

PR24

Best practice guide to delivering a tariff trial

Anglian Water

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Best practice guide to delivering a tariff trial



Foreword

Across the globe there is an increasing need to reduce water consumption and ensure that water is affordable. Achieving water supply / demand balance has often relied on supply side strategies or in companies taking action to reduce leakage. However, there is an increased need for more demand-side management options with company draft Water Resource Management Plans outlining water efficiency as an increasingly significant, cost-effective method of reducing demand. Making current resources serve an increasing population is both better for the environment but also helps prevent avoidable investment and so keeps bills lower than they otherwise would need to be.

Price and non-price approaches to water conservation have been implemented across the world with primary objectives being to reduce consumption or improve affordability for those least able to pay. Increasing block tariffs have been widely used in America, Spain, Portugal and Australia along with seasonal pricing approaches. These have had varying degrees of success and have sometimes inadvertently prompted unexpected behaviours resulting in unintended consequences for the customer and environment. Consequently, the trialling and implementation of tariffs needs to be carefully considered

The UK context differs from countries where tariffs to reduce consumption or improve affordability are often used. The Price Elasticity of Demand regarding water use combined with the price of water and regulatory constraints on revenue reduces the potential impact of tariffs alone. Cultural attitudes to water, and the need to save it, also differ. However, tariffs can be used alongside other types of intervention such as messaging and the provision of water saving devices to enhance their impact

The recent availability of high-resolution metering data gives the UK water sector a new opportunity to innovate in the use of different tariff structures. Historical metering data allows companies to set pricing strategies based on actual consumption patterns, whilst data collected during trials will enable robust evaluation of the effectiveness of different interventions. Through combining metering data with other measures of the impact of tariffs on customer behaviours these forms of trial can lead to new insights into customer actions, impacts of the tariff and messaging interventions, providing evidence as to how demand-side management can be achieved most effectively.

The implementation of tariffs can be costly requiring changes to systems and processes across the business and these constraints need to be taken into account, without undermining the trial itself. Anglian Water's approach to trialling a tariff as set out in this document highlights both the best practice and the measures needed to ensure that a successful trial can be rolled out at scale. These trials give the opportunity to rigorously assess the impact of tariff structures on prompting customers' behaviour to reduce consumption in the UK.

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1. Introduction

In 2022 Coningsby in Lincolnshire became the first place in the UK to experience temperatures above 40 C. Since 2013 the Anglian Water Region has been classified by the Environment Agency as being under severe water stress ([Water Stressed Areas – Final Classification 2021](#)). An additional 500,000 homes due to be built in the region in the next 25 years and increased population growth of 900,000 people will put further pressures on water resources. Anglian Water is meeting the challenge through improving supply side solutions such as planned new reservoirs in South Lincolnshire and West Norfolk, and addressing leakage. These necessary large infrastructure projects have impacts on customer bills and also result in additional volumes of water being taken from the natural environment. Reducing demand therefore has a key role to play in future water resource sustainability and resilience and in managing the supply / demand balance.

As part of our Water Resources Management Plan ([WRMP24](#)), we have set ourselves very ambitious goals to reduce household demand, non-household demand and leakage; being mindful of the targets set by Defra, Ofwat and the National Framework. Including our smart metering program and Government led interventions, we have forecast a 220 mega litre per day water saving, that will need to be addressed through demand management. With 92% (2022) of customers already having some form of meter and our full smart meter replacement programme being rolled out across the region by 2030, the company has the opportunity to bill customers based on a more sophisticated view of their consumption, whilst enabling them to understand their usage and how through their behaviours this might be changed. Reduced consumption may also result in lower bills, improving affordability.

Whilst this opportunity exists for both household and non-household demand, the focus of this document is on household consumption. As a note for future reference, the use of price signals alone to impact usage in “process” by non-household customers may be constrained. Where an industrial business requires water for non-domestic use, if price increases are not passed on to customers, it may risk making the business uncompetitive unless alternative sources of water (grey, black, final effluent etc) or improvements in process technology to increase water-use efficiency can be identified and developed. The water industry therefore needs to work in partnership with its industrial customers to help develop these solutions, with price signals emphasising the ambition.

In the UK, tools to reduce household customer consumption have mainly focussed on education campaigns, behavioural nudges, provision of water saving devices and temporary use bans. In other countries such as the United States, Australia and Spain these approaches are further supported by the use of different tariff structures.

In the UK there has been little attempt to use tariffs as a prompt for reducing water consumption, with few trials being attempted. There have been a number of barriers to trialling tariffs including lack of metering data, a low amount of discretionary use compared to other countries (notably Australia and the USA) and the low price of water as a proportion of household income. Barriers to the use of these approaches, notably the availability of metering data to measure consumption, are decreasing, giving greater scope for the sector to trial more innovative approaches to pricing.

There appear to be two critical considerations in the use of tariff structures and pricing in influencing household demand. The first is that with relatively limited discretionary demand in the UK, the price elasticity of demand evidenced in water consumption suggests a potentially unacceptable increase in price would be required in order to have a material impact on usage, thereby creating potential hygiene and affordability issues for a large segment of customers. It is therefore necessary that the behavioural change desired is achieved as much by changing customers understanding as to the impacts of their water use and so the psychology related to it, as by price. This leads on to the second consideration, being increasing the “value” that customers attach to their use of water, albeit not limited to monetary value. Therefore, any pricing of

water should maintain a clear message that water is a precious, finite commodity, and that all water use therefore has a transfer value i.e. it is taken from the environment and therefore has a wider social impact. This has important consequences when designing pricing structures for e.g. Increasing Block Tariffs (IBTs).

The enthusiasm for so-called “progressive” charges to help address affordability issues is understandable, but the likely transaction costs involved appear significant, particularly when ensuring that support is properly targeted towards low-income households, not just low occupancy. Differential pricing, particularly where it is below the cost to supply, may also send contradictory signals to customers as to the wider social value of water and could result in unintended behavioural change from some customers.

Anglian Water has operated its “Shop Window” in the Newmarket area since 2015 where we have tested interactions with customers including messaging, incentives and installation of devices to assist customers in reducing their water usage. Even after these interventions have ceased, we continue to see a sustained reduction in household usage. This has been achieved without a change in tariff structure. This experience suggests that given concerns surrounding the price elasticity of demand set out above, the primary role of innovative tariffs will be to emphasise through price signals and structure a strategy of wider messaging and communication with customers regarding water efficiency, rather than price being instrumental itself in changing behaviour.

This document lays out a generic methodology that Anglian Water will use in the design, delivery and evaluation of trials in line with best practice drawn from academic literature and case studies from around the world. It describes the ideal approach and outlines the operational considerations around the implementation of different tariff structures which, if the trials prove to be successful, can be rolled out at scale. The design and implementation of a seasonal tariff has been used as a case study throughout to exemplify the various steps in the methodology.

The scale and pace of our smart meter roll out strategy means that we are well placed to trial a time of use tariff, with a seasonal tariff being the obvious initial starting point. As a water scarce area the price signals in a seasonal tariff also align with our wider ongoing strategy to encourage water efficiency. We are aware that other companies intend to trial IBTs and therefore consider we can best add to the sum of industry understanding of the effectiveness of innovative tariffs by initially trialling a seasonal tariff. We remain open-minded regarding the effectiveness of IBTs and will look to build on wider industry experience in future trials.

