



An evaluation of the Plug In water saving project

Phil Beardmore

Calendula Consulting

June 2012

www.calendula.org.uk



South Staffs Water



Wolverhampton Homes

Introduction

This is an evaluation of the Plug In project that has been running since April 2011. The project aimed to install water saving measures in social housing in the Midlands, and to promote behavioural change among residents. The project was launched by the Environment Agency and the partners included Severn Trent Water; South Staffordshire Water; Global Action Plan; Northfield Ecocentre; and five social housing providers – Accord Group; Black Country Housing Group; Optima Community Association; Orbit; and Wolverhampton Homes.¹ Some training was provided to housing providers who joined the project later (Dales Housing, LHA-ASRA and Rykneld Homes).

Executive Summary

The Plug In water saving project has engaged seven social housing providers and their residents from across the East and West Midlands in water saving activity on a larger scale than previously. The project has been a success for the Environment Agency, enabling to fulfil their objectives in the *Water Resource Strategy for England and Wales* and *Working for a Better Midlands*. It has also been a success for the water companies, Severn Trent Water and South Staffordshire Water, who have formed partnerships to enable them to deliver large numbers of reliable water saving measures with certainty. Housing providers have succeeded in mainstreaming water saving as a core activity within their organisations for the first time, enabling their residents to take environmental actions and save money. Plug In has successfully established a working partnership between different agencies, with a key strategic role for the Environment Agency in achieving senior level buy-in from housing providers.

More than three and a half thousand measures have been installed in approximately three and a half thousand homes up between April 2011 and June 2012. Productive entry points at which water saving measures have been installed include void works and planned maintenance. The measures can be installed by maintenance contractors, non-maintenance housing association staff, or sometimes by residents themselves. The project has succeeded in getting measures installed in homes where a need for them has been demonstrated. The measures installed have been well-received among the residents who have understood how they work.

The project faced start-up difficulties due to lack of baseline data about water efficiency of housing stock and due to concerns over the suitability and utility of certain measures. Partners reacted

¹ Note on terminology: I have used the word 'resident' throughout to describe any householder (including leaseholders) although I am aware that different housing providers have their own terminologies e.g. customer, tenant. I have used 'engagement' of residents although I am aware that different housing organisations have their own terms including involvement and empowerment. The use of these terms is not intended to be a judgement on the performance of any housing provider but is merely a way of using standardised expressions throughout the text.

swiftly to these issues and were able to successfully identify the most appropriate measures for each housing provider's stock.

Substantial staff resources were put into the project by the Environment Agency, the water companies, and the housing providers. The water companies also contributed significant resources by paying for the water saving measures. The resources expended represent good value for money for the Environment Agency and water companies to fulfil their strategic objectives around water saving. For the housing providers, this new activity aligns with existing commitments to energy saving, community engagement and financial literacy and so the commitment of resources to the Plug In project is appropriate to their mainstream business.

Eco Teams has been an effective way of engaging residents on water and energy saving issues in the Plug In project. It has been a fun and inclusive way of learning about water and energy saving, that has been flexible to the needs of different housing providers. Eco Teams has succeeded not only at achieving specific pro environmental behaviours such as turning appliances off standby, but has enabled residents to make the transition from automatic to reflective behaviour in the way they manage water, energy and other natural resources.

Although the feedback we have obtained from residents has been limited, it is clear that the value which people place on water as a precious resource is uneven, and that awareness and understanding of the environmental impacts of water use is low, and particularly low compared to people's awareness and understanding of the environmental impacts of using gas and electricity. Eco Teams has had a substantial impact on people's behaviour with regard to water and energy use, but has had less impact on people's awareness and attitudes with regard to water use, and participants' understanding of issues such as water scarcity and the impact of water use on ecosystems remains weak. Participants are happy to adopt water saving behaviours when introduced to such behaviours, despite their poor understanding of the value of water. Perhaps this is because they understand that some water saving behaviours have a direct impact on their consumption of gas or electricity and therefore their expenditure, and their carbon dioxide emissions, since participants are generally quite aware of the impact of gas and electricity use on the greenhouse effect. Participants with a water meter have a general awareness of the monetary value of water but are unable to translate everyday water using activities into any kind of meaningful currency in terms of volume or financial value. Meter use does not seem to have affected their understanding of the environmental impact of water use.

The way in which water saving measures and advice enables householders to adopt and sustain pro environmental behaviour varies according to the degree to which the householder is able to experience reflective or sensory perception of the benefits and outcomes of the measure. We have outlined the concept of a Water Saving 'Ladder of Empowerment' to visualise the different ways in which measures enable these sensory or reflective outcomes to be achieved. Using multiple measures would seem to be a possible route to achieving the maximum combination of sensory and reflective outcomes.

The Plug In approach has the potential to be adopted by more social housing providers around the East and West Midlands and to achieve additional water and carbon savings through reliable installation of measures and behaviour change.

Photo Gallery



Training for maintenance teams, using EcoTeams games and water-saving products



Residents playing the energy-saving “price is right” game



Eco Teams training

Contents

Terms of reference	5
Strategic context	6
What were the motivations behind the project?	6
What was the baseline from which the project started?	7
What has the project achieved?	8
What targets have been met by the project?	10
What resources did partners put into the project?	10
What internal cultural and organisational barriers has the project faced?	11
What indicators were used to measure the success of the project?	12
How to explain variance between intended targets and actual achievements?	13
Procurement of measures	14
Procurement of installers	15
What have we learned about which kits will work in which physical contexts?	15
Eco Teams	16
Were the residents representative?	18
Overall success factors	21
What did residents tell us about the project?	22
Focus group	24
Conclusions	32
Recommendations – a checklist for success on future projects	40

Terms of reference

The terms of reference for this evaluation were as follows:

- Internal organisational and cultural barriers that housing providers face in delivering the project
- What opportunities exist for housing providers to deliver the project e.g. planned maintenance, energy efficiency programmes, caretaker schemes
- Lessons learned from the project
- How people value water and how this relates to environmental and socio-economic segmentation
- How people value the water saving kit and the impact on their behaviour of different levels of physical intervention
- The effectiveness of the training given to housing provider staff
- The effectiveness of the Eco Teams approach, where this has been delivered, in changing the behaviour and attitudes of residents
- How the Eco Teams offer can be adapted to fit the needs of different housing associations
- What are the procurement issues that partners face in specifying the right kit
- A framework for understanding which kits will work in which physical contexts
- Whether compulsory or optant metering leads to different water saving behaviour to non-metered households

- A checklist for success

It is not specifically within the remit of this evaluation to undertake quantitative evaluation of the amounts of water or carbon dioxide saved by the measures, nor of the cost-effectiveness of these measures, since this is being carried out separately by the water companies.

Strategic context

We are at a crossroads in the way we use and value water. Climate change impacts upon the availability of water with some areas of the country facing severe water stress; changing demand for water places further stress in some areas; charging systems are archaic but with no obvious and universally agreed system to replace them. The Government's 'Water For Life' White Paper describes a vision for water management in which the water sector is resilient, in which water companies are more efficient and customer focused, and in which water is valued as a precious resource. The average person uses 150 litres of water per day, which needs to be reduced by around 10 litres per day to be able to meet our water needs sustainably.

We know from previous work undertaken ² that:

- Consumers have limited awareness of water scarcity and the environmental implications of water usage
- There is little motivation to save water, only awareness of basic water efficient behaviours
- Personal habit and preference governs water behaviour
- Water efficiency is not a factor in appliance purchase
- Water is seen as plentiful and a right
- Consumers tend to evade personal responsibility by blaming others
- Consumers mistrust water companies as wasteful.

Existing good practice such as the Waterwise Tap Into Savings project, and the Preston Water Efficiency Initiative demonstrate which water saving measures deliver the most reliable water savings.

They key issues of uncertainty that face water saving projects such as Plug In include:

- What water savings can we expect from retrofitting under different scenarios e.g. partnerships with social housing providers, utilities, piggybacking on metering programmes
- How can we carry out retrofit in a more cost-effective way
- Which devices provide most savings and value-for-money
- How actual savings compare to modelled
- How much carbon dioxide is saved

² For example Defra, *Public Understanding of Sustainable Water Use in the Home* (Sept 2009) - http://randd.defra.gov.uk/Document.aspx?Document=EVO503_8291_FRP.pdf ; Waterwise, Evidence Base for Large-Scale Water Efficiency in Homes http://www.waterwise.org.uk/images/site/Policy/evidence_base/evidence%20base%20for%20large-scale%20water%20efficiency%20in%20homes,%20waterwise,%20october%202008.pdf

- Is multiple device retrofit more effective than single device retrofit?

What were the motivations behind the project?

The project was a successor to the Tap Into Savings project in Coventry, which involved the Environment Agency, Severn Trent and Global Action Plan, and whose successes the partners were keen to replicate in a social housing environment.

The project aligns with Environment Agency's *Water Resource Strategy for England and Wales*. It also aligns with the Environment Agency *Working for a Better Midlands* document, with an intended outcome that people value water and its contribution to the environment, ecosystem, and economy. The specific objectives of the project were to reduce water waste and carbon dioxide emissions, and promote pro environmental behaviour in the context of water consumption.

The initiative came from Environment Agency and one of the water companies who got the two water companies and the housing providers together to identify a way of funding the project. In some cases the Agency had existing relationships with housing providers and in other cases they were establishing relationships for the first time. One housing provider mentioned that they met the Agency through SHAP – the Sustainable Housing Action Partnership, and another mentioned that they had met them at a Sustainability West Midlands event.

Some housing providers were already doing energy efficiency programmes (installations and/or advice) and saw a water saving project as a natural extension of those programmes. One housing provider mentioned that before the project, it had been their ambition to raise awareness among residents and staff of the value of water to the economy, to society and to wildlife. They also mentioned that they saw valuing water as part of their work on financial inclusion. Another housing provider said that they had previously wished to reduce tenants' living costs on fuel and water bills. One housing provider said that they were able to manage water effectively in their offices but struggled to manage water use in tenanted properties through behaviour and non-drastic works. In Decent Homes programmes, the most common ways for providers to reduce water waste are through smaller cisterns and dual flush toilets, and also through smaller sinks and baths, although this is primarily intended to maximise living space. One housing provider had already specified aerated taps in kitchens and bathrooms, although this is not yet the norm in social housing.

For the water companies the motivation was largely to help fulfil their water resource management plans. They saw it as an opportunity to achieve actual water savings that could be verified through installation, unlike assumed installations through mail order and charity partnerships, methods where it is not possible to verify that the installation has taken place. The water companies were particularly interested in achieving behavioural change to support physical installations, and saw the Eco Teams activity as a way of achieving this. Many of the housing providers also saw Eco Teams as a way of achieving behaviour change and engaging residents.

What was the baseline from which the project started?

The Environment Agency, Severn Trent Water and Global Action Plan had been active participants in the Tap Into Savings³ project funded by Defra and delivered in parts of Coventry, Braintree and

³ www.tapintosavings.org

Redhill (with other water companies) and working with social housing providers such as Whitefriars in Coventry and others in Braintree and Redhill. The approach of installing water saving measures directly in people's homes and putting on Eco Teams activities, had been a success. An evaluation of Plug Into Savings is due in 2012.

There was a less clear baseline for the housing providers, with most reporting that they had no previous track record on water saving in their housing stock. Several providers mentioned that their major driver for maintenance in recent years had been the Decent Homes standard. Since new kitchens and bathrooms were often, although not always, a component of Decent Homes programmes, then many homes had water efficient kitchen and bathroom fittings despite Decent Homes not having a specific water saving indicator. Not all providers were replacing all kitchen and bathroom furnishings since new kitchens or bathrooms are not always necessary to meet the Decent Homes Standard. Since social housing providers are not obliged to measure the water efficiency of their stock, none of the housing providers had a meaningful water efficiency baseline. Whereas Decent Homes means that providers will usually have some indicator of energy efficiency in their stock, such as actual or modelled SAP ratings, in order to demonstrate that they are meeting the thermal comfort element of Decent Homes, there is no driver for them to keep any kind of baseline data on water efficiency in their stock. None of the housing providers had any information on the water meter population in their stock. This absence of baseline data makes it difficult for programmes like Plug In to make decisions about what water saving measures are needed, hence a process of trial and error was necessary in Plug In until housing providers could say with confidence that particular types of measures were needed in their stock profile. It is important to get into perspective that this process of trial and error has been fairly painless in Plug In with relatively little wasted time and investment before the right measures were found, helped by the fact that the measures themselves are relatively cheap to buy and install. This compares to the somewhat more expensive trial and error process that can be involved in trialling the right energy efficiency measures for housing stock where some housing providers have taken quite expensive risks to trial different models of solid wall insulation and even wind turbines until a value-for-money, replicable model of housing retrofit can be found.

Several of the housing providers have environmental management systems such as EMAS or ISO14001. Each of these list household water consumption as an aspect, and refer to retrofitting of water saving measures as a specific activity.

For the water companies, the project was attractive because it offered a reliable and cost-effective method of installing water saving measures. Otherwise they were sending out water saving devices to households on request by mail order, but only 70% of these were being fitted. Money was therefore being wasted on postage and devices that were never used, and consumer interest in water saving was not being successfully fulfilled.

What has the project achieved?

Several of the housing providers said that the project had engaged them in water saving for the very first time.

The project has been well received by residents of the housing providers, as indicated in feedback given by housing organisation managers in interviews, and in the limited number of telephone interviews we have carried out with residents.

A feature of the project has been partnership working – bringing water companies and social housing providers together for the first time on such a scale in the Midlands. Participants said that they believed that the partnerships would endure for many years into the future.

There has been a significant scale of installation of water saving measures, comparable in scale to existing initiatives undertaken by the water companies including by mail order.

