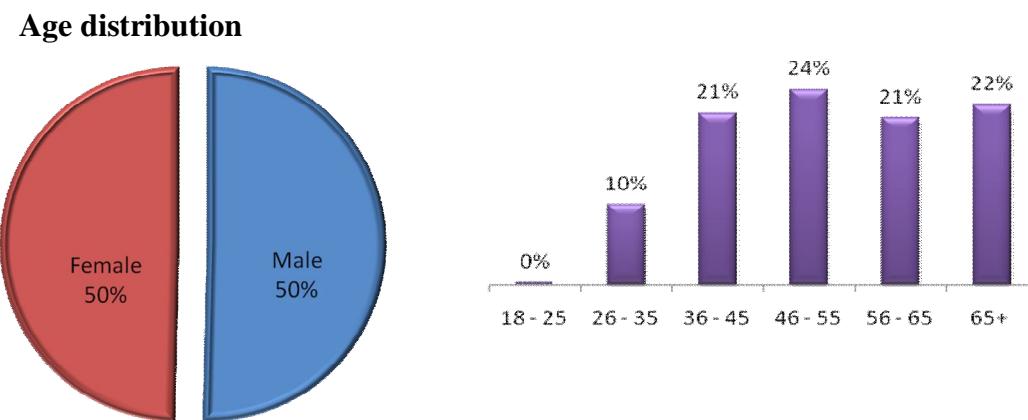
This chapter will provide information on the methodological approach and summarise the findings in the context of the third output. The first two outputs are dealt with in specific chapters elsewhere in the report.

### A6.2 Methodology

The survey was conducted using Computer Assisted Telephone Interviewing (CATI) between August and September 2009. Respondents had agreed to participate in the pre-trial and post-trial survey as part of their agreement to participate in the Customer Behaviour Trial. This

greatly assisted in the response rates achieved and 4,254 completions (corresponding to 85% of the population of participants).

### A6.3 Demographic profile of participants



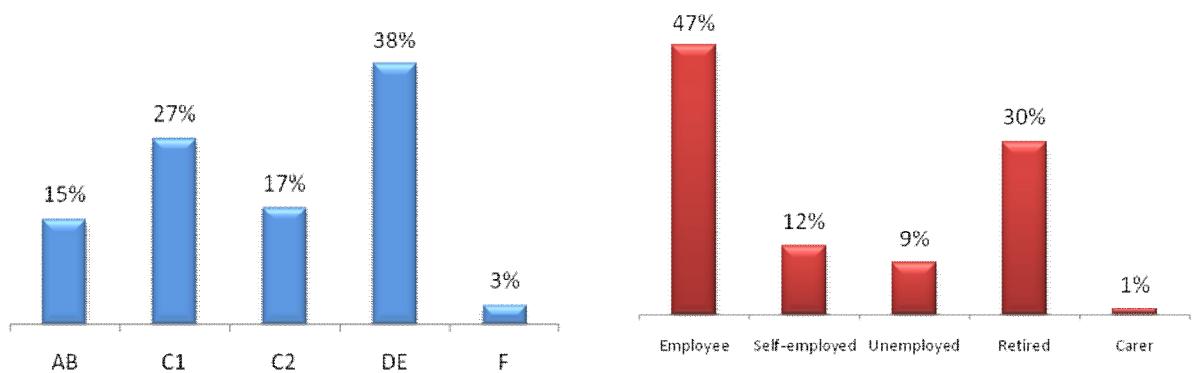
**Figure Ax. 54:** Gender and age distribution of participants

**Figure Ax. 54** shows the gender and age profile of the participants. Compared to the 2002 census (shown in the table underneath the histogram), there is significant over-representation of older age groups and under-representation of younger age groups. The discrepancy between the national age profile and the participant age profile is explained by two factors: participants in the survey were bill payers and consumers with short tenure were also excluded. Both these exclusions reduce the representation of younger age groups (in comparison, the 1996 census shows 5% of households with a head of house under 25).

**Figure Ax. 55** shows the distribution of participants by social grade (using the NRS social grade system) and by employment status. The difference shown in the figure between the national rate of 12.8% and the rate of 9% reported in the survey is explained by two factors: participants in the survey were bill payers and tended to be older and hence less likely to be unemployed<sup>7</sup>.

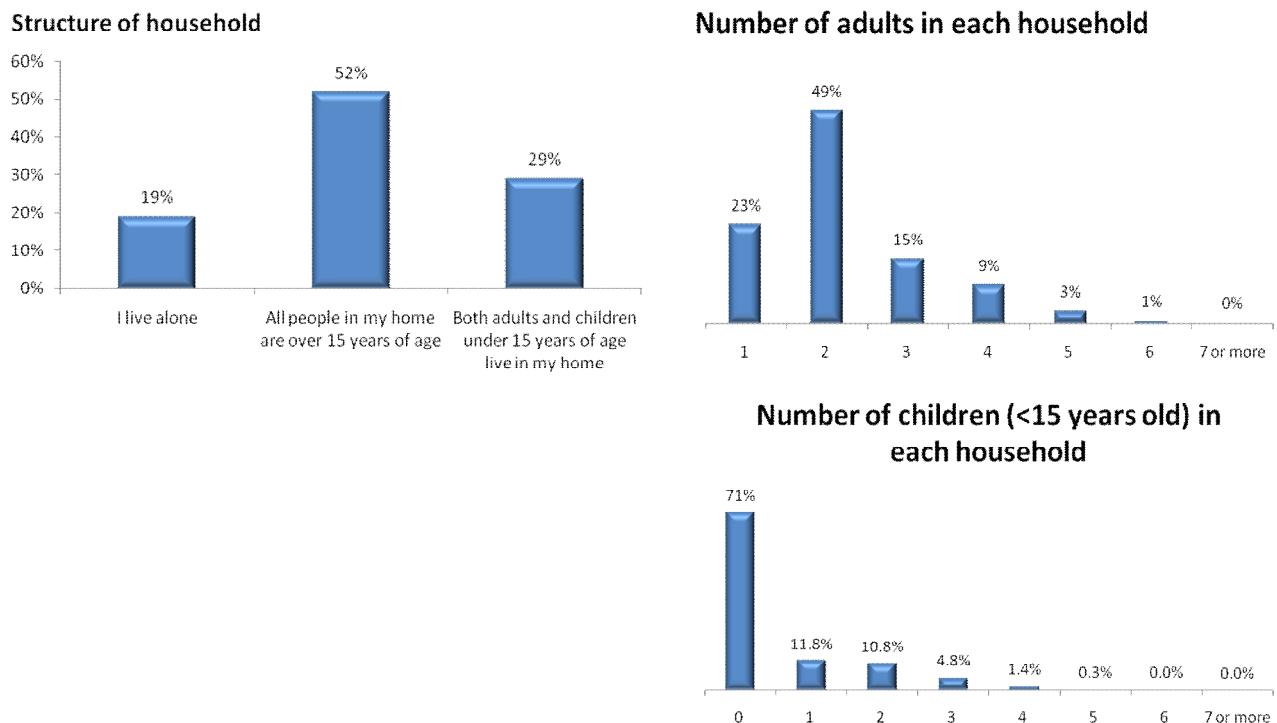
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<sup>7</sup> Unemployment statistics in October 2009 (when the survey was completed), as reported by the Eurostat unemployment statistic for Ireland was 12.8% with unemployment in the under 25 age bracket at 28.4%.

**Figure Ax. 55: Social grade and employment status of participants**

#### A6.4 Household profile

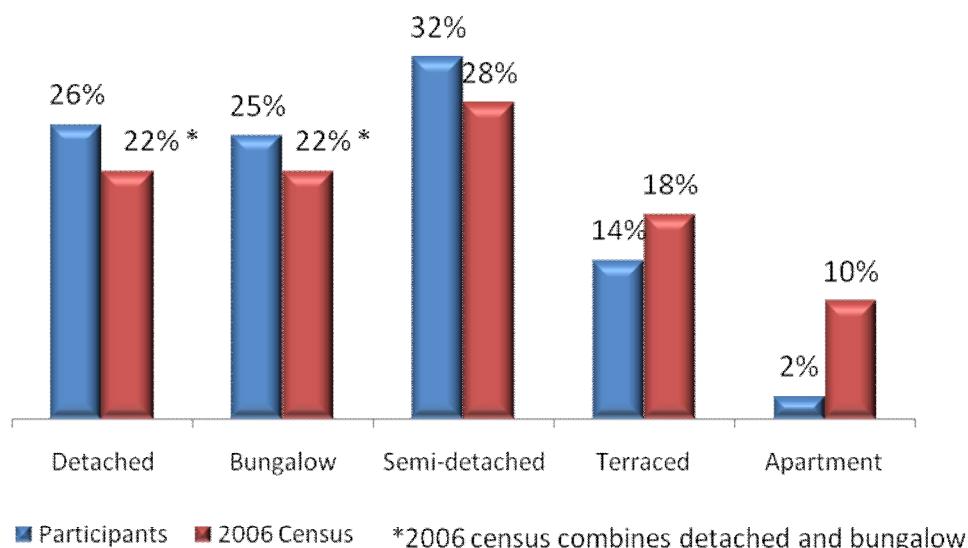
The survey included questions on the size and composition of the participants' household.

**Figure Ax. 56: Size and composition of household**

**Figure Ax. 56** shows the household size and composition. Single person household proportion is in line with the national distribution of 21%<sup>8</sup>.

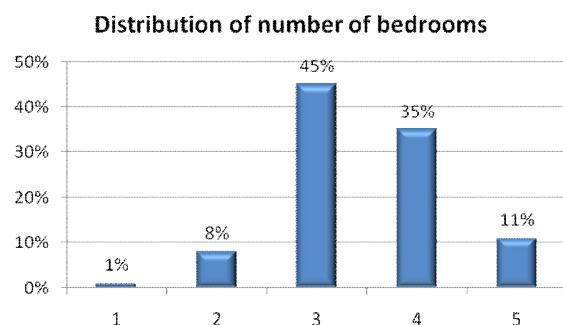
<sup>8</sup> "The statistical yearbook of the Economic Commission for Europe 2008"

### A6.5 Profile of Home



**Figure Ax. 57: Profile of house types among respondents**

**Figure Ax. 57** shows the distribution of house types compared to the CSO 2006 figures. It should be noted that CSO census does not distinguish between bungalows and the figures presented is a simple split into the two categories captured in this research. The exclusion of short term tenancies will reduce the representation of apartments and smaller houses (reflected in the under representation of terraced houses).



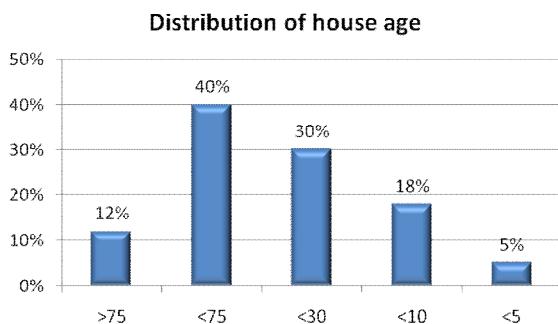
**Figure Ax. 58: Distribution of house types by age and number of bedrooms**

### A6.6 Profile of discretionary usage

The age profile of homes includes a higher proportion of older properties than suggested by research<sup>9</sup>. However, this can be partially explained by the profile of permanently occupied dwelling as the private rental (and hence often temporary) sector represents a larger proportion of new housing than older stock. More importantly from the perspective of the Trial, as most homes nationally do not use electricity for heating (and most homes that do use

<sup>9</sup> For example the SEAI report ‘Energy Consumption and CO<sub>2</sub> emissions in the residential sector 1990-2004’ (2004) suggested that 53% of permanently occupied dwellings were built before 1979 (i.e. 40 years ago).

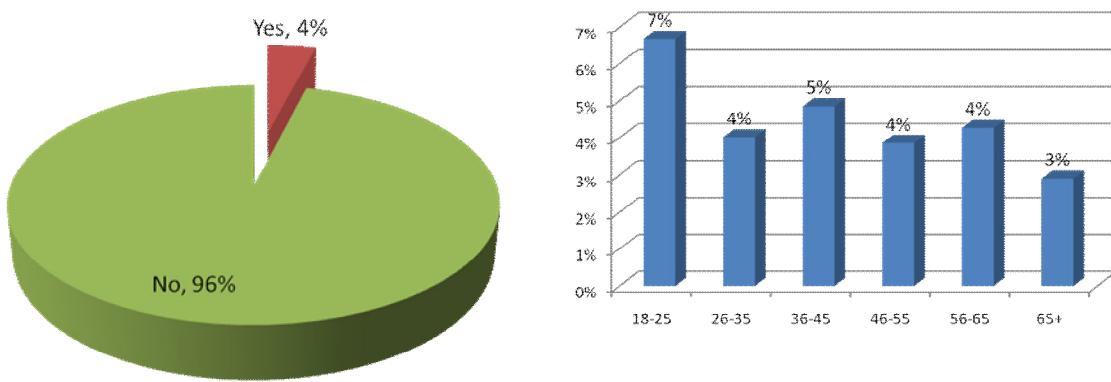
NightSaver tariff and are therefore excluded) there is no reason to link age of home to electricity usage.



**Figure Ax. 59: Distribution of house age**

### A6.7 Profile of Vulnerable groups

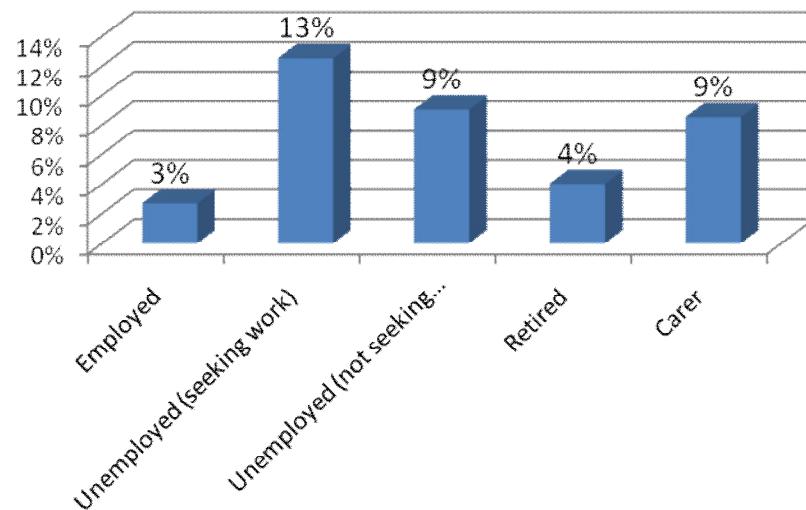
One potential side-effect of the introduction of Time of Use tariffs is disproportionate impact on vulnerable sections of society. For instance, less affluent consumers may not be able to modify usage in order to reduce the impact of increased prices for peak usage.



**Figure Ax. 60: Proportion of participants self-classified as fuel poor (left) in the trial and the proportion in each age group (right)**

Of particular concern are the members of society with insufficient financial resources to adequately heat their homes – these are known as the fuel poor. The two definitions for fuel poor used in this research are included in the chapter on the representativity of the trial participants. **Figure Ax. 60** shows the proportion of participants who state that they are fuel poor (i.e. have not been able to keep their home sufficiently warm due to lack of money). The breakdown by age shows that the age group with the highest proportion of fuel poor in the Trial was in the under 25 age groups with the lowest in the over 65. The higher representation of the youngest age group will partially reflect the impact of the focus on householder (as opposed to total population) and the exclusion of recent tenancy: Both

exclusions will lead to under-representation of higher social and more affluent individuals who may live at home or still be in full time education. The lower proportion at greater than 65 is also not surprising given the availability of the free electricity allowance to less affluent consumers in this age group.



**Figure Ax. 61: Proportion of participants self-classified as fuel poor by employment status**

In the current economic climate with increased levels of long term unemployed, fuel poor should also be related to employment status. **Figure Ax. 61** reflects this with 13% of unemployed participants who are actively seeking work reporting fuel poverty, compared to just 3% of those employed.

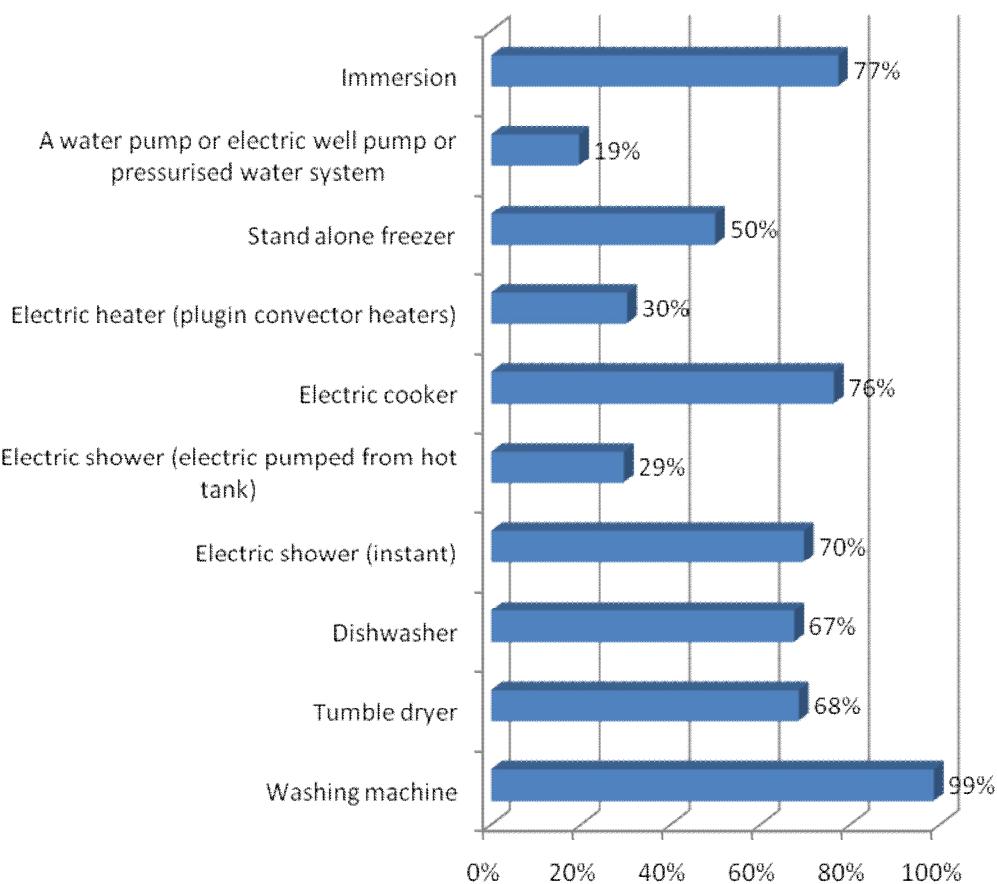
#### A6.8 Electricity usage profile

The objective of the Trial is to achieve load reduction and load shifting. This depends on the householder engaging appropriate behaviours and the existence of discretionary usage within the home. It should be noted that the Irish context is very different from many other locations and in particular US locations where smart meters have been trialed or deployed. In particular, most Irish homes do not use electricity for home heating and do not have air conditioning (areas where consumer initiated or automated changes in the temperature setting can generate usage reduction). Therefore, the areas which represent Irish residential consumer usage fall into five main categories:

1. Lighting
2. “Wet” appliances such as dishwashers, washing machines and clothes dryers
3. “Entertainment” appliances such as televisions, computers, games consoles and miscellaneous small appliances
4. Water heating for washing purposes – either centrally with an immersion or as needed with electrically powered showers
5. Water pumps, pressurization and wells – for areas where mains water is not available or the pressure delivered is insufficient

Out of these five categories, research in the UK suggests that “Wet appliances” provide the greatest area of discretionary usage from both overall load reduction and load shifting. While, it could be argued that “Entertainment” also provides an opportunity for reduction, it is reasonable to assume that there is limited opportunity to reduce load in the other categories. This model of usage was incorporated within the profiling exercise used to allocate participants to different experimental cells.

Therefore, the pre-trial survey measured the prevalence of different types of appliance and different levels of usage of such appliances.



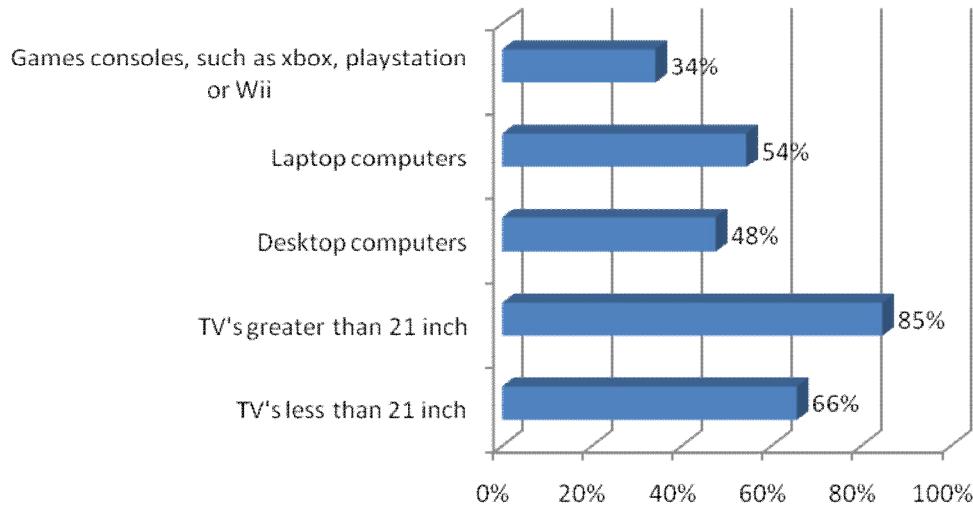
**Figure Ax. 62: Reported prevalence of "Wet" appliances and water related uses of electricity**

**Figure Ax. 62** shows the prevalence of “Wet” appliances and water related uses of electricity (such as electric showers, immersion and water pumps). The level of use of the main “Wet” appliances is shown below with most participants using each type of appliance less than once a day:

Usage per day of appliance	Washing machine	Tumble dryer (Clothes dryer)	Dishwasher
Less than 1 load	56%	81%	59%
1 load	30%	14%	37%
2 to 3 loads	13%	5%	4%
More than 3 loads	1%	1%	0%

**Table Ax. 22: Usage of appliance per day**

The prevalence of “Entertainment” appliances is shown in **Figure Ax. 63** and reflects the high level of usage of games consoles and computers. These compare to ComReg reported<sup>10</sup>figures of 38% for games consoles and 62% of home with broadband access.