2. Background

In the UK there has been little attempt to use tariffs as a prompt for reducing water consumption. Different barriers to the use of these approaches – notably the availability of metering data to measure consumption – are decreasing, giving more scope for the sector to trial more innovative approaches to pricing. There are two main drivers for the use of tariffs in the sector: to reduce consumption and improve affordability.

The use of water in the home is largely driven by habitual behaviours that people do with little conscious thought or deliberate action. These types of behaviours can be difficult to change. In 2011 Michie proposed a model of three factors that could help prompt behaviour change:

1. **Capability to change:** this can be physical or psychological. Interventions such as educational campaigns, training and enablement can help address these;
2. **Motivation to change:** these can be automatic or in response to interventions such as tariffs, incentives, and being 'normal' in how they use water; and
3. **Opportunity to change:** This may be through restricting a person's ability to exhibit a behaviour (e.g. hosepipe bans), enabling people to take action such as providing low-flow showers or changing what might be acceptable in a community.

In trialling innovative tariffs water companies are attempting to provoke a change in behaviour through a financial incentive to increase the motivation to reduce consumption; but people's capability and opportunity to change are also important factors. Work in Anglian Water's 'Shop Window' has demonstrated the importance of messaging in reducing consumption and the opportunities that the sector has to innovate in the use of behavioural change techniques ([Behaviour change interventions in the water sector](#))

In reviewing the work done by the Centre for Competition Policy at the University of East Anglia (CCP) and the University of Cardiff's Centre for Climate and Social Transformations (CAST), a number of key findings were identified:¹

- Know your customer
- Communication and information are important
- Need for consumption data
- The context matters
- Timely feedback to customers is needed

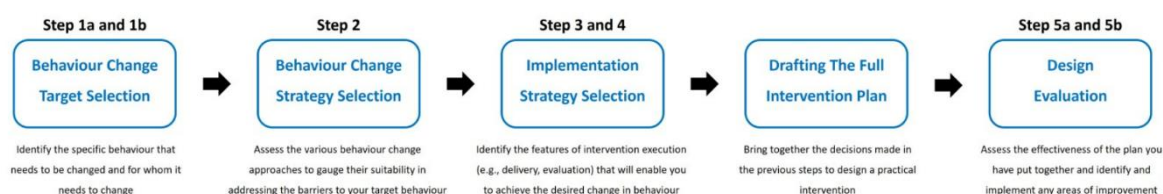
¹ This section is a summary of reports carried out by the Centre for Competition Policy at the University of East Anglia ("CCP") on [Price and Behavioural Signals to encourage Water Conservation](#) and the Centre for Climate and Social Transformations at the University of Cardiff ("CAST") [Water Efficiency and Behaviour Change: A Rapid Literature Review](#). A more comprehensive overview can be found in Appendix 1.

3. Behaviour change trial design overview

In 2019 as part of the Anglian Centre for Water Studies, Anglian Water and The University of East Anglia (UEA) successfully bid to InnovateUK for Knowledge Transfer Partnership funding to create a ‘Behavioural Science Toolkit’. The toolkit enables the business to effectively prompt behaviour change both internally as part of the change management process, and externally with customers around the use of unflushables and water consumption. This project built on previous work with UEA and Aquafresh which showed that nudge psychology approaches could reduce water use when people brush their teeth ([Institute of Water Journal Issue 3](#)).

The toolkit comprises the theoretical background, decision making tools and templates to guide the company through the process of designing, implementing and evaluating behavioural change interventions through five basic steps (fig . 1). These align with the government guidance on how to carry out behaviour change projects – ([Enabling behaviour change](#))

Figure 1. Five steps to designing, implementing and evaluating behavioural change interventions



Before embarking on this process there should be a very clear, specific statement about the overall objective of any particular intervention and how a successful outcome can be evaluated. In the context of tariffs trials this is likely to be reducing consumption and /or improving affordability.

Once the objective has been clearly set, there needs to be an understanding of what specific behaviours need to change and by whom. The toolkit provides templates for how this can be done including design of surveys, interviews and focus groups. For a tariff trial this could bring together an understanding of water use in the home; what is considered discretionary use; customer ability to pay; the use of metering data to understand consumption patterns; and attitudes to different behavioural change approaches.

Based on the understanding of what behaviours need to be changed and by whom, the toolkit then provides guidance on how to select a behaviour change strategy that is most likely to work. The intervention itself may involve combining different approaches. For example, communication strategies are core components of a tariff trial, not only to enable customers to understand that tariffs are changing and what they can do to reduce consumption, but also in prompting behavioural change itself through social norms messaging.

The remainder of this document assumes that tariffs coupled with allied non-price interventions have been identified as the best strategy to achieve a stated objective. It focusses on how to assess the relative impacts of price and non-price interventions and any additional impacts of combining demand management strategies to reduce discretionary use. In terms of the volume of water used the definition of discretionary use is anything over 100l ppd ([Domestic water quantity, service level and health Second edition](#)). This is the World Health Organisations estimate for economies with infrastructure patterns like the UK. A 2021 study by the University of Sheffield ([Defining domestic water consumption based on personal water use activities](#)) focusses on personal water use practices rather than volume of water used with reference to Maslow’s hierarchy of needs. This identifies that 92 l ppd is sufficient to achieve safety as well as psychological wellbeing.

Whilst these figures vary slightly they give an indication of the amount of water needed per household in the UK. New approaches such as grey water recycling may decrease this further when in widespread use.

Alongside a description of best practice, this document also demonstrates how the approaches taken exemplify Ofwat’s best practice principles on the design of tariff trials. These are highlighted in the yellow and green boxes that appear throughout the document:

Examples of how the best practice element being described would be used in trialling a seasonal tariff with the objective of reducing discretionary use.

Constraints on delivering this element of a trial will also be highlighted

These examples are formatted in yellow boxes.

How the best practice described meets the Ofwat principles on tariff design:

These examples are formatted in green boxes

The Centre for Competition policy report highlighted the complexity and unintended consequences associated with IBTS, including impacts on affordability and increased consumption if the structure is poorly designed. Pricing blocks of water more cheaply or giving ‘free’ water risks further undermining the perceived value of water. We understand that other companies are trialling IBTs. Therefore, to contribute to the sum of understanding across the industry as to how “innovative” tariffs can help deliver on the objectives, Anglian Water will initially trial seasonal tariffs to reduce discretionary use. These are consistent with the significant challenges in the region around the current and future supply / demand balance. We also consider them more straightforward to design than block tariffs. Seasonal tariffs are therefore used throughout this document as an illustrative case study of how the best practice principles can be applied and the considerations that need to be made in the implementation of innovative tariff structures.

4. Tariffs

Once tariffs have been identified as the appropriate type of intervention to prompt the desired outcome, there are decisions to be made about structure, pricing, and allied interventions.

4.1 Structure:

The decision about which tariff type might be best is based on the primary objective and data gathered on customer motivations. Ofwat have identified four broad types of structure:

Box1: Description of tariff types

Time of Use: The price per litre changes based on the time water is used. The seasonal tariff case study used throughout this document is an example. This type of tariff would be appropriate for reducing peak demand, such as in the summer (seasonal) or time of day. The benefit of this type of tariff is that it can be used to address specific challenges and has been used in the US during times of drought ([Residential Water Demand Management: Lessons from Aurora, Colorado](#)).

Increasing Block Tariffs (IBTs): With this structure, customers pay a different price per litre of water depending on the amount of water they have used. The amount paid per litre paid rises in blocks. This may be based on fixed blocks per premises or variable blocks based on occupancy.

