FIELD TRIAL OF ADVANCED METERING TECHNIQUES TARGETED AT SME LEVEL

Contract Number: 200340049-1

Final Report

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Statement

In order to meet the timescale for the delivery of this report it has not been possible for BEAMA to allow the other participants to review the report. The report has been produced solely by BEAMA and represents their views and understanding of the execution and outcomes of the trial.

EdF Energy has requested the following statement to be included in the report:

"*EDF Energy is happy to discuss its views on the subject matter of this report direct with relevant parties. In the interim, it must be stressed that this report has been prepared by BEAMA without the direct input of EDF Energy and as such does not necessarily represent the views or conclusions of EDF Energy, or its affiliates, in connection with the matters addressed within. EDF Energy has not reviewed the report in advance of publication and therefore does not endorse its content nor does it provide any warranties in relation to its accuracy or otherwise. "*

1. Summary

This is the final report of a trial of smart metering technology aimed at the small SME sector. The trial was led by BEAMA Limited, with contributions from EdF Customer Field Services, EdF Energy through the London Energy brand and PRI Ltd. The objective of the trial was to examine the response of small SME customers to the reality of smart metering, to see if it could deliver energy savings and to assess the minimum level of support needed for it to be effective. Over the course of the trial, 81 metres were installed in a variety of small establishments. All of these sites were customers of EdF Energy and were recruited by them. The single phase meters, manufactured by PRI, were installed by EdF Customer Field Services as primary meters, replacing the existing primary meter. An IQ keypad display was attached to each meter, enabling the customer to examine their current and previous consumption. The keypad was fitted with a GSM modem that allowed the data to be remotely downloaded by PRI. For some sites, the meter data was streamed to a web server enabling them to examine their electricity profiles via a web browser. At a later date, a sheet of daily profiles was posted to all the sites and they were phoned to discuss how they might make savings. Following this, the site profiles were examined to seek evidence for savings and, where savings were seen, the sites were called to confirm that the proposed action had been taken. A number of sites that did not show savings were also contacted to get an understanding of the problems they had faced.

There were a number of problems that beset the project, mostly relating to communications with the meters. These were readily solved but did delay the availability of a full data set. As a consequence, the monitoring of the sites' consumption following their energy saving measures has been limited.

The conclusions of the trial are generally positive towards smart metering and are presented in detail in the rest of this report. Of the sites, 69 examined the profiles when they received them and only 14 would not. When asked if they could identify possible energy savings measures, 32 of the sites believed that they could make savings although only 10 were proven by the data to have achieved a saving. The most encouraging result was that 28 sites expressed a positive attitude to the smart meter and the extra information they received. 22 of the sites were neutral or uninterested whilst 4 were unhappy, primarily due to issues around their bills.

The survey of the sites found this sector to be characterised by very lean organisations that were very focused on their businesses. They found it difficult to find time for secondary activities and this was one of the main reasons that they found the profiles

posted directly to them most helpful compared to the meter display or web site. On the other hand, the leanness of the businesses meant that their energy usage was relatively easy to understand and most sites had a single person with a good understanding of the operation of the business and authority to implement changes, if they could be engaged. The motivation for making savings was seldom expressed as purely financial, there seemed to be a tacit acceptance that it was the right thing to do, although this did not always translate into action. Similarly, only 2 sites explicitly said that they would not make any changes because the savings did not make it worthwhile.

Regarding energy savings, the primary opportunities for these came from reducing out of hours heating, lighting and desk pc loads. Two sites reduced their demands by 20% by paying especial attention to turning the lights off during the day. The sophistication of the controls for lighting and heating appeared very primitive. The sites wanted advice on improvement measures but these would have to be well targeted and easy to understand and implement.

Regarding future deployment of smart meters into this sector the key messages were that the information would have to made available to the sites with very little effort on their part and, the data would have to be accompanied with well targeted advice. They would also need repeated encouragement to get involved, simply fitting a smart meter will not produce results on its own.

2. Introduction

2.1. Background of the trial

Intelligent metering, by the provision of greater usage information, has long been promoted as a means to encourage consumers to reduce their energy bills and consumption. This approach is widely used by large energy users, where there are significant potential savings on utility bills and energy managers are on hand to interpret the data. However, take up has been much lower in the SME sector where absolute saving levels are smaller and skilled staff are rare. If the potential benefits of intelligent metering could be realised in the SME sector, it would have significant benefits as this sector has a very large energy load and is difficult to engage through conventional means.

Applying smart metering to the small SME sector poses very different challenges compared to the large SME and industrial sectors. Because the number of customers is very much larger, it is not economic to offer labour intensive interventions such as site visits or phone calls by experts. Also, the commercial imperatives of small SMEs are very different to larger companies; they have fewer staff, customer demands are very urgent and, often, their business is more ‘hand to mouth’. This results in them being very focused on the immediate needs of their businesses and reluctant to be diverted by non-essential activities.

The challenge of this project was to use it to examine the options that could be replicated in a large-scale roll out of the technology to the whole sector, and see if energy savings could be achieved. This raised a number of questions that needed to be resolved before the wide scale use of smart metering could be implemented in the small SME sector. Foremost of these were:

- Demonstrating conclusively that intelligent metering does indeed produce significant, repeatable and sustainable savings in this sector.

- Assessing the levels of carbon savings that are achievable with remote data reading, and provision of information to local staff, possibly with minimal external intervention.

- To show that these savings could be achieved cost effectively.
- Identifying which approach to implementing intelligent metering gives the best result. There are two fundamental choices to implementing intelligent metering:
  - *Local versus remote diagnosis*

    Having produced extra consumption data, should the data be interpreted remotely or should the local staff of the SME be relied upon to react to the data provided. Remote diagnosis also relies on it being possible to make sensible comments on the data provided by the meter. Local staff are much better placed to understand their consumption but lack specialist knowledge to identify and implement savings measures.

  - *Nature of the Data Provided to Local Staff*

    Energy data can be supplied in many ways, ranging from simply adding demand profiles to energy bills to real time provision of energy use data, via a keypad, on-site computer or from a remote server via a web browser.

- Support to Local Staff

  Other options included the extent of training and support provided when the meters were installed and afterwards. Typically, costs are higher for more sophisticated schemes, but experience suggests that there will be little change in behaviour below a certain level of data and training provision. With a simple enhanced bill, feedback is received long after the event when the causes of the consumption cannot be recalled, resulting in minimal impact. Through the provision of real time data and a little awareness training, initial trials carried out by PRI in the domestic sector have shown an average energy saving of 11%. This project set out to identify the optimum approach to these issues and to provide a sound framework for realising the benefits of intelligent metering in the small SME sector.

2.2. Number of sites monitored and meters installed

In all, the electricity consumption of a total of 81 sites was monitored. Only one site was supplied with two meters, the remainder had a single meter, although some had additional electricity supplies that were not monitored. This gives a total of 82 meters installed.

3. Background of the Project Participants

The project was carried out by BEAMA Limited, EdF Customer Field Services (CFS), PRI Limited and EdF Energy through the London Energy Brand (EdF Energy). BEAMA was the main contractor for the Carbon Trust, provided the project management and has been responsible for calling customers, suggesting savings and reporting. PRI provided the meters and communications services. CFS assessed the sites and installed the meters. London Energy was responsible for providing the sites from the Small Business portfolio.

The other participants provided services on a commercial basis to BEAMA and also entered into a Collaboration Agreement to govern the management of the project.

3.1. BEAMA

BEAMA is the primary trade association for the Electrotechnical and Allied Manufacturing Industries in the UK. It is a national grouping consisting of 14 Associations representing some 350 companies, with a turnover of £64 billion a year and employing over 450,000 people.

BEAMA is the coordinator for the electrotechnical industry with UK government and its European counterparts. BEAMA provides a wide range of services to both members and to the industry including legal, statistics, standards, commercial, overseas marketing, technical, and environmental.

BEAMA has in recent years become involved in more research based projects providing direct services, but mainly providing the direct link between the manufacturers and producers of relevant equipment. These projects have covered the power generation sector in detail in the past, but more recently activity has been growing in the electrical installation sectors, and in particular the use of metering and controls to reduce energy use in buildings.

Since as far back as the 1990s BEAMA members in the metering industry have been at the forefront of the development of intelligent or 'smart' metering. A number of pilot studies were carried out with the electricity supply industry assessing the benefits of a range of metering systems. A number of these systems are now in general use, primarily in the form of pre-payment meters and half-hourly metering for the non-domestic sector. The energy efficiency benefits of advanced metering were assessed in a DEFRA funded study carried out by EA Technology and BEAMA. BEAMA was also a major contributor to the DTI report from the sponsored Smart Metering Working Group, which recommended trials of smart metering systems.

BEAMA is also leading the DTI project 'Metering and Monitoring of Embedded Generation Sites' that is monitoring electricity import, export and generation data from 140 embedded generation sites (PV, microCHP, wind and hydro). This is also a multi-partner project involving meter manufacturers, suppliers and meter operators.

BEAMA is now leading the development of a European Smart Metering Alliance aimed at identifying and spreading best practice in smart metering across Europe in support of the Energy Efficiency and ESCO Directive, recently passed by the European Commission. This is a European SAVE Project.

3.2. PRI Ltd.

PRI was founded in 1989 by the merger of Polymeters Ltd (a designer of microprocessor based electricity metering) and Response Company (an energy management services company).

It is this unique pairing that has provided the industry with a single entity dedicated to the combination of smart energy management techniques being deployed in utility meters. Initially the company concentrated on the opening of the UK market in 1990 with its range of innovative high voltage half hourly meters and followed the deregulation through 1994 with its range of low voltage CT and whole current meters for the 100kW market. PRI remains the market leader in these fields.

In 1998 when the domestic market opened for competition, PRI was ready with its innovative "keypad" payment system, addressing the traditional prepayment and fuel poverty markets with its innovative use of low infrastructure costs combined with enhanced customer interaction through a remote keypad and display.

The purpose of the remote display (Freedom Unit) was not only to provide customer convenience, but significantly to provide useful energy management information. Initial trials have shown an average energy saving of 11% simply through the provision of such data and a little awareness training. As a result of this trial, Northern Ireland Electricity has so far installed 130,000 such meters.

3.3. EdF Customer Field Services (CFS)

CFS currently supports meter operations for over 2 million electricity meters within the London area, and is involved in developing new systems which will enable the ability to support a multi-utility service.

CFS is the largest provider of non half-hourly data retrieval services to residential and small business customers within the London and SWEB areas; accredited to 3.5 million MPANs ("metering points") for non half-hourly data collection. CFS currently dials around 24,000 SME and industrial/commercial meters every night using sophisticated software which retrieves the half-hourly data from the meters, validates the data against strict validation parameters, and then builds the data into files that are transferred to IMServ Europe Ltd.

In its own right ECS operates the unique Respond Bureau providing an impartial service in monitoring energy consumption – particularly useful for organisations wishing to control and reduce energy consumption or monitor energy efficiency measures.

None of the companies involved in the project had prior experience of this precise work as it was believed to be unique in the UK. However, the companies had, between them, all the skills and experience needed to carry out the project. A project team was formed which met monthly throughout the recruitment and installation phases of the project, to address issues and ensure the effective contribution of each participant.

4. Technical Aspects of the Project

4.1. Metering system

At the beginning of the project a number of issues were agreed:

- The meter to be used was a single phase, whole current, NHH meter. This was a constraint imposed by the availability of suitable meters from PRI.
- Pre-payment meters would not be used as the number of SMEs on a pre-payment contract was too small to provide enough sites. This meant that PRI would not be able to use the same meters as they used in Northern Ireland.
- The meter would be installed as a primary meter as fitting it as a secondary meter would cause difficulties in finding additional space in the meter box.
- This implied that the meter would have to be an OFGEM approved certificated meter.
- The customer display would be provided by a keypad with a data link to the primary meter. This ensured that an existing primary meter design could be used and allowed the keypad to be removed at the end of the trial without having to replace the primary meter.
- The keypad would be provided with a GSM modem so that data could be downloaded remotely. The power for the modem was greater than the meter could provide therefore an additional mains transformer power supply was fitted.

- The meter data would be supplied to CFS for entry into the data flow process.
- The normal meter reading schedule would be left in place as a contingency if the remote reading was not successful.
- The customer billing process would be unchanged apart from the additional remote meter read data flow.

Figure 1 below shows the data flow processes for the project. It shows the flow of meter data from the meters to PRI and hence to the Carbon Trust website (via BEAMA), to the PRI website for access by customers, and to CFS for inserting into the data flow stream. It also shows the parallel route for meter read data via the conventional meter reader.

It must be reported that there was a major issue with communication during the last half of 2005. This meant that the GSM modems for a number of sites de-registered from the GSM network and could not re-register without the modem being put through a power cycle. PRI conduced a major exercise of calling the sites to ask them to power cycle the modems. Many carried this out but those that could not, or would not, were visited to carry out the operation. Through these means a complete data set was collected, beginning from January 2006.

Figure 2 shows the arrangement for the meter installation. This arrangement was used for all the sites.

Appendix 9 shows the detailed wiring arrangement for the meter and keypad.

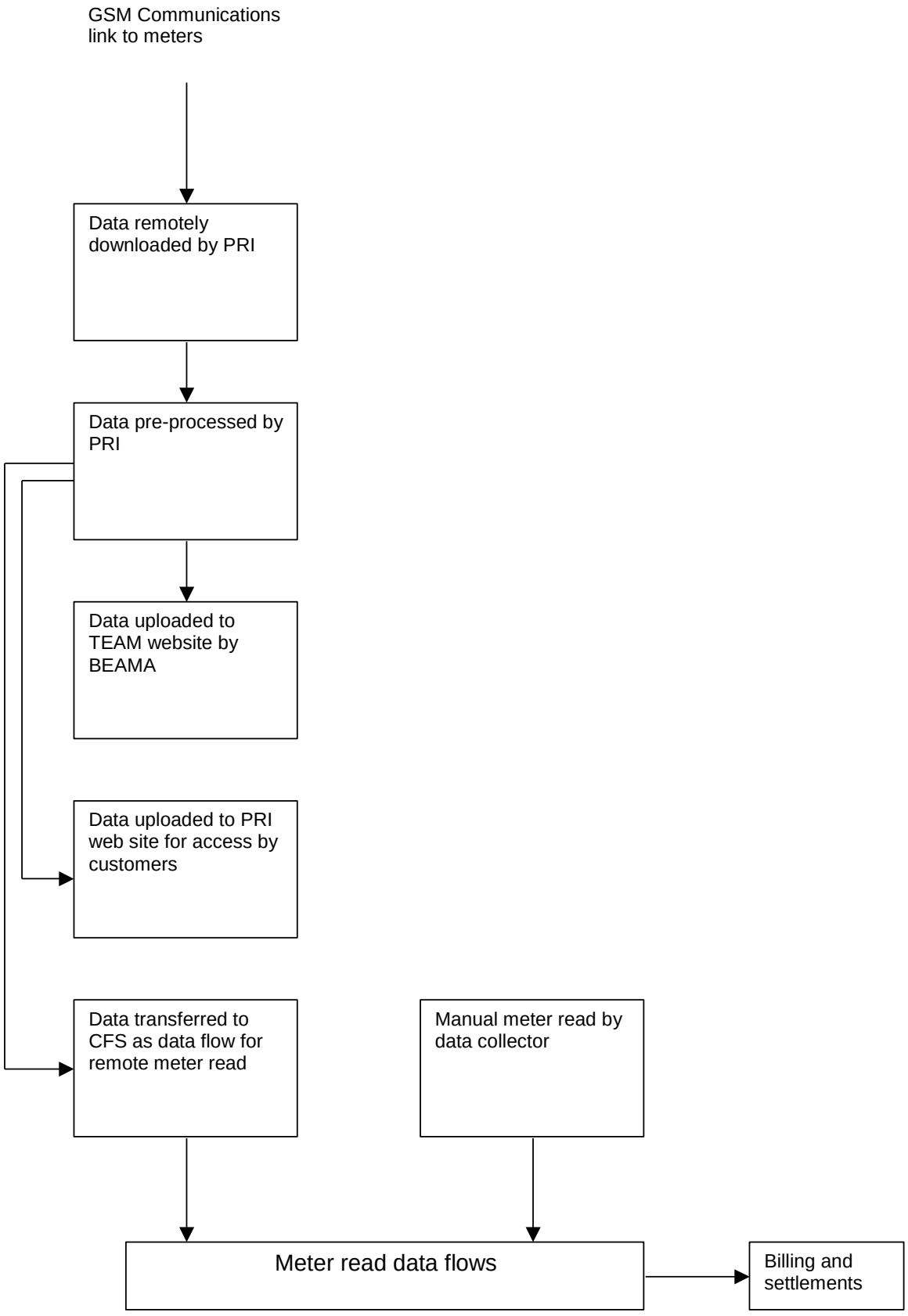

Figure 1 Data Flows

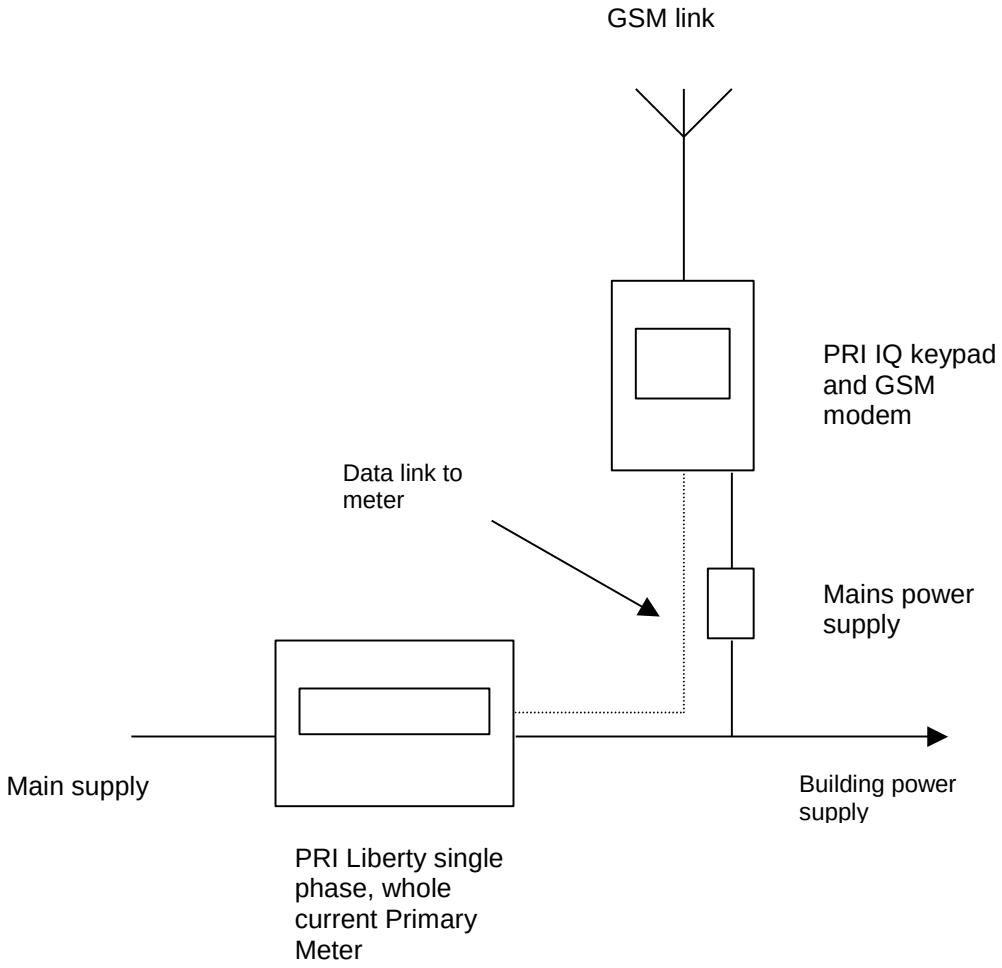

Figure 2 Meter Installation Arrangement

4.2. Meter details

The meters used for the project were designed and manufactured specifically for this trial by PRI. They were based on the meter design used by PRI in Northern Ireland but, as these are pre-payment meters, they could not be used in the project. This introduced an element of design, manufacture and commissioning that had not been anticipated in the project plan and caused a number of delays as the meters were not delivered to CFS until October 2004.

Figure 3 shows a Liberty meter, IQ keypad combination as used in the project. The Liberty meter was a single phase, whole current, NHH meter already approved by OFGEM for use as a primary meter. This avoided the need to have the meter approved and the associated delays this would have caused. All the customer information was provided by the keypad. This was connected by a physical data cable and repeated all meter functions as well as providing additional customer information. A separate GSM aerial was connected to the keypad.

The meters recorded the half hourly electricity consumption for the supply point.

An A5 booklet was provided to all customers when the meter was installed and this is shown in Appendix 8. Great care was taken to make this booklet accessible and understandable for the site staff.

The keypad provided the following information on the display:

1. Total unit register kWh (sum of all time of use registers)
2. Current load and hourly cost (kW and £)
3. Today's consumption and cost (kWh and £)
4. Previous day - consumption and cost (kWh and £)
5. This week - consumption and cost (kWh and £)
6. Previous week - consumption and cost (kWh and £)
7. Rate registers and prices (kWh and pence/unit)
8. Daily standing charge (pence)
9. Time
10. Date
11. Voltage
12. Current
13. Power factor
14. Frequency of supply

Accessing this data required the customer to follow a button press sequence that was explained in the A5 booklet.

4.3. Web site data provision

In addition to the on-site data display, some customers were given access to a website that displayed the meter data in various profile formats. Pictures of these screens are shown in Appendix 11. All data downloaded each night was uploaded to the website the next day. The website provided graphical profiles of:

- Daily ½ hour profile for chosen day
- Weekly ½ hour profile for chosen week

Although the website was advertised for all the sites that were given access to it, it does not appear that many sites made use of it. This would support the conclusion that sites in this sector will not go out of their way to access the data, but require it delivered directly to them.

4.4. Profile data provision

In January and April all sites were provided with a paper print-out of sample profiles from their meter. These were produced by BEAMA using data provided by PRI. The sheets contained seven daily half hour profiles plus an eighth profile showing the average profile for all working days. A sample sheet of profiles is shown in Appendix 13. The profiles were scaled with the kWh/half hour value on the y-axis but no label was added as it was felt that the unit would confuse more than it informed.

The weeks chosen for the sheets were selected on the basis of avoiding holiday periods and to provide the most recent data currently held by BEAMA, so that customers would be able to recall the circumstances surrounding them.

4.5. Installation process

The installation process was carried out by CFS using their normal meter operations staff. PRI provided training for the installation, and a sample installation was set up in their laboratory.

The installation process began once sites had been initially recruited into the trial. A visit was carried out to assess the practicality of the site for the trial. Appendix 6 shows a site assessment report sheet supplied to the engineers for these visits. The key issues for the assessments turned out to be:

- Was the site single phase?
- Could the keypad be placed in a convenient location without requiring extensive wiring (more than a few metres and not passing through walls and barriers)?
- Was there an adequate GSM signal?

