WRMP24: Planning for SSC Customer Engagement

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1.1 Introduction

This report is the result of a desktop research study that has reviewed customer engagement in the water industry in the context of water resources management planning, and the latest guidance, expectations, and regional method statements, with the aim of drawing out recommendations for SSC's WRMP24 customer engagement programme.

1.2 Review of WRMP19 Customer Engagement

SSC conducted a large and broad-ranging programme of qualitative and quantitative customer engagement for PR19 and WRMP19. Key pieces of research included the following:

- Foundation research on customer priorities (qual & quant)
- WRMP & long-term resilience core research on priorities regarding options (qual & quant)
- Metering uptake study to understand why customers won't change to a water meter and appropriate communications (quant)
- Willingness to pay research: Wave 1/Wave 2 stated preference research on WTP for different service & investment levels (qual & quant)
- Water efficiency research on how different groups of customers view water and the wider world (qual & quant)
- Customer journey engagement on customer experience including reporting a leak and having a meter installed (qual & quant)
- Engagement to gauge support on customer promises and ODI plans for 2020-2025 (qual & quant)
- Acceptability testing of business plan and associated bills for 2020-2025 (qual & quant)
- Customer forums on service and water efficient homes (qual)
- Young Innovators' Panel workshop on a real SSC task (qual)
- Customer service tracker to establish perceptions on service performance (quant)
- Analysis of daily customer contact data and CCW reports (desktop)

- PR19 data triangulation study built on WRMP core research outputs, online customer priorities survey and WTP research (desktop).

Although focused on PR19 business plans generally, rather than WRMP specifically, in its initial assessment of PR19 business plans, Ofwat assigned a Grade B (i.e. *overall high-quality plan that meets stretching expectations*) to South Staffs Water in the area of 'Engaging with customers'. Ofwat highlighted the following in its evaluation:

- The company's plan demonstrated high-quality engagement with customers.
- SSC conducted an extensive customer engagement programme that involved a wide range of qualitative and quantitative techniques, both on triangulation and segmentation.
- It demonstrated understanding of different customer segments, including hard-to-reach customers and those experiencing a range of vulnerabilities.
- SSC provided evidence of adopting the four FACE areas of action set out in Ofwat's Tapped In report.
- SSC talked with customers about longer-term issues, including via a 'Young Innovator Panel'.
- Areas where [engagement for the business plan] fell short: SSC used a top-down approach to setting ODI rates and provided no extensive evidence of ongoing engagement with customers prior to May 2017.

With respect to other companies across the industry, core WRMP topic areas included:

- How customers input into plans
- Research on willingness to pay – levels of service
- Supply/demand option preferences and trade-offs
- Deep dives: focused studies on individual options
- Acceptability testing.

Wider topic areas, with indirect impacts on the WRMP, included:

- Research on high-level customer priorities
- Behavioural segmentation
- Vulnerability
- Views and expectations on company ambitions and objectives within the long-term strategy plan.

Reviews by Ofwat and CCW of PR19 customer engagement in general recognised the improvements in quantity and quality of research in comparison to PR14 but highlighted a number of shortcomings. These included concerns about the complexity of some of the research materials, particularly with respect to willingness to pay research, concerns around the variation in willingness to pay valuation results, and concerns with respect to the transparency of how results were used by companies

1.3 Requirements for WRMP24

Statutory requirements for WRMP24 in the context of customer engagement and research are laid out in the joint EA-NRW Ofwat Water Resources Planning Guidance (WRPG). Water companies are responsible for involving customers, interested parties, statutory and non-statutory consultees throughout the planning process; ensuring that their plan is communicated clearly and transparently, notifying all stakeholders of any material changes in the plan development period; taking into account customer preferences in their plan; demonstrating how they have done so; and demonstrating customer and stakeholder support for their plan.

Companies should engage at an early stage with their board, regulators, customers and interested parties, especially if the plan is expected to be complex or include significant change (pre-consultation stage). Engagement should continue throughout the development of the plan and relevant information should be presented in the context of the previous WRMP and business plan, and any significant changes or variations in thinking prior to draft plan submission should be discussed with customers. Customer and stakeholder engagement should align across the WRMP, business and, where applicable, regional plans, and preferences identified as part of the WRMP process should be reflected in the business plan.

Companies need to adhere to good practice principles on communicating resilience risk and demonstrate how they have taken customer views and requirements into account in developing their level of service. They will also need to be able to evidence customer and stakeholder support for their long-term environmental destination, level of ambition, and decisions/proposed solutions on how these can be achieved.

Consultation must take place after the draft WRMP is published. Companies need to share the draft plan with all other organisations involved in the pre-consultation discussions. The draft WRPG also urges companies to consider the following, as suggestions towards continuing the engagement with customers, stakeholders and other parties in that stage:

- offering to explain the plan to established groups, known interested parties or companies within their area
- including an engaging summary of the plan which clearly sets out proposals to customers in plain language
- holding virtual events, roadshows or exhibitions conducting questionnaires to gain views on company proposals, using phone or in person surveys or other recognised survey techniques
- using social media to highlight the consultation
- using innovative web-based engagement
- organising joint communications with other companies.

In comparison with the previous WRPG guidelines from 2017, the key changes for the latest round of plans are that water companies should:

- take account of regional plans and the National Framework for water resources planning
- plan to provide a long-term destination for the environment by reducing abstraction where it is causing the most environmental damage
- be resilient to any drought of a return period of once in 500 years
- use natural capital in decision-making and provide environmental net gain through their WRMPs.

With regard to regional planning, guidance is provided within the National Framework (EA 2020a, Appendix 2).

In relation to setting a long-term environmental destination, the EA has again produced separate guidance (EA, 2020b). This applies to both regional groups and water companies.

The ultimate objective of the planning process is that it should culminate in a best value plan, as distinct from a least cost plan, and the WRPG includes specific guidance on what this requires of companies and regions. Furthermore, a recent UKWIR study focuses on this topic, providing a framework for Best Value Planning that can be used by regional groups and water companies for WRMP24 (UKWIR, 2020).

The Best Value Planning framework encompasses the need to consider the expectations of regulators and customer representatives in relation to customer engagement. Ofwat and CCW have recently published a suite of documents concerning their expectations for PR24 customer engagement. Given the integration between the WRMP and the broader business plan, these expectations represent an important set of requirements in relation to customer engagement for WRMP24. The following summarises the recommendations from UKWIR, CCW and Ofwat:

- Companies should own the engagement process with their customers
- Companies should consider collaborative research with other companies
- Statements and measures of customer preferences should be independently verified
- Customer engagement for water resources planning should be joined up with broader business planning engagement and incorporated into a wider strategic framework
- Companies should be transparent on how engagement informs their WRMP/business plan
- Companies should give more focus to business-as-usual engagement
- Customer engagement strategy design should aim to reduce complexity and create a better experience for participants

- Companies should consider the wider public value they can deliver through the WRMP

- Subject to the above, the design of customer research programmes, and engagement materials, should adhere to general best practice principles.

Given the close links between regional and company plans, the methodologies and timings of Water Resources West (WRW) and Water Resources East (WRE) are particularly pertinent to South Staffs Water and Cambridge Water WRMPs respectively. WRW and WRE have both produced method statements providing details.

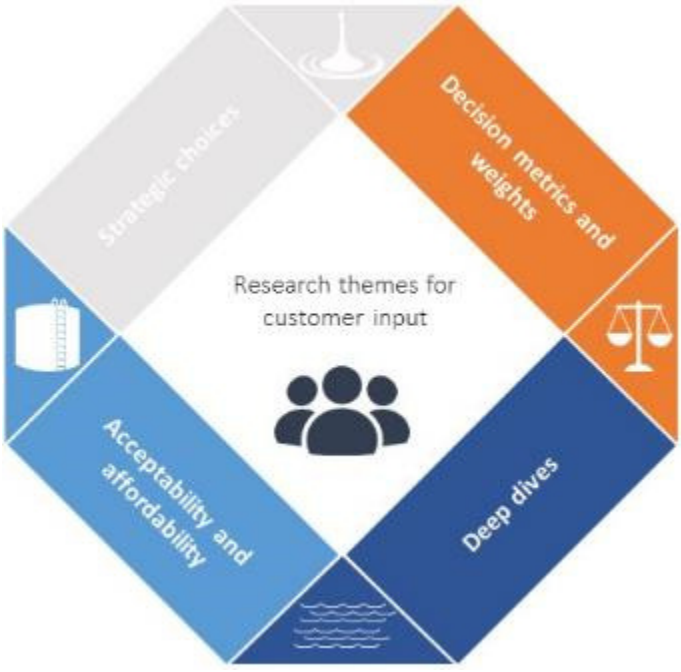
A final aspect of guidance that it is important to note in relation to WRMPs is that the EA has recently published (11 Feb 2021) a consultation on the determination of water stressed areas in England, which now includes both South Staffs Water and Cambridge Water in the list of water stressed areas. Previously neither of these areas were classified as seriously water stressed. The implication of this change in status, should it be confirmed following the consultation, is that both areas will be required to evaluate compulsory metering alongside other options through their WRMPs.

1.4 Recommendations

The central objective for the WRMP24 customer research programme is to be able to demonstrably and transparently obtain and utilise customer insight in order to produce a WRMP that genuinely reflects customer preferences.

Our recommendations are organised around four main themes, corresponding to key customer input points during the WRMP development. These are illustrated in the figure below.

Figure 1 Research themes / stages in WRMP development



Source: Accent-PJM

Theme 1: Strategic choices

Customer views, alongside those of regulators and other stakeholders, are needed to establish and define strategic choices at an early stage of the planning process. These include:

- **Environmental destination and ambition** – the rate at which sustainability reductions in abstractions should be achieved;
- **Levels of service** – how frequently temporary use bans, non-essential use bans and drought permits will be used; and how quickly the target of 1:500 resilience to emergency drought restrictions (rota cuts, etc.) will be achieved;
- **Water efficiency ambition** in terms of how levels of leakage and PCC should be reduced over time.

Both of the relevant regional groups have indicated that they intend for companies to ask a common set of key questions to customers in relation to these choices, although research could be tailored according to the particular circumstances of each company. The precise choices that need to be asked are, at present, not known to us.

There is value in applying both qualitative and quantitative methods to exploring customer views in these areas: qualitative research gives depth to the understanding of views and motivations behind views, while quantitative research can help extract insights based on representative, informed samples.

For the qualitative research, we recommend that SSC recruit a cohort of initially uninformed customers with emphasis placed on creating a group that will be representative of all voices within the SSC area. Once recruited, we envision that this could become a panel, possibly branded under its own separate name, that could be taken along on a complete WRMP journey: from making strategic choices at the start of the planning period to testing the acceptability of a preferred plan at the end. The same panel could thus be re-engaged in relation to the other themes' stages.

In order to maximise the value of the programme, we would anticipate the same key questions being asked in the qualitative research as in the quantitative research, but with a greater depth of education and discussion. This will allow the findings from both parts to be interpreted jointly rather than separately.

Theme 2: Decision metrics and weights

At WRMP19, SSC used an MCA tool to inform the selection of options within its WRMP. For WRMP24, WRW will be asking all member companies, including South Staffs Water, to complete a common MCA tool; while WRE will be using its own regional MCA tool to select options for the regional plan. In both cases, customer evidence will be needed to inform the weights that are used within these tools.

The precise form of questions that need to be asked to achieve alignment with the MCA tools is currently unknown. However, there are two broad types of methods that could be used:

- Measure preferences for the supply-demand options that customers would like to see implemented, given all relevant characteristics of those options (cost, environmental impact, etc).

- Measure preferences over the metrics themselves, i.e. how customers would want to see South Staffs Water/Cambridge Water balance the impact of cost vs environmental impacts vs wider impacts.

In general terms, we would anticipate a pairwise discrete choice exercise being most appropriate for evaluating preferences in both cases. The survey would benefit from including visually engaging material to communicate the solution options and its relative impacts on each of the key decision metrics.

Our recommendation for this theme would be to again conduct both qualitative and quantitative research, with the qualitative research using the same panel recruited for Theme 1, and the same key questions being asked in the qualitative research as in the quantitative research.

Theme 3: Deep dives

We anticipate that there may be a need to conduct one-off pieces of research to explore and understand customers views in particular key areas. At present, we anticipate that these areas may include:

- **Water transfers**
  At WRMP24, given the introduction of the National Framework and Regional planning, there is a greater emphasis on intra-regional and inter-regional transfers of water than at WRMP19. As these options firm up in the planning process, we anticipate that there may be value in exploring these in depth with customers including, amongst other aspects, how customers feel about sharing water with other regions when there is a drought, or about introducing water from other areas into the local supply.

- **Water efficiency / metering**
  Although water efficiency and metering were explored by SSC at WRMP19, and will be covered in the anticipated Theme 1 research area, there may still be value in undertaking a deep dive around this topic for WRMP24. This is because both South Staffs Water and Cambridge Water are now potentially to be classified as being water scarce areas given the latest EA consultation (EA, 2021). If this is confirmed, it will be necessary for both regions to consider compulsory metering. Up to date and detailed evidence on customers views and attitudes in this area would accordingly be beneficial in developing the policy in this area.

- **Drought plan**
  Although not directly part of the WRMP, it could be worthwhile undertaking a focused piece of research to explore ways of communicating with customers during droughts. The outcome from this research would be expected to inform the company's drought plan.

We anticipate this theme being primarily addressed by qualitative research, and using the panel recruited for Theme 1, and Theme 2. The topic guides for such research would need to be developed based on the specific topics that arise in these areas, or others, during the planning process.

There is likely to be an opportunity to add a few topic-specific questions to the surveys conducted under Theme 1 and Theme 2 where necessary to quantify responses.

Theme 4: Final choices, acceptability and affordability

Following creation of the Initial draft regional plans, there should be an opportunity for customers to be engaged around their preferences amongst a short list of alternative programmes, and to test their acceptability and affordability. Moreover, if plans are not considered acceptable the research presents an opportunity to explore why, and make any changes subsequently for the final plan. This stage will help ensure that the plans ultimately adopted are acceptable and affordable to customers, and that they fully reflect their views.

Our recommendation for this theme would be to conduct both qualitative and quantitative research. Both approaches would integrate and triangulate with one another to produce a greater depth of insight than would be achieved by conducting one or the other method in isolation.

2 Introduction

2.1 Background

Water companies are responsible for involving customers, interested parties, statutory and non-statutory consultees in the development of their water resources management plans (WRMP). Companies have adopted various strategies of engaging with their customers and conducting research to elicit their views, priorities and preferences up until WRMP19. Since then, the Environment Agency's national framework for water resources has brought requirements for a regional approach to planning to the forefront. Customer and stakeholder engagement should now align across the WRMP, business plan and, where applicable, regional plans; and preferences identified as part of the WRMP process should be reflected in the business plan (EA WRPG 2020).

During PR19, South Staffs Water Plc (SSC) conducted a comprehensive programme of qualitative and quantitative engagement with a broad range of its customers and stakeholders, the findings of which were used to inform its WRMP and business plan.

This report is the result of a desktop research study on customer engagement in the water industry in the context of water resources management planning, to take a critical look at past experience and draw out requirements for the next planning period in light of new guidance and other developments in the sector.

2.2 Objectives

The aim of this desktop research study was to provide a set of conclusions and recommendations for use as the basis for the development of SSC's WRMP24 customer research and engagement strategy.

Key objectives included:

- Reviewing the WRMP19 customer engagement approaches of SSC and other UK water companies and drawing out pertinent points from past experience
- Assisting with a review of SSC's customer insights related to the WRMP, in order to help identify the key topics on which to focus the WRMP24 customer engagement strategy
- Providing recommendations as to where the balance of the engagement should be focused at WRMP24, to ensure customers can provide considered input into the process
- Reviewing, where possible, the customer and stakeholder engagement strategies being used by the regional water resources teams in 2020 to engage with customers around resilience and the environment, alongside demand and supply options

- Recommending which customer and stakeholder groups should be covered in the WRMP24 research, considered in the context of the regional planning bodies such as WRE/WRW. This should also include recommendations on the balance between bill payers (households/HH and non-households/NHH) and wider stakeholder groups.

2.3 Approach

Review materials were grouped thematically as follows:

- SSC's own customer engagement research (past and on-going)
- Research conducted by other UK water companies for WRMP19. The review focused on those companies that received for their research a rating of A or B by Ofwat
- Reviews of wider industry PR19 customer engagement by Ofwat and CCW
- Key industry publications pertinent to PR24/WRMP24 requirements. These included publications by CCW, the EA, Ofwat and UKWIR
- Relevant available publications on engagement strategies used by Water Resources West (WRW), Water Resources East (WRE) and Water Resources South East (WRSE) to engage with customers and stakeholders around resilience, environment, demand-side levers and supply-side solutions.

Key messages on requirements, innovative approaches, best practice, 'good' and 'bad' examples of research were extracted and viewed in the context of SSC's current engagement and where its future focus should be.

There are certain activities in progress at the time of writing, such as the development of the final version of the water resources planning guideline, the Ofwat consultation on reflecting customer preferences in future price reviews, the EA consultation on updating the determination of water stressed areas in England, and the approaches being followed by regional groups. As such, the review represents a snapshot of the best knowledge we have today on customer engagement and may need to evolve if requirements and expectations change.

2.4 Report structure

Section 3 presents our review of engagement undertaken for WRMP19; Section 4 discusses the requirements for WRMP24, particularly focussing on developments since WRMP19 which affect these requirements; Section 5 sets out our recommendations based on this review and the requirements, as currently known; and lists outstanding issues. References for the materials reviewed for this study are listed at the end of the report.

Appendix A contains a summary of the detailed company-by-company review of WRMP19 engagement.

3 Review of WRMP19 Customer Engagement

3.1 Introduction

The purpose of this chapter is to document our review of the customer engagement undertaken by companies for WRMP19.

In general, activities were not clearly delineated between the WRMP and the wider PR19 business plan. As such, the review has drawn information from PR19 business plans, including all relevant appendices, as well as WRMPs (and their appendices), in an attempt to extract as much information as possible on the activities undertaken by companies that potentially impinge upon the WRMP. In so doing, we have excluded research from the review only where the topics covered do not appear to have had any relevance to the WRMP. We acknowledge that this has involved the exercise of some judgement.

A further important point to make at the outset is that the review has been limited to published information only – it has not incorporated detailed research outputs except where these have been published by the company. This means that, in a large number of cases, the detail on what was actually asked and shown to participants in each piece of research was unfortunately unavailable. Details of how research was used by companies was also reported in most cases at quite a high level, which has made the present review less detailed than it would desirably have been in some areas.

The remainder of this chapter begins with a summary of the research undertaken by SSC (3.2) before moving on to our review of other companies in the sector (3.3). The final part, (3.4), summarises the feedback by CCW and Ofwat on PR19 customer engagement.

3.2 SSC research

Overview

SSC conducted a large and broad-ranging programme of qualitative and quantitative customer engagement that informed its periodic review business and water resources management planning process. Key pieces of research included:

Research to establish customer priorities: Qualitative study (foundations study) establishing customer priorities for service delivery, both at present and over the longer term, via six focus groups (total of 52 customers). This was followed by a quantitative online survey of 291 households that took place on the SSC website.

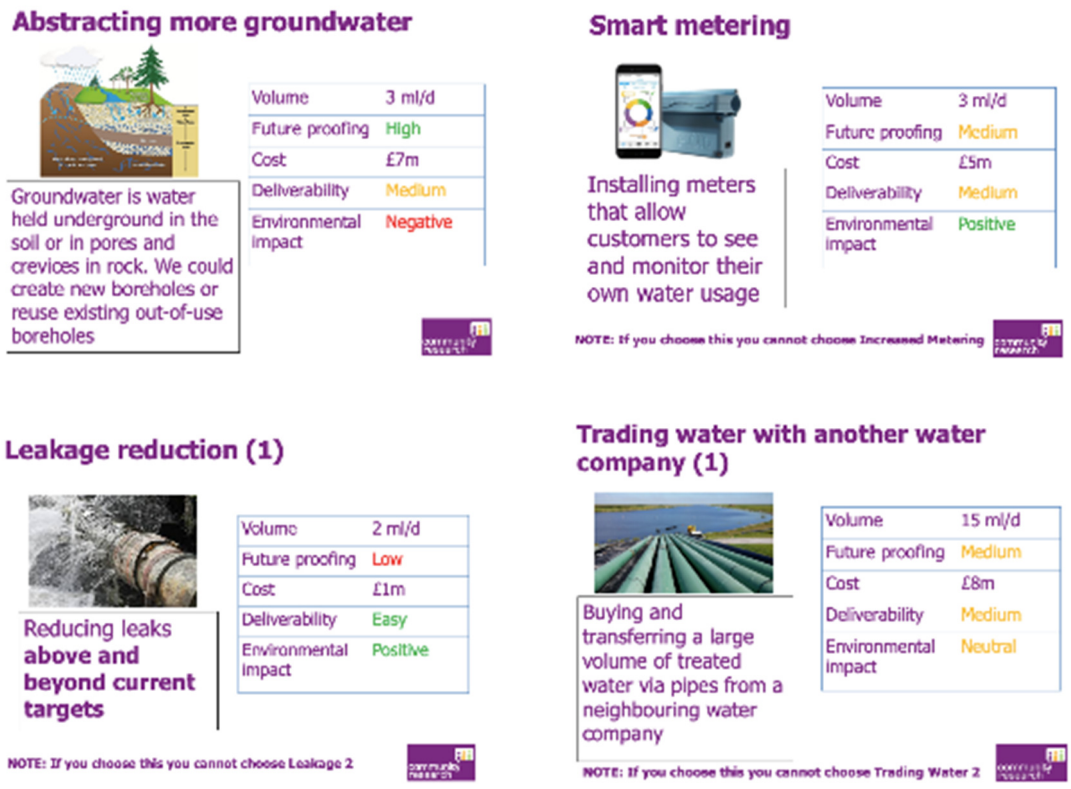
WRMP and long-term resilience: Core research on customer priorities on a range of supply-side and demand management options. This took place via a comprehensive programme of qualitative and quantitative engagement with a broad range of customers

and stakeholders, covering overall priorities, supply and demand side options and trade-offs. The research consisted of three elements in both South Staffordshire Water and Cambridge Water areas:

- two-phase deliberative workshops with 30 household, non-household SME and future customers
- two roundtables with 11 key industry stakeholders and large business customers at each session
- an online survey with 500 household customers across both regions using a slider tool to indicate whether 'for' or 'against' a given option.

A range of tools of engagement were utilised in the customer workshops, including voting keypads, quizzes and animations. At the first phase of the deliberative workshops, participants were given a list of the main challenges SSC faces and asked to rank the top 3 in order of importance. At the end of the first workshop (following information being given to participants), participants' priorities were reassessed. A 'Top Trumps' game was used to help consider strategic options and examine trade-offs during the second phase of the deliberative workshops. This innovative practice was commended by CCW in its review of PR19 engagement across the industry. Figure 2 provides a visual representation of the types of materials used in this exercise.

Figure 2 Top Trumps card examples – WRMP and long-term resilience research, South Staffordshire and Cambridge Water WRMP19



Source: Community Research WRMP & Long Term Resilience Customer Engagement Insight Full Report, September 2017

Metering uptake: Quantitative telephone study with 202 household customers (101 from each area) aiming to understand (i) customer reasons for not switching to a water meter,

and (ii) what messages and communication channels would be most effective in making customers switch to taking up a meter.

Willingness to pay research: Two large quantitative surveys (Wave 1 and Wave 2) using stated preference choice experiments in order to study customers' priorities and their willingness and ability to pay for different service and investment levels for water services. A range of 17 attributes was explored in these surveys. Wave 2 further explored results for specific attributes and refined the scope of attributes included. Wave 1 included six reconvened focus groups to co-create the quantitative survey, which was held with the participation of 1,096 household and 213 non-household customers. Wave 2 utilised two focus groups to help further refine the quantitative survey; the latter took place with 532 households and 187 non-household customers.

Water efficiency: Four-stage study aiming at an understanding how different groups of customers view water and the wider world and how they respond to propositions around water efficiency. Explored through online and phone interviews, focus groups and a quantitative survey with the focus ranging from general views to deeper exploration of specific responses.

Engagement on what constitutes the ideal experience for customers, including reporting a leak and having a meter installed. This was a qualitative study via a facilitated evening workshop event with 32 customers (covering household and non-household by key demographic splits). It was followed by a quantitative phone survey with 318 household customers (covering all key demographic splits and weighted to regional demographics).

Engagement to understand if customers support proposed customer promises and outcome delivery incentive plans for 2020-2025: Qualitative and quantitative This was a qualitative study via a facilitated all-day workshop event with 26 household and non-household customers. It was followed by a quantitative survey of 559 household customers and 12 business customers. The quantitative study included customers being exposed to an 'in the moment' bill impact when improving or decreasing level of service for 11 performance commitments. The results were sensitivity-tested with 25 household customers (random, non-weighted sample).

Customer forums held to understand views on service and hold discussion around how to build more water-efficient homes. Half-day forum with 10 and full-day forum with 14 participants including developers, self-lay providers and other industry stakeholders.

Young Innovators' Panel: In an immersive event for future customers, sixth form school students from schools from across the region worked on a real business task in the context of two full-day workshop sessions and presented ideas to a panel of company and industry experts. This was again drawn out as an example of good practice by CCW.

Customer service tracker to establish perceptions on service performance. A quantitative telephone study covering 300 household and 151 business customers, and a quantitative online survey of 2,547 household customers (a random, non-representative sample).

Analysis of daily customer contact data and CCW reports.

PR19 data triangulation study: Core input to the WRMP came from the triangulated insight, which itself was built up from:

- WRMP core research workshops on customer priorities on a range of supply-side and demand management options.
- WRMP core research quantitative online survey.
- Online customer priorities survey which quantified earlier qualitative research on priorities for service delivery, both at present and over the longer term.
- Core WTP research

The outcome of the triangulation was a robust customer priority index, by region, with respect to WRMP supply and demand options. This index was then used to fully reflect customers' preferences within SSC's Multi-Criteria Analysis investment tool, which drives the selection of supply-side and demand management options in the WRMP.

Customer acceptability testing of business plan and associated bills for 2020-2025: Customer acceptability testing took place over two stages. Stage 1 was a qualitative study comprising six facilitated focus groups of 47 household and non-household customers. Stage 2 comprised a quantitative survey with 625 household and 122 business customers.

The overall engagement programme included activities that involved household and business customers covering all key demographic characteristics, including future and hard-to-reach customers, and explored priorities and expectations regarding specific aspects of water management, delivery and use. Finally, SSC engaged with customers to gauge their support for the final business plan and associated targets and performance commitments directly linked to the delivery of the WRMP.

Feedback from Ofwat's Initial Assessment of plans

Although focused on PR19 business plans generally, rather than WRMP specifically, in its initial assessment of PR19 business plans, Ofwat assigned a Grade B (i.e. *overall high-quality plan that meets stretching expectations*) to South Staffs Water in the area of 'Engaging with customers'. Ofwat highlighted in its evaluation that:

- The company's plan demonstrates high-quality engagement with customers
- SSC conducted an extensive customer engagement programme that involved a wide range of qualitative and quantitative techniques, both on triangulation and segmentation
- It demonstrates understanding of different customer segments, including hard-to-reach customers and those experiencing a range of vulnerabilities
- SSC provided evidence of adopting the four FACE areas of action set out in Ofwat's Tapped In report
- SSC talked with customers about longer-term issues, including via a 'Young Innovator Panel'

- Areas where [engagement for the business plan] falls short: SSC used a top-down approach to setting ODI rates and provides no extensive evidence of ongoing engagement with customers prior to May 2017.

3.3 Research by other water companies

Water companies adopted various strategies of engaging with their customers and conducting research to understand their opinions, priorities and preferences as part of WRMP19 planning. This section provides a review of this engagement, focusing on those companies that achieved a rating of A or B by Ofwat for their PR19 customer research. Further details can be found in Appendix A, which contains summaries of WRMP19 customer engagement activities conducted by Anglian Water, Bristol Water, Dŵr Cymru Welsh Water (DCWW), Northumbrian Water, Severn Trent Water, South West Water, United Utilities, Wessex Water and Yorkshire Water.

Out of the 10 companies, including SSC, that achieved A/B ratings from Ofwat, 5 made available technical reports (Anglian Water, United Utilities), separate appendices (Bristol Water), or sections in appendices (South West Water, Yorkshire Water) discussing customer engagement activities specific to the water resources management plan. The remainder of the companies reviewed made reference to relevant pieces of research in the main body of their WRMP, providing an overview of the research that was most important in shaping the plan. Where this was the case, additional information on those particular pieces of research was sought from corresponding business plan publications. In most cases, publications tended to include an abbreviated version of research activities with full detail outlined in individual study reports which were typically not available publicly.

This section is structured around core WRMP topic areas and wider topics with indirect impacts on the WRMP development process, where customer input is sought. For each topic area, information is presented on what was covered by company research, what methods where used and what groups were consulted. Examples of interesting or innovative approaches are interspersed to highlight key points.

Core WRMP topic areas included:

- How customers input into plans
- Research on willingness to pay – levels of service
- Supply/demand option preferences and trade-offs
- Deep dives: focused studies on individual options
- Acceptability testing

Wider topic areas, with indirect impacts on the WRMP, included:

- Research on high-level customer priorities
- Behavioural segmentation
- Vulnerability
- Views and expectations on company ambitions and objectives within the long-term strategy plan

Core WRMP topic areas

How customers input into plans

All water companies undertook research for WRMP19 and/or PR19 that focused on how customers prefer to be engaged (i.e. means of engagement), what areas of the plan development are important for them to influence, as well as what are the best ways of conveying complex concepts and terminology, such as long-term challenges and risk. Important input to this area comes from direct engagement and indirect data sources, i.e. business-as-usual engagement. This research fed into the development of the customer strategy. For example:

- Anglian Water conducted co-creation workshops with 70 household customers in order to establish the framing and language that should be used to engage customers on the topic of long-term challenges, and to identify the areas that customers feel should be prioritised by the company. Resulting materials were tested further and the topics and outcomes were again discussed with the online community.

- Northumbrian Water held focus groups with customers on how they prefer concepts of probability, chance and risk to be communicated, as it observed that a significant minority of consultees were not comfortable with such numerical representations, which would lead to disengagement and lack of data reliability. The 'Communicating Risk' research was carried out via 8 focus groups (a total of 66 customers) and 13 in-home depth interviews with vulnerable customers. This research informed the use of risk concepts and metrics in the willingness to pay survey questionnaires.

- Northumbrian Water held workshops and hall tests to understand customers' preferences on the specific areas that they would like to influence. It engaged with household and non-household customers as well as stakeholders to explore where customers place importance (organised under three themes: home, community, environment), what they feel they should be consulted on or would like to influence, and what their preferred ways of engagement were. This project had a qualitative component (32 customers) and a quantitative component (8 hall tests with 500 customers).

Indirect sources of customer views and priorities include data mining from regular communications and conversations with customers, analysis of unprompted discussions on social media where the water industry, the company and its services are discussed, customer tracker surveys, operational data, analysis of company mentions on news sites, blogs and forums, etc.

Companies used these in combination with other insights to inform the design of the customer engagement strategy on the one hand, and specific customer engagement projects on the other.

Research on willingness to pay – levels of service

All companies engaged with customers in some form to obtain information on their opinions, insights and valuations about the level of service that they expect to receive with respect to the qualitative attributes of the water they receive and the activities and acceptable frequency of disruptions to the delivery of their water. Most companies at PR19/WRMP19 incorporated a valuation programme within their customer research strategy, using multiple valuation methods including deliberative valuation workshops, a variety of stated preference and revealed preference methods, gross value-added (GVA) approaches, as well as menu-based/slider tools and interactive games. Resulting values were triangulated and used at various points in the planning process. These were often followed by further research for testing and validation.

Deliberative valuation workshops

Deliberative valuation workshops involve deriving value judgments from participants through deliberation on information presented on the topic at hand and open dialogue. They can be used to obtain views and values in citizen juries, focus groups and discussion forums formats. Welsh Water, for instance conducted deliberative valuation workshops where customers had in-depth discussions regarding the full list of service measures and were asked to vote on the importance of each of these measures as one component of its multi-method valuation programme. This was carried out over 4 large-scale workshops of c.50 attendants each. Severn Trent carried out a deliberative self-complete version of their willingness to pay (WTP) survey with 120 participants during research workshops.

There are several advantages to using deliberative methods to extract valuations from customers. Deliberative research allows for in-depth discussion and participants' education as the deliberative context enables respondents to ask questions, share views and learn from others. As participants gain in understanding in the course of the research activity, a more informed set of preferences can emerge. This method also allows for a more comprehensive understanding of the motivations underlying participants' values for services, both at uninformed and informed states. In addition, deliberative methods can be used to elicit service values where monetisation is considered to be challenging for more conventional economic valuation methods (such as aesthetic and cultural values). The downside of deliberative research is that it is less likely to be based on a representative set of customers, than quantitative survey research.

This method of research as used in the previous planning period was seen very positively according to the CCW/Blue Marble report, and as a good way of understanding broad principles consumers want to seek upheld (rather than seeking consumer sign-off on complex and technical issues). Well-designed stimulus material was seen as essential for these sessions to be meaningful.

Stated preference research

Stated preference methods involve asking survey participants a series of carefully designed questions to explore their preferences in relation to the object of the study. When used for social valuation, methods invariably involve participants having to make a trade-off between having more or less of the good or service in question and having to make, or receive, a higher or lower payment. It is the trade-off between money and the provision of the good or service that defines the value measure. Values are then used as

inputs in the cost benefit analysis of alternative programme choices and in applying weights in multi-criteria decision-making processes.

The most common stated preference methods included the following:

- **Contingent valuation:** A question, or series of questions, aimed at obtaining a value estimate for a specific improvement or initiative. Typically, these questions involve a choice of whether to have the improvement in question and agree to a payment such as a bill increase, or not to have the good or service improvement but also not to make the payment.

- **Discrete choice experiments (also known as choice-based conjoint):** A series of questions asking for the preferred choice from two or more options where each is characterised by a number of attributes (typically 3-6). Econometric analysis of the data allows for valuation of each of the attributes individually.

- **Best-worst scaling (includes MaxDiff):** A series of questions asking for the most and least preferred alternative from a set of 4-6 options, or for the most and least important item from a list of 4-6 options. Econometric analysis of the data allows for an importance or priority index of options to be estimated.

- **Contingent ranking:** Questions asking participants to rank a list of options. Econometric analysis of the data allows for an importance or priority index of options to be estimated.

- **Menu-based / slider:** Participants construct their own package of service levels from a menu where each level of service improvement has an associated cost impact. As customers select higher levels of service, the bill rises accordingly, and respondents are updated in real-time as regards the total bill impact of their choices.

Of these methods, only the first two typically allow for valuation estimates to be obtained. However, it is possible to combine two or more methods within a single survey to good effect. For example, several studies include a contingent valuation exercise to obtain the value of a broad package of improvements, coupled with a discrete choice experiment to derive the relative values of individual attributes (see, for example, Metcalfe et al. 2012[1]).

In Main Stage WTP studies, respondents were usually presented with a package exercise to obtain the value of a broad package of improvements, coupled with discrete choice experiments or a MaxDiff exercise to derive the relative values of individual attributes. For Stage 2 WTP surveys, conducted by a few companies, respondents were presented with choice experiments in order to explore additional dimensions of attributes (e.g. different levels of severity, frequency, duration and/or location of service failures) that were included in the Main stage WTP survey. Values from the Stage 2 choice exercises were used to construct weighting factors for these additional service dimensions. A portion of the attributes investigated in those studies were directly relevant to the WRMP, such as water use restrictions in response to drought events, leakage and

[1] Metcalfe, P. J., et al. (2012), An assessment of the nonmarket benefits of the Water Framework Directive for households in England and Wales, Water Resour. Res., 48, W03526, doi:10.1029/2010WR009592.

environmental impact (e.g. quality of rivers, river flows, river abstraction and groundwater abstraction).

In addition to these methods, water companies also used improved graphical and user-friendly methods of stated preference research as part of taking on feedback from the previous round on improving the effectiveness of engagement. Survey designs were refined through various rounds of pilot testing and cognitive interviews with customers. In comparison to PR14, the new survey designs often included enhanced features such as (i) better wording of questions for choice tasks (ii) simplified presentation of service levels and attributes (iii) revised visual design and on-screen survey interface; (iv) use of animations and infographics to augment descriptions of service attributes; (v) Powerpoint slide-shows and videos for explaining various show materials (vi) step-by-step instructions illustrating choice task requirements and (vii) use of comparative performance data to inform customers of the relative performance of their company within the water industry.

Stated preference studies, where used, were reported to have gone through extensive design and testing phases to test and update surveys. Companies complemented these using additional valuation approaches to complete a programme, rather than rely on the outputs of a single study. Following the studies, review and validation of the results followed, including using customer playback sessions (e.g. South West Water).

Choice cards from Anglian Water, Wessex Water and Yorkshire Water are presented in Box 1 as examples of the type of choice that participants were called upon to make and the visual format that was used.

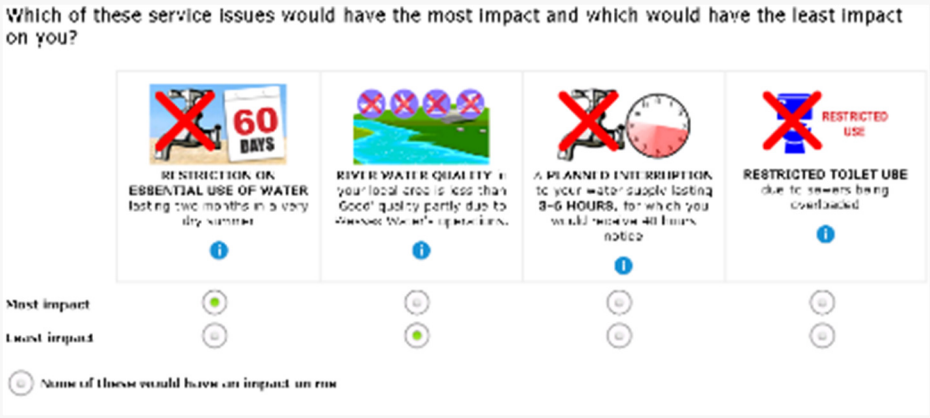
With respect to the approach adopted by SSC, this involved two large-scale quantitative surveys (Wave 1 and Wave 2) using stated preference choice experiments in order to study customers' priorities and their willingness and ability to pay for different service and investment levels for water services. The Wave 1 survey included a discrete choice experiment (DCE) and a MaxDiff choice exercise to assess customers' WTP for significant service improvements across various service measures. Wave 2 further explored results for specific attributes and refined the scope of attributes included. Wave 2 included a DCE and was a 'follow-up' customer valuation study carried out to further explore results for specific attributes and refine the scope of attributes included. In Wave 2, the levels of improvements displayed to respondents were amended, and new attributes relating to retail/community included (i.e. investing in community projects, educating future generations and supporting customers facing difficult situations).

Box 1 Example illustrations, WRMP19. (a) Anglian Water, (b) Wessex Water, (c) Yorkshire Water

(a) Anglian Water, DCE on levels of service, main stage. Participation of a total of 1,353 household customers (900 DCE respondents, and 453 BWS respondents) and 500 non-household (business, DCE only) customers.