As an illustration people might pay £1 per litre for the first 80l block; £1.50 per litre for the next 30l block and £2 per litre for anything over 110l. The design of this type of tariff can be changed in terms of the number of 'blocks', size of block and price per block. These tariffs have been used to reduce overall consumption for some people (for example in Santa Cruz, "[Does marginal price matter? A regression discontinuity approach to estimating water demand,](#)") and can address issues of affordability. However, IBTs can be difficult to design and may result in unintended consequences related to consumption patterns and water poverty.

Premium Charges: This is where different charges are levied based on a pre-defined criteria, for example when aquifers or reservoirs are low. By its nature the implementation of this tariff cannot be planned for and therefore may be constrained under the current regulatory structures. It may not result in a long term change in behaviours as customers associate the increase pricing with a particular trigger.

Two-part charges with rebate: This is where customers are charged as normal but get a rebate based on different behaviours e.g. reducing consumption. This type of tariff is highly dependent upon metering data and understanding changes in household occupancy or significant life events.

4.2 Price:

In the UK the cost of water is a relatively small proportion of a household's total outgoings. However, combined with the cost of other utilities, there may be an affordability issue for some customers. There is a desire to keep prices low, and combined with the regulatory framework, this can make calibrating an appropriate price signal difficult. The price elasticity of demand is also very low in the UK and pricing levels will need to be carefully considered and the outcomes monitored to reduce the risk of increasing affordability issues, with potential cross-subsidies being in place for those least able to pay.

In setting prices Anglian Water will use historical metering data to better understand patterns of demand and use the learning from the use of tariffs in other places. For example:

- A Cranfield University PhD thesis supported by Anglian Water used metering data to identify four clusters of consumption, and how the number of households in each group changed over the year and some of the socio-economic determinants related to those households ([An empirical water consumer segmentation and the characterisation of consumption patterns underpinning demand peaks](#)). This type of analysis can help us better understand the daily consumption behaviours by household.
- Evidence from the literature is that some groups of customers are more likely to respond to social norms messaging than tariffs, highlighting the interaction required with messaging to support tariff trials.

1. Ideal approach for setting prices for a seasonal (time of use) tariff to reduce demand:

Under a seasonal tariff customers pay a higher price per litre of water consumed in the peak summer months compared to the rest of the year.

Ideally all customers in a trial will have smart meters. For smart metered customers the volumetric charge can be calculated on a daily basis, allowing customers to see their consumption and associated price, and be charged on daily usage. The seasonal tariff can therefore be applied based on actual consumption.

Constraints:

Pricing based on higher charges through the summer may give customers concern over budgeting and make modelling income within the constraints of the regulatory control difficult.

5. Allied interventions

If a price signal is to have an impact customers need know how and why a tariff is going to change and understand the tariff structure. The provision of consumption information throughout the trial may be important for customers to be able to monitor their usage, and timing of billing and payment may have an impact on the effect of the price signal.

Beyond the provision of essential information about the tariff structure and levels of water consumption there are other factors that can enable customers to reduce their consumption and consequently their bill. In the paper [The behaviour change wheel: a new method for characterising and designing behaviour change interventions.](#)) Michie stipulated that there are three components that can prompt behaviour change:

- **Capability to change**
- **Motivation to change**
- **Opportunity to change**

Different customers will need differing support to achieve each of these factors. For example, compared to lower income households, more affluent households may have more capability and opportunity to purchase water saving devices or to fix plumbing losses, however their motivation to change may not be a price signal but rather a conjunctive norms 'nudge'. Which type of allied interventions are most appropriate should be decided based on the information gained from the initial phases of the trial design when identifying what behaviours need to change and by whom.

In addition to the type of allied intervention, consideration is required as to how it is done and by whom. For example, much communication is now done digitally through customer portal apps or email. Who is doing the communication is also important with communication from trusted voices being more likely to be acted upon.

Ofwat Principle:

Trials based on understanding of customers and their needs
Trials have a clear stated objective

2. Allied interventions for seasonal tariffs to reduce demand:

With the price elasticity of demand of water being low price signals are less likely to impact those who are better off. Standard communications strategies target their capability to change by highlighting the water resource challenge. More affluent households can have the opportunity to change e.g. by having the resources to buy water saving devices or fix leaks. An allied intervention could therefore target their motivation to change. For a seasonal tariff an allied intervention may be a communications strategy that uses conjunctive norms approaches to encourage reduced consumption as the motivation to change.

Constraints:

The cost of implementing different communication strategies for different customer groups needs to be considered, particularly where paper communications are needed – for example for customers who may be in digital poverty and have opted for paper billing

6. Trial Design

6.1 Defining the Objectives

The design of a tariff trial is dependent on the hypothesis that is to be tested. As outlined in sections 4 and 5 for a tariff trial there are three key considerations – tariff structure, the impact of the price and the effectiveness of the communications strategies that enable customers to understand the relevance of the tariff structure.

Beyond these key questions the trial could be set up to understand a variety of other factors, such as who responded to the trial (e.g. those with particularly high or low levels of water consumption or socioeconomic status), any differences between cohorts in engagement with digital communications or the ‘myaccount’ app or availability of outdoor space. Defining these objectives and how to evaluate them is key to the experimental set up as it determines the number of cohorts needed, the makeup of the cohorts, the data than needs to be collected and the evaluation protocols.

6.2 Experimental set-up.

When designing a trial it’s necessary to have ‘trial’ and ‘control’ groups for each element (structure, price or allied intervention) to be tested. This enables a comparison to be made between each group and identify whether the changes that were made had an impact. The more elements to be trialled the more groups will be needed.