The most common causes for sites to be rejected were the discovery that they were 3 phase sites rather than single phase, and the distance between the meter and any suitable location for the keypad.

As the meter was smaller than an equivalent electromechanical meter and it was being swapped with the existing meter, availability of space did not prove to be an issue.

Assuming that the site was suitable, it was registered in the trial and CFS then arranged a separate appointment to install the meter. As this required the power to be turned off, many sites requested an out of hours appointment. This limited the rate at which CFS could carry out the installations as well as adding to their costs. The need to turn off power caused issues with a number of businesses who would not allow the power to be turned off and also limited the work that could be done in the run up to Christmas 2004.

The installation itself was relatively straightforward – the previous meter was removed and the new Liberty meter fitted. The mains connection for the power transformer was fitted and the power turned back on. The keypad was then fitted and connected to the Liberty meter. Once power was supplied to the keypad it was checked to see if it was communicating with the Liberty meter. and the GSM modem was called with a mobile phone to check signal strength. This completed the installation and, after explaining the operation of the meter to the customer and handing over the A5 instruction booklet, the engineer left. PRI were then informed that the meter had been installed at the site and they carried out a test call to the site. Having established communications, PRI downloaded the customer's tariff and standing charge data on to the site so that it accurately reflected their electricity costs. On some sites this was not done as PRI did not have the necessary information and this later caused problems at a number of sites. These sites interrogated the meter and found that the financial information did not match their calculations and/or expectations.

There were some slight issues found around the installation, mostly related to making up the data cable between the keypad and meter (these had to be custom made on site to fit) but these were soon resolved.

5. The Sites

5.1. Site recruitment

London Energy marketing department undertook to recruit the customers for the trial. The following decisions were made before this process began:

- Either tariff or contract customers would be recruited, although only contract customers were included in the mail shot.
- The customers should have a single-phase supply and an annual consumption greater than 15000kWh so that they would possibly have worthwhile savings to make.
- Customers would be recruited by means of a mail shot. There was a possibility of simply supplying the meters to customers as their meters were replaced as part of the meter replacement programme. This would have made recruitment easier but was considered to raise too many issues around interaction with existing processes and also, there was no guarantee that the customers would be willing to engage in interviews and such.
- If possible, sites would be selected to provide a good coverage of different customer type.
- Sites would be recruited in the London area to minimise the time CFS engineers would need to travel to sites.
- Sites that were part of multiple chains were excluded as they might already be receiving advice on energy savings.
- Customers were to be in credit.
- No inducement would be offered to the customers other than free provision of the meter. The customer agreement letter sent to the trialees by EdF Energy is shown in Appendix 7.

Having made these decisions, London Energy queried its customer database and produced a list of 10,000 site addresses for contract customers. A letter was produced

and sent out to these customers in July 2004 (shown in Appendix 4). The response proved better than usual for similar exercises (2.7% response rate) and EdF Energy received 272 responses, having to put a further 30 replies on hold. It had been expected that follow up calls would be needed to get enough possible sites but this did not prove necessary, as all these sites contacted EdF Energy as a result of receiving the letter.

These sites were contacted and interviewed by EdF Energy call centre staff using the script shown in Appendix 5. Once they had been assessed the addresses were passed to CFS for site assessment. Starting this phase was delayed as it was wished to have a close link between the assessment and meter installation and the meter delivery had been delayed. Initially, the success rate for assessments was positive with an acceptance rate of 35%. However, this dropped as the assessments continued. Eventually a total of 76 sites were accepted after being assessed. It was also discovered that a number of the sites recruited had changed their mind when the CFS engineers went to fit the meters. The reported reasons for these were:

- They had changed their mind since the assessment visit; a problem exacerbated by the length of time between the assessment and installation visits.
- They were unwilling to allow the power to be turned off during installation. This had been explained to them previously but perhaps proved unacceptable when faced with the need to agree an appointment.
- The person who had agreed to join the trial had left or could not be contacted and the staff present would not allow the installation.

As the total had fallen below the target of 100 a number of exercises were undertaken to bring the total up the 100:

- Re-contact the 30 customers who had been turned down after the first call had been closed. This produced 3 new sites after assessment.
- EdF Energy used some contractors to cold call their customer database. The key problems with this exercise were overcoming the misapprehension that this was a sales call and in contacting the decision maker in the organization. An analysis of the responses is shown below from 571 calls. The net result of this exercise was to take the total of sites to 63.

Yes	39
No	195
Too busy to speak	131
No contact with customer	70
No benefit expected	57
Temporary/moved/gone out of business	24
Landlord supply – no benefit	19
No authority	12
Wrong supplier	7
Thought they were being sold to	5
Miscellaneous	5
Too much disruption	4
Already has HH metering	3

Energy consultant	1
Total	571

- A number of EdF Energy multiple site customers were contacted and a number expressed an interest. This identified North Somerset Council whose Energy Manager was keen to take part and volunteered a number of sites; mostly libraries and primary schools. After assessment, this produced a total of 15 sites; the requirement for single phase sites being the main constraint on recruiting sites.

  This left the final recruitment total at 81 sites and these are categorised below:

Classification	**Sites**
Wholesale and retail buildings	23
Recreational and cultural buildings	10
Hospitality buildings	18
Office buildings	17
Education buildings	6
Healthcare buildings	6
Industrial buildings	1
Total	81

Classification	**Sites**
Services - Retail Premises (non food)	25
Leisure - Arts / Museum	5
Services - Pubs / Clubs	6
Services - Restaurant / Fast Food	9
Services - Commercial / Offices	16
Education - Primary School	6
Healthcare - Primary Care Trusts	5
Industry - Textiles / Laundries	1
Services - Religion / Community Centres	3
Services - Hotels / Hostels	3
Industry - Wholesale / Distribution	1
Leisure - Heritage / Parks	1
Total	81

For all of these sites the meter was installed as the primary, fiscal meter.

5.2. Implications of the recruitment process

There are a number of points that must be understood when reviewing the results from these sites:

- The nature of the recruitment process means that there was an element of self-selection amongst the sites. This had a number of consequences:

  - The sites are probably more enthusiastic about saving energy than the average.
  - Some of these sites had probably already taken many measures to minimise their consumption, limiting the potential for the smart meters to identify significant savings.
- Not all sites properly understood the proposition that they were being offered; one site reported that they thought that the meter would deliver 10% savings without their taking any actions whilst another thought that they were being offered 10% off their bills.
- Many sites reported that they were more attracted by the remote meter reading and an end to estimated bills than by the potential for energy savings.
- The decision not to offer any incentives to the trial participants meant that they had minimal cause to be helpful. Given this, and the nature of many of these businesses, it was not easy to engage them in lengthy discussions about the project so the phone calls had to be very concise.

6. Approach to Savings

6.1. Trial design

The trial proposed by BEAMA only undertook to monitor electricity usage. This was a result of working in the small SME sector, where communications to gas and electricity meters is more problematic and not likely to be undertaken in the initial provision of smart metering to this sector. The meters were equipped with local displays and remote, GSM, communications.

BEAMA's original tender for this trial proposed a total of 400 sites, to be divided in three groups. These were:

- Minimum intervention; this would involve fitting the smart meter with keypad and providing on site training to explain the use of the meter and how to interpret the data.
- Medium intervention; this involved all the steps above plus provision of access to the data on a web site.
- Maximum intervention; this involved both of the above plus diagnostic phone calls to the sites to discuss the data and try to identify savings measures with the local staff.

It was deliberately planned that there would be no site visits as these would be unrealistic in terms of a major implementation of smart metering. Also data was to be collected for a minimum of 1 year to allow reliable before and after analysis of site consumption.

This total population and split would have given 133 sites in each group, which was believed to be a statistically significant sample.

The contract was offered to BEAMA by the Carbon Trust on the basis of a maximum 100 sites. This was accepted but it meant that the number of sites in each group was reduced to 33, too small to be statistically significant, especially if sectorial analysis was to be attempted.

For various reasons, that are explained below, the trial design was modified during the course of the project, although its basic intent was honoured.

To understand these issues a project chronology has been written and is shown in Appendix 16. From this it is clear that the project did not follow its original plan. Specifically:

- The delays in recruiting sites, delivering the meters and communications fault meant that the sites were not monitored continuously for the intended period of one year. Continuous data has only been available for all of the sites since the start of 2006.
- Many sites had their meters installed well before the trial was ready to launch and they were left for many months with no contact regarding the trial. This was deliberate as the hope was that they would not do anything whilst the data was not available to track their energy savings measures.
- The late introduction of the North Somerset sites meant that there was no opportunity to introduce them into the trial in the same was as the other sites. This meant that these sites did not begin to use the meters until they were called following the sending out of the profiles.

Owing to the delays in recruiting sites and installing the meters, there was a significant delay for many of the sites between having the meter installed and their first contact. Despite not being contacted, the sites did have a meter installed and had received instruction in using it. This meant that these sites could be queried to see if made use of the meter; effectively providing the minimum level of intervention to these sites.

During this period, although there were a series of disruptions to communications, a number of sites were enabled with website data. This allowed the effect of the medium intervention to be assessed.

Subsequently, at the request of the Carbon Trust, all sites were contacted and provided with profiles and remote diagnosis, rather than the intended third of sites. This meant that all the sites were offered the maximum intervention.

Thus, it was possible to assess the three levels of intervention as originally intended.

The revised trial design is summarised below:

- Meters installed, instruction given and instruction booklet handed over.
- Sites called after several months to get basic site information and check what they had done with the meters and knew how to use them (Script shown in Appendix 10).
- Profiles (accompanied by a letter and guidance shown in Appendix 12) were sent out to all the sites followed by a phone call to discuss the data and discuss with the site if they suggested any savings that could be made. These calls (script shown in Appendix 14) were carried out by BEAMA and they used the remote profile data to identify any areas that might need attention.
- Profiles were prepared for all the sites using data collected after the phone conversation. This was checked to look for evidence of any savings that had been made. These were sent to customers accompanied by a letter (Appendix 15)
- Sites that had agreed to make changes were called to get feedback on what they had done. This included all of the sites that did show savings and some of the sites that did not show evidence of savings.

It was not the intention of this trial to get involved in implementing the savings. This was viewed as unrealistic in terms of a real implementation of smart metering programme for this market sector. Suggestions were made but it was left to the site to implement them. It is fair to report, though, that it did seem that simply being contacted spurred many sites to look at their consumption; although this did not always translate into positive action.

7. Results

This trial was intended to assess the reaction of small SME sites to the provision of extra information about their electricity consumption from a smart meter. Efforts were made to ensure that the sites recruited were representative of this sector and they were not selected because of any expectation that they had large savings to be made. Indeed, as discussed in Section 5.2, it is probable that many of the sites were already interested in energy savings and had probably taken most measures that they could. Further, the scope of the trial limited savings suggestions largely to simple, no cost measures. Finally, it is believed that the only reliable way to prove savings for a sample such as this, with minimal involvement with the site, is to compare the overall change in consumption for the whole population compared to a control sample. The period that data has been collected for does not permit such an analysis.

The project has, however, resulted in a number of substantial savings implemented at some sites and has provided much useful information on the attitudes and requirements of this market sector.

7.1. Analysis of site responses

Appendix 1 contains a table showing the feedback from the sites. This is analysed below:

Measure	
Use of meter and profiles	
Made some use of meter when first installed	20
Looked at the profiles when provided	69
Not interested in profiles	14
Savings potential	
Believed they could make savings	32
Could not see scope for savings	44
Of which, believed they already followed good practice	18
Of which, profiles suggested possible savings	18
Response to trial	
Reported taking some measure	17
Savings demonstrated	10
Attitude to meter	
Positive attitude to smart meter and profiles	28
Neutral to smart meter and profiles	11
Not interested in smart meter and profiles	11
Unhappy with meter	4

It can be seen from the data above that the reaction to the meter was generally positive. The following messages were picked up from the sites:

- Only 20 of the sites looked at the meter when first installed. This over reports because most interest was short lived and only a few sites made active use of the meter with no outside prompting. The most frequent reasons for not using the keypad were being too busy and inconvenient location.

- 69 of sites looked at the profiles. Only one site reported not understanding the profiles although there was little understanding of the scale (kWh/half hour) or what kW's of consumption represented. Most sites could, however, recognize the pattern of the profiles and relate it to their operations. Three sites reported not believing the profiles, as the data did not match their expectations.
- Only 14 of the sites showed no interest in the profiles and would not discuss them.
- When presented with profiles, 32 of the sites thought that they could make some saving, or the data indicated patterns that needed to be investigated. 17 of the sites believed that they were already taking all the measures that they could. Of the sites that did not believe that they could make savings, 18 of them had profiles that suggested there might be some scope for savings, their explanation of their loads failing to explain the profile. This comment is subject to the limitations of remote monitoring, there being no way to confirm this directly.
- 11 of the 17 sites that claimed that they were already following best practice were supported by their profile data. These showed virtually no night load and well defined daytime profiles, closely matched to their operating hours. It has been commented earlier that those volunteering to join this trial were likely to have above average interest in energy savings. Thus, they might be expected to have already taken any actions they could to reduce their loads. Indeed, one site was found to have been reading his previous meter on a weekly basis and there was little additional information that the new meter could provide.
- Where the data was most useful in stimulating action was where it confounded the expectations of the site staff. Specifically, seeing the extent of their night loads on the profiles did provoke a number of sites to take action.
- In the interviews 17 of sites agreed to take some action or already had done so. Evidence in the profiles of savings directly related to the claimed action could only be found for 10 of the sites. The reasons for the failure to find evidence where:
  - The action was taken over a period when no meter data was held.
  - The savings were overtaken by otherwise increasing loads.
  - There had been insufficient time for the savings to show up.
- Attitudes to the smart meter were very good. 28 of the sites expressed a positive attitude to the meter and profiles. It should be noted that this was more noticeable for the profiles rather than the meter itself. Indeed a small number of sites that had shown little interest in the meter or energy savings prior to receiving the profiles expressed a strong appreciation of the profiles and were provoked by them to look at possible savings.
- 11 of the sites seemed to be neutral to the meter, not expressing any special interest in it or the profiles, whilst 11 were totally disinterested, stating that they were too busy to get involved or did not believe that the savings were sufficient to justify spending their time on savings.
- 4 of the sites were positively unhappy with the meter. These were sites that had had issues over reading of the meter. Owing to the failure to communicate with the meters through the trial, remote meter reads could not be provided. This meant that the meter reading had to fall back onto the normal manual read. There were a number of sites where the meter reader did not know how to access the Economy 7 register and so reported a 'failed to read' for the site and an estimated bill was sent

out. Where the estimate was out of line with the expectations of the site this resulted in a dispute. As an element of this was a suspicion (unfounded) that the meter was 'wrong', it was not possible to engage these customers in any discussion about the data from the meter. The increase in electricity prices early in 2004 also coincided with the fitting of many of the meters and some sites felt that the meters were responsible for their higher bills.

To summarise, there was a good interest in the meters and the profiles. The sites found the profiles more helpful and this proved a better way to engage their interest. This is related to the time pressure on these businesses, they respond best when the information is presented to them in a convenient form. There was a clear potential to make savings but the sites did not always find it easy to take action, because of the difficulty of the necessary action, low financial reward or time pressure.

7.2. Energy savings recommendations

This project focused on relatively simple energy savings measures. This was a result of the nature of the remote diagnostics but also reflected the nature of many of these businesses. Their energy use was relatively simple, largely made up of computers and office equipment, lighting, heating, appliances and cooling equipment.

The majority of recommendations that could be made based on the remote diagnosis related to out of hours loads. These are discussed in detail below:

- Lighting

  Many of the shops left their lights on after hours for display purposes and attracting passing trade out of hours was highly valued. However, there was little need for the lights to be left on after 11pm. Some sites had already put their lights on timers to achieve this but others reported that it was difficult to control their lights like this as this would require a controller to be fitted to the lighting circuit.

  Two sites reported taking action to improve the turning off of lights during the day, recording savings of 18.3% and 20.0%. These sites may have been unusually profligate with their lighting before they took these measures but even so, they illustrate the savings that can be made in this area. It is not possible to make any comment on whether there is excess daytime lighting load from the remote profiles, making it difficult to suggest this as a savings measure remotely.

  One site showed a saving of 54% as a result of fitting security shutters to the shop window and allowing them to turn off the interior lighting, which previously they had left on for security. This site did not replace the shutters to save energy but, in fact, the cost saving alone gave them a payback of 4.1 years.

- Heating

  It was found that there was a large savings potential related to electric heating. Many of the sites with electric heating were leaving the heating on all week even though the property was only occupied for part of the week. Saving energy through this means, however, was not straightforward, as the heaters they had only had a daily timer. Thus they would have had to reset the time every Friday and Monday, and even then they would have had a cold building on the Monday morning. 7-day timers on the heaters would have been required to easily enable this degree of control.

  Another heating issue was related to sites that were leaving their heaters on permanently to prevent freezing. It would have required a frost stat on the heater to

allow this load to be reduced. Electric heaters with frost stats are readily available but it was not possible to pursue this measure within the timescales of the trial.

- Computers

  Many of the offices demonstrated substantial night-time loads. Office staff were generally aware that they should be turning off desktop computers overnight and not leave them on standby. Not all did this, though, mostly owing to lack of motivation although some reported that they had been advised not to turn them off as this used more energy. This could be addressed by a campaign.

  Another source of night load was computer servers, which could not be turned off. Servers consume as much as 500W and it will require technical improvements by the manufacturers to address this.

- Chilling

  Many of the convenience stores and snack bars reported that they left their bottle chillers on 24 hour a day. One of the sites did report that they had put their chiller on a timer, turning off between 7pm and 4 am. It is suspected that this is not a simple measure as, presumably, the precise period when the chiller can be turned off will be specific to the chiller, its location, ambient temperature and the contents. However, some guidance on control of these chillers would be welcome to the shop owners and could provide worthwhile savings.

- Multiple Occupancy

  A characteristic of most of these small SME sites was that they were under the direct control of a single manager or owner, who had a good grasp of what was going on in the business. However, a number of sites reported that the manager did not have such control. This was due to a number of reasons:

  - Out of hours use, such as in school and community halls, when the manager had left the building.
  - Inaccessible areas, such as hotel rooms.
  - Remote areas, such as out building and annexes.

  These sites generally appreciated the ability to examine the profiles to see what was going on in their absence, such as seeing evidence of lights left on. Two of the sites were considering using the data to allocate charges to users.

7.3. Demonstrated savings

The details of the sites that made demonstrable savings are given below. It should be noted that these savings are based on monitoring before and after the savings were implemented at the site and assume that the initial saving is maintained through the year or heating season, as appropriate.

Site Number	Name	Annual Savings kWh	Percentage of Annual Consumption	Annual Carbon Saving T/year	Comments
BEA010	Wireworks	900	10%	0.4	Turning off lights and

					equipment at night
BEA023	Hamilton Leigh Estates	7440	54%	3.2	Installed security shutters and turned lights off at night
BEA037	The Knowledge College	585	11.3%	0.3	Reduced electric heating at weekends
BEA045	The Berridge Road Tenants Association	533	4%	0.3	Turning off lights at night
BEA049	CW Dixey (Blackheath) Ltd	2560	16%	1.1	Turning off lights at night
BEA068	Milton Infant School	2880	54%	1.2	Investigated night loads – did not find cause of load but found it reduced anyway
BEA077	Real Time Information	2000	18%	0.9	Turning off computers at night
BEA097	Burrington Primary School	3000	18.3%	1.3	Turning off lights during the day
BEA103	Weston-Super-Mare Tourist Office	4500	20%	1.9	Turning off lights during the day
Totals		24398		10.6	

Full details of these sites and their savings measures can be found in Appendix 2.

It is difficult to draw general conclusions from these sites to account for why they made savings. The motivation behind the savings varied between a 'save every penny' mentality through to a simple sense of responsibility for energy savings. The savings came from reduced lighting, heating and computer loads, during the day and after hours. One general observation is that at all of these sites there was at least one individual who took a personal interest. It is also worth observing that the profiles often seemed to stimulate an interest, more so than the meter alone, and the local staff felt impelled to see what was causing the unexpected features of the profile and what could be done to reduce them. Appendix 3 shows a number of Lessons Learn Case Studies, highlighting some of issues dealt with in this study.

8. Lessons Learnt

The trial has met most of the objectives that it set out to achieve. The size of the trial means that statistically valid conclusions cannot be drawn from the data. However, the engagement with the sites has given a very good flavour of the attitudes of this market sector and a large number of lessons have been learnt. These are set out below.

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8.1. Lesson learnt from the operation of this trial

- The requirement to find single phase sites with a suitable location for the keypad close to the meter seriously restricted the availability of sites for the project.
- The failure to maintain communications with all of the meters throughout the trial meant that remote meter reading could not be carried out. This resulted in some of the sites becoming dissatisfied and not engaging fully in the trial.
- The lack of meter data limited the period over which savings could be monitored. This meant that annual savings estimates had to be extrapolated. It also meant that longer term energy savings measures could not be evaluated at all sites.
- The coincidence between the installation of the meters and the rise in energy prices at the beginning of 2004 meant that some sites were suspicious that the cause of their price rise was the meter itself.
- The nature of the recruitment process meant that the sites were, to a degree, self selecting and probably not a truly representative sample for this sector. It can be expected that sites were attracted who had a greater degree of interest in energy saving. This means that the results probably overemphasise the enthusiasm of the sites for the meters. On the other hand it also means that the sites had probably already taken many measures to save energy, as supported by the feedback and limiting the potential for energy savings. However, the North Somerset sites were effectively a random sample as they were volunteered into the trial and even these sites showed a generally positive attitude.
- There was a concern during the interviews with sites that some were trying to please, provoked by a guilty conscience regarding their energy use. This may explain the relatively large number of sites that suggested possible savings but then failed to take any action.
- The ability to make energy savings suggestions based on the remote profile data was limited. It was possible to look at out of hours loads and make reasonable interpretations of what was going on. However, day time loads were too complex to analyse from a single meter point for many sites. It was also not possible to say from the remote data if the usage was necessary. This could be addressed, to some extent, by developing benchmark profiles for similar sites and comparing usage to these. This trial, however, did not have enough site data to make this a practical proposition.
- The decision not to offer any payment to sites for participation in the trial meant that they had minimal incentive to assist and make time available to discuss the trial. This made getting site data difficult and phone calls were generally short. It also meant, however, that their motivation could not be attributed to the inducements they were receiving.