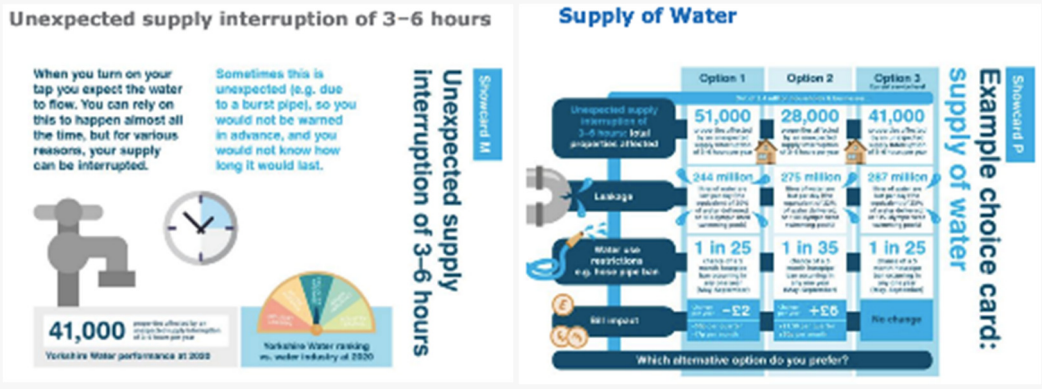
Source: Appendix 12G. Anglian Water's PR19 societal valuation programme

(b) Wessex Water, MaxDiff on interruptions to supply, main stage. Large-scale quantitative survey of 2,164 interviews with household customers and 650 CATI interviews with non-household customers.



Source: Wessex Water Business Plan Appendix 1.1.D – Willingness to pay research 1

(c) Yorkshire Water, example showcards, main stage. Quantitative surveys via a combination of Computer Aided Personal Interviewing (CAPI) and online panel with a total of 1,020 household and 542 business customers.



Revealed preference research

Revealed preference approaches involve the analysis of behavioural choices made by people in the real world. The most common approaches used in WRMP19/PR19 were averting behaviour and travel cost.

- Averting behaviour: This method assumes that expenditures incurred on averting (i.e., defensive) behaviour are indicative of the value avoiding the issue in question. This method is used in the water sector, for example, by investigating purchases of bottled water and other expenditures incurred when there is a water service incident as a means of obtaining a value for avoiding the incident in the first place.

- Travel cost / site choice: Analysis of which sites people choose to visit in connection with attributes of those sites, including how far away they are, can be a good means of estimating the value of allowing access to a given site and/or the value of key site attributes.

These approaches have the advantage that they are based on real world behaviour but come with the disadvantage that there are often no real-world situations where choices reveal values for the issues at stake. For example, this may be because the issue at hand is to value an initiative that has not previously been carried out, or it could be because people sometimes value things for reasons that go beyond any behavioural interaction they may have. Such 'non-use' value can be a significant component of the total economic value of an initiative or improvement, but it leaves no behavioural trace and so cannot be valued using revealed preference methods.

Revealed preference methods were used to derive valuations on preventing supply interruptions (Severn Trent, South West Water), preventing low water pressure incidents and water aesthetic issues (South West Water), and avoiding water quality incidents (United Utilities). Bristol Water used a survey to collect data about the choices household and non-household customers made, and associated expenditures, when their supply was interrupted. Revealed preference methods were further used as ways of obtaining valuations on bathing water quality and the recreational use value of coastal sites (Welsh Water, South West Water, United Utilities) and river water quality (Welsh Water, Yorkshire Water).

Gross Value Added

A GVA approach was used to understand the costs to non-households associated with water restrictions (or the value of avoiding long-term supply interruptions). This method was applied in studies by Anglian Water, Bristol Water and South West Water, with results contributing to the triangulation of valuation evidence.

The advantage of using this approach is that it is based on solid macroeconomic data and the interactions between different economic sectors. However, the method is highly dependent on assumptions made regarding the extent to which each sector's output would be affected by the restrictions.

Menu-based/Slider tools

Some companies used interactive menu-based/slider tools to complement their valuation research and as an easier-to-use approach to obtain customer views.

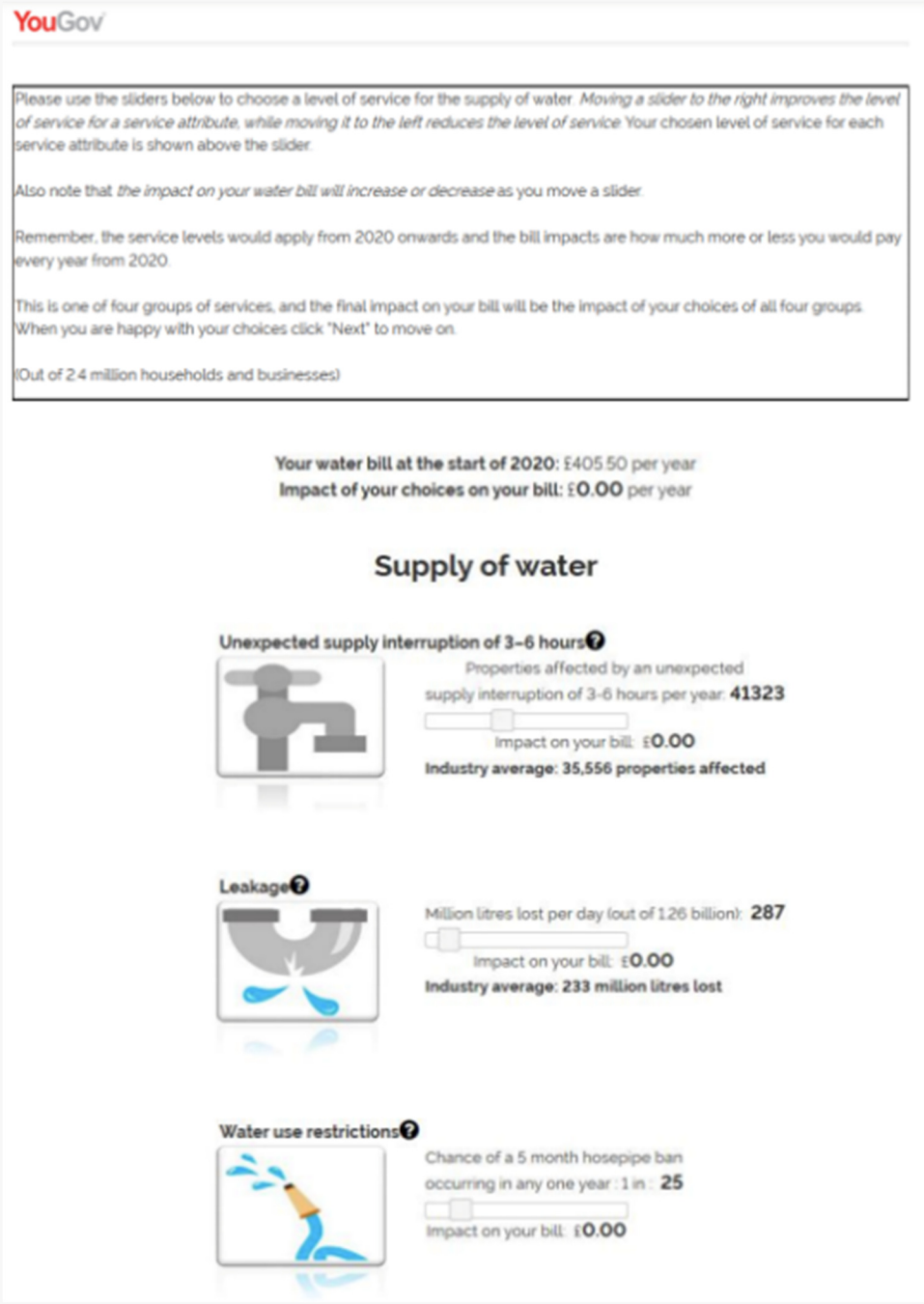
Respondents were asked to select their desired service level using sliders. As customers use the slider to select higher/lower service levels, the bill shown in the tool rises/falls to illustrate the trade-offs between service quality and price. Bristol Water implemented this in the form of an online attributes scenario game.

DCWW conducted a menu-based stated preference survey which asked customers about their views on current service levels and whether they would be willing to pay to improve them. Survey questions were asked in the context of the impact on bills of improved performance, historical performance levels achieved, comparisons with other companies' performance, and trading off of improvements across measures within a fixed bill profile. This quantitative research involved an online and telephone survey with 1,013 household and 300 non-household customers.

Northumbrian Water used a slider tool approach as the core of its valuation research as an alternative to traditional stated preference exercises, in order to explore customer preferences for service level improvements for a number of service areas and to obtain customer valuations for high service levels to inform the setting of outcome delivery incentives.

Yorkshire Water developed an interactive online slider tool which allowed customers to alter service levels and observe in real time the effects this would have on their bill. Customers were shown the impact of bill changes on their disposable income and comparative information on Yorkshire Water's performance on service levels vs. that of other companies. The likelihood of events happening was communicated in frequencies rather than quantities. Customers were able to adjust service levels for the same 13 service attributes examined in the stated preference surveys, grouped into four categories (water quality, supply of water, sewerage services, environment) and were shown the same showcards created for those studies. A sample of 2,027 respondents were completed for this experiment (1,732 responses were considered valid, as the rest did not move the sliders). Box 2 shows an example illustration of the slider tool.

Box 2 Yorkshire Water online slider tool, supply of water choices



Source: Yorkshire Water Business Plan Appendix 5i Understanding Customer Values_ Behavioural Experiment Report

Finally, SSC conducted a performance commitment slider study to help them evaluate the extent that customers wanted to achieve for 11 of their performance commitments and also help them understand how much customers would like SSC to spend for each of these performance commitments to deliver the service that they want. The main output from this survey comprised the service levels chosen by the respondents and their associated bill amounts. The insight from this research was used to develop some of SSC's performance commitments with regards to the levels of stretch – specifically, in the case

of leakage in the South Staffs region and the scope of SSC's education outreach programme.

The menu-based/slider approach has been said to have been used by companies to obtain willingness to pay estimates, however there are certain conditions in making the outputs of such a format valid. Typically, where menu choices/sliders have been used, the costs used for each of the service levels have been set equal to the company's expectation of the true costs for that service level with no variation across the sample. Only Yorkshire Water reported having varied the cost levels across the sample. However, keeping costs fixed across the sample entails an inability to measure willingness to pay as that requires variation in costs. As such, that approach is not fit for purpose if the aim is measure willingness to pay. Furthermore, even in the case of Yorkshire Water that did vary cost across the sample, their report on the study did not contain any estimates of willingness to pay[2].

Gamification

Some of the companies reviewed developed games in the context of responding to the challenge for innovation and enhancement of the customer experience. Severn Trent used a 'budget game', a survey conducted through face-to-face interviewing in the format of a large board game to present customers with different service levels (a current and two improvement options) and associated costs. The 'design your own plan' game formed a basis for interviews focusing on prioritisation of the different service levels and associated cost impacts. Non-household fieldwork was carried out over the telephone with show materials emailed to each respondent prior to the call.

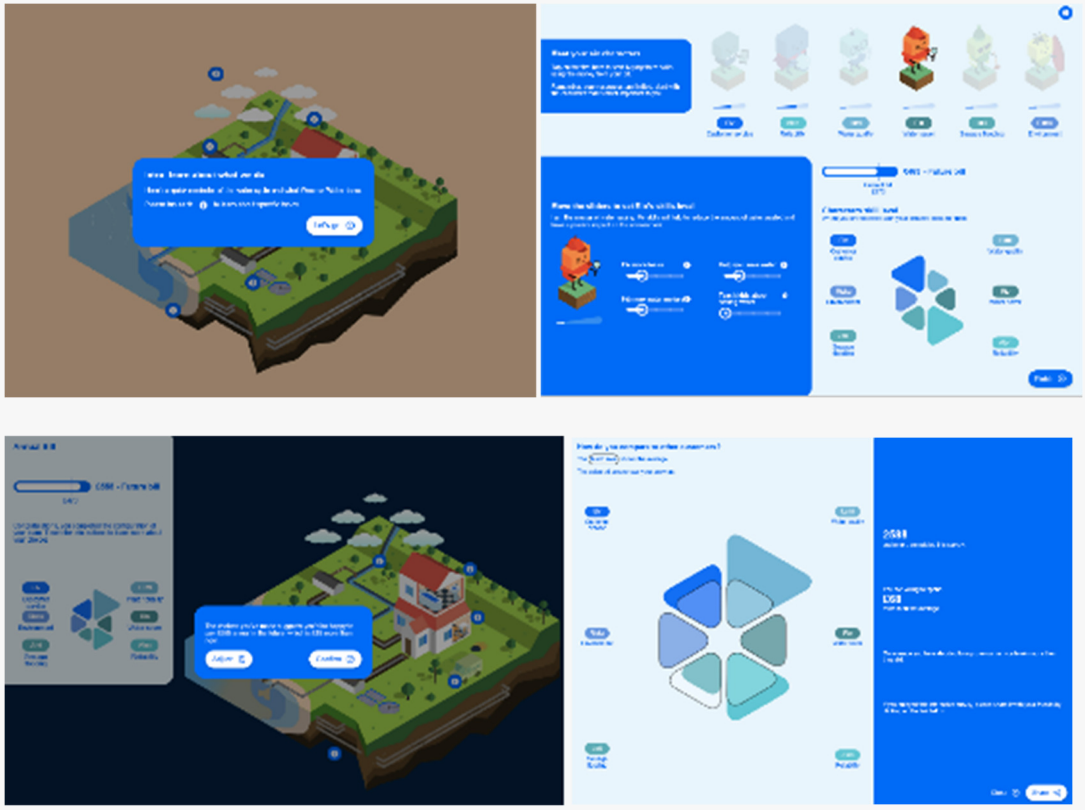
Wessex Water used an interactive online game designed to understand customer priorities for levels of service and how much they were willing to pay for those services. This was a quantitative method that produced willingness to pay results. An illustration is in Box 3.

The use of games in this context has similar pros and cons to menu-based/slider designs. In addition, they may be more engaging for customers, but this may come at the cost of customers not weighing their responses in a thoughtful way, as they are 'just playing a game'.

[2] Aecom (2017) PR19 Understanding Customer Values: Work Package 5 – Behavioural Experiment, A Report for Yorkshire Water (Yorkshire Water Business Plan Appendix 5i)

Box 3 Wessex Water Supercharge game, WRMP19

The game featured six characters representing different service areas. Participants were asked to prioritise which of the service areas were most important to them and choose how much they were willing to spend on each of these areas. Players were informed through initial background screens and a final impact screen which showed the outcomes of the choices made and how these compared to other customers' choices. Participants were able to adjust their choices if they wished to do so. Wessex Water collected the results of 500 online interviews representative of the Wessex Water area. Below are screenshots from different stages in the game.



Source: Wessex Water Business Plan Appendix 1.1.K – Supercharge game

Valuation methods used on wider topics

Companies incorporated a variety of other methods to build their valuation programmes. Albeit not necessarily directly relevant to valuing levels of service, these included, for instance, the following:

- A subjective wellbeing approach to estimate the value of avoiding flooding and roadworks incidents via their impact on customers' wellbeing; used by Anglian Water
- A stated preference method that combined a choice experiment on customers' willingness to pay for river water quality improvements with an analysis of the customers' subjective preferences for river water quality using 'Q methodology'; used by Anglian Water
- A natural capital framework to help analyse the impact of investments on natural capital and ecosystem services to inform values related to the environment; used by Anglian Water

- A trust experiment to understand the relationship between service measure failures and water bill payments, which involved undertaking a literature review on the measurement and valuation of trust and combining it with information from company-wide/aggregate data on service measure failures and payment records, and Customer Tracker survey data; used by Yorkshire Water.

Supply/demand option preferences & trade-offs

All companies sought input from customers in order to establish their preferences with respect to the various options put forward to maintain or improve the supply-demand balance in their area. The prevalent methodologies among the companies reviewed included deliberative/focus group discussions, contingent rating, budget/vote allocation, contingent ranking, discrete choice experiments, menu/sliders and an interactive video. Some studies used multiple methods; we refer to these across different sub-sections. Different methodological approaches on the topic of establishing supply/demand option preferences and trade-offs are discussed below.

Deliberative/focus group discussions

Some companies used this technique, either via the online community or through in-person workshops, to obtain qualitative and/or quantitative insight into customer priorities regarding supply side vs. demand side investment areas and trade-offs between particular types of options. The choice of where focus was given depended on each company's particular circumstances. For example, Northumbrian Water chose to concentrate on demand management options rather than levels of service which they considered more complex and poorly understood, while Severn Trent looked at various supply (e.g. water transfer, alternative use of sources, effluent reuse) and demand-side solutions (e.g. metering, behavioural change).

Following the concept of deliberative research, this approach involved understanding uninformed views, then presenting pertinent information and allowing customers to deliberate and re-examine their views while their reactions and views were recorded at different points. Questions were asked on individual options and packages of options, including the balance of demand and supply-side interventions. For instance, Bristol Water used deliberative valuation workshops on water resource options, alongside resilience attributes. These comprised 3-day long events with a total of 111 household customers and produced qualitative and quantitative findings on leakage, water efficiency, metering and environmental protection. Participants in the workshop were given a 'Top Trumps'-style budgeting exercise to explore their views on the trade-offs between short and long-term water resource options. The participants were able to deliberate on the various water resource options available to their company before they were asked to re-evaluate their initial choices. A stated preference choice exercise, conducted on voting keypads, was added to the start and end of the workshops to understand if and how customers' values had changed after deliberation.

Two-phase deliberative workshops were one part of a three-part study carried out by SSC on WRMP and long-term resilience. Facilitated, reconvened workshops were carried out with 30 household and non-household customers. The first workshop aimed at exploring customer views on core WRMP components through spontaneous discussion, informed discussion and live voting on various issues, including metering, leakage, customer

restrictions and water efficiency. Initial discussions on resilience, environment and options for the future were also held at that first workshop. The second workshop aimed at testing views on strategic investment options and co-creating the solution to SSC's strategic challenges. This incorporated discussion and voting on each of the demand management and supply side options, a 'Top Trumps' exercise where participants were tasked with combining the options discussed to develop their own plan (see also: budget/vote allocation).

SSC further held roundtables with 11 stakeholders and large businesses to explore these topics. The format of the roundtables largely followed the second-phase workshops, where participants were tasked with composing their own plans. An online survey of 305 household customers completed this research activity.

Contingent rating

Yorkshire Water carried out research into customer preference and prioritisation of different options through qualitative and quantitative research for WRMP14. Customers had been asked to rate a range of potential options before and after being provided with information on cost, environmental impact and yield for each option. Customers were asked to rate the range of demand management, resource management and distribution management schemes on a scale from 'very good idea' to 'very bad idea' and then decide which three options were the best ideas for managing future water supplies. A WRMP19 survey with the 1,003-strong online community followed the same principle of presenting additional information and asking for a new rating, as well as underlying reasons for customers' choices, by way of validating prior research outputs.

United Utilities split their quantitative customer research for WRMP19 in four parts: measuring attitudes towards the environment, levels of service/acceptability, levels of service/willingness to pay, and priorities for future investment in water supply options. The exercise on water supply options sought to understand 'raw' views on the type of option preferred by customers and did not take account of cost per unit saving. Customers rated the top three options where they wanted to see investment to be made. Cost was explicitly tested in the programme choice experiment (Box 6) allowing a comparison of views. The sample of responses came through 595 face-to-face interviews, 302 business interviews, 266 online panel surveys and 36 face-to-face computer-assisted interviews.

Budget/vote allocation

Northumbrian Water carried out a budget allocation exercise on topics relating to leakage, resilience and the environment. They asked customers about their views, priorities and an indication on willingness to pay with respect to going beyond government requirements in the areas of environment (spending more across a number of environmental activities), rare events (water supply cut off for several days) and leakage. They were then given 10 notional £1 notes to allocate across five potential water resource management investment options. This was done via focus groups in WRMP14 and via an online survey in WRMP19. On both occasions, participants were asked to repeat the exercise twice, before and after being provided with relevant information.

SSC used vote allocation within its core WRMP research on a range of supply-side and demand management options. At the WRMP workshops, participants saw, discussed and

stated their priorities for the various demand management and supply-side options presented to them on 'Top Trumps' cards (see Figure 1). Customers expressed their priorities at the start and end of the sessions using interactive keypad voting technology. Customers' priorities expressed in the workshops were measured using three measures: overall score; votes allocated (preferred option) and least preferred option. Further, in the follow-up WRMP online survey, participants stated their priorities amongst the various demand management and supply-side options presented to them within the survey. Customers' priorities expressed in the online survey were measured using four measures: mean score, proportion for an option, most preferred option and least preferred option.

Contingent ranking

Severn Trent asked customers to rank factors in selecting supply-side and demand-side options in order to get spontaneous views of customers towards possible water resource management options. Factors included sustainability, the environment, volume of water produced, option resilience, cost to build, customer acceptability. This was done in the context of the joint water trading and water scarcity research with United Utilities and Thames Water.

Discrete choice experiments

Stated preference research is one of the key methods of arriving at customer preferences and valuations regarding options and the management of water resources as the two link in the context of maintaining or achieving supply/demand balance. Most companies adopted this approach, often in combination with other methods to validate outputs.

A qualitative phase often preceded stated preference surveys, involving consultation with customers through company online community panels or focus groups. This phase was used to capture insights relating to water resources management in general and the areas that the plan should be addressing, as well as specific types of options in particular, which helped inform the design of the stated preference survey to follow.

Stated preference exercises were designed with the objective of understanding customers' choices in relation to demand and supply side options and managing available water, especially in times of drought. These choices are viewed in the context of bill impacts to elicit willingness to pay values for options and attributes such as reducing leakage, education on how to save water, issuing water-saving devices to customers, water transfers, increasing use of current water resources, developing new water resources, metering, water restriction options, desalination, new reservoirs and ground storage etc., depending on the relevance to each company's area.

Welsh Water's quantitative stated preference research carried out four separate exercises which obtained monetary estimates on (SP1) water resources management options, (SP2) water use restrictions options, (SP3) resilience valuation and (SP4) metering options. SP1 asked respondents to make a sequence of choices between options each representing a potential water resources plan. The options were characterised by the combination of supply-demand measures included and the impact on the level of service and on the customer's bill. SP2 measured customers' views on the types of water uses that should be allowed and prohibited if a hosepipe ban was put in place. SP3 gave a context statement to respondents and then asked them whether they would be willing to pay an additional cost on their current water bill for increased security

of supply, with follow-on questions to pinpoint the value. Finally, SP4 gave customers three choices of metering policy and asked which was the most, and which the least, that they would like to see. This research was carried out based on a total of 400 interviews with household customers and 300 interviews with non-household customers.

In addition, Anglian Water set up follow-up focus groups following completion of their stated preference study in order to explore results in more detail and help validate results, especially in the context of reliability for different water resource options. This was identified as good practice in the peer review of the study.

Box 4 and Box 5 provide examples of visual materials used in WRMP19 in this context. Examples come from Bristol Water, South West Water and Welsh Water. Companies across these examples focus on supply-demand options, however Bristol Water evaluates these in the context of whole plans while South West Water looks at options individually. Wessex Water focussed on quantitative measures of metering and leakage rather than single discrete options. Wessex further included river flows as a quantitative metric rather than simply a low/medium/high environmental impact score.

There is often a tension between the desire for simple methods and methods that more accurately, or granularly, capture the trade-offs relevant to decision making. No technique offers a clearly best solution; however, the examples serve a useful purpose for framing conversations amongst internal and external stakeholders around how these objectives might be balanced in the choice of design.

Box 4 Visual materials from water resources stated preference stage 2 study, Bristol Water, WRMP19

573 household and 300 non-household customers participating in this study were asked to provide their choices relating to the following service attributes: reduce leakage; education on how to save water; issue water saving devices to customers; water transfers from neighbouring companies; increase use of current water resources; develop new water resources; implement universal metering. They were shown a matrix of measures and impacts providing baseline information for each option on four metrics: impact on water available for use, impact on the environment, local disruption, impact on bill.

Measure	Impact on water available for use	Impact on the environment	Local disruption	Impact on bill
Reduce leakage	♦♦	++	⚒⚒⚒	£££
Education on how to save water	♦	+++	--	£
Issue water saving devices to customers	♦	+++	--	£
Increase use of current water resources	♦♦	-	⚒	££
Develop new water resources	♦♦♦	--	⚒⚒⚒	£££
Water transfers from neighbouring companies	♦♦♦	-	⚒	££
Continue current metering policy	♦	++	⚒	£
Implement universal metering	♦♦	++	⚒⚒	££

The more symbols shown, the greater the impact in question. In the case of "Impact on the environment", + indicates a positive impact and - indicates a harmful impact.

Source: Accent/PJM, WRMP research for Bristol Water, 2017

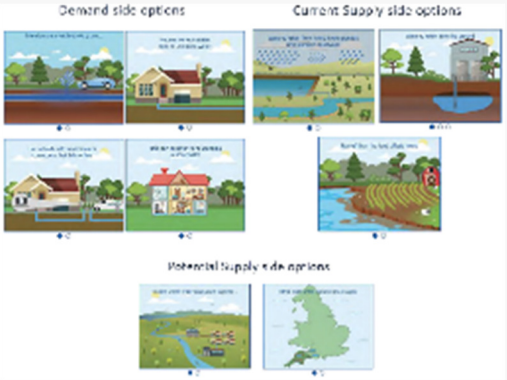
Respondents were asked to make a sequence of choices between potential water resources management plans (combinations of supply-demand measures) with associated impacts on the level of service and customer bills. The figure below is an example choice card from the second stage study.

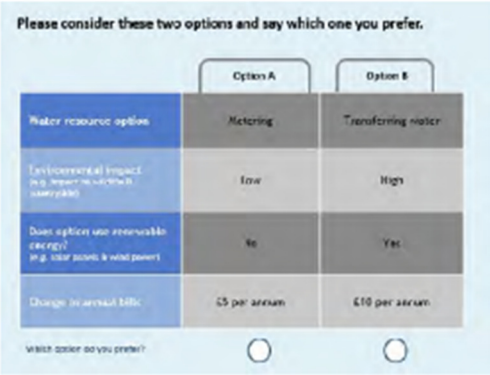
	Option A	Option B
Reduce leakage (from 84 to 76 litres per property per day)	✗	✓
Education on how to save water	✓	✗
Issue water saving devices to customers	✓	✓
Increase use of current water resources	✓	✗
Develop new water resources	✓	✓
Water transfers from neighbouring companies	✗	✗
Continue current metering policy	✗	✗
Implement universal metering	✓	✓
FREQUENCY OF HOSEPIPE BANS (lasting 5 months on average, from May to September)	1 in 10 years	1 in 10 years
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL above inflation to provide the service package above.	Increase of £41.30 by 2024 Gradual increase of £8.26 each year from 2020 to 2024	Increase of £41.30 by 2024 Gradual increase of £8.26 each year from 2020 to 2024

Box 5 Illustrations from (a) South West Water stated preference exercise on future interventions (b) Wessex Water stated preference exercise on water resources management

(a) South West Water

South West Water used a DCE exercise to ask participants their preferences on different options for managing the amount of available water and for providing additional water resources. Monetary values on willingness to pay were generated for the following attributes: security of supply (temporary use ban, non-essential use ban), water conservation, metering, water resource options (reuse, catchment management, transfer, river abstraction, groundwater abstraction). This survey was carried out with 601 household and 274 non-household customers.

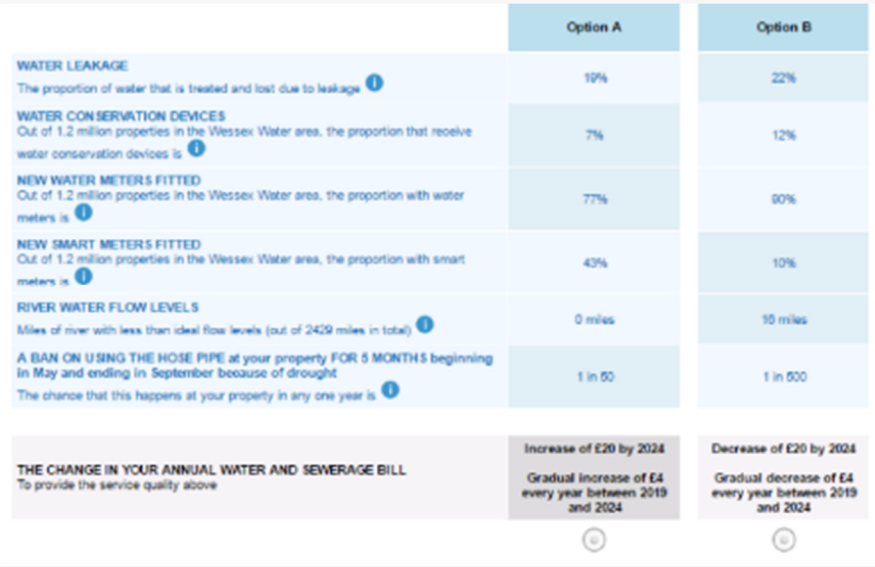




Source: South West Water / Bournemouth Water, Final WRMP, Appendix A. 1.6

(b) Wessex Water

Wessex Water carried out a DCE on water resources management to elicit willingness to pay values for leakage reduction, water efficiency and metering net of those options' impact on hosepipe ban risk and river flows. A literature review on the public's understanding of "local" in the context of rivers was also undertaken. Note that Wessex Water forecasts a surplus of resources for at least the next 25 years, and there is therefore no need to "solve" a supply-demand deficit. The research involved 652 interviews with household customers and 300 interviews with non-household customers.



Source: Wessex Water Business Plan Appendix 1.1.D – Willingness to pay research 1

Menu/sliders

In general, slider tools are very engaging and user-friendly. However, there are disadvantages to using them for valuation, unless differential prices are used across the survey. In general, it is difficult to interpret the results. A slider will provide a range and an overall income constraint, i.e. a cap to how much a respondent will be spending. However, that budget will be different for different people. As such, there can be no marginal trade-offs at different prices; and even though an average WTP can be extracted on how much people would be willing to pay overall, no secure conclusion can be drawn on the valuation of any package in particular.

United Utilities was the only company of the ones reviewed that used a slider tool to obtain information on customer choices and trade-offs in balancing supply and demand. Customers were presented with options to balance supply and demand and were shown the impact on bills as they amended the position of each point on the slider to achieve an overall balance. The options available were:

- Encouraging customer metering
- More frequent use of hosepipe bans in dry periods
- Taking more water from rivers in dry periods
- Increasing size of reservoirs
- Promoting water efficiency
- Reducing visibility cage
- Reducing non-visible leakage
- Taking more water from rivers
- Taking more water from underground.

Box 6 United Utilities programme choice experiment, WRMP19

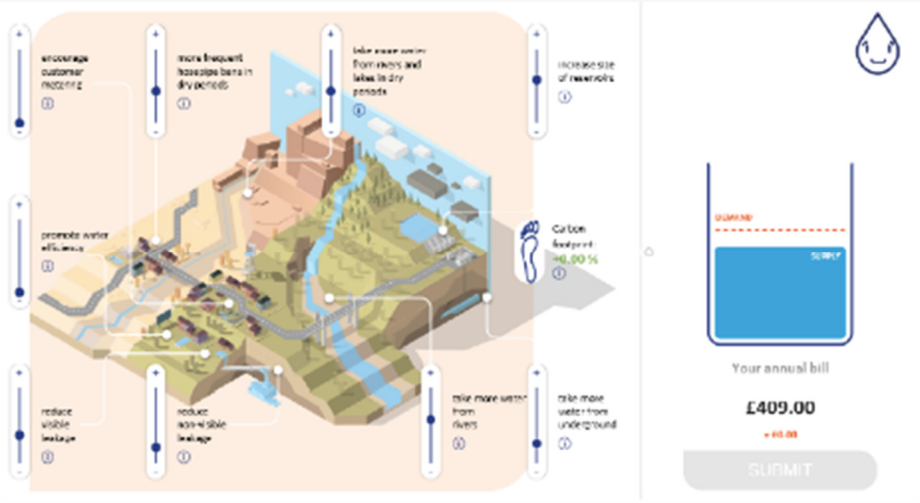
Interactive online tool intended for use by the customer panel, complementary to traditional willingness to pay research. Themes examined: leakage, level of service (temporary use bans (hosepipe bans) and drought permits), water efficiency, metering and supply options. Respondents were able to explore the choices and trade-offs in balancing supply and demand.

There were two rounds to the programme choice experiment, approximately 1 year apart, with 866 responses received in the first round and 702 in the second round. Response data were used in the triangulation of valuation evidence.

The figure below is a screenshot of the interactive slider screen which asks respondents to decide how to balance their water supply-demand balance. Each slider represents a different input or output that must be accounted for in this balance and describes to respondents the amount of change they would see when they adjust the slider.

Prior to the main supply-demand screen depicted below, initial screens asked participants:

- "Would you rather that we would use water bills or invest to improve the natural environment?" with choices ranging from *keep my water bill low* to *increase my water bill to protect the environment*.
- "Do you think that we should find and fix more leaks from water mains, meaning there will be fewer leaks and therefore we need to take less water from rivers, lakes and reservoirs?" with choices ranging from *reduce leakage in spite of higher costs* to *don't reduce leakage any more*.
- "During a year where it rains a lot less than normal, we will need to either take more water from rivers and lakes (reducing the water levels for fish) or impose hosepipe bans on households. How do you think we should balance these two choices?" with choices ranging from *introduce hosepipe bans and protect the environment* to *take more water from rivers and lakes.*
- "To reduce the need for hosepipe bands or the need to take more water from rivers, we could encourage people to use less water in their homes. How much do you think we should do this?" with choices ranging from *people should use less water and save the environment* to *I think there should be enough water for me to be able to use what I want.*



Source: United Utilities Final WRMP19 Technical Report – Customer and Stakeholder Engagement, Figure 11

Interactive video

South West Water used a personalised interactive video tool to collect customer feedback on the balance of supply/demand options and possible futures with respect to the use of water resources. Relevant details are included in Box 7.

Box 7 EngageOne interactive video, South West Water

EngageOne was a personalized interactive video tool sent to customers via email or text messaging to gather customer feedback on the balance of supply/demand options and the future use of water resources. Using this tool, customers were able to make choices based on an understanding of the possible futures in the absence of action. The video was location-specific, which meant that the customers using it would see information relevant to their Water Resource Zone, making issues local to the customer and their community. This was completed by over 2,500 customers and South West Water notes it was the first of its kind in the UK water sector. It had a positive reception by customers who engaged and gave positive feedback on the tool itself. The outputs added to the data richness, via engaging through a new and innovative channel, and was well-received by customers. Below is a screenshot from the tool.

Source: South West Water / Bournemouth Water, Final WRMP, Appendix A. 1.6

Resilience and long-term challenges

Viewed as one of the most important subjects around planning, resilience was identified as a subject difficult to engage with, as it relates to long-term, high-impact, low-probability events. Meanwhile, terminology around such concepts can pose an additional barrier to meaningful engagement.

Research on resilience explored customer views and perceptions of long-term challenges facing water resources management and the delivery of water, and the impacts that these can have on customers when they interfere with the capacity of a water company to maintain essential services. Most companies took their customers on a journey from uninformed to informed, to understand their perceptions of drought risk, and more generally water scarcity and the water environment in the context of population growth and climate change, as well as their views, expectations and priorities regarding resilience planning under different risk scenarios, reactions to extreme drought measures, investments considered to increase resilience to drought and the various water resource options that would needed to be developed to do this, willingness to pay for resilience activities, and insights on how best to communicate resilience topics to customers.

Companies used a combination of approaches, either in separation and combined at a later stage with e.g. stated preferences research on drought resilience and on-going business-as-usual research, or through dedicated mixed methods studies. Wessex Water added innovative aspects to the mix of approaches by used in resilience research by carrying out a qualitative study comprising research workshops, friendship paired in-

depth interviews using a 'Listening Project' approach (involving a private discussion between friends, observed through a two-way mirror), a film that introduced the topic of resilience, deliberative events in community venues to conduct an in-depth discussion of responses in previous stages, and group discussions with economically vulnerable customers.

Deliberative research workshops on drought resilience were held by Anglian Water, Bristol Water and Severn Trent. These workshops tended to obtain participant views while uninformed and then testing how their views may have changed once relevant information had been presented, both in relation to past company performance and in relation to that of other companies.

Bristol Water examined how customers valued resilience attributes (i.e. resilience relating to drought avoidance, alongside water resource options). During the course of these workshops, participants were provided with information on the performance of their company, including comparative information on how their company had performed relative to the rest of the water industry. Resilience scenarios were discussed to aid deliberation on the impact of potential droughts and mains bursts on customers, businesses and the environment. Within each session, a 'Top Trumps' budgeting exercise explored customer views on trade-offs between short- and long-term water resource options.

Northumbrian Water carried out qualitative and quantitative research on resilience. Workshops with an events-based approach, incorporating voting, scenario-based videos and brainstorming, were used to explore customer and stakeholder views on resilience. Four workshops engaging a total of 125 customers were held as part of this resilience research activity. A staff workshop was held beforehand, to test materials before these were presented to customers. Follow-up interactive meetings and telephone interviews with additional stakeholders complemented this research. In addition, six focus groups had been held for PR14 on identifying views and priorities in respect of Northumbrian Water going further than government requirements in the areas of resilience, environment and leakage. These took participants from uninformed to informed states and carried out a budget allocation exercise across five areas (one of which was preparing for rare events).

Severn Trent's carried out workshops focusing on: (i) perceptions regarding increasing resilience (focus on anticipating the challenge, and response when the challenge appears); and (ii) on perceptions of water stress/drought and customer preferences on addressing this. Participants were prompted to provide views before and after they received information. An example showcard on Severn Trent's drought consequence storyboard is shown in Figure 19.

United Utilities carried out what seemed to be one of the most comprehensive programmes of water service resilience risk research. Among a host of other activities, it carried out an immersive experience consisting of roleplay with customers the consequences of a service failure. It also carried out online surveys with a focus on the risk on service if no options to mitigate the risks were taken forward in the Manchester and Pennines area (see Appendix A).

Box 8 provides a closer look at this research. A summary of United Utilities' approaches to engaging with customers on the various aspects of water supply resilience risk investigated with their customers is shown in Figure 30.

Box 8 United Utilities immersive experience research: resilience and ecosystem services

United Utilities note this as the first research in the water industry to roleplay with customers the consequence of a service failure. It was designed to target the idea of resilience and to obtain more informed customer attitudes regarding high consequence, low likelihood events, which are generally hard to grasp and even more so to express economic decisions around them. The immersive experience was split into two concurrent workshops: on long-term supply interruptions – resilience; and on ecosystem services (case study on River Irwell), with 100 people taking part in each. The figure below is a schematic diagram of the immersive workshop set-up.

Source: United Utilities Final WRMP19 Technical Report – Customer and Stakeholder Engagement, Figure 9

In the first workshop, customers were immersed in a fourteen-day loss of water scenario using interactive games, emoji diaries, mock-up text and phone messages, newspaper articles, water rationing activity, etc. Customer behaviour was observed during the activity to derive customer compensation levels for long-term supply shortages and willingness to pay to avoid these, as well as test the impact of cause of interruption on willingness to pay, in order to better understand resilience value (irrespective of the cause of interruption).

The second workshop involved a virtual video tour of Greater Manchester's River Irwell, a model farm to simulate the impact of water run-off and floor puzzle games to obtain customers' bids for investment in their chosen areas of environmental priority. Customer valuations were collected on five ecosystem services: green spaces for recreation, a healthy river to support wildlife, visual appearance of rivers, safety of river for recreational use and

The following table summarises the breadth of approaches used to discuss the topic of resilience with their customers.

