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Evaluating Water Efficiency Retrofit Projects: An Example

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Introduction

Evaluating Water Efficiency Retrofit Projects: An Example is a supplement to the Evaluation Guide for Water Efficiency Initiatives. The Evaluation Guide is intended to act as a reference document for water efficiency practitioners, who can use it to understand what evaluation is, why it is important, key aspects to consider when planning an evaluation, some of the different evaluation tools available and when they are useful.

This short example is designed to bring the Evaluation Guide to life, by using a real-world situation to explore how the evaluation tools and techniques described can be put to use. An invented water efficiency retrofit project is introduced, and then the evaluation process described, from the aims and objectives set at the outset, through to the conclusions drawn as a result of the evaluation findings.

The Project

As part of a drive to promote water efficiency, a water company in the North of England piloted a home retrofit project lasting for a duration of three years. The project initially aimed to visit 5,000 households (within a certain part of the water company's area), with a view to expanding the programme should it be a success.

The water company approached and developed a relationship with the local council; allowing the council's existing agreement with a delivery contractor to be used for the project. The agreement between the water company, local council and delivery contractor stipulated that the contractor's installers would conduct the water efficiency retrofits of the recruited households. The installers involved in the project were given training by the water company in order to understand what the project was aiming to achieve and how to install the water efficient devices. The installers were also expected to give basic advice on water efficient changes the householder could make, and so the training covered this as well as arming the installers with answers to a range of questions that were likely to come up.

Four weeks prior to the main launch of the project, there was a drive to raise awareness about the forthcoming water efficiency retrofit programme.

Representatives from the water company went to local supermarkets to engage with customers and sign them up for a home visit retrofit. The water company also distributed a promotional leaflet to target households, including information about what water efficiency retrofitting involves, benefits it could bring through cost and wider implications, and the partnership between the water company and local council.

Households within the target area were then contacted by the water company via post or email, dependent on their billing preference. The householder could register their interest to receive a free home visit, either through using the freepost envelope provided or via email (through a link to a submission form). When responses were received, the water company phoned the householder to arrange an appointment for the home visit retrofit.

The home visit retrofit was provided free of charge to the householder, the cost was covered by the water company. A full range of water efficiency devices were offered as part of the retrofit visit. This included tap inserts, dual-flush conversion devices, cistern displacement devices, efficient showerheads, shower timers, hose guns and water butts. Re-washering of dripping taps was also offered.

Evaluating the Project

The overarching aim of the project was to promote water efficiency. In order to achieve this a number of specific objectives were set [1], including:

(a) carrying out home visit retrofits in 5,000 households within the target area over a course of three years,

(b) achieving a 10% reduction in household water consumption in participating households at the end of the project, and

(c) achieving a positive change in water related behaviours in participating households – specifically that 35% of residents receiving a home visit retrofit report making positive changes at the end of the project.

In addition the water company was particularly keen to understand what worked well and what worked less in terms of delivering the project, to ensure that if it was expanded across a wider area then any lessons learnt could be carried forward.

The evaluation tools used to assess the project against its objectives, and the corresponding results, are outlined below.

Carrying out home visit retrofits in 5000 households within the target area over a course of three years

Project records were kept in order to monitor progress. At the end of the three year project period the records showed that in total 5323 households had received a home visit retrofit within the target area, meaning this objective had been successfully achieved.

Achieving a 10% reduction in household water consumption in participating households at the end of the project

Water consumption data[2] was used to assess achievements against this objective.

In order to rule out as far as possible the influence of factors external to the project, a before-after design was used alongside a control group. In practice this meant monitoring water consumption in 550 households participating in the project, and 550 control households from outside the target area (so they were unlikely to have heard of, or be affected by, the project). Neither group were aware they were being monitored. The control group area was chosen specifically because the properties were known to match a similar profile to those within the target area, as were the socio demographic groups living there.

Of the households having a retrofit, approximately 45 a month for the first year were chosen for monitoring. The selection of households to be monitored was done in the first year of the project to ensure an ample 'after' monitoring period, and was spread evenly throughout the year to avoid only including those that were particularly keen.

Water consumption data was collected via existing meters using automatic meter reading (AMR) technology.

Baseline data was gathered for approximately a year (sometimes longer depending on the exact date of last meter read) prior to the launch of the project, using historic billing data. The fact that only metered properties (the project was open to all households, metered or not) were monitored meant that this evaluation activity was biased towards this group, and care should be taken when generalising any results. However in reality budget constraints made it unrealistic to take steps in order to monitor unmetered households.