8.2. Lessons learnt from the contact with the sites

- The initial response to the EdF Energy mail shot was above average and indicated a good interest in the smart metering proposition.
- Many of the sites were as interested in the provision of accurate bills as in the potential for energy saving.
- A number of sites that were interviewed during the cold calling exercise explained that their supply was via a shared supply meter, such as in a shared office block. They could not see any way to benefit from having a smart meter and a requirement to fit

individual meters, even if they are secondary meters, would be needed to bring such sites within the scope of smart metering/

- SME sites are very busy with a strong focus on their customers and the immediate needs of the businesses. They are reluctant to be distracted by secondary issues.
- Small SME's were found to be relatively simple operations so that, locally, they could detect the effect of their various loads from the profiles. There was no overlay of complex processes such as might be found in large commercial or industrial sites. Also the management of the sites was very lean with, usually, a single person in direct charge of the business and a good understanding of its operation. This meant that savings were relatively easy to identify and implement, having got the commitment of that person.
- The customers made limited use of the meter itself. Around half looked at the display when it was first installed but only a few consistently used it. The feedback was that they were too busy to look at it or it was inconveniently located. This does not mean that such displays would not be used more if it had been possible to locate them within the working area of the site.
- Few of the customers made use of the web site data that was provided for them. Because the data flow to the web site was intermittent initially, there was no effort made to promote the web site other than advising sites by email that it was available and providing them with passwords. This result, though, is again consistent with them being reluctant to take time out of their normal business to gather the meter data.
- The profiles were well received by customers who generally found them useful. This was because the information was delivered directly to them and was in a reasonably easily understood format. Only one site reported that it couldn't understand the profiles. Indeed, the profiles provoked the interest in energy savings of a number of sites that had initially expressed a limited interest.
- Many of the sites had the view that there was little that they could do to control their load; 'I only use what I need'. This attitude will have to be challenged by targeted advice and case studies of successful savings.
- The demand patterns of the sites were generally repeatable so that profile data delivered to them did not have to be current to be useful.
- Sites often asked for clear instructions on how to make savings, lacking local expertise to support them.
- The low level of financial rewards for saving energy was expressed as a deterrent to a few sites getting involved and limited the enthusiasm of many of the others. The profiles did not show financial figures for this reason. A few sites were motivated by achieving savings of any size, but this was rare.
- A number of sites reported taking energy savings measures but despite this their total load was going up. It is assumed that these sites were simultaneously taking other measures that were increasing their demand, outweighing the reductions.
- The meters were especially popular on sites where the manager was not fully in direct control of the site, either because they could not access all parts of the building or because the load occurred when they were off site. The ability to the see the time history of the load was very much appreciated.
- It was found that the enthusiasm and understanding of what the meter could do and how the data could be used grew through the series of conversations conduced with them. It can be inferred that sites will need repeated messages about the meters

before they fully engage with them and that repeating the message will improve the results from smart meters.

8.3. Lessons regarding energy savings

- The majority of energy savings identified fell into a few categories.
  - Lighting, primarily putting display lighting off at night. It was not easy for many of the sites to control this as the switches did not have timers. Two sites made significant savings (20%) by focusing on turning lights off during the day, indicating the potential for savings in this area.
  - Electric heating was found to be poorly controlled in many sites. There was a need for 7 day programmers and frost stats so that the heating could be turned down or off when the site was unattended. There was also a poor understanding of the potential for turning the heating down when unattended without the site being cold for ever.
  - Computers and servers represent a significant load out of hours. This was most noticeable in offices and represents a good opportunity for savings. Unfortunately, offices were often the most profitable businesses interviewed with the least incentive to save money. Servers were a significant issue because they could not be turned off. One site had a continuous night load of over a kilowatt and claimed that they turned everything off except their servers. Manufacturers should be encouraged to develop servers that reduce their load when they are idle.
  - Chilling loads were a major part of the load in convenience stores, restaurants and pubs. Where these held perishable goods there was no opportunity to cut down on energy usage short of buying more efficient units. However, many sites had chillers for bottles and cans of drink. One site had put his chillers on a timer, turning it off from 7pm until 4am. There would be large savings to be made if guidance could be provided on how to implement this saving at other sites.

8.4. Recommendations for future trials and major implementations

- In future trials it is recommended that sites are selected through the normal meter replacement programme. This will ensure a random selection of sites and prevent reluctance to have a meter change from excluding sites. The trial will have to be significantly larger than this trial because it can be expected that a significant number of sites will refuse to cooperate in any surveys. Using this route will also bring the meters within the ‘normal’ operating regime of the meter operators, avoiding many of the pitfalls experienced in this trial.
- Future trials should be run for at least one year to allow a proper long term assessment of changes in energy consumption compared to a control population.
- Data should be made easily available to sites such that they do not have to go out of their way to access it. This should take, for example, the form of letters, keypads sited within the working areas of their premises or streamed directly onto their computer systems.
- Sites should be provided with extensive and repeated support after the meters are installed. This should be directed through the media or by direct mailing.
- Sites should be targeted with specific and clear instructions on how to make energy savings appropriate to their activity. Suppliers hold data on their customers that

should allow them to target the sites accurately. They should also be given simple instructions on how to use the profiles to identify likely savings opportunities and how to identify the results when they have taken them.

- Smart metering should be linked to remote meter reading as this is generally seen as a benefit and leads customers into discovering the additional energy savings opportunity that the meters afford.

9. Conclusions

The trial, although having to cope with a number of problems, has successfully investigated the attitudes of small SME enterprises towards the practical application of smart metering. These sites are not easy to engage, as they are very busy and there are no ‘spare’ people. They have responded well to the consumption data and it has been demonstrated that substantial savings can be produced. To achieve this thought, the sites need the data to be made easily accessible and accompanied by targeted advice.

Appendix 1 : Site Summary

Site Code	Name and Address	Site used meter when fitted	Site used profiles	Felt they could make saving	Don't care	Took action	Profile evidence for possible savings	Evidence	Source of load	Site issues	Details	Attitude to Smart Meter	Type of business
BEA001	T J R Bathrooms	n	y	y	na	y	y	2kW night load	display lighting	n	no	positive	Services - Retail Premises (non food)
BEA002	NSC Site 002	n	y	n	na	na	n	na	na	n	no	neutral	Leisure - Arts / Museum
BEA004	Mr D Wale Mountwood Leisure	y	y	na	na	na	y	night load	cooling	y	meter dispute	unhappy	Services - Pubs / Clubs
BEA005	NSC Site 005	no	yes	no	na	na	y	electric heating control	space heating	n	no	neutral	Leisure - Arts / Museum
BEA006	Rumpack Ltd	no	no	no	no	no	yes	night load	heating	yes	couldn't contact	too busy	Services - Restaurant / Fast Food
BEA007	Limehouse Newsagents	no	no	no	y	no	yes	night load	cooling	yes	meter problem	not interested	Services - Retail Premises (non food)

Site Code	Name and Address	Site used meter when fitted	Site used profiles	Felt they could make saving	Don't care	Took action	Profile evidence for possible savings	Evidence	Source of load	Site issues	Details	Attitude to Smart Meter	Type of business
BEA008	Mr Mustafa	y	y	no	no	no	y	night load	1kW - cooling, lighting?	no	no	positive	Services - Restaurant / Fast Food
BEA009	Mr R Nicholls	y	y	y	no	y	y	night load	2kW load - cooling, lighting? Shared meter	no	na	positive	Services - Pubs / Clubs
BEA010	Wireworks	no	y	y	no	y	na	na	na	no	na	positive	Services - Commercial / Offices
BEA012	Mr C A Patel	y	y	no	no	no	no	na	na	no	na	neutral	Services - Retail Premises (non food)
BEA013	The Black Horse	no	y	y	na	no	y	night load	cooling, lighting?	y	meter dispute	unhappy	Services - Pubs / Clubs
BEA014	Luigi Coffee Shop	no	y	no	na	no	no	na	na	no	na	already saving energy	Services - Restaurant / Fast Food
BEA016	Stylist on the Sheen		y	y	no	na	no	na	na	no	na	already saving energy	Services - Retail Premises (non food)

Site Code	Name and Address	Site used meter when fitted	Site used profiles	Felt they could make saving	Don't care	Took action	Profile evidence for possible savings	Evidence	Source of load	Site issues	Details	Attitude to Smart Meter	Type of business
BEA017	NSC Site 017	na	na	na	na	na	y	night load	1kW base load	y	school closing	na	Education - Primary School
BEA018	NSC Site 018	no	y	no	no	no	y	night load	800W base load, electric heating - no controls for frost stat	no	na	already saving energy	Leisure - Arts / Museum
BEA019	Universar Management Services	no	no didn't understand	no	y	no	y	night load	2kW - computers	no	na	not interested	Services - Commercial / Offices
BEA020	BNP Paribas	no	y	y	no	y	y	check lights off - turn water heater off at weekend	lights, water heating	no	na	positive	Healthcare - Primary Care Trusts
BEA022	Ski Line	no	y	no	na	no	no	na	na	y	shared meter ownership changed during trial	neutral	Services - Commercial / Offices
BEA023	Hamilton Leigh	no	y	y	na	y	na	na	na	no	na	neutral	Services - Commercial / Offices

Site Code	Name and Address	Site used meter when fitted	Site used profiles	Felt they could make saving	Don't care	Took action	Profile evidence for possible savings	Evidence	Source of load	Site issues	Details	Attitude to Smart Meter	Type of business
BEA024	Mr M Patel Saraswati News	no	no	na	na	na	y	cooling	chillers	y	meter dispute	unhappy	Services - Retail Premises (non food)
BEA025	Russel and Hodge	y	y	no	na	no	y	things left on overnight	lighting?	no	na	positive	Industry - Textiles / Laundries
BEA026	The Churchwardens	na	y	no	na	no	no	na	na	y	multiple occupation	positive - wanting to use meter to assign charges -	Services - Religion / Community Centres
BEA027	Pyramis Ltd	no	y	y	y	no	y	400W night load	computers	no	na	value of savings did not motivate	Services - Commercial / Offices
BEA028		no	no	no	na	na	no	na	na	no	na	not interested	Services - Restaurant / Fast Food
BEA029	Mr Vasou	no	y	no	na	na	no	na	na	no	na	positive	Services - Retail Premises (non food)
BEA030	Mr Fosh	y	y	y	na	y	y	night load	electric heating in hotel rooms	y	multiple occupation	positive	Services - Hotels / Hostels

Site Code	Name and Address	Site used meter when fitted	Site used profiles	Felt they could make saving	Don't care	Took action	Profile evidence for possible savings	Evidence	Source of load	Site issues	Details	Attitude to Smart Meter	Type of business
BEA032	Tolly and Partners	no	y	y	no	na	y	low energy bulbs	lighting	no	na	positive - unaware of cost of lighting	Services - Retail Premises (non food)
BEA036	Mr Aligul Karagoz	y	no	no	na	no	no	na	na	y	meter dispute	unhappy	Services - Restaurant / Fast Food
BEA037	Knowledge College	y	y	y	na	y	y	reduce weekend heating	electric heating	no	na	positive	Services - Commercial / Offices
BEA041	Mr I G Moore	no	y	y	na	no	y	night load	lighting, cooling	y	meter dispute	positive	Services - Pubs / Clubs
BEA042	Emmanuel Youth Club	no	y	y	na	no	y	night load	lighting	no	na	positive	Services - Religion / Community Centres
BEA045	Berridge Road Tenants	y	y	y	na	y	y	night load	lighting	no	na	positive	Services - Religion / Community Centres
BEA046	Tannachem Ltd	no	y	y	na	no	no	na	na	no	na	not interested	Services - Retail Premises (non food)
BEA047	Mr M Patel	no	y	y	na	y	y	night load	cooling	no	na	positive	Services - Retail Premises (non

Site Code	Name and Address	Site used meter when fitted	Site used profiles	Felt they could make saving	Don't care	Took action	Profile evidence for possible savings	Evidence	Source of load	Site issues	Details	Attitude to Smart Meter	Type of business
													food)
BEA048	Ms Helen Lampkin	no	y	no	na	no	no	na	na	no	na	positive	Services - Restaurant / Fast Food
BEA049	CW Dixey	no	y	y	na	y	y	night load	lighting	no	na	positive	Services - Retail Premises (non food)
BEA050	The Hambledon Clinic	no	y	y	na	no	y	night load	lighting?	no	na	positive	Healthcare - Primary Care Trusts
BEA053	Obar Solicitors Office	no	y	no	na	no	y	night load	computers	y	meter on office - not interested in this	not interested	Services - Commercial / Offices
BEA054	Mr Martellotto	no	y	no	na	no	no	na	na	y	person left	neutral	Services - Retail Premises (non food)
BEA056	Vitellix Ltd	no	y	no	na	no	no	na	na	no	na	already saving energy	Services - Commercial / Offices

Site Code	Name and Address	Site used meter when fitted	Site used profiles	Felt they could make saving	Don't care	Took action	Profile evidence for possible savings	Evidence	Source of load	Site issues	Details	Attitude to Smart Meter	Type of business
BEA058	Mr Hawa the Dressbox	y	y	no	na	no	no	na	na	no	na	already saving energy	Services - Retail Premises (non food)
BEA059	Barker 8 Ltd	y	y	y	na	y	no	na	na	no	na	positive	Services - Retail Premises (non food)
BEA061	Mr Ashraf	no	y	y	na	no	y	reduce weekend water heating	immersion heater	no	na	positive - after seeing profiles	Healthcare - Primary Care Trusts
BEA063	Anne Winston	y	y	no	na	no	y	1200W night load	cooling	no	na	already saving energy	Services - Retail Premises (non food)
BEA064	Cheers Off licence	y	na	no	na	na	no	na	na	y	couldn't contact	already saving energy	Services - Retail Premises (non food)
BEA065	Channel Films Ltd	no	y	no	na	no	y	night load	400W	y	believed meter would save on its own	positive - after seeing profiles	Services - Retail Premises (non food)
BEA066	NSC Site 066	no	y	no	na	no	no	na	na	no	na	neutral	Leisure - Arts / Museum

Site Code	Name and Address	Site used meter when fitted	Site used profiles	Felt they could make saving	Don't care	Took action	Profile evidence for possible savings	Evidence	Source of load	Site issues	Details	Attitude to Smart Meter	Type of business
BEA067	Clare Obrien	y	y	no	na	no	no	na	na	no	na	already saving energy	Services - Retail Premises (non food)
BEA068	NSC Site 068	no	y	y	na	y	y	unexplained peak loads	unknown	no	na	positive - after seeing profiles	Education - Primary School
BEA069	NSC Site 069	no	y	no	na	no	y	night load	computers - but they were told to leave them on	no	na	already saving energy	Education - Primary School
BEA071	Mr Hawa	y	y	no	na	no	no	na	na	no	na	already saving energy	Services - Retail Premises (non food)
BEA072	Cities of Westminster Conservative Association	no	y	y	y	no	y	night load	computers?	y	did not believe profiles	not interested	Services - Commercial / Offices
BEA073	NSC Site 073	no	y	no	na	no	y	500W night load	unexplained	no	na	already saving energy	Leisure - Arts / Museum
BEA074	Mr Bhalla	y	y	no	na	no	no	na	na	y	meter dispute	already saving energy	Services - Retail Premises (non food)

Site Code	Name and Address	Site used meter when fitted	Site used profiles	Felt they could make saving	Don't care	Took action	Profile evidence for possible savings	Evidence	Source of load	Site issues	Details	Attitude to Smart Meter	Type of business
BEA075	NSC Site 075	no	y	y	na	na	y	night load	unknown	y	couldn't contact	neutral	Education - Primary School
BEA076	Environmental Council	no	y	no	na	no	y	night load	electric heating	y	site not in use in winter	positive	Services - Hotels / Hostels
BEA077	Real Time Information	y	y	y	na	y	y	night load	computers	no	na	positive	Services - Commercial / Offices
BEA078	Penbarth Properties	y	y	no	na	no	no	na	na	no	na	positive	Services - Commercial / Offices
BEA079	Foster and Allen ltd	no	y	no	na	no	y	1800W night load	computers?	no	na	not interested	Services - Commercial / Offices
BEA080	Site 080	no	y	na	na	no	no	na	na	y	did not believe profiles	positive - after seeing profiles	Industry - Wholesale / Distribution
BEA081	Site 081	no	y	y	na	no	y	night load	lighting	no	na	positive	Services - Retail Premises (non food)
BEA082	Tarman Public House	no	y	no	na	no	y	night load	4kW night load	no	na	not interested	Services - Pubs / Clubs

Site Code	Name and Address	Site used meter when fitted	Site used profiles	Felt they could make saving	Don't care	Took action	Profile evidence for possible savings	Evidence	Source of load	Site issues	Details	Attitude to Smart Meter	Type of business
BEA083	Erith Veterans Club	no	y	no	na	no	y	reduce heating at weekend	electric heating	no	na	not interested	Services - Pubs / Clubs
BEA084	AB Unit D	y	y	y	na	y	no	na	na	y	made savings when first received meter	positive	Services - Commercial / Offices
BEA085	Convenience Stores	no	y	no	na	no	y	2kW night load	lighting?	no	na	neutral	Services - Retail Premises (non food)
BEA086	Site 086		no	y	na	no	y	2 kW night load	computers, lighting?	no	na	not interested initially as saving too small but positive after receiving profiles	Services - Retail Premises (non food)
BEA087	Site 087	no	y	no	na	no	no	na	na	no	na	not interested	Services - Restaurant / Fast Food

Site Code	Name and Address	Site used meter when fitted	Site used profiles	Felt they could make saving	Don't care	Took action	Profile evidence for possible savings	Evidence	Source of load	Site issues	Details	Attitude to Smart Meter	Type of business
BEA088	Site 088	no	y	y	na	y	y	Continuous 2kW heating load when site occupied 3 days per week	electric heating	no	na	neutral	Healthcare - Primary Care Trusts
BEA089	Site 089	no	y	no	na	no	no	na	na	no	na	already saving energy	Services - Restaurant / Fast Food
BEA091	Site 091	y	y	no	na	no	no	na	na	no	na	already saving energy	
BEA092	Site 092	no	y	no	na	no	y	reduce weekend heating	electric heating	no	na	already saving energy	Services - Retail Premises (non food)
BEA093		no	y	no	na	no	y	reduce weekend heating	electric heating	no	na	already saving energy	Healthcare - Residential Care
BEA094	Site 094	no	y	y	na	no	y	turn off lights at weekend	display lighting	no	na	neutral	Services - Commercial / Offices
BEA095	Site 095	no	no	na	na	no	no	na	na	y	owner changed during trial	not interested	Services - Commercial / Offices

Site Code	Name and Address	Site used meter when fitted	Site used profiles	Felt they could make saving	Don't care	Took action	Profile evidence for possible savings	Evidence	Source of load	Site issues	Details	Attitude to Smart Meter	Type of business
BEA096	Site 096	no	y	no	na	no	no	na	na	no	na	already saving energy	Services - Retail Premises (non food)
BEA097	Site 097	no	y	y	na	y	y	reduce weekend heating	electric heating	no	na	positive	Services - Restaurant / Fast Food
BEA098	NSC Site 098	no	y	y	na	no	no	na	na	no	no	positive	Education - Primary School
BEA102	NSC Site 102	no	y	y	na	no	y	reduce weekend heating	electric heating	no	na	positive	Education - Primary School
BEA103	NSC Site 103	no	y	y	na	y	y	reduce weekend heating	electric heating	no	na	positive	Services - Commercial / Offices
BEA104	Pinestyle	no	y	no	na	no	no	na	na	na	na	already saving energy	Leisure - Heritage / Parks

Appendix 2 : "Success" Case Studies

Site Number	Name	Savings	Percentage of annual consumption	Comments
BEA010	Wireworks	900kWh	10%	Turning off lights and equipment at night
BEA023	Hamilton Leigh Estates	7440 kWh	54%	Installed security shutters and turned lights off at night
BEA037	The Knowledge College	585 kWh	11.3%	Reduced electric heating at weekends
BEA045	The Berridge Road Tenants Association	533 kWh	4%	Turning off lights at night
BEA049	CW Dixey (Blackheath) Ltd	2560 kWh	16%	Turning off lights at night
BEA068	Milton Infant School	2880 kWh	54%	Investigated night loads – did not find cause of load but found it reduced anyway
BEA077	Real Time Information	2000 kWh	18%	Turning off computers at night
BEA097	Burrington Primary School	3000 kWh	18.3%	Turning off lights during the day
BEA103	Weston-Super-Mare Tourist Office	4500 kWh	20%	Turning of lights during the day

ENERGY SAVINGS CASE STUDY FOR WIREWORKS

The Business case

"I've been looking at the meter regularly to check my consumption and costs. I used it to look at the benefits of turning the lights off over lunch time"

Company Profile

Wireworks is a small business based in Marylebone, London, supplying high class stationary and gifts. The site has relatively simple power loads; lighting, computers, and some electric heating.

Introduction

Wireworks was recruited into the trial by the London Energy mail shot. The owner was motivated by the opportunity to save energy and reduce his energy bills.

Achievements

The owner has actively used the meter since it was installed and looks at it on a regular basis to check usage and costs. As a result of his attentions:

- The site base load has been reduced by 3.4kWh for a Sunday, equivalent to 900kWh per year.

The Technical Case

Installing Half-Hourly Meter Readers

The primary electricity meter was replaced with a PRI Liberty single phase meter with an attached Freedom keypad. This was connected to a GSM modem to allow meter data to be downloaded remotely.

Energy Saving Solutions

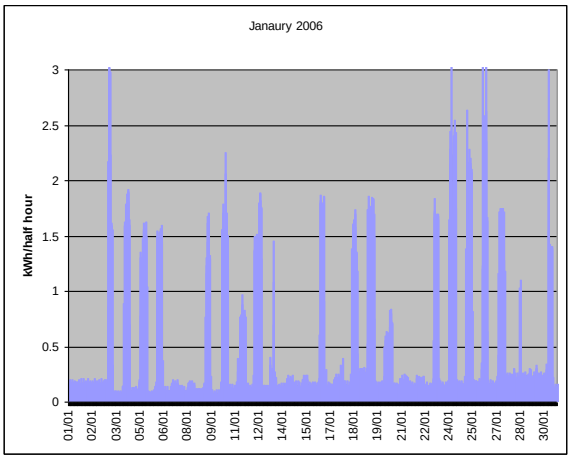
The owner experimented with the meter looking at the savings that could be made by turning off lighting, computers and electric heating. The site already had a minimal electricity load out of hours but the owner managed to reduce it even further. The owner even used the meter to look at the savings that can be made by turning off the lights during lunchtime.

Having the meter had caused him to pay special attention to turning everything off at night.

Working and operational hours –

The business operates from 10am until 5pm 5 days per week.

- **Energy Profiles –**



- **Energy Savings Identification –**

The savings were identified by using the meter data to compare the base load before and after the energy saving measures had been taken. These savings were then extrapolated across the out of hours periods for a year.

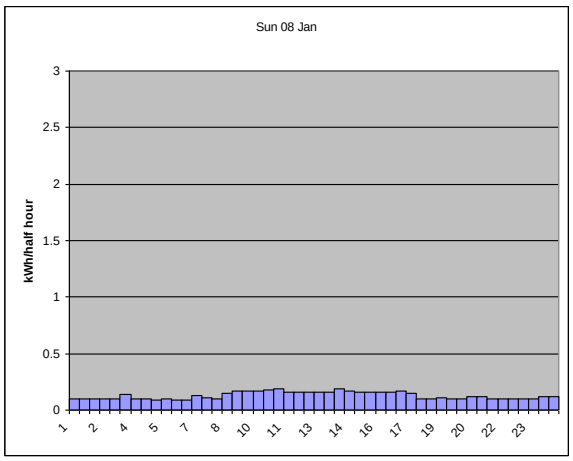
- **Implementation**

The site bore no implementation costs as it only required extra care in turning off loads.