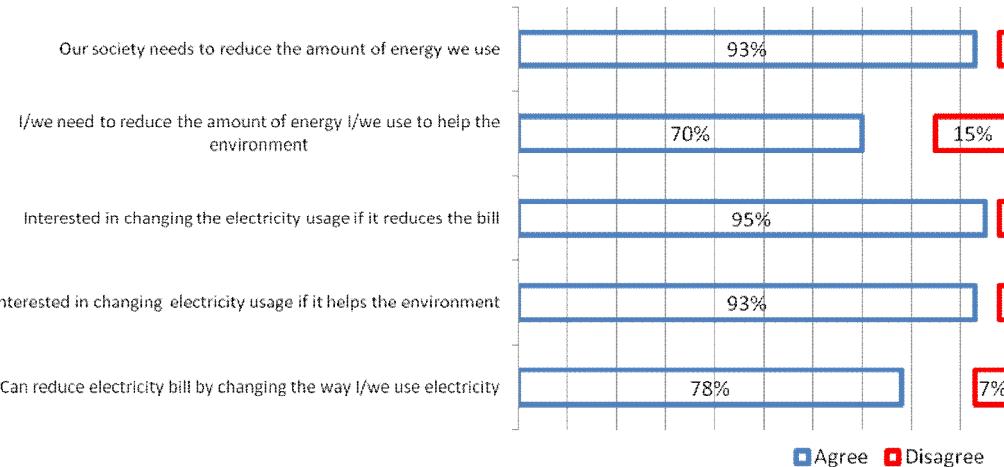
**Figure Ax. 63: Prevalence of "Entertainment" appliances**

#### A6.9 Attitudes towards behaviour change among the participants

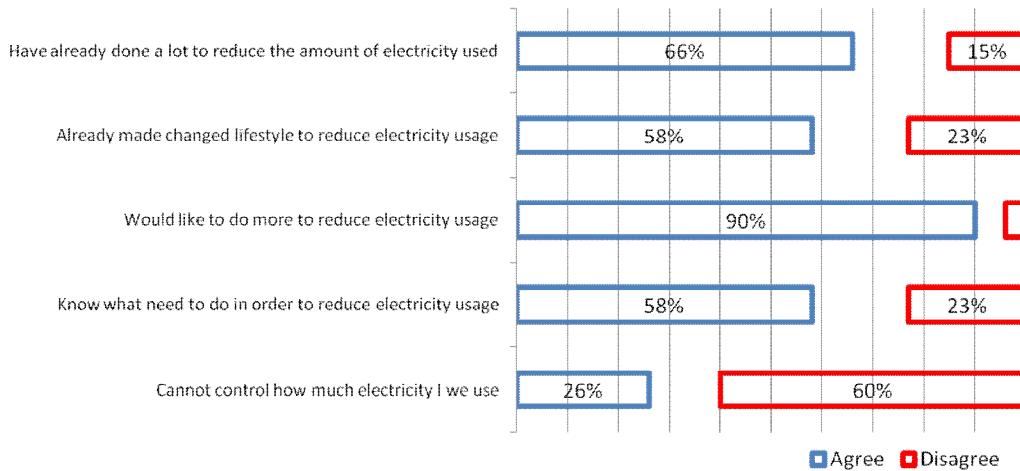
In order to assess participants’ predisposition towards behaviour change in relation to electricity, participants were asked about their current attitudes towards the topic in terms of societal obligations and personal actions. Among those participants who stated that they had already endeavoured to make changes, their assessment of the impact of the changes was captured. Among those who had not made those changes, reasons for this decision not to change was captured. Finally, the level of adoption of energy reduction home improvements was also assessed.

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<sup>10</sup> “Irish Communications Market Quarterly Key Data report – Q3-2010”, Commission for communications regulation

**Figure Ax. 64: Attitudes towards reduction in electricity reduction**

**Figure Ax. 64** shows the attitudes of participants toward reducing electricity use. There is a very high level of acceptance of the general need for society to reduce energy usage (93%), interest in changing usage in order to help the environment (93%) or to reduce the bill (95%). While still confirmed by a majority of respondents, lower proportions believed that they personally needed to reduce their usage to help the environment (70%) or that they could reduce their electricity bill by making lifestyle changes (78%).

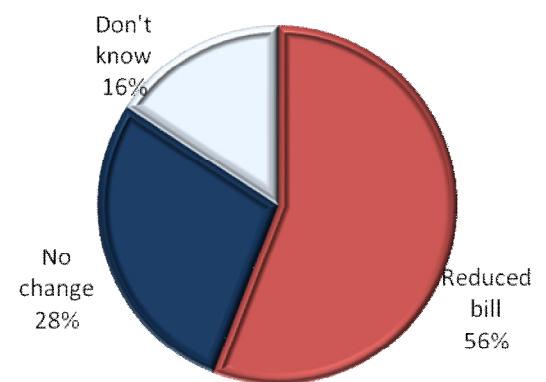
**Figure Ax. 65: Energy reduction engagement and empowerment**

While most participants are positive about the concept of energy reduction, engagement and empowerment is more variable (shown in **Figure Ax. 65**). Two thirds of respondents believed that they had already done a lot to reduce usage with 58% claiming to have made lifestyle changes to reduce usage. However, 23% do not believe that they know what they need to in order to reduce electricity usage and 26% do not believe that they can control how much electricity they use. While it is positive that a majority believe that they are engaged in

energy reduction, the significant minority who are not empowered or engaged is a concern in any energy reduction initiative including a national roll-out of Smart Meters.

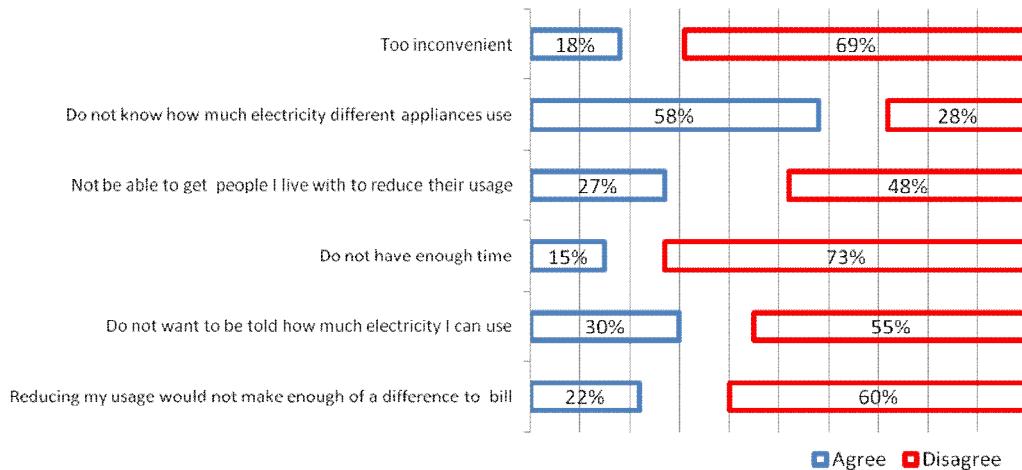
Among those claiming pre-existing engagement in energy reduction, 56% believe that they achieved a reduction in the size of the bill (**Figure Ax. 66**). For these participants (71% of the total), this experience of behaviour change should have been reinforced by the perceived savings achieved.

Among participants who had not engaged in behaviour change (**Figure Ax. 67**), the only reason cited by a majority of respondents was knowledge of appliance use of electricity (58%). It is not surprising that reasons of convenience were not often selected given the large majority agreeing with the desirability of the objective of energy reduction.



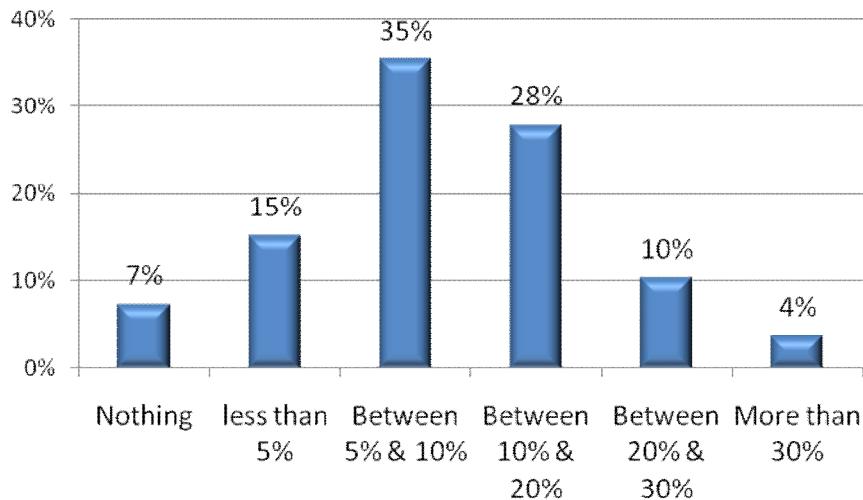
**Figure Ax. 66: Impact on bill size of behaviour change**

However, significant minorities of participants believe that energy reduction would not significantly impact their bill (22%) or that they could not motivate co-habitants to reduce usage (27%).



**Figure Ax. 67: Reasons given by participants for not reducing usage to date**

Among those who had not undertaken energy usage reduction, there was an expectation that they would be able to reduce usage by more than 11% (**Figure Ax. 68**). It should be noted that this finding is in line with qualitative findings which found that consumers tended to over-estimate their ability to impact their electricity bill.

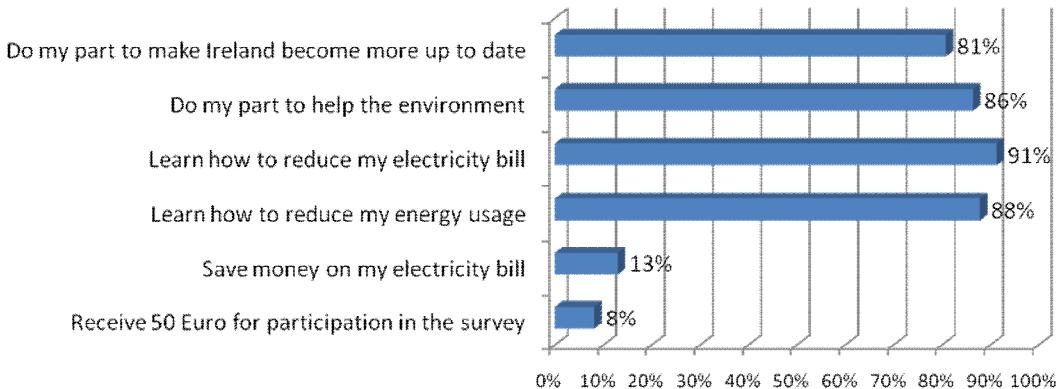


**Figure Ax. 68 Expectations of percentage reduction in usage due to behaviour change**

#### A6.10 Motivation for participation in the Trial

A significant concern in the testing of the impact of innovative technologies such as smart metering where recruitment is voluntary is that the Trial will attract participants who are predisposed to responding to the ToU tariffs or DSM stimuli. The potential bias is dealt with across a number of dimensions:

- Invitation to participate was targeted at individuals at random – with profiles matching the overall population (this is covered in **Appendix 3.**)
- The allocation algorithm was designed to ensure the profile of the test groups and the control group was similar. All comparisons are between very similar populations (in the test groups and the control group).
- Measurement of the stated reasons for participation



**Figure Ax. 69: Stated motivations for participation**

**Figure Ax. 69** shows the responses to the motivation questions asked of all participants (including those allocated to both control and test groups). The focus on motivations associated with increasing knowledge, helping the environment and reducing the electricity bill demonstrates the high level of motivation and this is not unexpected given the voluntary aspect to the recruitment. However, as is covered in **Appendix 3**, Profile of Residential Participation and the comparison with consumers who were invited and chose not to participate, there is no evidence to support the contention that the Trial disproportionately recruited individuals more likely to change behaviours.

## Appendix 7: The Residential Post-Trial Survey

### A7.1 Introduction

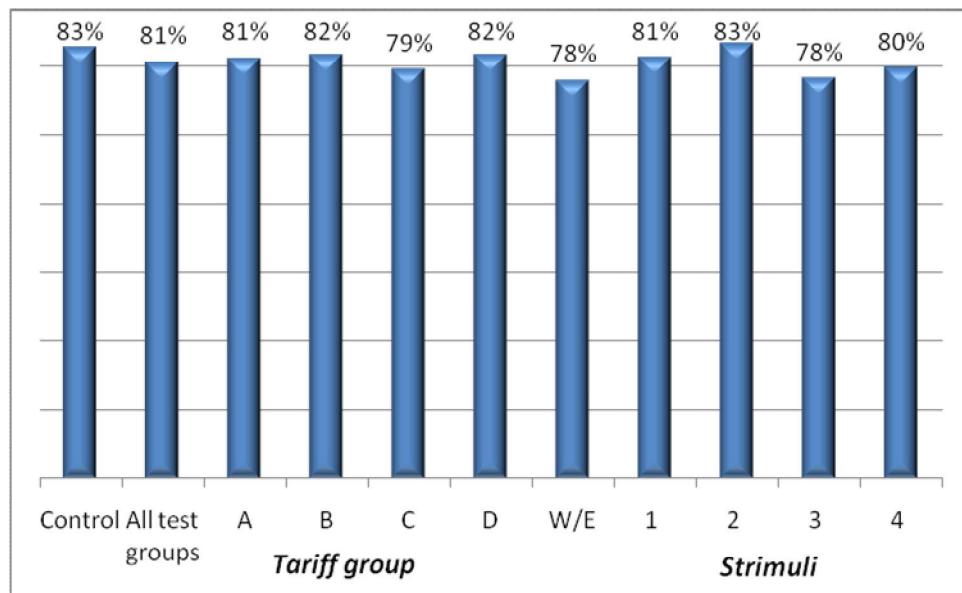
In early 2011, a second survey of the residential participants was conducted by The Research Perspective Ltd among trial participants who had remained in the Trial until the end. (i.e. all remaining participants in both control and test groups were included; attritors were not included). The objectives of the survey included:

- To gather perceptions of the impact of the Trial (perceived change in usage levels and patterns, perceived behavioural changes)
- To assess the level of recall and impact of the tariffs and reasons why tariffs did not impact
- To assess the level of recall and perceived impact of the TOU tariffs and DSM stimuli; and recall and rating of the tariffs and DSM stimuli at a feature and functional level
- To gather evidence that the Trial led to changes in usage patterns of appliances (cooking, use of immersion etc)
- To gather evidence that trial participation led to investment in energy efficiency (while the Trial was electricity and not related to home heating for most participants, it may have led to a higher awareness of general energy efficiency)
- To determine whether participation in the Trial had any impact on the attitudes towards energy reduction – compared by including the same questions on engagement with the topic of energy reduction and behaviour change

This chapter will provide information on the methodological approach and summarise the findings in the context of the third output. The first two outputs are dealt with in specific chapters elsewhere in the report.

### A7.2 Methodology

The survey was conducted using Computer Assisted Telephone Interviewing (CATI) in January 2011. Respondents had agreed to participate in the pre-trial and post-trial survey as part of their agreement to participate in the Customer Behaviour Trial. This greatly assisted in the response rates achieved and 3,423 completions (corresponding to 81% of the population of participants). Levels of participation in the post trial survey showed little variation between control and test groups and also within tariffs and as shown in **Figure Ax. 70**.



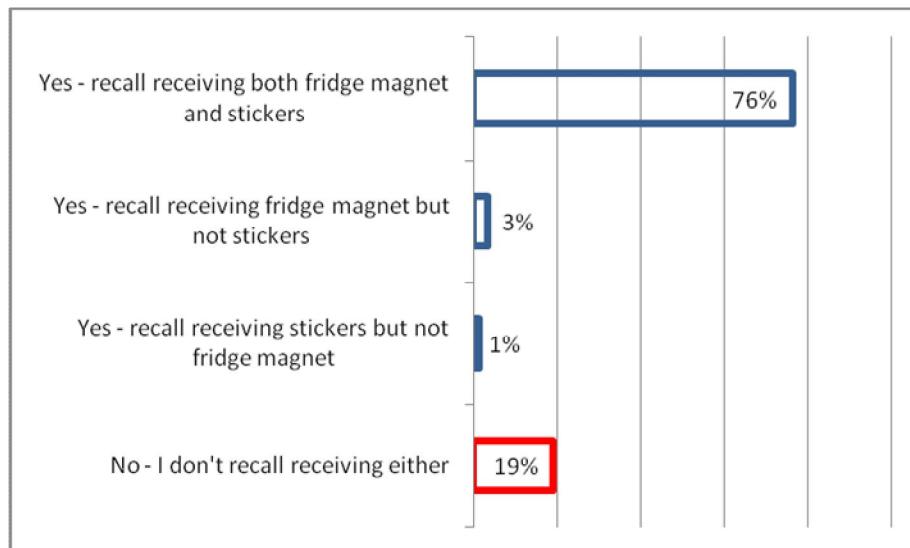
**Figure Ax. 70:** Level of participation in the post-trial survey by tariff, stimuli and overall

### A7.3 Impact and assessment of Information supports and DSM stimuli

The participants in the test groups were asked to assess their experience of each DSM stimulus. All were asked to rate the common stimuli of fridge magnet and stickers.

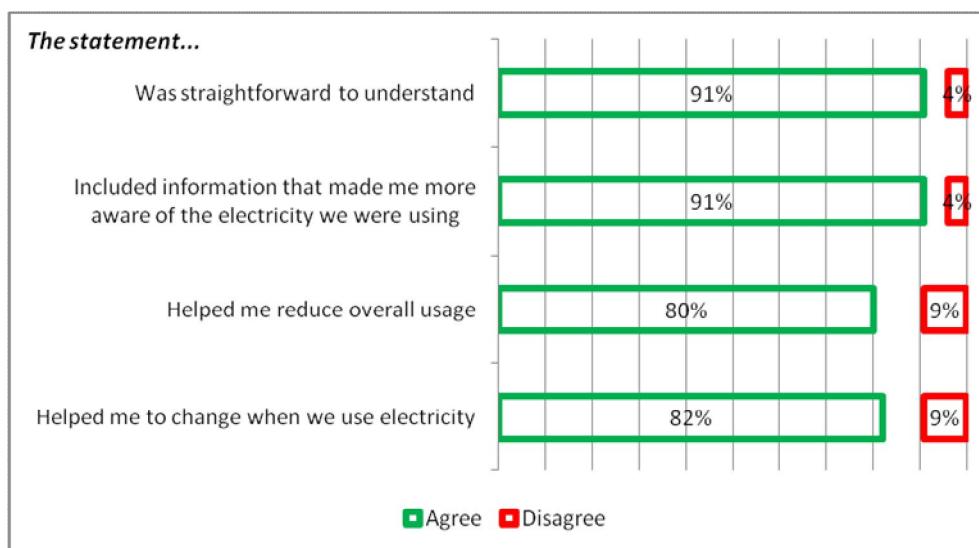
#### i) Information Supports: Fridge magnets and stickers

The fridge magnet and stickers (shown in **Appendix 12:** Sample Communications) were recalled by 81% of participants with 19% not recalling either. Of those who recalled receiving the fridge magnet, 75% stated that they were useful in reducing their electricity usage. Of those who recalled receiving the stickers, 63% stated that they were useful. Given the relatively low cost of providing this information, they achieved good recall and usefulness scores. As all participants received these, it is not possible to determine their incremental value.

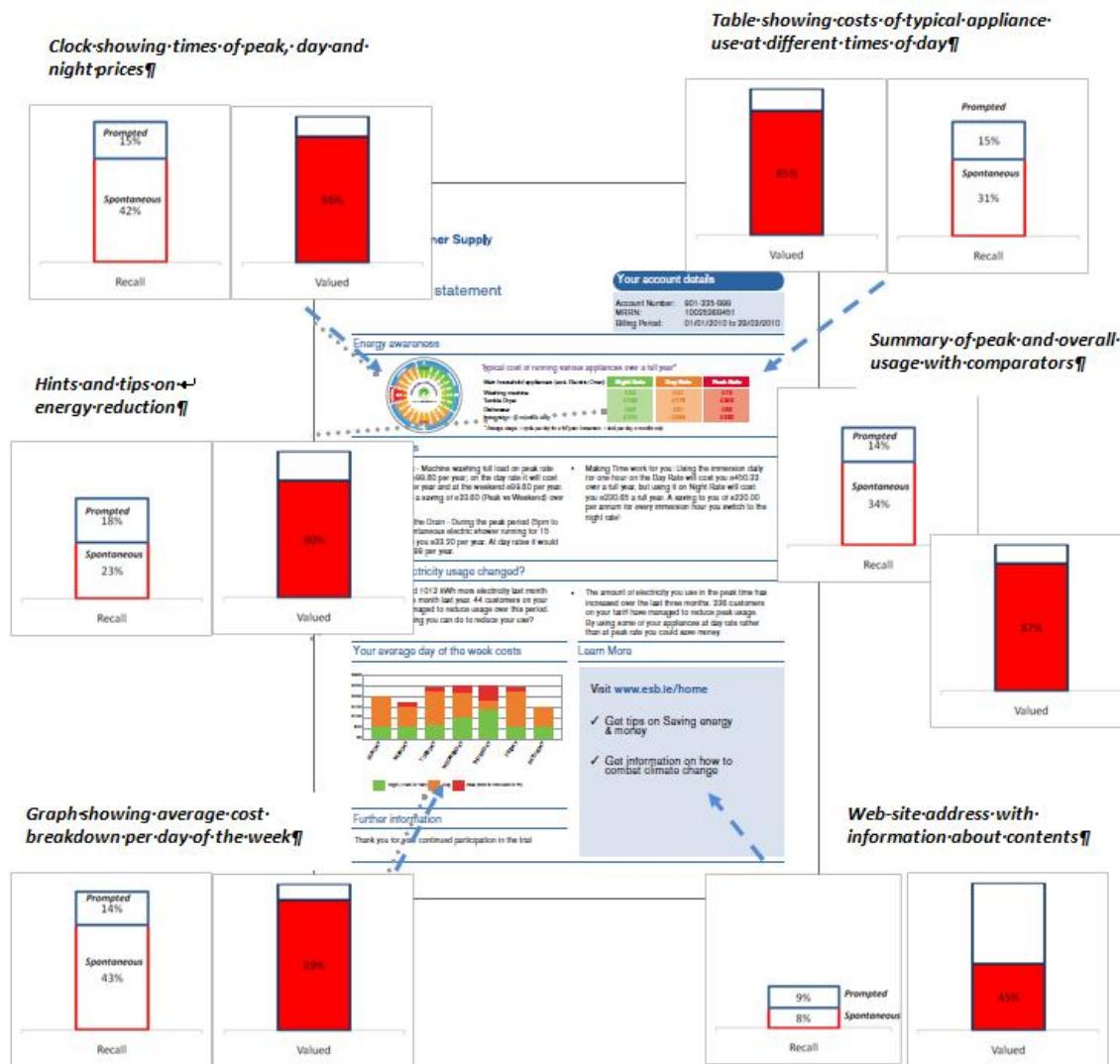
**Figure Ax. 71: Level of recall of fridge magnet and stickers**

## ii) Stimulus 1 and 2: Bi-monthly and Monthly usage statements

All participants in the trial groups received an energy usage statement with each bill. This usage statement was a separate sheet included in the envelope with the bill and 82% of participants recalled receiving the statement. The finding that 18% did not recall the statement is not unexpected as the placement of the usage statement in the bill envelope had the associated risk of the participant interpreting it as an advertising insert and ignoring it (the placement is justified by the advantage of ensuring the linkage with the bill showing the expenditure). **Figure Ax. 72** shows the positive assessment of the usage statement among those participants who recalled receiving it.