Table 1: Water Saving Measures installed by Severn Trent Water up to 30 April 2012

Measure	Number installed	Savings – litres per day	Savings – mega litres per day
Showerheads	591	17,730	0.0018
Shower saves	14	420	0.0000
Save-a-flush	108	1,555	0.0002
Tap inserts (twin pack)	12	432	0.0000
Shower timers	2626	13,130	0.0013
Eco-betas	20	940	0.0001
Water saving guides	493	5,275	0.0005
Total	3864	39,482	0.0039

Among some of the housing providers, installation of water saving measures is now well on the way to becoming a mainstream activity. One housing provider commented that they had a track record on new build properties with high standards of water and energy efficiency, but they had been less successful at retrofitting measures in existing homes, and that the Plug In project had focussed their thinking on how they could install water and energy saving measures in void and responsive repairs.

The picture of physical installations has not been uniform, with some housing providers having completed a much smaller number of installations. The reasons behind this are usually to do with the way maintenance contracts are structured. In all cases the housing providers are confident that they will be able to overcome these obstacles in the near future and begin to undertake installations on a scale similar to those housing providers who have achieved significant numbers of installations.

There have been a number of different entry points at which the housing providers have succeeded in getting water saving measures installed. These include:

- Void works
- Piggy backing on home visits to assess the property for energy saving measures
- Manual distribution of measures for DIY installation by residents, with no need for a home visit by housing provider or maintenance contractor staff
- Posting of measures directly to residents.

Engaging residents and staff of housing providers in water saving activity, usually for the first time, through an EcoTeams approach, also reinforces work that the housing providers have done with their residents on energy saving.

The project has enabled the water companies to distribute water saving devices more effectively, because it has enabled them to install them in homes where there a need for them has been demonstrated, by some sort of water use audit, as opposed to other distribution methods such as mail order or charity partnerships where the wrong measure can be given to a household and never used due to the lack of any kind of water use audit.

Overall, while the project has underachieved in terms of numbers of physical installations, in due course, as a result of the changes in maintenance procedures brought about as a direct result of the project, we can be confident that the target of 10,000 installations predicted at the beginning of the project, will be achieved. The target for the number of housing provider/maintenance contractor staff trained has been exceeded, and the target for the number of people engaging with EcoTeams materials at events has also been surpassed.

What targets have been met by the project?

Some of the housing providers found that the project was able to help them meet community engagement and environmental targets. These included climate change action plans and environmental management systems, where the project helped the housing providers to meet water saving or CO2 reduction targets, or in some cases, both. On the resident engagement side, one provider commented that the flexibility of the EcoTeams approach had enabled them to engage with residents who might not engage through coming to meetings. The main target for the two water companies and the Environment Agency was number of water saving measures installed, while for Global Action Plan, the project enabled them to make progress towards their target of delivering more EcoTeams through partner agencies.

What resources did partners put into the project?

Housing providers all put their own staff time into the project. In most cases there was one person working on the project for approximately 1 day per week on average over a 12 month period. The job titles of those working on the projects include:

Sustainable Projects and Funding Officer

Home Energy Improvements and Renewables Officer

Business Development Manager

Sustainability Officer

Programme Development and Climate Change Officer

Housing providers – internal resources

Associate – Sustainable Development

In some instances there was a small amount of input from communications teams e.g. with mailing/leaflets.

The workload varied during the 12 month period but overall we can estimate that each housing provider put in about 1 day a week over 12 months. The housing providers vary in the number of

homes they own or manage from around 2,000 to 20,000, but the amount of staff time does not seem to vary much according to the size of their stock. This may be because the barriers to getting the project up and running are contractual and cultural and are common to all of the housing providers irrespective of size.

One of the housing provider project managers commented that most of the workload consisted of keeping on top of the maintenance contractors to make sure they completed their paperwork. She expected that as contractors got used to the installations and the paperwork, once there was an ethos of water saving within the organisation, then the amount of work involved in getting the measures installed would decline over time.

Housing providers who succeeded in installing significant numbers of water saving measures also provided contracted resources. These included:

- DLO – 5 void teams and 2 kitchen/bathroom teams with at least 18 operatives in each
- Maintenance contractor who were eventually talked round into doing them for free
- 3 contractors plus DLO – did installs at no cost
- Contractors attending training.

The input of housing provider staff in the first year of this activity, plus their maintenance teams, is a significant resource implication that cannot be overlooked and must be made clear to any new housing providers wishing to undertake large-scale water saving activity.

The water companies' staffing input was 0.5 day a week and 1.0 day a week approximately for 12 months and we would expect this to be replicated in a follow-up project of similar size.

EcoTeam resources already developed were put into the project, also new activities were developed specifically for this project. EcoTeams staff time was funded by the Environment Agency.

What internal cultural and organisational barriers has the project faced?

Most of the housing providers had done little or no water saving activity despite a long-standing commitment to environmental action.

In most of the housing providers the project was led with someone whose job role includes sustainability or environmental issues either as part of their role or as a full time responsibility. In all cases it was possible to win the buy-in of senior management fairly easily.

Several housing providers have observed that they have come across a lack of understanding within some parts of their organisations as to why they were involved in the project. This is not related to the technical issues involved in choosing the right water saving measures but is based on a lack of understanding of the environmental, financial inclusion and resident engagement reasons why it is relevant for housing providers to do so. One housing provider commented that you cannot institute cultural change overnight.

One housing provider observed that their maintenance team spend a lot of time fire-fighting and this means that the Plug-In project had a tendency to get relegated to the bottom of the pile. Those aspects of maintenance where there is a target or a legislative driver tend to get priority.

As we have seen, few housing providers hold any detailed information on the water efficiency of kitchen and bathroom fittings in their stock condition data. Sometimes date of installation can be used as the indicator of the efficiency of bathroom and kitchen fittings. One of the housing providers, which had a large amount of new-built stock, was able to ascertain relatively easy that their bathroom and kitchen furnishings were modern and therefore other opportunities such as shower timers needed to be exploited. Most of the housing providers have a wide variety of stock that they have acquired or built over many decades and it is not easy to plan which measures to install in which homes, other than to do it opportunistically when there is another visit planned e.g. for maintenance or void work. Not all of the housing providers are the same in this respect. Each one has its own history, some of them have been formed through mergers or group structures and have inherited varied housing stock. Also different housing providers have been funded in different ways due to changes over the last 30 years in the way capital funding is provided to social housing. One of the participants was an ALMO (Arms Length Management Organisation) and one was an LSVT (Large Scale Voluntary Transfer) housing association, both of which have been funded in different ways to other housing providers. This means that where a water efficiency baseline exists for one housing provider, it cannot be assumed that other housing providers have similar baselines, and a tailored approach needs to be adopted with each different housing provider.

One of the water companies commented that the project would have worked better if they had had the same staff member working consistently on the project throughout its duration.

What indicators were used to measure the success of the project, and what targets have been met?

Among the housing providers there was a wide variety of attitudes to what indicators should be used to measure the eventual success of the project. There appears to be little common ground in how the housing providers view this. There is a spectrum of indicators used, including:

Table 2: indicators used to measure the success of the project

Maintenance based indicators	Engagement based indicators	Water and carbon based indicators⁴	Suggested behavioural indicators⁵
Number of water saving measures installed	Number of staff trained	Litres of water saved	Self-reported learned behaviours
How and where the measures were installed e.g. voids, DIY	Number and variety of engagement activities	Kg of CO2 saved	Changed habits e.g. travel planning, water re-use, as evidence of reflective behaviour
Feedback on performance on	Numbers of residents engaged	EMS targets met	

⁴ None of the housing providers had reported this in their EMS reports at the time of writing, however several had said that they would mention this in their forthcoming EMS reports that are due within the next 12 months.

⁵ These are not indicators that any of the housing providers have used; they have been used in this evaluation and are suggested as indicators to be used in any future project

measures			
	Number of forms completed by residents		

Global Action Plan also valued the engagement based indicators most highly. South Staffordshire Water placed a greater emphasis on the need for the measures as an indicator of success – i.e. that measures were installed into homes where there was a need for them rather than being randomly distributed to homes where they might not be needed.

Some housing providers were most interested in maintenance based indicators, others in engagement based indicators, and some in both. For future projects, it would be useful to develop a common set of maintenance, engagement-based and behavioural indicators that all participants can use to measure success, using the table above as a starting point.

How can we explain the variance between the targets the project intended to achieve and what was actually achieved in practice?

At the beginning, the project aimed to install water saving measures in 10,000 homes. After 12 months the project had succeeded in installing 3,864 measures in approximately 3,300 homes. The project partners are confident that the target of 10,000 measures will be achieved in the subsequent year.

Most of the housing providers started installing measures later than expected. It had been assumed that all of the measures would be compatible with the stock of the participating housing providers. This turned out not to be the case for a number of reasons:

- Incompatibility of some water saving measures with the existing kitchen and bathroom appliances, including measures that required post-installation maintenance because they were incompatible.
- Modern kitchen and bathroom installations in some housing stock, particularly where large decent homes programmes had been undertaken, with dual flush toilets and water saving bathroom taps
- Properties with no shower, with varying policies between housing providers about installation of showers
- Delays in getting hold of certain water saving measures due to issues with suppliers.

This has caused the project partners to review the measures offered. The process of trial and error of measures has enabled the housing providers to develop a rudimentary baseline for the water efficiency of their stock, through better understanding what type of water using appliances they have installed, and which can be used by them and by the water companies as intelligence in future water saving activity. The housing providers praised the flexibility of the water companies in adapting to circumstances by making sure the right measures were available when it became clear that a particular measure was not suitable.

The willingness of external maintenance contractors and internal direct labour teams to participate in the project varied greatly. In some instances contractors were reluctant to take part for contractual reasons, and in other cases contractors were reluctant to fit certain measures because

they were not convinced that they would work in a particular context, or at all, based on their previous experience. In one case, a housing provider had already scheduled to put their maintenance contracts out to tender during the course of the project. The new contracts that have been concluded include the installation of water saving measures as a costing within the contract. This means that although this particular housing provider was unable to complete any installations during the lifetime of the project, they will be able to achieve significant installations in future with no up-front contractual issues.

One of the housing providers observed that they had achieved largely what they set out to achieve in terms of installation but still felt that they could achieve more.

Global Action Plan observed that it was in some cases difficult to get the idea and practice of water saving embedded into the whole system of a housing provider. Senior management commitment does not automatically lead to water saving becoming embedded into systems of asset management, ordering, maintenance schedules. So agreement at one level can be ignored at another level within the same organisation. There are many systems and processes that you need to work with or modify, perhaps involving 10 or 15 people within the organisation, before anything can happen.

One housing provider reported that they had over-achieved on the project because they had undertaken additional EcoTeam activities, and that the wider environmental knowledge that Global Action Plan and Northfield EcoCentre had brought added value to the project, including both individual household behaviour change and also getting residents talking to each about water saving.

Procurement of measures

There is a healthy level of competition between different manufacturers of water saving measures. This means that for each category of measures, such as cistern displacement devices, water saving shower heads, tap aerators, there several manufacturers and brands of the same category of device to choose from. There are several different quality marks associated with water saving measures, such as the Waterwise Mark and RTAS. In some cases manufacturers also emphasise non-water saving qualities of their products, such as limescale or bacteria prevention. While most tap aerators or cistern displacement devices do exactly the same job and are of similar design, and therefore it is possible to compare apples with apples, there are some devices where there are competing products that operate radically differently to each other, making it difficult to compare. A bicycle and an aeroplane are both means of transport but it is very difficult to develop a common set of indicators against which to compare them. Similarly an Eco-beta and an Interflush are both devices to vary the flush capacity of a toilet cistern but they are very different in their design, making it difficult to compare apples with apples. Most of the housing providers had little or no experience of procurement of water saving measures, so they were not in a position to make informed choices about which manufacturer's measures were the most effective and efficient.

Since the water companies were responsible for choosing and paying for the measures, then this saved the housing providers from having to worry about which brand of measures to buy.

One of the housing providers had adopted the AECB Water Standards⁶ and this enabled them to keep paperwork to a minimum, and to choose measures effectively.

One housing provider reported that as a result of Plug In, they had changed their specification for kitchen and bathroom replacements to include water efficiency of fittings as a performance measure alongside the usual quality and price based measures.

Some housing providers have asked for measures such as water butts or fat traps. These are useful devices although not necessarily as high a priority as the other measures that have been installed, in terms of certainty and cost-effectiveness of water savings.

Procurement of installers

In addition to the contractual procurement issues mentioned above, it was observed by one project participant that there were issues around whether the housing providers' maintenance contractors were the appropriate people to identify need for water saving measures and whether they were in the right position to be able to do so.

Some participants commented that certain suppliers were not always able to provide the water saving measures when they were needed. As water saving activity among housing providers in the region is scaled up, then whoever is procuring the measures will need to ensure that the suppliers have sufficient capacity to supply when necessary.

Housing providers nowadays tend to have long-term contractual relationships with large maintenance companies. It is not always easy to modify these contracts half way through. Some of the housing providers have managed to negotiate around these issues. Other providers have decided to wait until the contract was up for renewal and negotiate then, because this would make it easier in the long term. Eventually the fashion for large, long-term 'bigger is better' maintenance contracts may well change, and the social housing world may at some stage decide that 'small is beautiful'. Until then, those housing providers wishing to replicate the successes of Plug In need to decide whether to negotiate around existing maintenance contracts or wait until the contract is up for tender, in which case it may well be a matter of months or even years between agreeing in principle to retrofit water saving measures, and being in a position to install them on a large scale.