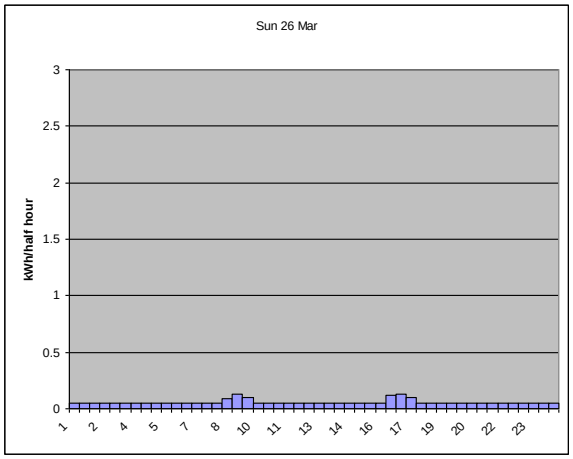
- **Graphs**

The profiles below show the Sunday demand before and after the energy measures were taken. They clearly show the reduction in base load. This reduction is also apparent through the week when the business is closed.

Sunday Profile before Measures



Sunday Profile after the Measures



The Financial Case

As the measures had no cost, there was no need to carry out a cost benefit prior to implementation.

The Sunday load before and after the measures were subtracted to give a daily saving. This was then extrapolated across a year by multiplying the hourly saving by the number of out of hours during the year.

- **Savings**

The customer will save £50/y as a result of reducing his out of hours demand.

- **Costs**

There were no costs other than the time required to investigate the loads and turn the equipment off.

- **Payback**

With no cost there is no investment to repay.

- **Other financial Benefits**

None

ENERGY SAVINGS CASE STUDY FOR HAMILTON LEIGH ESTATES

The Business case

"We were surprised by the night load the meter was showing"

Company Profile

Hamilton Leigh Estates is a small estate agency situated in Dagenham employing four people.

Introduction

The business came into the trial as a result of a cold call from London Energy. They were attracted by the opportunity for reduced energy bills.

Achievements

Hamilton Leigh made a saving of over £484/year by installing shutters and turning off its lights at night.

The Technical Case

Installing Half-Hourly Meter Readers

The primary electricity meter was replaced with a PRI Liberty single phase meter with an attached Freedom keypad. This was connected to a GSM modem to allow meter data to be downloaded remotely.

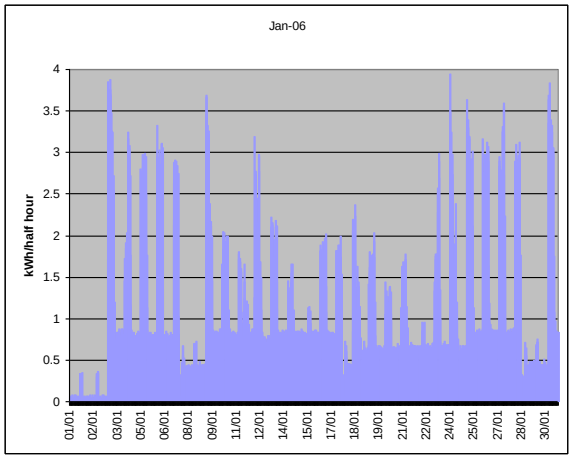
Energy Saving Solutions

The company installed security shutter on the front of the building. This has allowed them to turn the lights off out of hours. These had been left on previously as a security measure.

Working and operational hours -

The office operates from 8am until 5pm 6 days a week.

- **Energy Profiles –**



It can be seen from the January monthly profile that the site load is dominated by the out of hours demand; largely the result of office lighting.

- **Energy Savings Identification –**

The night load has been reduced from a consistent 1.6kW to virtually zero since the installation of the shutters.

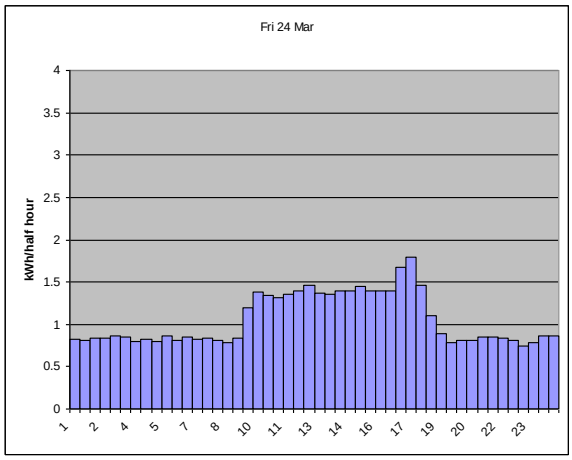
- **Implementation**

Once the shutters were installed, it was considered safe to turn the lights off in the evening.

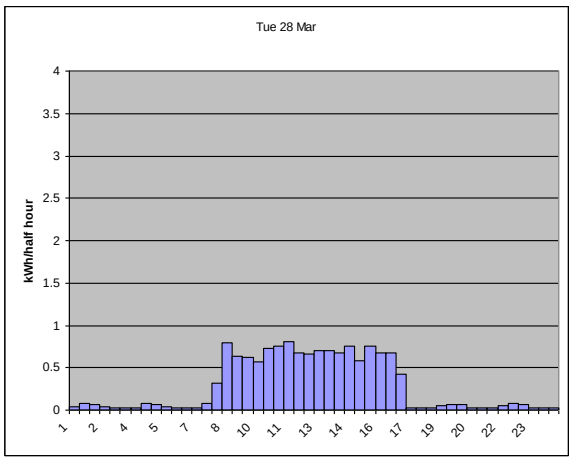
- **Graphs**

The profiles below show the daily load before and after the shutters were installed. The reduction in out of hours load has been repeated each night since then.

Profile before shutters were installed



Profile after shutters were installed



The Financial Case

The decision to install the shutters was solely based on security considerations. However, the energy savings are substantial and provide a good payback

- **Savings**

The reduction in electricity consumption was 1.5kWh per hour. This gives an annual saving of 7440kWh, worth £484/year.

- **Costs**

The cost of the shutters was £2000

- **Payback**

4.1 years

ENERGY SAVINGS CASE STUDY FOR KNOWLEDGE COLLEGE

The Business case

"I hadn't thought about the cost of leaving the electric heater on over the weekend"

Company Profile

The Knowledge College provides training for black cab drivers preparing for their "knowledge" exam. The company has a small office and uses electricity for lighting, office equipment and heating.

Introduction

The business came into the trial as a result of a mail shot by London Energy. They were attracted by the opportunity for reduced energy bills and accurate bills.

Achievements

Simply by re-setting the controls of the electric heating the business made a saving of 585kWh per year.

The Technical Case

Installing Half-Hourly Meter Readers

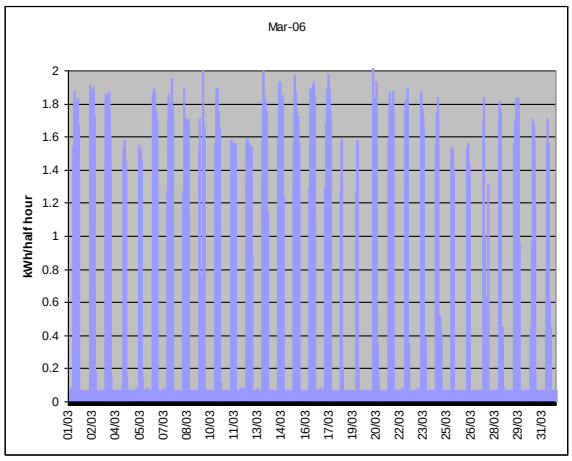
The primary electricity meter was replaced with a PRI Liberty single phase meter with an attached Freedom keypad. This was connected to a GSM modem to allow meter data to be downloaded remotely.

Working and operational hours -

The office is occupied between 8am and 4pm, 5 days per week.

- **Energy Profiles –**

The graph below shows the profile for the business during March 2006. Most of the load is due to the electric heater.



- **Energy Savings Identification –**

When the owner was phoned after receiving his sheet of profiles, he was surprised to see the high level of consumption at the weekends when the office was empty. He agreed to re-set the timer on the heater to reduce heating at the weekends.

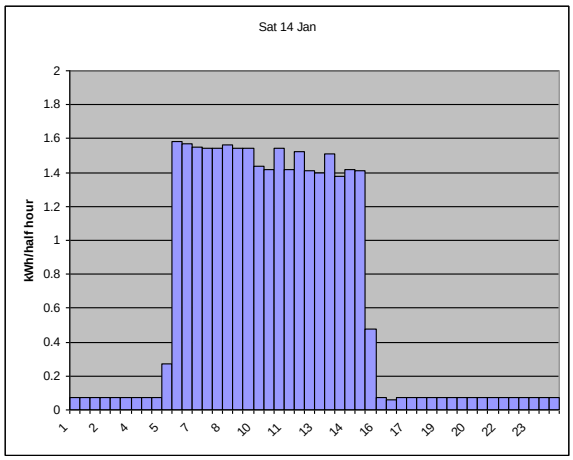
- **Implementation**

Looking at the profiles after the call it was apparent that the heater timer had indeed been adjusted. However the timer only had a daily setting so that this applied to every day. The owner states that he has suffered no coldness, suggesting that the weather has warmed enough to reduce his heating load anyway.

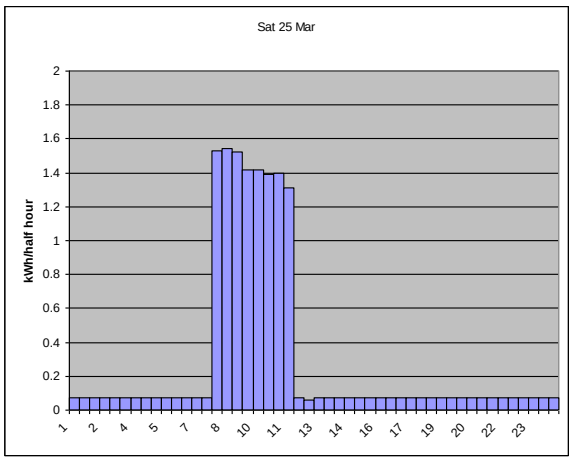
- **Graphs**

The graphs below show the Sunday profile before and after the change to the timer setting. The reduced demand can clearly be seen.

Saturday Profile During January 2006



Saturday Profile During March 2006



The Financial Case

The owner immediately recognised that there was a worthwhile saving to be made for no outlay.

- **Savings**

Simply assuming that the heating was reduced by 6 hours each Saturday and Sunday for a third of the year, this saved 585kWh per year worth £100. If he had a 7 day timer and could have turned the heater off at weekends the saving would have been doubled.

- **Costs**

Aside from providing the meter there was no cost for the business in making the saving.

- **Payback**

Not applicable for the business.

- **Other financial Benefits**

None.

ENERGY SAVINGS CASE STUDY FOR BERRIDGE ROAD ESTATE TENANTS' AND RESIDENTS' ASSOCIATION

The Business case

"As a charity we are very cost conscious and watch every penny, I really like the meter".

Company Profile

The Berridge Road Tenants Association is a Community based organisation providing a meeting place and venue for local people. The electrical loads of the hall are lighting, office equipment and kitchen equipment. Heating is by gas. It is located on the Berridge Road Estate, Norwood in London.

Introduction

The Association came into the trial as a result of a mail shot by London Energy. They were attracted by the opportunity for reduced energy bills and accurate bills.

Achievements

Made savings worth £30/y simply by checking and managing night time load.

The Technical Case

Installing Half-Hourly Meter Readers

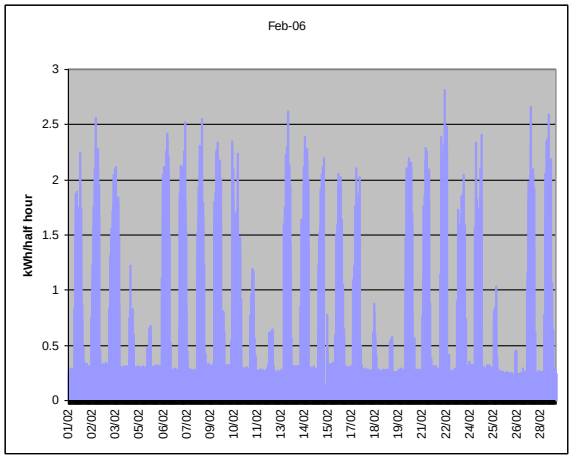
The primary electricity meter was replaced with a PRI Liberty single phase meter with an attached Freedom keypad. This was connected to a GSM modem to allow meter data to be downloaded remotely.

Working and operational hours -

The building is open from 8am to 7pm, 6 days per week.

- **Energy Profiles –**

The graph below shows the profile for the business during February 2006. Most of the load is due to the lighting and linked to occupation patterns. There is also a 500W base load.



- **Energy Savings Identification –**

When the manager of the Association was phoned he reported that he had been using the meter a lot and liked it. Has been monitoring, and had been experimenting with the meter.

When he saw the profile sheet that had been sent to him he agreed to investigate the night load as this should only have been a fridge running at night.

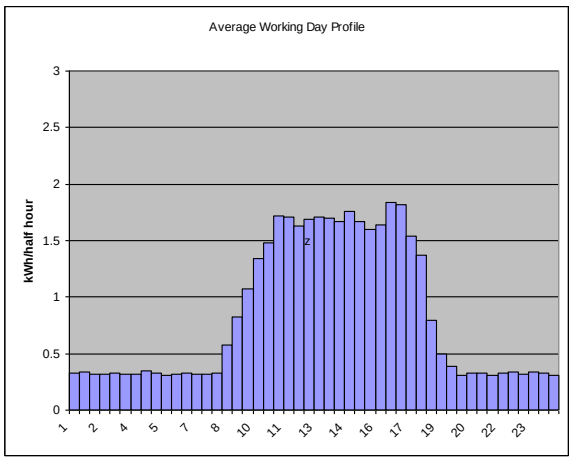
- **Implementation**

Looking at the profiles after the call it was apparent that the night load had been reduced. The manager reported that this was mostly due to good management. He found it especially useful to have the meter because he was not always present and so, not in control of the building all the time.

- **Graphs**

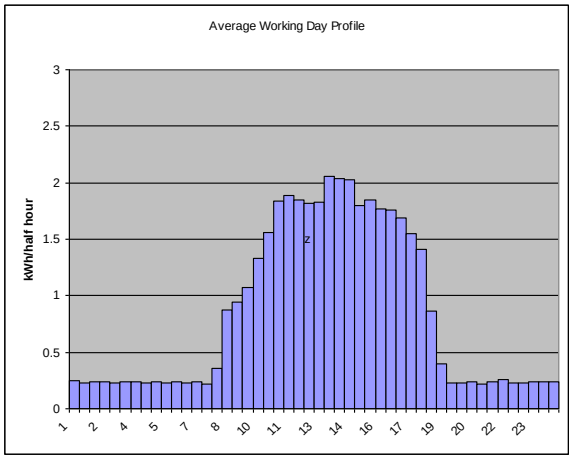
The graphs below show the average weekly profile before and after the change to the timer setting. The reduced demand can clearly be seen.

Averaged Weekly Profile during January 2006



None.

Averaged Weekly Profile during March 2006



The Financial Case

The manager recognised that there was a worthwhile saving to be made for no outlay.

- **Savings**

On the basis of the graphs shown above the out of hours load has been reduced by 100W.

Extrapolated across the year this gives an annual saving of 533kWh, worth £30/y.

- **Costs**

Aside from providing the meter there was no cost for the business in making the saving.

- **Payback**

Not applicable for the Association.

- **Other financial Benefits**

ENERGY SAVINGS CASE STUDY FOR CW DIXEY (BLACKHEATH) Ltd

The Business case

"I don't have much time to do things but I like the idea of getting extra information and remote meter reads"

Company Profile

Dixey's Opticians on Montpelier Vale is owned by the eye care company CW Dixey established in 1777. The practice is one of Blackheath's main independent traders. The main loads in the clinic are lighting and air conditioning.

Introduction

The company came into the trial as a result of a mail shot by London Energy. They were attracted by the opportunity for reduced energy bills and accurate bills.

Achievements

This opticians has reduced its electrical demand by 2560kWh simply by turning more lights off every night.

The Technical Case

Installing Half-Hourly Meter Readers

The primary electricity meter was replaced with a PRI Liberty single phase meter with an attached Freedom keypad. This was connected to a GSM modem to allow meter data to be downloaded remotely.

Energy Saving Solutions

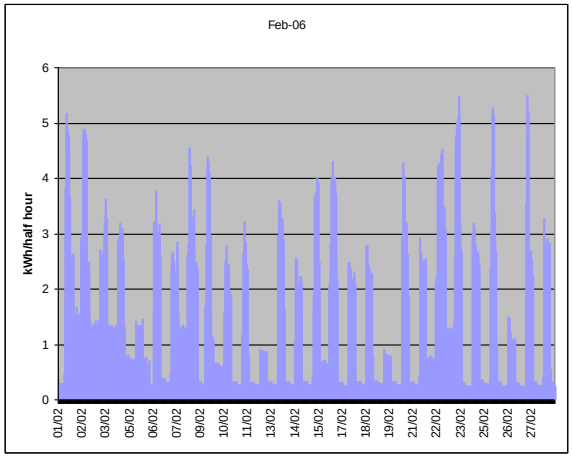
The manager of the opticians claimed to be too busy to make use of the meter when first contacted. However, when asked about the night load at the shop he suggested that he could put the second air conditioner on a timer. He also proposed checking the lights were off.

Working and operational hours –

The opticians is open from 10am until 5pm 6 days per week.

- **Energy Profiles –**

The profile for the shop through February 2006 is shown below. This shows a strong link between the opening hours and demand. However, there is a steady base load each night.



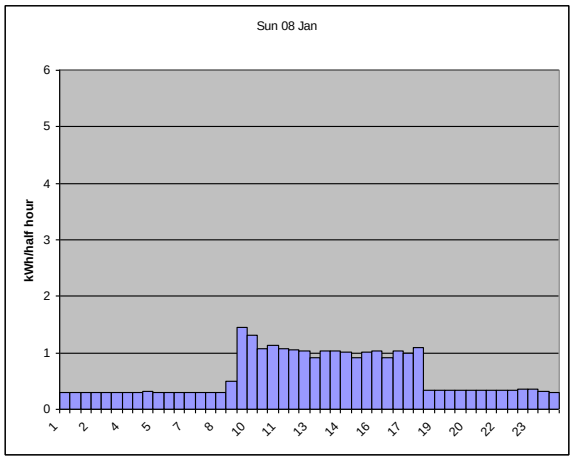
- **Implementation**

When contacted after the March profiles had been sent out it was discovered that the manager of the opticians had retired. However, before he left he had instructed t he staff to make a practice of turning all the lights off at night. They had continued to do this.

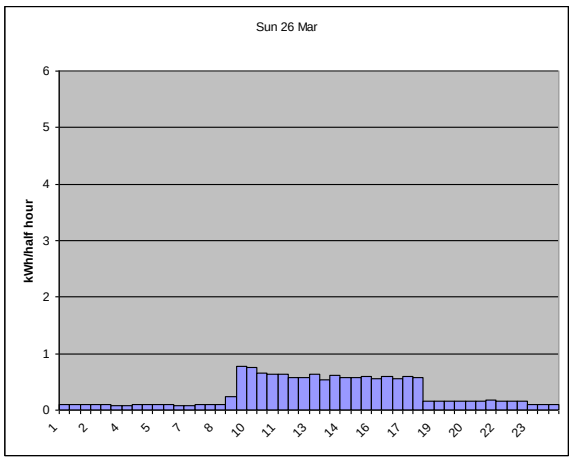
- **Graphs**

The graphs below show the Sunday profiles before and after the site began to turn the lights off.

Sunday Profile January 2006



Sunday Profile March 2006



The effect of turning the lights off can clearly be seen. It is estimated that the load has been reduced by 400W, representing an annual saving of 2300kWh.

The Financial Case

The manager of the opticians recognised that there would be no cost associated with the energy saving.

- **Savings**

It was calculated that the night load was reduced by 400W continuously. For a business that is closed for 5840 hours per year this represents a saving of 2300kWh or £150/y.

- **Costs**

Aside from the cost of the meter there was no cost to the business in making this saving.

- **Payback**

Not applicable.

- **Other financial Benefits**

None

ENERGY SAVINGS CASE STUDY FOR MILTON INFANT SCHOOL

The Business case

"In principle we are very enthusiastic, we have looked at the profiles and will take action depending on what they see there".

Company Profile

Milton Infant School is situated in a suburban area of Weston-Super-Mare, North Somerset. It is a broadly average sized infant school with 177 pupils on roll, aged between 4 and 7.

Introduction

Milton Infants School was volunteered for the trial by North Somerset Council. It complied with the basic requirements of having a single phase supply and adequate GSM signal. North Somerset Council was interested in seeing the demand patterns of all its sites with a view to identifying scope for energy reductions.

Achievements

The school investigated the night loads and reduced its overall consumption by 24%.

The Technical Case

Installing Half-Hourly Meter Readers

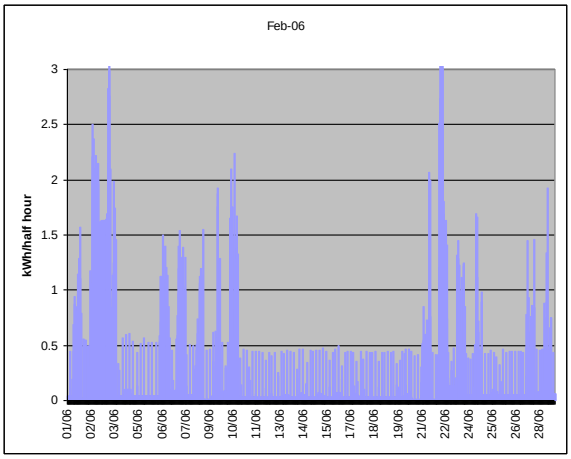
The primary electricity meter was replaced with a PRI Liberty single phase meter with an attached Freedom keypad. This was connected to a GSM modem to allow meter data to be downloaded remotely.

Working and operational hours -

The school keeps normal school hours and there is evidence of people working through to 7pm.

- **Energy Profiles –**

Below is a graph of the profile for the meter from February 2006. This profile includes a one week school holiday. There are clear peaks marking the occupation pattern of the building. Also notable is a continuous peak demand showing at all times.



- **Energy Savings Identification –**

Discussion with the school revealed that they did not know the cause of these peaks. Spurred by the profiles they set out to discover the cause. They report that, in fact, they did not find it. However, the load was found to have much reduced. The only explanation they could offer was that the caretaker had changed during this period and, possibly, he had adopted a better practice.