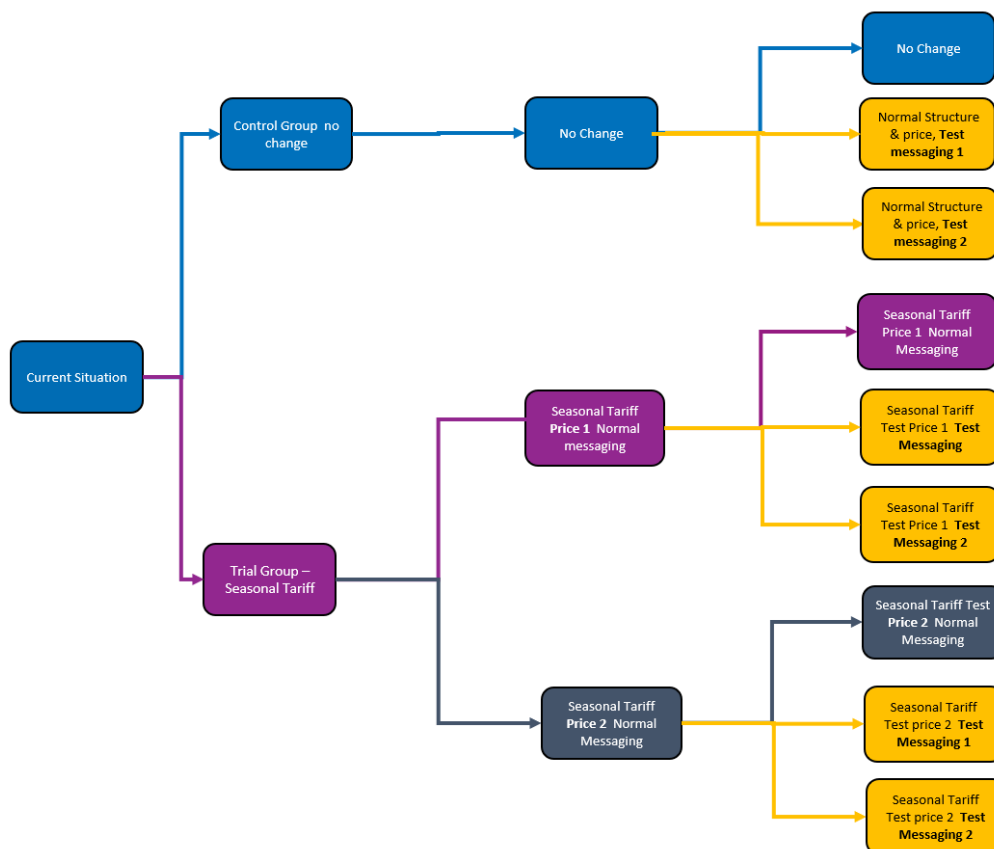


Fig.2 shows the design for a trial where one tariff structure change (seasonal tariff) has two alternative seasonal prices and two alternative allied interventions. The principle is that there are trial and control groups in place for each of the alternatives being tested. To test the impact of two seasonal prices three cohorts are needed; a control cohort on the normal flat rate tariff; a cohort experiencing seasonal price 1; and a cohort experiencing seasonal price 2. To then trial an allied intervention such as frequency of messaging or a conjunctive norms (nudge) communications strategy, in total nine cohorts are needed.

6.3 Composition of Cohorts

6.3.1 Availability of metering data

The key prerequisite for customers to be included in the trial is the availability of smart metering data to enable a direct evaluation of any change in consumption patterns between cohorts. The availability of historical smart metering data available will also enable analysis of whether consumption patterns have changed compared to previous years.

6.3.2 Demographics

To reduce the to reduce the impact of bias in the sample groups there needs to be a method of ensuring that **within** each cohort there is a diversity of people, but the overall composition of each cohort needs to be as similar to each other as possible. This could be done by randomly allocating customers to a group from across the region, focussing on one conurbation or creating matched cohorts from communities in different areas. Whilst randomly allocating customers to specific trial groups across the region as part of a randomise control trial may be desirable in many respects, the approach of selecting customers in specific geographical areas with similar historical patterns of consumption reduces the amount of personal data being used. It also reduces the risk that behaviours exhibited by neighbours who are not part of the trial and not being incentivised to reduce consumption may have a strong social norms impact on trial participants.

6.3.3 Opting into the trials

Consideration could be made as to whether customers opt-in to the trial. Whilst this could be advantageous in terms of providing consent for data to be used in different ways it may skew the sample so it is not reflective of the attitude to water consumption and patterns of usage seen in the region. It would also not be reflective of a wider scale roll out of the tariff should the trial be effective, as ultimately customers would have no choice as to whether they are on a seasonal tariff. Consideration as to whether customers on social or other non-standard tariffs are included in the trial and the subsequent roll out is discussed below.

As outlined above there are a number of things that need to be in place to ensure a successful trial can be run. A decision hierarchy as to how customers are allocated to each cohort has therefore been established:

- It is important for the success of tariff trials that customers have access to their consumption and therefore tariff trials will be aimed at smart meter customers only.
- Properties have smart metering data for at least one year prior to trial roll out so historical metering data can be used to provide a base line.
- Each cohort has a similar range of consumption– accepting the patterns of consumption between households can be diverse.
- There is a broadly similar range of participants from different demographics in each cohort
- Customers in all cohorts experience similar weather patterns.
- It is feasible to treat people in each group differently to the wider population in terms of pricing, billing and communication strategies.
- It is possible to monitor local extrinsic factors that may impact participants view of the company and water consumption e.g. mains bursts or interruptions to supply.
- The trial doesn't impact any existing monitoring strategies.
- There are no other types of company intervention or unusual relationships with communities that are planned e.g. hyperlocal communications strategies, significant disruption to the area for planned works, recent operational incidents that may impact the perception of the company etc.

To achieve this the company will use its historical metering data and external data sets to identify similar communities to be included in the trial that are representative of the regional customer demographics. Customers in these areas will be allocated to different cohorts. One of these cohorts will form the control group and the others the trial groups.

Ofwat Principle:

Be based on a fair and neutral approach, to make sure findings are robust and unbiased, and be large enough to be meaningful but small enough to manage

Supporting the full diversity of customer needs, for example communication in an accessible format or help with meter reading to monitor water consumption.

6.4 Number of participants

Each group will contain the minimum number of premises to enable Anglian Water to understand whether any changes seen were statistically significant and practical at scale. The precise group of customers involved in a trial will depend on the objective of that trial. Trials will be designed to be as close to a proposed roll-out as possible so the company gains a good understanding as to whether the interventions are likely to work at scale. Therefore, in principle, all customers in trial areas will be automatically enrolled in the trial.

The ethics specific to each trial will be considered during the trial design -see below. Where the primary objective of a trial is to reduce consumption, the company may choose to exclude from first iterations of a trial customers on social tariffs or with water dependent needs on the priority services register, until the company has a clearer idea as to whether:

- a trial is likely to work logistically;
- it will achieve the objective; and
- any unintended consequences that may arise can be reasonably mitigated.

Ideal participants for a seasonal tariff:

As for all tariffs the ideal number of participants in a seasonal tariff should be enough to make the trial statistically significant and test the feasibility of a large scale roll-out.

Each cohort should be representative of the socio-demographic make-up of the region as defined by the ACORN datasets.

Overall the cohorts should reflect the seasonal consumption patterns of the region

Constraints:

As metering data is essential for the delivery of a trial there will need to be enough metered customers with similar patterns of water use in each group to give a statistically robust trial. Data will also be needed for at least a year prior to the trial commencement date in order to provide a baseline data set.

Inclusion of customers in specific circumstances such as those who opt for paper billing, sewerage abatements, home movers and those on social and other tariffs needs to be considered.

Lack of knowledge on household occupancy information may affect the interpretation of consumption data and affordability e.g. understanding the proportionate change in demand between households.

Ofwat Principle:

Be based on a fair and neutral approach, to make sure findings are robust and unbiased, be large enough to be meaningful but small enough to manage

6.5 Pre-trial customer engagement

Before finalising the design of a trial the company will undertake a customer engagement process to inform details of the trial such as effective pricing and communications strategies. Engagement with key stakeholders such as the Consumer Council for Water will also be required to review what is being done and why, and how diverse customer impacts are being considered.

Customer Engagement for Seasonal Tariffs:

Customer engagement in advance of a seasonal tariff would comprise:

- Engagement with Anglian Water's online community around the need to reduce consumption;
- A an in-depth qualitative survey focussed on perceptions of tariffs;
- Gaining of an understanding of the level of price increase to reduce consumption;
- Gaining of an understanding of the actions customers may take to reduce consumption;

Constraints

- It may not be possible to assimilate the breadth of views expressed in positioning and/or promoting the aim of the trial during the implementation of the trial itself

6.6 Pre-trial Communications

Customers in the relevant trial cohorts will need to know that their tariff structure is changing. Tariffs will be published on 1 February prior to a trial commencing 1 April. There will then need to be targeted communications to customers explaining how their charges will be impacted and the objective of the trial. They should also know what their water consumption is and how they can monitor it throughout the trial. Communications should be made accessible to different customer groups according to the standard procedures.