Those housing providers who have Direct Labour Organisations and who are in a position to access funding for worklessness programmes, may be in a position to utilise the availability of additional staff through the worklessness programmes to provide the labour to install measures, particularly those of relatively low skill levels such as cistern displacement devices, shower heads or shower timers. Worklessness schemes that are genuinely voluntary on the part of the jobseeker are to be preferred since people who are compelled to work have little incentive to install the measures properly and may not be motivated to create a positive impression of the housing provider, water company or other partner.

What have we learned about which kits will work in which physical contexts?

⁶ http://www.aecb.net/standards_and_guidance.php

All of the water saving measures are useful in some properties, but not in all properties. Shower timers work in any home that has a shower, and are popular. The save-a-flush is also popular but as many rented homes now have dual flush toilets, it has not been compatible with all properties. The picture with showers has not been uniform – some housing providers fit only gravity-fed showers while others have a mixture of gravity-fed and electric showers. Developing a baseline is key to understanding which type of shower measures should be fitted. The tap inserts procured by the project were not universally compatible. However tap inserts should not be thrown out with the bath water and could be targeted at homes with young children where a bath is more frequently used.

Eco Teams

The housing providers said that Eco Teams was a fun and flexible way of working with their residents and in some instances, staff, to raise awareness of environmental issues. They liked the Eco Teams approach because it offered residents a variety of common-sense reasons to adopt pro-environmental behaviours, including monetary, quality of life, and environmental reasons. It was felt that Eco Teams avoided the ‘preaching’ or ‘sermon’ mentality that characterised some environmental awareness-raising activity. Additionally, one provider commented that Severn Trent’s water saving booklet focussed on reducing volume of water consumed in litreage, and that this was not understood by householders, a view confirmed indirectly by participants in our focus group.

The fact that Eco Teams provides multiple motivations for residents to change behaviour is significant and represents good practice. It is a good way of fulfilling the recommendations of DECC’s research into motivations to take action, and aligns with the findings of other recent projects in this region.⁷

Black Country Housing Group said that they engaged with residents on energy saving issues through Energy Extra, and that if they did not already have Energy Extra, then Eco Teams would have been useful to them. They had tried to engage residents on environmental issues but with little success. Energy Extra succeeded in engaging residents by focusing on fuel poverty, helping vulnerable residents to save money, energy and carbon. One project participant observed that Eco Teams provided a good base for monitoring and evaluating behaviour change.

Housing providers valued Eco Teams as a way of training their own staff. They also valued Eco Teams as a way of training their residents, but opinions varied on the need for it among their residents. Some providers had existing initiatives to raise environmental awareness among tenants and felt that there was little need for Eco Teams. Several providers commented that Eco Teams was suitable for situations where residents were already gathered together e.g. over 55s group, parent/toddler group. Eco Teams was found to be flexible in its delivery methods, and one provider

⁷ DECC, *Consumer Needs and Wants for the Green Deal*, <http://www.decc.gov.uk/assets/decc/11/consultation/green-deal/3505-green-deal-consumer-needs-wants.pdf>; Chamberlain Forum/Localise West Midlands/i-SE, *Green Deal Opportunities for Social Enterprise*, <http://localisewestmidlands.org.uk/leaf>; Rebecca Ince/Northfield Ecocentre, *Motivations and Barriers to domestic retrofit through the Green Deal pilot project*, <http://www.northfieldecocentre.org/images/stories/newsletters/motivations%20and%20barriers%20to%20domestic%20retrofit.pdf>

particularly valued the fact that Eco Teams activities such as the games could be delivered in different locations including the entrance lobby to a block of flats, as well as in formal meetings.

One provider said that they liked the fact that they were able to continue with Eco Teams method even when the project had formally finished, and so they were carrying on Eco Teams activities as a mainstream activity within a residents group.

Severn Trent Water also valued the Eco Teams activity highly. They did feel with hindsight that they could have got more involved in this activity themselves, and that their own education co-ordinators could have supported the programme to measure the behaviour change element and associated water savings. Severn Trent Water also thought that the Eco Teams activity was important in getting the buy-in of the housing providers, who valued the community engagement aspect of Eco Teams very highly.

We asked the participants in the Focus Group hosted by Optima Community Association about the Eco Teams activity. Initially they hesitated to comment because they did not perceive this as a specifically “Eco Teams activity”, they perceived it as a residents’ group or parents’ group activity because it took place in a residents’ group or parents’ group normal gathering. Participants liked the interactive nature of the Eco Teams activity because it got them engaged in games and made them think about their own habits. The language used had been appealing, and accessible to people of all levels of interest and ability. As the Eco Teams activities were delivered within mainstream community groups then they were able to access individuals who were not particularly environmentally aware beforehand, in a way that was appropriate to them. Such participants had been shocked at the electricity they were wasting. There were also children present and they found the Eco Teams interesting, they were offered chocolate as an incentive.

Focus Group participants reported on the behavioural changes they had made as a result of the Eco Teams activities. On waste, one participant said that she used left-over food now to make other dishes rather than wasting left-overs. All participants said that they used fewer carrier bags than previously, either having reduced their use for the first time or deepening a previous commitment to do so. One participant recalled that global consumption of carrier bags could cover the earth’s surface in six months. Participants said there were financial reasons as well as environmental reasons for doing this, all three participants were frequent visitors to one of two local Tesco stores and had earned substantial Clubcard points through carrier bag re-use, in one case to the value of £23 in a year. This reflects a mindset among the attendees that environmental issues and household financial management issues were interlinked and it wasn’t an either/or case of environmental versus household financial management reasons. One participant had become a self-appointed ambassador for this cause and encouraged everyone she knew to reduce carrier bag use.

All three participants were car users, and all reported that they had reduced their car use partly as a result of the Eco Teams activity and partly for economic reasons because of the rising cost of fuel. This reduction had come about through leaving the car at home for short journeys, and through smarter use of the car on other journeys. These actions including doing ‘one big shop’ to reduce the amount of repeat visits to the supermarket, and making the most of journeys to other parts of the city, through making multiple calls in the same area such as shopping, visiting relatives, to reduce the need for subsequent trips. Although the participants could not recall the specific concept of ‘travel planning’ being discussed at the workshops, they agreed that what they had learned at the

workshops, along with the passion of Optima staff, had caused them to change the way they travelled.

All participants had adopted basic water saving behaviours before the Eco Teams workshops, either for environmental reasons or because of metering. Following the workshops they had all moved on to more advanced water saving behaviours. One participant in whose household there are separate mealtimes, said that she would now re-use pans that had only had vegetables cooked in them rather than wash them up between sittings. One participant said that she reused cold water left over from hot water bottles, for things such as washing out a vase. One participant said that when she turned the hot water tap on for washing up, while waiting for the hot water to come through she decanted the cold water into 2 litre plastic bottles, for watering the plants on the balcony, thus re-using plastic bottles and reducing water waste. She said that she probably used about 1 litre a day on this. Another participant said that she now re-used warm or hot left-over washing up water for cleaning the pathway in the front garden. The participants did not recall explicitly being told to re-use water in these ways at the Eco Teams activities. Two of them described water re-use as a 'natural process' and that as a result of Eco Teams, they look around the house for what can be done.

One of the metered participants felt that she had saved water as a result of Eco Teams, while the other could not say because she had not attended the last Eco Teams workshop.

The principal energy saving behaviours which participants had learned from the Eco Teams workshops were turning off appliances when not in use, and unplugging appliances when not in use. Other energy saving behaviours included not heating rooms that are not in use (most of Optima's homes are new build and of high thermal efficiency), and washing clothes at lower temperatures where possible.

Were the residents who were engaged in the project and received measures representative of the resident body as a whole?

Wolverhampton Homes supplied equal opportunities data on a sample of homes engaged in the project, which demonstrate that the project succeeded in engaging a good variety of household types, as illustrated by the graphics below.