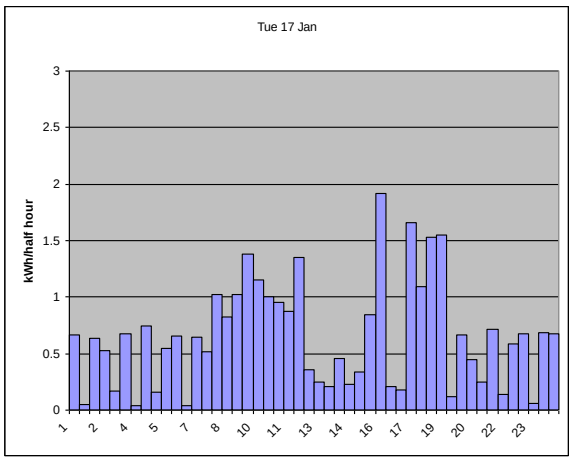
- **Implementation**

As explained above, the school looked hard to find the cause of the peak load. However, without identifying the source, it did reduce. They have committed to continue to monitor the loads in case it reappears.

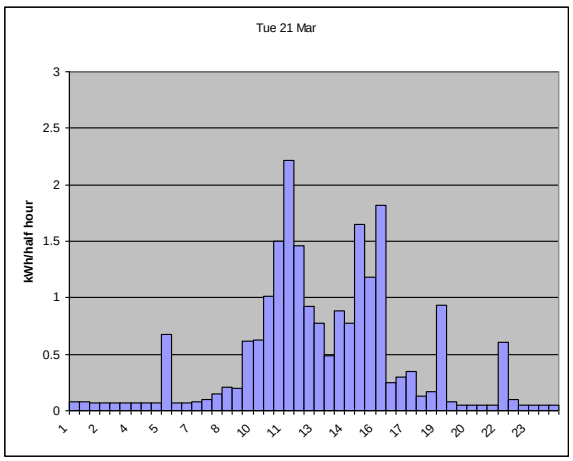
- **Graphs**

The graphs below show a day in January and one in March to show the difference in the profiles.

Profile for Tuesday in January



Profile for Tuesday in March



ENERGY SAVINGS CASE STUDY FOR REAL TIME INFORMATION

The Business case

"We wish we'd had the keypad put somewhere more accessible, we find it very useful - especially now the cost of electricity is going up".

Company Profile

Real Time Information is a specialist internet vendor of music CD's and fashion clothing. It is located in Holloway, London. The main electrical loads are lighting and office equipment; mostly computers.

Introduction

The business came into the trial as a result of a mail shot by London Energy. They were attracted by the opportunity for reduced energy usage, bills and get accurate bills.

The Financial Case

The school administration recognised that they could reduce their energy bills for no cost if they could reduce their out of hours period, when there should be no, or slight, load.

- **Savings**

Taking the difference in averaged demand across a week in January and March there was a reduction in demand of 5%. It is hazardous to extrapolate this as the reason for the reduction is not well understood, but, if it applied to the whole year, this would represent 2880kWh per year worth £187/y.

- **Costs**

Aside from the cost of the meter, the school incurred no cost in implementing the energy reduction.

- **Payback**

Not applicable.

- **Other financial Benefits**

None

Achievements

By using the meter to examine their loads and turning off computers at night, the business is saving £195 a year.

The Technical Case

Installing Half-Hourly Meter Readers

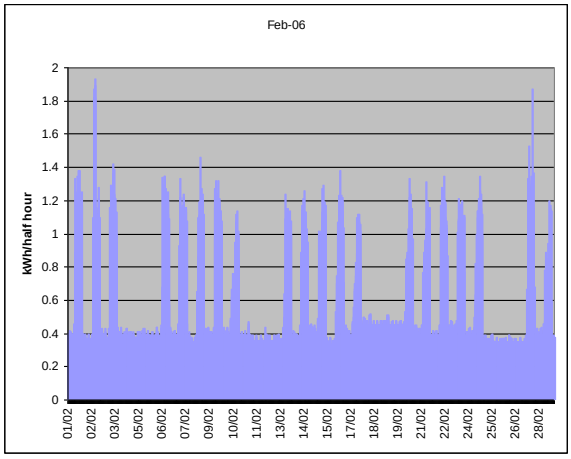
The primary electricity meter was replaced with a PRI Liberty single phase meter with an attached Freedom keypad. This was connected to a GSM modem to allow meter data to be downloaded remotely.

Working and operational hours -

He office is occupied between 10am and 7pm for 5 days per week.

- **Energy Profiles –**

The February profile for Real Time Information is shown below. It indicates a sharply defined daily profile matching the occupation period. There is also a large base load resulting from the computers.



- **Energy Savings Identification –**

The owner of Real Time Information reported that he had been experimenting with the meter when it was first installed. However, the keypad was inconveniently located and he had found the profile that he received more useful. They now turned off all the computers every night and were using the meter to see where the remaining night time load was going. They wanted to keep the meter as they found it very useful.

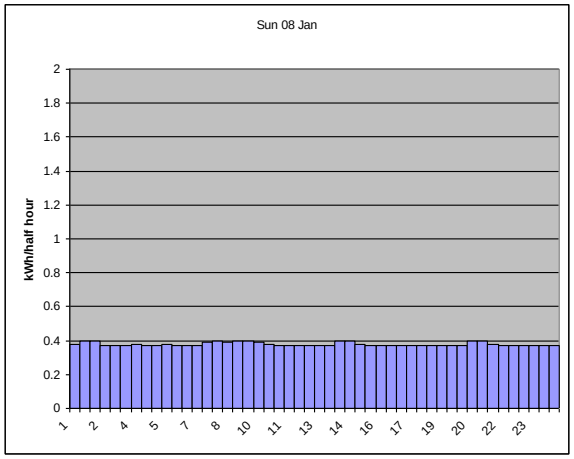
- **Implementation**

The company now turned its computers off at night.

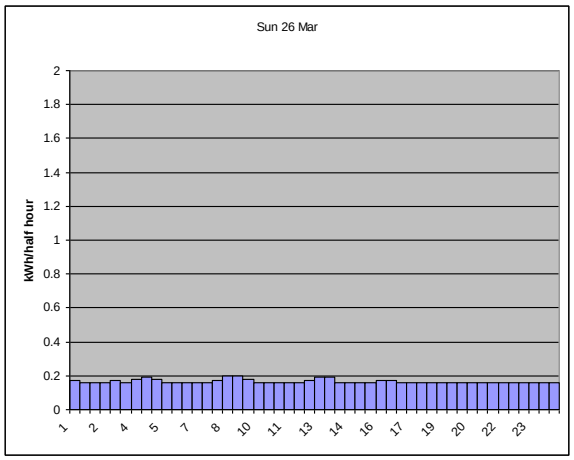
- **Graphs**

The profiles below show the Sunday demand before and after the company began to turn off the computers. The marked reduction in demand can be seen.

Profile for a Sunday in January 2006



Profile for a Sunday in March 2006



The Financial Case

The owner readily recognised that there was a worthwhile saving to be made for no outlay.

- **Savings**

The weekly power load fell from 200kWh to 130kWh. This equates to a saving of 3000kWh, worth £195/year.

- **Costs**

Aside from the cost of the meter the customer carried no cost in implementing the energy saving measure.

- **Payback**

Not applicable.

- **Other financial Benefits**

None.

ENERGY SAVINGS CASE STUDY FOR BURRINGTON PRIMARY SCHOOL

The Business case

"Everyone is involved – the children are turning the lights off when they finish in the toilets now".

Company Profile

The school is set in the village of Burrington to the south west of Bristol. At present 75

pupils are on the roll. The school is all-electric with electric heating. Lighting comprises the majority of the remaining load.

Introduction

Burrington Primary School was volunteered for the trial by North Somerset Council. It complied with the basic requirements of having a single phase supply and adequate GSM signal. North Somerset Council was interested in seeing the demand patterns of all its sites with a view to identifying scope for energy reductions.

Achievements

The school has focused on turning lights off during the day, they have reduced their weekly day time load from 270kWh to 170kWh, potentially saving 3000kWh per year or £195.

The Technical Case

Installing Half-Hourly Meter Readers

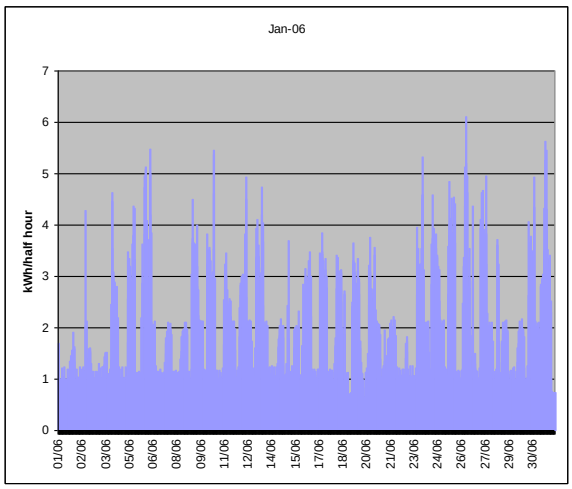
The primary electricity meter was replaced with a PRI Liberty single phase meter with an attached Freedom keypad. This was connected to a GSM modem to allow meter data to be downloaded remotely.

Working and operational hours -

The school keeps normal school and term hours.

- **Energy Profiles –**

Below is a graph of the profile for the meter from January 2006. There are clear peaks marking the occupation pattern of the building. Also notable is a continuous peak demand showing at all times.



- **Energy Savings Identification –**

Speaking to the caretaker it was agreed that it would be worthwhile trying to reduce the heating demand; especially by turning the heating down at the weekends. However, although the caretaker made some adjustments there was little scope given the controls on the heaters. These only had a single setting so would have to adjusted every Friday and Monday to achieve this saving.

The school carried out its own investigation and decided that it could focus on turning lights off when not needed. Working with the school, North Somerset Council has brought Dalkia in to review the school energy usage and seek further savings.

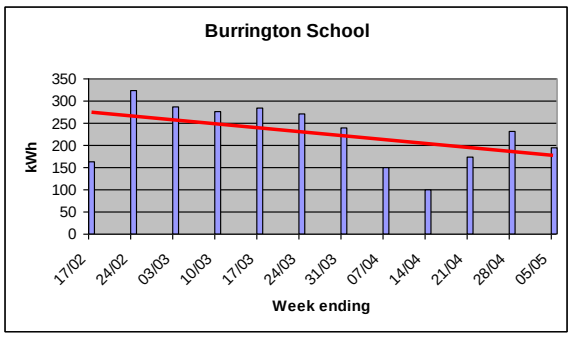
- **Implementation**

The whole school population was involved and the children now make a point of turning the lights off in the toilets when they leave them. The caretaker has identified more possible savings by turning lights off in the corridors but these would need sensors to control safely.

The meter has been very popular.

- **Graphs**

The graph below shows the weekly, daytime electrical demand between February and May, covering the period when the school was implementing the savings. This shows a reduction in the weekly demand from 270kwh to 170kWh.



Weekly daytime demand from February to May 2006.

The Financial Case

The school management recognised that they could reduce their energy bills for no cost if they could reduce the time the lights were left on.

- **Savings**

The graph above shows a reduction in the weekly daytime load of 100kWh. If repeated for 30 weeks during the year this would equate to 3000kWh or a saving of £195.

- **Costs**

Aside from the cost of the meter, the school incurred no cost in implementing the energy reduction.

- **Payback**

Not applicable.

- **Other financial Benefits**

None

ENERGY SAVINGS CASE STUDY FOR WESTON-SUPER-MARE TOURIST INFORMATION OFFICE

The Business case

"We are really working at reducing our consumption; we are taking part in the Green Tourism Scheme Award and are using the meter data to show our energy savings."

Company Profile

The Tourist Office is located on the promenade in Weston-Super-Mare and provides information for visitors to Weston-Super-Mare. It has around 5 staff on site and the main electrical loads are lighting, office equipment, a small kitchen plus the supply to a server for the main Council Offices. The offices have gas central heating.

Introduction

Weston-Super-Mare Tourist Office was volunteered for the trial by North Somerset Council. It complied with the basic requirements of having a single phase supply and adequate GSM signal. North Somerset Council was interested in seeing the demand patterns of all its sites with a view to identifying scope for energy reductions.

Achievements

The office staff managed to reduce their average day time electricity consumption by 20%; equivalent to 100kWh per week or 4500kWh per year, if maintained. This would be worth £300/year.

The Technical Case

Installing Half-Hourly Meter Readers

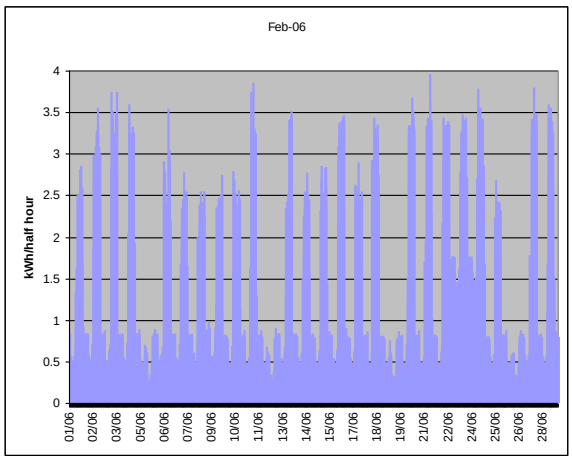
The primary electricity meter was replaced with a PRI Liberty single phase meter with an attached Freedom keypad. This was connected to a GSM modem to allow meter data to be downloaded remotely.

Working and operational hours –

The working hours vary through the year. The office is open from 10am until 5pm for 6 days a week during the winter. From Easter onwards the office opens on Sundays as well.

- **Energy Profiles –**

The profile below shows the electrical demand for the office during February 2006. This shows a fairly regular pattern, the demand clearly outlines the occupation periods. There was an extra demand during the last week of February, possible due to electric spot heating being left on.



- **Energy Savings Identification –**

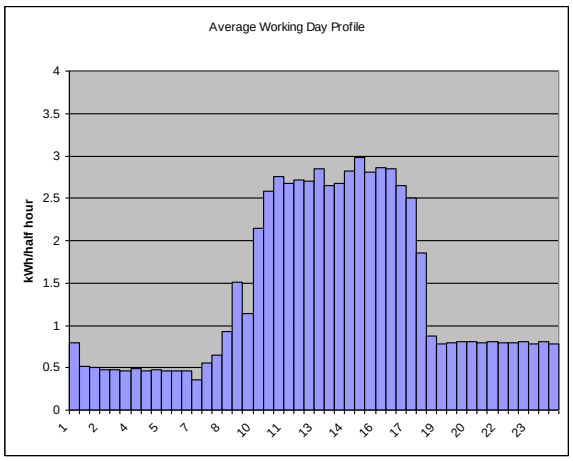
The manager of the Tourist Office was phoned after the first set of profiles had been sent out. She was very interested in the profiles as the keypad had been installed too high to permit easy access. There were some very high loads evident overnight in the profiles but the Manager was not sure they could do much about these. However, they decided to focus on day time loads and began to ensure lights were turned off when not needed and computer monitors were turned off rather than allowed to remain on standby.

- **Implementation**

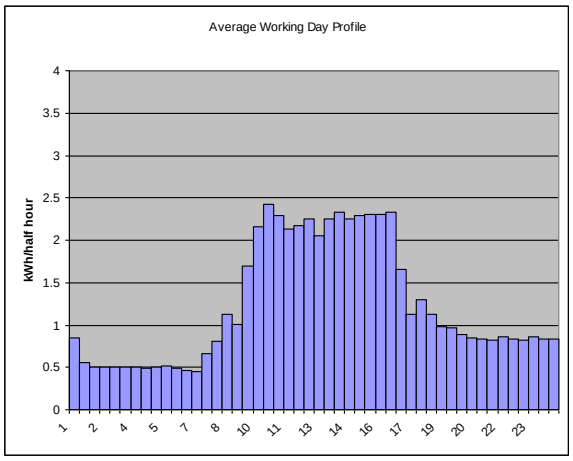
The Manager has produced a set of instructions for more sustainable practice. These include instructions on turning and computers lights off during the day and at night. The staff have been instructed to follow these.

- **Graphs**

Averaged profile for a week in February 2006



Averaged profile for a week in March 2006



It is clear from the averaged weekly profiles shown above that the staff had made a marked improvement in their power consumption during the week. This had reduced by 18% for between the periods shown.

The Financial Case

The staff in the Tourist Office recognised that there was scope to reduce their consumption at no cost.

- **Savings**

Assuming the reduction in daily consumption is replicated across the year, this is equivalent to 4500kWh per year or £300.

- **Costs**

Aside from the costs of the meter there were no costs associated with these savings.

- **Payback**

Not applicable.

- **Other financial Benefits**

None

Appendix 3 : "Lessons Learnt" Case Studies

Site Number	Name	Comments	Lessons Learnt
BEA001	TJR Bathrooms	Spent £2000 on sensors to reduce lighting load but there was insufficient time to measure a reduction	The ending of the trial means that a number of sites cannot demonstrate actions taken late in the project.
BEA008	Twins Snack Bar	Owner used the meter extensively and was positive about its help in managing his budget. He wanted to reduce his load but felt he had few options available to him	Many sites do not believe that they many options to reduce their load. This can be: Accurate because they already follow best practice. Inaccurate because they are not aware of the savings options or they are not sufficiently easy to implement.
BEA009	Stanley Arms	The owner was very active in using the meter to reduce his load and had implemented a number of measures to cut demand. However, this seemed to have been overtaken in other actions he had taken that increased the load; such as installing air conditioning	Businesses are under commercial pressure to use more energy to improve their business as well as to reduce it. Increases in load can hide positive efforts to reduce loads.
BEA030	Amhurst Lodge Hotel	The owner has been using the meters actively and is taker ever more note of the information being provided. However, the savings that had been made could not be isolated from reducing heating loads as the site moved out of the winter.	Demonstrating energy savings based on reduced heating loads require data from successive heating seasons. In this site the major loads were due to the action of hotel guests in their rooms and these were not quantifiable from a single supply meter.
BEA066	Winscombe Library	The manager was already following best practice and there was very little load to save.	Many sites do not believe that they many options to reduce their load. This can be accurate and night time meter data can confirm this. However, it is not possible to decompose daytime loads remotely with a single supply meter and identify if there are savings to be made or not.

BEA081	PPS Distribution	It was agreed with the site that the night time load could be reduced by putting the display lighting on a timer. This was not done because it was required new switch gear to be installed and the business was too busy to implement this.	Although motivated to reduce consumption , small SME's are busy and struggle to implement savings that are not easy.

ENERGY SAVINGS LESSONS LEARNT CASE STUDY FOR TJR BATHROOMS

Company Profile

TJR Bathrooms is a shop selling bathroom equipment situated in Little Ilford, London. The shop is open from 9am until 6pm every day (10am until 4pm on Sundays). The majority of the load was related to lighting and the shop has gas central heating.

Introduction

The owner of the shop volunteered to join the trial after receiving a cold call from London Energy. She was attracted by the promised energy savings and zero cost and the promise of no estimated bills.

Meter installation:

The primary electricity meter was replaced with a PRI Liberty single phase meter with an attached Freedom keypad.

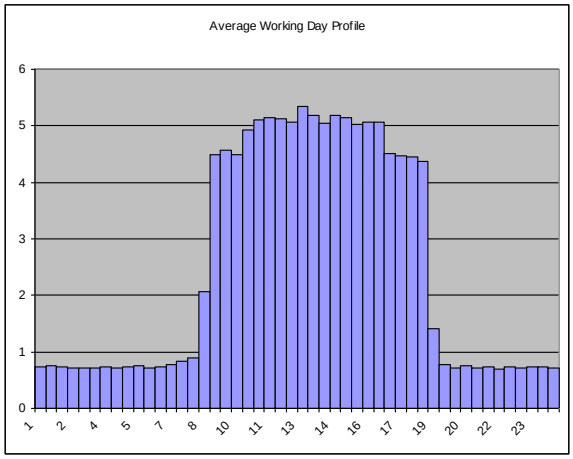
Meter Data Reporting:

The meter data was downloaded via a GSM modem in line with all other sites in the BEAMA trial. In addition, the customer was able to interrogate the keypad to look at the current day's consumption, the previous day's and the previous week's data. As well as this, BEAMA sent the site a sheet with one week's profiles from a week in January. This was followed by a phone call to discuss the profiles and find out if the site had been making any use of the meter and if the profiles suggested any ways to reduce consumption.

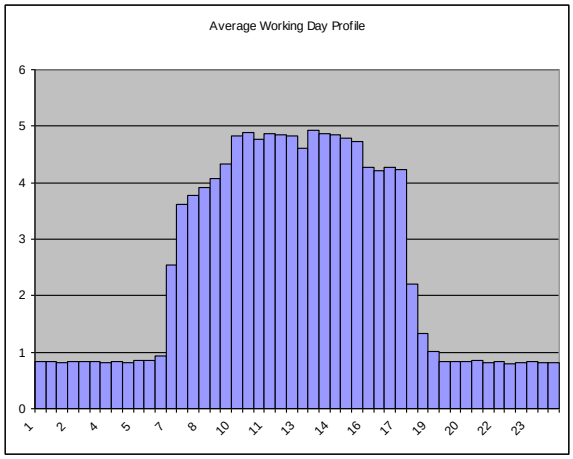
Energy savings recommendations:

The profile sheet was sent to the owner of the store and followed up with a call to discuss whether she could see ways to reduce her demand. The profiles showed a substantial night load and this was said to be due to her leaving display lights on at night. She agreed to think about turning the lights off at night or putting them on a timer.

Averaged weekly Profile from January



Averaged Weekly Profile from March



Energy Savings Implementation:

From the average weekly profiles from January and March shown above, it is clear that there was no reduction in the night load; indeed it rose slightly.

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The Lessons Learnt

1. Many shops leave their lighting on at night for display purposes and to attract passing trade. They see this as worthwhile advertising.
2. It is not easy to arrange for normal lighting systems to turn on and off.

ENERGY SAVINGS LESSONS LEARNT CASE STUDY FOR THE TWINS SNACK BAR

Company Profile

Twins Snack Bar is a small café situated in the centre of Lewisham. The café is open every weekday from 7:30 until 17:00. It was closed for the first two months of 2006 for refurbishment.

Introduction

Twins Snack Bar volunteered for the trial as a result of the cold calling exercise carried out in the summer of 2005. The owner was attracted by the offer of savings and remote meter reading.