Meter reads were taken every six months as standard for billing purposes, and these reads were used as part of the water consumption data set. In all metered households participating in the project, the installer would take a read on the day of the home visit retrofit, giving a clear point from which to assess before and after use. As the home visit dates for the participating households being monitored were spread evenly across the first 12 months of the project, the 'estimated home visit date' for the control households was taken to be the 6 month point. At this point, readings were taken for all households within the control group.

At the end of the project, after checking for and removing any erroneous data, the average before and after daily water consumption, and so any change in consumption, was calculated per household for the participating group and the control

1. See section 3.1 in Evaluation Guide for Water Efficiency Initiatives for further information on this process
2. See section 4.1 in Evaluation Guide for Water Efficiency Initiatives for further information on using water consumption data in evaluation

group. Taking into account properties that were removed as outliers or as a result of erroneous data meaning too few readings were available, a total of 514 participating households and 498 control households were included in the final calculations. Over the course of the project the average change in water consumption for the control group was an average increase in use of 6 litres per day (from 458 to 464 litres/property/day), while for the participating households there was an average reduction in use of 34 litres per day (from 441 to 407 litres/property/day). The average reduction of 34 litres per day represented a direct reduction of 8% for participating households following the home visit. Taking into account the 1% average increase in water consumption shown within the control group (as it was assumed that had the participating households not received a home visit retrofit they too would have shown a 1% increase in consumption on average), the overall average reduction was 9%. Therefore the water consumption data revealed that the project did not quite meet this objective.

Achieving a positive change in water related behaviours in participating households – specifically that 35% of residents receiving a home visit retrofit report making positive changes at the end of the project

Surveys[3] were used to understand what impact, if any, the project had on water using behaviours.

Prior to the launch of the project, and before any projects activities had begun, a baseline survey was conducted by the water company in order to assess attitudes towards water efficiency and the frequency and types of water efficient behaviours carried out by their customers. The survey was carried out within the project target area (an area with over 50,000 homes).

As the company held email addresses for all of those customers that received their billing electronically, an on-line survey was used as the primary method via which to gather data – all customers within the target area for which email details were available were sent the link to the questionnaire (a total of 12,086). In addition, an effort was made to include those groups that could be excluded from using an on-line approach (older people and those that did not use the internet), with the same questionnaire sent in paper form by post to 2000 customers within the target area, randomly selected from those that received their bills by post. As an incentive to complete the survey, entry to a prize draw was offered. Overall a 13% response rate was achieved, with 1382 on-line responses (11% response rate) and 410 postal responses (21% response rate), 1792 responses in total.

At three month intervals throughout the project, customers that had received a home visit were sent a follow-up questionnaire. Although this meant that some who received the questionnaire had only had their home visit a week before and others nearly 12 weeks before, this approach still kept a more consistent 'after' time frame than surveying all at the end of three years. The route via which the questionnaire was sent again corresponded with the customer's billing choice, either an on-line survey was used and the link sent via email, or a paper questionnaire was sent by post. As an incentive to complete the survey, entry to a prize draw was offered. Over the course of three years, all 5323 participating households were sent the follow-up survey, and a 36% response rate was achieved with 1916 questionnaires completed in total.

[3] See section 4.2 in Evaluation Guide for Water Efficiency Initiatives for further information on using surveys in evaluation

In order to compare the results of the baseline survey conducted prior to the start of the project to that of the follow-up survey, many of the same questions were repeated as well as new ones added. Of particular interest for assessing achievements against the objective were four questions relating to water using behaviour:

1. How often do you wash/rinse dishes under a continuously running tap?

(Answer options: always, very often, quite often, sometimes, occasionally, never)

2. How often do you turn off the tap whilst cleaning your teeth?

(Answer options: always, very often, quite often, sometimes, occasionally, never)

3. As a result of having a water efficiency home visit, have you cut down the time you spend in the shower?

(Answer options: yes a lot, yes some, yes a little, no not at all, don't know / not applicable)

4. As a result of having a water efficiency home visit, are you more careful with how you use water?

(Answer options: yes a lot, yes some, yes a little, no not at all, don't know)

Combining those that responded 'always' or 'very often' to each of the first two questions gave a broad picture of the number of respondents that were carrying out these behaviours regularly. The baseline survey results showed that 24% of respondents were regularly washing dishes under a running tap, compared to 17% at the follow-up survey – an improvement of 7%. Meanwhile, 62% reported regularly turning the tap off when brushing their teeth in the baseline survey, compared to 85% at the follow-up – an improvement of 23%. Because no control group was employed, and because the baseline and follow-up respondents were not the exact same group (many of the baseline respondents would not have gone on to have a home visit, while many of the project participants may not have filled in the original survey), it was not possible to be completely certain that these positive changes were a direct consequence of the project, however the results looked promising (even though they did not meet the targeted increase of 35%).