Table 1 Breakdown of approaches to discussing resilience with customers in WRMP19

Method	Examples of approach
Deliberative research, both in-person and using online panels	Via the online community. Focus: perceptions of drought risk in the region; reactions to extreme drought measures; buy-in to further investment; and views about metering and leakage. With households of various age groups and customer segments. (Anglian Water) Day-long events with household customers where, among other topics, resilience scenarios were presented and discussion followed around potential impacts on events such as droughts and mains bursts on customers, businesses and the environment. (Bristol Water) Workshops on resilience, asset health and long-term affordability (Northumbrian Water) Deliberative workshops and depth interviews to explore customer views (unprompted and informed) and priorities related to the environment, dealing with climate change

Method	Examples of approach
	uncertainty and the impact on bills (i.e. investing now vs. investing later), increasing resilience (focus on anticipating the challenge or preparing a response when the challenge appears?), ensuring intergenerational fairness, water stress / drought and preferences on addressing this. Use of a drought consequences storyboard to convey messages on resilience and drought. (Severn Trent)
Surveys with the online panel	Quarterly surveys with online customer panel. Insights collected such as considering meeting the water needs of a growing population and improving the environment. Insights contributed to the triangulation of evidence. (Bristol Water)
Focus groups, Interviews (teledepths, face-to-face)	Macroeconomic GVA resilience costs study with non-households (Anglian Water, Bristol Water, South West Water) Mapping priorities regarding leakage, resilience and the environment. Initially participants were asked to rate their priorities without access to any relevant information. Questions were asked again after presenting relevant comparative and cost information to participants. Run with the participation of diverse household customer profiles. (Northumbrian Water) Focus groups on resilience, asset health and long-term affordability (Northumbrian Water) Depth interviews on priorities relating to the environment (Severn Trent) Friendship paired in-depth interviews using a 'Listening Project' approach, where the concept is that of a private discussion between friends, observed through a two-way mirror. (Wessex Water)
Second stage stated preferences research on drought resilience	Stated preference exercises with a focus on drought resilience (Anglian Water) Customer views on the level of resilience the company should adopt, attitudes towards water shortages and extreme drought water use restrictions, and how these could be addressed (Welsh Water) Preferences on managing water when in short supply during periods of drought, including different types of water use restrictions. (South West Water) Measured attitudes towards the environment and tested views on severe and extreme drought resilience. (United Utilities)
Workshops	Events-based workshop approach incorporating voting, scenario-based videos and brainstorming. A staff workshop was held beforehand to test workshop materials before engaging with customers. (Northumbrian Water)
Self-selective research	Customer engagement via H2OMG, a water-themed community engagement scheme / water festival. (Anglian Water)
Interactive video tool	Choices on the future use of water resources (South West Water)
Immersive experience research	Roleplay with customers the consequences of a service failure (United Utilities)
Film on resilience	Film to introduce the topic: expert voices including customers, Wessex Water staff and stakeholders. Extensive stimulus development using four areas (supply interruptions, water restrictions, environmental damage, sewer flooding) with context boards and different future scenarios with investment choices. (Wessex Water)
Mixed method	Research workshops, friendship paired in-depth interviews using a 'Listening Project' approach film on resilience, deliberative events, depth discussion of responses in previous stages, and group discussions with economically vulnerable customers. (Wessex Water) Focus groups, in-home interviews, online surveys to explore the value customers place on company services and customer expectations and aspirations in the context of population growth and climate change. (Yorkshire Water)

Focused studies on individual options / types of options

Water companies carried out focused studies and 'deep dives' on individual options, or types of options, such as metering, leakage and water trading. Results from these studies in combination with outputs of stated preferences and other research are then used to

determine the prioritisation of options, contribute to the triangulation of evidence, and help shape company strategic programmes.

Metering research

This research was intended to understand customers' views and attitudes towards metering. For example, Anglian Water held discussions related to customers' understanding of the benefits and challenges of having a smart meter, their expectations of smart meters and views on compulsory metering. It also gauged through their H2OMG water festival their customers' willingness to have a smart meter fitted. Northumbrian Water conducted research on metering and supply-demand investment priorities with a qualitative (deliberative workshops and face-to-face, in-depth interviews with vulnerable customers) and a quantitative (online survey via online panel, Facebook and Computer-Aided Personal Interviewing) component to understand customer views on metering, installation, reading and billing timescales, and expectations with respect to Northumbrian Water's role in promoting metering (especially to vulnerable customers) and in providing information on smart metering. Severn Trent carried out co-creation sessions on metering and water efficiency. United Utilities carried out a qualitative survey with 1,300 household customers on motivations and barriers to metering and water efficiency, using behavioural economics techniques to analyse results. Welsh Water devoted an exercise in their second stage stated preference research to obtain valuations from customers relating to metering. This exercise gave customers three choices of metering policy and asked which was the most, and which the least, that they would like to see. Finally, SSC carried out a quantitative telephone study with a household sample comprising 202 customers, aiming to understand customer reasons for not switching to a water meter.

Leakage research

This research was intended to understand customers' views and attitudes towards leakage issues and preferences regarding leakage reduction. Companies explored leakage issues extensively and through various means, both as one attribute among others in qualitative and quantitative surveys, or as a central theme in bespoke research. A combination of results from those sources and analysis of information from business-as-usual engagement, company online panels and social media (where leakage was the dominating conversation), companies informed their leakage strategies to align with their customers' preferences. Examples of studies focused solely on leakage include studies by United Utilities, Wessex Water and Yorkshire Water.

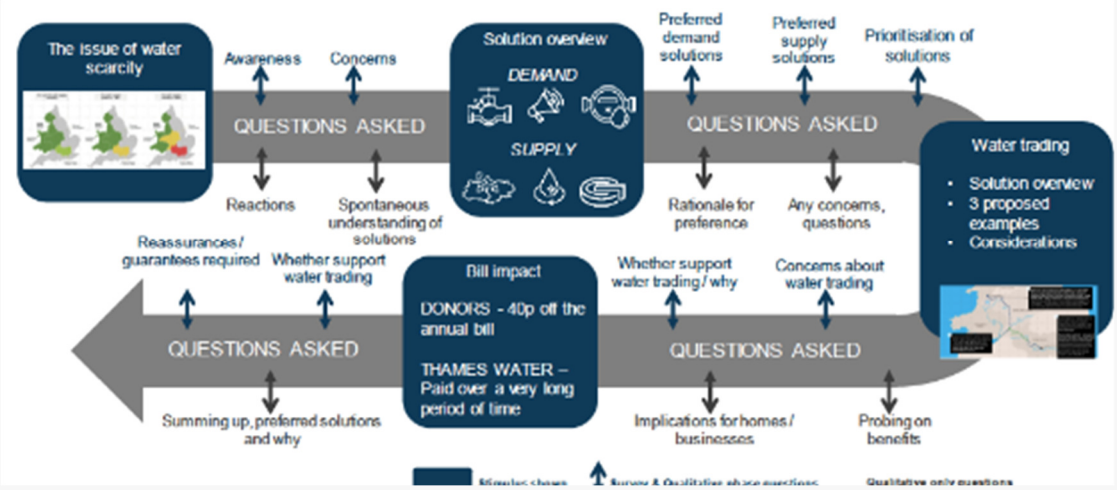
United Utilities and Yorkshire Water used their online panels to carry out quantitative leakage surveys. These sought to find answers as to whether customers think of leakage reduction as an important issue; whether they would be willing to pay extra on their bill to support the reduction and, if so, how much; and, in the case of United Utilities, the perceived impact that leakage reduction activities would associate with the company brand. Wessex Water used co-creation in a series of two-stage deliberative workshops, with the involvement of staff in both stages. The first stage involved communicating and discussing leakage-related information with customers and the second stage involved co-creation of leakage performance promises and communications. Results were tested via interviews with customers, including depth interviews with seldom-heard customers.

Water trading

Some of the companies reviewed have carried out focused research to understand customers' views and attitudes towards water trading. Severn Trent and United Utilities, jointly with Thames Water, carried out research on water trading, transfers and water scarcity with a mix of household and non-household customers. Box 9 provides more details on this study.

Box 9 Severn Trent, Thames Water and United Utilities water trading research, WRMP19

Joint research among Severn Trent, Thames Water and United Utilities used a multi-stage approach involving qualitative and quantitative phases in order to assess customer views on water trading, transfers and water scarcity. The study involved 49 non-household customers in depth interviews, a deep dive with the online community (a total of 173 households) and an online survey with 1,505 household customers. Participants were provided with water scarcity information and asked to choose their preferred among three supply solutions: regional water transfer, water reuse, and the construction of new reservoirs. The insight gathered is based on an informed customer view. The figure below illustrates the questioning and stimulus journey taken by participants.



Water efficiency

Water efficiency is a core part of companies' demand reduction strategies and customers were invited to provide their input in various ways during the planning period. All companies engaged their customers on water efficiency through various means, however this was usually looked at in combination with other, related topics and few companies carried out specific deep dives on this topic.

Severn Trent and United Utilities looked at water efficiency in combination with metering (see earlier section). Severn Trent further engaged Tap Chat, their online community of customers, to help them understand their views and test water efficiency campaign materials.

SSC carried out research on water efficiency and other retail services. This study aimed at an understanding how different groups of customers view water and the wider world and how they respond to propositions around water efficiency. Explored through online and phone interviews, focus groups and a quantitative survey with the focus ranging from general views to deeper exploration of specific responses.

- Stage 1: online and phone interviews with 515 household customers to understand the different views of customers based on their views and attitudes to water and the wider world (covering all key demographic splits and weighted to regional demographics).

- Stage 2: four focus groups to explore differing customer views in greater depth.

- Stage 3: online and phone interviews with 270 household customers to understand responses to selected propositions (covering all key demographic splits and weighted to regional demographics).

Environment and uncertainty

While all companies have carried out research to establish customer priorities in relation to various environmental attributes (for example through valuation studies discussed earlier), one made reference to holding a deep dive. Severn Trent held deliberative workshops and depth interviews to explore customer views and priorities related to the environment, both unprompted and informed. Specific topics discussed included catchment management, the Water Framework Directive (WFD), and biodiversity.

Severn Trent also explored aspects of these topics in its Real Options research. Again, through a deliberative workshop, the company explored which of the approaches it was considering in relation to the WFD and attitudes about responding to uncertainty associated with climate change (among other topics) was preferable for customers. A second part comprised an online panel discussion and two polls to gauge preferences on the approach that Severn Trent Water could take with respect to improving the biological health of rivers over 2020-2025 to comply with the WFD, the supply-demand balance, ensuring water for future generations, and testing different options for how the company might respond to the uncertainty associated with climate change. As the same topics were explored through both the online community and deliberative research, this was an opportunity for Severn Trent to examine whether results are different when customers had a more informed understanding.

The immersive experience workshop session on ecosystem services ran by United Utilities is another example of a focused piece of research on environmental attributes (Box 8).

Acceptability research

Most companies undertook acceptability testing of the potential water resources management programme as part of the business plan process, by obtaining feedback on performance commitments contained in PR19 acceptability linked to the delivery of the WRMP. Business plan acceptability testing involved both qualitative and quantitative components. SSC, Wessex Water and United Utilities structured their overall acceptability testing over two phases: the first phase aimed at collecting feedback on the draft plan, which could then feed into the final plan; and the second phase to test customer support for the final plan. For example, Wessex Water's acceptability testing involved qualitative engagement events depth interviews and quantitative surveys in phase 1, and interviews, surveys and additional engagement through the Wessex Water magazine, online surveys and social media and roadshow events in phase 2. United Utilities carried out research

comprising both qualitative and quantitative components (online and CAPI quantitative surveys, in-depth interviews, focus groups) on the rationale and motivations that underpin responses, and used sliders to test over bill impacts. In the context of the revised draft business plan acceptability testing, 2 plan variants were tested to extrapolate alternative options. Bill impacts were presented in the context of customers' own current bills and included the impact of inflation over the period to 2025. The acceptability of a "reasonable range" of bill impacts as a result of potential outcome delivery incentives to assess levels of acceptability was also tested, using a set potential bill impact range. Yorkshire Water structured extensive qualitative and quantitative research on acceptability testing around its five big goals. Finally, Anglian Water referred to holding acceptability testing at different stages in the WRMP process to obtain feedback, including through deliberative research with the online community following the submission of the draft WRMP. It further obtained feedback on the draft WRMP in meetings with water retailers.

Wider topics with indirect impacts on WRMP

Research on high-level customer priorities

All water companies carried out qualitative and quantitative research to elicit customer priorities for a number of purposes at PR19/WRMP19. Uninformed research was typically used to obtain high-level, top-of-mind/spontaneous customer priorities as a means of understanding customers 'as they are', primarily for communication purposes. Initial research on uninformed, or spontaneous, priorities acted as a precursor to willingness to pay surveys and informed their design.

As an example, one of the avenues which Bristol Water used to establish customer priorities was through qualitative research: three focus groups were held (group 1 comprised customer on a social tariff, group 2 customers who experienced disruption and group 3 was a control group). Topics discussed included open-ended questions (e.g. "what is a water company for?") and a ranking exercise of service attributes (customers were asked to rank their top 10 out of 24 of Bristol Water's service attributes, including reliability, water quality, affordability, leakage, water efficiency, conserving water/education/behaviour change, water meters, hosepipe bans, etc.). Groups were then asked to share the reasons behind their choices, whether these were affected during discussions with other participants, and to state what communication and engagement channels with Bristol Water they preferred.

SSC conducted a foundational qualitative and quantitative research study, focusing on understanding customer attitudes to water; brand and service perceptions of SSC; uninformed and informed views of customer priorities for investment now and in the future; and views around whether SSC offered value for money. SSC then conducted a Customer Priorities survey which resulted in a list of key uninformed priorities in order to validate findings from the foundational research study. The qualitative study covered 52 customers (mix of household and non-household) while the quantitative survey covered 291 household customers.

Following establishing spontaneous, high-level customer priorities, customers were continually asked about their priorities in different contexts to identify any variations. Informed research was thus used for prioritisation over specific policy choices or initiatives, whilst formal economic valuation techniques, including willingness to pay research, were used where cost-benefit analysis was required to set performance commitment levels, and for the setting of outcome delivery incentive rates.

Behavioural segmentation

This type of research aimed at profiling customers to allow a better understanding of their priorities and behaviours relating to water use, the environment and the company, an understanding of what would motivate different customer segments to change behaviours, and assisting companies in viewing the world from their customers' perspective. Anglian Water carried out behavioural segmentation research via a telephone survey with 1,200 customers, followed by qualitative interviews and focus groups exploring segmentation characteristics in more detail. Yorkshire Water's Lifestyles study engaged various customer segments identified in the first stage of the study in innovative consumer reveal workshops and ethnographic amplification depth interviews. The feedback from the reveal workshops and ethnographic interviews was assessed by an anthropologist to determine customers' priorities and preferences for water. Insight from segmentation studies helped create companies' approaches to engaging with customers on various topics.

Vulnerability

All water companies included vulnerable customers, by varying definitions of vulnerability, in their research, tailoring their materials and approach to suit their audience. Most water companies also made reference to the research they conducted in relation to vulnerability issues. This research was intended to understand service experiences and expectations of vulnerable customers, explore if and how current service experiences meet their needs, explore the broad range of customer vulnerabilities and inform a definition for vulnerability that can be used for company services and communications with vulnerable customers, the drivers and barriers of customers joining the existing support schemes, customers' experience of the existing support schemes, consultation with groups and organisations who were working with people in vulnerable circumstances to help companies tailor an effective research strategy for its vulnerable customers and to gain a deeper understanding of the impact of supply disruption on vulnerable customers and other related support requirements. Anglian Water, Bristol Water, Northumbrian Water, Welsh Water, Wessex Water and Yorkshire Water are among the companies that conducted research in this area. Anglian Water further conducted a poll on social media that asked customers if they were willing to pay an additional £2 on their water bill to support more specialist services for vulnerable customers.

Views and expectations on company ambitions and objectives within the long-term strategy plan

Research into customer views and expectations on companies' long-term strategies was carried out via multiple channels, including deliberative workshops, meetings and

interviews, open public qualitative and quantitative consultations, as well as reaching out through online platforms and social media.

For example, Anglian Water carried out a survey to test the acceptability of its strategic direction statement (SDS) and feedback meetings with water retailers including on Anglian Water's long-term ambitions. Northumbrian Water gathered views on its long-term strategy plan through deliberative workshops with current and future customers. Wessex Water tested the acceptability of their SDS through launching a programme of research comprising qualitative deliberative events, group discussions, meetings and depth interviews (in person and telephone), and quantitative interviews via multiple channels, to get a feel for the views of staff, stakeholders, household, non-household and future customers. Bristol Water undertook quarterly surveys with an online customer panel asking questions on meeting the needs of a growing population, improving the environment and water efficiency as key goals for Bristol Water.

Welsh Water carried out open public consultations on the company's Water 2050 vision using both qualitative and quantitative approaches. The qualitative consultation involved focus groups, the quantitative consultation involved reaching out to customers at various public events throughout Wales via surveys on tablets, company website, Facebook 'Chatbot' and paper questionnaires. In all of these surveys, the participants were asked to rate the strategic responses in order of importance out of a scale of 5. Different groups were engaged via different means in this consultation: expert attendees through 1-2-1 meetings and stakeholder workshops; interested / informed customers through the online community, open consultation and focus groups; and uninformed customers through the website, the chatbot, and presence at various events.

Along a relevant vein, on the long-term outlook Severn Trent undertook deliberative research with a representative sample of the online community on intergenerational fairness to explore how to ensure a fair balance of charges over time, and between generations.

3.4 Industry feedback

What worked well

Research by Ofwat and CCW highlights insights from PR19 consumer engagement. Albeit recognising the strides taking place in some cases in comparison to PR14, they both acknowledge that there is still room for improvement.

Overall approach to customer engagement

Water companies stepped up their engagement activities over the last 10 years to involve their customers in making decisions that would help develop and sense-check a plan for company activities in delivering their services. In PR19, customer engagement and research activities reached a larger number of customers, using a wider range of engagement techniques, over a more extended period of time, thus creating a more informed cohort of customers involved at various stages throughout the operating cycle and not just for plan milestone purposes. Companies brought together data from alternative sources to construct more solid bases for decisions, including data from

business-as-usual interactions, and customer views took a more central place in crafting strategies and solutions.

Understanding customers

For the most part, companies were more mindful of differences among customer segments and made efforts to ensure that the views of those less likely to engage were included in their research. Positive developments in this space include reducing non-response bias (more consideration on how to involve seldom-heard customers) and reducing recall bias (more use of observational research to understand customer behaviours and attitudes around water and the water environment) (CCW 2020b).

Companies extended their definitions of vulnerability to consider income, physical health, mental health and other indicators of vulnerability. Companies also made efforts to include the views of seldom-heard consumers in their research. Good examples of altering their approach to understand and interact with their customers better come from Dŵr Cymru Welsh Water and Hafren Dyfrdwy, which offered welsh language engagement, and Severn Trent Water, which translated willingness to pay and acceptability surveys for face-to-face research in areas where the census showed higher % of people not speaking English to a high level (CCW 2020b).

Companies also utilised more observation and ethnography research approaches to better understand how customers engage with water and water services in their daily lives and what are the factors shaping this. Good examples on this come from Yorkshire Water, which carried out a lifestyles research using ethnographic depths, comprising behavioural and video diaries, to explore the role water plays in the lives of households, while also including minority ethnic groups to understand how religious and cultural needs interact with water use; and United Utilities which spent time with people in their home to gauge what people felt was important around different themes linked to water (CCW 2020b).

Improving research methods and engagement approaches

Albeit with some way still to go, at PR19 research evolved to help ensure that findings are a better, more accurate reflection of customer beliefs and preferences. This was achieved by validating, sense-checking and making the research process itself more interesting, rewarding, and easier to engage with for participants (CCW 2020b). Examples of this are:

Valuation research: The water industry is well-versed in carrying out qualitative and quantitative surveys, focus groups and interviews. Companies use multi-stage valuation research, which provides them with more data points for validation and triangulation. Typically, valuation approaches included both revealed and stated preference studies. As an example, Yorkshire Water found a way of combining revealed and stated preference findings (CCW 2020b).

Sense-checking: Some companies, recognising the complexity of business plan development, sense-checked aspects of the plan with customers to ensure that the plan reflected customer views and that it was acceptable to them. For example, Bristol Water and South Staffs re-tested aspects of their plans throughout development with the same group of consumers, while South West Water used playback sessions, playing results from

one or more studies of customer views to new groups of customers as a way of challenging findings (CCW 2020b).

Making research methods more engaging: There is some progress made towards making customer-facing research more engaging, through the use of more creative, observational behaviour-based techniques, immersive exercises, gamification/interactive graphical interfaces, co-creation settings, and putting more thought into the presentation of materials presented to customers (e.g. by using graphic designers and by testing materials with staff, CCGs or a smaller customer group before kicking off the research). South Staffs has done this by using immersive events for future customers (16-18 year-olds), and using a 'top trumps' card format to help people engage with investment choices in the context of a deliberative research workshop. Other examples include those of United Utilities, which used role-play to engage people in thinking about long-term water supply interruptions, and South West Water which developed a personalized interactive video tool sent to customers via email or text messaging to gather customer feedback on the balance of supply/demand options and the future use of water resources.

What didn't work so well

Quality of customer engagement research

The quality of research was variable across companies, leading to concerns about outputs. There were examples where customers struggled to engage with the research, either because the topic of engagement was overly complex, technical and/or not directly customer-focused, or because the research method and materials used themselves were overly complex, such as a willingness to pay survey where respondents are required to assimilate large amounts of information (CCW 2020a, Ofwat 2020a). In such cases, only a small number of people felt comfortable enough to answer complex surveys with lots of service aspects and service levels or linked to long-term challenges; most people would prefer to have those considered and decided upon by experts or to receive better information in order to enable them to participate more meaningfully (CCW 2020b).
In addition, research tailored to meet the needs of non-English speakers and different ethnic communities was generally limited (CCW 2020a).

The Competition and Markets Authority raised concerns over the extent to which customers can be reasonably expected to have meaningful contributions to complex technical matters as well as the validity of research methods (Ofwat 2020b).

Approaches and methods

There was diversity in the research techniques applied at different times, such that the methodologies and approaches selected for individual studies were not comparable across the sector (CCW 2020a). With respect to co-creation, it is not clear whether companies interpreted the essence of this approach consistently (CCW 2020b).

Large differences were observed among companies for willingness to pay estimates on a significant number of the same or similar types of attribute, pointing to differences in methodology as the underlying factor (Ofwat 2020a,b). Sometimes, the selection of an inappropriate methodology meant that disproportionate effort would be placed in a research project that informed a very small subset of outputs (CCW 2020a).

Use of outputs

Lack of clarity has been observed regarding the use of results. How research and engagement outputs and findings are used to inform and influence the plans, and how they are combined with other evidence in the process of triangulation, tends to not be fully outlined and remains an implied topic in several plans (CCW 2020a,b, Ofwat 2020a,b).

4 Requirements for WRMP24

4.1 Introduction

This chapter reviews the requirements for WRMP24, as set out in statutory guidance, UKWIR guidance, CCW and Ofwat expectations, and the method statements of the regions to which SSC belongs. It begins with an overview of the requirements for WRMP24 before reviewing each set of guidance individually, and finally summarising the implications for South Staffs Water and Cambridge Water customer engagement for WRMP24.

4.2 Overview of requirements for WRMP24

Statutory requirements for WRMP24 in the context of customer engagement and research are laid out in the joint EA-NRW Ofwat Water Resources Planning Guidance (WRPG). This is currently still in draft form (version reviewed: v6.8, July 2020) with a final version expected imminently. Water companies are responsible for involving customers, interested parties, statutory and non-statutory consultees throughout the planning process; ensuring that their plan is communicated clearly and transparently, notifying all stakeholders of any material changes in the plan development period; taking into account customer preferences in their plan; demonstrating how they have done so; and demonstrating customer and stakeholder support for their plan.

Companies should engage at an early stage with their board, regulators, customers and interested parties, especially if the plan is expected to be complex or include significant change (pre-consultation stage). Engagement should continue throughout the development of the plan and relevant information should be presented in the context of the previous WRMP and business plan, and any significant changes or variations in thinking prior to draft plan submission should be discussed with customers. Customer and stakeholder engagement should align across the WRPM, business and, where applicable, regional plans, and preferences identified as part of the WRMP process should be reflected in the business plan.

Companies need to adhere to good practice principles on communicating resilience risk and demonstrate how they have taken customer views and requirements into account in developing their level of service. They will also need to be able to evidence customer and stakeholder support for their long-term environmental destination, level of ambition, and decisions/proposed solutions on how these can be achieved.

Consultation must take place after the draft WRMP is published. Companies need to share the draft plan with all other organisations involved in the pre-consultation discussions. The draft WRPG also urges companies to consider the following, as suggestions towards continuing the engagement with customers, stakeholders and other parties in that stage:

- offering to explain the plan to established groups, known interested parties or companies within their area
- including an engaging summary of the plan which clearly sets out proposals to customers in plain language
- holding virtual events, roadshows or exhibitions conducting questionnaires to gain views on company proposals, using phone or in person surveys or other recognised survey techniques
- using social media to highlight the consultation
- using innovative web-based engagement
- organising joint communications with other companies.

Full details can be found in EA/NRW/Ofwat's draft WRPG.

In comparison with the previous WRPG guidelines from 2017, the key changes for the latest round of plans are that water companies should:

- take account of regional plans and the National Framework for water resources planning
- plan to provide a long-term destination for the environment by reducing abstraction where it is causing the most environmental damage
- be resilient to any drought of a return period of once in 500 years
- use natural capital in decision-making and provide environmental net gain through their WRMPs.

With regard to regional planning, guidance is provided within the National Framework (EA 2020a, Appendix 2). The key aspects of this guidance are outlined in Section 4.3 below.

In relation to setting a long-term environmental destination, the EA has again produced separate guidance (EA, 2020b). This applies to both regional groups and water companies. The key aspects of this guidance are outlined in Section 4.4 below.

In the next part of this section, we then discuss the requirements of regional groups and water companies in relation to Best Value Planning (4.5). The ultimate objective of the planning process is that it should culminate in a best value plan, as distinct from a least cost plan, and the WRPG includes specific guidance on what this requires of companies and regions. Furthermore, a recent UKWIR study focuses on this topic, providing a framework for Best Value Planning that can be used by regional groups and water companies for WRMP24 (UKWIR, 2020). Section 4.5 provides an overview of the guidance in this area, and the UKWIR framework, particularly in relation to the requirements they make for customer engagement.

The Best Value Planning framework encompasses the need to consider the expectations of regulators and customer representatives in relation to customer engagement. Ofwat and CCW have recently published a suite of documents concerning their expectations for PR24 customer engagement. Given the integration between the WRMP and the broader business plan, these expectations represent an important set of requirements in relation to customer engagement for WRMP24. These expectations are integrated into the discussion around best value planning in Section 4.5.

Given the close links between regional and company plans, the methodologies and timings of Water Resources West (WRW) and Water Resources East (WRE) are particularly pertinent to South Staffs Water and Cambridge Water WRMPs respectively. Sections 4.6 and 4.7 therefore provide details of WRW and WRE regional planning methods, as drawn from the method statements published by these two regional groups.

A final aspect of guidance that it is important to note in relation to WRMPs is that the EA has recently published (11 Feb 2021) a consultation on the determination of water stressed areas in England, which now includes both South Staffs Water and Cambridge Water in the list of water stressed areas. Previously neither of these areas were classified as seriously water stressed. The implication of this change in status, should it be confirmed following the consultation, is that both areas will be required to evaluate compulsory metering alongside other options through their WRMPs.

Section 4.8 concludes this chapter with a summary of the guidance in relation to how SSC needs to engage with customers for WRMP24.

4.3 Regional water resources planning

Following the National Framework (EA, 2020a), five regional bodies are currently in the process of producing regional water resources plans for the first time. Each regional plan must deliver:

- a resource assessment, that informs a statement of need for the region - this will include scenarios exploring key challenges and sensitivities
- a statement of ambition and agreed regional policies and principles
- a list of options considered to resolve deficits both within a region and to contribute to the national need
- the preferred plan, identifying the best value strategic options to meet multi sector water needs. (EA, 2020a)

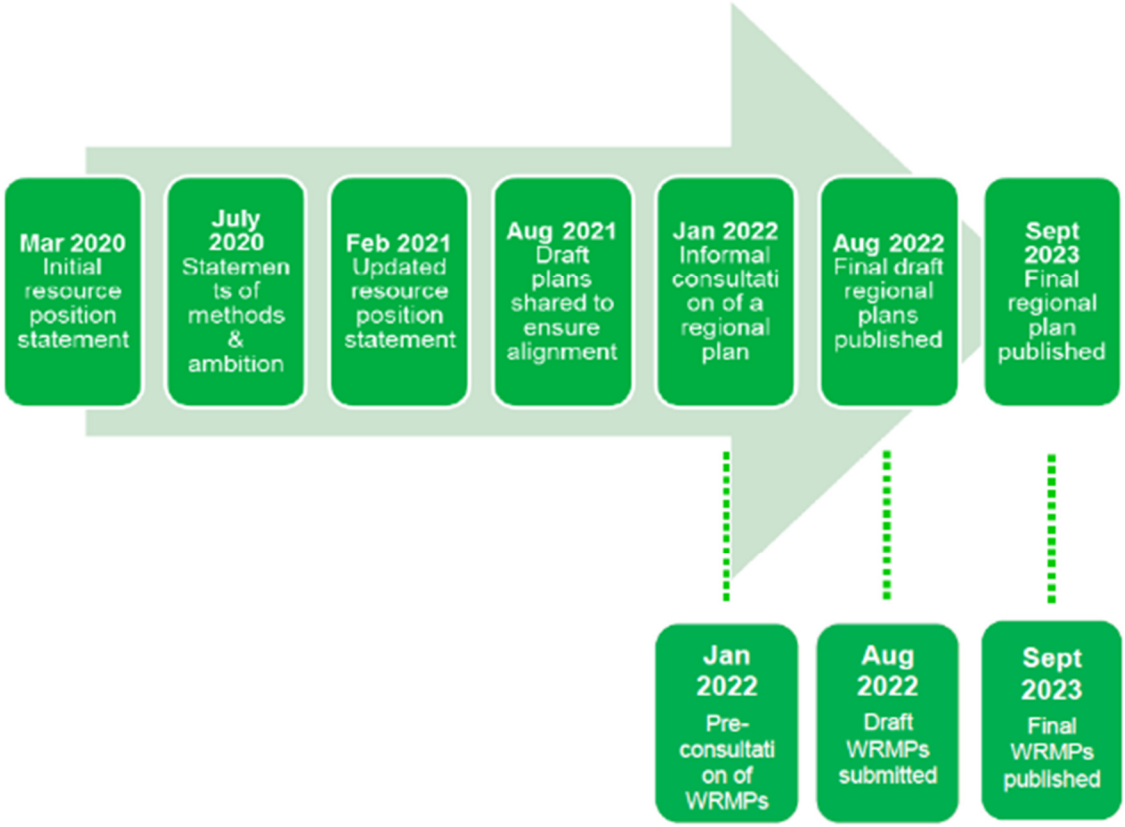
The methods being used to develop regional plans vary across the regions. The following figure, extracted from EA (2020a), lists the actions that must, should and could feature in regional plans.

Figure 3 Regional plan requirements

Source: EA (2020a) Meeting our future water needs: a national framework for water resources, Appendix 2, p.9

Given that regional plans 'must' be reflected in WRMPs, the methods, activities and timings of the regional plans relevant to SSC are critical aspects of the context within which SSC WRMP customer engagement and planning is to take place. The following figure provides the overall high-level timetable for regional and company WRMPs. More detailed timescales and methodologies concerning the two regions relevant to SSC are discussed further in the sections below.

Figure 4 Timescales for Regional and Company WRMPs



Source: EA (2020a) Meeting our future water needs: a national framework for water resources, Appendix 2, p.16

As the above figure shows, two key initial stages of the regional planning process have already passed: the 'Initial resource position statement' (March 2020), and the 'Statements of methods & ambition' (July 2020). By the end of this month (Feb 2021) an Updated resource position statement' is required and, following this, an initial draft regional plan is to be produced by August 2021 for sharing with other regions to ensure alignment. Further key dates include an informal consultation with stakeholders in January 2022, alongside pre-consultation by companies on their own WRMPs. Then, the key dates are August 2022 for both the full draft regional plan and full draft company WRMP. Consultation will then take place, and be responded to, prior to an expected publication date of September 2023 for the final regional plans and company WRMPs.

With regard to customer engagement, the guidance simply states that this is a matter for individual regional groups to determine how and to what extent they engage with customers at the regional level.

Both WRW and WRE regions have produced method statements including details of their proposed approach to customer engagement. We provide a high-level overview of how the WRW and WRE regional plans are being put together, with a focus on how customer engagement is proposed to be managed, in sections 4.6 and 4.7 below. First, however, we discuss guidelines applying to all regions, and companies, in relation to Environmental destination and ambition and Best Value Planning, again with a focus on the aspects relevant to customer engagement.

4.4 Environmental destination and ambition[3]

A key requirement within the EA regional planning guidance is that '*regional groups must work with regulators and other partners to develop a shared long-term destination on environmental ambition. This should ensure no deterioration, address unsustainable abstraction and improve environmental resilience in the face of climate change. The groups must develop a plan setting out actions they will take to reach the destination*'. (EA 2020a, App.2, p.11)

Further guidance on how this is to be achieved is set out in the EA supplementary guidance on 'Long-term water resources environmental destination' (EA, 2020b). This guidance makes clear that setting the environmental destination is a matter for regional groups, rather than companies individually, but that companies will be required to reflect their region's environmental destination in their WRMPs. It also makes clear that the environmental destination must be accompanied by a set of actions, prioritised over the short, medium and long-term, to achieve this destination.

With regards to engagement, the supplementary guidance is entirely focussed on regulators and stakeholders and is largely silent on the matter of customer engagement. The only cases where customers are explicitly mentioned in the guidance are the following:

- 'Your long-term planning should also consider enhanced protection for local priorities where your engagement indicates there is stakeholder support to do so. Where this requires water company action it should include support from water company customers.' (EA 2020b, p.10)

- 'Where your long-term destination has implications for water company operations, you should discuss proposals with regulators to ensure the costs and benefits of water company investment represent best value for water company customers.' (EA, 2020b, p.14)

More generally, however, customer engagement is required within the core WRPG on all aspects affecting the content of the plan, and its cost to customers, and the level of environmental ambition, and potentially also the prioritisation of actions to achieve the environmental destination, falls within this category. There would therefore seem to be an expectation, even if not explicit, that customers should be engaged around these topics.

In terms of timings, regional bodies are required to propose and agree a long-term environmental destination in time to inform the Resource position statements, which are due by the end of February 2021. These will then be used to develop the initial draft regional plan due in August 2021. Following this, however, there is an opportunity to engage with customers on this topic as an input into the full draft regional plan due in August 2022.

[3] Term disambiguation: 'Environmental destination' refers to the total volume of sustainability reductions, while 'environmental ambition' refers to the rate at which these are delivered.

4.5 Best Value Planning

The draft WRPG includes a supplementary guidance note focused on best value planning for regional and company water resources plans. This guidance instructs planners to undertake the following to develop a best value plan (EA 2020c, p.2).

- Set clear objectives for your plan
- Identify a range of best value metrics
- Consider a wide range of options
- Carefully consider the application of policy aims
- Robustly and transparently apply your best value metrics
- Undertake effective engagement
- Account for geographical scope and deliverability
- Appraise and compare the differences between programmes
- Present and justify your preferred plan clearly

The draft WRPG (Section 9 – Decision making) contains suggestions for consideration with respect to best value metrics, and companies and regional bodies are encouraged to consider a wide range covering, but not limited to:

- environmental improvements
- biodiversity
- non-drought resilience such as water supply system resilience
- social benefits such as public health, well-being, and recreation
- economic factors such as affordability, distributional impacts, local regeneration and economic growth

The guidance does not provide detailed expectations regarding the customer engagement that is required to deliver a best value plan. It simply states:

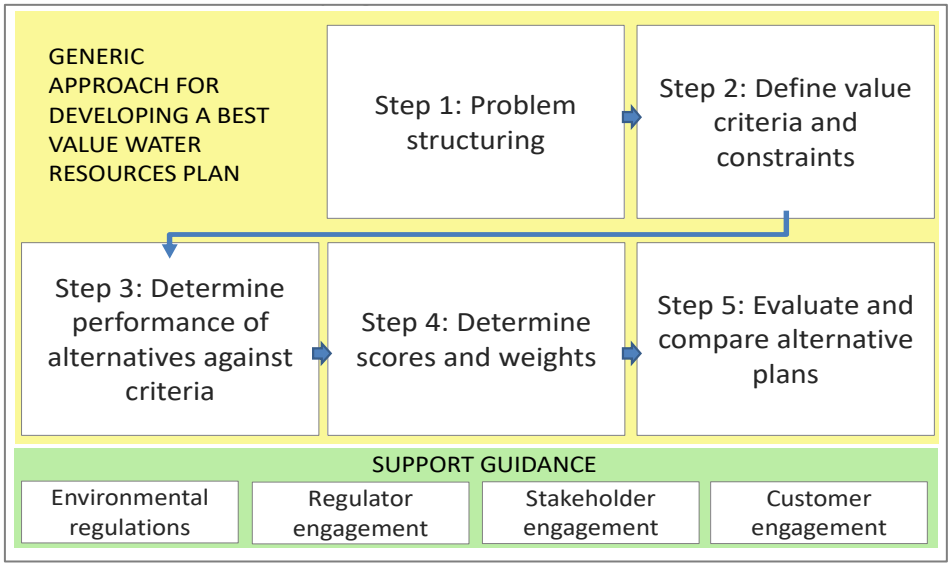
Your plan should transparently demonstrate effective engagement with regulators, stakeholders and customers at key stages throughout the development of the plan. Your proposed approach to best value planning should be part of the information you present at the pre-consultation phase and you should continue your engagement the development of your plan.

The costs and benefits of the preferred programme and alternatives, including comparison to the least cost programme benchmark must be clearly presented to regulators, stakeholders and customers. It should be clear how this engagement has informed the decisions made within the plan. (EA 2020c, p.4)

The recent UKWIR Best value planning (BVP) framework (UKWIR 2020) provides more detailed guidance on how companies and regions should develop a best value plan, including detailed guidance on customer engagement. The EA supplementary guidance notes that this framework might be found to be helpful to develop a best value plan but that planners do not need to use it.

Figure 5 provides an overview of the UKWIR BVP framework. The framework is consistent with EA guidance, and contains similar elements. These include: Step 2: Define value criteria and constraints (Identify a range of best value metrics); Step 3: Determine performance of alternatives against criteria (Robustly and transparently apply your best value metrics); and Step 5: Evaluate and compare alternative plans (Appraise and compare the differences between programmes). Both also emphasise the need for effective engagement.

Figure 5 UKWIR (2020) Best Value Planning Framework



Source: UKWIR (2020) Deriving a Best Value Water Resources Management Plan: Final report

With regard to customer engagement, UKWIR (2020) provides detailed guidance, which itself is based, in part, on a review of guidance from Defra, EA, Ofwat, CCW, and previous UKWIR reports (UKWIR, 2011, 'Customer Involvement in Price Setting' and UKWIR, 2016, WRMP Methods: Decision-making Process Guidance'). In the following, this guidance is reproduced but supplemented with recommendations arising from more recent reports by CCW and Ofwat. Many of the recommendations are overlapping, but references are given in the following with respect to the primary source of the recommendation.

Companies should own the engagement process with their customers

Companies should take responsibility for their relationship with their customers (Ofwat 2020b) as they are in the best position to know their customer base and the specific supply-demand balance circumstances in which they operate. They are therefore best placed to design and implement research programmes tailored for the audience they want to engage and determine how to use the evidence obtained. Guiding principles can be useful in informing the research design but cannot, and should not, be fully prescriptive (UKWIR 2020).