Meter installation:

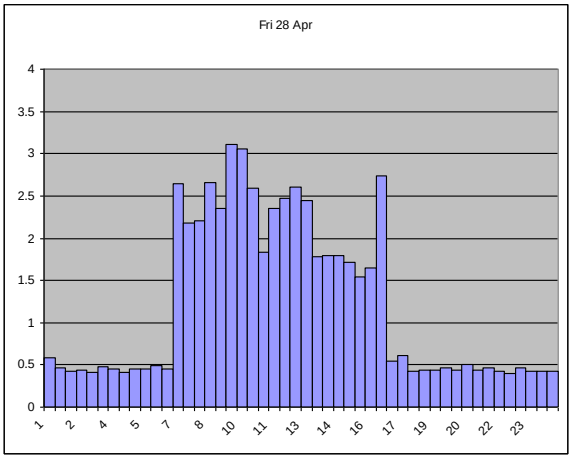
The primary electricity meter was replaced with a PRI Liberty single phase meter with an attached Freedom keypad.

Meter Data Reporting:

The meter data was downloaded via a GSM modem in line with all other sites in the BEAMA trial. These sites were identified late and data was not collected from them until January 2006. Since then a full data set has been obtained. A page of sample daily profiles was sent to the site and followed up with a phone conversation to discuss the profiles and seek ways to reduce consumption.

Energy savings recommendations:

Reviewing the profiles with the owner it was clear that there was little scope for any reductions in consumption. The A typical daily profile is shown below. Night time load is dominated by the chillers and freezers in the café. The owner did say that he was refurbishing the café and suggested that he would use the meter to check the consumption of new equipment before deciding what to buy.



Despite these limitations however, during refurbishment the owner used the meter to measure the consumption of new equipment and he was very positive about the data he got from the meter

.

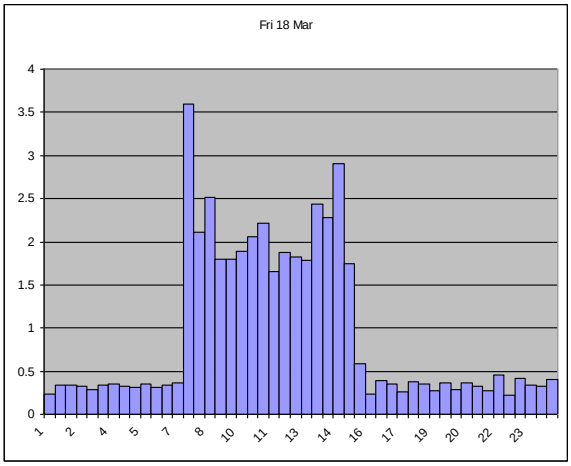
He also checked the meter every week to record his spend on electricity and puts aside money to cover the bill. This allowed him to manage his finances much more effectively. It also meant that he saw if there are any unexpected changes in his consumption.

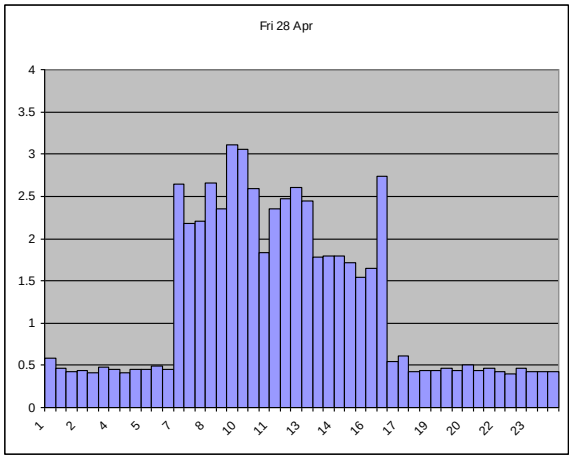
Energy Savings Implementation:

When interviewed after the refurbishment, the owner reported that the had had little option over what equipment he purchased, although he does check what the consumption was.

This site was already following good practice as far as could be determined remotely. There was no scope for further improvement.

The profiles below show the demand on a Friday from March 2005 and April 2006.





The Lessons Learnt

Reasons for no savings recommendation:

1. There was no excess usage identifiable remotely.
2. The customer believed that they were already following best practice and could not identify any savings.
3. The owner made extensive use of the meter to understand his weekly demand and the individual demand of the appliances in his café.

The owner did not think he had much control over the energy consumption of the appliances he purchased.

ENERGY SAVINGS LESSONS LEARNT CASE STUDY FOR THE STANLEY ARMS PUBLIC HOUSE

Company Profile

The Stanley Arms public house is a small, single bar public house in Bromley, London. The bar is open every day from 10:00 until 23:00. Working hours are from 9am until around midnight. The main loads on the site are lighting, chilling, cooling and a washing machine. Space heating is provided by gas central heating. After the meter was installed an air conditioning unit was installed at the pub.

Introduction

The owner of the Stanley Arms volunteered for the trial as a result of the cold calling exercise carried out in the summer of 2005. The owner was attracted by the offer of savings and remote meter reading.

Meter installation:

The primary electricity meter was replaced with a PRI Liberty single phase meter with an attached Freedom keypad.

Meter Data Reporting:

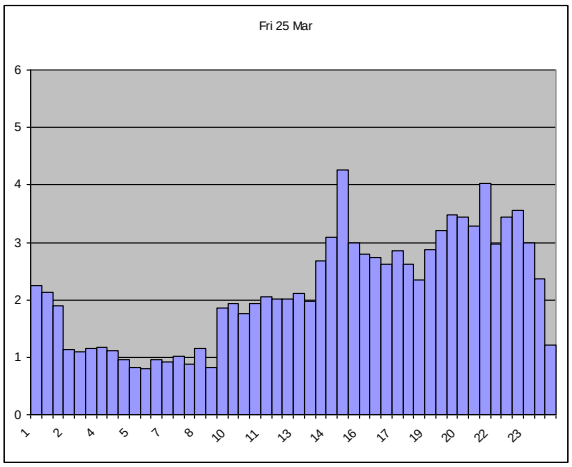
The meter data was downloaded via a GSM modem in line with all other sites in the BEAMA trial. These sites were identified late and data was not collected from them until January 2006. Since then a full data set has been obtained. A page of sample daily profiles was sent to the site and followed up with a phone conversation to discuss the profiles and seek ways to reduce consumption.

Energy savings recommendations:

The owner of the pub was very keen to save energy and had identified a number of measures. There was a total refurbishment at the pub during the trial and a number of these were implemented. The measures included:

1. Turning all the lights off at night and turning off appliances that were on standby.

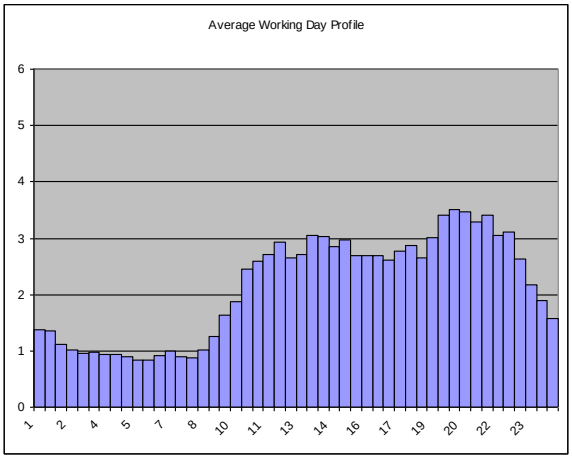
2. Split the lighting circuits so that there can be better control of the lighting and fewer lights left on.



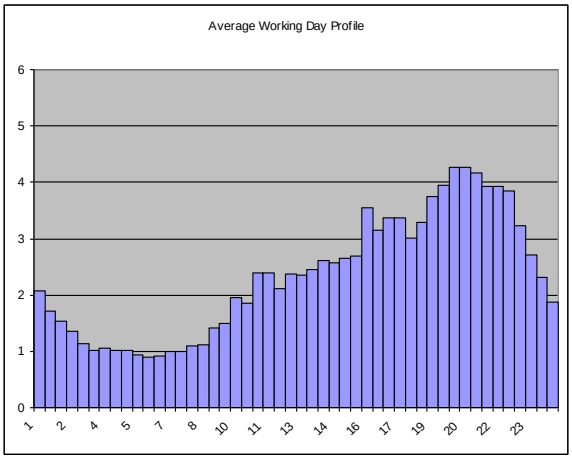
Energy Savings Implementation:

The profiles below show the averaged daily demand for a week in March 2005 and March 2006.

March 2005



March 2006



The owner of the bar conceded that he was now using the air conditioner a lot to improve customer comfort. They had also installed a second cooler downstairs. The owner does find the meter very useful and routinely checks the meter to keep track on his bill. He uses the data to picks up on exceptions and had recently been alarmed to see a weekly spend of £170 for a week, as a result of which he had tried to be more economical. The only thing he couldn't turn off at night was a TV projector fitted on the ceiling and he was planning to get the switch re-arranged to allow it to be turned off more easily.

Assuming that the owner is to be believed, there should have been an energy saving evident from the profiles. However, examination of the profiles showed an increase in 2006 compared to 2006. This does not mean t hat the owner did not save energy through his energy savings measure, rather, it would appear that the increased loads due to the air conditioner and extra cooler offset the savings.

The Lessons Learnt

Reasons for no savings recommendation:

4. The owner was working hard to reduce consumption and had good ideas that he had implemented. However, the increase in his usage through added loads more than offset his savings.
5. The owner made extensive use of the meter to understand his weekly demand and the individual demand of the appliances in his pub.

It is not easy to identify savings in a set of profiles from a single supply meter when there are offsetting increases in demand elsewhere.

ENERGY SAVINGS LESSONS LEARNT CASE STUDY FOR THE AMHURST LODGE HOTEL

Company Profile

The Amhurst Lodge Hotel is a budget hotel located in Stamford Hill, London. It comprises two buildings and a large garden. All rooms contain a fridge and electric heater. Other loads are mostly comprised of lighting, chilling appliances and office equipment. The hotel operates 24 hours per day all year.

Introduction

The business came into the trial as a result of the mail shot from London Energy. They were attracted by the opportunity for reduced energy bills and consumption. The owners are keen to protect the environment and state on their web site that the hotel is run by an "Eco-friendly management team".

Meter installation:

The primary electricity meter was replaced in both buildings with a PRI Liberty single phase meter with an attached Freedom keypad.

Meter Data Reporting:

The meter data was downloaded via a GSM modem in line with all other sites in the BEAMA trial. In addition, the customer was able to interrogate the keypad to look at the current day's consumption, the previous day's and the previous week's data. As well as this, BEAMA sent the site a sheet with one week's profiles from a week in January. This was followed by a phone call to discuss the profiles and find out if the site had been making any use of the meter and if the profiles suggested any ways to reduce consumption.

Energy savings recommendations:

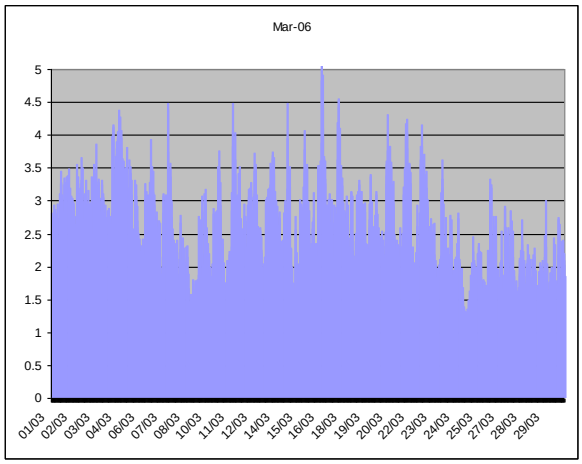
The hotel management were actively working on a number of energy saving measures. Those that they had implemented were:

- Extensive use of low energy bulbs
- Replaced room fridges with B rated fridges

In addition they were contemplating a number of further measures:

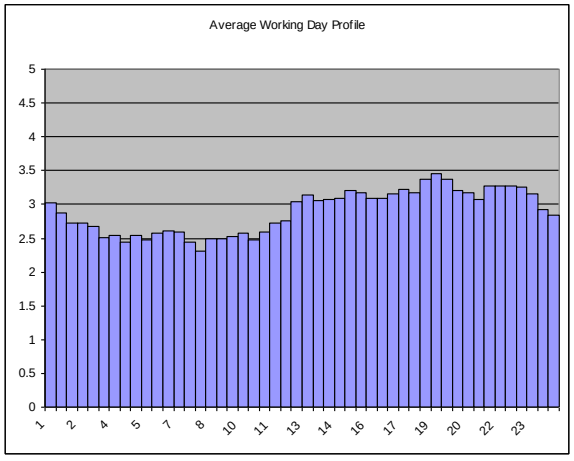
- Upgrading of insulation and draught proofing – this had not been checked for 10 years
- Looking to collect water off the roof
- Planning to up-rate the central heating – this was a necessary step but they intended to link it to removing the electric heaters from rooms
- Going to put a sheet by the meter and track their consumption every day.

Daily Profile for one building March 2006

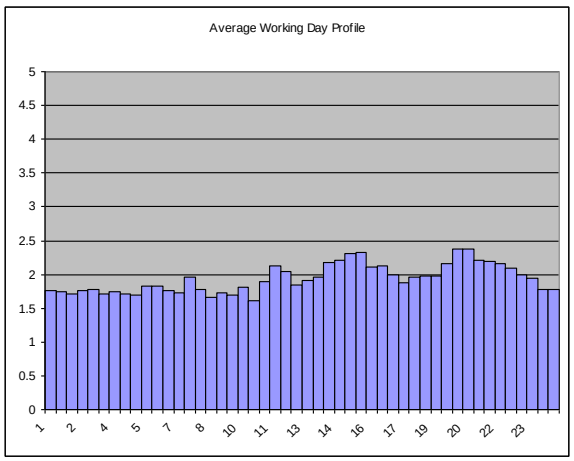


Energy Savings Implementation:

Sample Averaged Weekly Profile from February 06



Sample Averaged Weekly Profile from March 06



There is, in fact, a reduction in consumption in March compared to February but, given the variables of

occupation number and weather conditions, it would not be safe to draw a firm conclusion from these figures. The combined nature of the profile also means that savings cannot be identified for individual measures such as installing new, low energy fridges.

Lessons Learnt

3. The management of the hotel had found the smart meter very useful and it had helped them carry out a number of energy measures.
4. Those concerned to save energy seem to have a broader interest in sustainability; they do not allow their interest to be limit by the limits of the meter.

For complicated profiles it is very difficult to attribute changes in load to a single cause.

ENERGY SAVINGS LESSONS LEARNT CASE STUDY FOR WINSCOMBE LIBRARY

Company Profile

Winscombe Library is a small local library situated in the village of Winscombe, North Somerset. It is open four days a week; Tuesday, Thursday, Friday and Saturday.

Introduction

WInscombe Library was a site volunteered by North Somerset Council. It complied with the basic requirements of having a single phase supply and adequate GSM signal. North Somerset Council was interested in seeing the demand patterns of all its sites with a view to identifying reductions.

Meter installation:

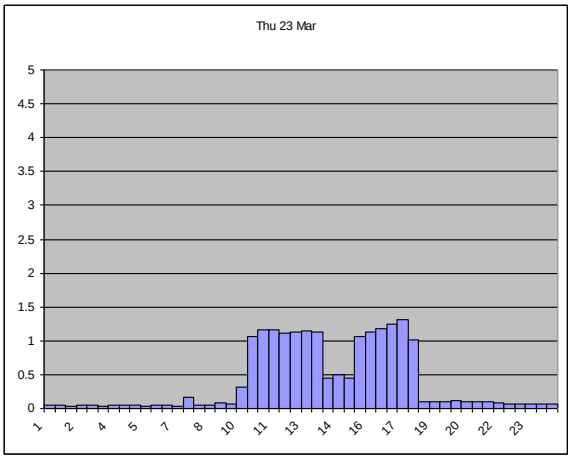
The primary electricity meter was replaced with a PRI Liberty single phase meter with an attached Freedom keypad.

Meter Data Reporting:

The meter data was downloaded via a GSM modem in line with all other sites in the BEAMA trial. These sites were identified late and data was not collected from them until January 2006. Since then a full data set has been obtained. A page of sample daily profiles was sent to the site and followed up with a phone conversation to discuss the profiles and seek ways to reduce consumption.

Energy savings recommendations:

Reviewing the profiles with the Library manager it was clear that there was little scope for any reductions in consumption. A typical daily profile is shown below.



The Library manager claimed that they were already following good practice. They turn off all computers and lights; a statement well supported by the profiles. The library had a small fridge as indicated by the small night time peak. They were not really using the meter but it had not been properly introduced to them to explain its capabilities. It was noted that she did not have responsibility for the energy bills and hence, was not rewarded for reducing consumption.

Energy Savings Implementation:

This site was already following good practice as far as could be determined remotely. There was no scope for further improvement.

The Lessons Learnt

Reasons for no savings recommendation:

6. There was no excess usage identifiable remotely.
7. The customer believed that they were already following best practice and could not identify any savings.
8. This site represents a best practice case for control of night time load.

ENERGY SAVINGS LESSONS LEARNT CASE STUDY FOR PPS DISTRIBUTION

Company Profile

PPS Distribution is a motorcycle dealership based in Welling, Darford. The salesroom is open from 10am until 5pm 6 days per week.

Introduction

The manager of the business volunteered to join the trial as a result of the London Energy mail shot. She was motivated by concern for the environment as well as the energy saving and accurate billing on offer.

Meter installation:

The primary electricity meter was replaced with a PRI Liberty single phase meter with an attached Freedom keypad.

Meter Data Reporting:

The meter data was downloaded via a GSM modem in line with all other sites in the BEAMA trial. In addition, the customer was able to interrogate the keypad to look at the current day's consumption, the previous day's and the previous week's data. As well as this, BEAMA sent the site a sheet with one week's profiles from a week in February. This was followed by a phone call to discuss the profiles and find out if the site had been making any use of the meter and if the profiles suggested any ways to reduce consumption.

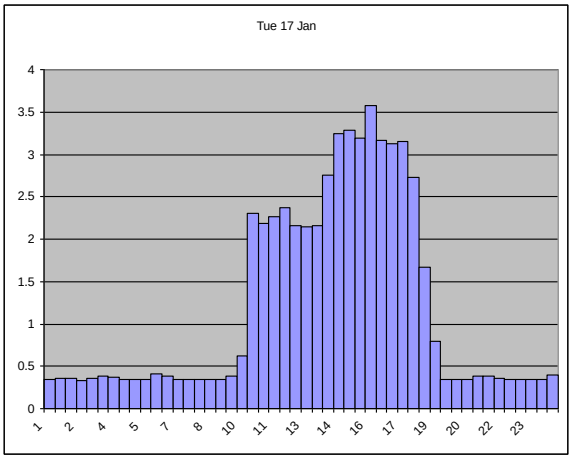
Energy savings recommendations:

The manager of the saleroom was very busy but was motivated by a desire to help towards climate change and reduce energy consumption and she tried to use the meter information to minimise demand. . She had received the profiles, had looked at them before the call and understood them. When they were discussed she identified the source of the 800W constant base load as display lighting. She agreed it would be a good idea to put these on a timer so as to turn them off during the night.

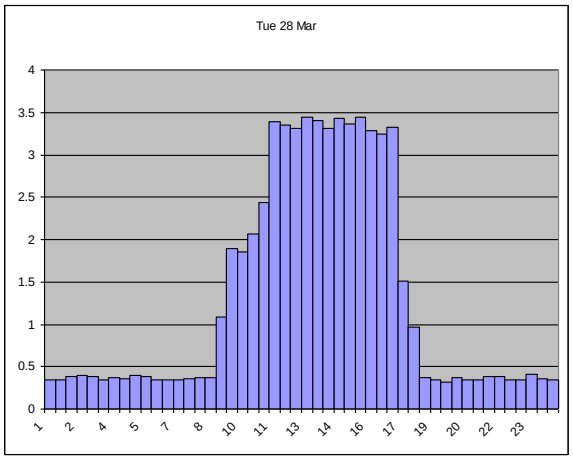
Energy Savings Implementation:

When the profiles before and after the call were examined it was clear that there had been no change in the base load demand. This can be seen in the sample daily profiles shown below.

Sample Daily Power Profile before Call



Sample daily Power Profile after Repair



The Lessons Learnt

Even well motivated people can fail to implement energy saving measures. This is likely to be due to the manager being too busy running the business.

Appendix 4 : First Customer Letter

EDF293 210x142 Bill 30/6/04 4:52 pm Page 1

LONDON ENERGY

Register now
Call on
0800 096 7355*
Monday - Friday
9am - 5pm

Or e-mail us at
amfreetrial@edfenergy.com
with your name, company name, account number, phone number and e-mail address

Act now, only the first 100 companies will qualify

WOULD YOU LIKE SMALLER BILLS?**

Mr AB Sample
ABC House
ABC Street
ABC Country
AB1 2CD

72431

<Account number>

Please pay

11% LESS**

Save with a new smart meter. A recent trial with residential customers showed an average saving of 11%.***

Only 100 places available

Be one of the first businesses in the country to try this exciting new electricity meter completely free.

Accurate readings

This new meter takes accurate readings every half hour and calculates the cost of your energy consumption, which allows you to see where energy is being wasted therefore helping you to be more energy efficient.

TRY OUR NEW MONEY SAVING METER FOR FREE

This special 18 month trial offer is exclusive to London Energy customers and will be allocated on a first come, first served basis.*** It's a unique chance to be one of the first companies in the UK to try out this innovative meter that could save your business money.

If you are allocated a place on the trial we will visit your site to check it is suitable. After that we will replace your current electricity meter completely free at a time that's best for you. It's as simple as that. The new meter will provide you with a clear pattern of your energy consumption, therefore helping you to identify ways to reduce it.

If you're interested in shrinking your bills and benefiting from this exciting new technology contact us today with your company name, account number, phone number and e-mail address. It could make a big difference.