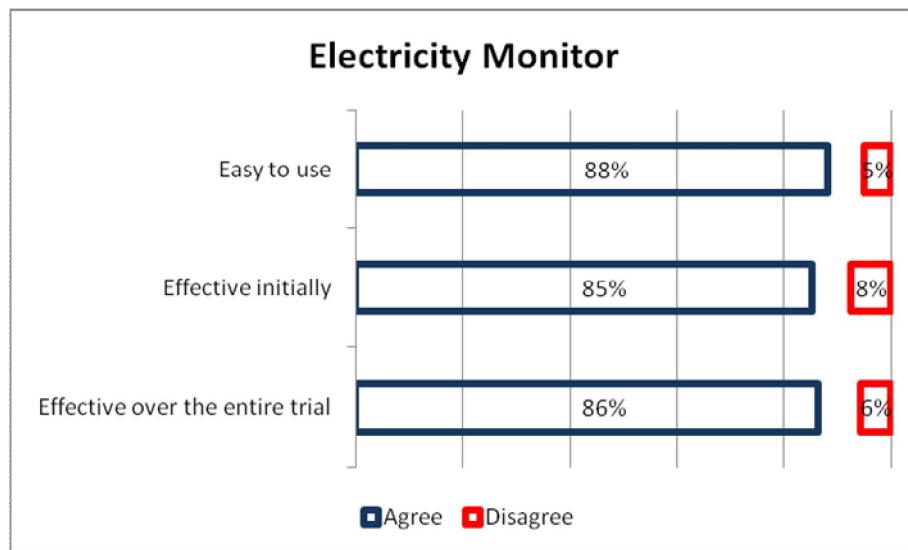
**Figure Ax. 72: Participant assessment of the benefits of the usage statement**

Participants who were asked to recall elements of the usage statement with unprompted recall indicating engagement with that component of the statement. Those who did recall the element were asked to rate the value of the element in supporting reduction. Finally, elements which they had not spontaneously mentioned were asked about to see if the respondent could recall their presence on the statement. The levels achieved are summarised in **Figure Ax. 73**.

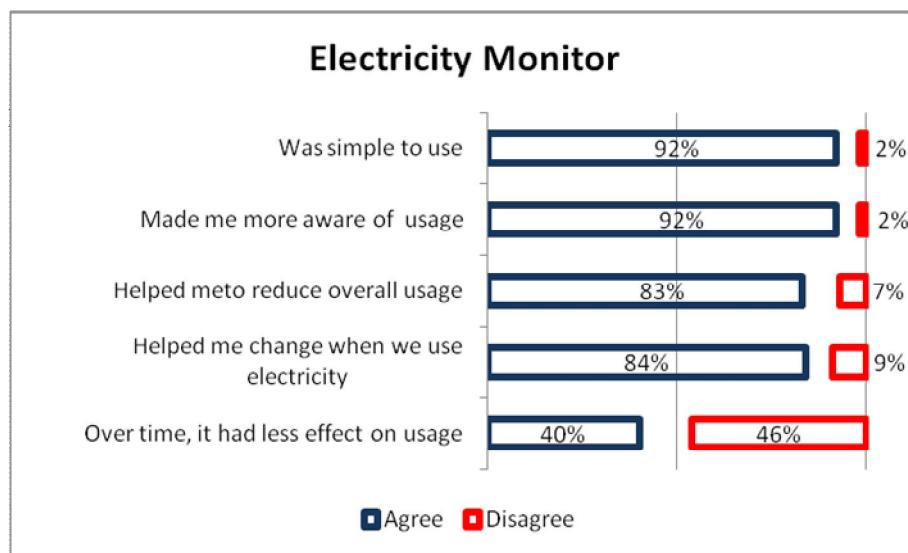


**Figure Ax. 73: Summary of feedback on the energy usage statement**

iii) **Stimulus 3: The electricity monitor**

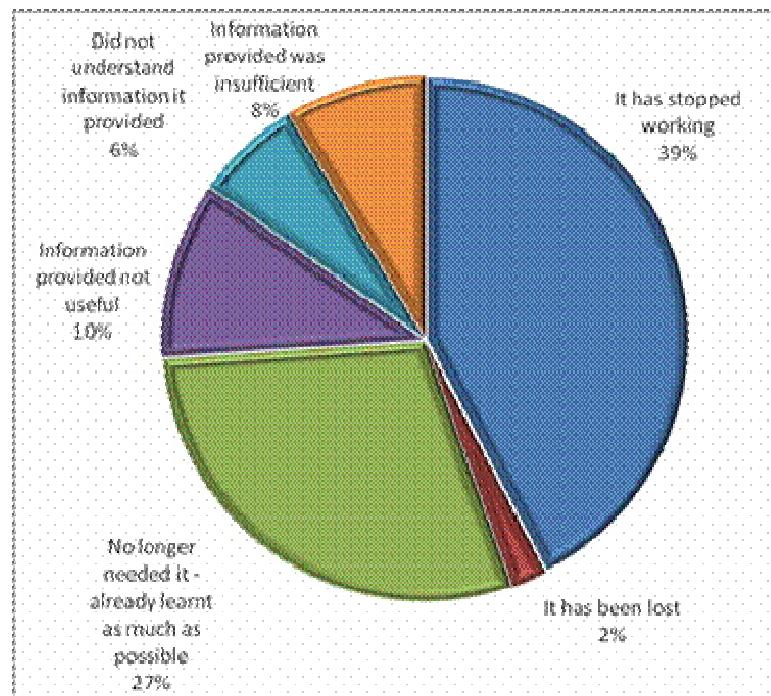


**Figure Ax. 74:** Assessment of electricity monitor



**Figure Ax. 75:** Impact of electricity monitor on usage and behaviour change

49% of participants stated that they still use the electricity monitor often with a further 22% stating that they use it occasionally. Among the 29% who stated that they didn't use it, 24% ascribed this to reasons associated with the lack of understanding or appropriateness of the information. The most common reason was unit failure at 39% (it should be stressed that this is based solely on the respondent's response as actual failure rates would require further investigation).



**Figure Ax. 76: Reasons for not using electricity monitor among participants stating they no longer use it**

20% were not able to recall any feature of the electricity monitor unprompted (**Table Ax. 23**). Among the features recalled, the cost of current usage was most spontaneously recalled (58%) and deemed useful by 95% of those who recalled it unprompted. All features recalled were highly rated.

Recall of features	Awareness		Useful (among unprompted aware)
	Unprompted	Prompted	
None	20%	N/A.	N/A.
The cost of the electricity you are currently using	58%	27%	95%
The amount of electricity you are using	45%	34%	91%
Your daily budget	41%	39%	84%
The cost of the electricity you have used so far this month	39%	36%	85%
The price of the electricity at different times	39%	36%	94%
The other screen showing more detailed information on the number of units or the cost of the electricity that you used during the different times of day on the previous day and the day before that	26%	33%	82%
Your current meter reading	16%	35%	78%

**Table Ax. 23: Recall and usefulness of electricity monitor features**

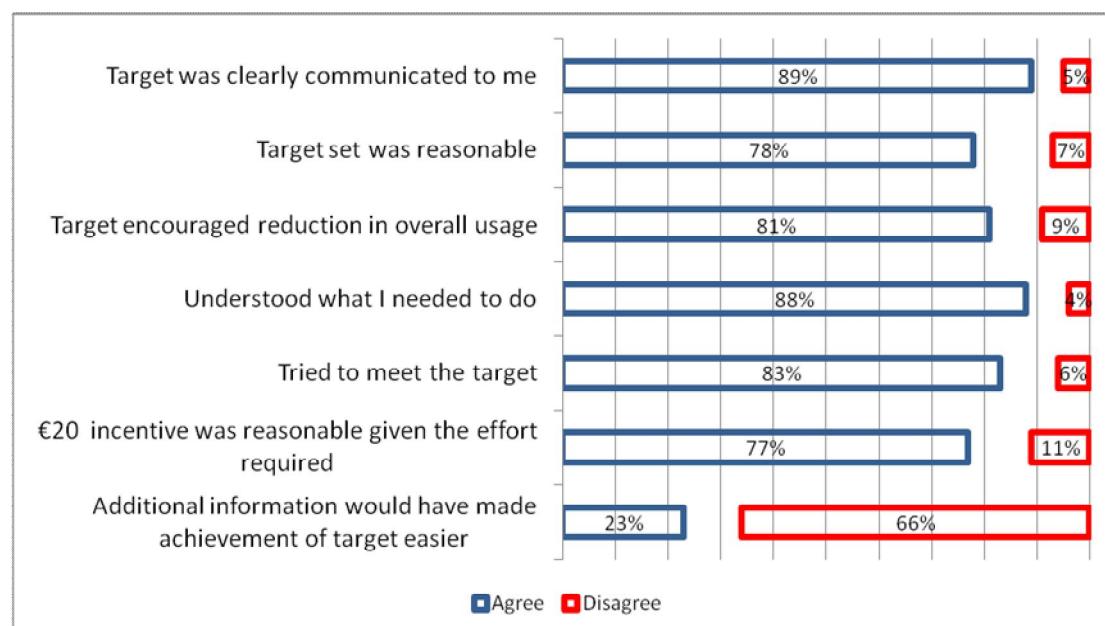
	Used feature	Didn't use	Unaware of feature
Use of setting capabilities Changed the display from showing usage in euro to showing electricity units (or the other way around)	24%	48%	28%
Set your daily budget which is shown on the main display	41%	40%	19%

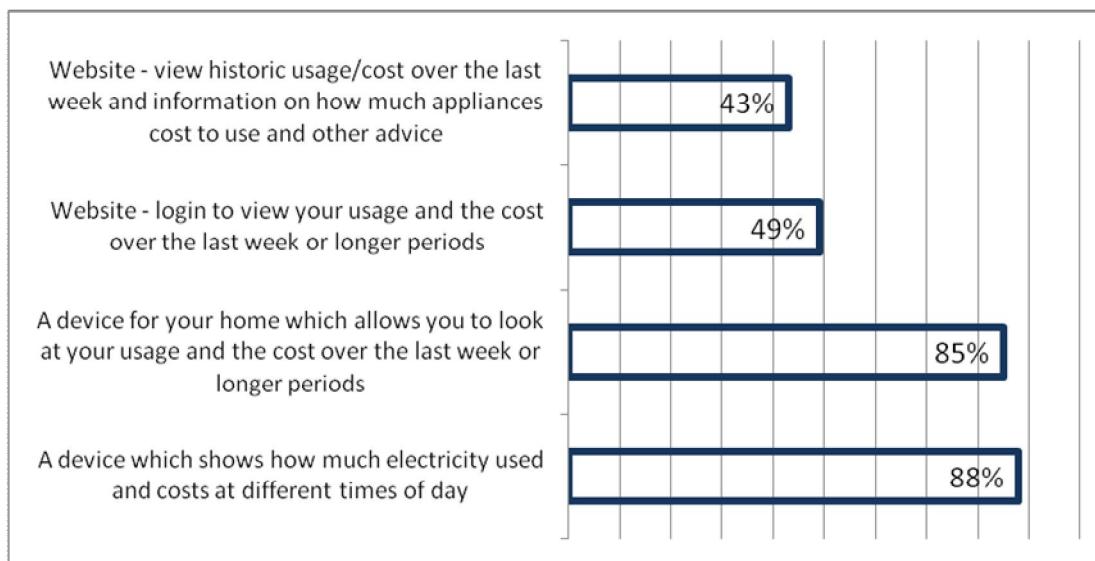
**Table Ax. 24: Use of setting capabilities on electricity monitor**

Most participants did not use the setting capabilities (even changing the display from euro to units or vice versa). A higher proportion set the daily budget (equal to the proportion who were aware of the daily budget).

#### iv) Stimulus 4: The overall load reduction incentive target

There was a low level of recall of the existence of the target (at 58%) among the participants.

**Figure Ax. 77: Assessment and experience of OLR stimulus**



**Figure Ax. 78:** Among participants who agree that extra supports would be useful, rating of potential usefulness of suggested supports

#### A7.4 Perceived impact of the Trial

The participants were asked to estimate the degree to which their bill was reduced or increased and the degree to which overall, peak and night usage changed during the Trial. In general of the participants who believe that they reduced their usage, 60% stated it reduced their bill to the degree expected with 40% stating the reduction was to the degree expected.

	Overall bill	Overall consumption	Peak consumption	Night consumption
Average estimated change during trial	-6%	-6%	-12%	+4%
Recorded change during trial	-3%	-1.4%	-7.58%	+2.3%

**Table Ax. 25:** Comparison of overall, peak and night reductions estimated by participants and recorded

**Table Ax. 25** compares the average estimate given by participants with the average change measured at a participant level. As was noted in the main report, participants were on average over estimating the reduction in bill size and usage overall and at peak, but under-estimating the usage shift during the night period.

Examining the range of estimates given, it is clear that most participants believed that their bill reduced in size (66%) with only 6% believing it increased.

Most test group participants (74%) believed that they reduced peak usage. However, this estimate is broadly accurate with an estimated 68% actually reducing their peak usage. The

distributions of estimates of impact on bill, overall, peak and night usage are shown in **Figure Ax. 79**, **Figure Ax. 80** and **Figure Ax. 81**.

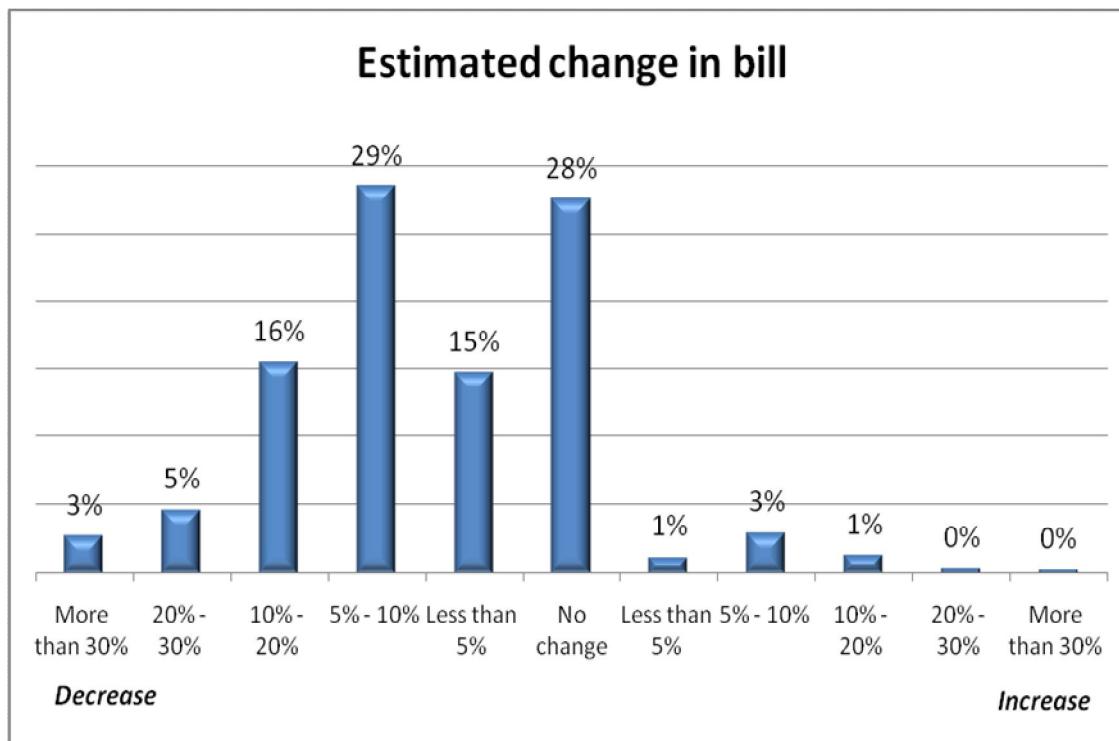


Figure Ax. 79: Distribution of test group participants' estimates of change in bill caused by participation in the trial

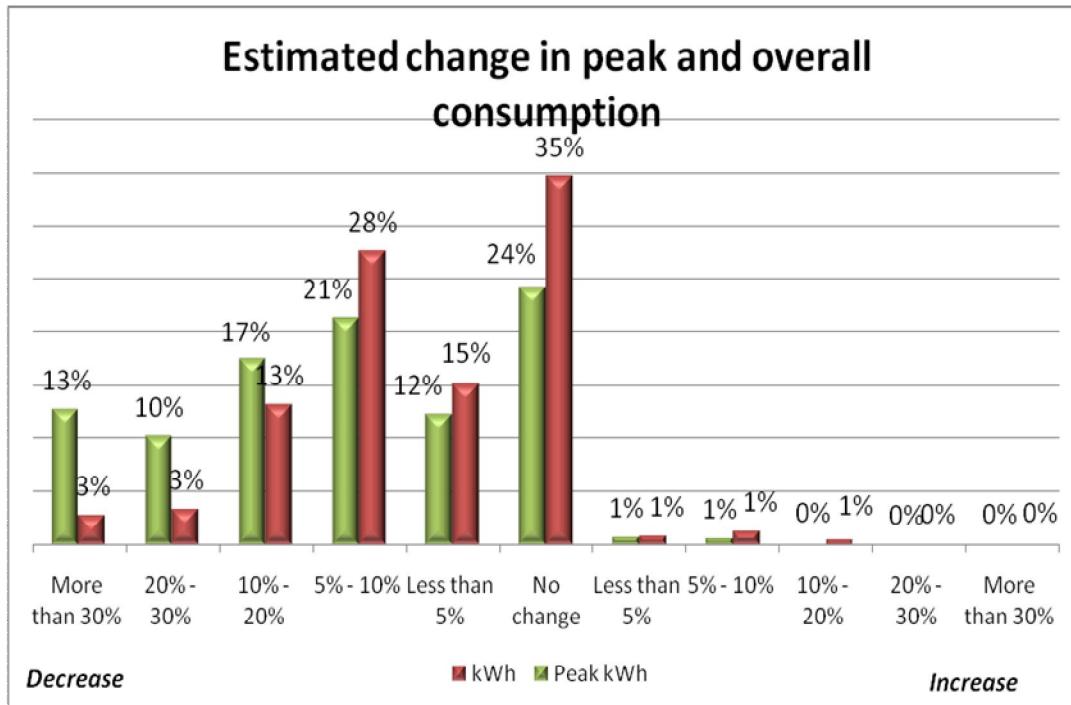
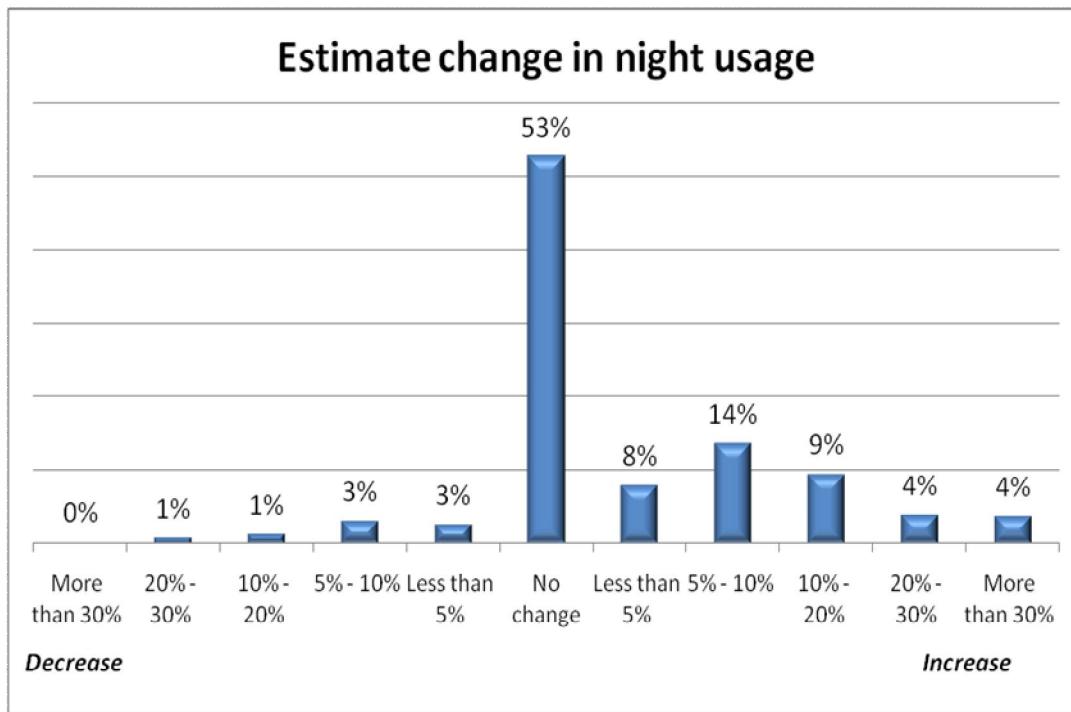


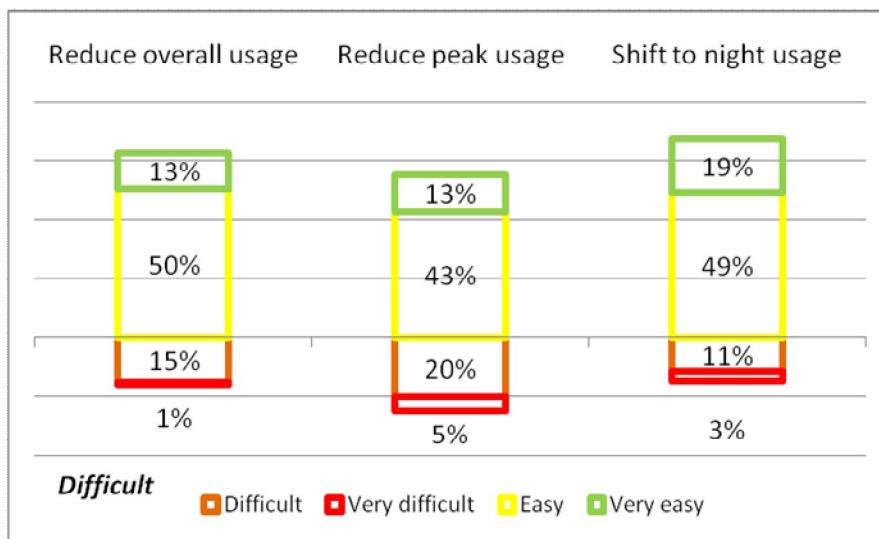
Figure Ax. 80: Distribution of test group participants' estimates of change in overall and peak usage caused by participation in the trial



**Figure Ax. 81: Distribution of test group participants' estimates of change in night usage caused by participation in the trial**

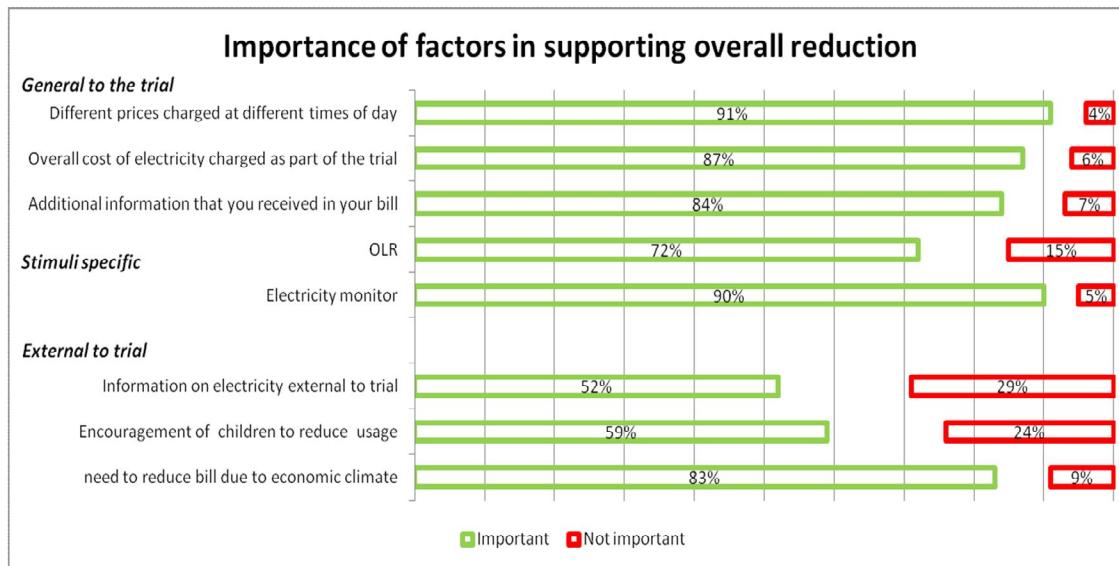
### A7.5 Reaction to tariffs and assessment of supports

The objectives of the Trial required participants to react to the tariffs and therefore a key assessment of the Trial is whether the effort required was deemed to be acceptable and if the results delivered were sufficient. **Figure Ax. 82** shows the perceived ease with which reported reduction or shifting was accomplished. Among this group of individuals who have claimed successful behaviour changes, 25% found it difficult to shift peak usage, with 14% finding it difficult to shift to additional night usage.