Questions 3 and 4 were included in the follow-up survey only and directly asked if a change had been made, and if it was as a result of the project. In total, 38% of respondents reported having cut down on the time they spent in the shower as a consequence of the home visit, and 42% of respondents reported being more careful with how they used water. These two direct questions indicated that the objective had been met.

Focus groups[4] were used at the end of the project to further understand how the home visits had influenced the water using behaviour of households, adding meat to the bones of the water consumption data and survey results. Different types of households were purposefully recruited to ensure a range of views were heard, including single person households, older people, and households with children. In total 10 focus groups were held, involving 76 people who had received a home visit retrofit. The groups were run by an experienced facilitator, and each was recorded and later transcribed for analysis. Each focus group lasted 90 minutes, and the sessions were held at three different community centres within the area, at a range of times of day. A cash incentive was given at the session to encourage participation.

The focus groups examined how water was used, changes in water use as a result of the home visit, barriers to change and so on, as well covering delivery elements that fed into the evaluation of processes (discussed further below). The findings around changes in water use were positive, with it becoming clear that the home visits had prompted a range of behavioural changes, some big and some small, and that this was often dependant upon where the person was starting from (i.e. were they already quite conscious of their water use and had discovered a little extra they could do, or had they not really thought about how they used water before, and so had discovered a whole variety of changes to implement). Specific barriers to change were also identified, enabling the water company to consider how these may be addressed in future work involving households.

Both the survey and focus groups showed that the project achieved a positive change in water related behaviours in participating households, with the survey showing that the specific objective of 35% of residents reporting positive changes had been met.

[4] See section 4.3 in Evaluation Guide for Water Efficiency Initiatives for further information on using focus groups in evaluation

Evaluation of project processes

Project records proved particularly useful in understanding certain elements of the project. For example, the water company wanted to understand how effective their recruitment for the project had been, particularly the use of email and on-line forms as this was something they had not tried before. Project records showed that just over 40% of participating households had been recruited on-line via the email link to an on-line submission form, indicating that this particularly cost-efficient recruitment method had been a success. However it was also clear that over half of participating households had been recruited via letter, and so keeping multiple options would be important to appeal to the widest possible audience.

It was also key to understand which devices had been most successfully fitted, and after six months the project records clearly showed that while tap inserts had been installed in over 80% of properties visited, water efficient shower heads had only been installed in 16%. Discussions with the installers quickly revealed that the shower head on offer did not seem to appeal to the households. Action was taken to alleviate this problem with installers carrying a range of showerheads in different colours, and after a further three months it was clear that this had a positive impact on installation rates, with 46% of households now receiving one.

The follow-up survey was used to assess satisfaction with various elements of the project, including the length of time between requesting and receiving an appointment, the available appointment times, the information provided by the installer about the devices installed and the information provided by the installer about ways to save water. Overall the survey results indicated that satisfaction with the project was high, however there was some dissatisfaction around the available appointment times. This was followed up in the focus groups, and it became clear that it was difficult for many people to organise being at home during normal working hours (when the home visits were being offered). As a result, the water company will consider offering early evening (up to 7pm) and Saturday appointments in future work.

Discussion within the **focus groups** relating to project delivery highlighted the importance of the installer providing a clear description to the householder of the device they were fitting and showing them exactly how it worked. Where focus group participants had removed devices following the home visit, it was often because they were disappointed with their performance. This disappointment appeared to be a result of misuse due to misconceptions, or inappropriate installation, problems that improved installer training and a clear demonstration at the time of fitting could help to alleviate. Also of key interest for future work were people's motivations for taking part in the project. While the focus groups revealed a wide range of motivations, with many people having multiple reasons, the wish to 'do the right thing' and to avoid waste were repeated throughout.

Evaluation conclusion

The evaluation activities carried out showed that the project had met two of its specific objectives, successfully carrying out over 5,00 home visits with over 35% of households receiving a home visit reporting making positive changes in how they used water. The third objective, to achieve a 10% reduction in household water consumption, was narrowly missed.

Evaluating the processes of the project enabled the water company to identify key areas for improvement relating to recruitment, device choice and installer training. Whilst the objective of reducing water consumption by 10% was missed, the water company felt the project overall had been a success and could see that with tweaks to improve project delivery this target was within reach. Based upon this, the decision was made to roll out the home visit retrofit project further, with the aim of reaching a further 20,000 households over the following three years.

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