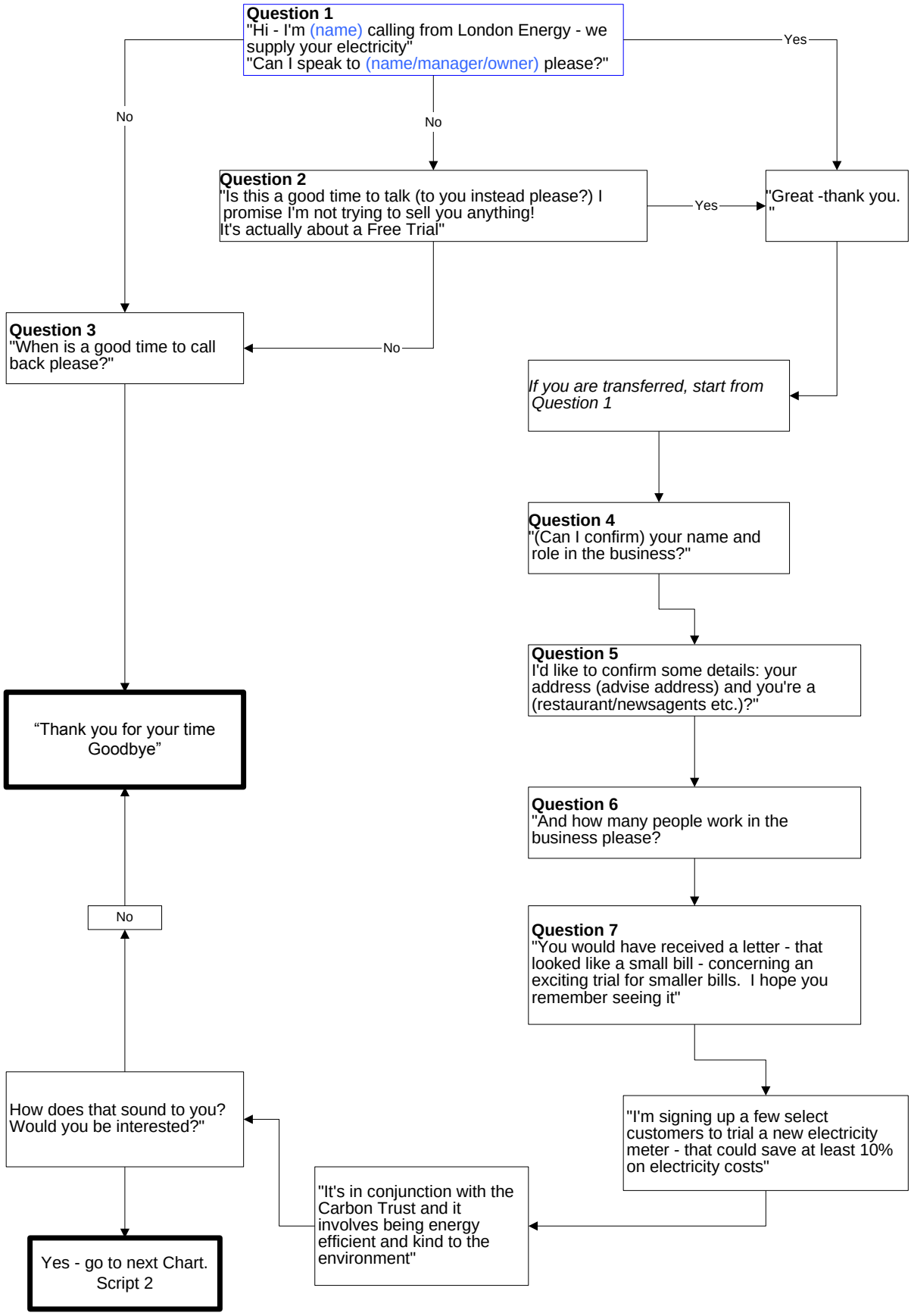
Your bills will always be accurate

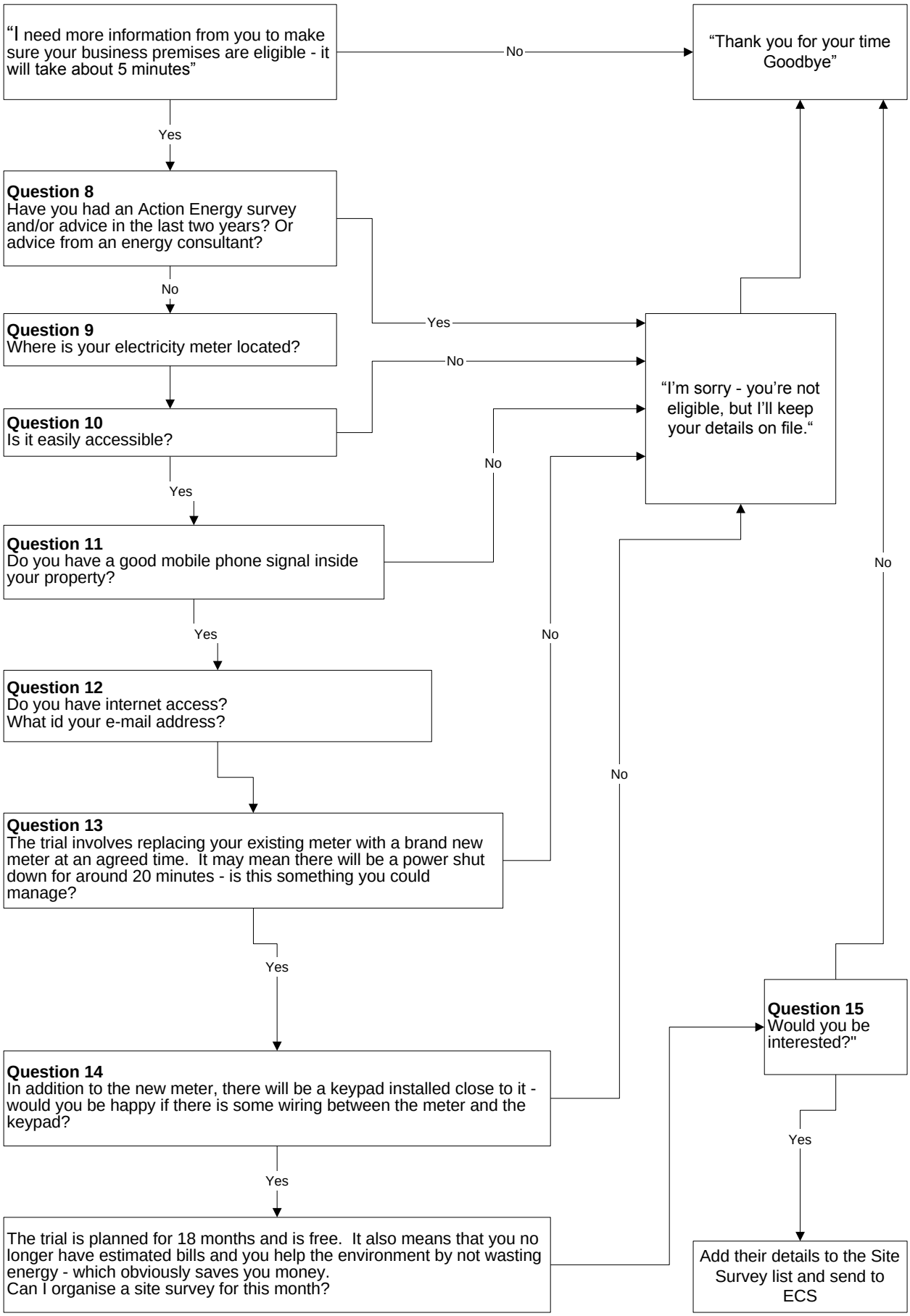
Your reading will not be estimated so you only pay for the energy you use. You can manage cash-flow more effectively and budget for the amount of energy you are likely to use based on previous actual usage.

TO REGISTER OR FOR MORE INFORMATION EMAIL US AT amfreetrial@edfenergy.com or call 0800 096 7355*

*Calls maybe monitored and recorded as part of our customer care programme
**Actual savings obtained by a business customer participating in the trial are not guaranteed and will vary for each participant
***Subject to terms and conditions which are available from London Energy
****Based on 118 customers trialled in Northern Ireland in September 1998

Appendix 5 : Script for Follow Up Calls




"I need more information from you to make sure your business premises are eligible - it will take about 5 minutes"
No
"Thank you for your time Goodbye"
Yes
Question 8
Have you had an Action Energy survey and/or advice in the last two years? Or advice from an energy consultant?
No
Yes
Question 9
Where is your electricity meter located?
No
Question 10
Is it easily accessible?
No
"I'm sorry - you're not eligible, but I'll keep your details on file."
Yes
Question 11
Do you have a good mobile phone signal inside your property?
No
Yes
No
Question 12
Do you have internet access?
What id your e-mail address?
No
Question 13
The trial involves replacing your existing meter with a brand new meter at an agreed time. It may mean there will be a power shut down for around 20 minutes - is this something you could manage?
Yes
Question 15
Would you be interested?"
Question 14
In addition to the new meter, there will be a keypad installed close to it - would you be happy if there is some wiring between the meter and the keypad?
Yes
Yes
The trial is planned for 18 months and is free. It also means that you no longer have estimated bills and you help the environment by not wasting energy - which obviously saves you money.
Can I organise a site survey for this month?
Add their details to the Site Survey list and send to ECS

Appendix 6 : Site Survey Forms

Smart Meter Trial

Customer Name	Business Name	Address	Post Code
Mr Whiley, Owner 7760204074104	K&K AUTO SPARES	81 REVELSTOKE ROAD	SW18 5NL TARIFF
Telephone 1	Telephone 2/E-mail address	Site Survey Date	Site Survey Outcome
020 8947 5372	kandkautospares@ukonline.co.uk		
Preferred Shutdown Time	Training Level	Installation Date	Agreement letter signed
Read Window	Rates/Tariff	GSM number	Previous consumption

Checklist:

Property

☐ Meter cupboard with a modern, well maintained electrical installation.

☐ Sufficient wall space for the new meter equipment.

☐ Own service fuse (no other customers are affected by disconnection).

☐ Space for keypad in/immediately adjacent to the cupboard and located above ground-level.

☐ No concerns of drilling or making good for the cable run. (i.e. the customer should be willing to accommodate visible cabling in the property relating to the equipment).

☐ Customer should be able to accommodate a pre-arranged, day time shutdown.

☐ Equipment adversely effected by power down?

Technical Criteria for the Supply and Installation.

☐ Service cut-out must be in a suitable condition to be operated for disconnection of supply. This is to allow the meter exchange, avoiding the possibility of delay from Networks for cut-out replacement or renovation.

☐ Customer installation should be suitably installed and maintained in line with Wiring Regulations BS 7671 (16th Edition). The survey does not need to carry out any testing to prove this, but visual inspections that the circuit is protected by its own fuse, suitably earthed and cables relate to the fuse size and are not over heating or in poor condition.

Installation of the meter and keypad.

☐ Space at the meter place to replace the existing meter with the new meter and any ancillary equipment that is associated with the new meter.

☐ Distance between the meter point and the preferred location for the customer keypad should be kept to a minimum. Preferably less than 5 metres.

☐ Cable run between the meter and the customer keypad should be a simple run. Preferably passing through no floors or walls, especially where the customer may not approve of drilling or where the work would be difficult and time consuming.

☐ Cable run should only be in an area that would not suffer aesthetically from its presence.

☐ Cable should be located so as not be subjected to mechanical stress.

☐ Keypad must be located in a suitable area and at a suitable height where the customer can safely access it.

Appendix 7 : Customer Agreement Letter

Customer Name
Customer Address

Date

Dear

Re: Advanced Meters for Energy Saving Pilot Scheme

As your energy supplier, London Energy is committed to finding ways it can improve the quality of service you enjoy from us.
One of the ways we can do this is to improve the accuracy of the way that we record your business's electricity usage.

As a result of this London Energy is participating in a trial of LCIP Small Advanced Meters which will record small business customer electricity usage on a half-hourly basis. The aim of the project is to reduce energy consumption through increased awareness of usage, thus reducing energy costs.

We would like to offer you the opportunity to participate in this pilot scheme which will run for a period of [18 months from _____ to _____.

Participation in the scheme will involve the following:

You will allow access to your property in order for a LCIP Small Advanced Meter to be fitted on your premises by an engineer from ECS Data and Metering Services Limited ("ECS").

You will allow access by ECS staff as required in order to maintain, repair, read, replace or remove the meter or for other purposes of the scheme.

You will provide feedback and comments to us in a timely manner when you are contacted, and will co-operate in making the scheme a success.

You will allow details of your premises to be exchanged with third parties involved with the scheme as required. by the pilot scheme

Participation in the scheme will not cost you anything. Your current terms and conditions and invoices for your electricity supply will be unaffected.

Upon conclusion of the scheme we will contact you to discuss the pilot. At this time we may remove the meter from your premises or alternatively leave it fitted. Whilst we will endeavour to meet your wishes at this stage the ultimate decision will depend on the results of the pilot scheme and will be the decision of London Energy.

If you choose to participate in the pilot you will be contacted by [insert cotact name] shortly to discuss the details of this exciting new initiative. If you would like to discuss any of the details of the scheme before committing please call[insert contact name] on [insert ph no.].

Yours sincerely

[ ]
London Energy plc

_____

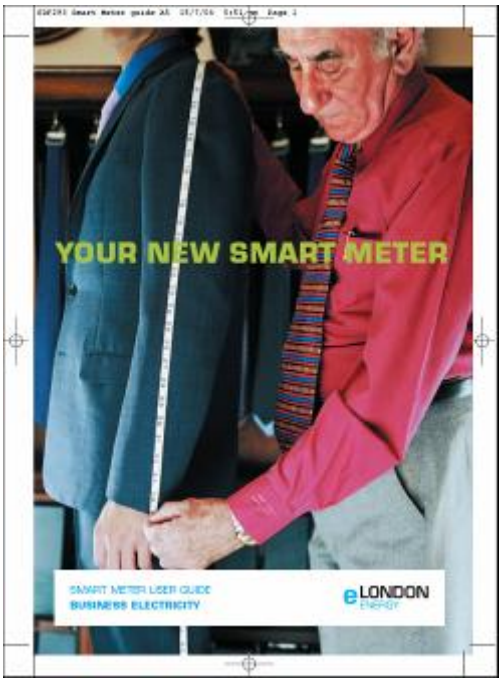
Consent to participation in the pilot scheme

I have read the above terms and conditions of participation in the Advanced Metering for Energy Saving Pilot Scheme and consent to my business premises being used in the Scheme subject to those terms and conditions.

_____
Signature

_____
Print Name

Appendix 8 : Instruction Booklet



EDF293 Smart Meter guide A5 15/7/04 5:52 pm Page 2

WELCOME TO YOUR SMART METER

Your new Smart Meter records the amount of electricity you actually use, so there is generally no need for you to read the meter or receive estimates.

A Smart Meter checks and records your consumption automatically every half an hour and sends the readings to our database via a communications link every night. This means that your bill is based on the amount of energy that you actually used so there is no need for estimates.

IMPROVING ENERGY EFFICIENCY

Because your Smart Meter reads your meter automatically and you can view this information, you have a very clear idea of how and when you use energy. Knowing when electricity is being used gives you more control over how it's used and how much it costs.

For instance, if you check your current usage at a time when you expect all electrical items to be switched off but the display indicates that usage is still above zero. Then this could be because appliances are on standby or not actually switched off. You're using electricity and spending money without knowing it.

Your Smart Meter gives you the information you need to reduce the amount of energy you use, and therefore the cost of your bill.

WELCOME

EDF293 Smart Meter guide A5 15/7/06 9:52 pm Page 6

Button 8
Standing Charge

You can press button 8 to see your daily Standing Charge, which is part of the cost of the electricity you use.

Press again or wait for change: 10.50P

Button 9
Instantaneous Parameters

Pressing button 9 gives you a lot of useful information.

Pressing once: 88888888

Technical: test (also press buttons A, B & 0 for the same result)

Displaying the time

Pressing twice: TIME

This displays the time according to the meter's internal clock in the 24-hour format in Greenwich mean time. When you put the clocks forward an hour in summer, the time on the meter's clock doesn't change.

It will be an hour behind until you move your clocks. Your bill is not affected.

Press 5 times or wait to change: 12:25

Displaying the date

Press 4 times: DATE

Press 5 times or wait to change: 30/11/04

Voltage

Press 6 times: VOLTAGE

Press 7 times or wait to change: 230

This shows units measured in Volts.

Current

Press 8 times: CURRENT

This shows the amount of current being used in Amps.

Press 9 times or wait to change: 0.012

Power factor

Press 10 times: PWR FACT

This shows the difference between the amount of power your electrical equipment uses and the amount of power supplied. This figure is the quantity of wasted energy. But don't worry, a fraction of every unit of power generated is always wasted.

Press 11 times or wait to change: 0.950

Frequency of supply

Press 12 times
or wait to change: FREQUENCY

This displays the frequency of supply. All mains electricity runs at 50 Hertz. If the figure is much lower than 50, it means the electricity network is heavily burdened.

IMPROVING ENERGY EFFICIENCY

If you'd like to know anything else about how your new Smart Meter works, please call us right away on 020 7326 6462.

Thank you once again for agreeing to take part in our Smart Meter trials. We hope you'll soon see the benefits of using your Smart Meter.

NB. All figures are hypothetical and do not represent actual costs.

FOR ANY INFORMATION ON HOW YOUR NEW SMART METER WORKS PLEASE CALL

020 7326 6462

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YOUR SMART METER KEYPAD

The easy-to-use keypad, mounted on your wall, enables you to access the information stored in your Smart Meter just by following these simple instructions.

Look at your keypad and use the functions as you work through the instructions, to make sure you're comfortable with using the keypad to access information.

Button 1
Total Unit Register

Pushing button 1 will show exactly how many kilowatt-hours or units you've used from the time your meter was installed.

KWH-UNIT 6.23

Button 2
Current Load and Cost

Pushing button 2 will show the amount of power currently being used (the load) by all of your electrical appliances in kilowatts (KW). This then changes to show the value in units.

KW LOAD changes to KW 2.35 value in units

If you push button 2 again the meter calculates and displays the hourly cost of electricity for that amount of load.

LOAD COST changes to 0.052/HR

This helps when you want to see how much electricity you use at different times of day and if energy is being used when you might not expect it.

Button 3
Today's Consumption and Cost

Button 3 displays the total number of kilowatt-hours or units you've used that day. As units are used, your Smart Meter calculates their cost and shows this information as a total daily cost. The final value is stored at midnight and the record is reset.

Press button 3: TODAY

Press again or wait for change: KWH 12-25

Press again: 60.99

Using this display helps you see how much electricity you use on different days.

Button 4
Previous Day (Consumption and Cost)

At midnight, your Smart Meter transfers the total number of units used in the day to a historical register and calculates the total cost as a daily total.

Press button 4: PREV DAY

Press again or wait for change: KWH 14-36

Press button 4 again: 61.25

Button 6
Previous Week (Consumption and Cost)

At midnight/00.00hrs on Sunday your Smart Meter transfers the total number and cost of units used in the week to a historical register and starts recording again. Pushing button 6 shows the previous week's total.

Press button 6: PREV WEEK

Press again or wait for change: KWH 98-21

Press again: 65.10

Button 5
This Week (Consumption and Cost)

Pushing button 5 shows the total number of units you've used since Monday at midnight and what they cost.

Press button 5: THIS WEEK

Press again or wait for change: KWH 98-75

Press again: 65.12

Button 7
Rate Registers and Prices

As well as storing daily and weekly information, your Smart Meter maintains registers for up to a maximum of 4 different tariff rates (Economy 7, Evening & Weekend etc). The units are stored in these registers as increasing values. Pressing button 7 shows the amounts in each register.

Price per unit – rate 1: R1 PRICE

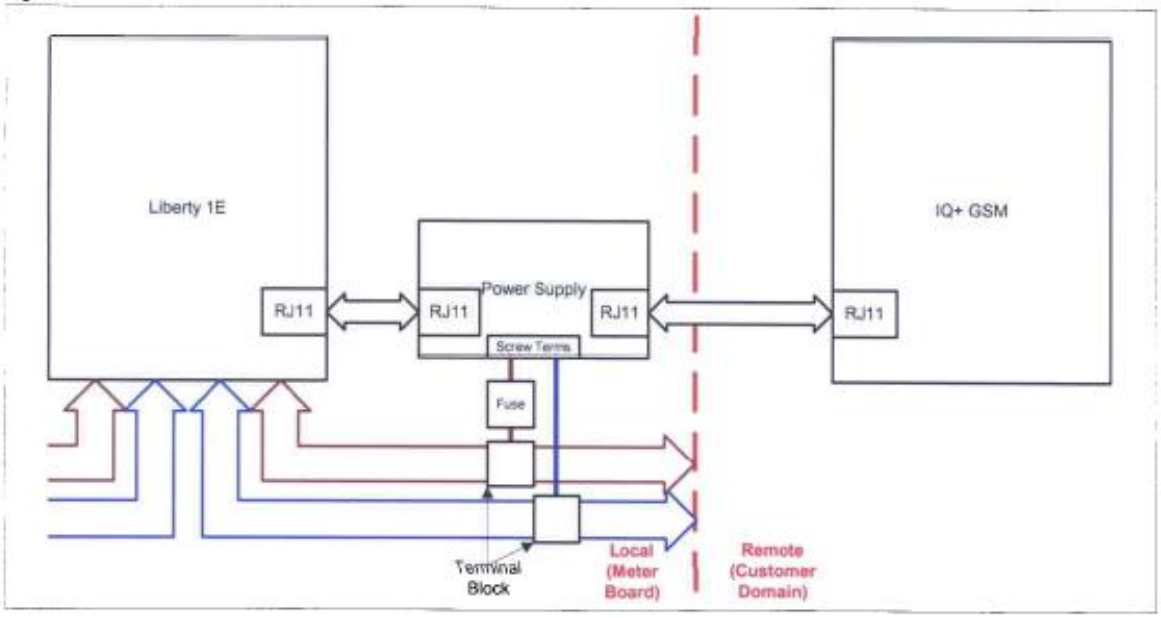
Value: 009.603p

Press again: RATE 1 KWH Value: 129

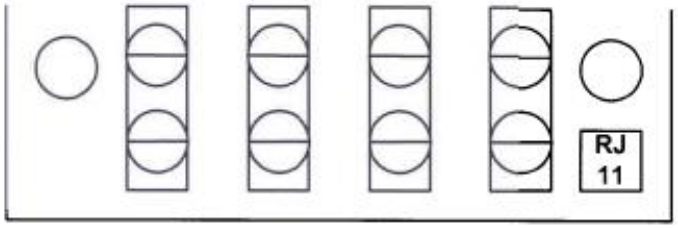
Appendix 9 : Wiring Details for Meter Installation

Advanced Metering Trial Installation Notes

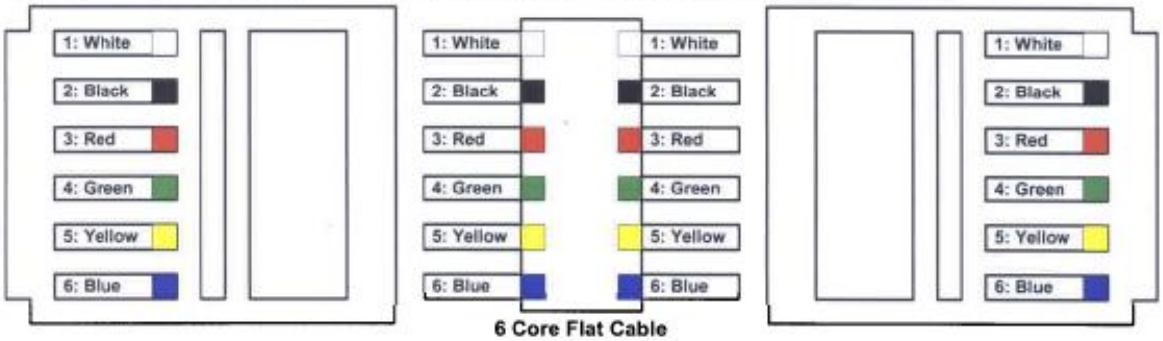
System Overview



Meter Terminal Block



Interconnecting Cable Pin-out (Connectors shown pin view, *hook at bottom*)



Appendix 10 : First Customer Call Script

Introduction

Hi – I'm phoning you on behalf of London Energy ? EdF Energy about the new meter that was fitted a while ago.
Am I talking to …….. I understand that you are responsible for the electricity bills. Is this a convenient time to talk? It will take about 10 minutes. [y/n]

I'd like to start by explaining what we have been up to. We have now finished installing the meters for the trial and want to launch the project.