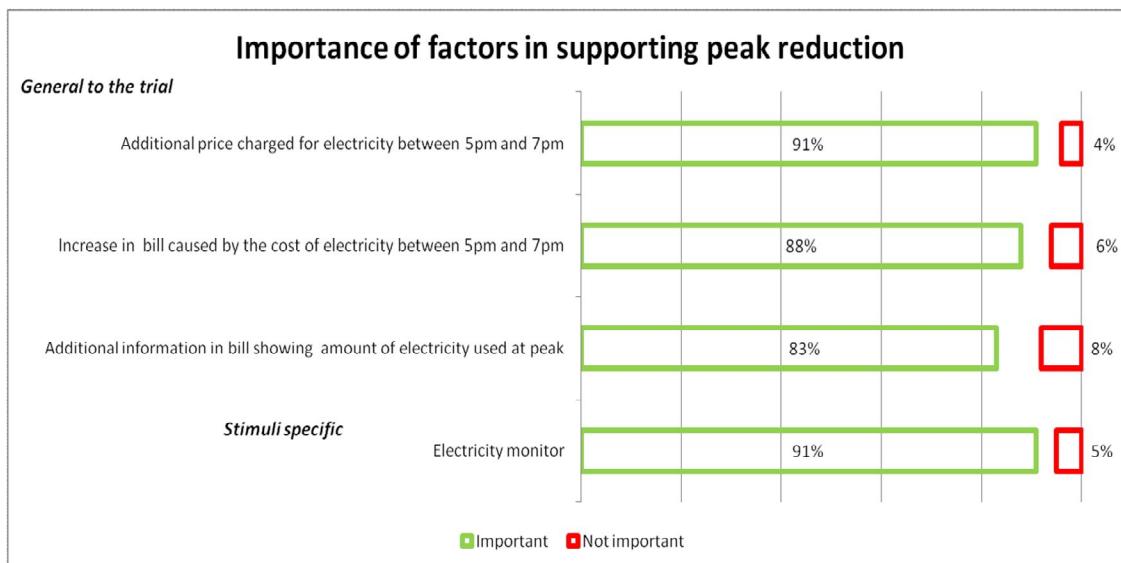


**Figure Ax. 82: Assessment of ease or difficulty associated with reducing overall usage or shifting other usage among those who claim to have achieved the reduction/shifting**

In the case of overall reduction, those participants who had achieved a reduction most commonly identified the concept of a time of use tariff as an important aid to reduction (91%). Among the electricity monitor group, this was rated as important by 90% of participants in that group. Finally, while external factors also supported the participant external information was rated as important by only 52% of participants.

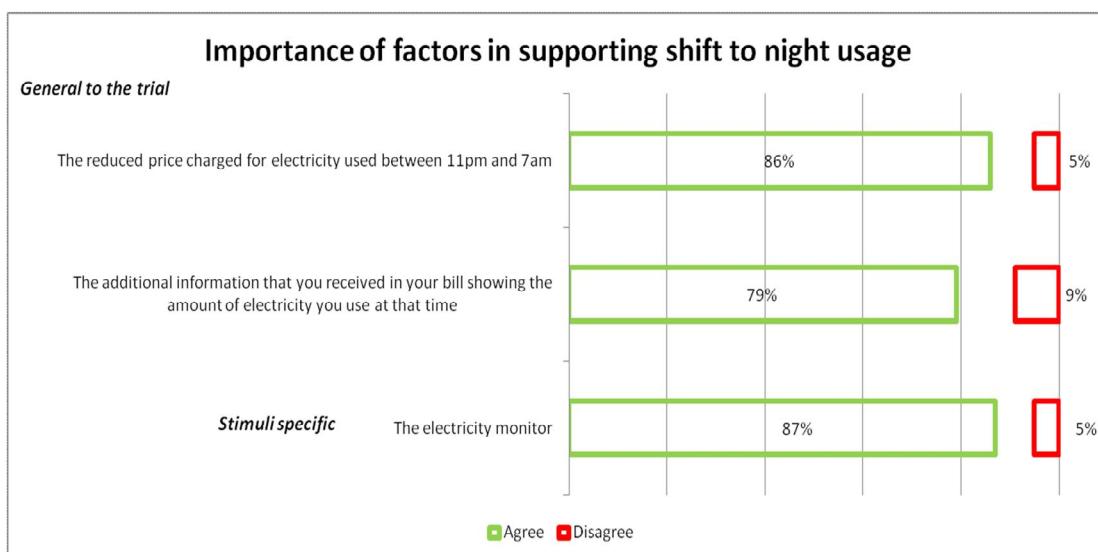


**Figure Ax. 83: Rating of the importance of supports in achievement of reduction in overall usage**



**Figure Ax. 84: Rating of the importance of supports in achievement of reduction in peak usage**

### A7.6 Impact of trial on attitudes and behaviours



**Figure Ax. 85: Rating of the importance of supports in achievement of shifting to night usage**

**Figure Ax. 83, Figure Ax. 84 and Figure Ax. 85** show the importance of each potential support for overall reduction, peak reduction and shifting to night usage respectively.

There are few differences in responses by the tariff group or stimulus the participant was allocated to. The exception to this is the impact of night rate prices as a support which does vary by tariff as shown in **Table Ax. 26**. In this case, participants in tariff D were more likely to see the reduced night rate as a very important support for shifting usage to night time.

Reduced night rate price charged as a support was	Tariff A	Tariff B	Tariff C	Tariff D
Very important	65%	67%	67%	76%
Important	19%	19%	20%	13%

**Table Ax. 26: Value of night price as a support for shifting usage to night time by tariff**

Barriers to this shifting are shown in **Table Ax. 27** for peak usage and **Table Ax. 28** for overall usage.

Reasons for not reducing peak	Agree	Disagree
We did not know enough about how and when we use electricity to reduce our usage during peak hours	29%	55%
The difference between the peak price and the other prices was not enough to get me [us] to move my [our] usage	28%	53%
I did not try to reduce because I did not think it would be possible as the peak price was too high	22%	56%
We tried to reduce but the bill seemed to be the same so we gave up	59%	21%

**Table Ax. 27: Significance of reasons for not reducing peak usage**

In the case of peak, the primary barrier to reduction is lack of linkage between the behaviour change and the bill. A finding of the qualitative research undertaken prior to the Trial was that residential consumers are not good at estimating the proportion of their usage during peak or translating between a tariff and the bill impact. Therefore, it seems likely that the participants expect a much greater impact, not realising the overall proportion of usage that occurs during the peak hours.

Reasons for not switching to night usage	Agree	Disagree
It was too inconvenient to move usage to night time	53%	36%
We did not know enough about how and when we use electricity to move usage to night-time	24%	59%
I was concerned about the safety implications of using appliances at night-time	53%	38%
I was concerned about the noise associated with using appliances at night-time	31%	59%
The difference between the night time price and the other prices was not enough to move usage	25%	55%
We tried to reduce but the bill seemed to be the same so we gave up	15%	67%

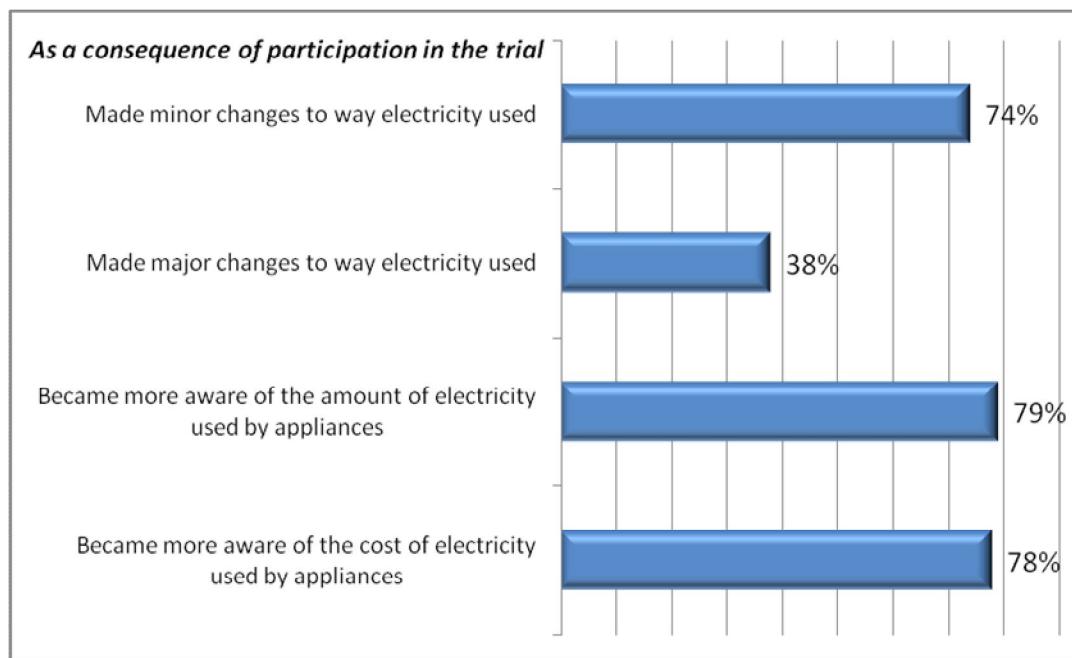
**Table Ax. 28: Reasons for not shifting usage to night time**

When considering barriers to night-time switching, as expected safety and inconvenience were most often cited (each with 53% agreeing that it was a barrier to moving to night usage).

An outcome of the Trial could have been to change participants' perceptions of their own behaviours and engagement with future opportunities for behaviour changes. The analysis of

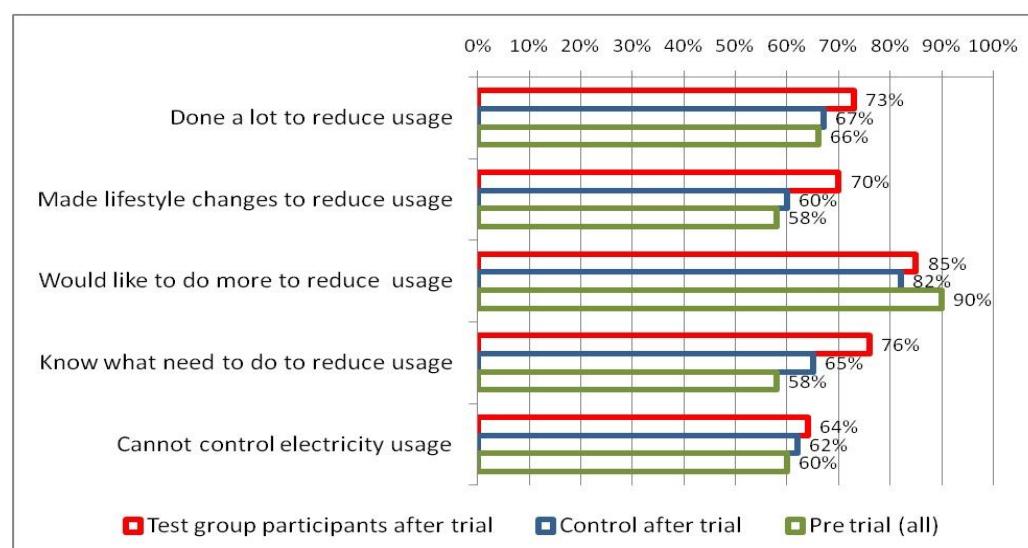
the post trial survey suggests that the Trial had limited or no impact on general attitudes and behaviours towards reducing energy outside of the specific actions required by the Trial (behaviour changes leading to overall reduction and shift of usage to cheaper periods).

**Figure Ax. 86** shows that most participants in the test groups believed that they had made minor changes to their lifestyles (74%) with 38% believing they had major changes and most reporting greater awareness in their households.



**Figure Ax. 86: Reported impact of participation on awareness and behaviour changes directly related to the Trial**

**Figure Ax. 87** shows the level of agreement with statements and participants' own behaviours and attitudes.

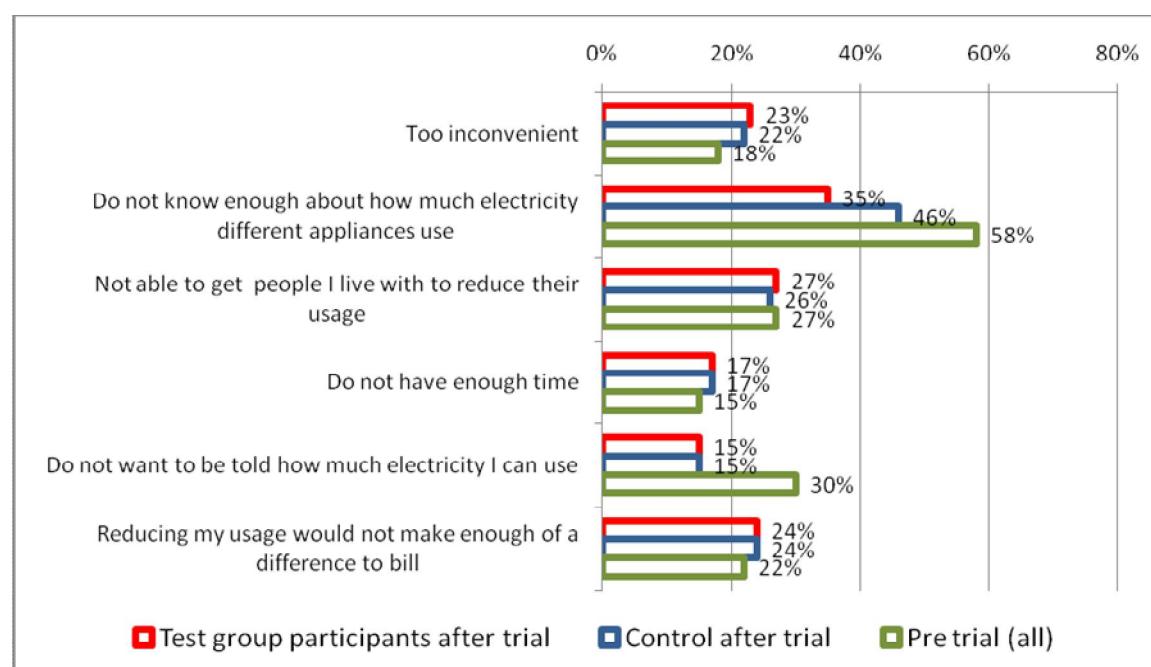


**Figure Ax. 87: Perceptions of behaviour changes and attitudes to further change**

In order to determine if the Trial has impacted on their general attitudes and engagement, the responses from participants exposed to ToU tariffs and DSM stimuli (the test groups) are compared to those in the control and the entire population of participants prior to the Trial.

It can be seen that there is a small but noticeable difference between the responses of the test groups and the control group with higher proportions believing that they have done a lot to reduce usage and made lifestyle changes. However, when the responses are categorised by the level of reduction achieved (both overall and at peak times) no difference emerged in the responses of those who achieved greater levels of reduction than those who achieved lower levels (or none at all). This suggests that the small change is related to notion of involvement in the Trial rather than actual direct result of experience of ToU tariffs or DSM stimuli.

Focusing on the participants who stated that they could not reduce usage, there are no significant differences between the responses of the test group participants and those in the control group except in the area of knowledge of appliance usage (**Figure Ax. 88**). In this case, test group participants were less likely to use this as a reason for not reducing usage (35%) compared to those in the control group (46%) or the population before the Trial (58%). This suggests that the communications have been effective in removing this barrier to reduction.



**Figure Ax. 88: Reasons for given for statement that participant could not control electricity usage**

Impact of trial on awareness and interest on test group participants	% agree
More aware of electricity usage over last 12 months	54%
Know more about how to reduce usage than 12 months ago	22%
More interested in reducing usage than 12 months ago	24%

Changes in use of immersion (77% of test group participants use immersion)	% agree
Caused me to use immersion less	16%
Caused me to use immersion at different times	18%
It made no difference	65%
Use heating instead of immersion – regularly	46%
Use heating instead of immersion – occasionally	24%

Changes in cooking behaviours (66% of test group participants with electric cooker)	% agree
Changed when I cooked every day	17%
Changed when I cooked sometimes	23%
Made no difference to when I cooked	60%

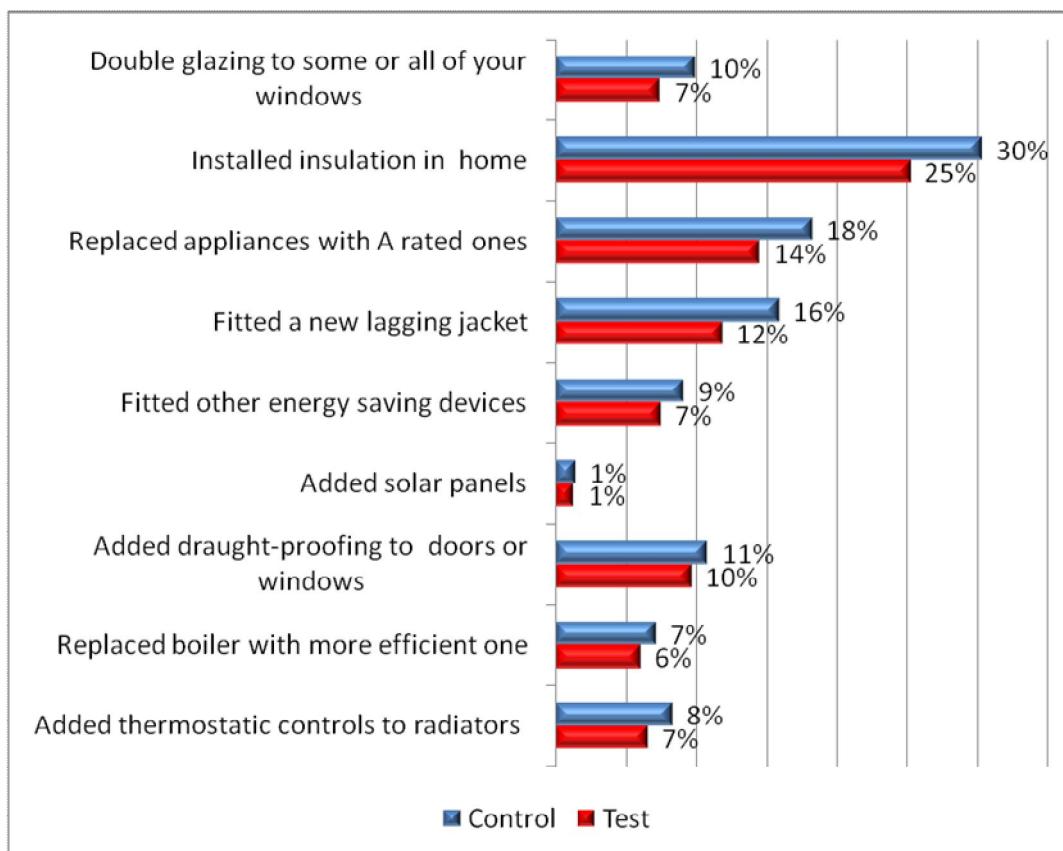
**Table Ax. 29: Impact of trial participation on awareness and behaviours**

**Table Ax. 29** shows the impact of the Trial on overall awareness of electricity usage and on specific behaviours associated with use of the immersion and electric cookers. The Trial clearly impacted on the awareness of electricity usage, but had less impact on overall knowledge and interest in reduction.

Among test group participants with immersions, 16% stated that they would now use the immersion less, while 18% stated that they would now use the immersion at different times (to avoid expensive times). However, most (65%) stated the Trial made no difference. A similar proportion (60%) of those who cooked with the electricity stated that the Trial made no difference to when they cooked.

Finally, participants also reported no increase in investment in energy saving enhancements to their home. As shown in

**Figure Ax. 89** participants in the test groups were less likely to invest in energy efficiency enhancements than those in the control group.

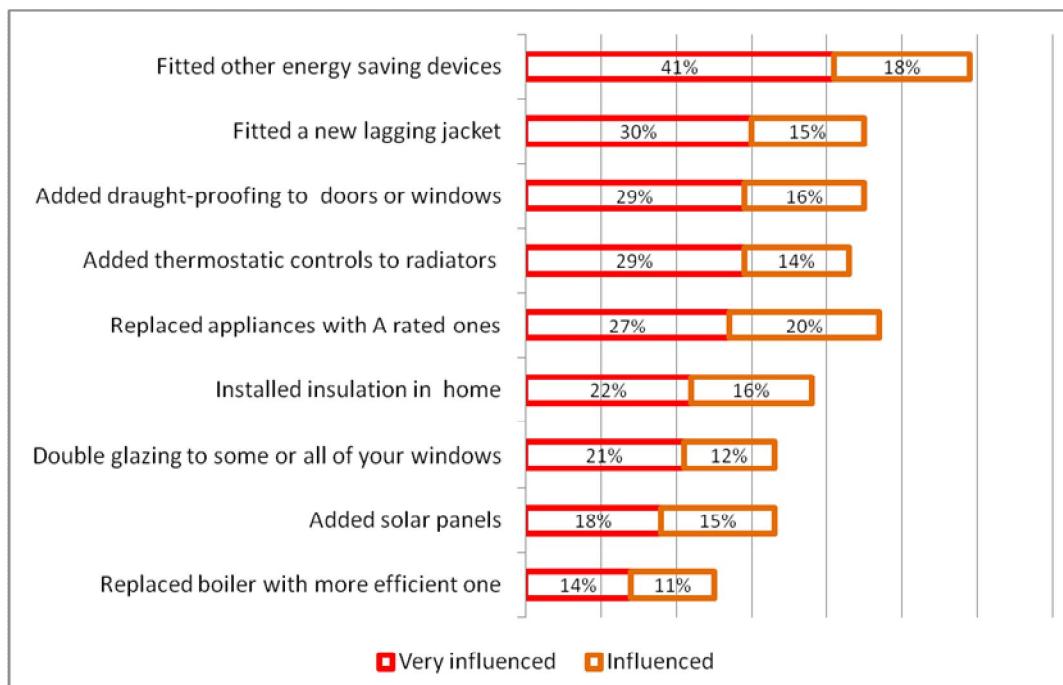


**Figure Ax. 89:** Comparison between the reported level of investment in energy efficiency enhancements of the home among test group participants and control group

Test group participants who had invested in an energy efficiency enhancement rated the influence of the Trial on their decision

**Figure Ax. 90.** While the reported influence is positive, it must be interpreted in the context that overall similar or higher proportions of the control group invested in their innovations during

the same period. Therefore, it should be concluded that the Trial did not increase the level of investment. Although participants might link the decision to the Trial this is substituting for other drivers which are causing control group participants to invest.