The customer perception of why trials are happening has an impact on their success. Whilst customers need to know how the tariff structure is changing if it is understood as a trial they may behave differently compared to how they would react to a permanent change in charging. Careful consideration therefore needs to be given about how customers are told what is happening and for what purpose. These communications should reflect those that would be used as part of the wider roll out. Reflecting on how context can impact success of the timing of pre-trial communications consideration should also be given to other planned communications such as the normal price change between charging years.

Ideal pre-trial communication for Seasonal Tariffs:

September: Start conversations with the Consumer Council for Water and other stakeholders on proposed tariff trials for the following year

January: begin communications with customers regarding the following charging year including tariff trials

February: Publish tariff structures

April - May: essential information such as:

- The changes in tariff structure and the purpose of the trial
- Reminder of how to access metering data
- Water saving tips communicated

Constraints:

Ideal communication and billing timeframes may not align requiring a different communication strategy

Ofwat Principle:

Companies will need to communicate and engage effectively with their customers, explaining the purpose of the trial, so that customers feel that they have the information they need to react appropriately.

Supporting the full diversity of customer needs, for example communication in an accessible format or help with meter reading to monitor water consumption.

Ofwat Charging Rule:

Charges schemes must be published no later than 1 February in the year immediately preceding the Charging Year in relation to which they have effect.

6.7 Within Trial Communications

Unless communication is one of the allied interventions being tested (see section 5) all participants should receive the same communications as the rest of the Anglian Water customer base. Where this isn't possible e.g. due to interruptions to supply or other unforeseen circumstances, the trial team should note what happened, where and when to help interpret impact on customer behaviour.

Ideal within Trial Communication for seasonal tariffs

Unless a particular communications strategy is part of the trial, people included in the trial should receive the same communications as the rest of the customer base.

Constraints

Tariff trials harbour a risk of disproportionately impacting those least able to pay. To reduce this risk increased communications to both the control and test groups may need to be done. These would include:

- Customers will be provided with timely information about their consumption and cost through the app
- People will have access to their metering data in line with the communications strategies being trialled
- Unless it is one of the allied interventions being trialled all customers will be given regular water saving tips through email the customer app and post for customers who opt for paper billing

Ofwat Principle:

Supporting customers in reducing leakage and discretionary water consumption, including repairing leaks and providing advice on water efficiency;

Supporting the full diversity of customer needs, for example communication in an accessible format or help with meter reading to monitor water consumption.

6.8 Charging, Billing and Payment

There are a number of factors that need to be considered around billing and payment during a trial:

6.8.1 Billing frequency: The impact of billing frequency on behaviour change is unclear. Increased billing frequency allows customers to have better information about their usage, but the monetary impact on each bill is less compared to less frequent bill and therefore may have less impact.

6.8.2 Charging type: Where a change in price is associated with consumption – such as Increasing block tariffs – it is important that customers can see the impact of consumption. Volumetric charges are just one element of the bill which also includes fixed charges for water and sewerage services. The higher the proportion of the overall charge that is recovered through a fixed charge the less scope there is to influence behaviour through a varying volumetric price signal.

6.8.3 Payment amount: The amount paid should be based on the actual levels of consumption and price for that period, in line with the information they are being given from their customer account.

Billing and charging for a seasonal tariff demand

A higher volumetric rate is charged to metered customers over the summer (May to August) with a lower rate the rest of the year. Customers billing and payment frequency will be maintained at pre-trial levels. The benefit to customers from budgeting for payments across the charging year is significant, even if it weakens price signals from the trial. Interventions will need to be designed to enable customers to be informed as to their usage and resulting charges to date. These interventions are expected to vary between paper and paperless billed customers.

Constraints:

- Changes to billing and payment schedules require significant alterations to systems and processes. This can make seasonal billing difficult to implement, particularly for customers choosing paper bills.
- Monthly changes in payments needed can impact customer household budgeting, disproportionately affecting those least able to pay and is generally unpopular with customers

6.9 Customer Support Plan

Changes in tariff structures can have unintended consequences, including on affordability. There will be specific support available for customers who are participating in the trial. The exact nature of this will be dependent on the trial and what it is looking to achieve but will include:

- Making all relevant information easily accessible to customers
- Guidance for customer service agents and CRM system alerts for customers in trial cohorts
- Monitoring of changes in customer contact from the trial areas; the frequency and nature of the contact. This will be used to inform adaptations to the support strategy as the trial progresses.

Ofwat Principle:

To be based on charging policy that estimate the likely impact on customers, has identified mitigating measures and has robust plans for engaging and supporting customers;

Offering support for customers struggling to pay, informed by the estimate of potential impacts;

6.10 Length of Trials

The length of a trial will be linked to its primary objective. However, monitoring and evaluation of the impacts of the trial should continue for a period after the intervention has been removed in order to understand whether there are longer term impacts, for example does any reduction in consumption persist after the intervention and for how long.

Length of a seasonal tariff trial:

For a seasonal tariff where the primary objective is to reduce demand, the initial increase in price and implementation of any allied interventions are likely to happen between 1 May and 31 August. After this point the price will reduce to the “low season” level.

Given the revenue control, at the average customers should be charge-neutral as a result of a seasonal tariff, i.e., lower charges in the winter offset higher charges in the summer. This impact may not be appreciated until customers have been billed for the first year of the trial.

Therefore, monitoring and evaluation of what happens in response to this change in pricing should continue into at least a second year of any trial to see if any reduction in demand is maintained. The impact of seasonal tariffs may also vary year on year depending on the weather – this type of tariff has been shown to be more effective during drought periods – so the trial should be iterated and continue through a second year to give an opportunity to understand impacts of varying weather conditions.

Once the trial ends, the smart metering data from the cohorts will still be available to analyse in the future. This will help determine whether there is an ongoing sustained difference in consumption in these groups compared to the rest of the population in the region, even once they have reverted to the normal pattern of charging.

6.11 Post-trial Communications

At the end of the trial an evaluation will be done as to whether it was successful and the impact it has had (see section 7). At this point the customers involved in the trial will be told about the outcomes of the trial: whether it achieved its objectives; any savings of water; reduction in bills; and changes in levels of affordability that have been delivered; and how the information gained from the trial is to be used to make further decisions as to a wider future roll-out.

Post – Trial Communications at the end of a seasonal tariff

The outcomes of the tariff should be published on the Ofwat portal and communications made to customers about whether the tariff met its objectives and any benefits.

7. Evaluation Methodologies

An initial evaluation will be done immediately after the first summer season to inform the pricing strategies for the following year and whether the trial should continue. More in-depth analysis will be done after the first full year of the trial to understand the full impact and design the allied interventions to be trialled in year two. This work will continue throughout year two and inform any decision to roll-out for AMP8

The specific evaluation methodologies used will depend on the purpose of the trial and will be identified during the planning phase of individual trials. Evaluation will be done using both quantitative and qualitative approaches and be reviewed by independent experts in the field for example the Centre for Competition Policy (CCP) at the University of East Anglia and Tyndall Centre for Climate Change Research and the Centre for Climate and Social Transformations. Anglian Water is building an on-going relationship with CCP to ensure the continued best practice in the design and evaluation of this and future trials. Where feasible, data from the trials will be shared with CCP to enable further research into this field that can be used to inform future strategies.