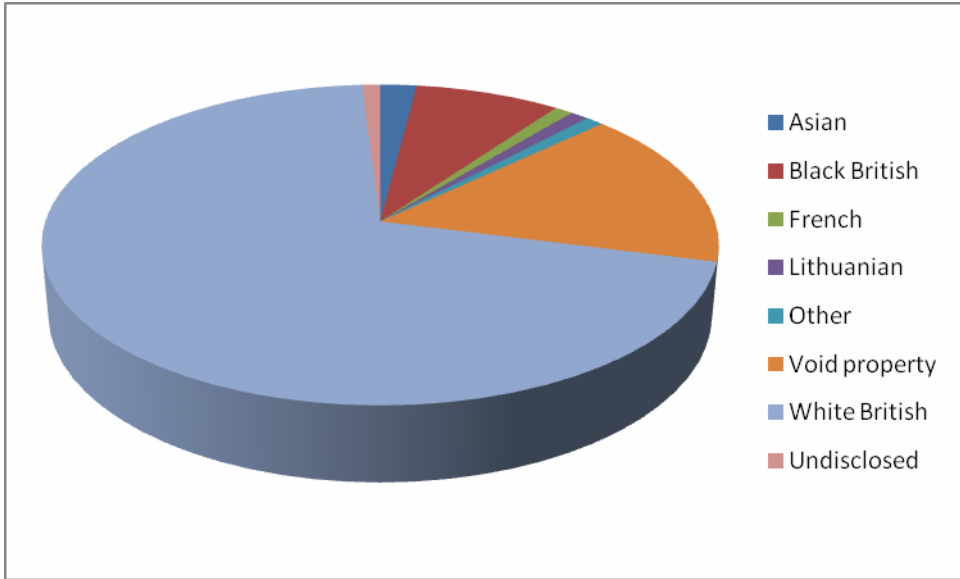


Chart 1: Ethnic origin of 100 households engaged by Wolverhampton Homes

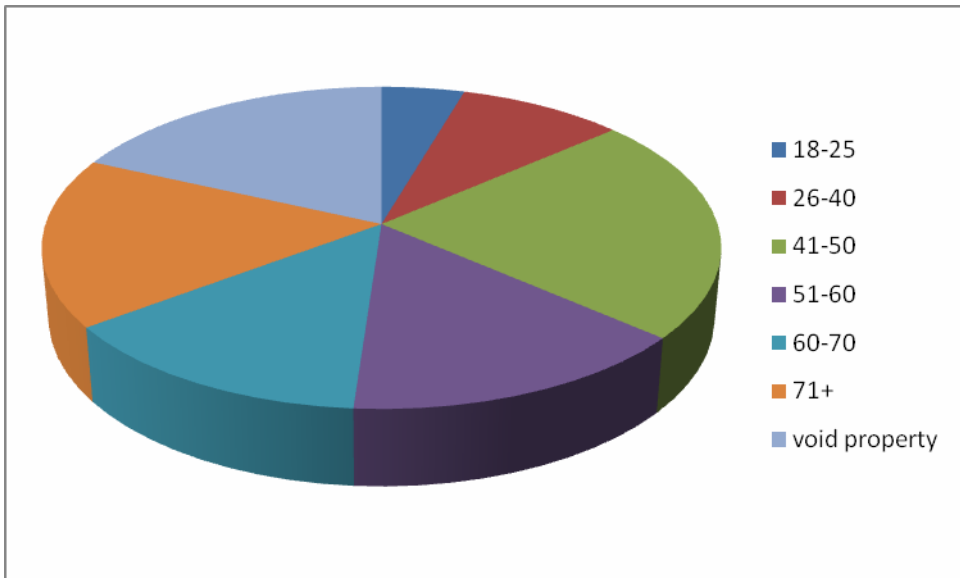


Chart 2: Age of 100 households engaged by Wolverhampton Homes

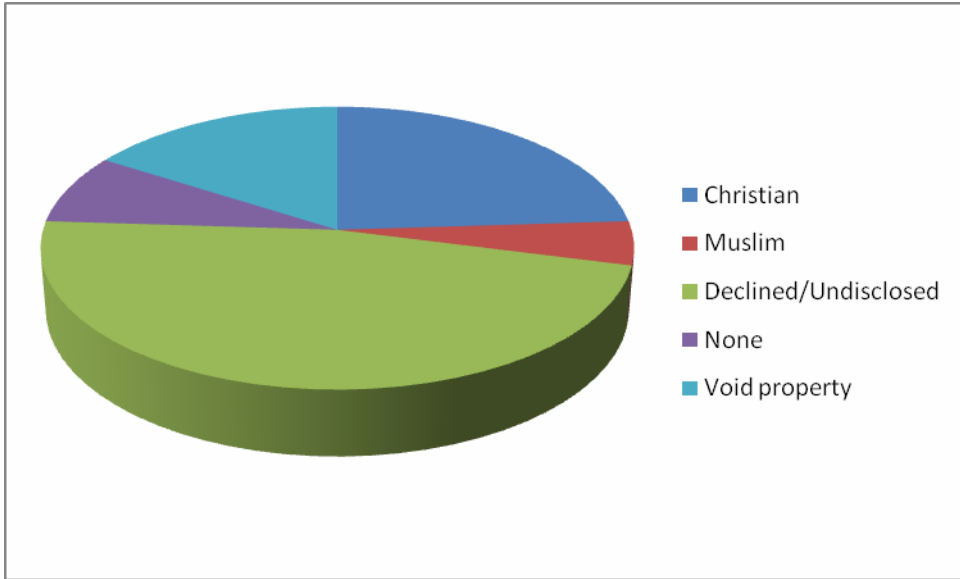


Chart 3: Religion and belief of 100 households engaged by Wolverhampton Homes

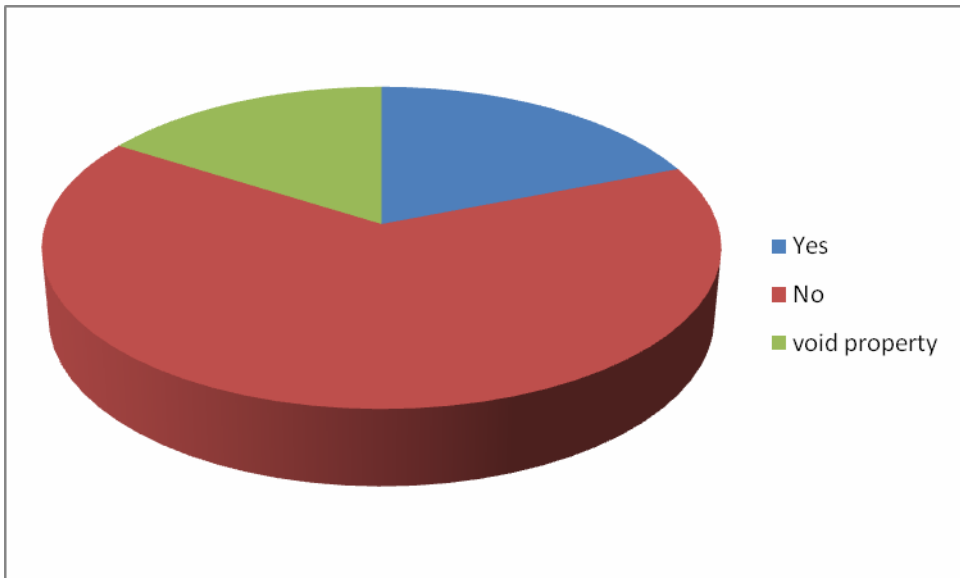


Chart 4: Disability among 100 households engaged by Wolverhampton Homes

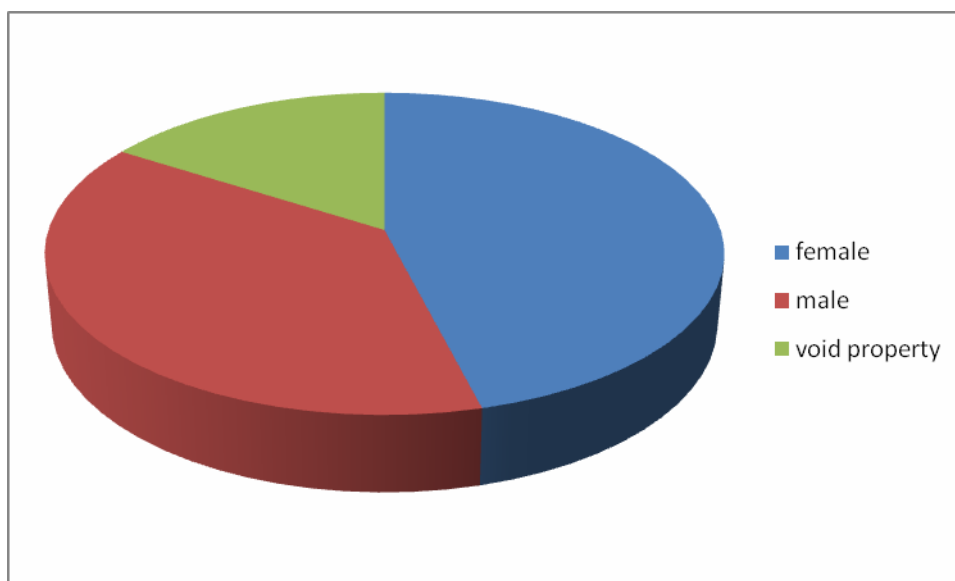


Chart 5: Sex of 100 households engaged by Wolverhampton Homes

Many of the measures were installed in a void property or in a tenanted property as part of a planned maintenance programme, by many of the housing providers. In these examples the resident does not initiate the installation and therefore there is little possibility of an unrepresentative sample of residents getting the measures in preference to others.

It was observed that those residents attending Eco Teams activities represented the most active section of the resident population. However the housing providers believed that those residents were interested in community and neighbourhood issues as a whole, not specifically environmental issues, and therefore the attendees were not necessarily more environmentally aware than the resident population as a whole, although it could be argued that active citizens tend to be more environmentally aware than most of the population, which would apply to the residents' group, but not necessarily the parent and toddler group.

Overall Success factors

The input of GAP and Northfield Ecocentre as environmental experts through Eco Teams was seen as an important success factor. Housing providers liked the fact that Eco Teams activities could be delivered in a variety of ways and locations and were not dependent on getting people into a meeting room. They have succeeded in moving on all project participants including staff and residents – in some cases introducing them to the benefits of pro environmental behaviour for the first time; in other cases introducing people, including housing provider staff, to the more advanced concepts of sustainable development. One participant felt that other housing providers would benefit from their input, and said that it had been amazing to see the reaction of their staff including herself as the project leader. She said that people are aware that you should not leave the tap running while brushing teeth but that the Eco Teams input had helped people to understand the true nature of the waste that results from such actions. This confirms the findings of our focus group which demonstrated the level of help that people need in understanding the value of water and the implications of wasting it.

The water companies were praised by housing providers for ‘bending over backwards’ to get the right kit to suit the homes. Sometimes utility company schemes are criticised for not being flexible and for dictating what type of measures will be fitted, but this has not been the case with Plug In where the water companies have been flexible in making sure that measures were sourced based on household need rather than a purely target-driven or one-size-fits-all approach that sometimes characterise CERT and CESP schemes.

Getting strategic buy-in from all partners was a key success factor in the project. The involvement of the Environment Agency had been critical in getting the project started and getting strategic buy-in from senior management in the housing providers. Holding these discussions on a one-to-one basis with each housing provider rather than approaching them as a group appears to have helped. They also helped to build relationships between the housing providers and the water companies. These relationships had often existed on an ad hoc basis but now are based on high level strategic agreement. The Agency has also been critical to sustaining the project and sharing the learning outcomes through organising regular meetings and telephone conferences of partners.

Most of the partners described partnership working between different housing providers, the Agency, the water companies, GAP and Northfield Ecocentre⁸ as being a critical success factor. Many of the partners praised the flexibility of the Agency and the water companies and their willingness to discuss problems openly, troubleshoot and modify the project including budgets, compared to some water saving projects where participants had felt stuck with a particular way of doing things, even if it could be seen that it wasn’t working. Regular feedback through partner meetings and telephone conferences has been critical to this. The comments made by partners during the evaluation demonstrate that the contribution of each group of partners – the housing providers, the Agency, the water companies, GAP and Northfield Ecocentre, were all equally highly valued and all of these organisations input was indispensable to the project and it would have been an inferior project had any of the partner groups not been represented.

Participants recognised the increasing inter-penetration of water saving and energy saving programmes and felt that the progress they had made on water saving through Plug In had enabled them to catch up with their existing energy saving commitments and that integration of water and energy saving measures was now more achievable for them. The large-scale energy efficient retrofit programmes that are emerging around Green Deal and ECO were now more likely to have water saving as a mainstream component. One housing provider who had worked with Groundwork West Midlands to provide Green Doctor home visits said that working with Groundwork’s Green Doctor programme had helped them to make the connection between water efficiency and energy efficiency. She described a ‘Golden Thread’ where different activities and funding streams came together.

One housing provider said that it was important to keep up momentum. They had lost momentum at a point in the project and had to work to keep the project going.

Getting buy-in from DLOs and maintenance contractors is important not only in contractual terms but in assuring them that the kit would work without the need for follow-up visits.

⁸ Northfield Ecocentre delivered Eco Teams activities with Optima Community Association.

The water companies and the Environment Agency found it advantageous to work with social housing providers on a larger scale than previously. There are approximately 600,000 social rented properties in the Severn Trent area, and the housing providers have teams who can install the water saving measures. There has been a word of mouth process among housing providers, who have shared experienced which has directly and indirectly encouraged other housing providers to take part.

Other things that participants have learned from the project include being more realistic in setting targets and to bear in mind start-up issues, water saving measure compatibility issues and procurement issues.

One housing provider commented that it was useful to work with other housing providers, and that thinking ahead to Green Deal, this would be useful in future.

What did residents tell us about the project?

Our attempts to interview residents by telephone about the water saving measures were not very successful. Most of the Plug In monitoring forms received were either from void properties or from properties where the householder had not ticked the box to give consent to being contacted by telephone. As a result we were able to complete only two telephone interviews with residents. As there are such small numbers we have presented them as mini case studies rather than statistically.

- i. Mrs L, Wolverhampton Homes tenant (unmetered), recalled having a shower timer, which was received in the post. She also recalled receiving a water saving guide, but only when prompted. The shower timer was still being used, it was adequately explained to her how to use it, and she was happy with its performance and said that it had helped her to save money. Mrs L had followed up advice in the water saving guide including turning off tap when brushing teeth; using less washing loads; encouraging family to take showers instead of baths. Mrs L said that she had always regarded environmental issues as very important and had been aware of the impact of water use on the environment, e.g wildlife. Since she had received the shower timer and water saving guide, she was more confident that she could personally do something about environmental issues. She had not regarded water scarcity as an issue before, and still does not feel it is a problem after receiving the shower timer and water saving guide. Mrs L had not previously been aware of the impact of domestic fuel and water use on the production of greenhouse gas emissions, but she is now more aware of it. Before the project, Mrs L believed that water companies and consumers were responsible for water saving, but not the government. Her views are the same after the project. Saving money is most important for Mrs L followed by reducing water waste and reducing water use. We estimate that Mrs L has saved 1825 litres per annum through the shower timer and a further 8695 litres per annum through behavioural change.
- ii. Mrs P, Wolverhampton Homes tenant (unmetered), recalled receiving a save-a-flush, a shower head, a shower timer, and a water saving guide (when prompted). The devices were still in use, and Mrs P was impressed particularly with the shower head, which she described as “not fierce, exactly how I want it”. Mrs P said that she believed that the shower head was saving her water, and that the shower still functions adequately. Mrs

P did not comment on whether she had noticed if the save-a-flush was saving her water. She was happy with the way the kit had been installed, and with the explanation she had received about its use. She said that the shower timer had taken a bit of working out. The water saving measures had been installed following a phone call from Wolverhampton Homes about installing loft insulation, the lady from Wolverhampton Homes came and did a survey of the loft and installed the water measures while she was there. Mrs P said that having the water saving kit installed had encouraged her to do extra things to save water, including using a water butt, only filling kettle half way, and taking the car to the car wash. Mrs P said that she had received other advice on saving energy and water in the home, including turning tap off when brushing teeth, putting a full load in the washing machine, using heating timers and thermostats, but that she was doing these things already. She was given a TV powerdown but does not use it because she was already in the habit of taking the plugs out.

Mrs P said that she had always regarded environmental issues as very important. She had always felt quite confident that she could do something about environmental issues personally, and that this remained the same since the project. Mrs P had always believed that water scarcity was a problem and always kept bottled water bought from supermarkets in the house. She commented that the recent rains (in April and early May 2012) had not made any difference. Mrs P said that she had always been aware of the impact of water use on the environment, such as wildlife. Previously she had been aware of the impact of domestic fuel use on the production of greenhouse gas emissions, but was not aware of the impact of water use in the home and garden on greenhouse gas emissions. Since the project, she was now 'vaguely' aware of the impact of domestic water use on emissions. Mrs P had previously thought that consumers and water companies were responsible for water saving, and now she believes that government also has a responsibility. Mrs P thinks that reducing water waste is the most important to her, followed by saving money on her bills.

We estimate that Mrs P has saved 7080 litres per annum through her shower timer and save-a-flush, and 4485 litres per annum through behavioural measures.

Focus group

In May 2012 we held a focus group for residents of Optima Community Association who had received water measures and been involved in the Eco Teams project there. Four residents attended the focus group, although one of them was considerably late due to a mix-up over start times, but she was able to participate in some of the workshop nonetheless. Hence at some points the number of attendees varies from three to four⁹. Bernie McCullagh, Sustainability Officer for Optima, was also in attendance.

Water saving measures

All three residents present at this point had received shower timers, which they were happy with and which were still in use. One of the residents commented that she 'loved it to bits' and another

⁹ This also applies to the Focus Group comments on Eco Teams above.

that it was 'brilliant as long as you weren't washing your hair or using conditioner'. One resident observed that one member of her family was not using it. All three present thought that the shower timer was saving them water, and that it was probably saving them gas or electricity for heating the shower water. There was little recollection among attendees of receiving a water saving guide.

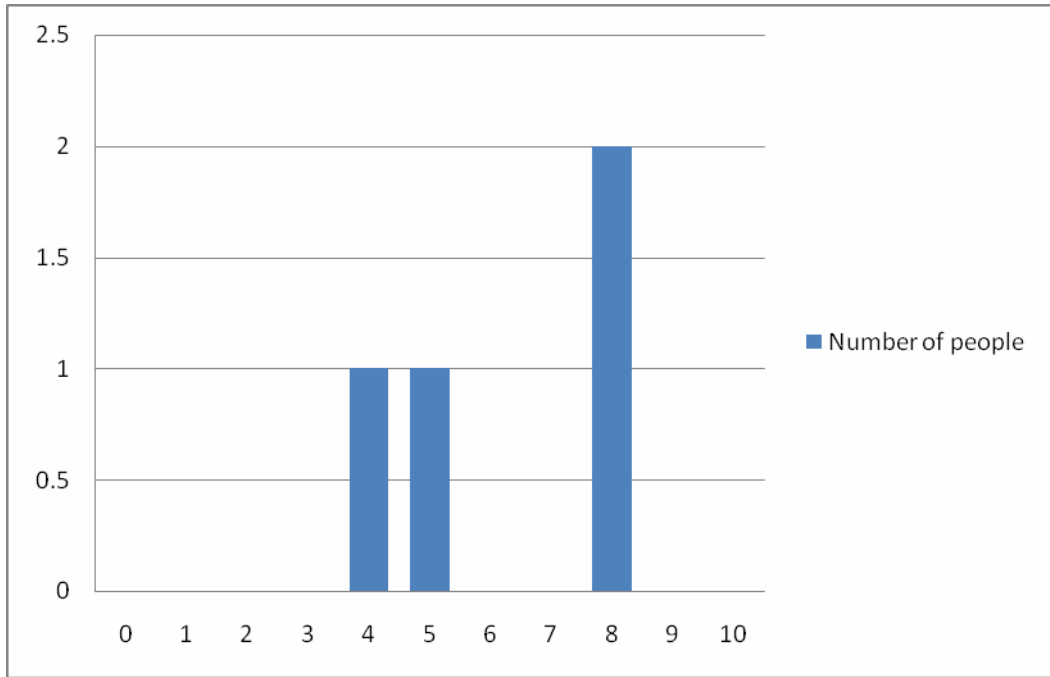
Attendees had taken further water saving action as a result of receiving the shower timers. These actions included washing up less frequently, using a washing up bowl, and using a water butt.