**Figure Ax. 90: Stated influence of participation on the decision to invest in the energy efficiency enhancement**

### A7.7 Impact on Participant Bills

The deployment of time of use tariffs was assessed to understand the impact on customer bills, at the level of the individual participant. Different social and economic groupings were explored to assess impact. The key measure used was defined as Measure 2, as outlined in Section 7.6.1:

**Measure 2: Estimate of the impact on the bill of participation in the Trial:** The comparison between the bill, based on actual usage and the tested tariff and a bill calculated using an estimate of the usage if no reduction was achieved and using the cost of electricity at the start of the Trial (14.1c per kWh). The estimate of usage if no reduction was achieved was calculated for each individual based on the average reduction for the time period (i.e. day, night or peak) for the combination of tariff and stimulus applied to the individual participant.

The following tables provide a view of the differential impacts across the measures. In some cases, the degree of impact is driven by the consumption level – for example if the electricity usage level is low, the level of absolute reduction is more limited than the case where both usage and discretionary usage is high. **Table Ax. 36** Impact on participant bills by Free Electricity Allowance recipients considers the impact of usage reduction but does not allow for the part payment of units consumed, which is a feature of this scheme. Therefore, in that case the savings listed may not all accrue to the individual but, instead, represent the savings possible based on the usage level of individuals and the associated reduction.

Employment Status	Impact on the bill of trial participation: Average Annual Savings
An employee	<b>-€ 19.28</b>
Self-employed (with employees)	<b>-€ 24.64</b>
Self-employed (with no employees)	<b>-€ 24.85</b>
Unemployed (actively seeking work)	<b>-€ 19.60</b>
Unemployed (not actively seeking work)	<b>-€ 19.90</b>
Retired	<b>-€ 17.43</b>
Carer - Looking after relative or family	<b>-€ 18.63</b>

**Table Ax. 30: Impact on participant bills by employment status**

Owner/Renter status	Impact on the bill of trial participation: Average Annual Savings
Own	<b>-€ 19.58</b>
Social rent	<b>-€ 16.89</b>
Private rent	<b>-€ 19.43</b>

**Table Ax. 31: Impact on participant bills by Owner/Renter status**

Age Category	Impact on the bill of trial participation: Average Annual Savings
18 to 25 years	<b>-€ 4.85</b>
26 to 35 years	<b>-€ 14.07</b>
36 to 45 years	<b>-€ 21.69</b>
46 to 55 years	<b>-€ 22.17</b>
56 to 65 years	<b>-€ 19.83</b>

65+ years	-€ 18.69
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**Table Ax. 32: Impact on participant bills by age category**

Social Class	Impact on the bill of trial participation: Average Annual Savings
AB	<b>-€ 21.60</b>
C1	<b>-€ 19.93</b>
C2	<b>-€ 18.14</b>
DE	<b>-€ 18.45</b>
F	<b>-€ 18.69</b>

**Table Ax. 33: Impact on participant bills by Social Class**

Household Classification	Impact on the bill of trial participation: Average Annual Savings
Alone	<b>-€ 16.40</b>
Adults	<b>-€ 19.40</b>
Adults+children	<b>-€ 22.08</b>
Single adult + children	<b>-€ 18.47</b>

**Table Ax. 34: Impact on participant bills by Household Classification**

Number of people in the household	Impact on the bill of trial participation: Average Annual Savings
1	<b>-€ 16.15</b>
2	<b>-€ 17.86</b>
3	<b>-€ 19.88</b>
4	<b>-€ 24.21</b>
5	<b>-€ 21.74</b>
>=6	<b>-€ 26.89</b>

**Table Ax. 35: Impact on participant bills by number of people in the household**

FEA/All	Impact on the bill of trial participation: Average Annual Savings
Free Electricity Allowance	<b>-€ 18.96</b>
All	<b>-€ 19.54</b>

Table Ax. 36: Impact on participant bills by Free Electricity Allowance recipients

House occupied during the day	Impact on the bill of trial participation: Average Annual Savings
Yes	<b>-€ 20.16</b>
No	<b>-€ 20.93</b>

Table Ax. 37: Impact on participant bills by number of people in the household

## Appendix 8: The SME pre-trial and post-trial surveys

### A8.1 Introduction

Two surveys were conducted by The Research Perspective Ltd among all SME trial participants:

- A pre-trial survey of all SME participants (including those subsequently allocated to both test and control groups) in October and November 2009. The survey achieved a response rate of 65% (467 respondents from a population of 725 acceptances). The objectives of the survey were similar to that of the residential pre-trial survey and included:
  - Business and usage profiling of the participants - who has opted to participate in the Trial
  - Motivation of the participants– why they joined
  - Reported behaviours related to the energy reduction – how they were likely to behave during the Trial
  - Engagement with the topic of energy reduction and behaviour change– how likely were they to stay for the entire period and become engaged in the objectives of the trial
- A post-trial survey, including those subsequently allocated to both test and control groups, in October and November 2009. The survey achieved a response rate of 65% (300 respondents from a population of 465 acceptances). The objectives of the survey were similar to that of the residential post-trial survey and included:
  - To gather perceptions of the impact of the Trial (perceived change in usage levels and patterns, perceived behavioural changes)
  - To assess the level of recall and impact of the ToU tariffs and reasons why ToU tariffs did not impact
  - To assess the level of recall and perceived impact of the TOU tariffs and DSM stimuli; and recall and rating of the tariffs and DSM stimuli at a feature and functional level
  - To gather evidence that the Trial led to changes in usage patterns of appliances (cooking, use of immersion etc)
  - To gather evidence that trial participation led to investment in energy efficiency (while the trial was electricity and not related to home heating for most participants, it may have led to a higher awareness of general energy efficiency)
  - To determine whether participation in the Trial had any impact on the attitudes towards energy reduction. This was compared by including the same questions on engagement under the topic of energy reduction and behaviour change

This appendix provides information on the methodological approach and summary findings. It aims to provide insight into the attitudes and behaviours of SME electricity consumers

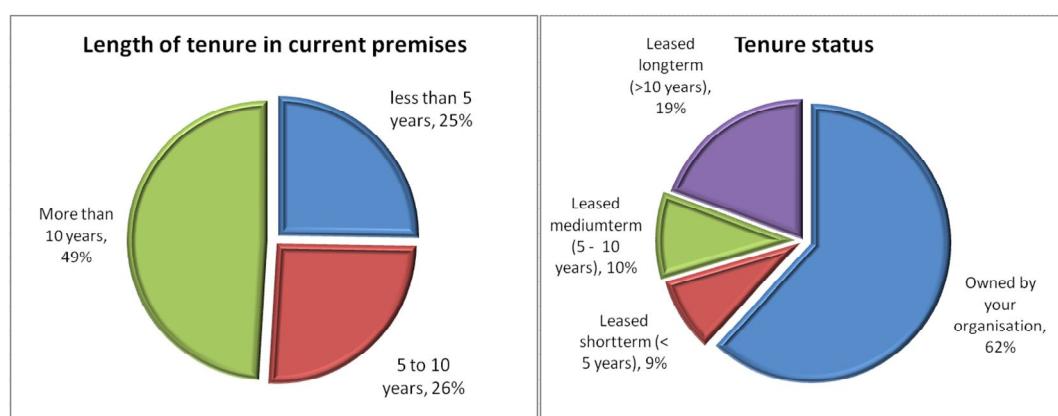
before and after the Trial which can be used to inform future policies and programmes related to energy usage.

### A8.2 Methodology

Both surveys were conducted using Computer Assisted Telephone Interviewing (CATI). Respondents had agreed to participate in the pre-trial and post-trial surveys as part of their agreement to participate in the Customer Behaviour Trial. While lower than the level achieved in the residential surveys, the 65% response rate is sufficient.

### A8.3 Profile of participants and electricity usage profile

The profile of the participants by sector, size and business turnover has been reported in section 9 of this report. In addition, participants were asked to provide information on the length of tenure in their business premises and the basis of the tenure (**Figure Ax. 91**).



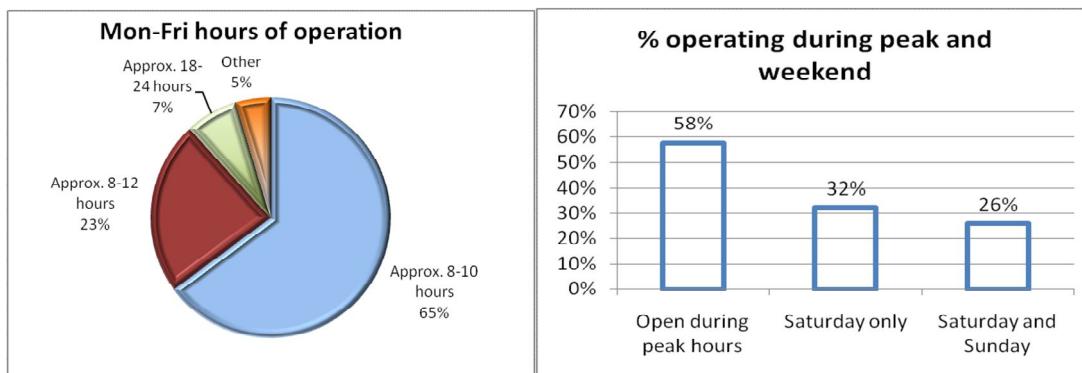
**Figure Ax. 91: Length and status of tenure in current premises**

75% of participants are long standing businesses in the current premises for more than five years. Similarly, most are likely to remain in the premises for a long period as 62% are owned by the organisations and only 9% are in short term leases of less than five years duration. However, there is a lack of investment in energy efficiency enhancements as shown in **Table Ax. 38**.

	% agree
Greater than half of all bulbs are energy saving bulbs	29%
No energy saving bulbs	57%
Internal walls insulated	34%
Internal walls not insulated	50%
External walls insulated	37%
External walls not insulated	40%

**Table Ax. 38: Investment in energy efficiency enhancements**

The time of use tariffs tested included both increased price at peak periods and reduced rates during the night and at weekends. The ability of the business to benefit or otherwise from these tariffs, to a degree, depended on the hours of operation of the business.

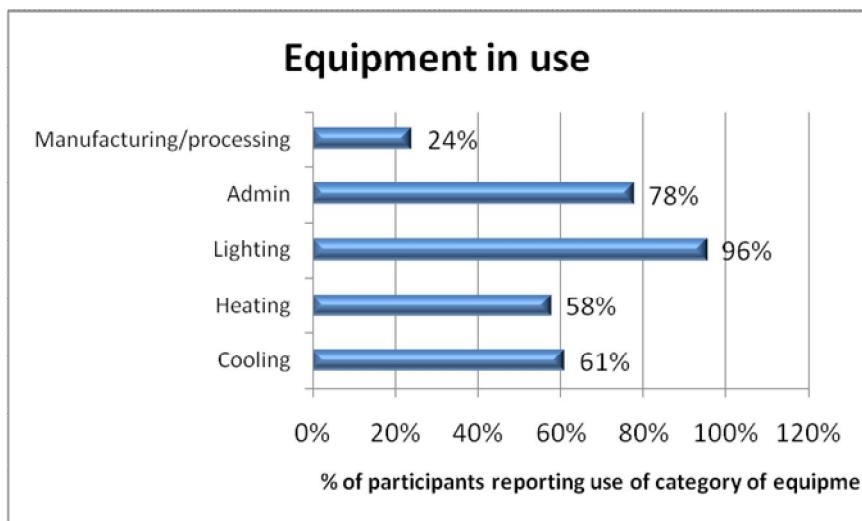


**Figure Ax. 92:** Length and status of tenure in current premises

**Figure Ax. 92** shows the proportion of SME respondents operating with standard business hours of 8-10 hours (shown on the left). It can be seen that a majority (65%) operate these hours and 58% also operate within the peak hours of 5pm to 7pm. Reflecting the inclusion of retail and entertainment sectors, there is also a significant proportion operating outside of Monday to Friday (58% operate on Saturday or Saturday and Sunday).

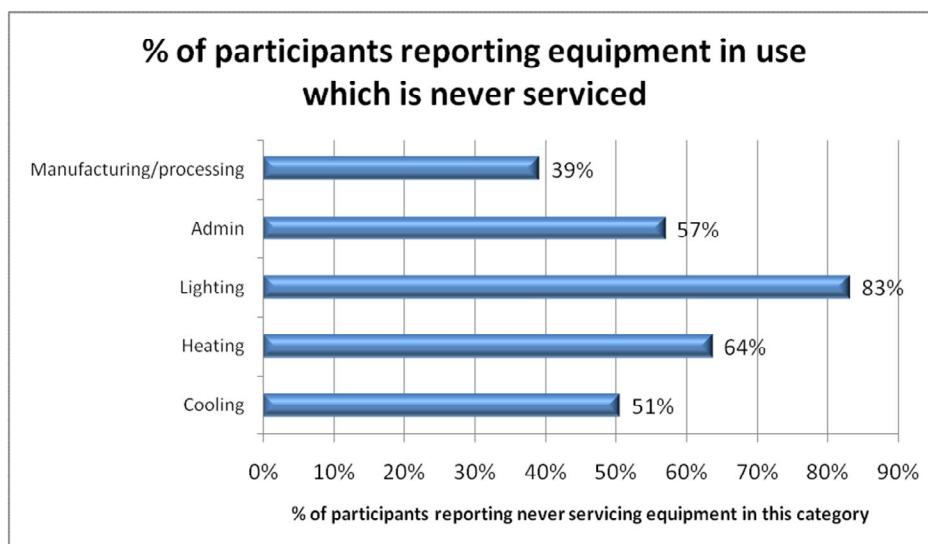
#### A8.4 Electricity usage profile

Respondents are SMEs and therefore do not include heavy users of electricity such as heavy manufacturing or IT businesses using data farms. This is reflected in the range of electricity powered equipment reported in use shown in **Figure Ax. 93** with a majority reporting the use of heating (58%), cooling (61%) compared to only 24% reporting the use of manufacturing or processing equipment. A large proportion (78%) also reported the use of administrative equipment (such as printers of PCs) while almost all reported the use of lighting.



**Figure Ax. 93:** Percentage of respondents with each type of equipment in use

The respondents were also asked in the pre-trial survey about how often they serviced the equipment in use. **Figure Ax. 94** summarises the responses with a majority of SMEs never servicing any equipment apart from manufacturing or processing equipment. In this category, 39% never service equipment.

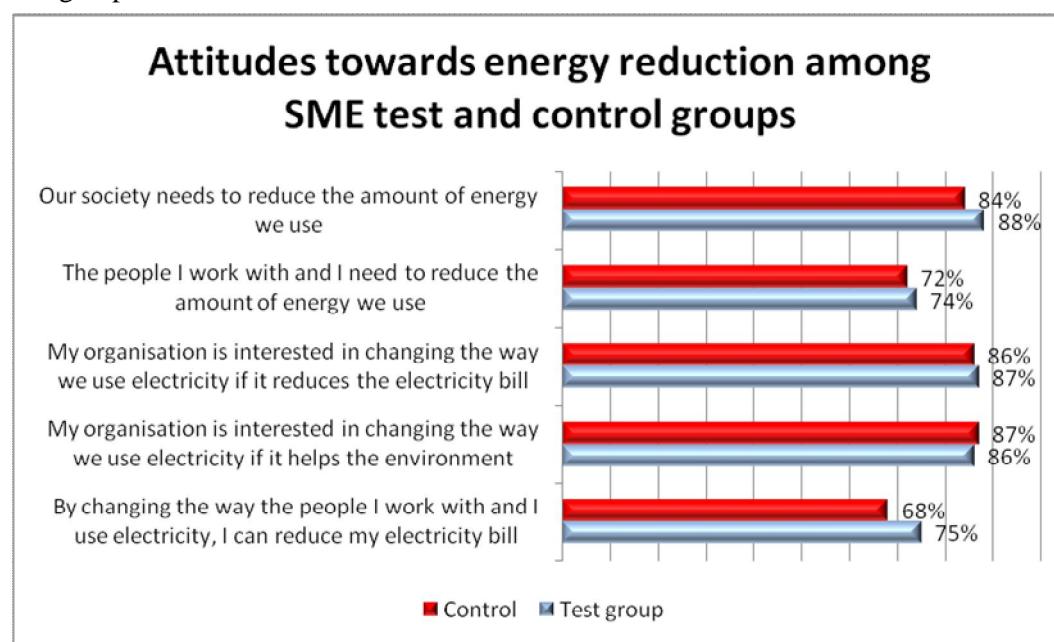


**Figure Ax. 94:** Percentage of respondents with each type of equipment in use who report never servicing the equipment in each category

#### A8.5 Attitudes towards and engagement with behaviour change among the participants

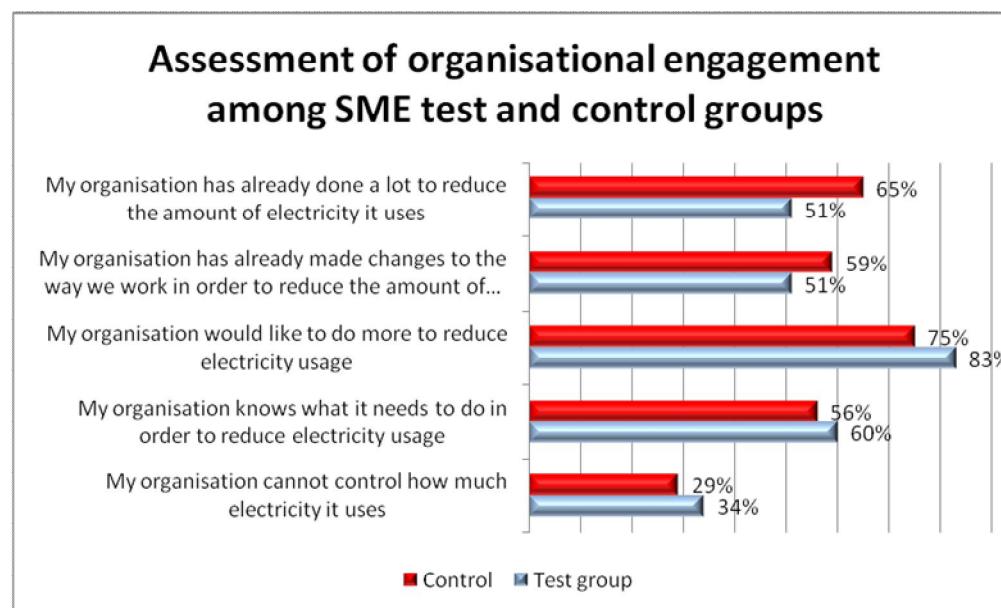
Attitudes towards energy change were measured in both the pre-trial and post-trial surveys. The objective was to determine whether the Trial had an impact on attitudes. This is assessed

by comparing the post-trial attitudes of the control group with the post-trial attitudes of the test group<sup>11</sup>.



**Figure Ax. 95: Comparison in attitudes towards energy reduction between test and control groups (post-trial)**

The results (**Figure Ax. 95**) show little difference between the test and control groups apart from the statement “*By changing the way people I work with and I use electricity, I can reduce my electricity bill*” where the test group scored 7% higher than the control group.



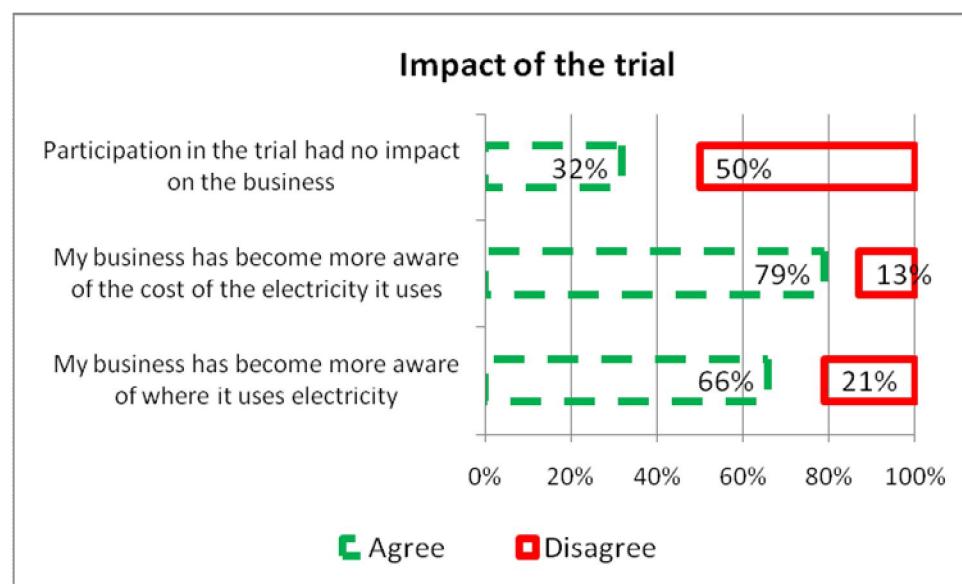
**Figure Ax. 96: Assessment of organisational engagement among SME test and control groups (post trial)**

<sup>11</sup> Comparing pre-trial and post-trial surveys would reflect changes in general business sentiment rather than impact of the trial.

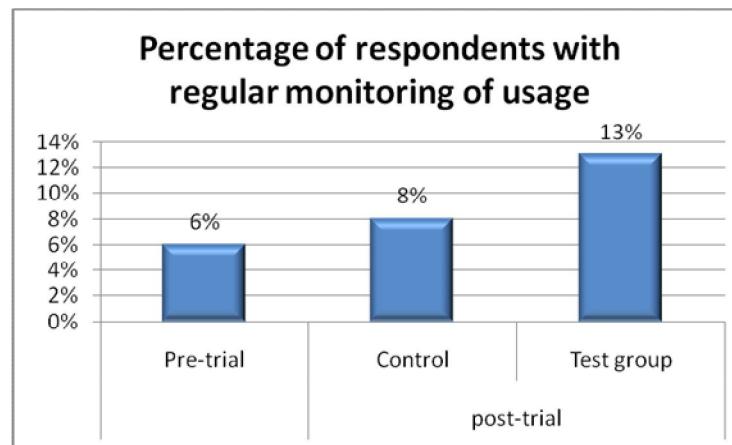
Statements of organisational engagement (**Figure Ax. 96**) exhibit some differences across a range of attitudes. In particular, test group participants are less likely to claim that their organisation had already done a lot to reduce overall usage or peak usage. Conversely, the test group participants are more likely to state that they would like to do more and know what to do. This suggests that participation in the Trial has increased the level of expertise and led to a greater degree of realism around what had already been undertaken with regard to energy reduction.

#### A8.6 Impact of the Trial on participating SMEs

Participants were asked about their perception of the impact of the Trial on their organisation. **Figure Ax. 97** shows that 66% of SME participants stated that they became more aware of electricity usage as a result of the trial with 79% stating that they became more aware of the cost of the electricity used by the business.