7.1 Quantitative Evaluation of whether consumption decreased

The availability of smart metering data gives a new opportunity for Anglian Water to evaluate how water consumption has changed at a household level over the course of the trial. This data will be useful in understanding how the volume of water people are using changes over time and how broad patterns of consumption alter and will indicate if there was a reduction in consumption that correlates with the trial interventions. It can also provide supporting evidence to people's perceptions of their own water consumption habits. However, this data cannot determine why consumption has changed, what different behaviours have occurred or what prompted those behaviours.

The availability of historical metering data means that levels of consumption can not only be compared to the control groups but to previous patterns of water use. For example, work done by Cranfield University using Anglian Water's metering data identified 4 types of water user based on the time of day they used water. For a time of use tariff trial aimed at reducing discretionary use this type of analysis may be useful to identify how patterns of water use changed:

- Whether the trial outputs showed a statistically significant change in what it was intended to achieve across the whole trial population informed by smart metering data.
- The average and median change in usage across cohorts;
- Whether different patterns of water use were seen;
- Whether different responses were seen in different types of water user e.g. high water users; those with higher discretionary use; different socio-economic groups, etc.

7.2 Qualitative Evaluation of changes in behaviours

Whilst quantitative evaluation of patterns of water consumption can be useful in determining the broad outcomes of a particular intervention, it doesn't address specifically why and how any decreases in water consumption have been achieved. Whilst some of the literature focusses on factors such as socio-economic factors in attempting to determine responses to particular interventions as described above, understanding people's practices around water use provides a different lens on how people are using water in their homes. Gaining a better understanding of these factors can provide opportunities to get an insight into the

sustainability of any behaviour changes, how to help entrench them and any unintended consequences. An example may be reducing consumption so that it impacts hygiene or water using activities happen more outside the home such as showering at work or in the gym. It may provide direction for future price and non-price interventions.

Broad Groups of different practices have been identified:

- Cleanliness – the cleanliness of homes and other possessions such as cars
- Hygiene – the use of water for personal health and wellbeing
- Laundry – the frequency of laundry use
- Gardening – for example the watering of plants
- Other outdoor use - for example the filling of paddling / swimming pools

These practices can be influenced by many different things and therefore any changes in consumption may be due to factors unrelated to messaging or price. Conversely people may not be able to change how they use water. Some of the key factors that may impact people's ability to change include:

- Existing household infrastructure e.g. type of house, garden;
- Appliances connected to that infrastructure and how they are used e.g. smart meters, appliances, number / length of showers;
- Everyday routines and habits such as going out to work, school, hobbies that relate to how and why water is used;
- Broader expectations of those routines and habits e.g. expectations of cleanliness; and
- Wider elements of the provision of the supply infrastructure e.g. pricing, water company actions and the local environment.

Other factors to be considered are outlined in the University of Manchester's paper [Patterns of Water: The water related practices of households in southern England and their influence on water consumption and demand management](#).

Common methods of assessing what happens in people's homes and any change in practices are through diaries, surveys, focus groups and interviews. Each of these provide different types of information and have different associated costs and methods of analysis. As with every aspect of designing an effective intervention, the method of evaluation is linked to the primary objective. For most tariff trial interventions a survey is likely to be the most useful generic tool for understanding practices across a large number of people. However, to understand why water use practices have changed requires in-depth surveys to be undertaken, requiring a significant investment of time from the participants and in the data analysis. Surveys should be performed before the intervention to assess current practices and at the end of the trial to understand if practices have changed over the trial period and why. They could also be done periodically throughout the year to assess the 'stickiness' of any change in behaviours, however there is the risk of survey fatigue.

The information can provide the basis for focus groups or interviews to explore specific topics coming out of the survey. The use of diaries can be very useful in gaining a detailed story of how a person is using water in the home. It can highlight the different reasons people use water as well as whether they are aware of communications around the tariff and external factors that could impact how water is being used e.g. weather, media attention around the sector. It also provides insight into the psychological impact of the trial and particularly "social norming". However, the writing of a diary in itself prompts more thought about water consumption than would be normal for an individual, potentially impacting their behaviours. The analysis of the output can be very resource intensive so consideration should be given to the cost, capability and capacity of the team to analyse this type of data.

7.3 Evaluating the impact on affordability

The availability of metering data allows for a relatively straightforward assessment of changes in consumption. Impacts on affordability will need to be assessed through changes in annual bills and proxy measures such as increased contacts from customers regarding additional payment support, social tariffs or bad debt. This data should be made available to a governance group (see below) on a regular basis to assess whether trials should continue and whether further support for customers' needs s to be put in place.

Evaluation of a seasonal tariff is primarily focussed on reducing discretionary use, with unintended impacts on affordability to be monitored and corrected:

- Quantitative evaluation using smart metering data of whether average total demand was significantly different between each trial and control group through May and August
- Assessment as to whether any statistically significant difference in demand between the different groups continued between September and April the following year to assess the 'stickiness' of any behaviour change
- Quantitative evaluation as to whether any % decrease seen was the same across different demographic groups and people with different water consumption patterns i.e. were more affluent customers equally responsive to price and allied interventions than less affluent customers; did high water users reduce consumption more than low water users
- Evaluation of impact of increased pricing on affordability
- Qualitative assessment of impact of interventions on water use in homes through assessing water practices around hygiene, laundry, kitchen use and outdoor water use comparing households in each cohort in April, July and September

7.4 Additional Analysis

In addition, where the data is available, we will assess:

- There was a correlation between customers who responded to the intervention and engagement with digital communications
- Impacts of external factors such as drought, implementation of Temporary Use Bans, media focus on the sector
- Local factors such as pipe bursts, pollutions
- How changes in practices may cluster together
- How changes in practices may link with patterns of smart metering data
- Within the constraints of the company's data sharing policy Anglian Water will share data from the trials with the CCP [University of East Anglia] and University of Manchester to enable further research into the effective use of tariffs and allied interventions in the UK. Different types of analysis will be done at different times in the trial. .

Ofwat Principles:

Be based on a fair and neutral approach, to make sure findings are robust and unbiased, be large enough to be meaningful but small enough to manage

Using experts where needed, for example, to design a consistent basis for evaluating trials;

To reflect consistent principles to aid comparability across companies

Collaborating with other companies to develop consistent and robust trials, including how they will be evaluated

8. Governance, risk management and impact

Tariff trials elsewhere in the world have resulted in unintended consequences around consumption and affordability. During the course of the trial a governance group will meet monthly to review progressing and consider areas of concern. They will monitor how the systems and processes used to manage the trial are working and review the risk register. This group will also decide when to terminate the trial if thresholds around customer contacts, affordability and environmental risk are met. The group will also make recommendations as to whether the trial is revised and run again or rolled out to the population more widely. The group will include the relevant leads from across the business.

The issues that governance group will need to consider are set out below.

8.1 Data protection

All data collected as part of the trial will be treated in line with Anglian Water's data management policies and the planned use and protection of data will undergo a legal review. The minimum amount of data needed to evaluate the outcome of the trial will be collected. Data is likely to be both quantitative and qualitative in nature. There will be a full data management plan, including how data is stored, access arrangements, what it can be used for and how long it will be kept and how it will be destroyed. Where data needs to be shared with external parties to independently assess the success of the trial and inform future trial design full data sharing agreements will be put in place.