Companies should consider collaborative research with other companies

Companies should consider collaborating with other companies on shared challenges and, where practical, conduct joint research with other companies or participate in joint industry research (UKWIR 2020, CCW 2020b, Ofwat 2020a,b). There are multiple merits to this approach:

- Comparability/consistency of outputs: using the same or similar questions and methodology would result in greater consistency and comparability of research outputs (UKWIR 2020, CCW 2020b, Ofwat 2020b). This could, in turn, be beneficial at the regional planning level, as it would create the grounds for a smoother integration between company and regional plans (UKWIR 2020)

- Enhanced understanding: more collaborative research could help the industry gain a deeper and better understanding of customer attitudes and behaviours, and how these can be influenced (CCW 2020b)

- Cost-effectiveness: sharing research costs could help reduce the research gap between larger and smaller companies, thereby improving smaller companies' access to insights that resource constraints would otherwise deprive them of (CCW 2020b). As costs would be reduced for everyone, this could potentially free up funds that could be directed towards exploring further company-specific issues (UKWIR 2020)

- Innovation & sharing of innovation risk: collaboration would help share knowledge, balancing the quality of insight between smaller and larger companies, and create fertile ground for innovation (CCW 2020b, Ofwat 2020b).

Statements and measures of customer preferences should be independently verified

Companies should be able to provide assurance that plans are correctly representing their customers' views (Ofwat 2020b). To this end, companies should seek to obtain an independent statement of assurance on the quality of their customer engagement and the degree to which this has informed the WRMP. The body carrying out independent scrutiny, challenge and verification of companies' approaches, and results could be found in CCGs, where in place. Where CCGs are not in place, are unavailable, or where the company or key stakeholders consider the CCG to be inappropriate for this purpose, independent assurance by another means should be sought. Having this independent scrutiny, challenge and verification process in place is likely to be beneficial in the context of any dispute over how customers' views have been taken into account in the WRMP (UKWIR 2020).

Note that Ofwat outlines how and why CCGs did not always work well in PR19 and how their function could be improved in PR24 (Ofwat 2020b).

Customer engagement for water resources planning should be joined up with broader business planning engagement and incorporated into a wider strategic framework

In England and Wales, WRMPs feed into business plans; and outcomes determined for the water resources plan also impact on the business plan and vice versa. Multiple overlapping issues, such as trade-offs between quality of service, environment and bill levels, affect both plans. Moreover, both plans are potentially influenced by companies' broader strategies and ambitions, and regulator expectation. Accordingly, engagement with customers on the water resources plan must be considered as part of a broader integrated customer engagement strategy (UKWIR 2020). CCW recommends that a framework for water company research is developed, based on three strands of public engagement: on-going research and engagement to understand customer views; business planning research; and on-going community engagement (CCW 2020c). Proportionality of effort vs. plan influence potential should be considered as part of the future customer strategy development (Ofwat 2020b).

Companies should be transparent on how engagement informs their WRMP/business plan

Companies are encouraged to be clear and transparent on how engagement has informed and influenced the WRMP and business plans. Where it has not been possible to act on the findings or where a piece of research has not achieved its objectives, this too should be reported and lessons learnt extracted (CCW 2020b). This transparency can boost customers' and communities' confidence that companies listen and respond to their needs (Ofwat 2020b).

Companies should give focus to ongoing and business-as-usual engagement

Companies should give focus to ongoing and business-as-usual engagement as a means to maintain an ongoing dialogue with customers, monitor changing preferences and needs, and obtain an additional dataset that can inform decisions at all stages of the planning cycle. This is particularly important in terms of continuously improving services, and mostly in terms of understanding the needs of customers in vulnerable circumstances or those who need accessible services, who should not have to wait for comprehensive pieces of research that are typically triggered by WRMP and business plan requirements (CCW 2020b, CCW/Blue Marble 2020).

Customer engagement strategy design should aim to reduce complexity and create a better experience for participants

Water companies should engage with customers at a level appropriate to their (lack of) subject matter expertise (UKWIR 2020). Companies should innovate in finding ways to reduce research complexity and making research meaningful for participants4. Research materials should be tailored to the level of detail and complexity that is appropriate for the customer segment they engage with at any given occasion. In particular, research and engagement should be made more accessible to seldom-heard groups and the implications where there is low representation of these should be considered (CCW 2020b).

Companies should consider the wider public value they can deliver through the WRMP

Customers, stakeholders and the wider community increasingly hold companies accountable with respect to the wider direct and indirect, negative and positive impacts in which their operations can result. Water companies have the potential to broaden the value that they can deliver to communities and the environment through their activities and Ofwat recommends that they do so, including in the context of customer engagement. Meanwhile, the national framework for water resources notes that every decision (in water resources planning) should be seen as an opportunity to add value to society and improve the environment (EA 2020).

Companies, communities and stakeholders should input into the public value choices and decisions companies make. Tools such as the customer measure of experience (C-MeX) could have a helpful role to play in driving public value outcomes, which are likely to be context-specific and evolving in response to events and changing societal expectations

[4] Industry research has identified five elements that make research more meaningful for participants: ease; relevance; listening; making a difference; financial incentive (see CCW/Blue Marble 2020).

(Ofwat 2020c). Companies are hence encouraged to consider people's views as citizens as well as their views as customers (Ofwat 2020b).

Subject to the above, the design of customer research programmes, and engagement materials, should adhere to best practice principles

Principles of good practice for customer engagement are set out in a number of sources (UKWIR 2016, Defra 2016, Ofwat 2016, Ofwat 2019, CCW/Blue Marble 2020), as well as recommendations derived from research following the conclusion of WRMP19 planning cycle. Companies should adhere to best practice principles in the design of engagement programmes, projects and materials, and in the analysis and application of results. A summary of recommendations is set out in Table 2 below.

Table 2 Principles of good practice in customer engagement for water resources planning

Companies are encouraged to explore alternative and complementary tools to validate and test results from stated preference WTP surveys, to make more use of evidence obtained through day-to-day contact with customers and consider using more innovative and frontier-shifting approaches to customer engagement. (Ofwat 2016)
Promoters should consider how to improve the ability of customers to shape and challenge future business, water resources and regional plans; draw lessons learnt from customer engagement to date and propose best practice that can feed into the development of a consistent approach to customer research across water companies. (derived based on Ofwat 2016 and Ofwat 2019)
Companies should own the engagement process with their customers. (UKWIR 2020)
Companies should consider collaborating with other companies. (UKWIR 2020)
Customer engagement for water resources planning should be joined up with broader business planning engagement. (UKWIR 2020)
Statements and measures of customer preferences should be independently verified. (UKWIR 2020)
The processes set up for periodic reviews (such as the role of CCGs) should be utilised to add value. (UKWIR 2020)
Companies should engage with customers at a level appropriate to their (lack of) subject matter expertise. (UKWIR 2020)
Companies should prioritise the respondent experience (better tailoring of materials and methods to different segments, improvement of appeal, comprehension and therefore effectiveness of surveys and stimulus materials). This kind of research also serves to build the sector's reputation. (CCW/Blue Marble 2020)
Companies should place greater emphasis on describing the context and relevance of every research exercise to respondents, give clarity and communicate on how the research will be used and create feedback loops to show how respondents' views have been used. (CCW/Blue Marble 2020)
Companies should rebalance the use business-as-usual research to inform complex decisions – especially for hard-to-reach consumer segments. (CCW/Blue Marble 2020)
Companies should focus on understanding customers' perspectives on issues pertinent to planning to obtain insight that will allow planning in a consumer-centric way, without needing to test every aspect with large scale samples. (CCW/Blue Marble 2020)
Companies should place greater emphasis on ensuring participants are well-informed as part of conducting meaningful research. (CCW/Blue Marble 2020)

Companies should design and analyse future-focussed objectives with care (rooting research in consumers' current and historic experiences, and extrapolating from this where necessary, may be more valid in some instances). (CCW/Blue Marble 2020)
A greater emphasis is needed on describing the context and relevance of every research exercise to respondents (CCW/Blue Marble 2020)
Companies should use deliberative approaches to understand broad principles consumers want to see upheld, rather than seek consumer sign-off on complex and technical aspects of a plan. (CCW/Blue Marble 2020)
Companies should make greater use of 'expert consumers' and true 'co-creation' methods. (CCW/Blue Marble 2020)
Companies should be transparent on how engagement informs the business plan, so the extent of consumer influence is clear. If not possible to act on research results, clarify this and share lessons learnt. (CCW 2020b)
Companies should place more focus on business-as-usual engagement, especially for those in vulnerable circumstances. This would transform their engagement to an on-going dialogue where needs would be better understood, and services improved appropriately. (CCW 2020b)
More collaborative research among companies would support innovation, reduce the research gap between smaller and larger companies, and introduce consistency in research outputs to support regulation. Share innovation risk through collaboration and help smaller companies improve their quality of insight. (CCW 2020b)
More water companies should publish the original research materials and related research reports in full on their websites, as well as learning points. This will help inform the development of industry research. (CCW 2020b)
Companies should consider innovative ways of reducing complexity for customers and creating a more aware customer base. (CCW 2020b)
Research and engagement should be made more inclusive and accessible to seldom-heard groups, by tailoring them to their audience. Companies should consider the implications where there is low representation of these. (CCW 2020b)
Companies should do more to draw on ideas in other sectors that transfer to water effectively to strengthen customer engagement in the water sector. (CCW 2020b)
Consumers should be asked about the things which are most important to them in the right way, either by using qualitative approaches which inform people to come to a meaningful view, or by adapting surveys to be the right level of detail for the average consumer to give a meaningful response. (CCW 2020b)
Engagement for business planning and business as usual [and water resources management planning] should sit within a wider strategic framework. (CCW 2020b). A proposed framework for water company research is based on three pillars of public engagement: on-going research and engagement to understand customer views; business planning research; ongoing community engagement. (CCW 2020c)
Of what principles on how customer evidence might be used to inform future price reviews: enable companies to take responsibility for their relationship with their customers; recognise similarities and differences in needs and expectations of customers and communities; foster collaboration among companies; promote transparency; increase proportionality of research projects; broaden the scope of value delivered to wider public value. (Ofwat 2020b)
Companies should engage customers on long-term challenges and consider the needs of future customers, do more to meet the long-term challenges ahead, and ensure that action is taken to deliver for future generations as well as current ones. (Ofwat 2020b)
Water companies should deliver outcomes that customers and society value at a price they are willing to pay. (Ofwat 2016)

Customer engagement is essential to achieve the right outcomes at the right time and at the right price. (Ofwat 2016)
Continuous engagement is required to enable understanding on what customers want and respond through plans and ongoing delivery. (Ofwat 2016)
It is the companies' responsibility to engage with customers and to demonstrate that they have done it well. (Ofwat 2016)
Engagement must be carried out in such a way that customers and their representatives are able to, and do, challenge the companies throughout the process. (Ofwat 2016)
Engagement is not a 'one-size-fits-all' process but should reflect the particular circumstances of each company and its various household and non-household customers. (Ofwat 2016)
The final decision on price limits is entrusted to Ofwat, who will use a risk-based approach to challenge company plans if this is necessary to protect customers' interests. (Ofwat 2016)
Companies should use a robust, balanced and proportionate evidence base. Stated preference willingness to pay (WTP) approaches have an important role to play, however it is also important for companies not to place sole or disproportionate reliance on such methods. (Ofwat 2016)
Customer engagement to be thought of as a continual and ongoing process of learning and responding. (Ofwat 2016)
Ensure a two-way and transparent dialogue: educate customers as well as seek feedback from them. (Ofwat 2016)
The process should be designed to enable a deep understanding of the needs and requirements of different customers. (Ofwat 2016)
Customers should be engaged on longer-term issues, including resilience. (Ofwat 2016)
Companies should explore ways to involve customers in service delivery. (Ofwat 2016)

UKWIR (2020) Recommendations for incorporating customer preferences in the water resources plan

In line with the principles above, the key recommendation with regard to incorporating customer preferences in best value water resources plans (WRPs) is that decisions regarding topics to be covered and research methods should be developed individually by each company, or region, subject to independent review and challenge by a neutral body. CCGs could play a key role here; however, where this is not possible for any of the reasons outlined earlier, promoters should obtain independent verification via an alternative means.

This work can be compiled in a separate report (or Annex) for submission alongside the draft WRP, and an updated report for publication alongside the final WRP. The report could contain the group's (or other body's) independent assessment of the quality of the company's customer engagement in relation to its water resources plan, and its assessment of how well the results of this engagement have driven decision making within the water resources plan.

Reports relating to the customer research programme of member companies could serve a useful purpose at the regional level, in helping to ensure that each company's customer preferences are reflected in the regional plan.

Notwithstanding the need for promoters to design their own customer engagement frameworks and for independent bodies to contribute and challenge, it is recommended that the following outputs are sought, as a minimum, to feed into company and regional water resources plans.

- Qualitative insight to support development of metrics for customer evaluation of value criteria and measures (Step 2 of the best value plan framework)
- Quantitative measures of customer preference across value criteria, e.g. via discrete choice experiments. This will establish customer trade-offs between, for example, cost and environmental benefit and/or direct preferences across option types (Step 4 of the best value plan framework)
- Quantitative acceptability testing of draft/final plans (Step 5 of the best value plan framework).

The first two of these, potentially alongside additional outputs relevant to the company in question, may be used within the decision-making framework to arrive at a best value WRP incorporating customer preferences. Acceptability testing is then to be undertaken following development of a draft WRP to test and refine it prior to finalisation.

In line with the principles set out above, it is particularly important that promoters should engage with customers at a level appropriate to their (lack of) subject matter expertise. Accordingly, it is likely that the descriptions of options and value criteria will need to be tailored to be appropriate for use in customer research; for example, by simplifying or aggregating technical measures of environmental impacts to a format with which customers can meaningfully engage. Doing so does not, however, preclude the use of more sophisticated criteria when engaging with informed stakeholders and regulators, and when internally appraising the performance of alternative plans.

Ideally, acceptability testing would be undertaken jointly with the business plan to ensure that the full bill impact associated with the business plan is considered when testing the acceptability of the WRP. However, draft WRPs are published for consultation well before submission of the company's business plan to Ofwat in England and Wales. Additionally, companies' expectations of the likely bill impact and content of the business plan may be substantially different at the time of consultation on the WRP. This may make it unhelpful to include companies' expectations within a WRP acceptability research instrument. Consequently, we propose that the WRP acceptability testing is conducted independently of the broader business plan acceptability testing.

The above outputs are not intended to be considered as sufficient for a company. Rather, they are the minimum types of study a company would be expected to deliver as part of a broad and deep engagement programme to fully understand its customers' preferences, priorities, needs, requirements and behaviours.

4.6 WRW methods

Overall approach

The overall approach to developing WRW's regional plan is 'bottom up', with each company developing its own plan according to a shared set of technical approaches and the regional plan then being comprised of the amalgamated set of company plans. The needs of other abstracting sectors will be considered in parallel. This contrasts with the WRSE approach, for example, which is based on a top-down regional planning model covering all companies and sectors.

Alignment will be achieved in the WRW region via an iterative process whereby cross-zonal options, where selected by one company, would be treated as fixed for the source company and evaluated. This should continue to iterate, within and across regions, until no further import/export or joint options are identified.

WRW have adopted the following principles for the regional plan, as shown in Figure 6.

Figure 6 WRW regional plan principles

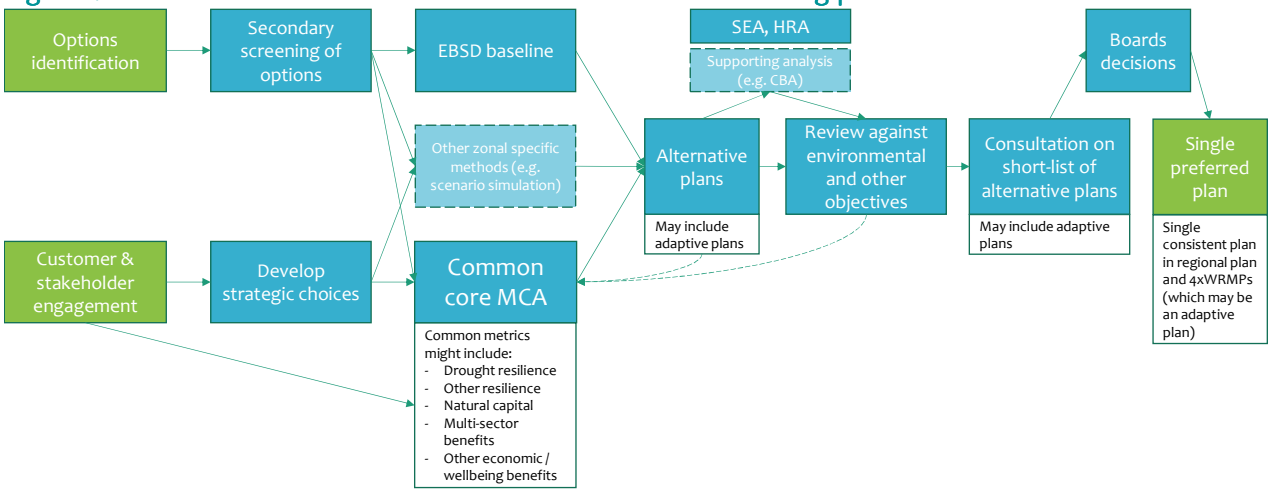
1.	Consistency between WRMPs and Regional Plan, with consistent inclusion of schemes which bring joint benefits, (noting that some non-PWS only schemes may be in the regional plan but not WRMPs)
2.	Accountability for statutory WRMP is with Water Company Boards
3.	Elements which need to be aligned for effective regional planning are agreed up front
4.	Companies commit to aligning WRMPs for the agreed elements
5.	WRMPs and the regional plan are developed together by companies on a zonal basis
6.	Fully involve non-PWS sectors to ensure their sector needs are reflected in the West regional plan
7.	Iteration is used to optimise the plan across the region and with other regions
8.	Consultation and consensus building is used to develop the plan
9.	Planning scenarios will be agreed with other regions and the National Framework
10.	60 year plan (2025 – 2085) with preferred options in the first 25 year period then indicative look ahead from 2050 to 2085
11.	Adaptive plan to allow for external dependencies on other regions / sectors – with a single preferred pathway
12.	Resilience to non-drought hazards used as a factor in options appraisal (full assessments not in regional plan, in line with national steer on how to produce a regional plan)
13.	Assurance will demonstrate that the regional plans and WRMPs are consistent

Source: WRW (2019) Overall Approach Methodology, v1.0, 8 November 2019

WRW has set out a decision-making methodology for its plan that follows the UKWIR (2016) decision-making guidance. In order to select a best value plan, the methodology includes the use of an MCA process, consistent with the UKWIR BVP Framework. The following figure illustrates the key steps in the process with respect to how customer engagement is anticipated to contribute to decision making. Inputs and outputs are shown in green, while key stages in the process are shown blue and additional stages

appropriate to zones with complex problem characteristics are shown with a dashed outline.

Figure 7 Overview of the MCA within the WRW decision making process



Source: WRW (2021) Decision-Making Methodology v2.1, 4 Feb 2021

As Figure 7 illustrates, customer evidence and consultation is anticipated to input into:

- The development of strategic choices;
- The values / weights with respect to decision metrics entering directly into the MCA process;
- The choice of single preferred plan from amongst a short list of alternative plans.

Strategic policy choices

With regard to strategic choices, these include the key decisions that will drive the content of the plan, and hence over which maximum transparency and accessibility of decision making is required. At present, we understand these to include:

Environmental ambition – the rate at which sustainability reductions in abstractions should be achieved.

Levels of service – how frequently temporary use bans, non-essential use bans and drought permits will be used; and how quickly the target of 1:500 resilience to emergency drought restrictions (rota cuts, etc.) will be achieved.

Water efficiency ambition in terms of how levels of leakage and PCC should be reduced over time.

These strategic choices each represent a significant decision to be taken in developing the plan. They might be company or zone specific or region wide.

The senior management group will use stakeholder and customer views to select the strategic choices to be set out in the initial draft regional plan (August 2021) and subsequent deliverables. The decision making workstream will support the senior management group by developing the strategic choices based on this engagement, the

strategic context from the WRW resource position statement and problem characterisation and government policies in England and Wales.

The Customer and Stakeholder Methodology Statement (WRW, 2020) sets out some details regarding the customer engagement expected. In line with the bottom-up nature of the WRW regional planning methodology, and also with one of the core UKWIR BVP principles, it is expected that companies will own their own WRMP customer and stakeholder engagement programmes, each building on the knowledge gained from WRMP19.

However, in order to achieve alignment, it is proposed that there will be a common set of choices put to all customers at the key consultation stages of the planning process. To date, we have not had sight of any such choices and so we have assumed that none have been developed to date. Hence, in our recommendations (Section 4), we include some of the types of questions that could be asked, but note that these require coordination with the WRW decision-making workstream, the WRW customer and stakeholder engagement workstream, and the co-members of the WRW region.

Decision metrics and weights

In line with the UKWIR BVP framework, WRW is intending to use a multi-criteria analysis (MCA) process to select the best value combination of options within its plan. This process requires the specification of decision metrics at the option level, and then weights need to be generated that reflect the relative value of each metric in contributing to the objectives of the plan. A tool will then output the preferred combinations of options from the candidate list.

The decision metrics themselves were selected transparently by the 'Multi-sector senior management group' at the May 2020 workshop and the decisions and reasons clearly documented in the workshop report. (NB: we have not had sight of this report for the purposes of this review, and therefore cannot verify whether or not customer evidence has been used to inform these metrics.)

From the Decision-making methodology statement, we understand that the metrics include the following.

- Drought resilience;
- Other resilience benefits (e.g. resilience to flooding, WTW failure etc);
- Environmental or natural capital benefits;
- Multi-sector benefits (e.g. benefits to non-public water supply abstractors);
- Other economic and wellbeing benefits (to water company customers, other abstractors, communities, etc).

Detailed calculation methods for the metrics are intended to be developed in early 2021. The majority of these will be produced through integrated environmental appraisals, to be conducted by a single consultancy for all companies. This will ensure the quantification of metric scores is used consistently for the regional plan and WRMPs.

WRW plans to commission a consultant to develop a common MCA tool, and guidance, that all member companies can apply in each of their zones. This will take as input all the candidate options, scored against each of the decision metrics, and will guide users on how to derive weights.

At the present time, given that neither the tool nor the guidance have yet been produced, it is not fully established how the weights will be generated. However, it is our expectation that customer evidence will need to be applied, somehow, to ensure that the weights chosen take account of customer preferences. We expect that the consultant appointed to produce the MCA tool should provide guidance covering how this might be done given the available customer evidence.

It seems unlikely to us that new primary research could be commissioned, implemented and reported in time for incorporation within the MCA process for the Initial draft regional plan due to be published in August 2021. For this run, we would therefore expect that existing customer evidence would be relied upon. However, it seems certainly feasible to us that later runs of the MCA process could take account of new primary research. Accordingly, we include some outline recommendations pursuant to this in Section 4.

Consultation on short-list of alternative plans

Customer consultation is due to take place following publication of the Initial draft plan (August 2021), and following publication of the full Draft plan (August 2022). Figure 8 illustrates the anticipated context of each stage of consultation. (NB this figure includes consultation on the Statement of Needs, which was due to have reported by the time of writing, but which has not been made available to us.)

Figure 8: Stages of consultation on the regional plan

Source: WRW (2021) Decision-Making Methodology v2.1, 4 Feb 2021

In line with the above figure, we anticipate that the Initial draft plan will include options relating to strategic policy choices, as discussed above, and it will be necessary for companies to consult on these choices with customers.

Following the full Draft plan, there will be a further need to consult with customers, but this will include a more refined shortlist of alternatives for customers (and stakeholders) to comment on. It is anticipated that the key questions asked at each stage will be agreed between the member companies to ensure consistency of approach.

Miscellaneous

In addition to the above key research stages, the WRW Customer and Stakeholder Engagement Methodology Statement highlights the need to:

- 'ensure any customer research fully explores the area of water trading influences on service (both customer and environment) as this is seen to be a key risk area'; and,
- 'to do some joined up research with other regions to give us some consistent inputs, and also work with other regions to share research outputs from individual surveys, via the RAPID Stakeholder Group'.

4.7 WRE methods

Overall approach

WRE published its method statement for the regional water resources plan in August 2020. The group's approach is based on co-creation, engagement and collective decision-making. Planning will take place on two interrelated levels: at the strategic, regional-scale level; and at the sub-regional, catchment-scale level. Both levels are multi-sector, require high levels of stakeholder engagement, and link to company WRMPs.

The regional strategic planning will focus on:

- Large supply-side options, including current and possible future strategic regional options (SROs)
- Demand management
- Current and future environmental need.

Planning at this level will utilise a decision-making process based on Robust Decision Making (RDM), Multi-Criteria Search (MCS), Systematic Conservation Planning (SCP) and least cost optimisation using an approach based on the Economics of Balancing Supply and Demand (EBSD). The RDM and MCS will be combined in one process: Multi-Objective Robust Decision Making (MO RDM), previously used to develop the Phase I WRE regional strategy. MO RDM will be used to select the preferred combination of supply-side and demand management options for the regional water resources plan (WRP), taking into

account imports/exports, demand forecasts, climate change, drought and environmental destination.

The outputs of the MO RDM will include a combination of schemes, to be delivered via individual company WRMPs and business plans. Least-cost optimisation is then to be used at the regional and the company levels, to schedule delivery of options and facilitate alignment between the regional WRP and individual WRMPs.

Planning at the sub-regional programme level is based on co-creation and multi-sector collaboration. Important local issues highlighted in these planning processes will be escalated into the regional plan, and benefits of actions taken will flow back towards the local planning partners. Local partners include water companies, drainage authorities, the Environment Agency, Natural England, Local Authorities, energy companies, farmers and land managers, universities and numerous environmental NGOs, including local river campaign groups.

These partners will participate in co-creating a plan as well as in delivering it: the plan will make clear each sector's responsibility in financing and delivering the schemes needed to achieve the overall - regional - planning objectives. These comprise:

- Schemes specifically for water companies, which can be incorporated in their draft WRMPs and related business plans, and,
- The strategies, plans or schemes which will need to be delivered by others.

The outputs of the sub-regional programme and associated working groups will be coordinated via a series of Planning Conferences for stakeholders in each area, in order to kick off the stakeholder engagement process. The aim of stakeholder consultation at that stage will be to discuss a range of proposed solutions, understand challenges and opportunities, and seek consensus on the portfolio of options that will progress to the next stage of planning. Stakeholders are categorised into three groups: the strategic advisory group (formally members of WRE) which have a formal vote; the consultation group (e.g. government organisations, regulators, customer representatives) which have no formal voting rights; and the technical delivery group, which ensures delivery of core technical programme.

Touch points between the WRE planning process and SSC's WRMP are understood to be:

- Updating the SSC Resource Position Statement with WRE information
- SSC participation in the MO RDM process for selecting the preferred combination of supply-side and demand management options
- SSC participation in the MO RDM process for determining environmental destination (total volume of sustainability reductions)
- SSC participation in the combined EBSD and SCP process for determining the level of environmental ambition (volume of sustainability reductions by water company and by AMP).

Some of the options included in the regional plan will be funded and delivered solely by water companies, others in partnership arrangements and others by other sectors. The reporting process of the regional plan will make this distinction clear and will make sure that water company options will be supported by the same WRP data needed to complete water company WRP data tables, to avoid duplication of effort.

WRE's approach to customer engagement is to utilise the current and past experience and evidence within individual companies and, through their customer engagement activity, inform the regional plan. A Task and Finish group for WRE representing each of the water companies is tasked with ensuring that there is consistency in approach and a common set of questions where research in similar topics is conducted. Four key activities highlighted in the method statement on customer engagement are:

- Water company customer research: primary and historic customer research review to understand customer views on resilience, environment, customer side levers and supply-side solutions. These topics are in line with those emphasised by the National Framework. By way of a definition, these are meant to cover:
    - **Resilience:** how reliable the water system will be, how adaptable the system will be to changing conditions and how the system will evolve as the future changes.
    - **Environment:** how the plan delivers on ambitions to protect and restore the water environment, the broader environmental aims and objectives of the plan, and the impact of the plan's options on the environment.
    - **Demand-side levers:** how the plan impacts directly on customers (e.g. per capita consumption, water efficiency).
    - **Supply-side solutions:** the range of potential resource options and how they might be implemented (including balancing between sectors).

- WRE Planning Conferences: water companies represent customer views while CCG members and CCW attend.

- WRE regional plan: companies publicise and consult with their customers on the regional plan.

- WRMP consultation: companies' statutory public consultation on their WRMPs.

WRE is currently at the stage of engaging with strategic (large) stakeholders. Household, local and community group level customers will be the responsibility of SSC.

Informal feedback by the EA on WRE's method statement commended the WRE's expressed desire to engage with and involve stakeholders and ensure water company customer views are taken into account; however, it underlines that the method statement does not make clear exactly how this will be done and how such activities will align with the development of company WRMPs. The review of the WRE method statement, as summarised in this section, corroborates this view.

4.8 Summary of customer engagement requirements

Although there are differences across regional groups, as outlined above, customer input is expected to generally be required to inform the following stages:

Table 3 Summary of customer engagement requirements in the regional context

Stage in regional planning	Driver for input
Strategic policy choices	Preferences regarding environmental ambition, levels of service/resilience, and water efficiency ambition, including rates of leakage and PCC reduction.
Input into MCA (metrics and value weights)	Establishment of customer weightings and trade-offs between, for example, cost and environmental benefit and/or direct preferences across option types
Finalisation of the preferred plan	Choices between a few distinct programme alternatives Acceptability and affordability testing of draft/final plans

Additionally, 'deep dives' may be required into specific issues, for example, into water trading, or consulting on specific strategic resource options, if any are relevant to SSC.

A key requirement for both WRE and WRW is that key questions should be aligned across member companies. This will require coordination of any key intended customer engagement activity with the regional group in question.

5 Recommendations

5.1 Introduction

The central objective for the WRMP24 customer research programme is to be able to demonstrably and transparently obtain and utilise customer insight in order to produce a WRMP that genuinely reflects customer preferences. This chapter distils learnings from the review of materials in the preceding sections to provide recommendations for the types of customer engagement that would be appropriate for SSC to consider commissioning for WMRP24. The first sections provide a recommended set of principles which we have used to govern our recommendations (5.2) and an overview of the high-level themes that organise them (5.3). The remainder of the chapter then discusses each of them in turn.

5.2 Principles

Summarised below are a set of high-level principles that we recommend as the basis for guiding SSC's customer engagement and research programme. These are listed in order of priority in case there are any conflicts between them.

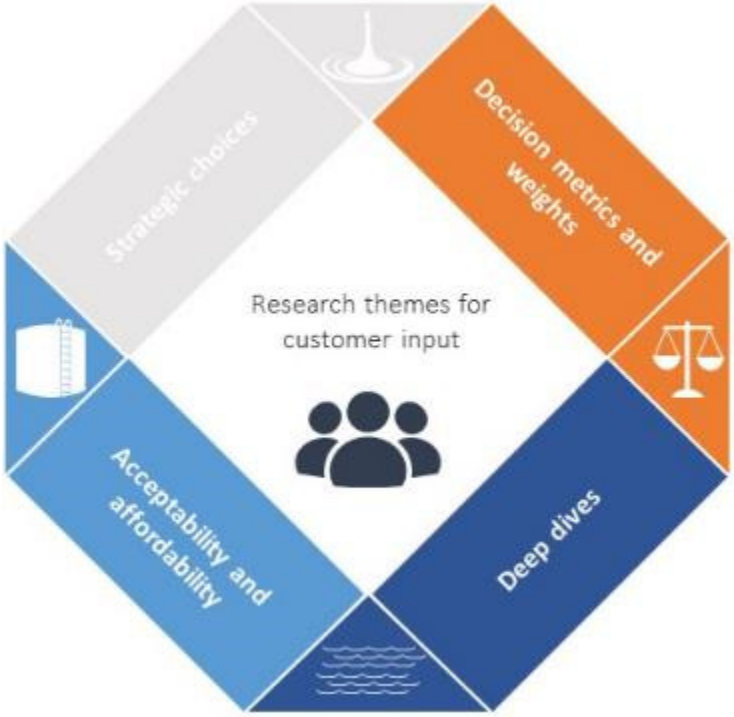
- Adhere to the requirements, principles and timescales set out within the WRPG, including supplementary guidance, first and foremost as the basis of ensuring a compliant WRMP.
- Align to regional method statements in terms of how the engagement is structured and how the outputs sought are defined. This will involve collaborating with regional groups and other companies within the region and agreeing on common questions to be posed across similar topics.
- Adhere to the expectations of regulators and consumer representatives, including CCW and the CCG, regarding how customers should be engaged.
- Conform to the recommendations outlined in UKWIR's best value planning guidance.
- Consider the likely cost-effectiveness of different types of engagement methodology, to help maximise the efficient use of the customer engagement budget (this may include collaborating to share costs with other companies in the same region).
- Ensure that the research programme is coherent, both internally and with the broader PR24 and BAU engagement programmes, considering the interactions between different aspects and how they can support or challenge one another.

Question for SSC: Are these the right set of principles? Is anything missing?

5.3 Overview of research themes / stages

Our recommendations are organised around four main themes, corresponding to key customer input points during the WRMP development. These are illustrated in the figure below.

Figure 9 Research themes / stages in WRMP development



Source: Accent-PJM

Strategic choices

Certain key decisions will drive the content of the plan, and hence require maximum transparency and accessibility of decision making. Customer engagement is required to input into each of these choices, at an early stage in the development of the WRMPs. Section 5.4 discusses details of the methods that could best be used to address these questions.

Decision metrics and weights

In order to select a best value programme of options to ensure supply matches demand, an MCA approach is needed. Such an approach requires the specification of a set of decision metrics / value criteria and a corresponding set of decision weights to govern how influential each will be in determining the choice of schemes to include in the plan. In Section 5.5 we set out how customer engagement could best be used to provide evidence to support this decision making.

Deep dives

In the course of compiling the WRMPs, it may be helpful to undertake deep-dive engagement with customers on particular topics. These could be used, for example, to explore attitudes to water trading, or to add insight into what might be effective water efficiency options, or how best to design them, or to add robustness and support, or

challenge, to a particular set of weights used in decision making. Section 5.6 discusses how such activities could be undertaken.

Final choices, acceptability and affordability

Shortly before the draft WRMP is submitted, or possibly as part of the consultation once the plan has been submitted, there will be a need to engage customers to choose between a shortlist of final programmes, and test the acceptability and affordability of either the shortlist or the single preferred plan. Section 5.7 outlines an engagement programme focused on this theme.

Question for SSC: Do you agree that these are the right themes?

5.4 Theme 1: Strategic choices

Customer views, alongside those of regulators and other stakeholders, are needed to establish and define strategic choices at an early stage of the planning process. These include:

- **Environmental destination and ambition** – the rate at which sustainability reductions in abstractions should be achieved.
- **Levels of service / Resilience**– how frequently temporary use bans, non-essential use bans and drought permits will be used; and how quickly the target of 1:500 resilience to emergency drought restrictions (rota cuts, etc.) will be achieved.
- **Water efficiency ambition** in terms of how levels of leakage and PCC should be reduced over time.

Both of the relevant regional groups have indicated that they intend for companies to ask a common set of key questions to customers in relation to these choices, although research could be tailored according to the particular circumstances of each company. The precise choices that need to be asked are, at present, not known to us. As such, the following, in Table 4, represents a high-level review of potential options only for discussion, and ultimate agreement with the regional groups.

It may be the case that key strategic schemes require customer engagement at an early stage. However, we consider these within Theme 3: deep dives.

Table 4 Indicative areas of research per strategic choice thematic area

Strategic choice	Possible topics to cover in research
Levels of service / resilience	■ Are the current levels of service appropriate with respect to temporary use bans, non-essential use bans and drought permits, or should there be higher or lower levels? ■ What risk is acceptable with respect to emergency drought restrictions (rota cuts, etc)? ■ Should there be harmonisation across the region of these restrictions, or separate levels?
Environmental destination / ambition	■ How do customers feel about low flows in the region's rivers? ■ What should South Staffs/Cambridge Water be aiming for by 2050 in terms of sustainability reductions in abstractions? ■ How fast should the rate of reduction be? ■ How should a catchment management approach be implemented?
Water efficiency ambition	*Leakage:* ■ How do customers feel about current levels of leakage, and current targets for leakage reduction? ■ Should leakage be reduced faster or slower?
	Water efficiency: ■ How do customers feel about the company's current policy with respect to water efficiency? ■ What is the information that customers need in order to help them reduce their water consumption? ■ How would they like this communication with the company to take place? (format, frequency)
	Metering: ■ How do customers feel about (compulsory) metering / smart metering? ■ What are the barriers relating to switching to a water meter ■ For metered customers: how has having a water meter changed their attitude towards water use?

There is value in applying both qualitative and quantitative methods to exploring customer views in these areas: qualitative research gives depth to the understanding of views and motivations behind views, while quantitative research can help extract insights based on representative, informed samples. In order to maximise the value of the programme, we would anticipate the same key questions being asked in the qualitative research as in the quantitative research, but with a greater depth of education and discussion. This will allow the findings from both parts to be interpreted jointly rather than separately.

Qualitative research

The aim of the qualitative research would be to get under the skin of customer attitudes and expectations to understand what is driving their thinking. It would also aim to obtain a greater depth of insight, via more extensive education and discussion, than is possible from a purely quantitative approach.

There are a number of considerations when designing the qualitative research:

- The need to uncover preconceptions and uninformed attitudes;
- The need to educate consumers about SSC and the role they play within the water cycle, as well as about the strategic policy choices at stake;
- The need to explore how attitudes change in response to this education;
- The need to potentially provide insight at two or three stages in the planning process.

Given the ongoing issues pertaining to Covid-19, we would anticipate all qualitative research being conducted online for the remainder of 2021. Our recommended approach has hence been designed accordingly, as a combination of LiveMinds insights and Zoom discussion groups.

We suggest an approach that relies on LiveMinds for the education and spontaneous priorities and then we would follow this with a Zoom group discussion. LiveMinds tasks would be designed to take place over two days and participants' input could be reviewed during this period, registering what the spontaneous attitudes and priorities are and capturing any discussion.

Following the LiveMinds tasks, we would recommend that everyone be invited to participate in a Zoom discussion which would last 75-90 minutes. We know from all our online work, especially in the last year, that it is unrealistic to conduct groups for longer than this time as people lose focus and there are concerns over screen time.

Each group would consist of 5-6 participants. Any more than this in an online discussion group and it's impossible for everyone to have sufficient airtime.

A full discussion guide would be developed after the briefing meeting but during the initial groups, we would anticipate covering the following topics:

- Welcome and introductions
- Reminder of SSC role/responsibilities
- Review of the spontaneous attitudes and priorities generated via LiveMinds
- Sharing of key educational material needed to inform the strategic policy choices
- Comprehension and language review
- Discussion around strategic policy choices
- Thank and close

We considered whether H2Online could be used for the qualitative research. However, this panel would already be knowledgeable about the topics under discussion and so could not provide the uninformed view that would be helpful at the start of this phase. Additionally, there are certain downsides to the outputs of H2Online in terms of representativeness of the sample of participants. For instance, there would typically be the same – household – participants coming back, thereby introducing opt-in bias. Other related concerns are digital exclusion, low likelihood of response among lower income groups and young people, as well as being a vehicle that is potentially not easily accessible to customers who cannot comfortably communicate in English.

To address this, and to create a dedicated source of continuous feedback, we recommend that SSC recruit a cohort of initially uninformed customers with emphasis placed on creating a group that will be representative of all voices within the SSC area.

We would suggest ten groups and six depth interviews at each stage to ensure coverage of all of the important consumer and business groups. The sample structure below would ensure that all voices are represented and heard.