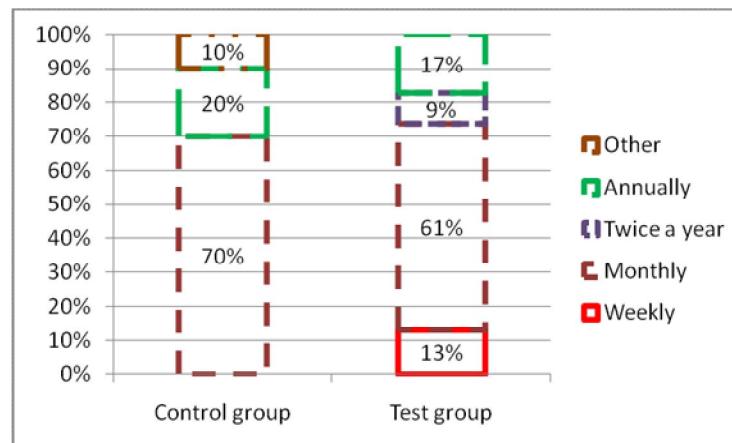


**Figure Ax. 97:** Perceived impacts of the trial on SME participants



**Figure Ax. 98: Percentage of SME respondents with regular monitoring of electricity usage**

This is also reflected in the higher proportion of test group participants which reported regularly monitoring and reporting of electricity usage **Figure Ax. 98** compared to control group SME participants. It is also notable (**Figure Ax. 99**) that 13% of the test group also monitor usage weekly compared to 0% of the control group.



**Figure Ax. 99: Percentage of SME respondents with regular monitoring of electricity usage**

Analysing the approach to energy reduction reported (**Figure Ax. 100** and **Figure Ax. 101**), investment in more energy efficient equipment (64%) is the most common outcome with a significant proportion not making even minor changes to when electricity is used (53%) or how much is used at an overall level (49%).

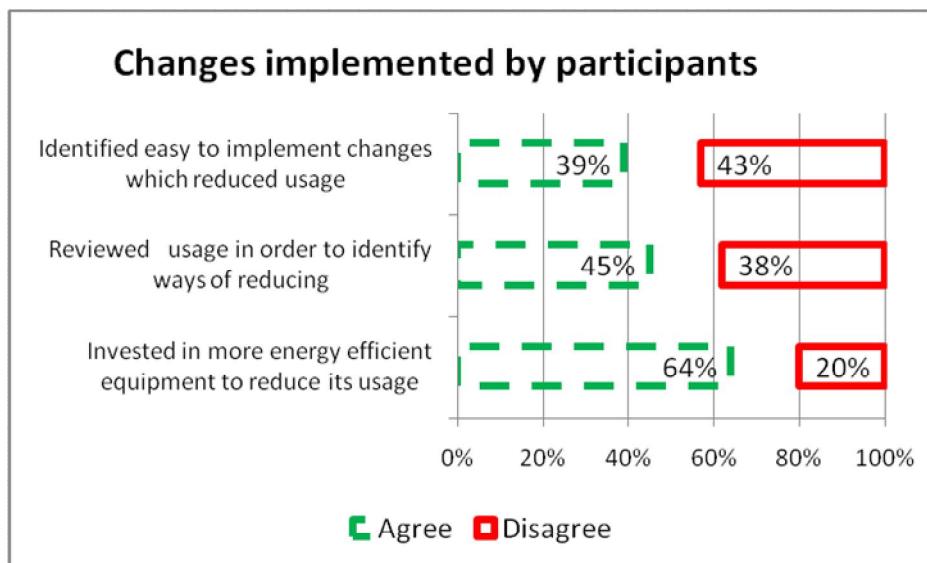


Figure Ax. 100: Changes implemented by SMEs as a result of participation

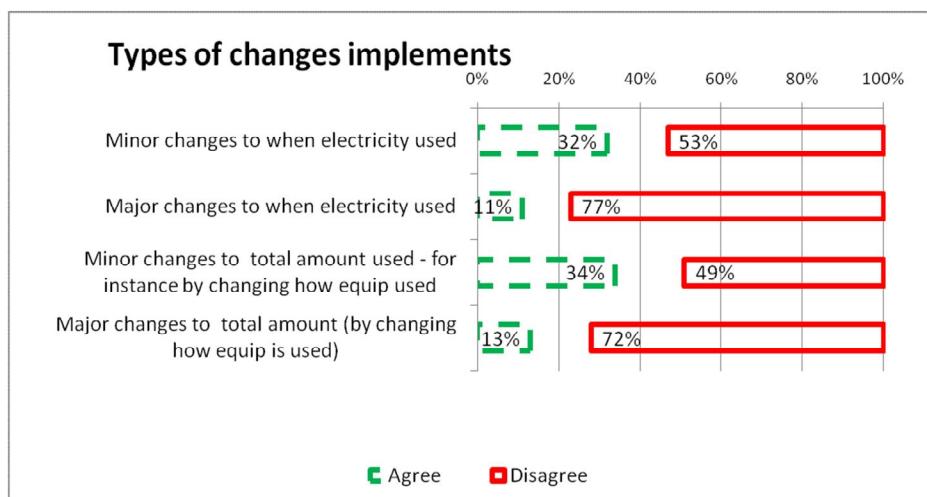
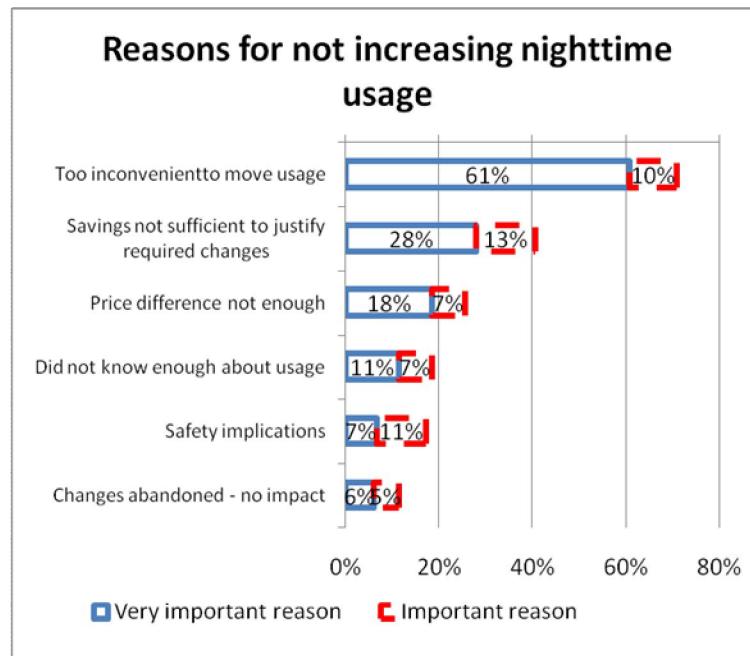


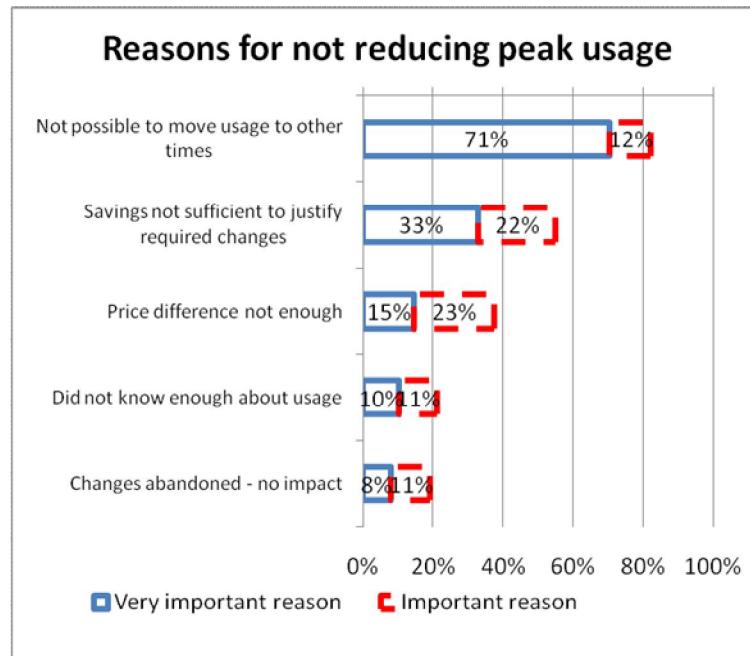
Figure Ax. 101: Categorisation of the types of changes implemented

### A8.7 Perceived reasons for lack of reduction

Participants who reported not shifting usage to the cheaper night-time period were asked to identify potential reasons. The most common reason identified was inconvenience (**Figure Ax. 102**) with 61% stating this as a very important reason. In contrast, issues of safety or cost savings were much less often identified.

**Figure Ax. 102: Reasons for not increasing night-time usage**

Similarly, 71% of respondents who stated that they had not reduced their peak usage also identified most often identified lack of opportunity to move usage as a very important reason for not reducing peak usage (**Figure Ax. 103**).

**Figure Ax. 103: Reasons for not reducing peak usage**

## **Appendix 9: Table of Communications**

Communication	Issued
Invitation Letter, FAQ and telephone call	From September 2008
Letter acknowledging their agreement to participate	From November 2008
Letter outlining what would happen next	August 2009
Letter and brochure to the electricity monitor group advising of installation of the unit	November 2009
Letter advising participants their bills would be calendarised.	December 2009
Letter to the Control Group	December 2009
Letter and brochure advising participants which test group they were being allocated to.	December 2009
Letters advising participants they would be contacted regarding pre- and post-trial surveys, as well as non-response and attrition surveys	From July 2009 onwards
Letter advising participants the Trial was ending and addressing issues, such as reversion to normal billing, return of the electricity monitor and thank-you payments.	December 2010
Final letter reconciling costs of electricity during the Trial and credits due to participants	January 2011

**Table Ax. 39: Electricity Customer Behaviour Trial – Main Communications 2010**

## Appendix 10: De-energisation Code of Practice

- **Notice of De-energisation**

Participants were given five days notice, together with the reason for de-energisation and adequate opportunity to pay their account.

- **Participant Communications**

In addition to the first initial de-energisation text, participants also received a daily reminder up to the date of de-energisation. Once de-energised they were advised how they could have their supply re-energised.

A contact number for the participant was also provided to ESB Networks.

- **De-energisation Management**

De-energisation under the Prepayment Trial was remote. This precluded an assessment of vulnerability or potential financial loss. However, known vulnerable customers were not included in the Trial. In addition, de-energisations were not scheduled for Friday, the weekend, the evening before bank holidays or bank holidays.

- **Re-energisation**

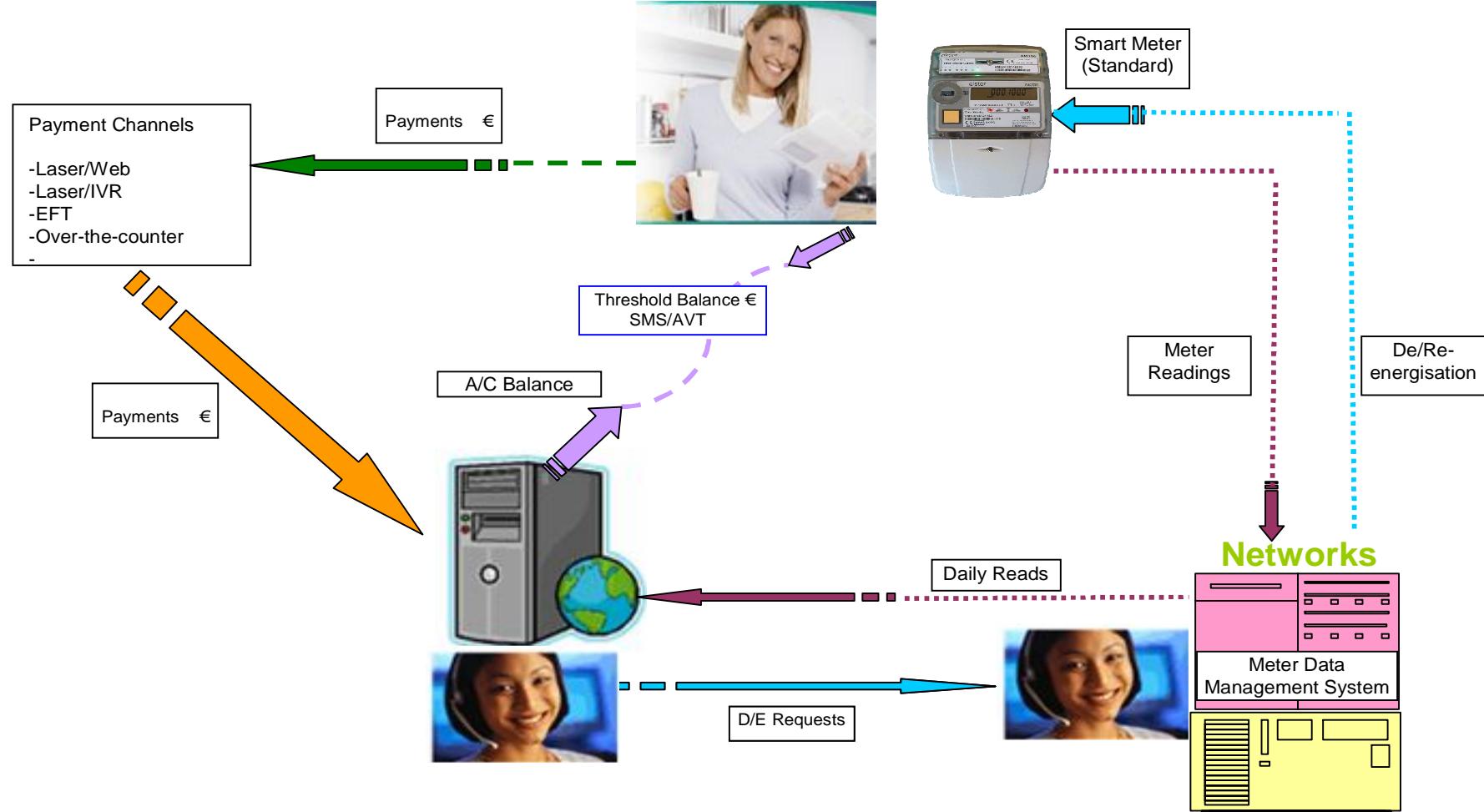
It was expected that re-energisation would be carried out within the same working day of the payment being made. This would be scheduled with the participant in conjunction with ESB Networks.

- **Cancellation of a De-energisation Call**

All accounts scheduled for de-energisation were checked on a daily basis. If payments were received, ESB Networks were advised and the de-energisation cancelled.

**Appendix 11: Prepayment Overview**

# Pre-payment Overview



## Appendix 12: Sample Communications

### Invitation Letter Version 1



National Smart Meter Plan

Mr Firstname Surname  
Address line 1  
Address line 2  
Address line 3  
Address line 4  
**#DATE#**

Account No: #A/C#  
MPRN: #MPRN#

#### The National Smart Meter Plan. Make the smart move.

Dear Mr Surname,

I would like to invite you to participate in the User Trials of the National Smart Meter Plan which are due to commence shortly.

#### What are the Smart Meter User Trials?

The purpose of the User Trials is to see how Smart Meters, combined with different forms of information and incentives, can help customers reduce the amount of electricity they use. Smart Meters are a new type of electricity meter which can:

- Help you to conserve energy and make savings on your bill
- Enable you to have more regular information on your electricity usage throughout the year
- Assist you in contributing to the environment by being more energy efficient
- Eliminate the need for estimated bills

Smart Meters are already in use in other countries, such as Italy, Canada and Sweden and following this trial, will ultimately be installed in every home in Ireland.

#### What happens if you choose to participate?

If you choose to participate ESB Customer Supply will provide you with all the necessary information at the start of the trial and at regular intervals throughout. In addition, your existing electricity meter will be replaced with a Smart Meter by ESB Networks. You will receive €50 credited to your ESB bill at the end of the trial as a 'thank you' for completing a short 10 minute questionnaire at the start and end of the trial.

During the Trial a number of energy efficiency initiatives enabled by smart metering will be trialled, including 'Time of Use' tariffs. These tariffs and initiatives will offer you the opportunity to better manage and reduce your electricity bill.

#### How do you sign up to take part in the Smart Meter User Trials?

- complete and return the tear-off slip at the bottom of this letter
- or Phone us on a Lo Call number 1850 21 16 50
- or email us at [smartmeter@esb.ie](mailto:smartmeter@esb.ie) quoting your ESB Customer Supply account number and your name and address.

As this User Trial is limited to 5,000 places nationally, we would ask you to let us know as soon as possible if you wish to participate.

Please note, throughout the trial, all information will remain confidential to you and to ESB Customer Supply.

#### Want to find out more?

Please read through the enclosed leaflet or, if you prefer, call us on 1850 21 16 50 or email [smartmeter@esb.ie](mailto:smartmeter@esb.ie)

Yours sincerely,

*Pat Fenlon*

Pat Fenlon  
General Manager  
ESB Customer Supply



The National Smart Meter Plan is managed by the Commission for Energy Regulation with the support of the Department of Communications, Energy & Natural Resources, Sustainable Energy Ireland, ESB Networks and the electricity and gas industry in Ireland.

**ESB Customer Supply**

Customer Name: Mr Firstname Surname  
Address: Address line 1  
Address line 2  
Address line 3  
Address line 4

Account No: #A/C#  
MPRN: #MPRN#



National Smart Meter Plan

I agree to participate in the User Trials of The National Smart Meter Plan and to receive information in relation to this Plan from ESB Customer Supply. (Please tick)

My contact number is \_\_\_\_\_

My email address is \_\_\_\_\_

We need your contact number so that ESB Networks can call you to arrange an appointment to install your Smart Meter. Your contact number will be used for account management purposes only. Please note, throughout the trial, all information will remain confidential to you and to ESB Customer Supply.

## Invitation Letter Version 2



Mr AB Sample  
123 Sample Road  
Sample Town  
Sample County

Account No: 9999999  
MPRN: 99999999

17<sup>th</sup> November 2008

### The National Smart Meter Plan. Make the smart move.

Dear Mr Sample,

I would like to invite you to join the User Trials of the National Smart Meter Plan due to commence shortly. If you choose to take part you will receive €50 credited to your ESB bill as a 'thank you' at the end of the Trial.

#### What is a Smart Meter?

- A Smart Meter is a new electricity meter that:
- Helps you make savings on your bill by helping you reduce the amount of electricity you use
  - Provides you with more information on what electricity you use
  - Eliminates estimated bills
  - Assists you in being energy efficient

In this trial you will be given a Smart Meter. The purpose of the Trial is to see how Smart Meters can help customers reduce the amount of electricity they use. Smart Meters are already in use in other countries and following this trial, will be installed in every home in Ireland.

#### What happens if you choose to participate?

- ESB Networks will replace your existing electricity meter with a Smart Meter.
- ESB Customer Supply will provide you with information at the start of the trial and at regular intervals throughout
- You will receive €50 credited to your ESB bill at the end of the trial as a 'thank you' for completing a short 10 minute questionnaire at the start and end of the trial.

During the User Trial a number of different ways of improving your energy efficiency enabled by smart metering will be trialled, including 'Time of Use' tariffs (different prices for different times during the day and night). These tariffs and other information will offer you the opportunity to better manage and reduce your electricity bill.

#### How do you sign up to take part in the Smart Meter User Trials?

- complete and return the tear-off slip at the bottom of this letter
- or phone us on the Lo Call number 1850 21 16 50
- or email us at smartmeter@esb.ie quoting your ESB Customer Supply account number and your name and address.

As this User Trial is limited to 5,000 places nationally, we would ask you to let us know as soon as possible if you wish to participate.

Please note, throughout the trial, all information will remain confidential to you and to ESB Customer Supply.

#### Want to find out more?

Please read through the enclosed leaflet or, if you prefer, call us on 1850 21 16 50 or email us at smartmeter@esb.ie

Yours sincerely,

*Pat Fenlon*

Pat Fenlon  
General Manager  
ESB Customer Supply

9999

The National Smart Meter Plan is managed by the Commission for Energy Regulation with the support of the Department of Communications, Energy & Natural Resources, Sustainable Energy Ireland, ESB Networks and the electricity and gas industry in Ireland.



Customer Name: Mr AB Sample

Account No: 9999999

Address: 123 Sample Road  
Sample Town  
Sample County

MPRN: 9999999

I agree to participate in the User Trials of The National Smart Meter Plan and to receive information in relation to this Plan from ESB Customer Supply. (Please tick)

My contact number is \_\_\_\_\_

My email address is \_\_\_\_\_

We need your contact number so that ESB Networks can call you to arrange an appointment to install your Smart Meter. Your contact number will be used for account management purposes only. Please note, throughout the trial, all information will remain confidential to you and to ESB Customer Supply.

## Frequently Asked Questions Brochure

**ESB Customer Supply**

**Make the smart move**

**YOUR QUESTIONS ANSWERED**

**National Smart Meter Plan**

**Wait more information?**

**Smart Meters. Make the smart move.**

**why** Why are the User Trials being carried out?  
The purpose of the User Trials is to understand how a number of energy efficiency initiatives enabled by Smart Metering can help customers reduce the amount of electricity they use, thus helping the environment and helping Ireland meet its climate change targets.  
The changes that customers make in the User Trial will also provide information on what could be expected when all customers have Smart Meters.

**where** Where have Smart Meters already been introduced?  
Italy, Canada and Sweden are some of the initial countries that have already installed Smart Meters.

**User Trial?** Where can I get more information about this User Trial?  
Telephone 1850 21 16 50 or email smartmeter@esb.ie

**CER** Commission for Energy Regulation  
The National Smart Meter Plan is managed by the Commission for Energy Regulation with the support of the Department of Communications, Energy & Natural Resources, Sustainable Energy Ireland, ESB Networks and the electricity and gas industry in Ireland.

**2** This leaflet and letter are printed on environmentally friendly stock which is produced from sustainable forests, 30% mill broke and post consumer waste.

**what** What are the National Smart Meter Plan User Trials?  
The National Smart Meter Plan will ultimately see every house in the country provided with a Smart Meter. This will enable customers to reduce their electricity use by cutting back on the unnecessary use of electricity.

Prior to the national installation of Smart Meters, a User Trial is being undertaken. The purpose of this User Trial is to understand how the use of Smart Meters can reduce the amount of electricity customers use.

A large number of participants from across the country will be randomly selected and invited to participate in this User Trial. Participants who take part for the full duration will receive a 'thank you' payment.

**What is a Smart Meter?**  
Smart Meters are the next generation of electricity meters. They monitor and record how much electricity you use and when you use it. They can then communicate this data automatically to your electricity supply company.

**Is my usage information secure and will it remain confidential?**  
Under the Data Protection Act 2003 your information will be kept confidential.

**What am I signing up to?**  
By agreeing to take part in the Smart Meter User Trial, you agree to the following:

- Taking part in the User Trial for its full duration of 18 months

**who** Who is sponsoring the National Smart Meter Plan?  
The National Smart Meter Plan is managed by the Commission for Energy Regulation with the support of the Department of Communications, Energy & Natural Resources, Sustainable Energy Ireland, ESB Networks and the electricity and gas industry in Ireland.