8.2 Equity and Ethical Considerations

A key part of trialling an intervention is to test an approach that is representative of, and scalable across the whole customer base. However trials, and particularly tariff trials, can have unintended consequences that can impact more vulnerable customers and those least able to pay. The ethics of undertaking a trial with different customer groups should therefore be considered during the planning stage. There will be different ethical considerations depending on the trial being conducted but some examples include:

- How is the trial in the interest of the customer
- Where the primary objective of a trial is to reduce consumption, rather than improve affordability, should certain groups of customers who are less able to pay be excluded until the trial has been shown to work with other customer groups and any unintended consequences have been evaluated
- Where a tariff structure is based on varying levels of consumption (such as Increasing Block Tariffs) should those with water dependent needs be excluded from the first iterations of a trial
- How is inclusivity being managed. For example a digital survey that requires people to use a computer and have an internet connection will exclude those in digital poverty which are often older people, those most financially vulnerable and those in DE households ([UK Digital Poverty Evidence Review 2022 Introduction - Digital Poverty Alliance](#)).
- Where customers in the trial control group haven't had the opportunity to benefit from the outcomes of a successful trial does there need to be a way to restore equity and if so how is this realised across the customer base with different patterns of consumption?
- How will customers who are limiting water consumption below levels deemed essential for health and wellbeing be identified and what actions need to be taken to address this?

8.3 Challenges of Implementation

This document has laid out the best practice in designing an ideal tariff trial and some of the challenges around implementation. The implementation of ideal tariff trials may be difficult where they require significant changes to systems and processes, customer engagement strategies, capacity of customer advisor teams and new approaches to evaluation. Information needed for an ideal trial may also be difficult to obtain – particularly occupancy data. The feasibility of implementation, the costs and benefits to customers also need to be considered in the design of trials. This best practice guide helps companies understand the impact of the compromises that will need to be made to make a valid tariff trial and large scale roll-out feasible. In designing and monitoring a trial, these compromises should be noted, their likely impact evaluated, and the outcomes assessed in light of them.

8.4 Impact Assessment

Whilst the evaluation methodologies will enable us to understand whether the trial was successful in achieving its desired objective there will be broader impacts of the work. Anglian Water is using a six capitals framework in decision making and evaluation across the business. The six capitals framework will help us assess the wider impacts of a roll out of a successful trial:

Intellectual Capital: Has the trial resulted in the company doing things differently e.g. new uses of data, evaluation methodologies, communication strategies?

People Capital: How has the trial impacted staff delivering the trial e.g. increased workload due to more customer contacts?

Natural Capital: Has the trial impacted the natural environment e.g. through reduced abstraction or less treatment and pumping of water, reducing the carbon footprint?

Social Capital: Has the trial had an impact on customers e.g. improving affordability?

Financial Capital: Has the trial had an impact on the cost base of the company e.g. through increased cost in changing systems to enable the trial?

Manufactured Capital: Has the trial changed the manufactured capital of the company?

8.5 Publication strategies and shared learning

The outcomes of trials will be disseminated through:

- Contributing data into the Ofwat portal
- Publication of any academic outputs or in trade journal such as the Institute of Water Journal as part of the ongoing collaboration with the Centre for Competition Policy
- Participation in water efficiency events, such as the Waterwise conference
- Extending the current work with the Centre for Competition Policy to explore other interventions including with Non-Household users

Ofwat Principle:

Sharing learning with each other, to improve the effectiveness of future trials and wider implementation of more innovative charging approaches.

Appendix 1 Prompting Behaviour Change

This section is a summary of reports carried out by the Centre for Competition Policy at the University of East Anglia (“CCP”) and the Centre for Climate and Social Transformations at the University of Cardiff (“CAST”), with particular reference to tariffs. These reports were funded by Anglian Water Services. The full CCP report including references to primary sources can be found here: [Price and Behavioural Signals to Encourage Water Conservation.pdf \(ofwat.gov.uk\)](#) and the CAST review here: [Water Efficiency and Behaviour Change: A Rapid Literature Review.](#)

Background

In the UK there has limited use of tariffs to drive reducing water consumption. Different barriers to the use of these approaches – notably the availability of real-time metering data to measure consumption – are decreasing, giving more scope for the sector to trial more innovative approaches to pricing. There are two main drivers for the use of tariffs in the sector: to reduce consumption and improve affordability.

The use of water in the home is largely driven by habitual behaviours that people do with little conscious thought or deliberate action. These types of behaviours can be difficult to change. In 2011 Michie proposed a model of three factors that could help prompt behaviour change:

4. **Capability to change:** this can be physical or psychological. Interventions such as educational campaigns, training and enablement can help address these;
5. **Motivation to change:** these can be automatic or in response to interventions such as tariffs, incentives, and being ‘normal’ in how they use water; and
6. **Opportunity to change:** This may be through restricting a person’s ability to exhibit a behaviour (e.g. hosepipe bans), enabling people to take action such as providing low-flow showers or changing what might be acceptable in a community

In trialling innovative tariffs water companies are attempting to provoke a change in behaviour through a financial incentive to increase motivation to reduce consumption. However, people’s capability and opportunity to change their behaviour are also important factors.

In reviewing the work done by the Centre for Competition Policy at the University of East Anglia and the University of Cardiff’s Centre for Climate and Social Transformations, a number of key findings were identified:

- Know your customer
- Communication and information are important
- Need for consumption data
- The context matters
- Timely feedback to customers is needed
- Evaluation is difficult but essential
- There will be limiting factors
- Be aware of unintended consequences

Knowing the customer

Reducing consumption is generally regarded as a pro-environmental behaviour. Pro-environmental behaviour change has been shown to be associated with attitudinal factors; knowledge and awareness; contextual forces; habits; and socio-demographic variables. Of these contextual forces, habits and socio-demographic variables are likely to have stronger impacts on behavioural changes.

The socio-demographic variables related to water demand are wide. Examples include:

Property: People living in larger properties with more outside space are likely to be higher water users as they may be watering gardens or using more water for cleaning etc., so have more opportunity to use water. Home ownership can also have an impact as people renting can have less control over fixing plumbing, changing shower fittings etc., as these are often the responsibility of the landlord.

Income: Higher income households may be high users of water as they are more likely to live in larger properties with more outside space. Their water bill as a proportion of their total income is lower so there is little price incentive to encourage water conservation. However, their opportunity to change is perhaps higher as they are better able to afford water saving devices or to fix faulty plumbing than lower income households.

Age: Older people are more likely to live in larger properties but may be more thrifty than younger people.

Education: There is a link between level of education and conservation beliefs that may result in higher levels of water conservation if inconsistencies between conservation beliefs and actions are highlighted.

Culture and Ethnicity: Water use can relate to visible signs of affluence or belonging that can relate to culture and ethnicity. For example, green lawns are highly valued in some areas which makes it culturally difficult not to water them. Water use can also be core to religious observance at particular times of day or year which can't be changed.

Pro-Environmental World Views: Those people who care about the environment are more likely to say that they save water. For this group showing how they act as opposed to what they think they're doing and how it compares to others may have an impact.

Patterns of Behaviour.

Whilst understanding of the socio-demographic and world views of customers can be useful, people in the same socio-demographic group will use water in different ways, and may be more similar in their actual patterns of water consumption to those categorised differently. Social pressure and expectations around things like cleanliness and hygiene can be strong drivers of behaviours. But how people choose to meet those expectations varies, as does the amount of water used by those different practices. Better understanding of how people use water in their homes, patterns of behaviour and why those behaviours are carried out provides different insights and opportunities. These may be around addressing the wider socio-technical or societal expectations of activities that use water, such as cleanliness. Many of these actions are habitual and therefore not taken consciously. They are also often dependent upon the embedded infrastructures available to people. Understanding how tariffs and other interventions change these habitual practices can give an indication as to the different ways people choose to reduce consumption and highlight where tariffs may be having unintended impacts on basic hygiene needs.