Environmental and water saving values and attitudes

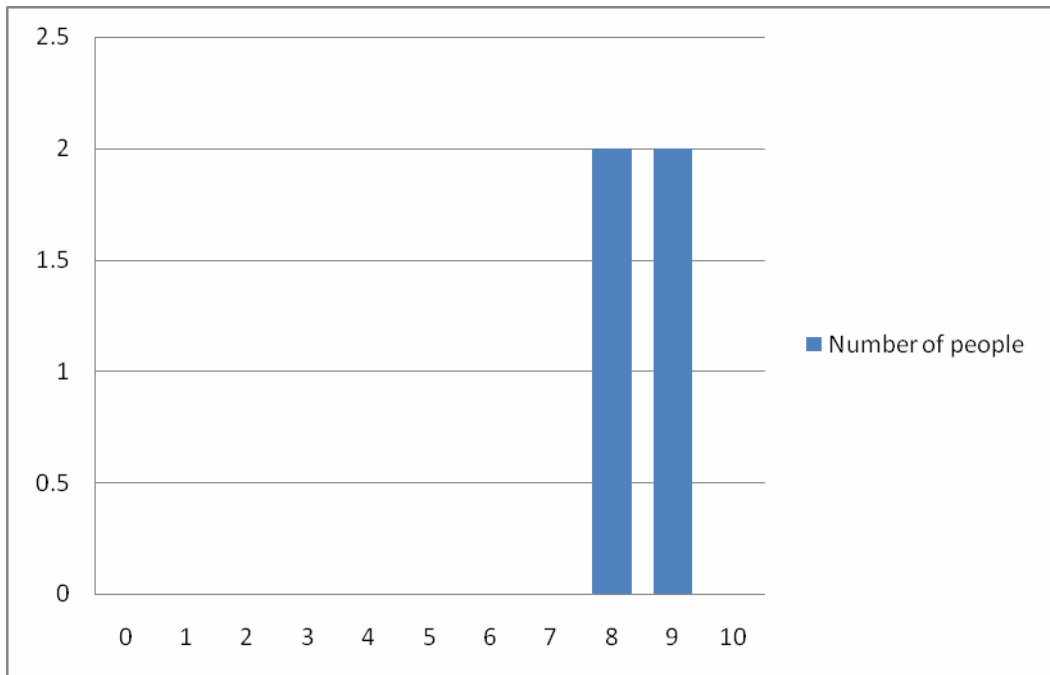
We asked participants to score themselves on their values and attitudes towards environmental issues in general and water saving in particular. This is designed to give us a simple segmentation model building upon the methodologies in the 4 E's model used by the Sustainable Development Commission; Defra's Framework for Pro Environmental Behaviour; and Chris Rose's Values framework for understanding pro environmental behaviour.¹⁰

- i. Before the project, how important were environmental issues to you personally? (10 = greatest importance, 1= least importance)

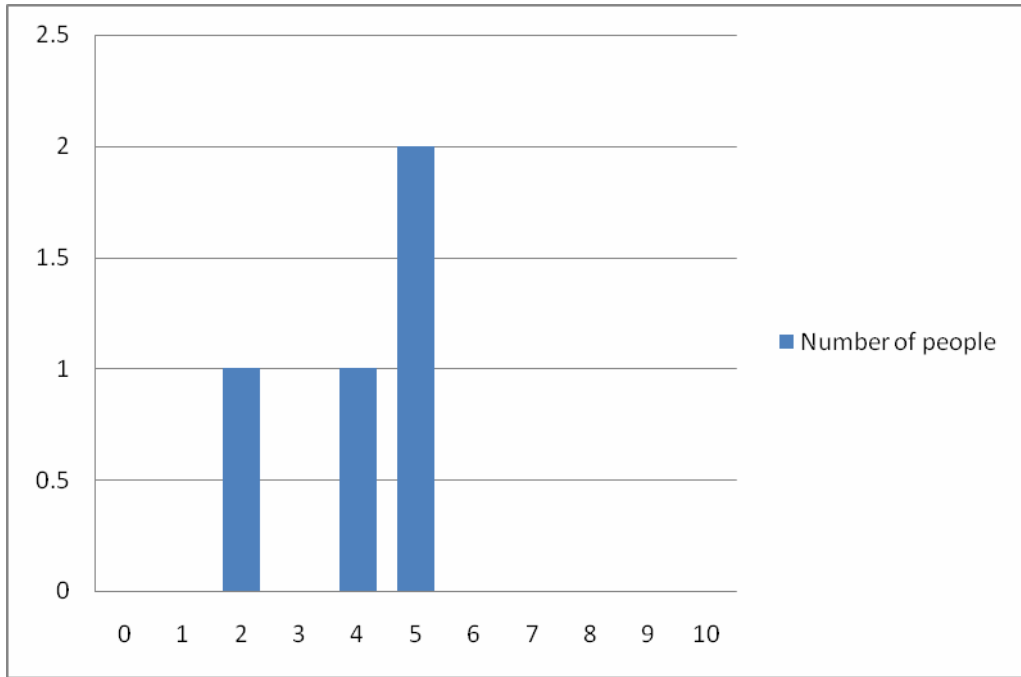
¹⁰ Defra, *A Framework for Pro Environmental Behaviours*; <http://www.defra.gov.uk/publications/files/pb13574-behaviours-report-080110.pdf> Chris Rose/Campaign Strategy, *Using Values Modes* <http://www.campaignstrategy.org/articles/usingvaluemodes.pdf>



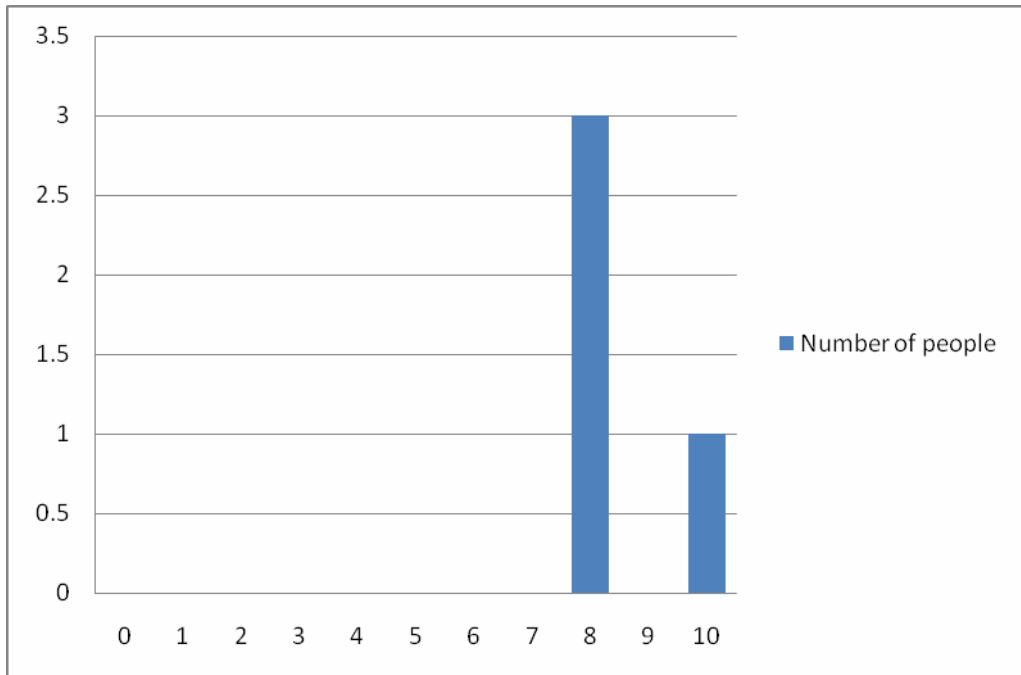
ii. After the project, how important were environmental issues to you personally?



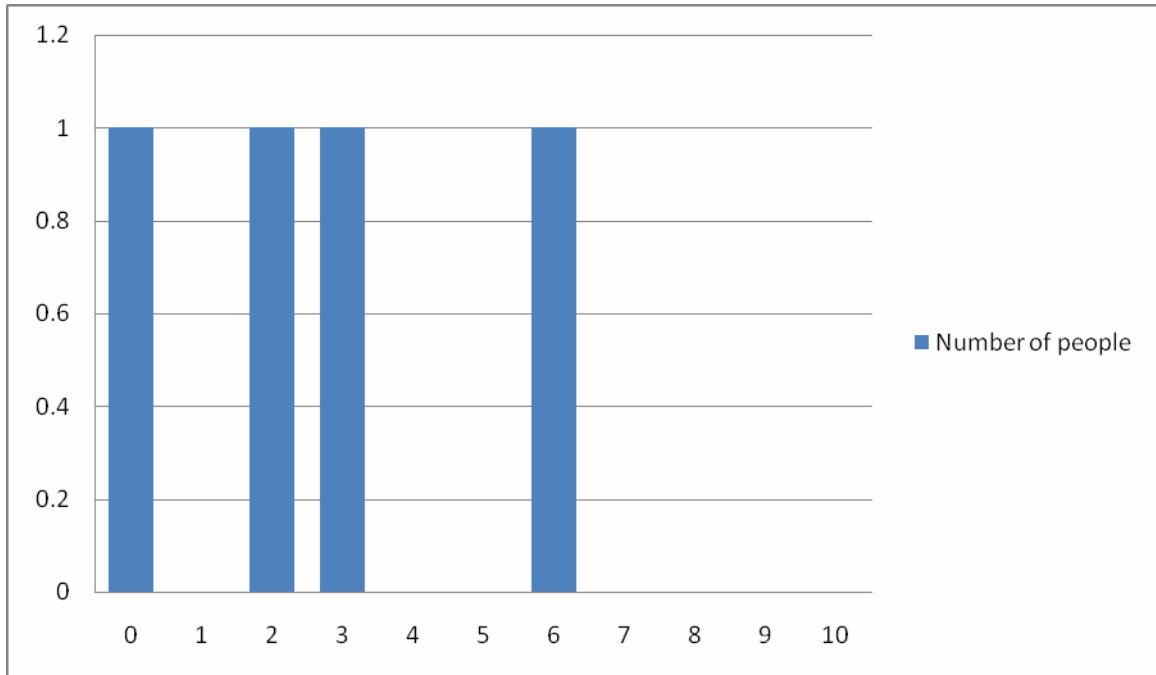
iii. Did you feel confident before the project that you personally could do something about environmental issues?



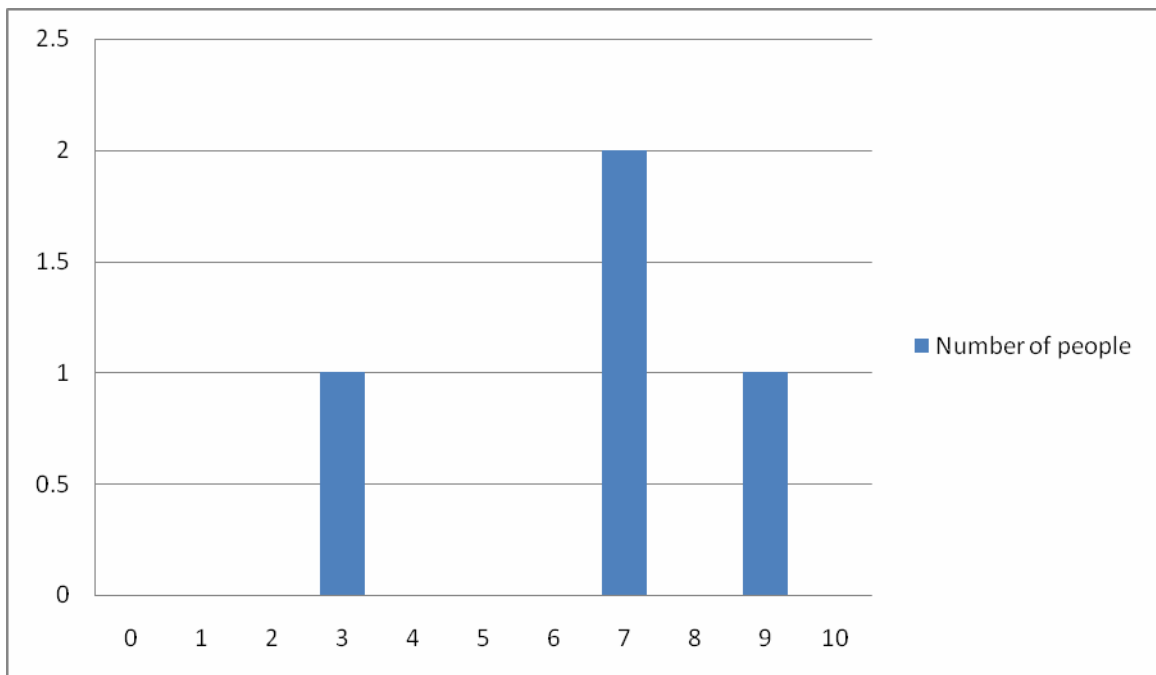
iv. Do you feel confident since the project that you personally can do something about environmental issues?