The CER is an independent agency that regulates electricity and natural gas utilities in the public interest. SEI is the national agency responsible for promoting sustainable energy in Ireland.

**Who is participating?**  
Participants will be invited from all parts of the country. The goal is to reflect the diversity of customers who use electricity in different ways.

**how** How do Smart Meters differ from the existing Meters?  
Our old-style meters can only measure the total amount of electricity used over an entire billing period because they have to be read manually. This often results in estimated bills.

Smart Meters can capture electricity usage at regular intervals throughout the day and communicate this information from the customer's premises to the supplier. Smart Meters can be read remotely which will bring an end to estimated billing.

Will I need to pay for any equipment?  
No, the Smart Meter will be installed free of charge by an ESB Networks Technician and there will be no additional charges associated with the Smart Meter installation.

How long does it take to fit the meter?  
Once the Technician has access to the meter position they will need to switch off power to your home for 1-2 hours approximately to allow the meter to be replaced. Supply will be restored once the Smart Meter has been installed successfully. You will be contacted to arrange a suitable time.

Where will the meter be positioned?  
The Smart Meter will be positioned in the same location as your existing electricity meter. Installation of the Smart Meter is dependent on your wiring meeting current standards.

32167 Smart Meter FAQ.indd 1

32167 Smart Meter FAQ.indd 2

04/09/2008 16:57:02

04/09/2008 16:57:03

## Acknowledgement Letter

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National Smart Meter Plan

Mr AB Sample  
123 Sample Road  
Sample Town  
Sample County

Account No: 9999999  
MPRN: 99999999

17<sup>th</sup> November 2008

### The National Smart Meter Plan. Make the smart move.

Dear Mr Sample,

Thank you for agreeing to participate in the User Trials of the National Smart Meter Plan. We will be writing to you over the coming months to provide you with more details on the various initiatives involved in these Trials.

In the meantime, however, we would like to arrange to have a Smart Meter installed at your home. ESB Networks has a programme of work in place to install Smart Meters nationally and they plan to have all installed by the end of April 2009. A local ESB Networks representative will contact you to arrange an appointment to install the smart meter in your home.

There are a number of points we would like you to note:

- The Smart Meter will be positioned in the same location as your existing electricity meter and this replacement will involve the minimum of disruption.
- During installation you will be without power for 1 to 2 hours. This is necessary because the meter is being exchanged.
- The Smart Meter, which will be used in the trial works on GPRS communications (ie. similar to your mobile phone). If the GPRS signal at the meter location is not sufficiently strong, it will not be possible to install a Smart Meter. This will be checked by ESB Networks before installation and we will be in contact with you should such a situation occur.

Once again, I would like to thank you for your participation. Your inputs and feedback from working with the various initiatives planned over the Trial, will provide us with valuable information for decisions around the national roll-out of these meters. We will provide you with further information on these shortly, but in the meantime if you have any queries, please contact us on 1850 21 16 50 or email us at [smartmeter@esb.ie](mailto:smartmeter@esb.ie).

Yours sincerely,

*Pat Fenlon*

\_\_\_\_\_  
Pat Fenlon  
General Manager  
ESB Customer Supply



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9999

## Letter to participants re what will happen next



National Smart Meter Plan

Account No:

MPRN:

11 August 2009

### The National Smart Meter Plan. Make the smart move.

Dear

Thank you again for agreeing to take part in the User Trials of The National Smart Meter Plan. Your Smart Meter is now installed and is operating normally. The purpose of this letter is to provide you with more information on the Smart Meter User Trial and some next steps.

The Smart Meter User Trial starts on 1st July 2009 and runs to 31st December 2010. It is divided into two parts:

Normal Use Period	1st July to 31st December 2009
Active User Trial Period	1st January to 31st December 2010

**Normal Use Period: 1st July to 31st December 2009 - What you have to do**

The period from 1st July to 31st December 2009 is called the "*Normal Use Period*". During this time we would just like you to continue using your electricity as normal. This is necessary so that we can establish your normal electricity use before we ask you to trial smart meter related initiatives. It also means that at the end of the trial we will be able to see whether you have reduced your usage in 2010 compared to 2009.

#### *Pre-Trial Survey*

We would also like your help during the *Normal Use Period* in gathering some details about you and members of your household and how you use electricity in your home (for example, what kind of heating you have, how often you use a washing machine, dishwasher or tumble dryer and so on).

You will receive a survey phone call in the next six to eight weeks from a representative of our research company, The Research Perspective. The survey will be completed during that call and should take approximately 12 minutes. If the telephone call comes at an inconvenient time, The Research Perspective will be happy to call back when it suits you.

Once the survey is complete we will credit €25 to your October/November ESB bill. (We will repeat this survey at the end of the trial in January 2011 and you will receive a further €25 for taking part.)

These surveys are an integral part of feedback in relation to the Smart Meter Programme and your participation would be very much appreciated. As you know, throughout the trial, all information will remain confidential to you and to ESB Customer Supply.



The National Smart Meter Plan is managed by the Commission for Energy Regulation with the support of the Department of Communications, Energy & Natural Resources, Sustainable Energy Ireland, ESB Networks and the electricity and gas industry in Ireland.



National Smart Meter Plan

Account No:

MPRN:

**The National Smart Meter Plan. Make the smart move.****Active User Trial Period: 1st January to 31st December 2010 - What you have to do**

From 1st January 2010 different groups of customers will be asked to test various energy efficiency initiatives, such as a different tariff or an in-home display or a monthly bill.

Some customers may be asked to participate in a separate group where they just continue using electricity as normal.

We will write to you towards the end of the year to tell you which group you are in and to explain what we would like you to do. We will also provide you with more information about the trial at that stage.

As you can see it is important that you stay in the trial from 1st July 2009 to 31st December 2010. This means, unfortunately, that if you move house or move to a different electricity supplier, your involvement in the trial will stop. If this happens, please do not worry. We will sort everything out and will forward you any amounts due.

**How much can I save in the Smart Meter Trial?**

For those involved in trialling smart meter initiatives, what you save will depend on you and how you manage your electricity use, assisted by the information we will provide. However, we guarantee that over the period of the trial you will not be charged more for your electricity than if you had stayed on your normal electricity tariff.

If you have any queries on any of the above please contact us on 1850 21 16 50 or email us at [smartmeter@esb.ie](mailto:smartmeter@esb.ie).

Yours sincerely,

Pat Fenlon  
General Manager  
ESB Customer Supply



The National Smart Meter Plan is managed by the Commission for Energy Regulation with the support of the Department of Communications, Energy & Natural Resources, Sustainable Energy Ireland, ESB Networks and the electricity and gas industry in Ireland.

## Letter advising participants re calendarisation (*monthly version*)



Joe Sample  
Sample House no.  
Sample Road  
Dublin Sample  
Ireland

MPRN No.  
A/c No.

18th December 2009

Dear XXXX,

As the start of your participation in the User Trial of the National Smart Meter Plan nears I am writing to inform you of changes to the timing of your electricity bill from 1st January 2010.

### **Why are these changes being made?**

At the moment customers receive bills at different times in the month over any two month billing period. So, for example in the period January to February, some customers get their bill early in January, some at the end of January and some in February. We need everyone in the trial to get their bill at the same time so that we can clearly see what changes have occurred as a result of smart meters. This means changing the timing of your bill.

### **Changes to your Bill Timing**

In summary the main changes are:

- From 1st January to 31st December 2010 you will receive an electricity bill once a month (you currently receive a bill every two months).
- Your bill will issue at the start of the month following each billing period.
- We will issue you with a bill up to end of December 2009, so that from 1st January 2010 we can start participants in the trial at the same billing date.
- If you pay by direct debit, your payment dates will change.

### **What happens at the end of the User Trial?**

At the end of the User Trial (31st December 2010) your bill will return to its normal billing cycle. We will write to you again at this time.

Thank you for participating in the National Smart Meter Plan. The active phase of the User Trials will commence from 1st January 2010 and we will contact you shortly with further details.

Yours sincerely

Pat Fenlon  
General Manager  
ESB Customer Supply



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## Letter to Electricity Monitor Stimulus Group



Joe Sample  
Sample House no. 14  
Sample Road  
Dublin Sample  
Ireland

Dear Joe

Thank you for agreeing to participate in the user trials for the National Smart Meter Plan. The trial will begin shortly and we would just like to give you some additional information on it. From 1st January to 31st December 2010 you will be helping us in trialling:

**An Electricity Monitor**  
**Time of use electricity prices**  
**A more detailed bill**

We will tell you more about the time of use prices and the detailed bill in December, but for now we will just talk about your home Electricity Monitor.

### Electricity Monitor

You are being given an Electricity Monitor for use during the user trial. It takes data from the Smart Meter and provides you with information on your electricity use and costs on a small screen.

For the purpose of this trial, it is important that all groups start their requested actions at the same time. Therefore, your Electricity Monitor will be delivered and installed in your home by ESB Networks between the 30th December 2009 and 4th January 2010. A representative will contact you in December to agree a suitable time.

### Replacement of Communications Module

Before installing your Electricity Monitor, ESB Networks need to call and replace a communications module in your home Smart Meter to enable it to communicate with the Electricity Monitor. This will mean your electricity supply will need to be disconnected for a short period, less than 20 minutes. ESB Networks will contact you shortly to agree a convenient time for this replacement in the next few weeks.

Attached is a leaflet which provides more information on the Electricity Monitor. It also includes contact details should you require further information.

Thank you again for taking part in the user trials. We will write to you shortly with details of other aspects of the trial as detailed above.

Yours Sincerely

Pat Fenlon



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**Letter to Bi-monthly Bill/Electricity Monitor Group** (*letters to other stimulus groups were variants of this letter*).



MPRN No.  
A/C No.

18th December 2009

Dear

Your role in the User Trial of the National Smart Meter Plan is about to begin. From 1st January to 31st December 2010, as a participant in the User Trial your help will be invaluable to us in trialling the following:

**Time of Use Electricity Prices**

Your current electricity price is changing to "Time of Use" pricing. Time of Use pricing means electricity is charged based on the time of day when it is used – Peak, Day or Night. See enclosed guide for further details.

Peak rate, the highest rate, applies for only two hours per day – weekdays only excluding public holidays and weekends.

Day rate applies from 8am to 5pm and from 7pm to 11pm on weekdays and all day from 8am to 11pm on weekends and public holidays (no Peak at weekends or on public holidays).

Many households use around one quarter of their electricity between 11pm and 8am (Night rate). The table below shows how much electricity you have used on average during the different time bands since your smart meter was installed.

Timeband	Day Rate	Peak Rate	Day Rate	Night Rate
Electricity you used at each time	8am – 5pm	5pm – 7pm	7pm – 11pm	11pm – 8am

A fridge magnet and stickers which illustrate the 'different times, different prices' are included in your folder.

Over the period of the trial we will ensure you won't pay any more for your electricity than you would if you had stayed on your normal electricity prices. To help you get started in using your new Time of Use prices we have credited € 25 to your December bill. Once your participation in the trial ends in December 2010 you will receive a further credit of € 25 in January 2011. This is in addition to the two €25 credits for completing the surveys.

**Detailed Bill**

As part of the trial, you will receive a more detailed bill than normal to help you reduce your electricity use and decide what you might use outside of the weekday Peak time. This bill will give you information on electricity used, tips on how to save money and how to move use from the Peak to Day or Night periods. The bill will also compare your usage to others in the User Trial.

**Electricity Monitor**

Delivered and installed in your home by ESB Networks, the Electricity Monitor will give you information on your electricity usage.



**What happens next?**

You will receive your Electricity Monitor between 30th December 2009 and 4th January 2010. From 1st January your electricity will be charged at the new Time of Use price. You will receive your first detailed bill with these new prices early in March.

**What do you have to do now?**

From 1st January we would like you to use the Time of Use prices, your detailed bill and your Electricity Monitor to help manage and reduce your electricity use. The enclosed guide contains further information on each of these.

**Would you like more information?**

We would like to thank you again for your participation in the User Trial and wish you every success in reducing your electricity usage over the next twelve months. If you have any queries on any of the above, please contact us on 1850 21 16 50 or email us at [smartmeter@esb.ie](mailto:smartmeter@esb.ie)

Yours sincerely

A handwritten signature in black ink that appears to read 'Pat Fenlon'.

*Pat Fenlon  
General Manager  
ESB Customer Supply*



The National Smart Meter Plan is managed by the Commission for Energy Regulation with the support of the Department of Communications, Energy & Natural Resources, Sustainable Energy Ireland, ESB Networks and the electricity and gas industry in Ireland.



This leaflet and letter are printed on environmentally friendly stock which is produced from sustainable forests, 30% mill broke and post consumer waste.

## Sample Electric Ireland Bill

<b>Customer Supply</b>		Your Account Number is <b>123456789</b>																																															
		Date of issue <b>2 MARCH 10</b>																																															
		Invoice number <b>987654321</b>																																															
JANE DOE 123 HIGH STREET ANY TOWN ANY COUNTY		<b>Useful contacts</b> For Accounts/General enquiries 0800 123 0000/ 1800 1 <b>1850 372 372</b> Mon-Fri 8am-6pm, Sat 9am-5pm Please have your account number ready  For Emergencies/Electrical Interruptions Callout team numbers <b>1850 372 999</b> Lines open 24hrs, 7 days a week Please have your MPRN number ready																																															
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## Sample Electric Ireland Residential Energy Usage Statement

**ESB Customer Supply**

**Your usage statement**

**Your account details**

Account Number:  
MPRN:  
Billing Period: 01-JUL-10 To 31-AUG-10

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**Energy awareness**

Typical cost of running various appliances over a full year\*

Main household appliances (excl. Electric Oven)	NIGHT RATE	DAY RATE	PEAK RATE
Washing machine	€41	€57	€174
Tumble dryer	€137	€191	€579
Dishwasher	€55	€76	€232
Immersion - 6 months only	€152	€211	€641

\*Average usage 1 cycle per day; 5 days a week for a full year. Immersion: 1 tank per day 6 months only.

---

**Hints and Tips**

- Money Down the Drain - During the peak period (5pm to 7pm) an instantaneous electric shower running for 15 minutes costs you €217.17 per year. At day rates it would cost you €71.44 per year.
- Beat the Peak. Machine washing a full load on peak rate will cost you €79.74 per year; on the day rate it would cost you €57.15 per year
- Off peak costs less, but it still costs you. Remember it is important to be energy efficient outside of peak hours.

---

**Has your electricity usage changed?**

- Last month the amount of electricity you used during the peak time has increased compared to the previous month. This has cost you €0.63 more. Is there anything you can do?
- Last month 227 customers on your tariff have reduced the amount of electricity they use. Is there more that you could do?

---

**Your average day of the week costs**

Day	Night (per day)	Day (per day)	Peak (per day)	Total (per day)
Sunday	€0.10	€0.20	€0.20	€0.50
Monday	€0.10	€0.20	€0.20	€0.50
Tuesday	€0.10	€0.20	€0.20	€0.50
Wednesday	€0.10	€0.20	€0.20	€0.50
Thursday	€0.10	€0.20	€0.20	€0.50
Friday	€0.10	€0.20	€0.20	€0.50
Saturday	€0.10	€0.20	€0.20	€0.50

---

**Further information**

Values given above may be slightly different to Page 1 due to rounding impacts. The correct final values are those displayed on Page 1 of the Bill.

**Learn More**

Visit [www.esb.ie/home](http://www.esb.ie/home) to view:

- ✓ Energy Efficiency tips
- ✓ Ways to Save money
- ✓ Energy Challenge

## Sample Brochure



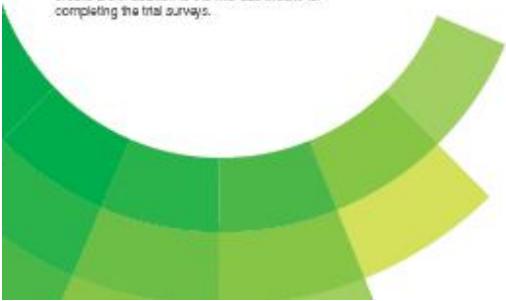
 SMART METER USER TRIAL GUIDE

### Time of Use prices and our guarantee to you

At first glance, you will see at different times of day the Time of Use price is higher and at other times it is lower than the rate charged up until 31st December 2009. This is to encourage use outside of Peak times. You may feel, however, that you cannot move a lot of your electricity usage into night or away from Peak times.

Don't worry - over the period of the trial we will ensure you won't pay any more for your electricity than you would if you had stayed on your normal electricity price.

To help you in this we will credit your bill for December with €... Then in January 2011 we will give you a second credit of €... When the trial period has ended, if we calculate you have still paid more than you would have on your normal electricity price, we will give you a final credit for this amount. Please note that these credits are in addition to the two €25 credits for completing the trial surveys.



### Smart energy tips

To get you started there are a number of actions you may consider:

Try to use washing machines / dishwashers when the Day rate applies or at the Night rate. For safety reasons it is best not to leave appliances on when you are asleep or when your house is unoccupied.

Think before you use something in Peak time. Remember Peak is only two hours - could you move some of your appliance use outside of this time?

We would like you to try and use less electricity during the trial. Are there any additional actions you can take? Are there "silent users", for example, the immersion, lights and appliances left on in unoccupied rooms, especially during Peak time?



**SMART METER USER TRIAL GUIDE**

### Understanding your Smart bill

During the User Trial of the National Smart Meter Plan you will receive a more detailed bill than your current one. This new bill and the information on it provided will help you to identify where and when you are using the most electricity, and what usage you can move outside of the Peak period to reduce your bill. There will be 2 pages in your new bill:

**The first page**

The first page will be very similar to your existing electricity bill with just a few small changes.

**Meter Readings**

Because smart meters collect your usage regularly throughout the day and can be read remotely, all of the bills you receive during the User Trial will be based on actual use. This removes the need for estimated readings.

**Standing Charge and PSO levy**

Standing Charges and PSO levy remain unchanged from your previous bills.



This shows the number of units used and their costs at the different rates: Peak, Day or Night.

The new period covered by your bill (Jan/Feb, Mar/Apr, etc.) and the new date on which your payment is due.

### What are the new prices?

There are three different prices for electricity, depending on the time of day you use it. You can save money by choosing to use electricity when the price is lower.

#### Time of Use prices from January 2010

	Day Rate	Peak Rate	Day Rate	Night Rate
Timeband	8am - 5pm	5pm - 7pm	7pm - 11pm	11pm - 8am
Unit Rate (excl. VAT)				

#### Peak Rate:

Applies only 2 hours per day on weekdays only (excluding public holidays and weekends).

#### Day Rate:

Applies from 8am to 5pm and from 7pm to 11pm weekdays. Day rate also applies from 8am to 11pm on weekends and public holidays (no Peak rate at weekends or on public holidays).

#### Night Rate:

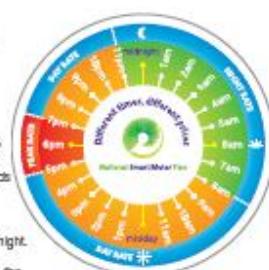
Applies from 11pm to 8am every night.

The Peak rate is the highest while the Night rate is the cheapest.

Unit rate until the 31st December 2009 (excl. VAT) is 14.10c – 24 hour rate.

Time of Use prices will apply from 1st January - 31st December 2010. These rates may be subject to change in line with ESB Customer Supply tariff changes.

**SMART METER USER TRIAL GUIDE**



171.

**Smart Meters**

Smart meters are the next generation of electricity meters. They monitor and record how much electricity you use and when you use it. They can then communicate this data, and report it to your electricity supplier. The National Smart Meter Pilot User Trial is being undertaken to understand how the use of smart meters can help in reducing the amount of electricity customers use.

**Your guide to residential Time of Use prices**

As part of the National Smart Meter Pilot User Trial, electricity will be charged per unit, based on the time of day it is used (Time of Use pricing).

**Using your Electricity Monitor**

Your Electricity Monitor can help you in being energy efficient by giving you information about your electricity use and how much it is costing you. This home screen gives you the following information at a glance:

- Shows how you are doing against your daily budget.
- Indicates the current cost of electricity per hour (does not include standing charge and VAT).
- Indicates price per unit at Peak (red), Day (orange) and Night (green) rates.
- Indicates how much your electricity has cost this month (does not include standing charge and VAT).

**Daily budget setting**

The home screen display includes a daily budget gauge to help you in your budget planning. The amount on the gauge is the amount set by you to help manage your electricity use. You can set this amount at any time, based on your budget and the level of electricity use in your home. The gauge indicates how close to the target your usage is. When the target is exceeded it is displayed as "Over Budget".

**See how much you have used**

Using the cord loops on each side of the Electricity Monitor, you can see your daily, weekly and monthly costs and usages. This will help you track how you are doing.

**The Budget Gauge**

The Electricity Monitor is fitted with a rechargeable battery which allows it to be moved into other rooms while still working. The battery will last for up to eight hours before it needs to be recharged. It is recommended that you leave it plugged in.

## Introduction to Electricity Monitor



**What is an Electricity Monitor?**

An Electricity Monitor is a small device that displays information from your Smart Meter or a small handheld screen. It provides you with immediate information on what electricity you are using at home during the month and what it is costing.

**How can I use it?**

You can use your Electricity Monitor to understand which appliances use more electricity and to compare different appliances' energy use. For example, if you switch on or off the kettle, a printer or any electrical equipment, you can see the change this has made to your electricity use.

**Manage your budget**

The Electricity Monitor also lets you set a daily budget for your electricity use and lets you know if you are exceeding it. You can decide your daily budget amount and change it as often as you wish.

**How does the Electricity Monitor work?**

The Electricity Monitor communicates with your electricity meter using a wireless connection, similar to that in cordless phones. Every three minutes it automatically calculates your cumulative usage and costs and if you switch on or off an appliance it will show the revised cost of your current use over a one hour period.

**Will the Electricity Monitor calculate my electricity bill?**

The Electricity Monitor is not a replacement for your electricity meter and will not calculate your bill. It will only display what electricity you are using at home and what it costs. It will not provide you with information on other costs associated with your electricity bill, such as your standing charge, electricity levies or VAT.

**What size is the Electricity Monitor?**

The actual dimensions are: 15cm x 10cm x 3cm and weighs approximately 200g. It has a stand and can also be wall-mounted, similar to a picture frame. It also has a rechargeable battery which will work for about eight hours before it needs to be recharged. However to get the most from your Electricity Monitor you should leave it plugged in during normal use.

**What does the Electricity Monitor look like?**

The picture on the left shows the device with the default screen displayed.

**What is involved in the Electricity Monitor's installation?**

Installation is simple, taking approximately 10 minutes. An ESB Networks technician will call to your home, plug in the device and ensure that it is working correctly. You can decide where you want to locate the device, however it would be ideal if it is close to a socket.