Using data

Understanding both historic and current demand is essential to assessing if an intervention is achieving its objective. Demand changes over time and is a factor of variables such as income, household characteristics, weather, property characteristics and other influences such as energy prices. Metering data, and specifically smart metering data, is therefore a key component in assessing the impact of demand management strategies.

Meters measure household consumption and therefore provide a direct reflection of household occupancy. Whilst households with high occupancy can have an overall more efficient set of water use behaviours based on per capita consumption e.g. by communal activities such as watering gardens, use of dishwashers and washing machines, their total consumption is likely to be higher than similar houses with lower occupancy due to increased individual actions such as showering. Tariffs designed around household consumption can have a greater impact on higher-occupancy households. Up to date household occupancy data is difficult to obtain and can change quickly with changes of ownership or tenant.

Provision to, and use by, the customer of timely consumption data is also essential if price signalling, particularly through block tariffs, is to be effective. Customers are generally unaware of the amount of water they use each day and therefore their understanding of the potential impact of tariff increases based on consumption is likely to be low.

Communication is key

To some extent people need to be aware of how the tariff works. With some tariffs this may be reasonably straightforward – you pay more at specific times of day or year. Other tariffs have more complicated structures requiring the customer to have a better, timely, understanding of their levels of consumption. For example for Increasing Block Tariffs, a lack of understanding of how much water is being used for which activity may have a significant impact on the effectiveness of a tariff to prompt changes in behaviours.

How information is presented is also important. For example, presenting consumption levels next to the price on the bill reinforces the link between the two. In one study paper billing was shown to be more effective than digital engagement – and has wider reach for customers who are in digital poverty. Understanding customer preferences is therefore key to maximising engagement. People also need to know how to reduce their consumption. An advantage of tariffs over interventions such as temporary use bans (hosepipe bans) is that customers have a choice in how to reduce consumption rather than having something imposed that may not be relevant to them. However, they need to have a good understanding of what can be done to reduce consumption and where changes in behaviour could have the biggest impact.

For many people the price of water is a small proportion of their total income. Therefore, for a price signal to impact these consumers, the price of water would need to be raised to a level that is likely to be considered unacceptable in the UK. For these customers communications that address things like environmental concern or perception of social norms is more likely to have an impact than the tariff itself.

How customers are informed of the impact of their actions can also have an impact on future behaviours. For example, using social norms messaging for customers who have below average water use may lead them to feel they can use more water, resulting in increases in consumption. Billing as a form of communication can also have significant impacts. More frequent bills act as reminders of the price signal, but the actual price on the bill is smaller than with infrequent billing so the higher cost or savings may be masked.

Context Matters

How people respond to a tariff change is dependent on their personal context (as stated above) but also the wider environmental and social factors that are happening at the time.

Drought is an obvious example of the environmental context that may impact the effectiveness of tariffs. Generally, tariff structures, such as seasonal tariffs, are more likely to be effective where people are aware that there is a drought. However, drought conditions often occur when the weather is hot and peoples' use of water changes, for example filling paddling pools, increased watering of the garden or showering to cool down. Water consumption may therefore still increase and understanding whether the increase would have been greater without the tariff is difficult and multi-dimensional.

The unfolding, and increasingly obvious, impacts of longer term climate change is a new context to which the developing behaviour response may be significant but is unknown, and may run counter to existing experience.

Political and economic factors can also impact the effectiveness of tariffs. For example, if customers think that tariffs are being changed to increase company profits there may be more resistance to changing behaviours as a result. This may lead to a consideration in the timing of communication around the tariff, for example avoiding coinciding with the publication of company annual reports.

Local impacts of water company activity may also result in different attitudes of customers. For example, if leakage is particularly high in an area or there is a significant pollution incident, trust and attitudes to the company may adversely impact customers willingness to do what is asked of them. Conversely, customers may be more inclined to reduce water consumption where they can see investment being made by the sector in benefiting the environment or expanding infrastructure.

As well as the broad contextual factors that affect consumption as a whole, the household context changes over time. For example water use changes when people become ill, have a child, change jobs or retire. These changes provide an opportunity for interventions as when people experience change in one area of their life they are more likely to change other aspects of behaviour.

Evaluation is needed but hard

Evaluation of the effectiveness of any intervention is needed to understand whether the intended outcomes are being realised and if it is worth continuing to invest in specific approaches. Evaluation of the impact of behavioural change interventions, including tariffs, has generally not been done well ([Literature Review: Learnings from previous pro-water campaigns, interventions and studies](#)). Baseline data on water consumption patterns and practices is difficult to obtain and it can be hard to attribute any observed change in consumption to a particular type of intervention. Where smart meter data is available, a well-designed experiment should be able to show correlations between intervention and reduction in consumption. Changes in patterns and frequency of water use can also show that there has been a change in how water is being used, even if total consumption has not changed.

Understanding how and why customers changed behaviours is more difficult and relies on approaches like surveys and interviews which can be costly and laborious both in data collection and analysis. Ideally customers would be asked about their consumption before, during and after the trial – but this in itself raises the profile of water use. Given that water consumption is generally unconscious and habitual, it may also be difficult for people to accurately reflect on their activities. However, this form of data provides rich

information, not only about how people are changing practices but who in the household is impacted most by those changes.

There are also questions about what constitutes a 'good outcome'. A well-designed campaign or experiment should have a clear objective. Understanding how to evaluate whether that has been met should be part of the experimental design, but there are other considerations as to evaluating whether that has been a good outcome for the customer or the environment.

Limiting Factors

There are a number of limiting factors that can inhibit the successful outcome of a behaviour change intervention.

- Regulatory mechanisms such as revenue controls means a company needs to ensure that only the allowed level of revenue is generated through charges, meaning that across the customer base increases in one area are offset by decreases in another.
- There is strong desire to ensure that customers are not unduly disadvantaged, for example by higher prices in summer making it difficult to budget even if the annual cost to the customer is the same.
- Water use in the UK is generally insensitive to changes in pricing. This lack of price elasticity of demand means that prices need to be raised significantly to have an impact on water consumption which may not be politically or socially acceptable.
- As mentioned above, relevant data sets (e.g. occupancy) may not be readily available potentially resulting in inequity between customers.
- Being able to implement a new tariff structure and price signal requires changes in the systems and processes within organisations. These can be expensive to change and have a number of interdependencies in how they work, constraining what is feasible in the implementation and evaluation of a trial.
- Other business objectives and measures of success can inhibit how interventions are trialled. For example, customers generally don't like changes in tariffs and this could impact how customers perceive the water company. In the UK this customer measure of experience metric is an important operational delivery incentive which can be negatively impacted through the implementation of tariff trials.

Conclusion

Behavioural change interventions through tariffs and other mechanisms have been trialled with varying levels of success across the world. Evidence as to the effectiveness of tariffs to reduce consumption or improve affordability (other than by direct discount) in the UK is limited. Context is important to the success of interventions and therefore, whilst much can be learnt from trials in other countries, it is essential that companies understand how things are working in their own regions.

Whilst companies may be aiming to impact average consumption levels or improve affordability through tariffs and other mechanisms, different customers will respond differently to interventions. Understanding which types of intervention are effective through a trial can help companies focus on how to focus a wider roll-out, whether that be based on demographics or water use behaviours.