Table 5 Sample structure for ten Zoom Groups with Consumers and SMEs (75-90 Minutes)

Customer Type	HH				Future Customers	
Geography	South Staffs		Cambridge		South Staffs	Cambridge
SEG	ABC1	C2DE	ABC1	C2DE		
Life stage	Pre-kids	Family	Family	Empty nesters	Youth (up to 25, non-bill payers)	

Customer Type	Vulnerable		NHH SME	
Geography	South Staffs	Cambridge	South Staffs	Cambridge
Definition	Medical need for water; Disability; Elderly		Mix of small (up to 10) and medium (up to 50)	

With respect to vulnerable customers, careful recruitment would be needed to ensure that they are comfortable when taking part in research. Research materials and the structure of discussions will need to be designed carefully and in a manner mindful of the different dimensions of vulnerability that each respondent faces.

Once recruited, we envision that this could become a panel, possibly branded under its own separate name, that could be taken along on a complete WRMP journey: from making strategic choices at the start of the planning period to testing the acceptability of a preferred plan at the end. The same panel could thus be re-engaged in relation to the other themes' stages, as discussed further in Sections 5.5, 5.6 and 5.7 below. Over time, the panel would be able to provide more educated, considered feedback. However, the group could potentially be supplemented with additional uninformed groups at later stages to explore differences in attitudes between informed and uninformed customers. Anglian Water adopted a similar approach with their *Love every drop* online community. This community was set up to be broadly reflective of Anglian Water's customer segments. Numbering 300 people during PR19, it has now nearly doubled (500).

As outlined above it is recommended that the core research programme focuses on engagement with customers (domestic, non household and future). However, it may be useful to also include a small number of depth interviews with relevant stakeholders such as local nature and environmental groups/trusts. Whilst there may be consistent views across regions it would be useful to explore these expert opinions and views from a local perspective.

Quantitative research

We would recommend a quantitative research phase to explore and quantify customers' views and preferences in relation to the strategic policy choices, to the best extent possible in a short survey context.

The quantitative research would be designed to collect views across SSC's household and non-household customer base, and designed to cover different categories of customers such as socio-economic group, income, low income and other vulnerable customers.

The questionnaire should include visual aspects to help explain quite complex concepts to participants. Ideally, we would suggest a mix of online and face-to-face interviews for vulnerable customers. However, because of Covid-19 we recommend an entirely online approach using commercial panel samples. It should be noted that there are some who would be excluded when using this approach, notably those customers who do not have access to the internet as well as those with literacy issues. Nonetheless, recent online research we have undertaken has been able to closely match the relevant proportion of vulnerable customers under most metrics.

Online surveys are a cost-effective means of achieving large geographically dispersed samples. The approach benefits from:

- Short fieldwork periods
- Participant preference – many prefer to answer surveys online rather than via telephone or face-to-face as they can pick a time that suits them best, and the time needed to complete the survey is shorter.
- Anonymity – participants in online surveys often provide longer and more detailed answers because they feel safe in the anonymous environment of the Internet, thus making them more likely to give a more honest and open response.
- Easy use of images including animations.

Sufficient sized samples of South Staffs Water and Cambridge Water household and non-household customers, plus future customers, would be needed to obtain robust results for these populations, plus an ability to explore how preferences varied across key segmentations. These could include quotas by region and loose quotas for:

- Age
- Gender
- Income / SEG.

For non-households we would recommend sampling by:

- Industry type
- Company size (i.e. no. employees)

With respect to the key methods for asking questions, we would recommend making use of either:

- Ranking questions
- MaxDiff; and/or
- Discrete choice experiments

Ranking questions are most appropriate when there are a small number of options to choose between. For example, where there are between 3 and 6 distinct strategic policy alternatives. This approach was adopted in the Manchester and Pennine resilience

research carried out by United Utilities. Household customers were asked, through online surveys, to rank five options for increasing water resilience, ranging from minimal investment to long-term solutions. Information about the risk of supply interruptions and water quality issues, potential number of affected properties and the bill impact of each option was provided to participants before they were asked to rank options in order of preference. In a different context, participants in the joint water trading research among Severn Trent, Thames Water and United Utilities were asked to rank the following six factors in selecting supply and demand-side options: sustainability, the environment, volume of water produced, option resilience, cost to build and customer acceptability.

MaxDiff methods are most appropriate when the number of distinct policy alternatives is greater than 6. Apart from SSC, Anglian Water, Bristol Water, DCWW, Severn Trent, Wessex Water and Yorkshire Water all used a form of MaxDiff exercise in their stated preference research to estimate customer values for different service levels across the various service measures presented to them.

Discrete choice experiments are most appropriate when there are multiple attributes that need to be simultaneously evaluated but where preferences, or willingness to pay values, are needed with respect to each attribute individually. SSC, Anglian Water, South West Water, Wessex Water and Yorkshire Water applied discrete choice experiments in their stated preference studies.

Menu/slider approaches are an engaging format for participants and can provide useful insight within a triangulation exercise. However, they can be expensive to implement if a high-quality graphic interface is desired. The resulting data are also not as clearly insightful as results from the other listed methods, in that they do not provide robust willingness to pay estimates, nor preferences with respect to discrete alternatives. We would therefore not recommend using this format as a priority.

5.5 Theme 2: Decision metrics and weights

At WRMP19, SSC used an MCA tool to inform the selection of options within its WRMP. For WRMP24, WRW will be asking all member companies, including South Staffs Water, to complete a common MCA tool; while WRE will be using its own regional MCA tool to select options for the regional plan. In both cases, customer evidence will be needed to inform the weights that are used within these tools.

The precise form of questions that need to be asked to achieve alignment with the MCA tools is currently unknown. However, there are two broad types of methods that could be used:

- Obtain preferences for the options that customers would like to see implemented, given all relevant characteristics of those options (cost, environmental impact, etc).

- Preferences over the metrics themselves, i.e. how customers would want to see South Staffs Water / Cambridge Water balance the impact of cost vs environmental impacts vs wider impacts.

SSC conducted both qualitative and quantitative research for WRMP19 to support the measurement of an index of priority amongst potential supply-demand options. This research stands up well against the research undertaken by other companies at WRMP19 of a similar kind and can potentially be used within a triangulation exercise for WRMP24. However, in our view, it would not be ideal to rely solely on this for the purpose of contributing to the WRMP24 MCA processes. This is partly because the options and impacts may have changed but, even if they are the same, there may have been a change in preferences over the past five years. Moreover, if new research is undertaken, it could be designed to better provide insight to support the weighting between options, rather than relying on a direct index of preference over options. This would be subject to the WRW and WRE MCA processes allowing such input, which would need to be discussed and agreed with the regions directly.

Our recommendation for this theme would be to again conduct both qualitative and quantitative research.

Qualitative research

We would recommend utilising the same panel for this phase of research that was recruited for Theme 1. The structure of sample would therefore be the same for both parts.

As for Theme 1, we would also recommend utilising a mix of LiveMinds and Zoom groups. LiveMinds tasks would be designed to take place over two days and participants' input could be reviewed during this period. This could involve an unprompted discussion around the topic of choosing solutions to solve supply-demand shortages. It could also explore whether participants have any idea of the sorts of solutions that might be used, and what factors might be considered important when choosing between them.

Following the LiveMinds tasks, we would recommend that everyone be invited to participate in a Zoom discussion which would last 75-90 minutes. Again, each group would consist of 5-6 participants.

A full discussion guide would be developed after the briefing meeting but during the initial groups, we would anticipate covering the following topics:

- Welcome
- Review of the topics covered in the LiveMinds exercise
- Introducing the proposed attributes for testing and the context in which they are being used. These would be designed to correspond to the decision metrics, but with language and definition tailored to be understandable and meaningful to customers
- Explore understanding of the metrics and help refine them
- Discuss whether there are any missing aspects relevant to decision making
- Discussion around the relative importance of the different metrics
- Thank and close

Following the initial group meetings, we would recommend that participants be asked to complete the same survey that will also be used for the quantitative phase. This will allow

for integrated insight between qual and quant phases, and thereby aide the triangulation process.

Quantitative research

A quantitative survey is required for this theme to obtain measures of customers' decision weights with respect to the metrics entering the MCA tools. These are likely to be different for South Staffs Water and Cambridge Water customers due to different MCA models being used, and so the designs will need to be tailored separately for the two regions.

We have considered whether the quantitative phase for this theme could be combined within the same survey as used for Theme 1. This is a possibility, as the timings for both elements seem to coincide, and it may be a more cost-effective approach than undertaking two surveys. However, depending on the content agreed to be needed for both themes, it is likely to be preferable, if the budget allows, to run two separate surveys, possibly with the same sample, or an overlapping sample, to avoid each one being too long.

As discussed above, there are two broad ways in which customer preferences can be incorporated within MCA decision making: by measuring an index of preference over solutions, or by measuring the value weights themselves. Both approaches have validity, but the design would need to be developed in consultation with the modelling teams working on the regional and company MCA processes in order to ensure that the designs are fit for purpose.

In general terms, we would anticipate a pairwise choice exercise being most appropriate for evaluating preferences between supply-demand solutions. Figure 10 provides an illustration of the type of question we have in mind. The survey would benefit from including visually engaging material to communicate the solution option and its relative impacts on each of the key decision metrics.

Figure 10 Illustrative pairwise choice situation

	Option A	Option B
Option type	New reservoir	New desalination plant
Impact on rivers	Neutral	Neutral
Impact on carbon emissions	- Negative	- - Strongly negative
Change in your annual bill from 2023	Increase by £2	Increase by £1
Which option do you prefer?	○	○

In all cases water quality meets all legal standards

Participants could be shown a sequence of option pairs and asked in each case which of the two they would prefer to see implemented in their region. The number of questions

to be shown would depend on how many options were being evaluated. Each option should be seen at least once by each person but the order in which they appear, and the permutations of options within pairs, would be varied across the sample.

This type of approach would be fairly similar to the approach used by SSC for WRMP19 but would include pairwise choices to establish preferences rather than identifying the top 3 and the worst option from the full set. The pairwise choice approach would provide richer information on preferences and be easier to answer in a survey context.

The most comparable study to use this approach at WRMP19 was the South West Water survey (Box 5).

With respect to the alternative approach of measuring value weights relating to the MCA decision metrics, none of the WRMP19 studies attempted this. However, a similar design to that illustrated in Figure 10 could also be used, or be used instead, to measure the relative values associated with each of the metrics. In the example shown, these are: Impact on rivers, Impact on carbon emissions, Cost, and the nature of the solution itself, but these could be revised to reflect the actual decision metrics selected for the MCA process.

The key distinction between approaches relates to the experimental design.

- Where the focus is on measuring an index of preference over solutions, each solution appears in the design only with the impacts representing as they are expected to be in reality.

- Where the focus is on measuring the value weights against each of the metrics, the impacts need to be varied according to an experimental design so as to include sufficient variation across the sample to be able to identify, and efficiently estimate, the preference weights associated with each metric individually.

The advantage to measuring value weights rather than, or as well as, preferences over solution options, is that customer preferences can be considered directly in terms of how much weight to put on the various decision metrics. There may be good reason why decision makers choose to adopt different weights to the weights derived directly from customers, for example due to their greater knowledge and understanding of the policy and operational context than customers. However, understanding how customers trade off these metrics against one another is a good way to ensure that their views are being appropriately reflected in the weights that are chosen.

Ultimately, the approach that is taken to the design of this part will need to reflect the design of the MCA process being undertaken by each region. It will therefore be vital for there to be good engagement between the users of the customer evidence and the designers of the survey. This will ensure a good fit between the two.

5.6 Theme 3: Deep dives

Throughout WRMP19, many companies undertook 'deep dives' into individual issues. For example, Severn Trent and United Utilities carried out deep-dives on metering and water efficiency using co-creation sessions and a qualitative survey of household customers respectively. United Utilities and Yorkshire Water used their online panels to carry out qualitative and quantitative leakage surveys, and Wessex Water looked into leakage using co-creation in a series of two-stage deliberative workshops. Another example is that of the joint research into water trading carried out by Severn Trent, Thames Water and United Utilities.

For WRMP24, we anticipate that there may be a need to conduct similar one-off pieces of research to explore and understand customers views in particular areas. At present, we anticipate that these areas may include:

- **Water transfers, and strategic resource options**
  At WRMP24, given the introduction of the National Framework and Regional planning, there is a greater emphasis on intra-regional and inter-regional transfers of water than at WRMP19. As these options firm up in the planning process, we anticipate that there may be value in exploring these in depth with customers including, amongst other aspects, how customers feel about sharing water with other regions when there is a drought, or about introducing water from other areas into the local supply.

- **Water efficiency / metering**
  Although water efficiency and metering were explored by SSC at WRMP19, and will be covered in the anticipated Theme 1 research area, there may still be value in undertaking a deep dive around this topic for WRMP24. This is because both South Staffs Water and Cambridge Water are now potentially to be classified as being water scarce areas given the latest EA consultation (EA, 2021). If this is confirmed, it will be necessary for both regions to consider compulsory metering. Up to date and detailed evidence on customers views and attitudes in this area would accordingly be beneficial in developing the policy in this area.

- **Drought plan**
  Although not directly part of the WRMP, it could be worthwhile undertaking a focused piece of research to explore ways of communicating with customers during droughts. The outcome from this research would be expected to inform the company's drought plan.

We anticipate this theme being primarily addressed by qualitative research, and using the panel recruited for Theme 1, and Theme 2. The topic guides for such research would need to be developed based on the specific topics that arise in these areas, or others, during the planning process.

There is likely to be an opportunity to add a few topic-specific questions to the surveys conducted under Theme 1 and Theme 2 where necessary to quantify responses.

5.7 Theme 4: Final choices, acceptability and affordability

Following creation of the Initial draft regional plans, there should be an opportunity for customers to be engaged around their preferences amongst a short list of alternative programmes, and to test their acceptability and affordability. Moreover, if plans are not considered acceptable the research presents an opportunity to explore why, and make any changes subsequently for the final plan. This stage will help ensure that the plans ultimately adopted are acceptable and affordable to customers, and that they fully reflect their views.

Our recommendation for this theme would be to conduct both qualitative and quantitative research. Both approaches would integrate and triangulate with one another to produce a greater depth of insight than would be achieved by conducting one or the other method in isolation.

Qualitative research

We would recommend utilising the same panel, with same structure of groups, for this phase of research that was recruited for Theme 1. As for Theme 1, we would also recommend utilising a mix of LiveMinds and Zoom groups. LiveMinds can be used to present the key aspects of the draft WRMP to customers in advance of the Zoom group and begin to initiate a discussion around key aspects that can then be followed up on the Zoom groups themselves.

Again, each group would consist of 5-6 participants and would last 75-90 minutes.

A full discussion guide would be developed after the briefing meeting but during the initial groups, we would anticipate covering the following topics:

- Welcome
- Review of the topics covered in the LiveMinds exercise
- Sharing of key stimulus material from the draft WRMP
- Comprehension and language review
- Discussion around strategic policy choices
- Discussion around acceptability
- Discussion around affordability
- Thank and close

Following the group, we would recommend that participants be asked to complete the same survey that will also be used for the quantitative phase. This will again allow for integrated insight between qual and quant phases, and thereby aide the triangulation process.

Quantitative research

A quantitative survey is essential for this phase, to capture the views of a representative sample of South Staffs Water and Cambridge Water customers, covering household and non-household customers. Sample sizes and structure would be broadly as discussed above for Theme 1. However, as this stage of the research is later than the others, there may be an opportunity to conduct part of the survey face-to-face rather than all being online. Ideally, we would recommend a small proportion (around 10%) of the sample is conducted face-to-face in order to target those who are less likely to be on online panels. This approach is dependent on the extent to which Covid-19 remains an issue in the regions.

The questions to be asked would be similar to those used in business plan acceptability / affordability surveys. However, there would be an expectation that the surveys would also include key choices between a shortlist of alternative plans that differ in terms of, for example, the rate of environmental ambition, or the date by which the level of service exceeds 1:500 with respect to the need for emergency drought restrictions. The precise nature of the shortlisted plans' variation would depend on the outcome of the regions' decision making workstreams, and the questions to be asked would need to be agreed with other companies in the regional groups in order to ensure a consistency of approach.

Questions for SSC:

- Do you agree with the recommendations presented in this chapter?
- Is anything missing, or not needed?
- Would you consider that anything should be done differently?

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Appendix A

WRMP19 evidence review – company customer engagement

Appendix A WRMP19 Evidence Review

Appendix A summarises the outcome of the individual water company review of customer engagement. The review focused on those companies that achieved a rating of A or B by Ofwat for their customer research. 5 out of the 9 companies reviewed, have made available technical reports (Anglian Water, United Utilities), separate appendices (Bristol Water), or sections in appendices (South West Water, Yorkshire Water) discussing customer engagement activities specific to the water resources management plan. The remaining of the companies reviewed make reference to relevant pieces of research in the main body of their WRMP, providing an overview of the research that was most important in shaping the plan.

On the whole, companies tend to think about customer engagement and research in an integrated manner between the business and the water resources management plan.
For this reason, the review sought further details in the respective business plans – albeit they tend to include an abbreviated version of research activities with full detail outlined in individual study reports which are typically not available publicly. An added complication concerned a degree of difficulty in discerning which research activity would be justifiably relevant, especially with respect to multi-attribute studies that tend to include WRMP-related attributes, but which will have not been highlighted in the WRMP. For example, supply interruptions interface with both levels of service (business plan) and resilience considerations (WRMP). As a guiding rule, the review sought additional information on those aspects of research for which some reference would have been made in the main body of the WRMP, thereby making the implicit assumption that they were the most important / impactful in the development of the water resources management plan.

It follows from the above that this section does not outline the full customer engagement programmes undertaken by water companies. It rather focuses on the activities that companies themselves highlight as the ones most relevant to the development of their WRMP, i.e. key research activities and points of interest. A degree of judgment was exercised in presenting additional information from business plans on the latter. Owing to these constraints, the research presented here cannot be considered exhaustive or representative of the entire programme of research and engagement activities that a company has carried out.

It also follows that the length of each section included in this appendix is not necessarily representative of the extent or richness of a company's customer research programme but rather on the availability of materials and detail provided on WRMP-specific engagement.

Anglian Water

Overview

One of the main drivers of Anglian Water's strategy development was shifting their approach to strategic customer engagement, from carrying out bespoke engagement to support a regulatory submission to developing and maintaining various channels to help them understand customer views and priorities. To do this, Anglian Water carried out an extensive customer engagement programme in WRMP / PR 2019 using multiple qualitative and quantitative channels. This involved targeted engagement; insights gathered from business-as-usual activities and operational data analysis; and valuation work. Between autumn 2016 (when the strategy was refreshed) and autumn 2018 (the submission of the revised draft WRMP), over 500,000 customers had been involved in 36 research projects. The development of the customer engagement strategy itself was the result of a series of facilitated co-creation workshops with 70 customers and 200 Anglian Water employees.

The topic of resilience, one that is initially difficult to engage customers on, was viewed as the most important of Anglian Water's four long-term strategic ambitions.

The conversation with customers regarding risks and impacts associated with investment in resilient water supplies focussed on three areas: (i) Views on resilience and severe restrictions (such as rota cuts and standpipes), (ii) Views on the choices of solution (i.e. demand management, new resource options), and (iii) Impacts on bills and what customers are willing to pay for.

Research activities most relevant to the WRMP

A range of qualitative and quantitative targeted customer engagement activities were used to understand customer views, perceptions and priorities relevant to WRMP19. Qualitative methods included focus groups, customer workshops and depth interviews. Quantitative methods included studies with large samples aiming at reaching and understanding a wide customer base and exploring more complex issues in depth. Table 6 summarises customer engagement activities highlighted by the company as most relevant to the development of its WRMP.

Table 6 Summary of Anglian Water's customer engagement initiatives most relevant to WRMP19

Type of research	Summary of research
Robust sampled surveys	Research into customer behavioural segmentation and water community perception, acceptability testing of long-term strategy and customer outcomes, stated preferences research focussing on water resource options and restrictions, willingness-to-pay research for a set of water, sewerage and environmental service areas, and acceptability testing.
Purposively sampled qualitative research and deliberative engagement	Qualitative interviews to explore customer segmentation characteristics in detail; a number of focus groups to develop understanding of customer perspectives, test how to best engage customers in discussion around long-term challenges, review the company's crisis management response, and explore results from stated preference surveys; research into vulnerability, including depth interviews; deliberative research via the online community focused on drought resilience, severe restrictions, water resource options, 'green water', vulnerability, smart meters, Anglian

	Water's actions to keep bills low and ensure intergenerational fairness; and testing the acceptability of the draft WRMP.
Self-selecting research and engagement activities	Engaging customers through a water festival, the touring Anglian Water Bus, Facebook and Twitter polls on 'green water'; and a series of meetings with water retailers.

Source: Adapted from Anglian Water Customer and stakeholder engagement, WRMP 2019 Technical Document, December 2019, Table 2.1

Points of interest from this engagement are developed further below.

Robust sampled surveys

Customer behavioural segmentation: A research report on customer behaviour segmentation was carried out with the aim to create a customer segmentation that would allow Anglian Water to better understand how attitudes towards water, the environment, and the company itself differ across the customer base; how this affects behaviour; what are the preferences of different customer segments for communication channels; and what would motivate different customer segments to reduce consumption. The study comprised a telephone survey with 1,200 household customers.

Community perception study: This involved an exploration of customer awareness and perception of the company's activities in the community and the environment.

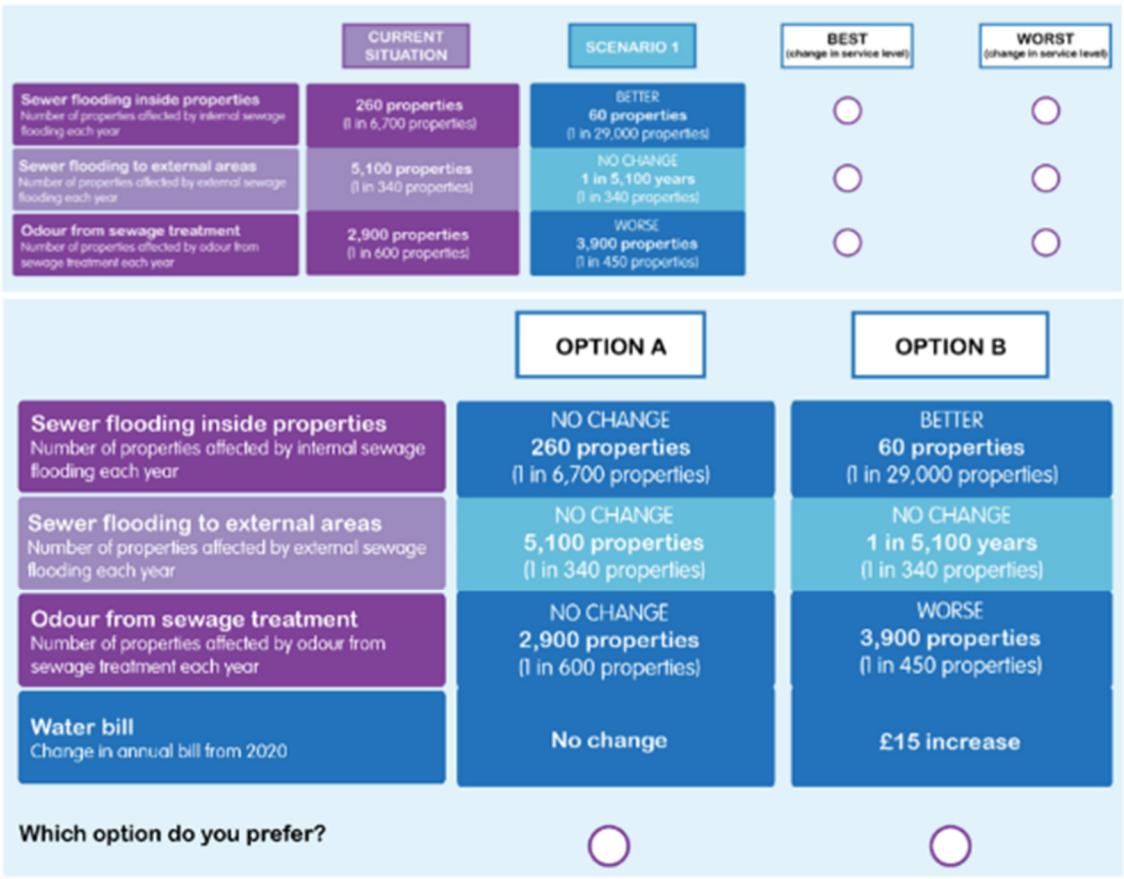
PR19 willingness to pay study[5]: The main stage willingness to pay survey was used to explore customer priorities and elicit customers' priorities and preferences for changes in service levels. The study developed two versions of the survey: a discrete choice experiment (DCE) and a best- worst scaling (BWS) approach. Illustrations of the materials prepared for customers are shown in Figure 11 and Figure 12. In the DCE format, respondents were asked to select their preferred package of water and sewerage services from three alternatives. Information on four types of characteristics were given on each package: unplanned interruptions, severe water restrictions, discolouration, leakage and water bill changes. In the BWS format, respondents made choices between specific changes in each service level. A paired comparison choice task presented respondents with trade-offs for changes in service levels and corresponding changes to the annual bill to obtain customer values for improving or maintaining service levels. The two approaches produced complementary results. The survey was carried out with the participation of a total of 1,353 household customers (900 DCE respondents, and 453 BWS respondents) and 500 non-household (business, DCE only) customers. Respondent feedback on the ease of the choice tasks found the DCE choice task to be slightly easier than the BWS (59% vs 41% found the task 'very easy' or 'fairly easy' respectively.

[5] In addition to using stated preference methods for valuation, Anglian Water also used a number of innovative valuation approaches, in relevance to the business plan. Albeit beyond the scope of WRMP engagement, these are mentioned here as examples of innovative approaches to valuation: (i) A subjective wellbeing approach to estimate the value of avoiding flooding and roadworks incidents via their impact on customers' wellbeing; (ii) A Gross Value Added (GVA) approach to estimate the value of avoiding long-term water supply interruptions via their estimated macroeconomic impact on non-households; (iii) A stated preference method that combined a choice experiment on customers' willingness to pay for river water quality improvements with an analysis of the customers' subjective preferences for river water quality using 'Q methodology'; (iv) Using a natural capital framework to help analyse the impact of investments on natural capital and ecosystem services to inform values related to the environment.

Figure 11 Illustration of DCE choice card, main stage valuation study

Source: Appendix 12G. Anglian Water's PR19 societal valuation programme

Figure 12 Illustration of BWS choice cards, main stage valuation study



Source: Appendix 12G. Anglian Water's PR19 societal valuation programme

Water resources second stage research: Anglian Water carried out a Second Stage Stated Preference Study focussed on drought resilience and water resource options. The aim of the study was to generate a set of quantified valuation data for use in water resources planning as well as the development of the business plan. It explored customer priorities

for water use restriction levels of service (customers were presented with alternative levels of service for severe restrictions (once every 100 years; once every 200 years; once every 500 years; never (once every 1000 years)); customer priorities for different water resource options (demand management and supply side); and customer values for estimating the benefit of investments that maintain or improve service levels. Customers were also asked how acceptable it would be to experience each type of restriction, in terms of expected frequency.

The study explored the following topics:

- Service restrictions: hosepipe bans, non-essential use bans, rota cuts and no tap water (standpipes);
- Demand-side options: reducing leakage, compulsory and encouraging optional metering, water saving devices, educating and incentivising water saving;
- Supply-side options: transferring water, desalination, reuse of treated wastewater, building new and extending existing reservoirs and underground storage.

The questionnaire structure started with screening questions; followed by background questions on respondents' awareness and experience of water services (e.g. taste and smell of tap water, interruptions to supply, low pressure leaks near home, sewer flooding, hosepipe bans, etc.); then questions on respondents' motivations for choice and to assess validity; and ending with socioeconomic and demographic information about the respondent.

The package experiment outlined, on a choice card, two alternative scenarios, the current situation and an alternative scenario. The scenarios comprised 7 service measures (preventing drought restrictions; look and taste of tap water; reducing leakage; introducing smart water meters; reliability of water supplies; preventing sewer flooding; quality of rivers) and associated price information (bill increase for the improvement in the service measures from the current situation to that in the alternative scenario).

1008 household and 408 non-household customers took part in the survey, via online interviews. To keep the survey at a manageable length, a twin type track approach was adopted, with half of each type of respondents answering questions on the resource options and the other half on levels of service and drought restrictions. The study also included post-survey focus groups to validate results.

Acceptability testing and research: acceptability testing was held at different stages in the WRMP development to obtain feedback on Anglian Water's long-term strategy and customer outcomes (as set out in Anglian Water's Strategic Direction Statement); the acceptability of the draft WRMP via deliberative research with the online community (see below); as well as, more widely, obtaining feedback on compulsory and proposed bespoke performance commitments and the draft PR19 business plan.

Purposively sampled qualitative research and deliberative engagement

Anglian Water held interviews and workshops to develop its customer engagement strategy with Anglian Water staff, experts, Customer Engagement Forum members, household customers, vulnerable customers, big and small business representatives. Follow-up qualitative interviews to the customer behavioural segmentation study were held to explore segmentation characteristics in more detail. Focus groups were further held to develop their understanding of the world from a customer perspective.

Long-term challenges: Co-creation workshops were conducted in order to inform the framing and language that should be used to engage customers on the topic of long-term challenges, and to identify the areas that customers feel should be prioritised by the company. For each initiative, materials were then tested in order to ensure that engagement would be as meaningful as possible. The topic of long-term challenges and customer outcomes was further discussed through a trial with Anglian Water's online community.

Post-survey focus groups: Following completion of the Second Stage Stated Preference Study, four follow-up focus groups were set up to explore results in more detail and present the potential cost of investment to ensure resilience to severe drought. This step served at validating and triangulating the proposed valuations to be applied in planning. The focus was on testing whether respondents had understood the concept of reliability for different water resource options and obtain feedback on the preferred water resource options (this phase included the testing of three additional options). The peer review to the study noted this as a useful tool for validation of the findings.

Deliberative research via the online community: Anglian Water developed an online panel to engage customers in discussions/ deliberative research relating to a wide range of topics relating to water resources, including: drought resilience, alternative water, vulnerability, financial fairness, smart water meters, acceptability of the WRMP, water resource management (whether reducing demand should be a priority, willingness to change behaviour to reduce demand, compulsory metering, climate change as a consideration in investment decisions, future-proofing), PR19 consultation feedback. Other topics engaged on through the online community for the wider PR19 programme included sewerage rehabilitation, low pressure, flooding, pollution definition, electric fleet, long-duration interruption, river quality, Q-analysis, catchment management, water hardness, cyber security, water industry national environmental program, water quality and social capital, exploring affordability and vulnerability support increase, exploring sludge transport, corporate governance.

Deliberative research on drought resilience: Water resilience was emphasised as a topic in Anglian Water's programme. Through deliberative research on drought resilience, severe restrictions and water resource options with the online community, customers were informed of investments considered to increase resilience to drought and the various water resource options that would need to be developed to do this. Customers were asked about their preferences regarding water resource options or whether they thought that the risk should be accepted. They were also asked about what they considered would be a reasonable bill increase associated with the scenarios they were presented with.

Following feedback from Ofwat on the draft WRMP on not having enabled informed engagement on drought resilience on account of not having provided customers key information (bill impacts, alternative levels of service, comparative performance), Anglian Water undertook further deliberative research with customers on the acceptability of its preferred plan. As a result, customers were provided with a range of information to ensure informed engagement, including alternative levels of service; the options required to improve resilience; how current performance compares to that of other companies and associated bill impacts. Customers were presented with three options on total bill increase to the average bill by 2025: investing in drought resilience (but not climate change), at £2.20 p.a.; investing in drought resilience and climate change, adding £8.30 p.a.; and future-proofing Anglian Water's network by building additional capacity now, which would add a total of £10.00 p.a.

Vulnerability: Anglian Water engaged with vulnerable customers to inform a definition of vulnerability that could be used for its services and communications with such customers. In addition, this research also aimed to understand these customers' expectations and the problems that they faced in accessing services and support. In addition, Anglian Water conducted focus groups with vulnerable customers to understand their views on a number of issues that included their current bill, investment options and associated bill profiles outlined in the business plan, the ODI for leakage, Anglian Water's vulnerability strategy etc. Further on this topic, Anglian Water conducted a poll on Twitter and Facebook that asked customers if they were willing to pay an additional amount of £2 on their water bill to support more specialist services for vulnerable customers.

Self-selective research and engagement activities

H2OMG was a water-themed community engagement scheme / water festival held over 5 days in Norwich, in August 2017. 33,000 visitors were able to interact with fairground-themed attractions (e.g. a water wheel of fortune which introduced customers to Anglian Water's 10 (target) outcomes and explored their response to drought risk, a "testing the water" stall (which focused on future service levels and attitudes to restrictions, a "magnet maze" which explored views on options for deficit reduction etc.) based on water resource challenges faced by Anglian Water, with a main focus on resilience. A voting station was set up at a separate information desk, collecting customer views on smart metering (customers were asked to vote on the question "do you want a smart meter?" yes/no/not sure). Throughout the festival Anglian Water consulted with visitors on their priorities and preferences on dealing with these challenges. The festival had a significant print, radio, TV and social media reach. Social media activity included five Twitter polls exploring customer views on key topics (e.g. views on compulsory metering, preferences on options for reducing drought risk, specific actions that customers are prepared to take to reduce their consumption, attitudes towards leakage).

H2O Let's Go was a tour to 14 sites around the Anglian Water region using an electric vehicle. Customers were engaged in a series of activities to understand their priorities. The main method of engagement was the 'Be the Boss' tool (also promoted through the My Account homepage and directly sent to 330,000 customers via email). This was a digital engagement tool which challenged customers to make key investment choices on behalf of Anglian Water.

The touring **Anglian Water Bus** visited 18 locations across the region and asked customers to cast their votes or participate in an online quiz on issues such as smart metering and water saving ideas.

Social media polls: Facebook and Twitter polls, in addition to those set up in support of the H2OMG festival, on 'green water' (i.e. whether it would be a good idea if all new homes in the future had two supplies for water, one for drinking and washing and the other, green, water for flushing the toilet and watering the garden), reservoirs, company approaches to vulnerability.

Feedback from water retailers: Anglian Water held a number of meetings with five of its retail customers: Waterscan, Wave, Business Stream, Castle Water and The Water Retail Company to obtain their views on the draft PR19 plans and the WRMP. The retailers were specifically asked to respond to Anglian Water's four long-term ambitions, aspects of service that mattered most to them, promoting water efficiency, wholesale tariffs, alternative water sources and the possibility of having an outcome delivery incentive (ODI) on retailer satisfaction.

Business-as-usual engagement: Anglian Water used regular communications and conversations with customers occurring as part of business-as-usual periods, alongside organisational performance data and service feedback, as a pool for extracting strategic insights alongside resolving tactical issues. Data sources included customer contacts and complaints; social media and online activity (i.e. blogs, websites, media) analysis to derive insights into the areas that customers were discussing online; quantitative online surveys such as CCW and SIM surveys; an online panel to engage customers in discussion topics related to water usage; appointment of community ambassadors (Anglian water staff trained to engage with customers across the region who obtained feedback from participants on a variety of topics through click pad voting button technology); setting up of a customer board comprising of several customers to provide feedback on strategic issues and conducting polls on Facebook and Twitter on a wide range of customer issues.

Summary of groups consulted

The various customer groups consulted included:

- Household and non-household customers taking part in quantitative surveys, stated preferences / willingness to pay research, qualitative interviews, focus groups, depth interviews, deliberative research, the online community and community engagement activities.
- Water retailers taking part in a series of meetings with Anglian Water following the submission of the draft WRMP, answering questions on the outline plan and seeking feedback on the draft WRMP.
- Stakeholders and the Customer Board engaged regarding acceptability of the draft WRMP.
- Customers and staff invited to take part in co-creation workshops on the customer engagement strategy.

How results were used

The results of customer WRMP engagement particularly informed the following decisions:

- The prioritisation of demand management, including further ambitious leakage reductions and the installation of smart meters.
- Investment in drought resilience, to ensure that no customers are vulnerable to severe restrictions in a severe drought event.
- The development of the strategic grid, which seeks to make best use of existing resources before developing new ones.

Valuation results from the PR19 second stage water resources study and the main stage study have been used as inputs in the WRMP and demand management strategy cost-benefit appraisal.

Outputs of customer preferences research also used in decision-making, through responding to the question: how well does the strategy align to customer preferences?

References

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(b) Anglian Water, December 2019. Water Resources Management Plan 2019
(c) Sophie Ahmad, Aug 2018, Anglian Water Customer Research and Engagement Synthesis Report v14
(d) Anglian Water, Jan 2018. 12J. Second Stage Stated Preference, Ken Willis Review
(e) Appendix 12G. Anglian Water's PR19 societal valuation programme
(f) WRMP 2019 Technical Document: Options Appraisal. December 2019

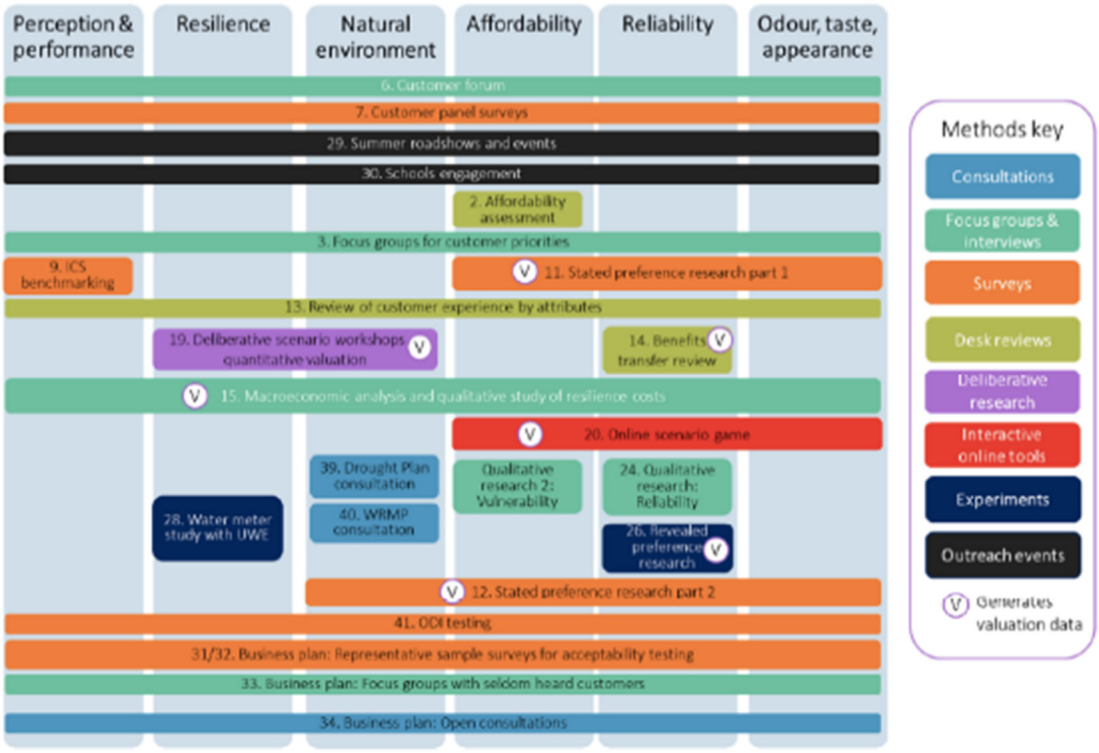
Bristol Water

Overview

Bristol Water developed a customer engagement framework to support the PR19 business planning and WRMP development process. The framework was based on mixed methods research and engagement, including valuation research, quantitative customer surveys, qualitative customer research, ongoing customer insight data, and acceptability research and testing. Parts of the engagement were designed to inform particular decisions and others as means of an ongoing engagement with customers.