**Extract from User Guide to Electricity Monitor**



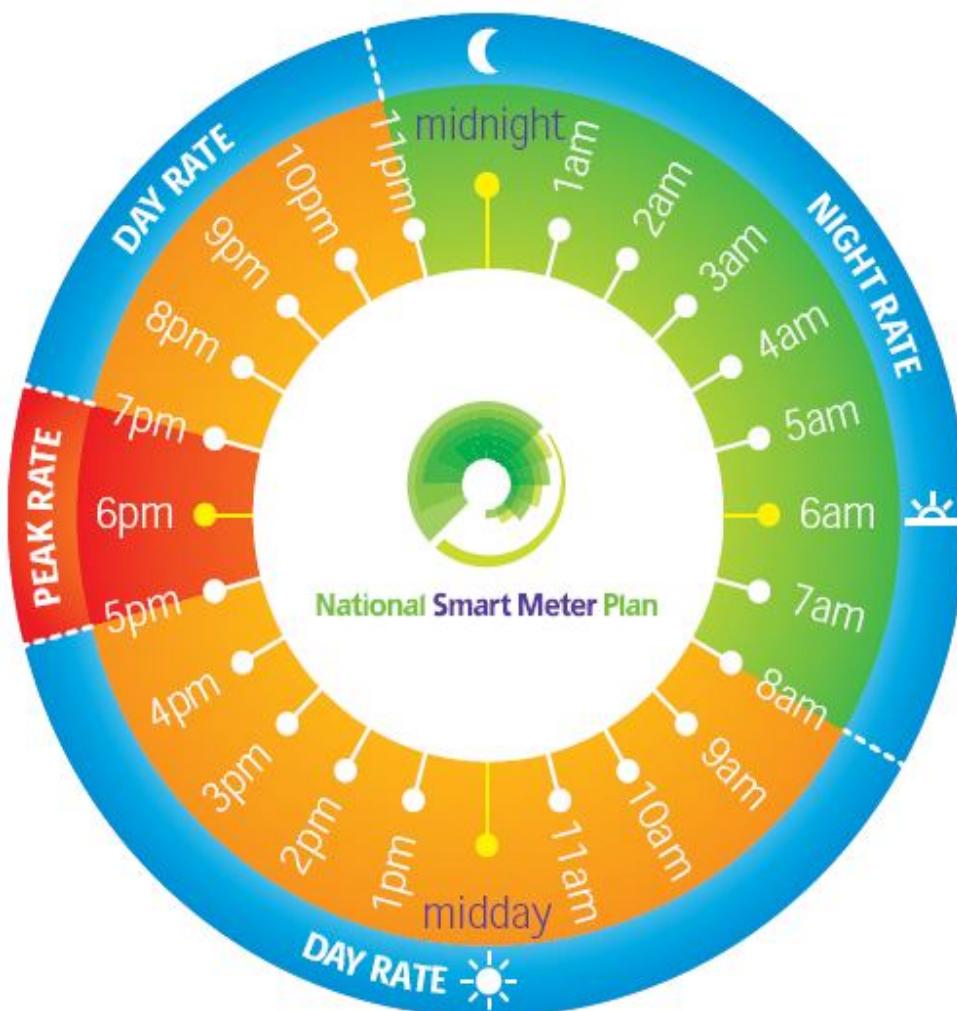


## User Guide to your Electricity Monitor

1. Key Features of your Electricity Monitor	2
2. Using your Electricity Monitor	3
3. Home Screen	4
4. Cost and Usage Information Screens	5
5. Menu Screens	6
6. Troubleshooting your Electricity Monitor / Customer Support	8 9
7. Important Safety Tips	10
8. Looking after your IHD	12



## Fridge Magnet (Tariff A)



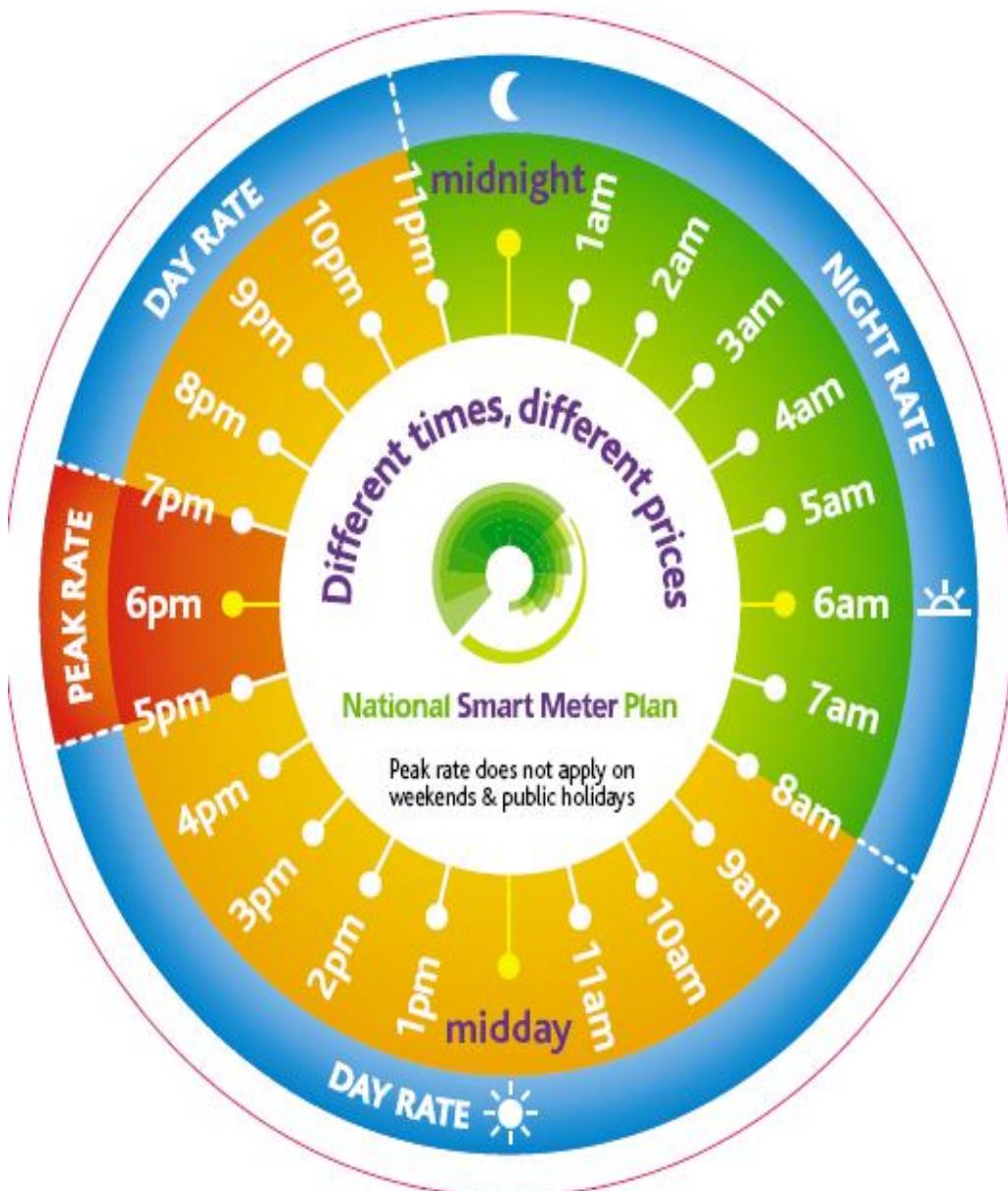
## Different times, different prices

DAY 8am - 5pm	PEAK* 5pm - 7pm	DAY 7pm - 11pm	NIGHT 11pm - 8am
14c	20c	14c	12c

\* Peak rate applies Monday to Friday only excluding Public Holidays.  
 Time of Use pricing will apply from 1st January - 31st December 2010.  
 Rates may be subject to change in line with ESB Customer Supply tariff changes.  
 Prices exclude VAT.



## Time-of-Use Pricing Stickers



## Sample Electric Ireland SME Energy Usage Statement

 Customer Supply





### Your usage statement

**Your account details**

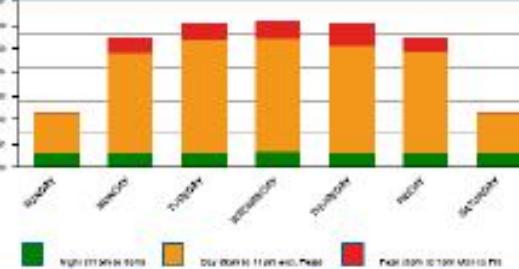
Account Number: [REDACTED]  
MPRN: [REDACTED]  
Billing Period: 01-JUL-10 To 31-AUG-10

#### Energy and Your Business

- Monitor your electricity usage - Switching off equipment will avoid peak rate charges between 6pm and 7pm weekdays.
- Heating and cooling requirements differ between summer and winter - Air conditioning costs rise by about 10% for each 1°C of overheating - Check thermostat settings on a regular basis & plan to minimise usage during the peak (6pm to 7pm weekdays)

---

#### Your average day of the week costs



Legend: Night (19.99 kWh), Day (69.99 kWh), Peak (10.99 kWh)

#### Detailed Weekly Usage

Usage and Cost last 8 weeks, Full week only

Week	Cost (€)	Usage (kWh)
Week 1	432.70	118.26 kWh
Week 2	432.66	118.26 kWh
Week 3	432.69	118.26 kWh
Week 4	432.72	118.26 kWh
Week 5	432.74	118.26 kWh
Week 6	432.71	118.26 kWh
Week 7	432.73	118.26 kWh
Week 8	432.75	118.26 kWh

#### Bill Comparison

	Mar/Apr	May/Jun	Current Period
Peak	€34.44 150.07 kWh	€26.83 118.26 kWh	€29.34 130.41 kWh
Day	€286.83 1782.00 kWh	€238.97 1485.00 kWh	€230.22 1400.00 kWh
Night	€8.39 1311.82 kWh	€9.97 502.83 kWh	€7.57 500.84 kWh

#### Reduce Your Usage

- Last month you have used 60 kWh less electricity than the same month in 2009. Is there anything you can do to further reduce your use?
- Since January 1st the amount of peak electricity you use has cost you €135.63. Peak savings are possible. Successful participants have reduced their peak usage by 14.32% since the start of the trial.



Legend: Night (19.99 kWh), Day (69.99 kWh), Peak (10.99 kWh)

---

#### Further information

Values given above may be slightly different to Page 1 due to rounding impacts. The correct final values are those displayed on Page 1 of the Bill.



## Sample Bord Gais Energy Supply Energy Usage Statement

**your electricity use statement**

**Bord Gás Energy** think beyond

**Sample Company Ltd.**  
1 Any Street  
Any Town  
Any County  
Ireland

**Billing period**  
01 Jul to 31 Aug 09

**Date of issue**  
10-Oct-09

**Account number**  
00000002222

**MPRN**  
111111111111

**TARIFF KEY\***

	€/kWh	Time Period
PEAK	20.10	5pm to 7pm Weekday (not BH)
DAY	15.90	5am to 5pm Every day except Peak
NIGHT	11.70	8pm to 6am Every day

**Average daily costs** across this billing period

**Monthly bill comparison**

	Second Last Bill	Last Bill	This Bill			
	Mar/Apr 09	May/Jun 09	Jul/Aug 09			
	Cost	Consumption	Cost	Consumption	Cost	Consumption
PEAK	No ToU	32,031	€5.24	28,000	€4.27	21,141
DAY	No ToU	280,120	€101.07	635,858	€54.55	343,362
NIGHT	No ToU	70,768	€15.82	135,088	€11.17	95,498

**Reduce your electricity use**

Monitor your electricity usage - Switching off equipment will avoid peak rate charges between 5pm and 7pm weekdays.

Heating and cooling requirements differ between summer and winter - Air conditioning costs rise by about 10% for each 1°C of overheating - Check thermostat settings on a regular basis & plan to minimise usage during the peak (5pm to 7pm weekdays).

**Weekly Usage: Units and Costs**

\* These rates represent the tariff at the end of the billing period only. There may have been a price change during the billing period, affecting presented graphs and tables. Please refer to Page 1 for more detail.



**Extract from SME brochure to Bord Gáis Energy Supply customers**



06 | SMART METER USER TRIAL GUIDE

## Understanding your new commercial bill

During the User Trials of the National Smart Meter Plan you will receive a more detailed bill than your current one. This new bill and the information it provides will help you to identify where and when you are using the most electricity, and what usage you can move outside of the Peak period to reduce your bill. There will be 2 pages in your new bill:

The first page

The first page is very similar to your existing electricity bill with just a few small changes. Each Time of Use price will be individually identified, along with the units consumed during the time for which the rate applies. Your total consumption over the period will replace your previous total meter readings.

Please also note that for the duration of the trial, your bill will not show the detail of your payments to us. These can be requested by contacting us either on 1850 495 600 or by email to [smart@bordgais.ie](mailto:smart@bordgais.ie)

## Meter Readings

Because smart meters collect your usage throughout the day and can be read remotely, all of the readings you receive during the user trial will be based on actual use. This will remove the need for estimated readings.

The new period covered by your bill and the new date on which your payment is due.

### The second page

The second page of your bill will provide you with extra information and tips on how you can reduce your electricity usage and avoid use during Peak hours.

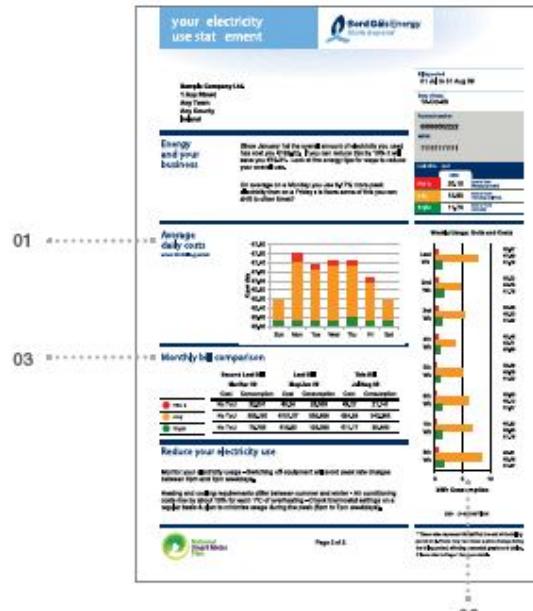
There are two graphs on the bill. The first [01] shows your average daily costs of using of Peak, Day, and Night rate electricity for every day of the week. Note that there will never be Peak usage during the weekend as the Peak tariff does not apply on the weekend. The graph allows you to easily compare your costs throughout the week.

The second graph [02] shows how your consumption has changed week on week for each complete week in the period that your bill covers. This allows you to identify any progress you are making to reduce your electricity costs within the billing period.

You can also compare your electricity usage and costs against how you have performed in previous billing periods using the historical billing table [03]. This allows you to compare the results of your initiatives from one month to the next. We will only compare prices in periods after 1st January 2010 when the Time of Use price comes into effect.

### Paying your bill

You can still pay your bill using your usual methods. Note that the timing of your direct debit may change with the issue of the first smart bill. At the end of the trial (31st of



December 2010), you will transition back to your standard bill.

If you want a statement of account at any time, or more information on your detailed bill, please contact us on 1850 495 600 or email us on [smart@bordgais.ie](mailto:smart@bordgais.ie). Phones are open Monday to Friday, 9am to 5pm.

## Sample Invitation Letter to Prepayment Group



MPRN:

Dear ,

As a valued customer of ESB Customer Supply I would like to invite you to participate in the Prepayment User Trial of The National Smart Meter Plan which is currently underway. If you choose to take part you will receive €25 credited to your ESB Customer Supply bill as a 'thank you' at the end of the Trial.

### What is the Prepayment User Trial?

The prepayment trial will test a bill top-up service similar to that used in the Prepay Mobile Phone Market. This means you pay for your electricity as you use it and top-up your account with an amount to match your electricity usage and budget. Bill top-up also means you won't have unexpectedly large bills for the duration of the trial.

### What happens if you choose to participate ?

- We arrange for ESB Networks to replace your existing electricity meter with a Smart Meter.
- Your account must be in credit to start bill top-up. We will send you a bill to cover the period up to the Smart Meter installation.
- You then make payment for the amount of this bill plus an amount of your choosing to bring your account into credit.
- You can pay smaller amounts instead of waiting for a bill every two months and can check your balance at any time.
- At the end of the trial in January 2011 we return your account to standard bi-monthly billing and you will receive €25 credited to your ESB bill as a 'thank you' for completing a short 10 minute questionnaire at the end of the trial.

### During the trial:

- We measure your electricity usage every day and calculate your account balance
- We provide this balance to you on request via text or by phoning our Customer Contact Centre.
- You decide your top-up amount, for example, you may decide to pay enough for a week's electricity at a time.
- You keep your account in credit i.e. maintain a minimum balance of €5 in credit in your account.
- If your balance reduces below €5 in credit, we will send you a reminder text to top up your account.
- If your account balance reaches more than €5 in debt, we will send a second reminder to top up your account.
- If your account balance reaches €25 in debt, a final reminder will issue, allowing 5 days to bring your account up to date to avoid disconnection of your supply.

### How do you sign up to take part in the Prepayment User Trial?

Simply phone us at 1850 21 16 50 or email us at [Smartmeter@esb.ie](mailto:Smartmeter@esb.ie) by 31<sup>st</sup> August. You must have a mobile phone which can receive text messages to participate in this trial.

Please note that places on the Prepayment User Trial are limited and you are advised to contact us early before all places are filled.

### Want to find out more?

Call us on 1850 21 16 50 or email [Smartmeter@esb.ie](mailto:Smartmeter@esb.ie)

Yours sincerely,

Pat Ferlon  
General Manager  
ESB Customer Supply



The National Smart Meter Plan is managed by the Commission for Energy Regulation with the support of the Department of Communications, Energy & Natural Resources, Sustainable Energy Ireland, ESB Networks and the electricity and gas industry in Ireland.

This letter is printed on environmentally friendly stock which is produced from sustainable forests, 30% mill broke and post consumer waste.

## Sample Acknowledgement Letter to Prepayment Group



MPRN:

Dear ,

Thank you for agreeing to participate in the Prepayment User Trials of the National Smart Meter Plan.

**Installation of your Smart Meter**

We would like to arrange to have a Smart Meter installed at your home and an ESB Networks representative will contact you shortly to arrange an appointment.

The Smart Meter will be installed in the same location as your existing electricity meter. While it is being exchanged, you will be without power for 1 to 2 hours.

The smart meter being installed for this trial works on GPRS communications (i.e. similar to your mobile phone). If the GPRS signal at the meter location is not sufficiently strong, it will not be possible to install a Smart Meter. However, this will be checked before installation and we will be in contact with you should such a situation occur.

**Starting with Prepayment**

Once the smart meter is installed, we will send you a bill to cover the period up to the smart meter installation. This bill must be paid in full before you can start using the bill top-up option. There are a few other points you should note:

- Your account must be in credit to start bill top-up.
- We send you a bill to cover the period up to the Smart Meter installation. On the same day we will also text you this bill amount and the cost of your typical weekly usage. By paying the bill amount plus the amount of your weekly usage within five days you will bring your account into credit and this commences Prepayment of your account (You can use your EasyPay card to make payments)
- Once your account is in credit you decide how much you want to top-up by and make payment for this amount to keep your account in credit.
- We will send you a statement of account showing your usage and payments each month

**During the trial:**

- We can provide your account balance to you on request via free-text or you can phone our Customer Contact Centre (for more details see the additional information attached)
- You decide your top-up amount, however, you must have a minimum balance of €5 credit on your account at all times
- If your account balance reduces below €5 in credit, we will send you a reminder text to top up your account
- If the balance on your account reaches more than €5 in debt (i.e. you owe more than €5), we will send a second reminder to top up your account
- If your account balance reaches €25 in debt (i.e. you owe more than €25) a final reminder will issue, allowing 5 days to bring your account up to date. You must bring your account up to date and contact us to let us know to avoid disconnection of your supply

At the end of the trial in January 2011 we return your account to standard bi-monthly billing and you will receive €25 credited to your ESB Customer Supply bill as a 'thank you' for completing a short 10 minute questionnaire at the end of the trial.

Once again, I would like to thank you for your participation. Your inputs and feedback from working with this Prepayment initiative over the Trial will provide us with valuable information for decisions around the roll-out of these meters. Please read the additional information enclosed and if you have any queries, please contact us on 1850 21 16 50 or email us at [smartmeter@esb.ie](mailto:smartmeter@esb.ie).

Yours sincerely,

Pat Fenlon  
General Manager  
ESB Customer Supply



The National Smart Meter Plan is managed by the Commission for Energy Regulation with the support of the Department of Communications, Energy & Natural Resources, Sustainable Energy Ireland, ESB Networks and the electricity and gas industry in Ireland.

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## Sample End of Trial Letter to Prepayment Group



JANE DOE  
5 ANY STREET  
ANY WHERE  
ANY TOWN

Date: 8<sup>TH</sup> February 2011

MPRN: 1000\*\*\*\*\*

A/c No. 90\*\*\*\*\*

Dear Customer,

Thank you for your participation in the Prepayment Trial of the National Smart Meter Plan. The trial will end on 18<sup>th</sup> February 2011.

### What will happen now that the Prepayment Trial is ending?

#### Account Balance

- We will discontinue the issuing of reminder text messages and associated follow up.
- The free-text account balance enquiry facility will be closed.

#### Your Bill

- You will then return to being billed for usage in the normal way and you will receive a standard bill, issued every two months.
- The timing of your first standard bill in 2011 could be less than two months after your statement as it depends on when meters are read in your area.
- Your payment terms will also change, as full payment will be due 14 days after your bill has issued.

#### Trial Statement

To conclude your involvement in the Prepayment Trial, we will provide you with a statement. This will set out details of the amount of electricity used and payments made by you during the trial.

#### Your smart meter

- Your smart meter will remain in place and will function as a normal meter.

#### We would like to receive your feedback

As you know, the purpose of the Prepayment Trial is to see if Smart Meters could operate as a prepayment meter. It is important, therefore, that we receive feedback from all of those involved.

You may receive a phone call this month from a representative of our research company, The Research Perspective. They may ask you to participate in a focus group review of customer experience of the trial. If the telephone call comes at an inconvenient time, The Research Perspective will be happy to call back when it suits you. All information will remain confidential to you and to ESB Customer Supply and your participation would be very much appreciated. You will receive €25 credited to your bill as a thank you for participating in the review.

Thank you once again for your participation in the prepayment Trial.

If you have any queries on any of the above please contact us on 087 7744899 or email us at [smartmeter@esb.ie](mailto:smartmeter@esb.ie).

Yours sincerely,

Brian Dowd  
Manager, New Products & Services



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## Sample Email to ESB Staff Prepayment Group

Folks,

Thank you very much for volunteering to assist us with our PAYG Trial.

This trial will work on the same principle as the Pay As You Go Mobile Phone in that you would make a payment to your account and this credit will reduce based on your Daily Electricity Usage, you can Top Up your account at any time using any of our existing Payment Channels and there is no limit on the amount of Credit you can have on your account. Also your Staff Discount will be included in the daily calculations.

You can make payments in the following ways:

**By Laser at 1850 372 372 Option 1 or On Line at  
[www.esb.ie/esbcustomersupply/home/index.jsp](http://www.esb.ie/esbcustomersupply/home/index.jsp)  
Over the counter in any Paypoint outlet**

Your remaining balance will be available by Text or via the IVR, we will also contact you when your remaining credit balance gets to €5 to remind you to Top Up your credit. At all times we will require your account to have a minimum credit balance of €5.

During this Pilot we will require any customer paying by Direct Debit to cancel their Direct Debit for the duration of the Pilot. Installation of the Smart Meter will be dependent on their being an adequate signal available to poll the meters for the daily readings.

To facilitate the installation of the Smart meter by Networks and to commence the Pilot I will require the following details:

Contract Account Number  
MPRN Number  
Contact Number