Knowledge of Meter - Basepoint

You should have a keypad somewhere and this will now be showing you details of your energy consumption over the last day, week, and month.
Do you know where it is [y/n]
You should have been given a guide describing how to use it. Do you still have it [y/n]
Did it make sense to you – can you use it okay [y/n]
[if no] – explain how to use
Have you looked at the keypad? [y/n]

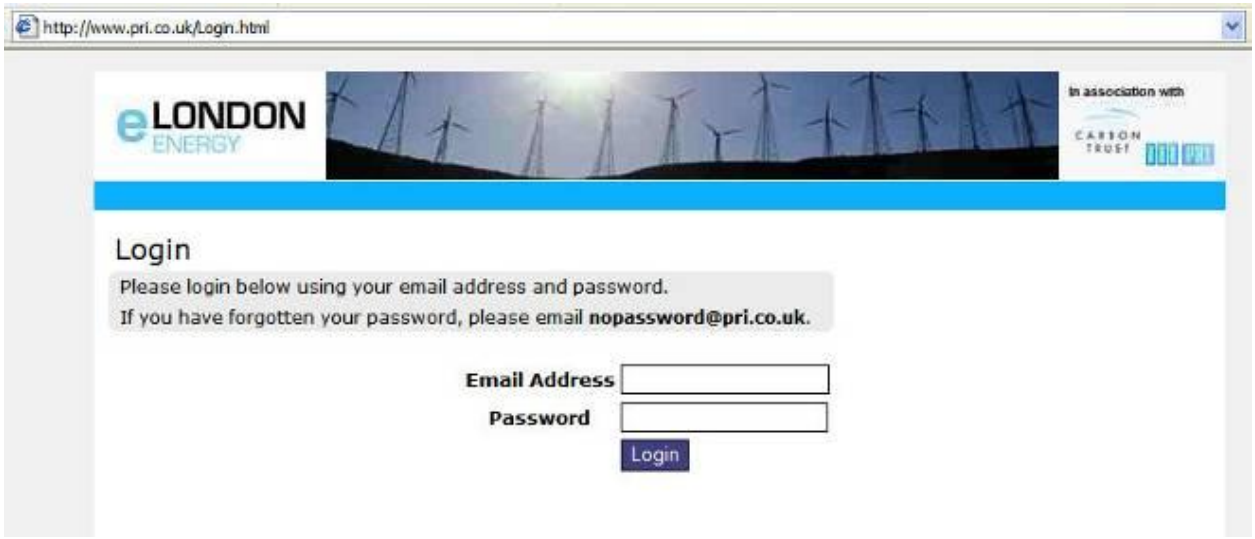
Meter Usage

The idea of the trial is that being able to see this information will help you make better use of your electricity.
Have you looked at the keypad [y/n]
Have you made any changes to your usage as a result [y/n]
[if yes] Could you give details [what action and when – to link to meter data]
One thing to look for is your overnight usage – are you leaving things on overnight that could be turned off, the data shows you what it might be costing. You will find a useful guide to energy saving on the LE web site.
Do you have access to the internet [y/n]
Do you have an email address we can communicate with you by [email address/n]

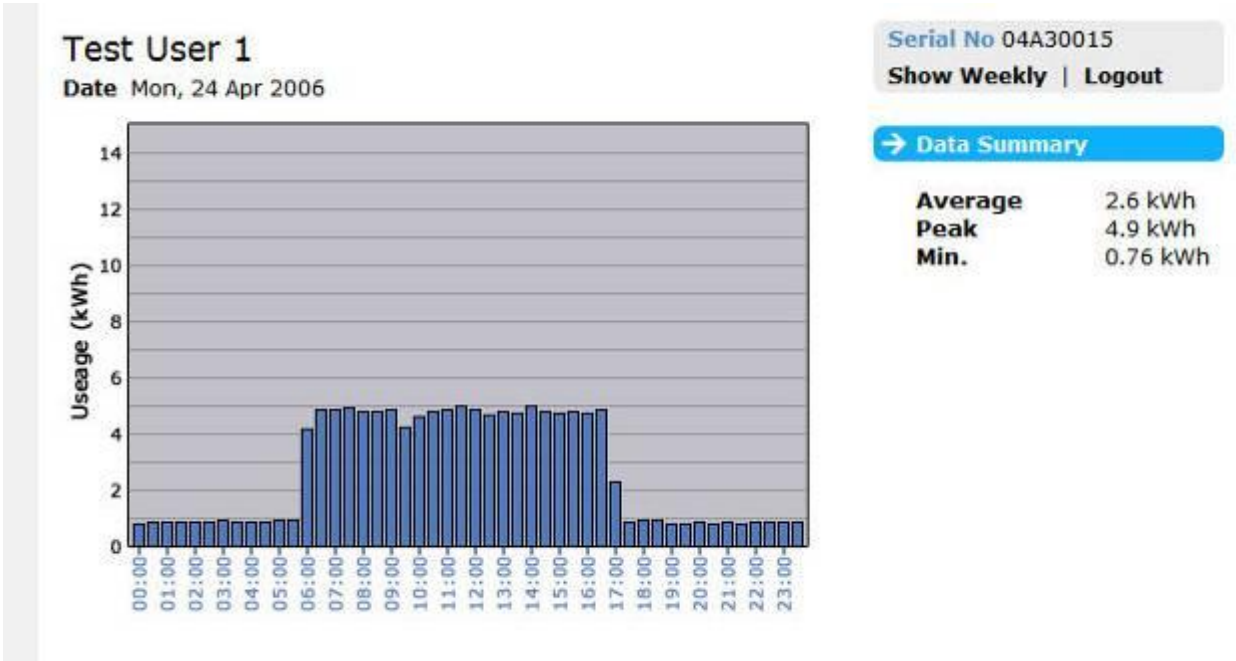
Background Information

Our records say that your business is a …….. Is this correct? [y/n]
How many employees do you have [A1]
What sort of work do you do [A2]
What is your electricity used for [A3]
[if specific use] Is this working all the time or does its use go up and down [A4]
Is electricity your largest energy bill or do you use a lot of gas or oil [A5]
Are you concerned about your energy usage [y/n]
[if y] Why are you concerned [devastating impact of carbon on the environment/cost]

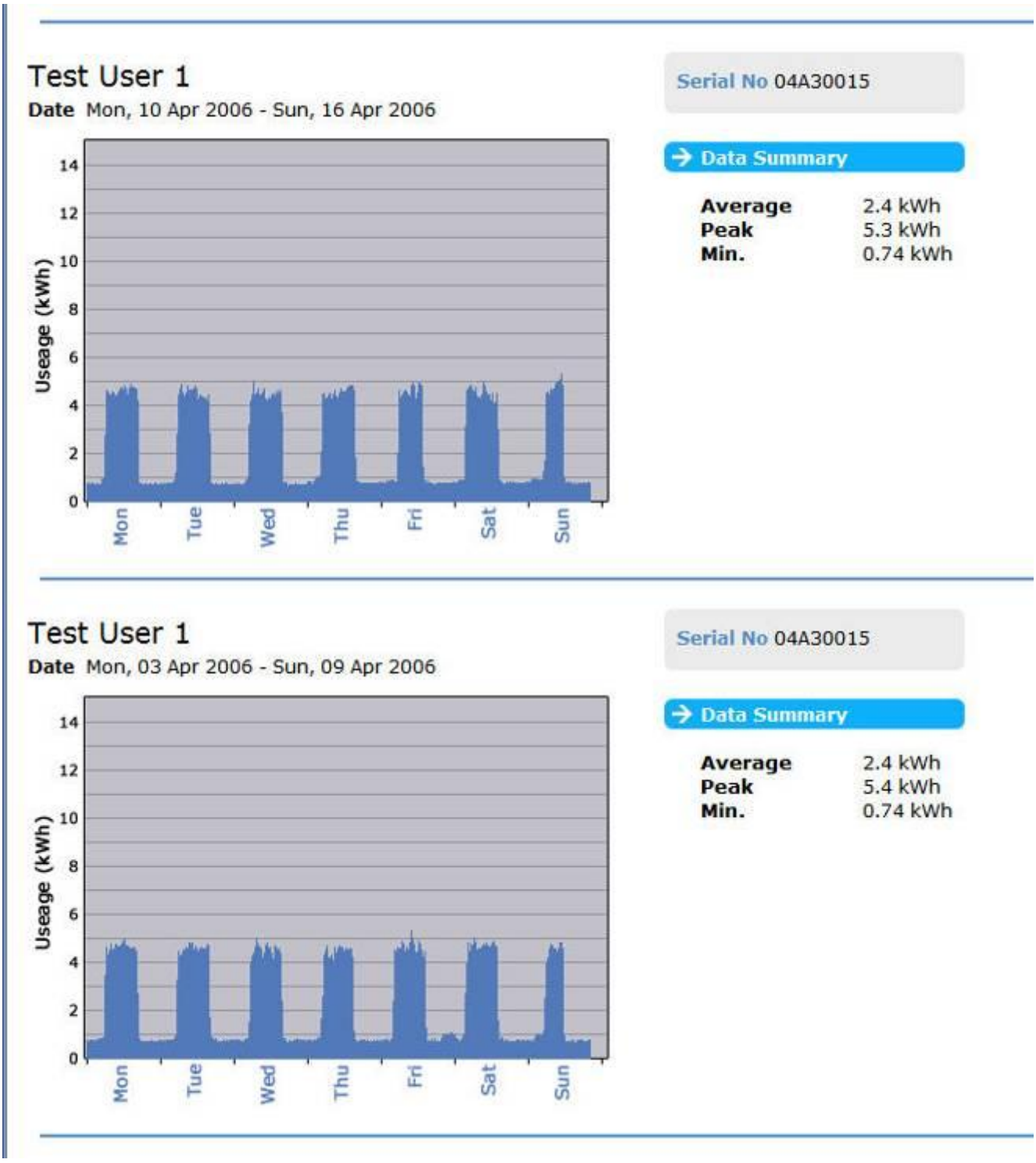
Appendix 11 : Web Site Pages



Login Screen



Daily profile



Weekly profiles

Appendix 12 : Second Customer Letter

LONDON ENERGY

London Energy

Freepost 3814
London
WC1V 6AJ

www.london-energy.com

MR AB Sample
Address
Address
Address
Address

Dear Mr Sample

Getting the most out of your Smart Meter

Now that your property has been fitted with a new Smart meter you can start to see a clear pattern of your energy consumption and can therefore start identifying ways to reduce it.

For instance, if you check your current usage at a time when you expect all electrical items to be off but the display indicates the usage is still above zero, this could be because appliances are on standby or not actually switched off properly - so you could be spending money without even knowing it!

The Smart meter checks and records your consumption every half an hour and automatically sends the readings to our database, therefore giving you the information you need to control and potentially reduce the amount of energy you use, and therefore the cost of your bills.

Using your easy-to-use keypad

Your keypad enables you to easily access all the information stored in your Smart meter and so will be vital in identifying wasted usage.

The keypad tells you both the amount of consumption you are using along with the cost of that usage. Putting usage into to monetary terms really helps to see how bills can be reduced through a few simple measures such as turning equipment off when not in use.

Overleaf we have shown a typical consumption graph for customers working normal day hours and some tips for things to look out for when analysing your own usage.

We have also enclosed a copy of your Smart meter guide in case you have mislaid your original version. This explains everything you need in order to use your keypad effectively and ensure you get the most out of your Smart meter.

As one of only 100 businesses trialling these new Smart meters with London Energy we hope you are able to use it to its full potential, enabling you to reduce both your consumption and your energy bills.

London Energy - Building our business around you

Yours sincerely

Andrew Edgoose
Managing Director - Customer Services

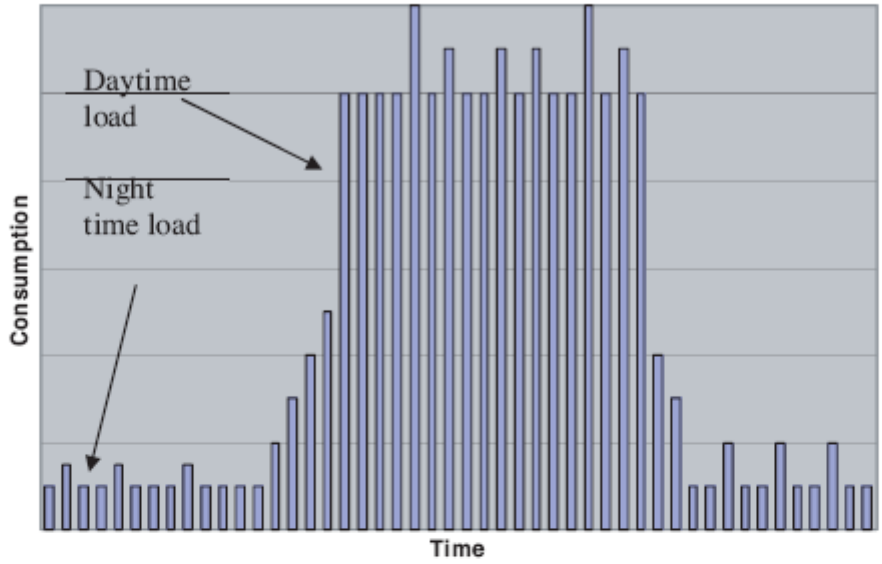
TOP TIP

At the end of the day when things are quiet, try turning equipment and lights on and off and then use your keypad to work out what each item costs you to run.

This will quickly inform you which equipment is using up your money, allowing you to focus on ways to cut your usage and therefore your energy bills.

The meter records your electricity consumption every half hour, which can be plotted in a bar graph as shown below.
For most customers the graph looks a bit like a top hat, with a low night time load followed by higher usage during the day.

Daily Profile



Every company is different but here are some of things to look for when trying to understand your usage pattern:

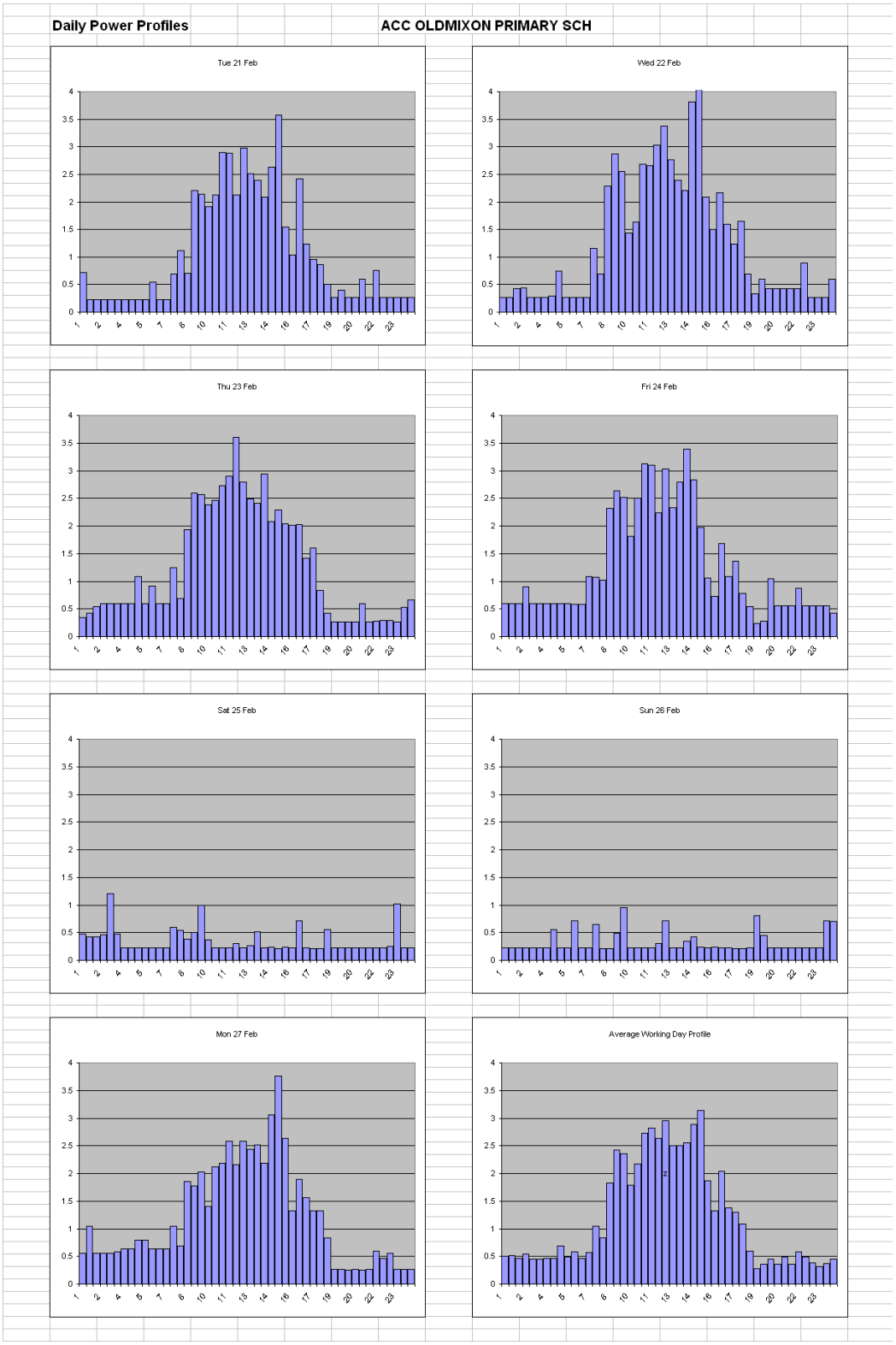
- **Night time load -**
  this is the energy you use when your business is doing nothing. Are you leaving more things running than you need to? Can you turn computers or lights off when no one's present? If you shut down over the weekend the demand then should be similar to the night time load.

- **Morning start up -**
  this shows when your business starts for the day. But does the power have to go on this early? Timers could be set back so that the building is warm when you arrive, not for an hour or so before.

- **Daytime peak -**
  this is what your business uses when it's in full operation. As you are present during the day you'd expect the consumption to be well controlled. However, you may see large peaks suggesting some of your equipment is using a lot of power. Could you use it less? Or is it getting old and expensive to run? Now that you know what it costs to run, does this bring forward the decision to replace it with a new, efficient unit?

- **Evening shut down -**
  How quickly does your consumption go down? Is anything being left on longer than it needs to be? It can also be interesting to see what goes on in the evening when you're not there. Are the cleaners or security leaving the lights on all night?

Appendix 13 : Sample Sheet of Profiles Sent to Customers



Appendix 14 : Script for Second Customer Call

(These call were made following the mail out of site profiles)

Q1 Have you received profiles?

Q2 Have you looked at them?

Q3 Do you understand them?

Q4 Do they suggest any ways you might save energy?

Q5 What changes could you make?

Q6 What would the effect be?

Outcome – Recommendation Yes plus details

No plus reasons

Appendix 15 : Third Customer Letter

Mr AB Sample
Address
Address
Address
Address

Dear Mr Sample

Seeing the benefits

With your Smart meter you should now be seeing a clear pattern of your energy consumption and the benefits and energy saving results! You will find enclosed with this letter another graph showing your business electricity consumption as recorded by your Smart Meter. The graph shows your consumption every half hour throughout the day and by comparing the information in this graph to that you received in January you will be able to see if there has been any changes in usage or energy saving results.

Energy saving tips

Here are some energy saving tips which may make a difference to your energy consumption:

- Switch lights off. A 100w light bulb costs more than £50 a year if left constantly on†
- Use low energy light bulbs. Replace standard fluorescent tubes with slim-line tubes.
- Install draught-proofing around windows and doors to reduce heating costs. An insulated building can help reduce heat loss by up to 40%.*

Your thoughts

We will be contacting you shortly to discuss your energy usage and the results shown by your graph to see if we can advise you on how to make further reductions to your energy consumption. We would also like to get your feedback on your Smart Meter and how valuable you feel the trial has been for your business.

In the mean time if you have any questions regarding the Smart Meter trial please contact us on 0207 100 3837.

As one of only 100 businesses trialling these new Smart Meters we hope that you are now starting to see the benefits in enabling you to reduce both your consumption and your energy bills.

London Energy – building our business around you.

Yours sincerely

† Based on a 100w bulb left on for 8760 hours using 6.6/kWh
* Source: The Carbon Trust – www.thecarbontrust.co.uk

Appendix 16 : Project Chronology

Date	Description	Duration	Comments
5/1/04	Project Awarded to BEAMA		
14/1/4	Project Kick Off Meeting		
6/2/04	London Energy Joined Project		Agreed in principle – Collaboration Agreement signed July 2004
19/7/04	First Mail shot		10,000 letters sent out
23/4/04	Meters design agreed		
19/7/04 – 4/8/04	Customer Responses	3 weeks	273 responses at 30/day
26/7/04	Customer follow up phone calls	3 weeks	
4/8/04	Site Assessment Visits	3 months	43 sites identified
1/10/04	Meter Delivery		
Oct 2004	Meter Installations Start	1/1/05 – 21 installed 1/3/05 – 29 installed 1/4/05 – 50 installed 1/5/05 – 52 installed 1/8/05 – 64 installed 1/9/05 – 81 installed 1/10/05 – 83 installed This was later revised to 81 sites when 2 meters could not be located	Early work delayed by reluctance of customers to shut down just before Christmas 21 of first list of sites declined to take part in trial
Oct 2004	Second phase of site recruitment calls	2 months	3 new sites
Dec 2004	Third phase of site recruitment calls	5 months	70 sites identified for assessment
Apr 2005	Meter fault identified		Software fault found on keypad.
June	Meters Firmware Upgraded	2 months	

2005

July 2005	North Somerset Council Recruited		18 sites identified
Aug 2005	First Customer Calls	2 months	
Oct 2005	Meter Communications fault identified		GSM modem communications failed on 51 sites
Jan 2006	Meter data collection exercise 1	6 weeks	Sites were either requested to power cycle the keypad, or, where they were not willing or able to do this the sites were visited
Mar 2006	Meter data collection exercise 1	3 weeks	Many sites sorted in the first exercise remained registered with the GSM network
Feb 2006	Mail out Guidance notes and profiles		The meters held 45 days of data so meters sorted in January provided data back to 1/1/05 These were sent out in batches as data was received and to stagger the customer calls
Feb 2006	Second Customer Calls	Feb – 42 Site savings reports Mar – 72 Site savings reports April – 73 Site savings reports	8 sites withdrawn from the trial, either because the sites were in dispute over their bills or because they could not be contacted
Apr 2006	Mail out second profiles		
Apr 2006	Follow up calls to explain results found	2 months	
May 2006	Final reporting and submission of Case Studies and Lessons Learnt Studies		No recommendations 43 No Savings 23 Savings 7