Bristol Water's customer engagement framework was structured across six topic areas: perception and performance, resilience, natural environment, affordability, reliability, and odour, taste and appearance. Figure 13, extracted from the final WRMP for Bristol Water, summarises customer engagement on these topics.

Figure 13 Bristol Water's customer engagement framework



Source: Bristol Water Final WRMP, Figure 3-1

Research activities most relevant to the WRMP

The research methodologies relevant to the development of Bristol Water's WRMP, identified in Appendix C to the WRMP, include the following:

Qualitative research on customer priorities: Qualitative research on customer priorities was carried out in March 2017 with 27 customers over three 90-minute focus groups (#3 in the customer engagement framework). Group 1 comprised customers on a social tariff, Group 2 customers who experienced disruption, and Group 3 a control group. Topics discussed included open-ended questions (e.g. "what is a water company for?") and a ranking exercise of service attributes (customers were asked to rank their top 10 out of

24 of Bristol Water's service attributes, including reliability, water quality, affordability, leakage, water efficiency, conserving water/education/behaviour change, water meters, hosepipe bans, etc.). Groups were then asked to share the reasons behind their choices, whether these were affected during discussions with other participants, and to state what communication and engagement channels with Bristol Water they preferred.

Online customer panel survey: Bristol Water undertook quarterly surveys of 10-15 questions with an online customer panel of 2,000 participants ('Let us Know') (#7 in the customer engagement framework). Customers were asked to prioritise and express levels of satisfaction with Bristol Water's service. Customer insights collected contributed to the triangulation of evidence on a range of topics. Indicatively, insights such as considering meeting the water needs of a growing population, improving the environment and improving water efficiency as key goals for Bristol Water; and requesting that the term "operational resilience" be communicated in clearer language, were among the evidence collected.

Annual survey: Bristol Water also undertakes an annual phone or online survey with a sample of 1,000 participants with questions on prioritisation of service attributes, perceptions of service and value for money (#8 in the customer engagement framework).

Stated preference research: A stated preference research study (Part 1, #11 in the customer engagement framework) was carried out with the participation of 1,016 households (online interviews), 100 households with less engaged / vulnerable customers (in-home interviews), and 300 non-households (CATI interviews). The survey questionnaire was designed around two exercises: (1) a Max-Diff exercise on which types of service issue would have the most/least impact on respondents if they were to be affected by them; and (2) a Package exercise focussed on high-level trade-offs between service improvements or deteriorations and changes in the level of the bill. WTP values were elicited as a result on the following service measures: planned and unplanned supply interruptions, taste & odour, discoloured water, occasional low pressure, hosepipe ban, restrictions on essential use of water and works-related road disruption.

Part 2 of the stated preference research (#12 in the customer engagement framework) comprised a quantitative willingness to pay survey with the aim of understanding customers' preferences in relation to the various ways of maintaining or improving the water supply-demand balance. The results were to be used to challenge and influence Bristol Water's water resource management plan.

The choice exercise was developed around the idea that the utility of a water resources management plan to a customer can be decomposed into three factors:

- The impact on the frequency of temporary use bans / non-essential use bans
- The impact on the customers' bill
- The external costs/benefits of the supply and demand measures included within the plan.

573 household customers (50 face-to-face) and 300 non-household customers were asked to provide their choices relating to the following service attributes: reduce leakage; education on how to save water; issue water saving devices to customers; water transfers

from neighbouring companies; increase use of current water resources; develop new water resources; implement universal metering. Figure 14 shows the matrix of measures and impacts and the symbols used to characterise impacts in the survey.

Figure 14[6] Matrix of measures and impacts, Bristol Water Stage 2 stated preference research

Measure	Impact on water available for use	Impact on the environment	Local disruption	Impact on bill
Reduce leakage	💧💧	++	🛠🛠🛠	£££
Education on how to save water	💧	+++	--	£
Issue water saving devices to customers	💧	+++	--	£
Increase use of current water resources	💧💧	-	🛠	££
Develop new water resources	💧💧💧	--	🛠🛠🛠	£££
Water transfers from neighbouring companies	💧💧💧	-	🛠	££
Continue current metering policy	💧	++	🛠	£
Implement universal metering	💧💧	++	🛠🛠	££

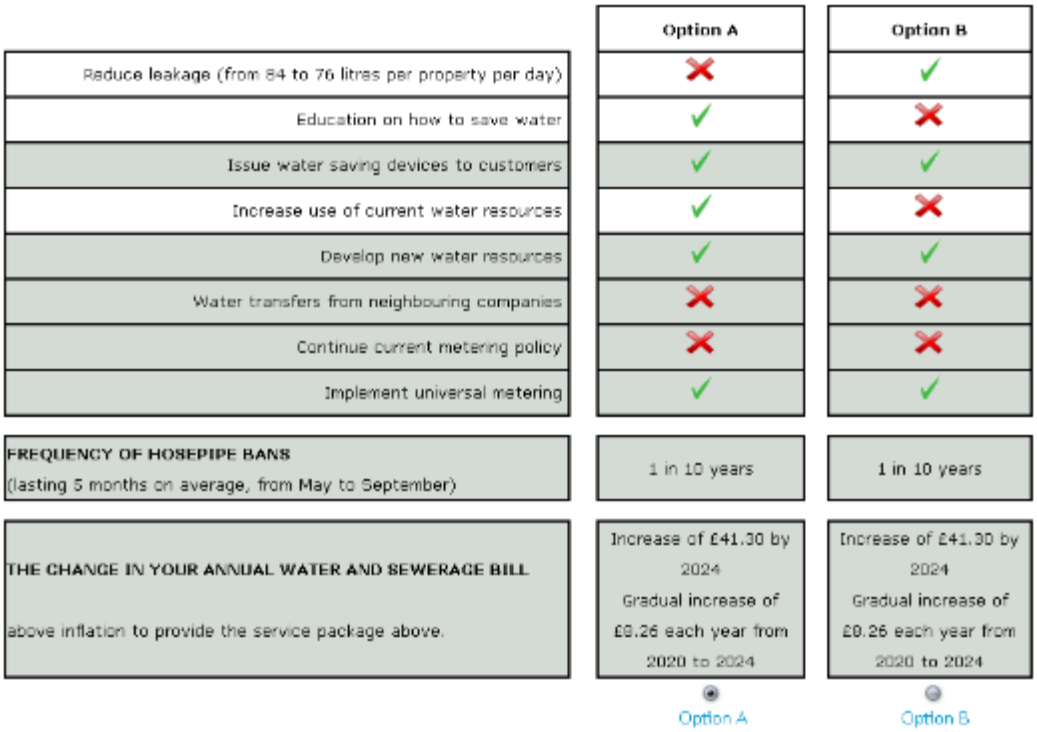
The more symbols shown, the greater the impact in question. In the case of "Impact on the environment", + indicates a positive impact and - indicates a harmful impact.

Source: Accent/PJM, WRMP research for Bristol Water, 2017

Respondents were asked to make a sequence of choices between potential water resources management plans (combinations of supply-demand measures) with associated impacts on the level of service and customer bills. Figure 15 represents an example choice card from the study.

[6] Please note that this figure is not available in the public domain.

Figure 15[7] Example stated preference choice card, Bristol Water Stage 2 stated preference research



Source: Accent/PJM WRMP research for Bristol Water, 2017

Customer experience of attributes: Customer insights and views on service attributes as revealed day-to-day through inbound calls, customer complaints, a service incentive mechanism (SIM) survey, a replica survey, feedback cards and social media (#13 in the customer engagement framework).

Benefits transfer: A benefits transfer desk review (#14 in the customer engagement framework) was carried out to triangulate valuation findings, which involved comparing the results of Bristol Water's PR19 values against other sources, such as Bristol Water's own PR14 stated preference Stage 1 and Stage 2 studies and wider PR14 industry valuations.

Resilience costs study: A macroeconomic (Gross Value Added) resilience costs study (#15 in the customer engagement framework) was carried out with 300 non-households. This comprised a quantitative macroeconomic analysis of costs of disruption caused by service attributes issues associated with resilience (e.g., economic impact for a business from having no water for 1 day in £). Assumptions were tested through qualitative interviews with representatives of key industries/businesses. The output of this study was the daily loss (in millions) in gross value added (GVA) due to drought for different drought events; this contributed to triangulation.

Deliberative resilience research: Deliberative research carried out on resilience through 3 day-long events with 37 household customers (a total of 111 household customers) (#19 in the customer engagement framework). This research resulted in both qualitative and quantitative findings on leakage, water efficiency, increased metering and protection

[7] Please note that this figure is not available in the public domain.

of environment. The events were structured around four parts: a simplified valuation survey applied pre- and post- event, to understand if, and how, customer valuations may change, with customers individually responding on keypads; a discovery session to aid customer understanding of their water supply; presentation of resilience scenarios and discussion around potential impacts on events such as droughts and mains bursts on customers, businesses and the environment; and a top trumps budgeting exercise to explore customer views on trade-offs between short- and long-term water resource options.

Further customer engagement took place during the public consultation phase of the draft WRMP. Bristol Water utilised road shows, the online panel, as well as three deliberative engagement sessions with customers to explore their views, particularly on demand reduction options (including metering and water efficiency) alongside seeking customer views on the proposals presented in the draft WRMP.

Online attributes scenario game: An online attributes scenario game was carried out with the participation of 300 customer households (#20 in the customer engagement framework). An online tool asked respondents to select their desired service level using sliders. As customers select higher/lower service levels, the bill shown in the tool rises/falls to illustrate the trade-offs between service quality and price. This represented a more user-friendly, graphical version of a stated preference rationale.

Qualitative customer research / performance commitments: Qualitative customer research on performance commitments and outcome delivery incentives (#24 in the customer engagement framework). Three half-day sessions were held with 29 household customers. These sessions introduced the idea of measuring performance, Bristol Water's performance commitments and their performance in relation with other companies. They included a ranking exercise and discussion on Bristol Water's PCs and customer views on ways of measurement; and on preferences for financial / reputational incentives for PCs. Among others, customer priorities on performance commitments relating to affordability, vulnerable customers and the environment and how these should be measured were elicited from this study.

Revealed preference research: Revealed preferences research (#26 in the customer engagement framework) was carried out with 528 household and 262 non-household customers. Both qualitative and quantitative data were obtained via asking customers about the choices they made, and their associated expenditures, when their supply was interrupted, through 4 focus groups in areas that had recently experienced supply disruption, 12 face-to-face interviews and 750 phone interviews.

Summary of groups consulted

Appendix B of Bristol Water's WRMP lists their complete consultee list for the development of the WRMP as follows. This includes statutory consultees.

- Regulators: Environment Agency, Ofwat, Defra, Drinking Water Inspectorate, Natural England, Natural Resources Wales, Welsh Government, Cadw, Historic England, Consumer Council for Water

- Household customers, including customers on social tariff, less engaged/vulnerable customers,
- Non-household customers: Bristol Water Non-Household Retail Customers (via the Bristol Water Wholesale team), Business West, CBI South West, Seabank Power Ltd, Rolls Royce plc, Siniat UK
- Neighbouring water companies: Wessex Water, South West Water, Severn Trent Water, Welsh Water
- Environmental organisations and trusts: Avon Wildlife Trust, Canal & Rivers Trust, Farming and Wildlife Advisory Group, RSPB, Somerset Wildlife Trust, Mendip Hills AONB Partnership, Salmon & Trout Conservation UK, Council for the Protection of Rural England
- City councils: Bath & North East Somerset Council, Bristol City Council, North Somerset Council, Mendip District Council, South Gloucestershire Council, Sedgemoor District Council,
- Unions and trade associations: Horticultural Trades Association, National Farmers Union, Country Land and Business Association
- Other: London Fire Brigade, Somerset Drainage Board, North Somerset Levels Internal Drainage Board, Lower Severn Internal Drainage Board, British Nuclear Group, The Bristol Port Company, North Bristol NHS Trust, Major Energy Users' Council, University of Bristol, University of the West of England, 13 MPs, 6 MEPs, 8 Libraries (and a Library Administration Centre), 4 Catchment Partnerships, Bristol Water Challenge Panel

How results were used

Customer engagement results were used to inform the development of the WRMP, informing, for example, company levels of service and preferences for the options that should be implemented. Examples of use of outputs include:

- Evidence from customer research activities was used to inform the assessment of water resource options. Each option was assigned a qualitative assessment using a graded scale, from an option likely to be positively supported by customers (+++) to an option likely to be substantially contrary to customer views (- - -). Both economic valuation data and non-valuation research findings were used to assign a grade.
- The outputs of the optimisation modelling process were subjected to additional scrutiny by an expert panel to test and confirm that overarching objectives of customers are at the centre of the decision-making process, in particular through reference to customer research findings.
- Options presented in the preferred programme were further tested with customers during the consultation on the draft WRMP.
- Customer views influenced the company's preferred approach to securing a supply-demand balance over the 25-year planning period, which is focused on leakage activities (additional leakage reduction beyond the SELL in the final WRMP). This was driven by strong customer preference (customer research before and after publication of the draft WRMP19 and customer responses to draft plan consultation) to prioritise leakage reduction activities before developing any new water sources.

References

a) Appendix B: WRMP consultee list
b) Appendix C: Research methodologies and outputs, relevant to the development of the WRMP. Bristol Water, November 2017.
c) Bristol Water Final Water Resources Management Plan 2019, August 2019, Chapter 3: Engagement with customers, stakeholders and regulators
d) PR19 Appendix C1: engagement, communication and research

Dŵr Cymru Welsh Water

Overview

Welsh Water conducted its PR19 customer engagement programme in three phases: phase 1 was focussed on obtaining information regarding customers' priorities, attitudes and preferences; phase 2 was focussed on determining customer valuations and trade-offs, including willingness to pay for performance improvements and phase 3 was focussed on testing the acceptability and affordability of the business plan. A combination of bespoke customer research, daily customer data sources, open public consultations, behavioural change campaigns and community engagement events were utilised across all the three phases.

For the development of the WRMP, Welsh Water sought views on:

- Approach and proposals to resolve the forecast supply demand deficits and improve resilience
- The level of water resource service customers would prefer across the region
- The types of solutions that they would like to see which resolve any supply shortfalls and more generally their feelings around leakage and metering.

The overall customer engagement and research programme for PR19 focused on the following topics:

- Phase 1: resilience; 'worst served' customers; environment; WRMP: willingness to pay (attitudes regarding water shortages/restrictions, and supply/demand side resilience options); vulnerable customers; customer priorities; performance measures; customer service expectations.
- Phase 2: willingness to pay (areas and levels of service of importance); customer expectations and priorities on planning/strategic objectives; bills; qualitative and quantitative performance targets; bathing waters; ODIs, social tariffs.
- Phase 3: business plan options testing; acceptability testing.

This section discusses the research most relevant to the shaping of the water resources management plan, as referenced in the final plan.

Research activities most relevant to the WRMP

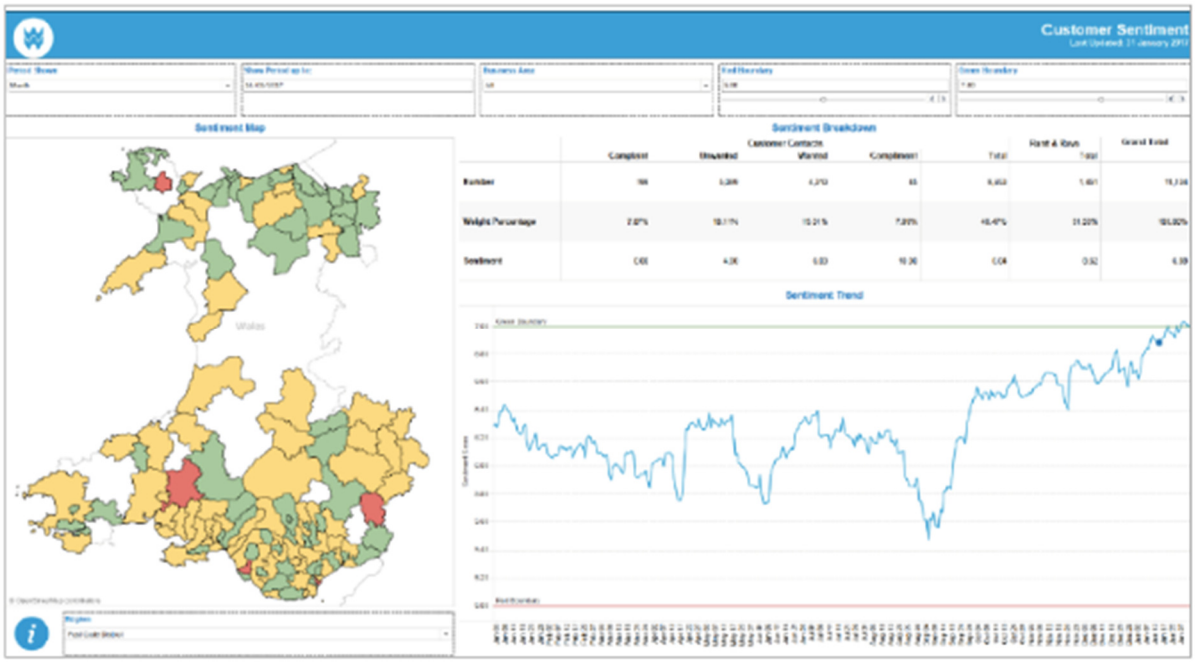
The first phase included a number of bespoke research projects to understand customers' priorities and preferences. These projects included qualitative and quantitative surveys to explore customers' views regarding the WRMP, the environment, performance measures, service expectations, water resilience and to understand the priorities and needs of the 'worst-served' and vulnerable customers. The first phase concluded with a triangulation of customers' priorities based on its research project outputs as well as a wide range of customer evidence. The customer evidence sources used for the triangulation included historical performance data (e.g. PR14 and AMP6 research), continuous engagement data (e.g. Trust tracker, Rant and Rave, Customer Feedback App, CCW Water Matters etc.), primary qualitative research (e.g. performance measures research) and other industry research (e.g. CCW research).

A number of bespoke research projects were undertaken during the second phase, to understand customers' priorities and values. Welsh Water used innovative valuation methods to derive customer values. Those pieces of research most relevant to shaping the WRMP include:

"Have Your Say" open public consultation. This comprised both qualitative and quantitative strands, aimed at identifying customers' priorities for the strategic responses within the company's Water 2050 vision. While the qualitative consultation involved focus groups, the quantitative consultation involved reaching out to customers at various public events throughout Wales via surveys on tablets, company website, a Facebook Messenger chatbot and paper questionnaires. In all of these surveys, the participants were asked to rate the strategic responses in order of importance out of a scale of 5.

Figure 16 shows the Customer Sentiment Dashboard, an interactive dashboard tool based on customer contact data and ongoing customer tracker data. The tool provides real time quantitative evaluation of customer sentiment across the Welsh water supply region thereby helping Welsh Water identify and focus on the areas that are of importance to its customers.

Figure 16 Customer sentiment dashboard, Welsh Water



Source: Ref 1.1. PR19 Customer Engagement Report, Figure 4

Based on a combination of customer research data and continuous tracking of customer sentiment, the company developed 6 promises to reflect the service they would provide to all customers, the most important of which (for customers) are '*safe, clean water for all*', and '*safeguard our environment for future generations*'.

The Facebook Messenger Chatbot introduced as part of the Have Your Say campaign and the Customer Sentiment Dashboard were two innovative engagement channels used by Welsh Water as part of its PR19 programme.

Performance targets and Willingness to Pay: Welsh Water used innovative valuation methods to derive the value customers placed on performance improvements. These included:

- A core stated preference survey including an interlinked MaxDiff and Package exercise. The survey questionnaire was designed around two interlinked exercises: (1) a 'MaxDiff' exercise focussed on which types of service issue would have the most, and least, impact on participants if they were to be affected by them; and (2) a 'Package' exercise focussed on high level trade-offs between service improvements or deteriorations and changes in the level of the bill. Attributes such as discoloured water, short and long-term interruptions to water supply and coastal bathing water quality were among the service issues examined.
- A menu-based stated preference survey which asked customers about their views on current service levels and whether they would be willing to pay more on their bill to improve them. The survey questions were asked in the context of the impact on bills of improved performance, historical performance levels achieved comparisons with other companies' performance and trading off of improvements across measures within a fixed bill profile.
- Revealed preference research using a travel cost approach to value bathing and river water quality
- Deliberative valuation workshops in which customers had in-depth discussions regarding the full list of service measures and were asked to vote on the importance of each of these measures.

Qualitative and quantitative stated preference research, WRMP: Stated preference research activities were carried out with the objective of obtaining customer views on: the various types of options available to allow maintaining and improving the supply-demand balance in the area served by Welsh Water; customers' preferences regarding the level of resilience the company should adopt as well as attitudes towards water shortages and extreme drought water use restrictions, and how these could be addressed. Both household and non-household customers were consulted through discussion works groups, in-home interviews, telephone cognitive interviews, CATI pilot interviews and CATI main stage interviews.

The quantitative stated preference WRMP research focused on providing an understanding of customers' preferences in relation to the various ways of maintaining or improving the water supply-demand balance as well as with reference to the types of restrictions that might be imposed in a drought situation. The study also explored customers' preferences with respect to improved resilience to the chance of emergency drought restrictions (e.g. rota cuts to supply) and in relation to alternative metering policies. Outputs were intended for use in cost-benefit analysis for Welsh Water's WRMP and drought policy planning.

Four stated preference exercises were carried out that obtained monetary estimates on: (SP1) water resources management options, (SP2) water use restrictions options, (SP3) resilience valuation and (SP4) metering options. SP1 asked respondents to make a sequence of choices between options each representing a potential water resources plan. The options were characterised by the combination of supply-demand measures included and the impact on the level of service and on the customer's bill. SP2 measured

customers' views on the types of water uses that should be allowed and prohibited if a hosepipe ban was put in place. SP3 gave a context statement to respondents and then asked them whether they would be willing to pay an additional cost on their current water bill for increased security of supply, with follow-on questions to pinpoint the value. Finally, SP4 gave customers three choices of metering policy and asked which was the most, and which the least, that they would like to see. Figure 17 is an example SP1 choice card and Figure 18 shows the metering policies tested.

Figure 17[8] Example SP1 choice card

	Option A	Option B
Reduce leakage rate (from 22% to 20%)	✗	✓
Reduce leakage rate (from 20% to 15%)	✗	✗
Compulsory metering (ordinary meters)	✓	✗
Compulsory metering (smart meters)	✗	✗
Expand existing reservoir	✗	✗
Re-open existing unused reservoir	✗	✗
New wastewater recycling works	✓	✓
New water transfers from neighbouring companies	✗	✗
New water to neighbouring companies	✓	✗
Internal water transfer	✓	✓
Water saving measures offered to targeted customers	✓	✗
New river or groundwater abstraction	✓	✓
Re-open existing river or groundwater abstraction	✗	✗
FREQUENCY OF HOSEPIPE BANS (lasting 5 months on average, from May to September)	1 in 20 years	1 in 20 years
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.	No change to your bill	No change to your bill

Source: Accent/PJM WRMP research for Welsh Water, 2017

Figure 18 Metering options tested at SP4

1	A compulsory metering policy, where all customers are billed by a meter without choice. Under this scenario customers would receive information on their water use delivered via a mobile phone app, or an online account. Customers would also receive a water efficiency audit to resolve any leaks, and to install water efficiency products to help manage their water use.
2	A progressive metering policy where all customers are metered, but have a 2 year adaption period to a measured basis (unless they prefer to swap earlier because of bill savings) and receive water efficiency support in terms of an audit and device installation or a leak repair before moving to a measured bill.
3	Optional, where customers opt to be billed on a measured basis, and receive water bills annually. (This option may be less effective at solving water resource challenges in the short term)

Source: Accent/PJM WRMP research for Welsh Water, 2017

[8] Please note that this figure is not available in the public domain.

The WRMP raises an interesting point regarding conflict in willingness to pay results between the PR19 and the WRMP19 surveys with respect to the topics of leakage and resilience. Regarding leakage, SP survey results show that customers would like to see a reduction in leakage as a priority and have selected the rate of reduction they consider optimum. Different rates of reduction come at a cost, and customers have indicated they have a limit as to the rate they would support. The WRMP notes there is significant conflict between these results and the findings of the wider PR19 survey results, which showed a strong preference for Welsh Water's existing position based on the sustainable economic level of leakage. However, it is underlined that the context of the two surveys was very different and the leakage attribute itself was described differently. Regarding resilience, the SP survey results indicate customers' wish to see an improvement in relation to the implementation of extreme drought measures, while the wider survey results gave mixed views on the acceptability of the higher bills that this would entail.

Other activities, linked to PR19, included:

- A Youth Board, comprising a group of 15 young people (16-18 years old) from schools across south Wales to advise the company on how to tackle significant issues facing the company in the future. The students then worked on an assignment over the summer following their engagement.
- Community Hubs, to target 'seldom-heard' or 'hard-to-reach', less digitally connected groups. This targeted a higher ratio of older customers; customers with lower incomes; long-term unemployed customers; customers on benefits; and customers experiencing some form of disability. Participants responded using iPads in local community centres, with the help of research field staff where necessary.
- Specific research on bills and affordability.

Summary of Groups Consulted

Summarising the groups consulted on the above-listed research, these comprise:

- An online panel of 500 customers ('Have Your Say')
- Water 2050: expert attendees, interested/informed, uninformed customers, engaged via different means (1-2-1 meetings / stakeholder workshops; online community / open consultation / focus groups; high level/website/chatbot/events; respectively).
- Stated preference research: This main survey comprised computer-assisted telephone interviews with 1000 dual-service households, 50 wastewater only households and 500 dual-service non-household.
- Quantitative research for performance targets survey (menu exercise): online and telephone survey with 1,013 household and 300 non-household customers.
- Deliberative valuation workshops: 4 large-scale workshops lasting approximately 4.5h, with c. 50 customers attending each.
- Quantitative stated preference research, WRMP: a total of 700 interviews with DCWW's customers, 400 with household customers and 300 with non-household customers.
- Continuous engagement as well as specific performance targets and willingness to pay research with household and non-household customers of various demographic characteristics.

How results were used

Customer and stakeholder engagement results fed into the shaping of the various strategies developed as part of the WRMP. Customer and stakeholder engagement took place concurrently with the development of the supply-demand balances, such that a holistic understanding of the supply position was gained and then built into the development of solutions. Strong customer and stakeholder views and clear links to other strategies were two of the main drivers based on which preferred schemes to resolve the forecast supply-demand deficit were selected. Customer views and preferences, stemming from detailed customer and stakeholder engagement, were therefore used as inputs to accepting/rejecting options.

Another key point in the decision-making process influenced by outputs of customer research was at the selection of the 'best value' solution, when a broader evaluation of the benefits of the schemes was considered, over and above the least cost output from the optimisation model.

References

a) Welsh Water Final Water Resources Management Plan – Main Technical Report, March 2019. Chapter 6: Decision Making.
b) Welsh Water Ref 1.1. PR19: Customer Engagement Report. September 2018.
c) Dŵr Cymru Welsh Water, WMRP Research Final Report. Accent / PJM Economics, December 2017. (NB: not publicly available)

Northumbrian Water

Overview

Northumbrian Water used insight from several qualitative and quantitative customer research and engagement activities on areas that link with water resource management and water efficiency. The foundation for the approach to customer engagement comprised two key pieces of research, 'Defining the conversation' and 'Communicating Risk' which took place early in the planning process. Customers were engaged on various topics including demand management, communication of risk, water efficiency, reliability and resilience, leakage, and the environment.

Research activities most relevant to the WRMP

Defining the conversation: Workshops and hall tests to understand customers' preferences and the specific areas that they would like to influence. This piece of research had a separate qualitative and a quantitative component. For the qualitative component, it engaged with household and non-household customers as well as stakeholders via workshops to explore where customers place importance (organised under three themes: home, community, environment), what they feel they should be consulted on or would like to influence, and what their preferred ways of engagement were. This research was key in shaping the customer engagement strategy. Follow-up quantitative research was carried out to validate the findings of the qualitative study.

Communicating Risk: Northumbrian Water engaged customers around how they prefer the concepts of probability, chance and risk to be communicated as it observed that a significant minority of consultees were not comfortable with such numerical representations, which would lead to disengagement and lack of data reliability. This research informed the development of the willingness to pay survey. Focus groups were held to understand customers' attitudes and preferences towards communicating risk and to explore the most customer-friendly, yet robust, metric of risk to be used in the design of WTP survey questionnaires. The topics explored were grouped as follows: experiences of Northumbrian Water (or Essex & Suffolk water) in terms of relationship between customer and company; awareness of the challenges that the water industry faces; understanding of risk in the water industry; understanding and interpretation of probability, chance or risk and the format in which customers respond to best; interpretation of risk metrics.

Research on metering and supply-demand investment priorities: This involved a qualitative (deliberative workshops and face-to-face in-depth interviews with vulnerable customers) and quantitative component (online survey via online panel, Facebook and Computer Aided Personal Interviewing).

Informed by the 'Defining the Conversation' and 'Communicating Risk' project findings, Northumbrian Water chose to concentrate on demand management options rather than levels of service which they considered more complex and poorly understood, such as hosepipe ban frequency. The range of issues explored included customer views on metering, expectations on the role of Northumbrian Water in promoting metering,

especially to vulnerable customers, views on installation, reading and billing timescales, expectations on the role of Northumbrian Water in providing information on smart metering, opinions on leakage, priorities regarding supply-side vis-à-vis demand-side investment areas.

Specific objectives for the study and questions posed included[9]:

- Uninformed customer perceptions: What customers think metering is for, the benefits and disadvantages associated with it, and who they believe it benefits.
- Customer drivers and barriers: Which drivers and barriers are most important for different types of customer?
- Customer expectations and attitudes towards choice; views on optant, selective, and compulsory metering.
- Customer expectations of how proactively NWL promote meters and especially to customers in vulnerable circumstances.
- Installation, reading and billing timescales. Is 90 days the right installation standard? How often do customers expect meters to be read? When do they expect bills? Attitudes to methods of bill delivery: apps, online, paper etc?
- Attitudes towards meter reversion: Whether customers support the idea of customers who opted for a meter to revert back to unmeasured billing.
- Information requirements: What customers would like, and what they expect NWL to provide, including a consideration of SMART metering and customers' experiences with the energy industry.
- Meter location: Customers' preferences on internal vs external metering.
- Tariffs: What customers think of the tariffs NWL currently offer and what opportunities do meters create for new tariffs? Opinions of rising block/seasonal tariffs.
- Prejudicial impact: Concerns customers may have about metering. How they expect NWL to manage the impact on lower income families and vulnerable customers
- How do customers want NWL to choose between options to manage the supply demand balance? Can they rank their preferences or do they support NWL taking the most cost effective option available at the time?
- Customer opinion on leakage: How concerned are customers about leakage (scale 1-10)?
- Why are customers concerned about leakage? What do customers think is a tolerable level of leakage (how much leakage in % is acceptable on a daily basis)? What are customers' views of how NWL set leakage levels on the sustainable economic basis? How should NWL address the significant issue of customer-side leakage? Location of meter affects whether customer side leakage is picked up: Does this affect customers preference on location of meter?
- Consumption: Do customers want to reduce their own consumption? Do customers want NWL to help them reduce their water use? Do customers want NWL to play a leading role in reducing consumption more widely? Views on targets for water usage. Do they feel NWL are doing enough (provide information, smart metering, water efficiency app etc)? Following an explanation of the methods NWL use, ask what methods customers find most acceptable?

[9] See Northumbrian Water Business Plan Appendix 2.2, Customer Engagement Summaries for PR19, p. 87

- Bills: methods of delivery/payment of bills, explore use of apps/online in energy market.

Resilience research: Workshops to understand customer and stakeholder views on resilience. These were explored through an events-based workshop approach incorporating voting, scenario-based videos and brainstorming. Four workshops were conducted in different areas across the area served by Northumbrian Water, engaging a total of 125 customers. A staff workshop was held beforehand to test workshop materials before engaging with customers. This qualitative, exploratory research was complemented by interactive meetings and telephone interviews with an additional 32 stakeholders.

Customer priorities regarding leakage, resilience and the environment: Six focus groups with the objective of identifying views and priorities in respect of Northumbrian Water going beyond government requirements in the areas of environment, leakage and rare events, whilst providing an indication around willingness to pay. Customers were asked to:

- rate their agreement with NWL going above and beyond government requirements and spending more of customers money across a number of environmental activities
- visualise what they would find most difficult if their water supply was cut off for several days
- describe their views around leakage.

Initially participants were asked to rate their priorities without access to any relevant information. However, once Northumbrian Water presented relevant comparative and cost information to participants, they were able to take more informed decisions and thereby revise their priorities. For example, when initially asked about leakage, the majority of the participants remained unconcerned. Once participants were presented with the relevant information, more than two thirds of customers opted to bring the level of leakage down.

At the end of the sessions, each customer was given 10 notional £1 notes and asked it to imagine it was their own money. They then had to 'spend' that £10 across five areas: environmental activities; reducing leakage; preparing for rare events; something else NW / ESW should be doing; keep the money. This piece of research was carried out in 2014.

Customer priorities on leakage, metering, tariffs, consumption and preferences for managing the supply-demand balance were also explored via an online survey for WRMP19. Participants were again asked to demonstrate what their priorities were in the context of allocating a £10 budget across five potential water resource management investment options.

Valuation research: Northumbrian Water opted for an alternative design to its valuation research to the traditional stated preference approaches. It used a slider tool approach to (i) explore customer preferences for service level improvements for a number of service areas, and (ii) obtain customer valuations for high service levels to inform the setting of outcome delivery incentives. For (i), customers were asked to allocate a proportion of their own bill to the service areas included in the tool. Results from this

part of the research were used to obtain relative priorities across service areas as well as the relative strength of that prioritisation, as the service levels included in the tool were related to the cost of Northumbrian to provide them. (ii) consisted of two parts: a constrained task in which customers were presented with a fixed amount of money to allocate across the service areas included in the tool, based on their valuation of the best possible performance level, and an unconstrained task in which customers were initially asked how much they would be willing to pay in total for rewards, then next, asked to allocate their chosen amount of money across the service areas included in the tool, again based on their valuation of the best performance level. The innovation in this approach was described as presenting service options to customers at cost and asking them to choose between service values based on how much they value those services.

Continuous engagement: As part of continuous customer engagement, Northumbrian Water used tracking research (e.g. telephone surveys to understand customer satisfaction, priorities etc.); bespoke qualitative and quantitative research around strategic aspects of service, including resilience, inclusivity, social tariffs etc. and other insights which included other research (e.g. CCW, Ofwat, charities etc.) and daily interactions with customers and social media analysis.

Acceptability research: A representative sample of Northumbrian Water's customers was invited to look at a summary of the PR19 business plan and the section specifically relating to water resource management, and comment on whether or not they accept it.

In addition to the above customer research, under PR19 Northumbrian Water sought specific insights including obtaining feedback from an online panel of customers ('Have your Say') and a number of bespoke projects to co-create specific elements of the business and water resources plans. Overall, most of these activities were largely qualitative and based on uninformed customer views. Customers' priorities resulting from these activities were either based on rankings or by asking customers to score the importance of a service area/initiative on a scale from 1-10.

Several other projects which touch on elements of water resource management planning included the following:

- Focus groups to help develop Northumbrian Water's bespoke measures of success.
- Deliberative workshops with current and future customers to gather their views on Northumbrian Water's ambitions within their long-term strategy plan.
- Deliberative events held to understand customers' prioritisation of service improvements.
- Vulnerable Customers Research Overview: this explored the broad range of customer vulnerabilities, the drivers and barriers of customers joining the existing support schemes, customers' experience of the existing Support PLUS schemes etc.
- Conversations with Vulnerable Customers: this involved focus groups and telephone interviews to understand the needs and expectations of vulnerable customers to inform the Northumbrian Water Inclusive Strategy.
- Resilience, Asset Health and Long-Term Affordability: this involved exploring customers' attitudes to water and their preference for minimising risks.

- Digital Engagement Research: this involved research to understand customers' current online habits in order to understand customers' preferences for digital channels including social media.
- Alexa Water Skill – an artificial intelligence-based app that aims to inform and educate customers and is a result of Northumbrian Water's Innovation Festivals. A co-creation exercise was carried out to prove in which direction the proof of concept of Alexa water skill could be taken, and to pinpoint where alignment should come in between marketing-based signposting and customer priorities/drivers. Prioritising among personas and sense-checking features of the app, as well as roleplaying what they would ask Alexa, were utilised in those sessions.

Summary of groups consulted

The groups referenced in the materials reviewed included several segments of customers, current and future; employees; and supply partners. Groups engaged by piece of research were as follows:

- Defining the conversation: Qualitative: four tables of eight customers – 32 customers present at each event. Mix of current and future, household and SME customers. Quantitative: 8 hall tests with 500 customers.
- Communicating risk: eight focus groups lasting 90 minutes. 66 customers took part, segmented by life stage, educational attainment and area, including future customers, those who had experienced service failures and those with below average numeracy. 13 in home depth interviews conducted with customers in circumstances that would make them particularly vulnerable in the event of a service failure.
- Resilience research: a range of customers engaged in terms of gender, age and socioeconomic group, as well as the following customer profiles: customers affected by flooding or other resilience scale events; customers at low risk of flooding; vulnerable customers and those on the risk register; black and ethnic minority groups; young people (future customers); customers with high/low satisfaction with water/waste services; customers in urban, rural and coastal communities; customers with recent/no recent contact with Northumbrian Water.
- Vulnerable Customers Research Overview: 9 telephone in-depth interviews with organisations offering support from Northumbrian Water's three operating areas and 10 with customers accessing Support PLIS; 8 conversations with groups of customers in vulnerable circumstances. With the participation of NWL employees taking part in the conversation and providing information to customers.
- Conversations with Vulnerable Customers: 8 focus groups with vulnerable customers, 9 telephone interviews with stakeholders and 10 telephone interviews with SupportPLUS customers.
- Digital Engagement Research: online survey of 15,524 customers and representative telephone survey of 650 customers and 20 stakeholders.
- Metering, supply and demand: qualitative stage: nine workshops with more than 200 customers and eight face-to-face in-depth interviews with vulnerable customers. Quantitative stage: online survey via online panel, Facebook and Computer Aided Personal Interviewing. 687 surveys.
- Resilience, asset health and long-term affordability: 5 deliberative workshops with a total of 120 diverse household customers, two focus groups with 12 future

customers, 12 interviews with vulnerable customers, eight interviews with businesses.

How results were used

The WRMP has been shaped based on insight from the several qualitative and quantitative customer research and engagement projects into areas that influence water resource management and water efficiency. The WRMP talks about findings and how these influenced the WRMP (for instance in terms of metering strategy and approach to water efficiency) but does not go into detail as to the use of results at specific points in the decision-making.

References

a) Northumbrian Water Final Water Resources Management Plan, August 2019
b) Business Plan Appendix 2.2, Customer Engagement Summaries for PR19

Severn Trent

Overview

Severn Trent Water's customer engagement programme consisted of a wide range of qualitative and quantitative techniques. The overall research framework was based on three principles:

- targeted qualitative research, to understand the issues that are important in people's lives (beyond the role that water plays)
- validation of these through focus groups, social media scraping, a review of the company's historical research, engagement with front line staff and data from customer interactions
- seeking on-going challenge from the Water Forum on conclusions.