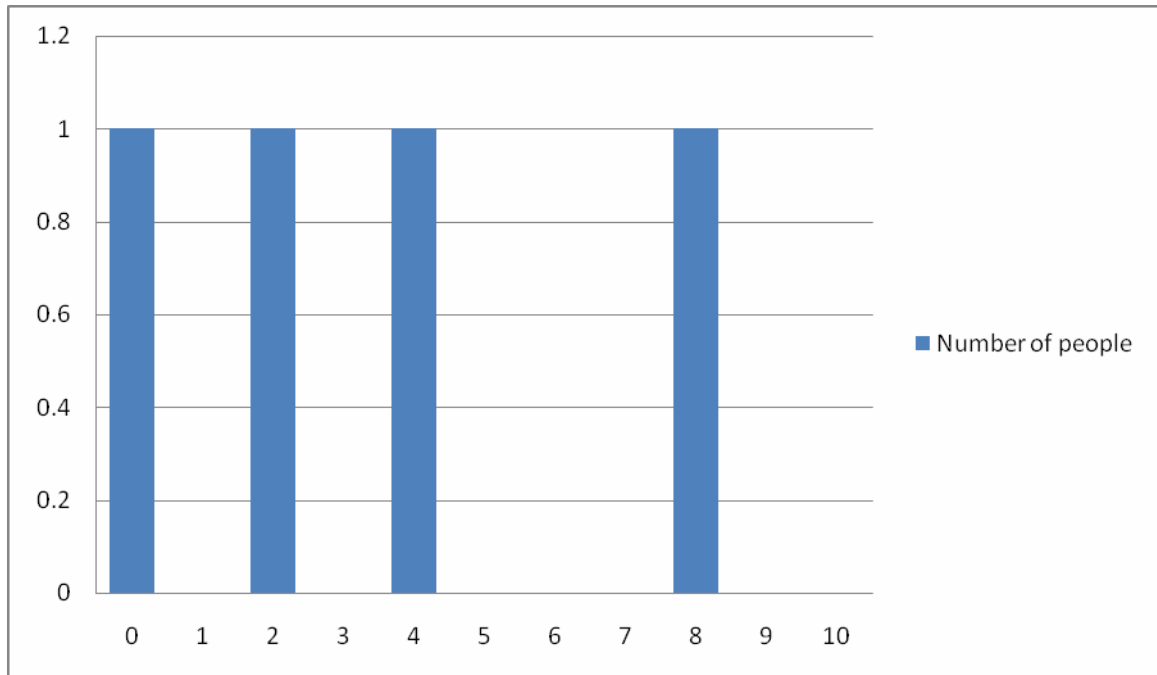
v. Before the project, did you believe that water scarcity was a problem?



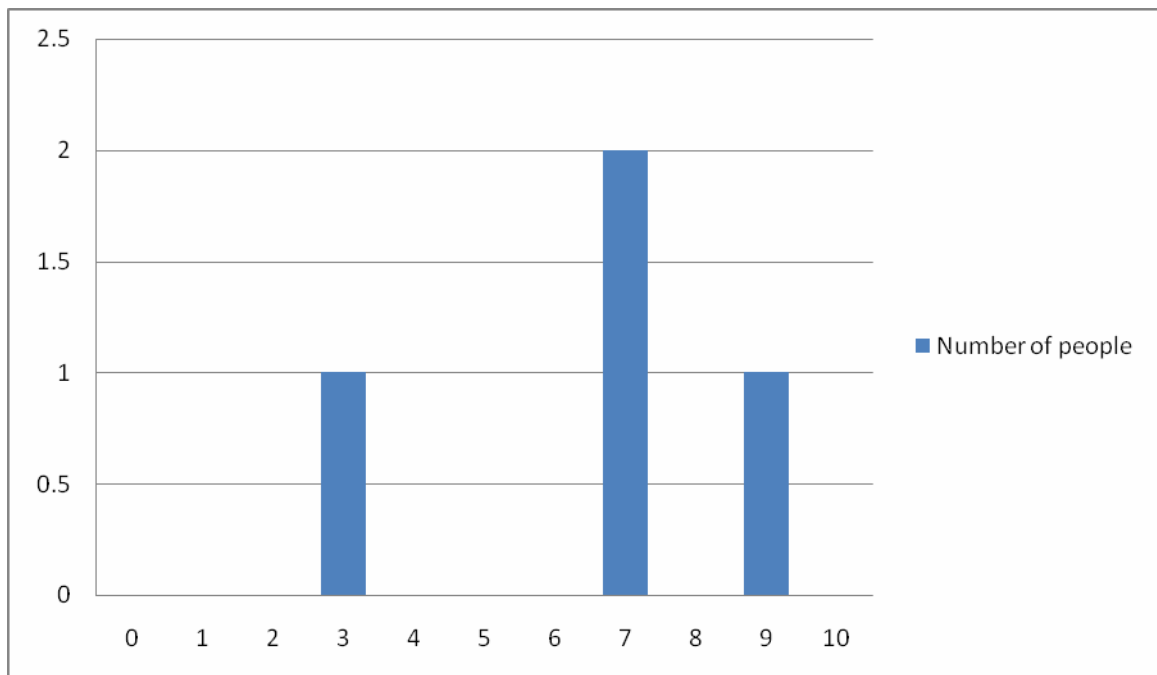
vi. Since the project, do you believe that water scarcity is a problem?



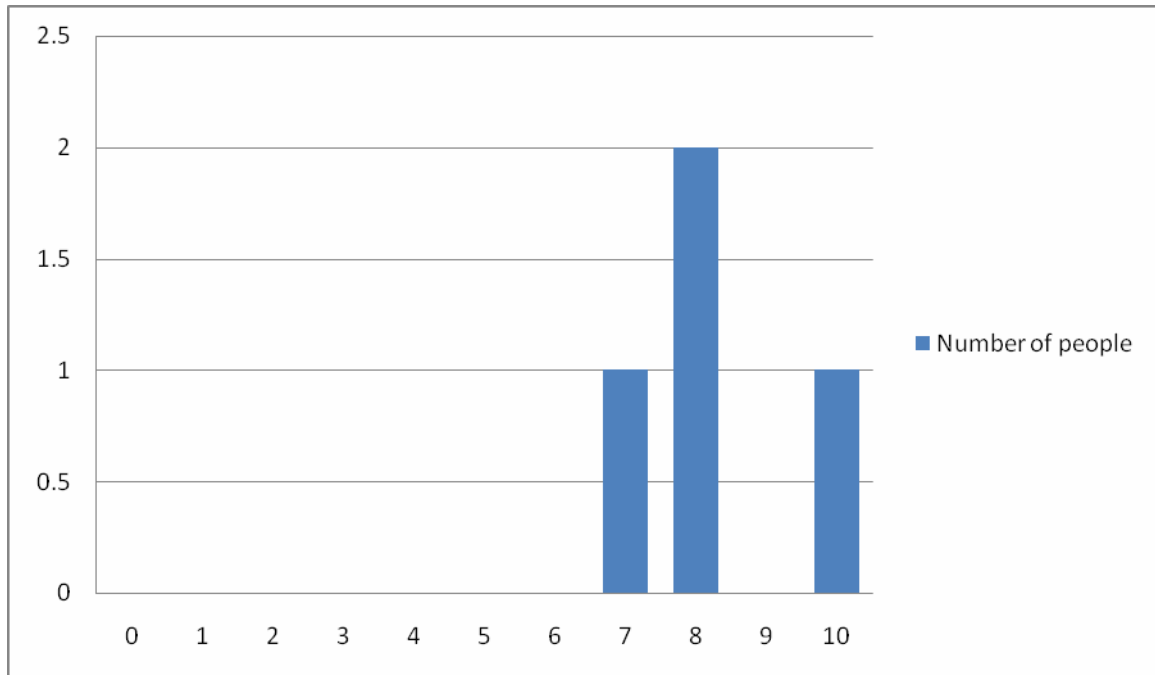
vii. Before the project, were you aware of the impact of water use on the environment, for example wildlife?



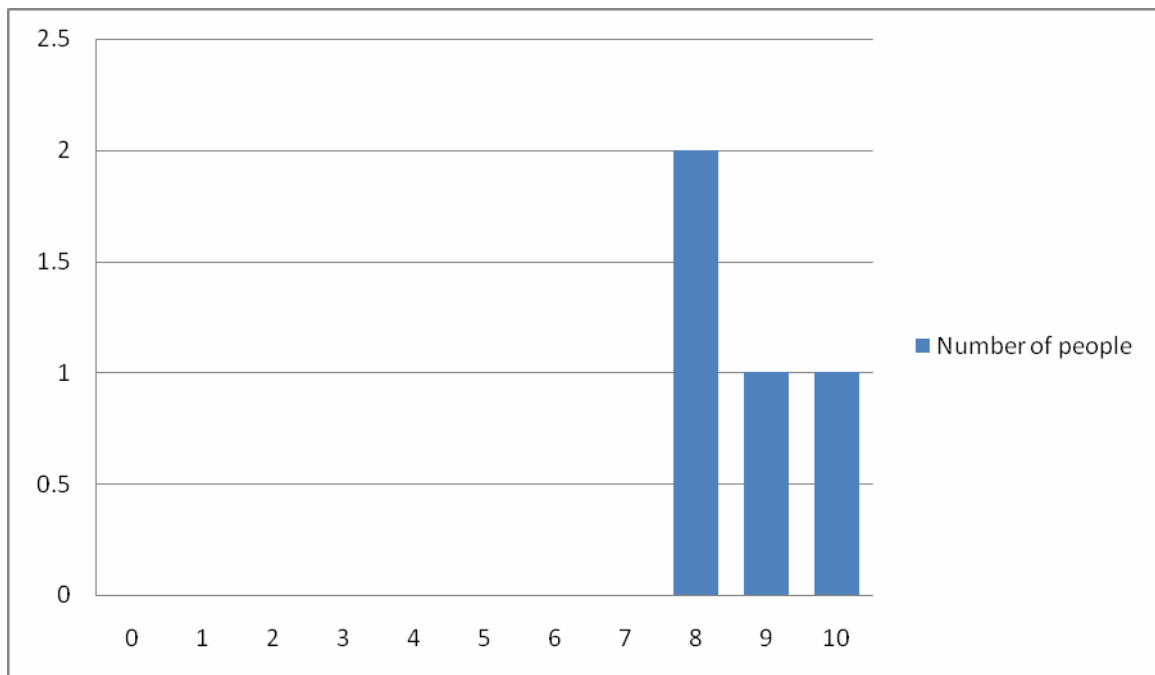
viii. Since the project, are you aware of the impact of water on the environment, for example wildlife?



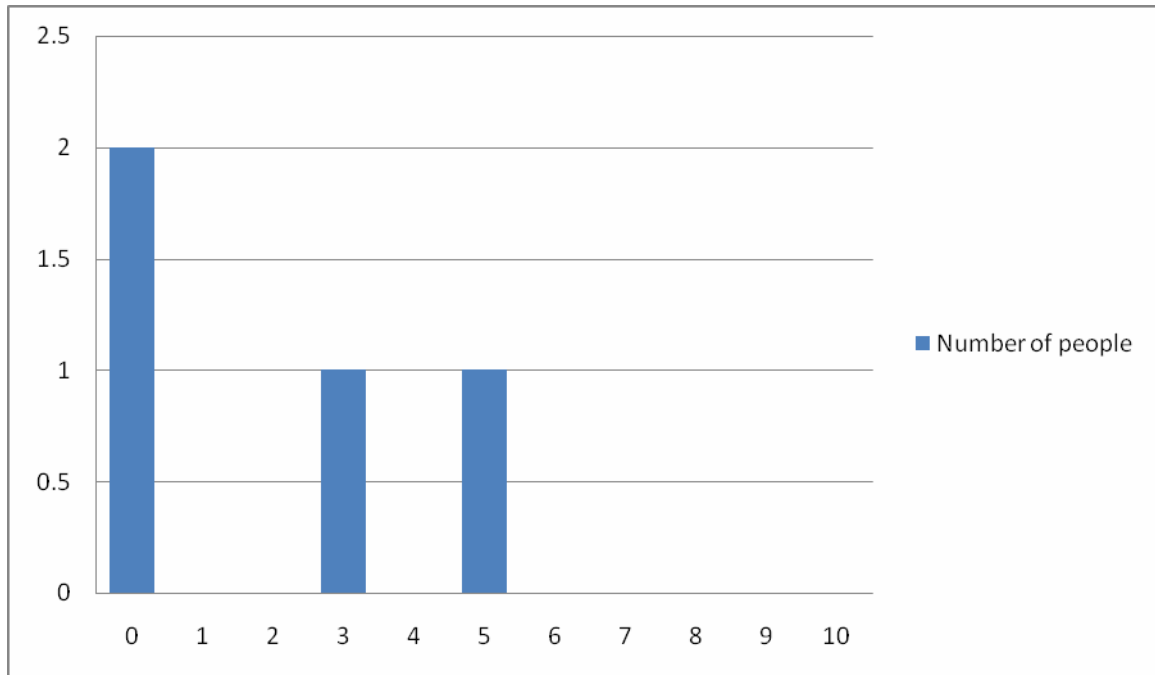
ix. Before the project, were you aware that the use of electricity and gas in your home were responsible for the emission of greenhouse gases such as carbon dioxide?