A key consideration in selecting research techniques was understanding how customers perceive issues by considering the type of issue at hand and how it ties in with a customer need; the extent of customers' conscious understanding of the service or issue; and the likely time of occurrence of this issue, i.e. whether it is something that occurs in the present, in the near term or in the long term. At the heart of the research framework is the understanding that not all customer needs are equal. For this reason, Severn Trent has built its customer research strategy around the notion that there is a hierarchy of customer needs and that it should be avoided to ask customers to make trade-offs across different types of needs. The categorisation of needs was based on Maslow's hierarchy, drawing on three levels: delivering functional needs, meeting psychological needs; and creating opportunities for self-fulfilment.

A range of topics were covered through the various techniques used. For instance, among the topics covered in workshops, the following were included: customer views on the impact of drought, their levels of tolerance regarding risk and impact of drought; informed reactions to proposed solutions regarding supply options (e.g. water transfer, effluent reuse, alternative use of sources) and demand management solutions (e.g. metering, behavioural change), and attitudes towards leakage and leakage reduction; attitudes towards short term versus long term investment options; attitudes to metering; attitudes to balancing water supply sources in areas with a supply / demand challenge; a gauging of willingness to pay for investment to improve supply / demand balance; intergenerational fairness and future customers; Water Framework Directive (WFD) (customers' views about how to manage uncertain options/not certain to be progressed, with a preference for higher bills now with potential for a reduction in the future, or lower bills now with a risk of higher bills; attitudes about how the company responds to uncertainty associated with climate change – including the balance between investing now versus investing later.

Research activities most relevant to the WRMP

Severn Trent's overall customer engagement programme has utilised a range of different approaches and methods, including customer needs and priorities research, social media

scraping, customer satisfaction quarterly tracker, operational insight, valuation research, deliberative research, co-creation, research on helping customers who struggle to pay, best in class customer service and experience research, choices research, acceptability research. Following the publication of the draft WRMP and challenges from the Water Forum, Severn Trent commissioned additional customer research. Some of the key research activities were:

On-going engagement: Day-to-d ay customer data sources used to understand priorities, including customer tracker surveys (on satisfaction, trust, value for money and affordability) and customer contact and complaints data. With respect to the latter, Severn Trent identified the top issues for complaint/contact. For written complaints, the top 10 complaint issues cover over 75% of complaints. For non-operational customer contacts, the top five reasons for contact cover 95% of the total contact received.

Views and priorities / social media: Severn Trent Water used innovative techniques to gain insight from social media on customers' views and priorities. It scraped and analysed customer conversations (unprompted by Severn Trent) on the water industry and the company (i.e. how they perceive Severn Trent and what the company could do better) from Facebook, Twitter, Google, Instagram, News sites, blogs and forums, YouTube etc.

Online panel Tap Chat: The ongoing dialogue with customers included an online community of customers known as Tap Chat. Tap Chat used online activities, discussions, surveys and quick polls on a range of topics to help understand customers' views, concerns and needs related to their current and future water services.

Customer needs research and co-creation: The key objective of this research was to understand customers' needs and priorities related to their water services. The research included interactions with the online panel of customers, depth interviews, deliberative workshops and co-creation workshops covering general customers, customers belonging to the largest faith and cultural groups in Severn Trent's area, vulnerable customers, future customers and shared/indirect bill payers, and customers who had suffered service failures. In all of these activities, both unprompted and informed customers' views were explored.

Water trading and water scarcity research: Joint research with Thames Water and United Utilities on water trading and water scarcity, with a mix of household and non-household customers (440 Severn Trent customers participated out of a total of 1,770). Across the project there were 49 non-household depth interviews, deep dive online community, online survey amongst household customers. Customers were asked to rank factors in selecting supply and demand-side options (sustainability, the environment, volume of water produced, option resilience, cost to build, customer acceptability). The aim was to understand spontaneous views of customers towards possible water resource management options; to obtain views towards water trading, focusing on perceived barriers and assurances needed to overcome these, and to understand how these differ across customer groups[10].

[10] See also: description of water trading research project in the United Utilities summary.

Real options research: this involved two parts. The first part comprised a day-long deliberative workshop to understand which of the approaches Severn Trent was considering in relation to the Water Framework Directive (WFD) and the supply/demand solutions that customers would prefer, attitudes about responding to uncertainty associated with climate change (balance between investing now vs. investing later), how customers feel about variations in their bill and what variations are deemed acceptable. The second part comprised an online panel discussion and two polls to understand customers' preferences for the approach that Severn Trent Water could take with respect to improving the biological health of rivers over 2020 – 2025 to comply with the WFD, the supply-demand balance, ensuring water for future generations, and testing different options for how the company might respond to the uncertainty associated with climate change. As the same topics were explored through both the online community and deliberative research, this was an opportunity for Severn Trent to examine whether results are different when customers had a more informed understanding. Qualitative and quantitative.

Deliberative workshops on strategic challenges – supply and demand: three deliberative workshops with a total of 48 participants held in different locations across the Midlands. Topics covered at these workshops included: understanding customer views on the impact of drought; exploring levels of tolerance regarding risk and impact of drought; exploring informed reactions to proposed solutions regarding supply options (e.g. water transfer, effluent reuse, alternative use of sources) and demand management solutions (e.g. metering, behavioural change), and attitudes towards leakage and leakage reduction; exploring attitudes towards short term versus long term investment options; exploring attitudes to metering; exploring attitudes to balancing water supply sources in areas with a supply / demand challenge; gauging willingness to pay for investment to improve supply / demand balance. Workshops were structured as follows:

- One main long-day workshop held to explore preferences on supply/demand options to meet the supply/demand deficit. The research took participants through a journey, from uninformed to informed, recording their views and reactions at different points. Customer views were explored both on independent options and on packages of options, probing customer views on their preferred package of options, including the balance of demand- and supply-side interventions. This research was complemented by 10 'in-home' interviews with customers facing vulnerable circumstances, around water resources and demand issues, attitudes to these topics and preferences for different supply and demand options.
- Two half-day workshops on metering and balancing water supply sources in an area with a supply/demand challenge.

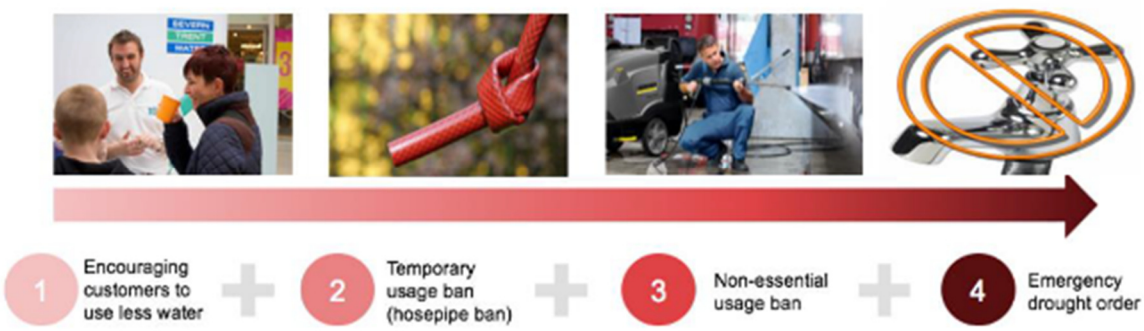
Deliberative research on strategic challenges – environment: Deliberative workshops and depth interviews to explore customers views (both unprompted and informed) and priorities related to the environment (e.g. on catchment management, water framework directive and biodiversity).

Deliberative research on resilience on strategic challenges – resilience: Full-day deliberative workshop with 24 customers and 10 in-home depth interviews with customers in vulnerable circumstances, exploring perceptions on increasing resilience (focus on anticipating the challenge or preparing a response when the challenge

appears?). Participants were taken on a 'journey' so that the things that matter most to them and their priorities (both spontaneous and when informed about Severn Trent Water activities) could be explored. This approach allowed the company to provide information, building participants' knowledge so that they were able to make an informed decision about different options and priorities.

Deliberative research on water stress: Perceptions of water stress/drought and customer preferences on addressing this. A drought story board was used to facilitate communicating the development of a drought situation over time. Figure 19 shows an outline of the story board used.

Figure 19 Outline of Severn Trent's drought consequences story board



Source: Severn Trent Final WRMP 2019, Appendix E: Decision-making, Figure E4.5

Co-creation sessions on metering and water efficiency:

- Communication and engagement: explore what customers are most interested in hearing about.
- Deep-dives into specific solutions to uncover some of the misperceptions and myths that customers associate with metering and how these could be dispelled in the future.
- Sessions on water efficiency. Severn Trent also tested water efficiency campaign materials and obtained valuable insight on customer preferred creative images and messaging through the online community, Tap Chat.

Intergenerational fairness: Deliberative and quantitative research with a representative sample of the online community on intergenerational fairness, to explore how to ensure a fair balance of charges over time, and between generations.

Willingness to pay research programme for PR19:

- Core WTP survey comprising interlinked package and MaxDiff exercises with a representative sample of household and business customers. The following key points were taken into account in the design:
    - Testing and piloting the survey prior to main fieldwork to ensure cognitive validity.
    - Ensuring the overall survey load was not too onerous
    - Minimising the need for scaling the final valuations by deriving WTP for groups of improvements, rather than trading-off money with individual service improvements which can lead to over-estimation of WTP

    - Appropriate context and question framing
    - External validity by validating findings using alternative methods and/or contexts, such as the budget game and service failure survey.
- Contextualized WTP survey with respondents who had suffered service failures due to a main burst and sewer flooding.
- "Hard to research": hall tests with translators and a translated version of the survey in three main foreign languages in Severn Trent's region.
- Non-respondents; eventual participants who responded when contacted a second time, via a postal survey.
- Deliberative WTP survey: 120 respondents during the deliberative research. This took place during research workshops using a self-complete version of the survey.
- The 'budget game' was a survey conducted through face-to-face interviewing in the format of a large "board game" to present customers with different service levels (a current and two improvement options) and associated costs. The 'design your own plan' game formed a basis for interviews focusing on prioritisation of the different service levels and associated cost impacts. Non-household fieldwork was carried out over the telephone with show materials emailed to each respondent prior to the call.
- Revealed preference research: derived alternative valuations for short-term supply interruptions using the averting behaviour method, administered in-person, over telephone interviews and through an online survey. All respondents were in areas that had been recently affected by supply interruptions.
- Insight from the valuation research was triangulated, compared to historic valuation results from Severn Trent and the wider industry, and used to inform incentive rates and in the cost-benefit analysis.

Choices and final acceptability research: part of the PR19 plan, aligns with the preferred programme of options set out in the WRMP. The key objective of the Choices research was to explore customers' prioritisation of improvements in different areas of service. This research involved focus groups, depth interviews and online surveys conducted with household and business customers. The research consisted of an interactive exercise in which customers were presented with the proposed incentive rates, based on a scaled-score derived from the triangulated WTP results for each service area. Customers were asked to provide feedback on the incentive rates, including reducing the rate to zero if they felt an incentive was not appropriate for any service area.

Summary of Groups Consulted

The groups referenced in the materials reviewed, engaged by piece of research, were as follows:

- Tap Chat is an online community of 15,000 members. Subsets participate in different topic categories, e.g. online research with 476 panel members resulted in a total of 1,119 comments over three months (March to May 2018); Tap Chat water efficiency campaign: 9 selected panel members were invited to participate. Live chat/ online discussion of one hour.
- Customer needs research: 178 customers engaged, in the following groups: 'general' customers; customers in financially vulnerable circumstances; customers in vulnerable circumstances due to health and wellbeing issues; future bill-payers (aged 19-24); customers with a high engagement with waterways; customers from our biggest faith and cultural groups (Muslim, Hindu and Polish); customers who have

suffered service failures; shared and indirect bill-payers. Also, needs of large developers and non-household retailers were explored for under the wider business plan engagement.

- Real options approach – deliberative research: 24 household customers, mix of demographics, payment types, attitudes to the environment. 4 customers financially vulnerable, 2 customers with a disability or health problem. Quantitative research: mix of demographics. Two polls, total of 1,605 complete responses and 216 comments in the online discussion.
- Strategic challenges - supply and demand. Research on the impact of drought, including levels of tolerance regarding the risk and impact. 48 household customers; 10 depth interviews with vulnerable customers; mix of other characteristics of household customers relating to e.g. age, gender, life stage, ethnicity, payment type, attitudes towards the environment, water meter status, etc.
- Strategic challenges – the environment: 24 customers in a one full day deliberative workshop; 10 in-depth home interviews with customers in vulnerable circumstances.
- Strategic challenges – resilience: 24 customers in a one full day deliberative workshop; 10 in-depth home interviews with customers in vulnerable circumstances.
- Valuation research programme: 1,047 household and 750 non-household respondents. 300 respondents who had suffered service failures, 73 'hard to research' respondents in hall tests; 432 who were unable (absent or refused) to take part in the core face-to-face fieldwork but responded to a follow-up via postal survey; 120 respondents during the deliberative research; 505 respondents to the budget game. Revealed preference research: 470 households that had experienced an unplanned supply interruption.
- Water trading (joint research): mix of household and non-household customers in four regions: Severn Trent, Thames Water, United Utilities and Wales. 447 Severn Trent customers consulted out of a total of 1,727.
- Choices research: household and non-household customers, mix of demographics. Total of 2,309. Depths with 3 large non-household customers.

How results were used

The outputs of engaging with customers, stakeholders and regulators helped shape Severn Trent's long-term water resources strategy as well as several aspects of the WRMP in the following thematic areas: balancing the risk between the environment and customers' security of supply, setting leakage ambition, adapting the metering strategy, screening new water resource options, managing uncertainty, as well as how to engage with customers and communicate complex issues. For instance:

Setting the leakage ambition: complementing the views of stakeholders and regulators, customer research indicated that leakage reduction was a top priority for improvement. Drawing from qualitative analysis, analysis of social media (where leakage was the dominating conversation), expectations from the Choices research and feedback on the draft WRMP, the company amended its leakage strategy to set more ambitious long term leakage reduction targets.

Making a change to the metering strategy: Insights gathered from focused customer research carried out on attitudes to metering helped shape an enhanced meter installation programme aiming to accelerate meter penetration.

Screening new water resource options: A range of options to meet the supply-demand balance deficit was discussed with customers in deliberative research sessions. Customer views on individual options as well as preferred package of options, including the balance of supply and demand-side interventions, informed the screening of new water resource options, in particular enabling a response against the various customer-centric criteria.

References

a) Severn Trent Water Resources Management Plan 2019, August 2019
b) Final WRMP Appendix E – Decision making
c) PR19 Business Plan Appendix A1: Engaging Customers

South West Water

Overview

South West Water's customer engagement programme included a wide range of qualitative and quantitative customer research activities. Key activities relating to the overall customer engagement and research strategy include board involvement; innovative interactive personalised video; co-creation workshops; valuation; best-worst scenario stated preference study; an innovative performance sharing and reporting framework; and behavioural economic pilots on water efficiency. Topics such as performance measurement and future choices; ability to move water around the network / resilience; leakage; security of supply; attitudes to supply and demand options; metering; conservation; customer attitudes and valuations with regard to service levels and future interventions; views on water restrictions; views on water resources options; were among those explored through different methodological avenues. Key activities of relevance to the WRMP are outlined below.

Research activities most relevant to the WRMP

Qualitative research

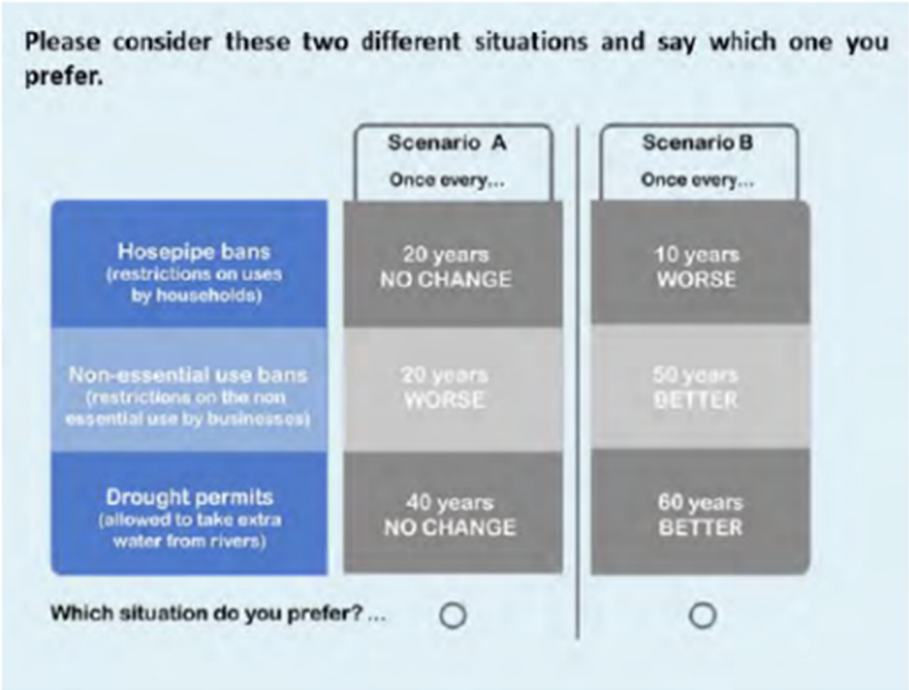
A survey focussing on customer attitudes to existing performance measurement approach, and customer attitudes and preferences regarding performance in future choices. Emphasis was given on the latter which provided insights into new areas that the water resources management plan should consider addressing.

Quantitative research

Stated preferences quantitative research was carried out to explore (a) customer attitudes and valuations regarding service levels and (b) customer attitudes and valuations regarding future interventions. Customer preferences and willingness to pay were established in relation to different types of options: leakage reduction, (dumb) meters, smart meters, helping customers save water, catchment management, transfers, reuse, groundwater schemes, river schemes. Both the traditional Discrete Choice Experiment and the Best Worst Scaling (BWS) method were applied in the stated preference studies.

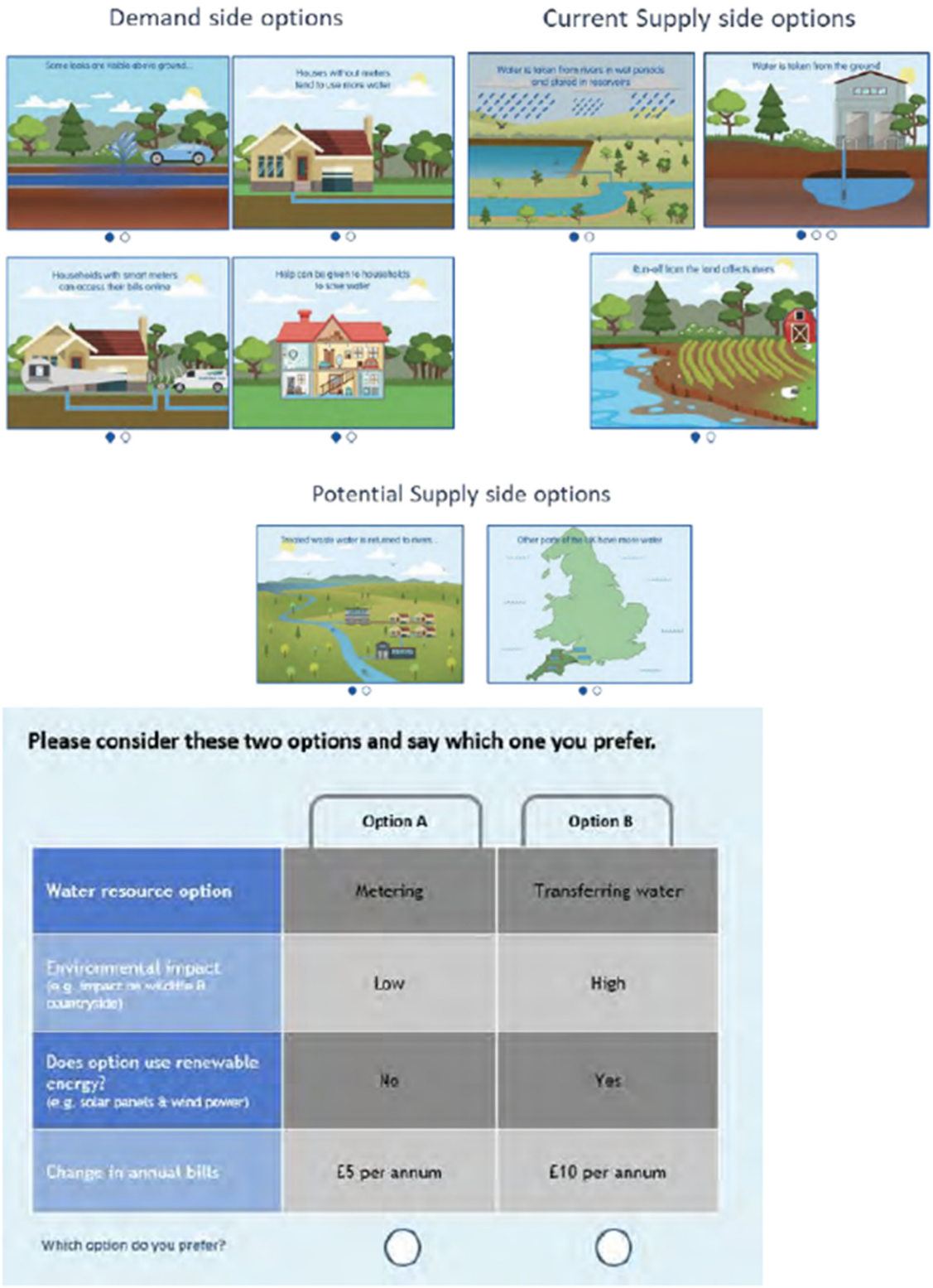
The second stage stated preferences study adopted a DCE approach in order to elicit customer priorities and preferences for water restrictions and resource options. Participants were asked about their preferences on managing water when in short supply during periods of drought, including different types of water use restrictions; and different options for managing the amount of available water and for providing additional water resources. Monetary values on willingness to pay were generated for the following attributes: security of supply (temporary use ban, non-essential use ban), water conservation, metering, water resource options (reuse, catchment management, transfer, river abstraction, groundwater abstraction). Figure 20 and Figure 21 are illustrations of the material used to convey information to customers and ask them to make a choice (top and bottom part of each figure respectively).

Figure 20 Example screenshots from survey GIF and choice card, restrictions, Stage 2



Source: South West Water / Bournemouth Water, Final WRMP, Appendix A. 1.6

Figure 21 Example screenshots from survey GIF and choice card, options, Stage 2



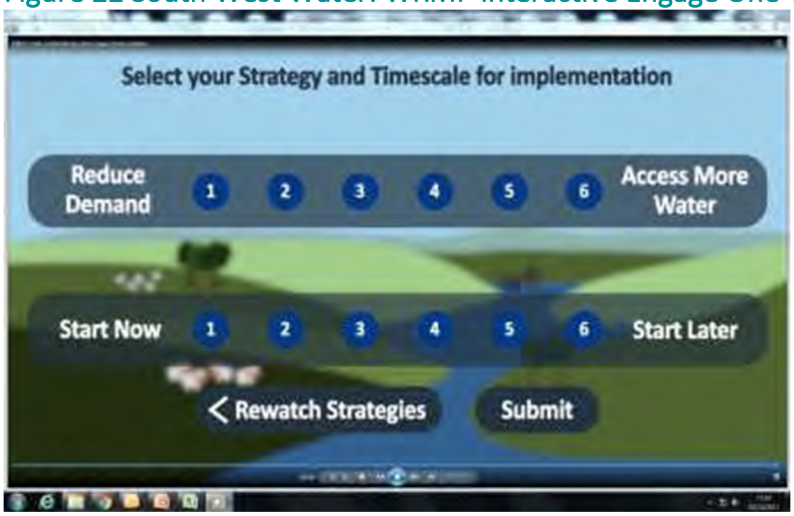
Source: South West Water / Bournemouth Water, Final WRMP, Appendix A. 1.6

EngageOne interactive video

EngageOne was a personalized interactive video tool sent to customers via email or text messaging to gather customer feedback on the balance of supply/demand options and the future use of water resources. Using this tool, customers were able to make choices

based on an understanding of the possible futures in the absence of action. The video was location-specific, which meant that the customers using it would see information relevant to their Water Resource Zone, making issues local to the customer and their community. This was completed by over 2,500 customers and South West Water notes it was the first of its kind in the UK water sector. It had a positive reception by customers who engaged and gave positive feedback on the tool itself. Figure 22 shows a screenshot of the Interactive EngageOne video tool. The outputs added to the data richness, via engaging through a new and innovative channel, and was well-received by customers.

Figure 22 South West Water: WRMP Interactive Engage One Video screenshot



Source: South West Water / Bournemouth Water, Final WRMP, Appendix A. 1.6

Stated preference studies were one component of South West Water's valuation programme. Other methods included; averting behaviour around water disruption events, a macroeconomic analysis of productivity impacts associated with water restrictions

South West Water conducted various other engagement activities for a number of purposes under the business planning remit, including, among others, the following:

- Revealed preference study: a travel cost assessment for recreational beach use.
- Averting behaviour around water disruption events.
- Macroeconomic analysis of productivity impacts associated with water restrictions.
- Value for water research: this involved an online survey in which customers were asked questions related to their use of water, the extent to which they were willing to get involved in the future of services that they received, how much they thought about water etc. This was a simple survey aiming at understanding to what extent customers consider and think about water and water services and whether they want to participate in water research in the future. Results on the awareness, engagement and willingness to get involved was useful in informing South West Water's plan to build the relationship between company and customer, especially in the Bournemouth area.
- 2050 vision testing: this involved focus groups to review the customer version of South West Water's 2050 Vision document with the intent to test customers' understanding of the language and content of the document.

- Corporate responsibility research: this involved focus groups and a quantitative survey to test customers' understanding of corporate responsibility with a focus on taxation of South West Water and its parent company.
- Advizzo pilot: this was a water efficiency incentivisation scheme wherein company data was used to help customers use water wisely through a number of personalised engagement routes (email, apps etc.).
- Greenredeem study: this was a water efficiency incentivisation scheme introduced in Exeter. Under this scheme, registered households could earn points directly for saving water and use the points earned to reward themselves.
- Watershare+ studies: this involved an online survey to gather feedback from customers on the approach and principles underlying the WaterShare scheme: a scheme wherein any outperformance of South West Water is shared with customers.
- Retailer research: this involved telephone interviews to explore how South West Water could support retailers in the current and future period and to understand retailers' perceptions of non-household customer needs for PR19.

Summary of groups consulted

Household, non-household, vulnerable, future and retail customers were involved in engagement and research informing South West Water's plan. For instance:

- Value for water: 807 household customers
- Stated preferences research: main study: quantitative survey – following hall tests with 1,502 household customers (online and face-to-face) and 455 (online) non-household customers, including vulnerable customers.
- Stated preference – water and wastewater second stage studies: quantitative survey with household customers, including vulnerable customers - 611 (wastewater) 613 (water and common)
- Stated preference – water resources second stage study: quantitative survey with 601 household and 274 non-household customers, including vulnerable customers.
- EngageOne interactive video: over 2,500 household customers
- Value for water research: 807 household customers
- 2050 vision testing: qualitative research with two groups of household customers (16 customers in total, including vulnerable customers)
- Retailer research: engagement with 8 retailers via in-depth telephone interviews of approximately 45-60 minutes.

How results were used

Qualitative research: Information from qualitative research was used, in combination with that from the quantitative research and the interactive video results, to develop the multi-criteria scoring mechanism for assessing the different plan choices.

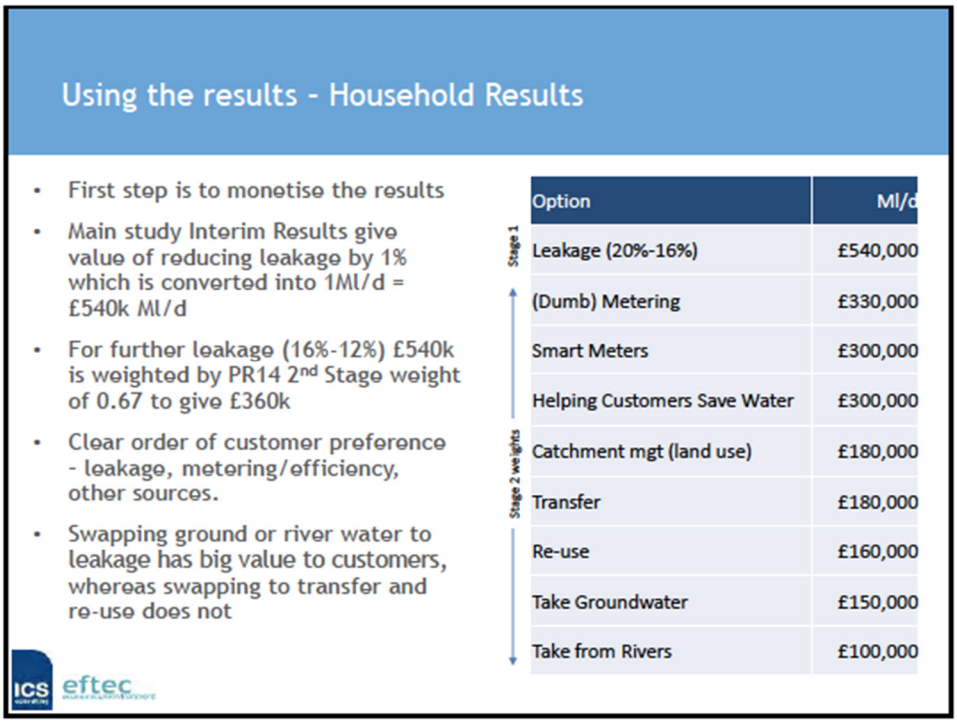
Quantitative research: The outcomes of the quantitative research were used in the following ways.

- Determine if customers wanted a change in level of service and how they would value a change.

- Identify the top 5 intervention types. These were then included in the multi-criteria assessment used to compare the different possible future programmes by assessing how different choices aligned to customer needs.
- The willingness to pay data were used in the cost benefit analysis of different programme choices. This was then used as a sensitivity test, to understand the extent to which programme choices were driven by willingness to pay and how they compare to programmes based on private costs only.
- In particular, willingness to pay data were used in two main calculations:
    - A customer valuation for a leakage reduction profile
    - The net cost/benefit of water efficiency measures.

One of the example calculations is illustrated in Figure 23 below.

Figure 23 Example of using stated preference outputs for the purposes of water resources management planning



Source: South West Water / Bournemouth Water, Final WRMP, Appendix A. 1.6

EngageOne Video: Outputs from this engagement influenced the final strategy towards giving focus on reducing demand and being proactive, rather than developing a plan on the basis of developing new water resources and acting 'just in time'.

References

a) South West Water / Bournemouth Water, Final Water Resources Management Plan. August 2019. Appendix A. 1.6.
b) South West Water / Bournemouth Water, Engaging Customers (a Business Plan publication)

United Utilities

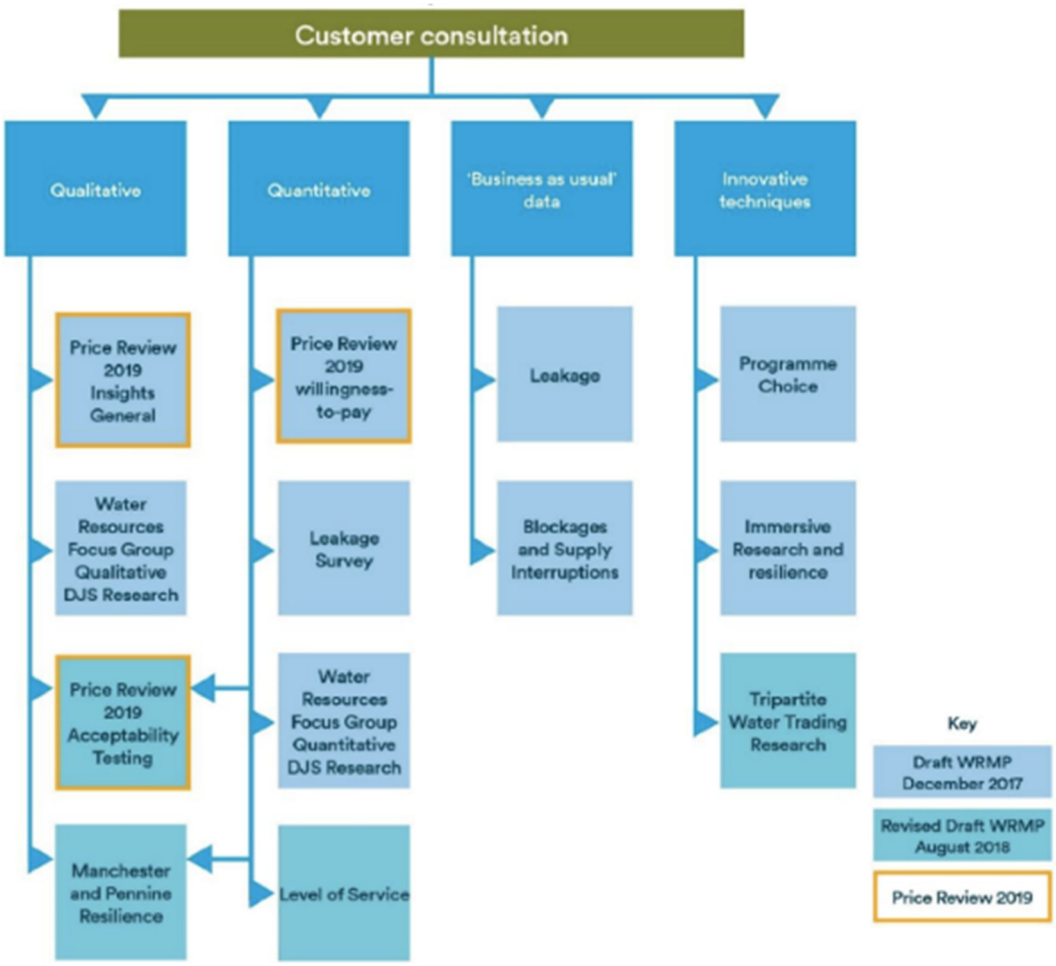
Overview

United Utilities carried out a wide range of customer research activities, both traditional and experimental, in order to engage and consult with their customer base. These included qualitative and quantitative surveys, focus groups, face-to-face interviews, a programme choice experiment (online interactive tool), the establishment of an online community panel and extensive resilience research, including an immersive experience). The guiding rationale behind the breadth of research was ensuring that the approach to customer engagement is enhanced with new and innovative techniques, beyond single surveys and traditional stated preference willingness to pay research. Key topics explored with customers include: water quality / safe, clean drinking water; reliable water supply / interruptions to supply / level of service temporary use bans (hosepipe bans) and drought permits; leakage reduction; catchment management; lead pipe adoption; water abstraction; water trading; water scarcity; motivations and barriers to metering and water efficiency; role of United Utilities and priorities towards water management; priorities towards water management; water supply-demand management options; measuring attitudes towards the environment; priorities for future investment; severe and extreme drought resilience; ecosystem services.

Research activities most relevant to the WRMP

The range and structure of research and engagement activities supporting the development of United Utilities' Water Resources Management Plan 2019 utilised online customer panels, behavioural economics research, stated preference surveys and other qualitative and quantitative methods, as illustrated in Figure 24.

Figure 24 Structure of research and engagement activities supporting WRMP 2019 development



Source: adapted from United Utilities Final WRMP19 Technical Report – Customer and Stakeholder Engagement, Figure 1

There is overlap with customer engagement activities relating to the development of the business plan insofar as this informs aspects relating to water resources. The technical report on customer and stakeholder engagement accompanying the WRMP makes this distinction by noting, in broad terms, how each piece of research relates to the WRMP.

WaterTalk customer panel: United Utilities set up an online community panel, WaterTalk, to obtain customers' views and opinions on a wide range of issues that would help support business planning. A number of qualitative and quantitative channels including focus groups, online community panels, online surveys, face-to-face and phone interviews etc, were used to understand customers' views and expectations regarding issues related to water quality, interruptions to supply, leakage, catchment management, lead pipe adoption, water abstraction, water trading, surface water management incentives etc. The online panel comprises over 7,700 customers across the region and is set to become a more informed community over time, able to provide a more educated input on customer concerns and priorities. It is designed to supplement rather than replace other forms of engagement or survey methods.

Water efficiency: customer behaviour change study: Behavioural economics research techniques were adopted to understand customers' behaviours and perceptions. These comprised a water efficiency behaviours and perceptions study and an immersive experience. The water efficiency study was carried out early in the planning period with 1,300 customers, and explored motivations and barriers to metering and water efficiency.

Business plan: customer priorities research: A series of face-to-face interviews (which included capturing vox pops/comments) and focus groups was carried out as the first of a two-stage customer priorities research programme. A second stage involved quantitative communications testing and channel evaluation. This research was carried out in support of the development of the business plan; it is, however, relevant here insofar as understanding what customers consider important in terms of providing reliable sources of water. Leakage reduction, safe, clean drinking water and reliable water supply were among the topics ranked.

WRMP19 customer research: Phase 1 qualitative research: Customer preference insights and thoughts were captured through seven focus groups with household customers and 15 face-to-face in-depth interviews (5 with vulnerable customers and 10 with non-household customers) as Phase 1 of WRMP19 customer preferences research. Outputs of this study were used to help design Phase 2.

WRMP19 customer research: Phase 2 quantitative research: United Utilities carried out a water resource-specific willingness-to-pay study, engaging through face-to-face interviews, online panel surveys and face-to-face computer-assisted interviews, to measure customer preferences for water resources, levels of service and potential options or plans to address a supply-demand deficit or any changes in levels of service. The study was split in four parts: measuring attitudes towards the environment; levels of service-acceptability; levels of service-willingness to pay; and priorities for future investment regarding water supply options. The exercise on water supply options sought to understand 'raw' views on the type of option preferred by customers and did not take account of cost per unit saving. Cost was explicitly tested in the programme choice experiment (see below) allowing a comparison of views.

A mix of socioeconomic, geographic, age and metered/unmetered household customers; and a range of non-household customers in different sectors, with different needs, different levels of water consumption, geographic regions and water uses were targeted as participants in the research. Beyond WTP exercises, the study utilised a Gabor-Granger acceptability exercise to compare results, and it also tested views on severe and extreme drought resilience for the first time in the context of the willingness to pay research. Results were used to assist in operational planning and the development of future strategy, as well as in the triangulation of valuation evidence.

Level of service (further research): Further research was undertaken following an Ofwat recommendation received on the draft plan, which specifically focused on levels of service (furthering the research carried out before the submission of the draft WRMP) and the impact of United Utilities' position relative to other companies. For this research, household customers were split into informed and uninformed groups regarding the levels of service relative to other companies.

Quantitative leakage survey: United Utilities explored whether customers would be willing to pay for leakage reduction utilising the WaterTalk online panel. The survey was conducted with 3,261 WaterTalk members and sought to answer whether customers think of leakage reduction as an important issue; whether they would be willing to pay extra to support the reduction and, if so, how much; and the perceived impact that leakage reduction activities would associate with the United Utilities brand.

Immersive experience research: United Utilities note this as the first research in the water industry to roleplay with customers the consequence of a service failure. It was designed to target the idea of resilience and to obtain more informed customer attitudes regarding high consequence, low likelihood events, which are generally hard to grasp and even more so to express economic decisions around them. The immersive experience was split into two concurrent workshops: on long-term supply interruptions – resilience; and on ecosystem services (case study on River Irwell). Figure 25 is an illustration of the workshop set-up.

Figure 25 Schematic diagram of the immersive workshop set-up

Source: United Utilities Final WRMP19 Technical Report – Customer and Stakeholder Engagement, Figure 9

In the first workshop, customers were immersed in a fourteen-day loss of water scenario using interactive games, emoji diaries, mock-up text and phone messages, newspaper articles, water rationing activity, etc. Customer behaviour was observed during the experience to derive compensation levels for long-term supply shortages and willingness to pay to avoid these, as well as test the impact of cause of interruption on willingness to pay, in order to better understand resilience value (irrespective of the cause of interruption).