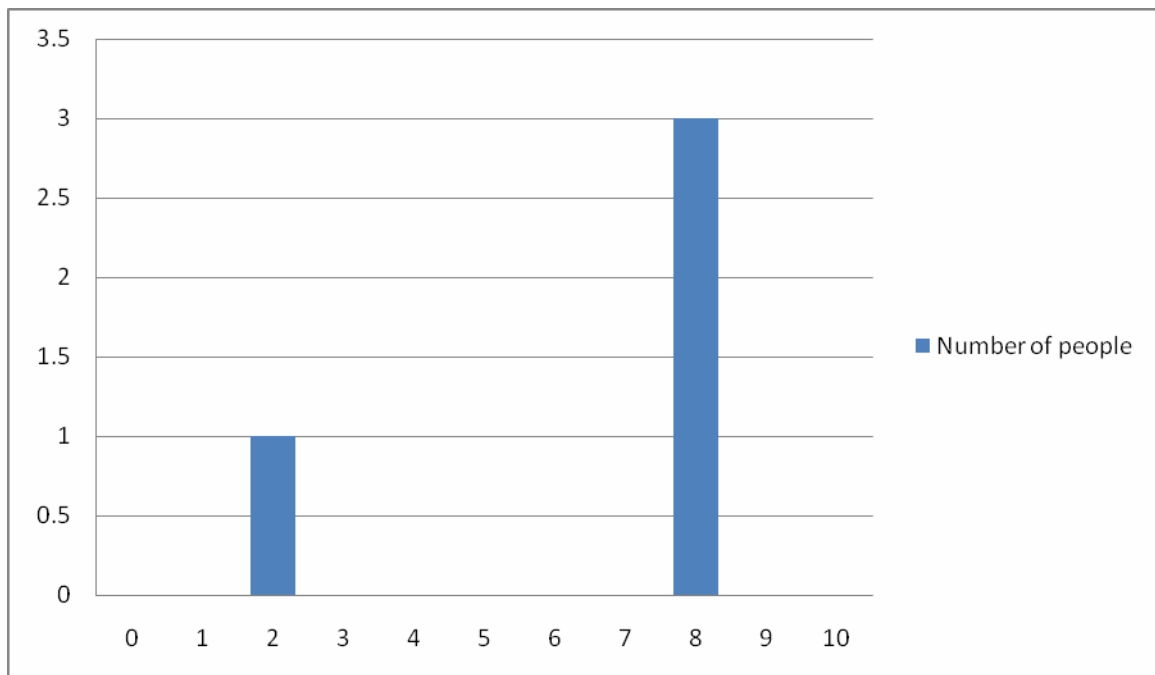
x. Since the project, are you aware that the use of electricity and gas in your home were responsible for the emission of greenhouse gases such as carbon dioxide?



xi. Before the project, were you aware that the use of water in your home and garden was responsible for the emission of greenhouse gases such as carbon dioxide?



xii. Since the project, are you aware that the use of water in your home and garden is responsible for the emission of greenhouse gases such as carbon dioxide?



xiii. Q. Before the project, who did you think was responsible for water saving – Government Water Companies, Consumers?

A. All of them

xiv. Q. Since the project, who do you think is responsible for water saving, Government, water companies, consumers?

A. All of them. One participant felt that consumers needed to be more responsible, while another thought that companies should do more, and that consumers were discouraged from saving water when water companies weren't seen to be doing their bit. The view was also expressed that water should be seen as a natural resource again and should not be in the hands of private companies. None of the participants had been aware of Severn Trent Water's involvement in the project nor were they aware of Severn Trent's presence at the summer event Optima held in 2011 although they were aware of the presence of Global Action Plan at the same event.

Two out of the three asked had water meters, which had been installed when they moved into their properties. Most Optima properties are metered as they are new build since the 1990s. Those with meters had a poor understanding of the relationship between the amount of water they were used and the amount they were charged. One participant said that she 'did not have a clue' about this relationship. Participants said that they had a reasonable grasp of the relationship between the use of gas and electricity consuming appliances and the amount they pay, and one commented that having an Owl electricity meter had increased her understanding of this. They felt that their understanding of water use was lower than their understanding of gas or electricity use. When asked which appliances used most water, participants gave answers which displayed confusion and lack of understanding of which appliances used and wasted most. One thought that washing machines and dishwashers used most water, because you could hear the water being used.

Participants did not feel that they knew any more about the relationship between appliance use and metered water charges since the Eco Teams workshops and Plug-In Project. One participant commented that she never read the meter, it was under the sink and it was too dark to read it, and that Severn Trent Water read it externally through a disk. This was a new build property in which the gas and electricity meters had been installed externally in meter cupboards in positions that were easy for her to read. She did not want to put her head under the sink to read the water meter.

The two participants with water meters had had them since they moved into their properties, which were 3.5 and 7 years ago respectively. Both felt that having a meter had affected the amount of water they used. One participant said that she is more careful with water use, and the other said that she was conscious of how much she was wasting and therefore waited until she had a full load for the washing machine.

One of the metered participants felt that she had sustained water saving behaviours consistently during the 3.5 years she had lived at the metered property. The second metered participant said that at first she had been frightened of the charges that might arise from the meter as previously she had only lived in a small flat with no water meter, and therefore told her sons only to flush the toilet when necessary. After a while she calmed down and allowed her sons to flush the toilet on every visit. Since then she had sustained a sensible level of water saving behaviour but has abandoned the extreme measures she adopted at first.

Both metered participants said that having a water meter had affected their water saving behaviour in ways such as using a bowl for washing up instead of washing them freely (although one participant also said that she rinsed dishes albeit with a bowl); having a shorter washing machine cycle; turning off tap when brushing teeth and encouraging others to do so (one of them appears to

be a one-person household). Both said that they had sustained this behaviour since they had the meters.

If we were able to see the second household's water bills then we might see very low consumption of water for a family household during the initial period of panic, settling down to a lower consumption of water than would be the case for that household if they were unmetered. So there is a level of panic water saving when there is first contact with the meter, which is unsustainable, followed by a period of more managed water saving which is more sustainable.¹¹

There was a lack of clarity among the metered participants about the currency for which they charged. One participant was not aware that she was charged in litres, she had believed it was charged in a higher currency, equivalent to gallons. Other participants pointed out that petrol was charged in litres as were other liquids such as bottled or canned drinks and cleaning fluids.

The unmetered participant was unable to have a meter for technical reasons but felt that if she did it would save her additional water and money. She felt that everyone should have a water meter as this would encourage them to save water.

Feedback from the focus group participants on their experiences of Eco Teams is dealt with elsewhere in this report.

Conclusions

The project has been a success for the water companies in achieving verifiable and value-for-money installations of water saving measures based on identified need. It has helped them to save time and money in sending water saving measures to homes where installation is assumed and cannot be verified. This has helped them to meet their water resource management plans. The water companies have played an enabling role in the project, recognising the strengths of housing providers and their maintenance teams in getting through the door and installing measures. This contrasts with the norm in the energy efficiency industry where some of the electricity and gas utilities believe that they themselves are best placed to market and install energy efficiency measures.

The project has been a success for the housing providers. Some of them have succeeded in installing measures, and others have laid the foundations for doing so in the near future. All of them have managed to embed water saving into their organisation and their supply chain. They have met environmental management targets through the project including water and carbon saving. They have also succeeded in engaging their staff and tenants and raising their awareness of water saving issues.

The project has been a success for the Environment Agency in giving a strategic lead by forming and sustaining new partnerships, and changing the way in which water saving measures are distributed. This helps the Agency to meet its strategic objectives as outlined in *Water Resource Strategy for England and Wales* and *Working for a Better Midlands*. Looking forward, the approach used in Plug

¹¹ We estimate that if 2 flushes per day were avoided by 2 people during the period of panic water saving, this would lead to panic water savings of 18 litres per day (6570 litres per annum) since this is assumed to be a 4.5 litre cistern. On an older cistern of 9 litres then the panic savings would have been 36 litres per day (13140 litres per annum).

It could be used to help fulfil the objectives of the *Water For Life* White Paper, such as raising the way in which people value water.

For residents, the project has been a success because it has enabled them to reduce water waste in their homes, in some cases leading to savings on gas and electricity bills and water bills. Residents have been able to save further amounts on fuel and water bills through new pro-environmental behaviours learned as a result of the project and in particular because of the Eco Teams activities. In some cases, residents have changed their attitudes towards water and environmental issues, including the way in which they value water.

The project has also been a success for the residents' groups who hosted Eco Teams activities, because this enables them to broaden their offer to the local community.

The Plug In approach has worked across all of the housing providers including large, medium and small (the project has not worked with any micro- housing providers) including group structures and independents, and including ALMOs and LSVTs as well as traditional housing associations. This provides a good basis for it to be replicated among other housing providers. We need to develop a common set of indicators for all participants, using Table 2 above as a starting point.

The lack of a water efficiency baseline for each housing provider has led to some wasted time and effort in deciding which measures are most suitable for each housing provider's stock. Each housing provider participating in any future project should be encouraged to develop a simple baseline. One way of doing this would be to do a simple water audit at the beginning of a sample of voids. Even the smaller housing providers could audit a significant sample of properties in just one month, and such an audit would take no more than ten minutes of a repairs surveyor's time to record the number and types of kitchen and bathroom installations. Housing providers could then look at adding additional fields to their maintenance databases for future recording and monitoring of water efficiency in their stock.

The Eco Teams approach has been a success for the project because it achieves cultural change as well as behavioural change among participants. It enables participants to approach resource use as reflective behaviour and not automatic behaviour.¹² A habit of reflective resource use is more important in creating a new generation of low carbon citizens than learning a list of good pro environmental behaviours from an energy advisor.¹³ Eco Teams is a flexible approach that is welcomed by the housing providers, that avoids the worst excesses of moralism and preaching. The individual staff working for GAP and Northfield Ecocentre on the project came across as having outstanding coaching skills as well as being able to provide advice to the highest standard. Eco Teams is also suitable for people of different environmental attitudes and segments and enables all to benefit.

Although Severn Trent Water's own educational team was not deployed on this project we know that they do have a track record on providing high quality advice. Many stakeholders are not aware

¹² See Phil Beardmore, *Greener Together: Influencing Environmental Behaviour the Co-operative Way*, Journal of Cooperative Studies, Volume 45, Number 1, Summer 2012

¹³ See Phil Beardmore, *What do we know about environmental behaviour?*

<http://www.greenertogether.uk.coop/blogs/phil-beardmore/what-do-we-know-about-environmental-behaviour>

of this and some people, as suggested in our Focus Group, believe that water companies have a split incentive on water saving. On future projects, opportunities for partnership working between Eco Teams and Severn Trent should be considered, using a co-production approach. This would retain the strengths of the Eco Teams approach, and also create opportunities for Severn Trent Water to have a more visible role in the project and potentially build trust among consumers.

It has not been possible to access the impact of installing multiple measures in this evaluation, due to the relatively small number of householder interviews and because the Focus Group included people who had only had one measure (because their homes did not need any further measures). In future projects, there needs to be more focus groups with residents. Consideration should be given to making the consent form 'opt-out' rather than 'opt-in' for permission for follow-up research, to increase the number of residents available for telephone interviews.

The value placed on different water saving measures varies. Some such as water saving guides seem not to have had much impact. Others such as shower timers have had more impact. The five senses seems to play a role in the value people attribute to a water saving measure. This is a key difference to energy efficiency. You cannot detect electricity or gas directly with any of the five senses under normal circumstances (unless there is a short-circuit or a gas escape). The common measures for using gas more efficiently, such as condensing boilers, heating controls, and insulation, are also invisible and inaudible to people in any real sense. With electricity, display energy monitors are starting to give people the ability to translate electricity saving into something that they can see and convert into a currency their brains are used to processing.

Since water flows can be easily detected with three of the five senses, then it is possible for people to directly interpret the benefits of water saving activity with their five senses.¹⁴ Examples include:

- Feeling the changed and reduced flow of a showerhead or tap restrictor
- Hearing and seeing the reduced volume caused by a cistern displacement device
- Hearing the absence of flow while brushing teeth
- Counting the amount of time one can hear or see water flowing – e.g. manually when filling a washing up bowl, mechanically with a shower timer.

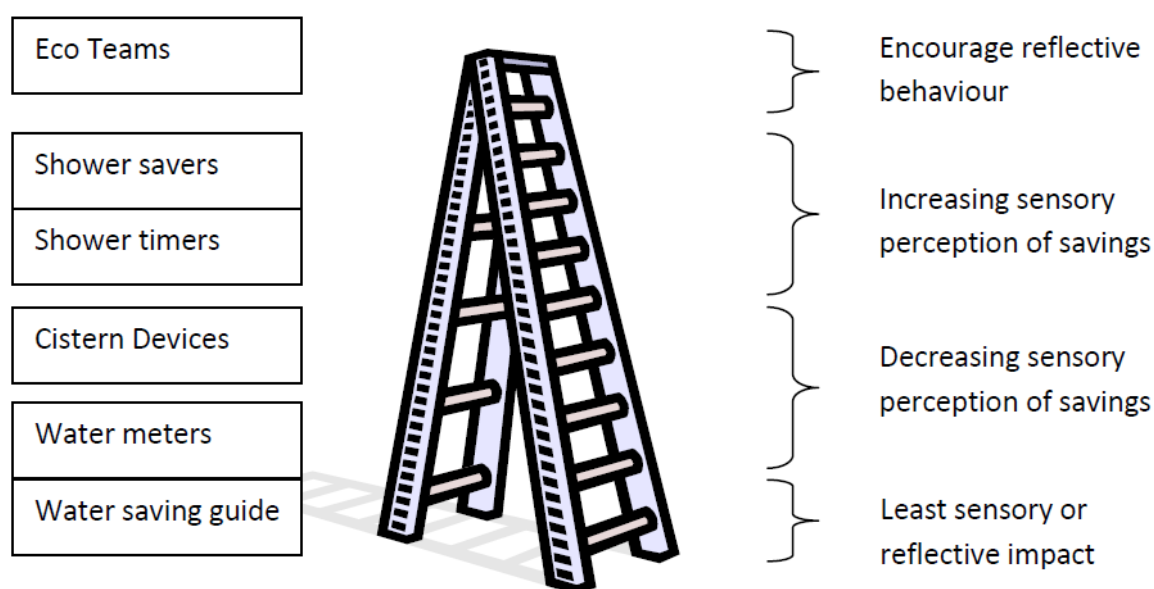
Since most people have difficulty in interpreting volume of water and in particular with understanding the litreage involved in everyday water use situations, then a sensory approach to the value of water could make a meaningful alternative to the litreage approach. Children's first experience of understanding the three states of matter is often by playing with water and sand to understand its physical attributes through the five senses. There is no reason why adults and children cannot relearn the attributes, value and currency of water in the context of domestic water use using the same sensory approach. This method could be used in education projects like Eco Teams to help people to quantify and value how much they waste and how much they subsequently save. When marketing measures to consumers a sensory approach could be used to inform people how much they are wasting. It is possible through the senses to instantly detect the amount that is being saved by a water saving activity. This is unlike activities to save gas and electricity, including

¹⁴ Maria Mannucci, *Five Senses From The Water*,
http://water.thinkaboutit.eu/think5/post/five_senses_from_the_water/

renewable energy micro-generation, the full value of which may only be appreciated after a twelve month billing period.

Some measures seem to trigger changes in attitudes and behaviours more than others. We normally perceive the utility of water saving measures in terms of the amount of litres they save, the amount of CO2 they save, their ease of installation, or the cost per litre of water or tonne of CO2 they save. We should continue to perceive their utility primarily in this way, but we also need to think about how we perceive and value their utility as gateways to increased pro-environmental behaviour, in the same way that people are now starting to perceive energy saving measures and renewable energy measures as gateways to further pro-environmental behaviour.¹⁵ It might be helpful to visualise this as a water saving 'ladder of empowerment', as illustrated below:

Fig 1: The water saving 'ladder of empowerment'¹⁶



This approach suggests that we should see water saving measures and advice not only as an output but also as a means to achieving an outcome such as a particular behaviour or set of behaviours, or a more reflective mindset.

It has not been possible to apply environmental, socio-economic or values-based segmentation techniques in the evaluation of this project on any meaningful scale due to the relatively small sample of householders questioned. Therefore it is difficult to draw any meaningful conclusions about the relationship between a person's segment and their likelihood of making and sustaining behaviour change. It was observed by project participants that the Eco Teams approach was suitable for all types and that the method of installing measures on void works or planned maintenance meant was neutral from a segmentation point of view.

¹⁵ See James Keirstead, Behavioural responses to photovoltaic systems in the UK domestic sector, University of Oxford, 2006 <http://www.sciencedirect.com/science/article/pii/S0301421507000651> and Alison Millward Associates/Localise West Midlands, Birmingham Energy Savers Phase 1 Evaluation, 2011

¹⁶ The concept of the Ladder of Empowerment was first used by Sherry R. Arnstein as the Ladder of Citizen Participation: Arnstein, Sherry R. "A Ladder of Citizen Participation," JAIP, Vol. 35, No. 4, July 1969, pp. 216-224.

Previous studies have suggested that metering reduces consumption by around 10 to 15 per cent. Due to the small sample size the experience of the two households with compulsory meters needs to be treated with caution, however, it is clear from both households' self-reported behaviour that metering did have an impact on their behaviour and consumption. Since the comparison of their post-meter use with their pre-meter use would be in different properties then it would be difficult to measure, however based on the new behaviours both households reported then a figure of 10 or 15 per cent in the long term would not seem unreasonable. One of the metered households described a number of unsustainable panic measures to save water when first exposed to a metered supply, which they later abandoned to a more sustainable and sensible approach to water saving. This reinforces the need to monitor water saving in metered households in the medium and long term, and not to assume that short term savings are sustained in the longer term.

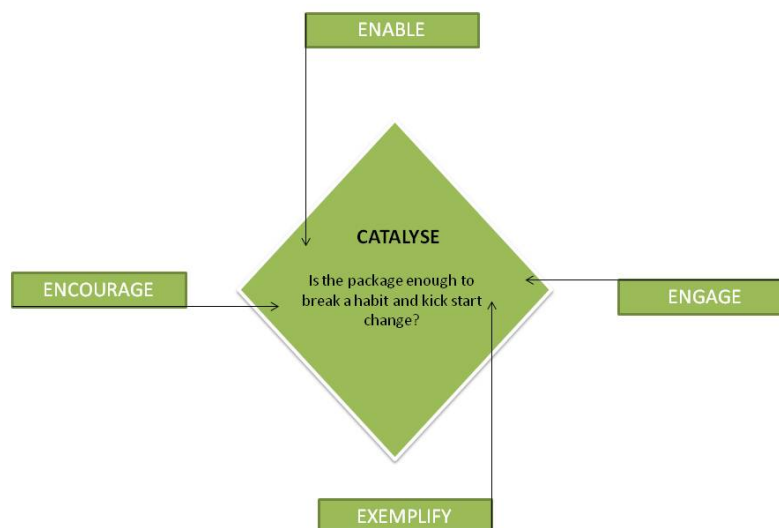
All of the housing providers have some experience of community engagement, in some cases substantially so. All of them have approached Plug In as a community engagement issue as well as a maintenance issue and an environmental issue. It would be interesting on a future project to correlate the level of community engagement undertaken with the take-up of measures.

The feedback we have obtained from residents about the way in which they value water is most instructive. Before the project, residents had very weak understanding of the water cycle and the link between water use, water quality and environmental degradation. This is illustrated by the low awareness of the link between water use and CO2 emissions, and the lack of awareness of water scarcity. This is true of all segments including the most environmentally aware. This dovetails with Defra's findings that even positive greens have relatively low awareness of these issues.¹⁷ There is higher awareness of the impact of water use on the environment e.g. wildlife. Overall, awareness of water scarcity issues and value attributed to them is lower among our participants than their awareness of energy saving issue and the value attributed to reducing greenhouse gas emissions. After the project, although participants had made physical and lifestyle/behavioural changes to save water, their awareness of the link between water saving and global environmental issues such as scarcity, wildlife and greenhouse gas emissions was still relatively low, including among those who were otherwise most environmentally aware. We observed that participants in the Eco Teams activities had picked up the link between gas and electricity use, cost and global environmental issues much more easily, possibly due to prior knowledge and the sustained campaigns by Government, EST and others since the Rio Summit, but they do not seem to have picked up the link between water use, cost and global environmental issues so easily, perhaps reinforced by the fact that less resources have gone into raising awareness of these issues by Government and others. We suggest that future Eco Teams activities could devote more time to making these links explicit, building on their existing success in promoting changes in behaviour to promote greater awareness on water.

In recent years Government has given us two models against which to evaluate projects that attempt to influence behaviour. These are the "Four Es" model and the "MINDSPACE" model.

¹⁷ Defra, op. cit.

Figure 2: The Four Es Model



Adapted from Securing the future (2005), HM Government

Plug In has succeeded in engaging residents in water saving activities, encouraging them to save water, and enabling them through providing and installing measures and putting on Eco Teams activities. It has been less successful in exemplifying water saving practices, with the exception of the Youtube video made by Optima's News Team.¹⁸ Most people have never seen a water saving shower head or a shower timer. Housing providers are good at exemplifying energy saving activities and many of the providers involved in Plug In have a track record on organising open days at retrofitted homes to show energy saving measures, and occasionally water saving measures. Such events work well because of the Seeing Is Believing principle. In future projects, water saving measures could be exemplified by:

- i. At community events, residents could be invited into the homes of people living nearby who have had water saving measures. Although going to view water saving measures is somewhat less exciting than the lure of a bouncy castle, most people are curious to see inside other people's homes. Incentives such as competition prizes or giveaways could be offered.
- ii. Energy saving demonstrator homes are likely to become more widespread due to the Green Deal, possibly as part of the Old Home Superhome network, including in social housing properties. These should also be seen as opportunities to exemplify water saving measures in their own right rather than being a sideshow to a more enticing main event such as solid wall insulation of solar panels.

¹⁸ <http://www.youtube.com/watch?v=yIW-PcKEOM4>

MINDSPACE is a checklist of non-coercive factors affecting behaviour¹⁹ that has had some application to energy saving behaviour.²⁰ The MINDSPACE factors are:

- **Messenger** - we are heavily influenced by who communicates information
- **Incentives** - our responses to incentives are shaped by predictable mental shortcuts such as strongly avoiding losses
- **Norms** – we are strongly influenced by what others do
- **Defaults** – we ‘go with the flow’ of pre-set options
- **Salience** – our attention is drawn to what is novel and seems relevant to us
- **Priming** – our acts are often influenced by sub-conscious cues
- **Affect** – our emotional associations can powerfully shape our actions
- **Commitments** – we seek to be consistent with our public promises, and reciprocate acts
- **Ego** – we act in ways that make us feel better about ourselves.

The MINDSPACE factors can be used to evaluate the Plug In project.

Messenger – the principal messengers in this project have been the housing providers, with GAP and Northfield Ecocentre being the messenger in a smaller number of instances. Social housing providers are perceived to have a high degree of trust from their tenants. The fact that housing providers in the Plug In project have succeeded in getting into people’s homes relatively easily suggests that this perception is justified. Less is known about the public perception of water companies, although Defra’s research suggest they are mistrusted on water saving issues.²¹ In future projects, social housing providers are a good messenger with tenants and leaseholders. GAP and Northfield Ecocentre are seen as good messengers because they are values-led. This should be built upon in future projects although as suggested above, the water companies’ own education staff could work with them.

Incentives – residents expressed their financial incentive for water saving as saving money. Avoiding loss, which is different to saving money, was not spontaneously identified by residents as an incentive. In evaluations of future projects, residents should be asked which of these is most important to them.

Norms – residents do not seem to be unduly influenced by what others think or do in deciding whether or not to adopt a water saving measure or behaviour. Eco Teams is important in establishing water saving behaviour as a social norm, especially when delivered through mainstream

¹⁹ Institute for Government, *MINDSPACE, Influencing behaviour through public policy*, <http://www.instituteforgovernment.org.uk/our-work/better-policy-making/mindspace-behavioural-economics>

²⁰ <http://www.greener.together.uk.coop/blogs/phil-beardmore/what-do-we-know-about-environmental-behaviour-part-2>

²¹ Defra, op. cit.

community group activity. One resident involved in the Focus Group has become a self-appointed ambassador and is attempting to establish a particular pro-environmental behaviour (reducing carrier bag use) as a social norm. Exemplar activities as suggested in the Four Es analysis above could help to establish water saving behaviour as a social norm.

Defaults – water saving activity lends itself well to default theory and design, since it is possible to design out water waste through procurement of water efficient kitchen and bathroom furnishings. Washing machine and dishwasher manufacturers are designing smarter appliances to make water efficient washing the default option. This leaves less and less scope, or necessity, for building in water efficient defaults.

Salience – by holding Eco Teams activities within the context of mainstream community group activities such as parent/toddler and residents' groups, water saving activity is made more salient to people's everyday experience. This should be repeated in future projects.

Priming – there are few known examples of practically applying sub-conscious primes to energy and water saving behaviour. The drab packaging of these two water saving measures is a missed opportunity for priming.



Packaging on water saving measures could be redesigned to provide cues. A picture of a fish or aquatic bird might help to make the connection with water quality and the ecosystem. Messages on rent statements could reinforce the water saving theme.

Affect – water saving activity does not have to be boring. Eco Teams is fun, this is one of its major strengths and is a good reason to include it as mainstream in future water saving projects.

Commitment – Eco Teams enables participants to make a public commitment to following a particular action. The Focus Group participants have largely stuck to the commitments they gave at the Eco Teams activities. In future projects, more Focus Groups or telephone interviews with participants would be a good way of evaluating whether people have kept their commitments.

Ego – the video made by Optima News Team about the Plug In project²² is a good example of creating a shared feelgood factor in celebration of the environmental achievements of Optima residents, staff and partners, which should be replicated in future projects.

Recommendations – a checklist for success on future projects

The Plug In approach, with a strategic role for the Environment Agency, an enabling role for the water companies, and a frontline delivery role for the housing providers, should be replicated among other social housing providers of all kinds across the Midlands. Delivery of water saving measures can involve a number of distribution methods including void works, planned maintenance, maintenance surveying or diagnostic visits, all of which are reliable methods of installation. Installation of measures should include behavioural advice where possible delivered by the housing provider's own staff or by partners such as GAP.

The Eco Teams activity is critical to the success of the project because it encourages reflective pro environmental behaviour, and should be continued, extended and evaluated. Educational activities could be co-produced with the education staff of the water providers. Eco Teams activity should be delivered through existing community groups and initiatives wherever possible rather than delivered as a stand-alone activity. Eco Teams activities need to pay more attention to drawing the links between domestic water use and global environmental issues such as water scarcity, impact on ecosystems, and greenhouse gas emissions.

The Plug In project should continue to provide water saving measures flexibly and in accordance with identified household need. Housing providers wishing to participate should be encouraged to develop a simple water efficiency baseline through audits of water using appliances at the beginning of voids for a minimum period of one month. This baseline data should then be used to forecast likely need for each type of measure for each housing provider.

Consent forms on future projects should be 'opt-out' rather than 'opt-in' to create a greater pool of residents to give feedback. Each housing provider that uses Eco Teams or similar in-house activity should hold a focus group to gain feedback for evaluation purposes. This is particularly important in measuring behavioural change.

Future projects need to exemplify water saving behaviour through open days as part of community events, through Youtube, whose use continues to multiply, and through activities aligned to Green Deal and energy efficient retrofit.

²² <http://www.youtube.com/watch?v=yIW-PcKEOM4>