The second workshop involved a virtual video tour of Greater Manchester's River Irwell, a model farm to simulate the impact of water run-off and floor puzzle games to obtain customers' bids for investment in their chosen areas of environmental priority. Customer valuations were collected on five ecosystem services: green spaces for recreation, a healthy river to support wildlife, visual appearance of rivers, safety of river for

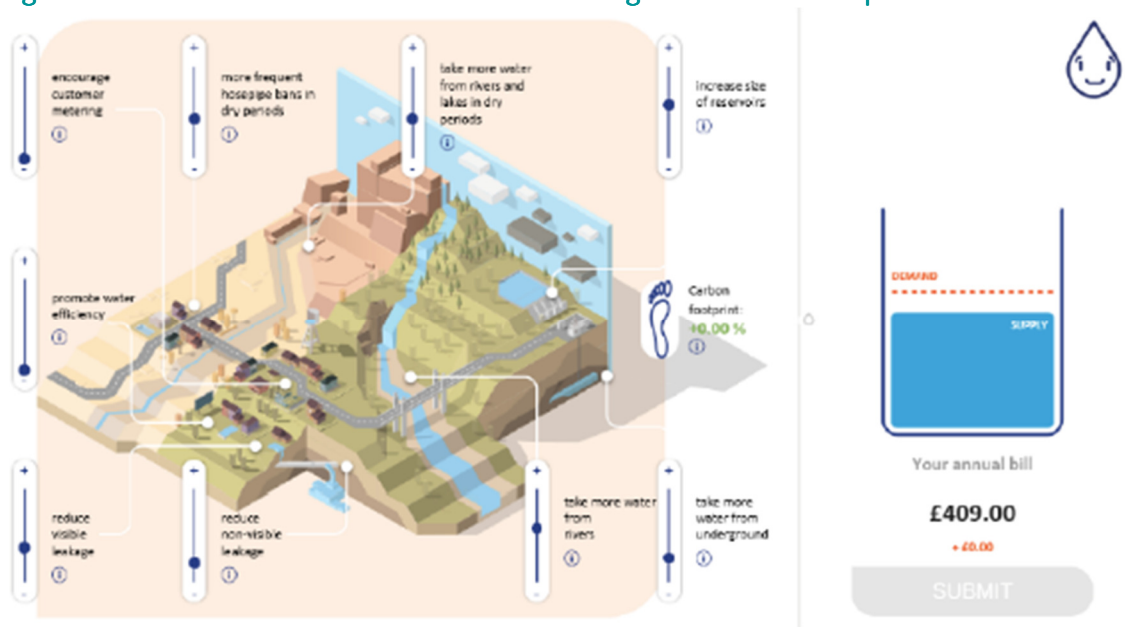
recreational use and biodiversity. The workshop was used to inform the business plan, it does, however, interface with relevant themes in the WRMP.

Programme choice experiment: One of United Utilities' innovations was considered to be an interactive online tool intended for use by the customer panel. The themes examined were leakage, level of service (temporary use bans (hosepipe bans) and drought permits), water efficiency, metering and supply options. Respondents were able to explore the choices and trade-offs in balancing supply and demand. There were two rounds to the programme choice experiment, approximately 1 year apart. Figure 26 is a screenshot of the tool. Response data were used in the triangulation of valuation evidence.

Customers were presented with options to balance supply and demand and were shown the impact on bills as they amended the position of each point on the slider to achieve an overall balance. The options available were:

- Encouraging customer metering
- More frequent use of hosepipe bans in dry periods
- Taking more water from rivers in dry periods
- Increasing size of reservoirs
- Promoting water efficiency
- Reducing visibility cage
- Reducing non-visible leakage
- Taking more water from rivers
- Taking more water from underground

Figure 26 Screenshot of slider screen used in Programme Choice Experiment



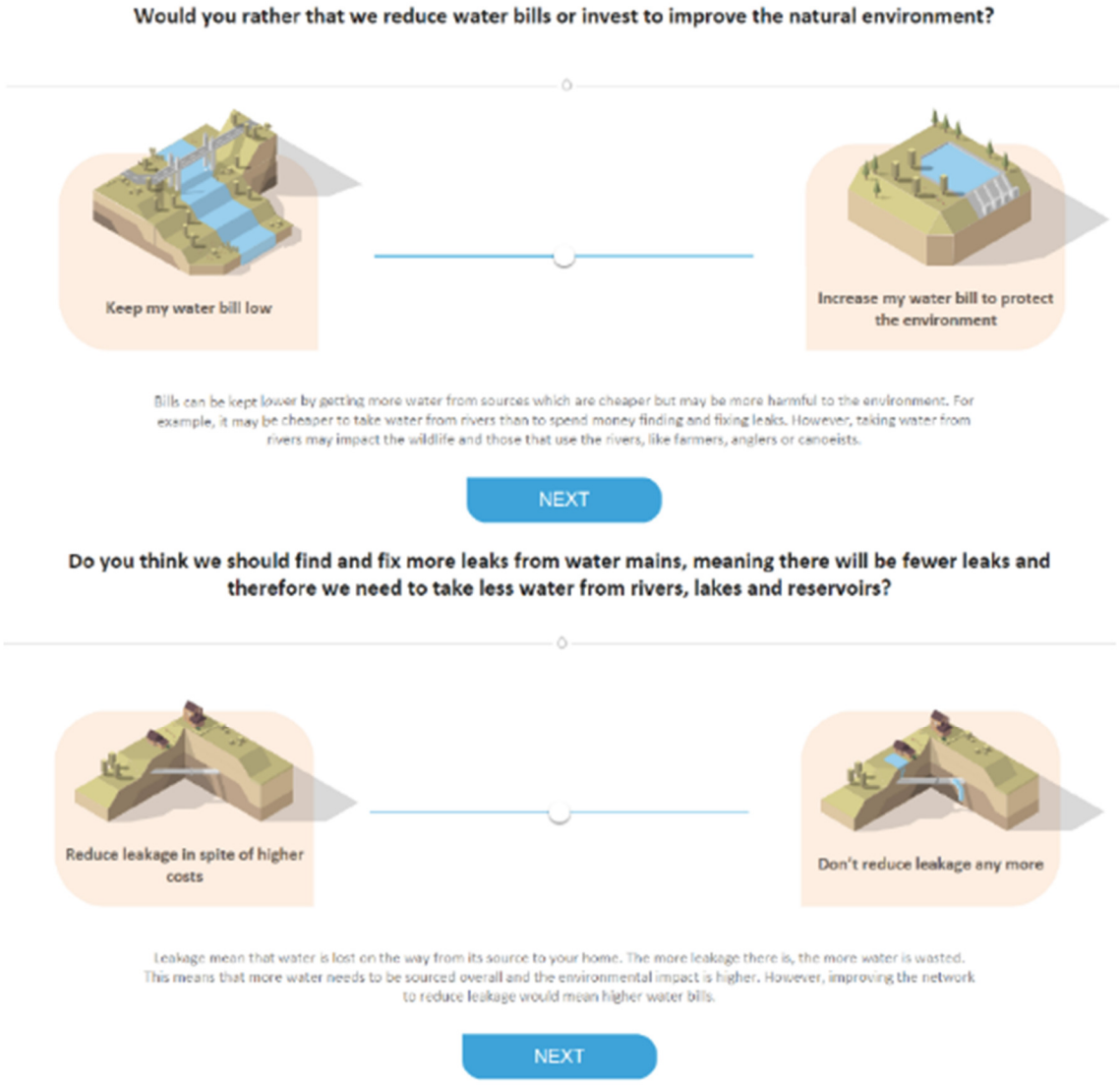
Source: United Utilities Final WRMP19 Technical Report – Customer and Stakeholder Engagement, Figure 11

Prior to the main supply-demand screen depicted in this figure, initial screens asked participants the following questions.

- "Would you rather that we would use water bills or invest to improve the natural environment?" with choices ranging from *keep my water bill low* to *increase my water bill to protect the environment*.
- "Do you think that we should find and fix more leaks from water mains, meaning there will be fewer leaks and therefore we need to take less water from rivers, lakes and reservoirs?" with choices ranging from *reduce leakage in spite of higher costs* to *don't reduce leakage any more*.
- "During a year where it rains a lot less than normal, we will need to either take more water from rivers and lakes (reducing the water levels for fish) or impose hosepipe bans on households. How do you think we should balance these two choices?" with choices ranging from *introduce hosepipe bans and protect the environment* to *take more water from rivers and lakes.*
- "To reduce the need for hosepipe bands or the need to take more water from rivers, we could encourage people to use less water in their homes. How much do you think we should do this?" with choices ranging from *people should use less water and save the environment* to *I think there should be enough water for me to be able to use what I want.*

Brief commentary provided context underneath each choice presented. Figure 27 depicts the slider format of the two initial screens.

Figure 27 First and second screen from program choice experiment

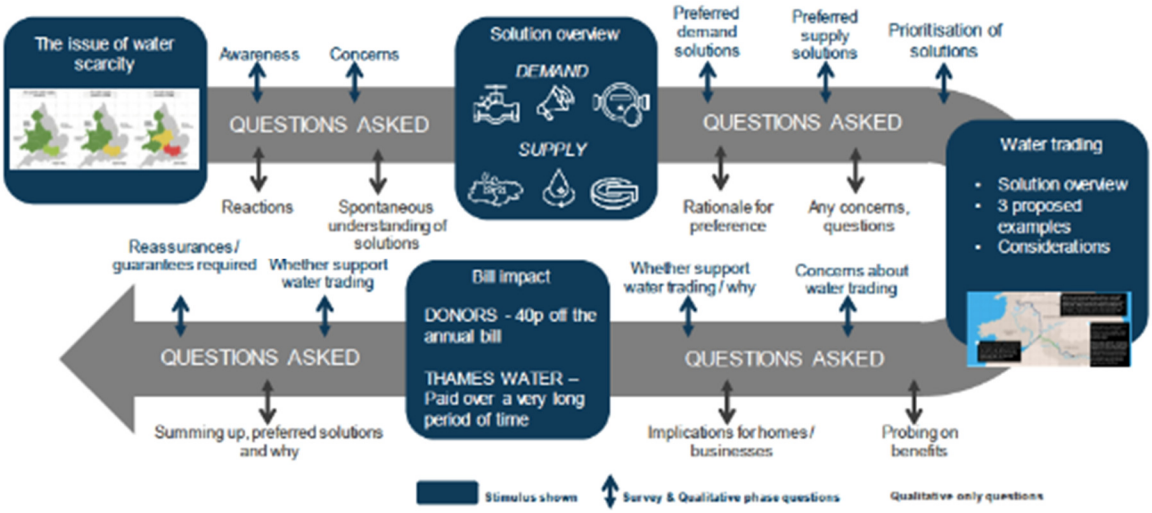


Source: Final WRMP19 Technical Report – Customer and Stakeholder Engagement, Appendix C

Programme acceptability testing research: acceptability testing of the potential programme as part of the business plan process. Results relating to customer views on leakage reductions and supply interruptions (interfacing with resilience considerations) were among key points of relevance informing the final WRMP. The research took place over two phases: one following draft submission, split between draft and revised draft, and a second phase on testing the final plan. The research comprised both qualitative and quantitative components (online and CAPI quantitative surveys, in-depth interviews, focus groups) on the rationale and motivations that underpin responses, permitting testing over bill impacts (through the use of sliders). In the context of the revised draft business plan acceptability testing, two plan variants were tested to extrapolate alternative options. Bill impacts were presented in the context of customers' own current bills and included the impact of inflation over the period to 2025. The acceptability of a "reasonable range" of bill impacts as a result of potential outcome delivery incentives to assess levels of acceptability was also tested, using a potential bill impact range of -£21.40 to +£23.00.

Water trading research: A multi-stage approach, involving quantitative and qualitative phases, in order to assess customer views on water trading and transfers. This research was run jointly with Severn Trent and Thames Water. It communicated water scarcity information to participants and asked them to choose their preferred among three supply solutions: regional water transfer, water reuse, and the construction of new reservoirs. The insight gathered is based on an informed customer view. Figure 28 illustrates the journey taken by participants to this survey.

Figure 28 Questioning and stimulus journey taken by participants to the water trading research



Source: United Utilities technical report on customer and stakeholder engagement, Figure 13

Business-as-usual data mining: United Utilities carried out a detailed analysis of internal data and customer tracking surveys to better understand customers' priorities, views and perceptions. This included analysing customer telephone calls, Live Chat conversations, Twitter and written complaints, Member of Parliament enquiries and secondary customer contact data from customer satisfaction surveys, Rant and Rave, and service incentive mechanism surveys to understand customers' priorities regarding a range of service issues such as supply interruptions, bursts and leaks, water quality, lead in water etc. Leakage and supply interruptions data were considered the most relevant in the context of the WRMP.

Manchester and Pennine resilience customer engagement: The Manchester and Pennines resilience research aimed at understanding customers' views and priorities regarding options for increasing water resilience. Online surveys were conducted with household customers wherein they were presented with five options ranging from minimal investment to long-term solutions along with information about the risk of supply interruptions and water quality issues, potential number of affected properties and the bill impact of each option. Participants were then asked to rank the five options in order of preference.

Figure 29 shows an example of the survey question posed to the participants as part of the Manchester and Pennines resilience research.

Figure 29 United Utilities: Manchester and Pennines Resilience research

Source: United Utilities WRMP Chapter 6, Figure 32

Water service resilience risk research – summary: United Utilities make particular reference to water supply resilience research. The customer research techniques they have used to understand customers' stated and revealed preferences for the management of water supply resilience risk are presented in Figure 30.

Figure 30 UU customer research techniques applied to water supply resilience risk research

Question?	Technique	Approach
How do attitudes change in short, medium and long service failures?	Business as usual data	Review of customer telephone contacts for change in rate of contacts as incident progresses. Review of customer responses to major incidents.
	Online customer panel surveys	Survey regarding duration to "intolerable" service failure.
	Immersive experience	Customers exposed to immersive experience of a long duration service failure, coming face-to-face with the real issues and constraints of no usable water followed by questionnaire.
How much worse are different service failures from each other?	Business as usual data	Comparison of contact rates for sewer flooding and water supply interruptions. Review of customer responses to major incidents.
	Online customer panel surveys	Survey ranking and valuing different types of water service failures (low pressure, no water etc.).
	Stakeholder events	Ranking of different investment drivers.
How infrequently is acceptable for a service failure?	Immersive experience	Customers exposed to immersive experience of a long duration service failure, coming face-to-face with the real issues and constraints of no usable water followed by questionnaire.
How much are you willing to pay for maintaining or reducing the risk of service failure?	Immersive experience	Customers exposed to immersive experience of a long duration service failure, coming face-to-face with the real issues and constraints of no usable water followed by questionnaire.
	Willingness to pay and affordability survey	Traditional stated preference willingness to pay survey.
	Business as usual data	Comparison of contact rates for sewer flooding and water supply interruptions

Source: United Utilities technical report on customer and stakeholder engagement, Table 17

Summary of groups consulted

Beyond statutory and non-statutory stakeholders, and household and non-household customers (including vulnerable customers), United Utilities make reference to engaging and consulting with their YourVoice Customer and Stakeholder Panel and its two sub-groups: customer engagement (CESG) and environmental (ESG). The Technical Report provides relevant sample sizes for most pieces of research but does not generally comment on which customer segment participants represent, as follows.

- Customer behaviour change study / water efficiency: survey with 1,300 customers
- Customer priorities research: qualitative exploration and understanding through face-to-face interviews and focus groups (stage 1) and quantitative communications testing and channel evaluation through an online survey with 3,340 customers (stage 2).
- WRMP19 customer preferences:
    - Phase 1, qualitative focus group research: 7 focus groups with domestic customers; 15 face-to-face in-depth interviews (5 vulnerable customers and 10 non-household customers). Quantitative leakage survey: 3,261 WaterTalk members.
    - Phase 2, contingent valuation WTP assessment: quantitative research with 595 face-to-face interviews, 302 business interviews, 266 online panel surveys and 36 face-to-face computer-assisted interviews.
    - Level of service (final WRMP): survey with 300 informed and 300 uninformed household customers

- Immersive experience: Two concurrent workshops to explore views, beliefs and opinions and elicit valuations on (i) long-term supply interruptions – resilience and (ii) ecosystem services, with 100 participants in each workshop.
- Programme choice experiment on the themes of leakage, level of service, water efficiency, metering, supply options engaging the customer panel. Round 1: 866 responses, round 2: 702 responses.
- Water trading research: qualitative surveys with 173 households and 49 non-households; quantitative online survey of 1,505 households.
- Manchester and Pennine Resilience customer engagement:
    - Qualitative: 14 household focus groups, 4 business focus groups, 6 teledepths with business customers, 11 face to face interviews with household customers (incl. 7 with vulnerable and 4 with BAME customers)
    - Quantitative: 1,965 interviews with household customers, 300 interviews with business customers

How results were used

Outputs from the customer engagement and research projects have been used throughout the WRMP and business plan development process to shape aspects of the plans, as well as providing input to the design of latter stage customer engagement activities. A key use of results of customer WRMP engagement related to the strategic choices developed in response to the views of customers, regulators and other stakeholders.

The strategic choices for the company's WRMP19 included: enhanced demand management (leakage reduction), improved level of service, improved water supply resilience to non-drought hazards, and the potential for water trading. Strategic choices were then combined into a series of "alternative plans" and an option appraisal process was carried out to determine which interventions are required and the necessary level of investment. Customer priorities acted as a constraint in this process (e.g. a reduction in levels of service was not assessed as customer research showed that this would not be acceptable to the company's customer base) while the costs to implement alternative plans (e.g. improved levels of service) were compared against quantitative customer research outputs.

Quantitative results were also used as part of the evidence triangulation strategy, to provide improved balance of valuation data. Customer valuations were also used in the cost-benefit analysis of options for the Manchester and Pennines resilience study.

References

a) United Utilities Final Water Resources Management Plan 2019. Technical Report – Customer and Stakeholder Engagement.
b) United Utilities Final Water Resources Management Plan 2019. Chapter 2 Customer and Stakeholder Involvement.
c) Customer research and engagement reports: executive summaries. Chapter 2: Supplementary Document (document reference: S 1001)

Wessex Water

Overview

The PR19 customer engagement programme of Wessex Water included day-to-day analysis of customer data sources, ongoing dialogue with customers and bespoke customer research. The core customer research areas that have informed Wessex Water's WRMP comprised strategic direction statement research; Young people's panel; willingness to pay research; bespoke research on resilience; bespoke research on leakage; business plan game; continuous engagement feedback; overall business plan acceptability testing.

Wessex Water was the only company that made the full suite of materials relating to its customer research for PR19 available online.

Research activities most relevant to the WRMP

Relevant details from Wessex Water's customer research relating to the development of the WRMP are drawn out below:

Strategic direction statement research: The strategic direction statement research comprised qualitative deliberative events, group discussions, meetings and depth interviews (in person and telephone), and quantitative interviews via multiple channels, to obtain a feel for the views of staff, stakeholders, household, non-household and future customers.

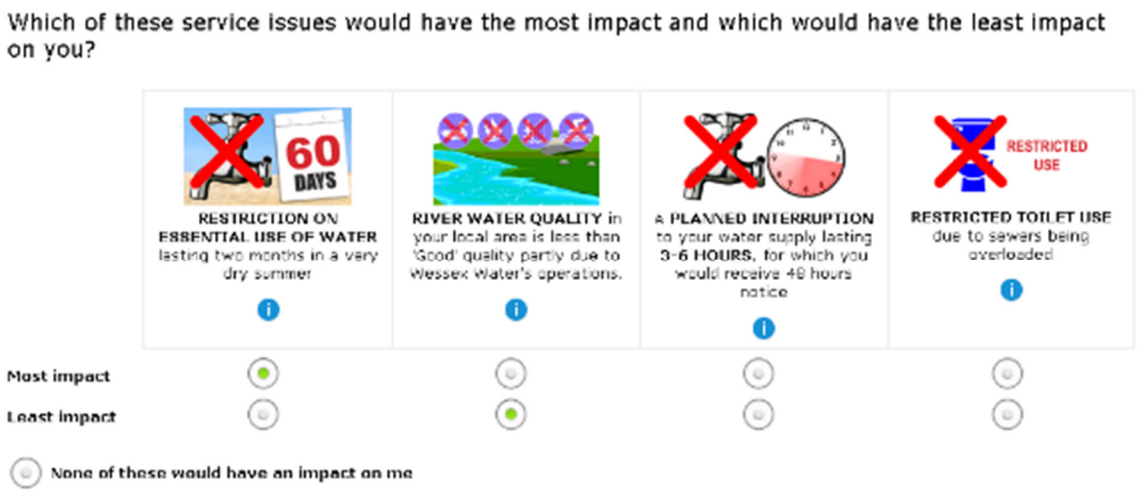
Young people's panel: A group of over 20 young people, aged 16-18 years, were invited to two day-long board meetings at Wessex Water headquarters involving mini-interviews with executives, tours of the building, small group work on a live business task, and pitching ideas to a panel of senior executives. The objective was to engage and to gain insight from future bill payers on service expectations and gain insight into emerging research issues, such as developing new ways to encourage metering take-up.
The Young People's panel is an ongoing programme with different live business tasks presented to participants each time. Wessex Water notes they were the first company to use this approach with young people.

Stated preference research: Willingness to pay research was carried out in partnership with Bristol Water (Bristol Water's water supply customers are typically Wessex Water's wastewater customers) to estimate customer valuations on service improvements. Quantitative surveys were undertaken in two stages: the first utilised a MaxDiff exercise and a Package exercise, followed by interviews with household and non-household customers, including seldom heard customers.

The second stage involved two stated preference exercises, one on community engagement (a MaxDiff exercise), which aimed at "priority scores" for different initiatives for engaging with local communities, and one on water resources management, resulting in willingness to pay values for leakage reduction, water efficiency and metering net of those options' impact on hosepipe ban risk and river flows. A literature review on the

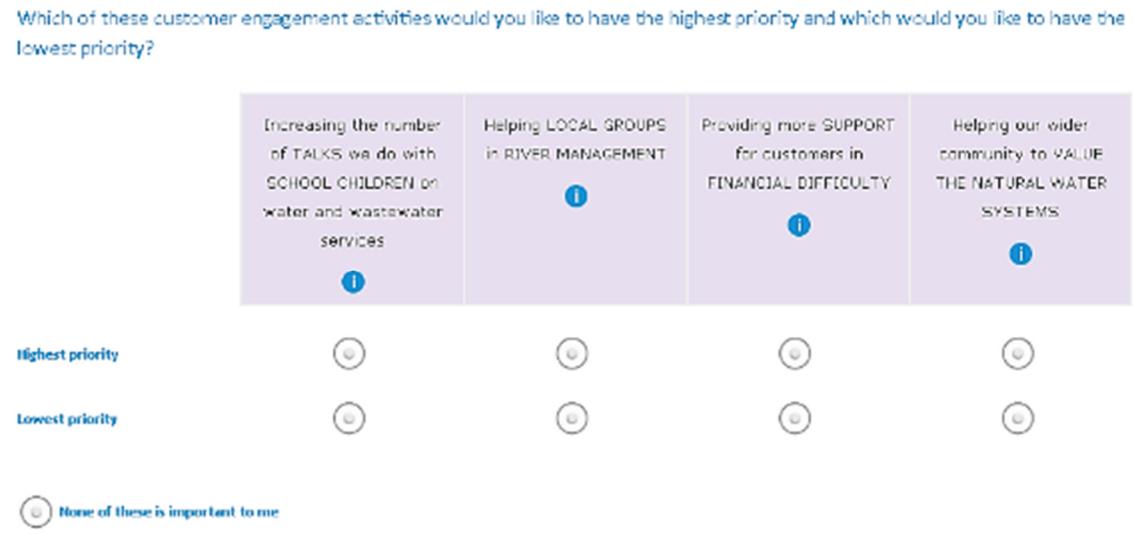
public's understanding of "local" in the context of rivers was also undertaken. The figures that follow are example showcards from both stages.

Figure 31 Example choice card, MaxDiff exercise (Stage 1)



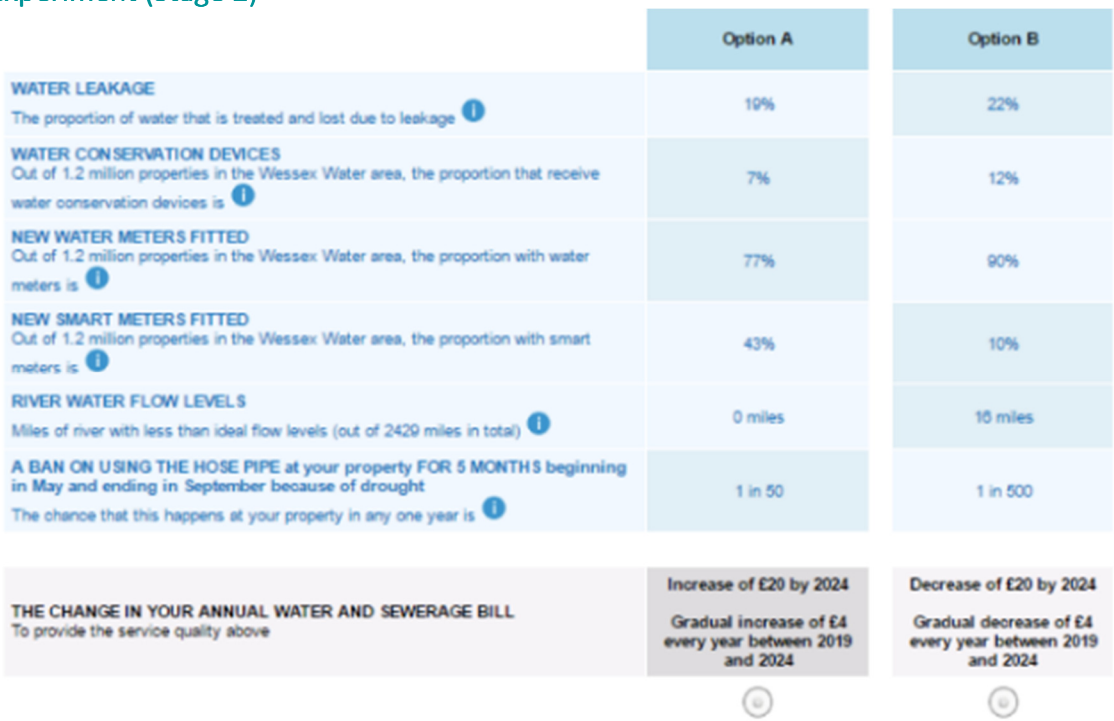
Source: Wessex Water Business Plan Appendix 1.1.D – Willingness to pay research 1

Figure 32 Example choice card, Community Engagement MaxDiff exercise (Stage 2)



Source: Wessex Water Business Plan Appendix 1.1.D – Willingness to pay research 1

Figure 33 Example choice card from the water resource management discrete choice experiment (Stage 2)



	Option A	Option B
WATER LEAKAGE The proportion of water that is treated and lost due to leakage	19%	22%
WATER CONSERVATION DEVICES Out of 1.2 million properties in the Wessex Water area, the proportion that receive water conservation devices is	7%	12%
NEW WATER METERS FITTED Out of 1.2 million properties in the Wessex Water area, the proportion with water meters is	77%	90%
NEW SMART METERS FITTED Out of 1.2 million properties in the Wessex Water area, the proportion with smart meters is	43%	10%
RIVER WATER FLOW LEVELS Miles of river with less than ideal flow levels (out of 2429 miles in total)	0 miles	16 miles
A BAN ON USING THE HOSE PIPE at your property FOR 5 MONTHS beginning in May and ending in September because of drought The chance that this happens at your property in any one year is	1 in 50	1 in 500
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL To provide the service quality above	Increase of £20 by 2024 Gradual increase of £4 every year between 2019 and 2024	Decrease of £20 by 2024 Gradual decrease of £4 every year between 2019 and 2024

Source: Wessex Water Business Plan Appendix 1.1.D – Willingness to pay research 1

Resilience research: The research aimed to understand customer views, expectations and priorities regarding resilience planning (i.e. strategies related to water restrictions, water stoppages, environmental damage, etc.) under different risk scenarios, their willingness to pay for resilience activities, and insights on how resilience topics are best communicated to customers. To do so, Wessex Water applied a mixed methods approach comprising research workshops, friendship paired in-depth interviews using a 'Listening Project' approach[11], a film on resilience, deliberative events in community venues to conduct an in-depth discussion of responses in previous stages, and group discussions with economically vulnerable customers.

Leakage research: This bespoke research comprised two-stage deliberative workshops using co-creation, with staff involved in both stages. The first stage involved communicating and discussing leakage-related information with customers and the second co-creation of leakage performance promises and communications. Results were tested via interviews with customers, including depth interviews with seldom-heard customers.

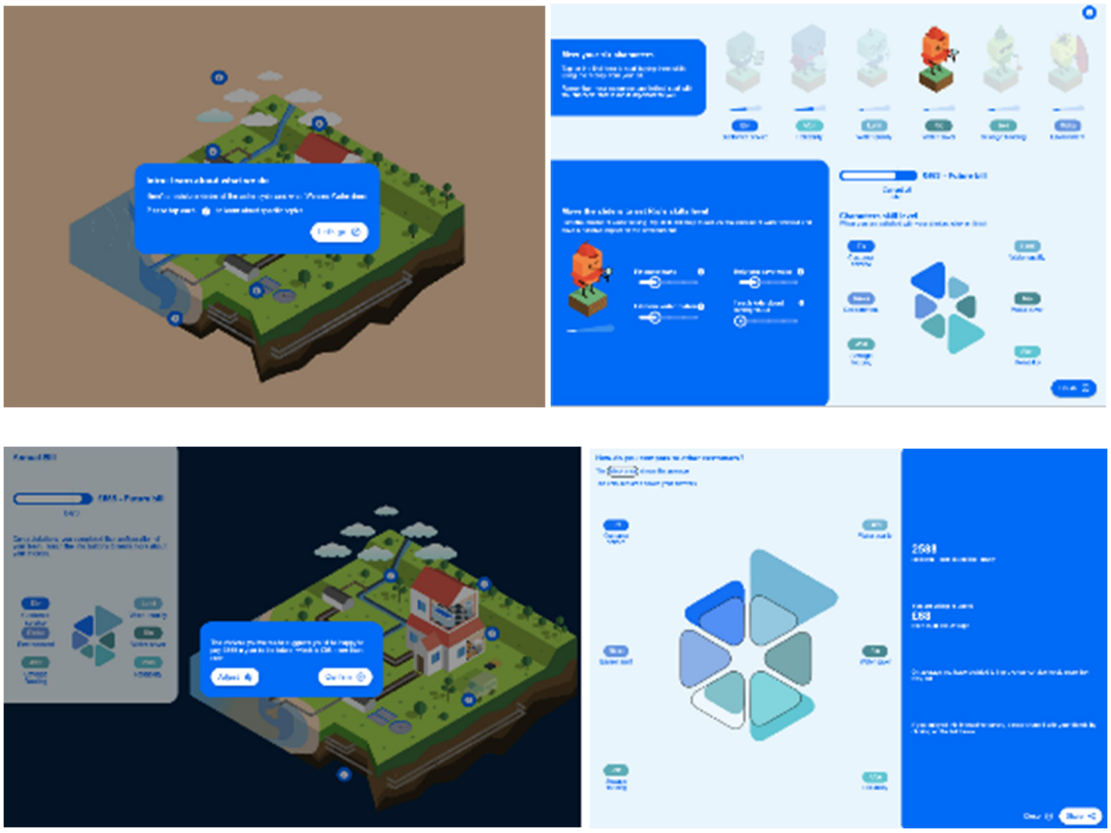
Business Plan Game: An online survey game aiming to educate the public on the water cycle as well as gain insights on customer priorities and valuations.

Figure 34 is a screenshot of various stages in the Supercharge online game presented to customers. This was an online interactive game designed to understand customers' priorities for levels of services and how much they were willing to pay for these services. The game started off with introducing participants to six characters that represented

[11] This involves a private discussion between friends, observed through a two-way mirror.

different service areas. The participants were then asked to prioritise which of the service areas were most important to them and choose how much they were willing to spend on each of these areas. Players were informed through initial background screens and a final impact screen which showed the outcomes of the choices made and how these compared to other customers' choices. Participants were able to adjust their choices if they wished to do so.

Figure 34 Wessex Water: screenshots of Supercharge online game



Source: Wessex Water Business Plan Appendix 1.1.K – Supercharge game

Continuous engagement feedback: Wessex Water utilised their daily customer data to identify the service areas that were most important to their customers. These customer data sources included results from telephone, SMS and paper surveys on completion of an operational contact, social media comments of customers on Facebook and Twitter, surveys on completion of a web chat on an operational or billing issue and SIM surveys. Further, customer surveys were conducted via the online research panel, 'Have Your Say'. These surveys were related to a wide range of issues such as leakage, bills, home water check services, satisfaction and priorities with respect to different service areas, etc.

Overall business plan acceptability testing: This took place over two phases. The first included qualitative engagement events and depth interviews and quantitative surveys. The second involved interviews, surveys and additional engagement through the Wessex Water magazine, online surveys and social media and roadshow events.

Summary of groups consulted

- Strategic Direction Statement research: staff, stakeholders, household customers, non-household customers, future customers
- Young people's panel: twenty 16-18 year-olds selected from across the Wessex Water region
- Willingness to pay: household, non-household, seldom heard customers
- Resilience: customers, including economically vulnerable customers
- Leakage: customers, staff. Initial outputs tested with household, non-household and seldom heard customers
- Business plan acceptability testing: household and non-household customers, customers with vulnerabilities, stakeholders (including two retailers)

How results were used

Wessex Water forecasts a surplus of resources for at least the next 25 years, and there is therefore no need to "solve" a supply-demand deficit. Key considerations stemming from the customer and stakeholder engagement and research activities have influenced Wessex Water's strategy to focus on options that help maintain their surplus position, improve resilience, are better for the environment, increase efficiency and meet regulatory and customer aspirations – in particular with reference to saving water (and money), reducing leakage, increasing reliability and resilience and sharing resources with other companies.

References

a) Final water resources management plan, Wessex Water, August 2019. Chapter 2 Customer Research and Consultation
b) Business Plan Appendix 1.1.D – Willingness to pay research 1 – Accent/PJM 2018
c) Business Plan Appendix 1.1.K – Supercharge game

Yorkshire Water

Overview

Yorkshire Water has taken a holistic approach to understanding and measuring all the impact its work has on people in the region it serves by implementing a 'six capitals'[12] approach to drive decision-making. The rationale was to be able to define those impacts, communicate them to its customers, and develop its work in a way that can deliver more benefits.

On the customer engagement side, Yorkshire Water undertook a widespread customer research, engagement and participation programme that involved a wide range of qualitative and quantitative techniques in order to provide an appraisal of customers' views on activities relevant to business planning and water resource planning. Activities explored, tested and evaluated the key themes (customer service, affordability, resilience, innovation) of PR19 from multiple perspectives across their customer and stakeholder base. Targeted activities aimed at understanding better the different lifestyles, needs and behaviours of their customer base and innovations were developed and implemented both in terms of the approaches to interacting with customers and in the analysis of the resulting data. This section draws out a number of those activities which are most relevant to Yorkshire Water's WRMP.

Research activities most relevant to the WRMP

Yorkshire Water held conversations with customers on the role of water in our lives and then dependencies of all on water, which have helped shape Yorkshire Water's long-term strategy. Bespoke research projects with customers which influenced the development of the WRMP are summarised here:

Valuing Water: a primary research study using a multi-method approach to explore the value that customers place on Yorkshire Water's services. This research involved focus groups, in-home interviews and online surveys to understand and identify customers' priorities for short-term and long-term service improvement areas. It was informed by data already held by the company: incident data, customer call volumes, customer complaints and social media interactions, to understand areas of greatest customer dissatisfaction. The study went further in seeking to explore customer expectations and aspirations in the context of population growth and climate change, as well as customer priorities in the shorter term, via engaging over 55 household customers through 18 focus groups, an on-line quantitative survey of 400 respondents, and virtual interactions with 24 respondents engaging via text-based discussions led by moderators.

'Your Water' study on leakage: Your Water' is Yorkshire Water's online community of over 1,000 customers (a nationally representative sample across Yorkshire Water's region). It was set up in January 2017 to generate an informed customer view of Yorkshire Water and the services it provides. For business planning for WRMP19 and PR19 the community represent the voice of the informed customer. For this study, perceptions of

[12] Six capitals: financial, human, intellectual, manufactured, natural, social.

leakage and willingness to pay more to reduce leakage from the current level were explored.

Comparability of Data and Future Aspirations study: a qualitative approach used to explore, in depth, the views of key customer groups on company performance now, in the context of industry performance and average bill value, and what it should look like in the future. This qualitative research was adapted to be repeated and quantified on the 'Your Water' online community. This study was particularly conclusive on customers' expectations on current and future leakage performance for Yorkshire Water.

Customer views on options: Research into customer preference and prioritisation of different investment options available was carried out for WRMP14. The qualitative phase was used to refine the options to ensure they were understood by customers, and the quantitative phase was used to establish which options customers preferred. Customers were asked to rate a range of potential options before and after being provided with information on cost, environmental impact and yield for each option.

As the research was carried out in the last five years preceding the preparation of WRMP19, Yorkshire Water considered this to remain useful for water resource planning. It was repeated for WRMP19 with the online community to ensure that previous results remained valid.

The online community was used to gauge customer views on options for managing future water supply, including a range of demand management, resource management and distribution management schemes. Customers were asked to rate each potential idea (on a scale from very good idea to very bad idea) and then asked to decide which three options they considered to the best ideas for managing future water supplies. Figure 35 represents the results of this, revealing the question asked and the high-level option types customers were presented with.

Figure 35 Customer rating of potential options

Source: Yorkshire Water WRMP 2019, Figure 9.4

Consistent with the WRMP14 research, customers were then presented with additional information about each option including the relative cost, environmental impact (both negative and positive) and confidence around the water delivered or water saved for each scheme. They were then asked again for their top three preferences and to give their reason.

Qualitative research on customer priorities: Customer insights from all the above were then combined with company aspirations to develop a set of five new 'big goals' and performance commitments. These were further tested with customers through a qualitative research project which asked customers across the Yorkshire Water region, including vulnerable and ethnic minority customers, to rank a set of 49 performance commitments by importance. Respondents were also asked to rank commitments related to water supply by expected improvements over the short, medium and long term. The overall aim was to arrive at a package of outcomes, performance commitments and incentives that customers understand and support. The resulting five goals include: 1. Customers; 2. Water supply; 3. Environment; 4. Transparency; 5. Bills. This piece of research provided customers with comparative performance data from the industry as a starting point for them to assess how they would like the company to progress in the next 5-year horizon and beyond.

A range of other research projects took place as part of the overall PR19 customer research strategy, which, albeit more relevant to business planning and service delivery aspects, they included elements and attributes of relevance to water resource planning. Notable among these were the following:

Lifestyles: The key objective of this research was to gain a deeper understanding of customers' expectations and priorities related to water use. The initial phase of the research involved an extensive customer segmentation analysis to identify different customer groups. In the next phase, these groups were engaged in innovative consumer reveal workshops and ethnographic amplification depth interviews. Finally, the feedback from the reveal workshops and ethnographic interviews were assessed by an anthropologist to determine customers' priorities and preferences for water. The lifestyles research was an important part of the company's overall approach to engaging with customers on affordability, alongside research and analysis of ability for customers to pay in the future; social tariff impact research; customer testing of bespoke performance commitments on affordability and bill acceptability research carried out for PR19.

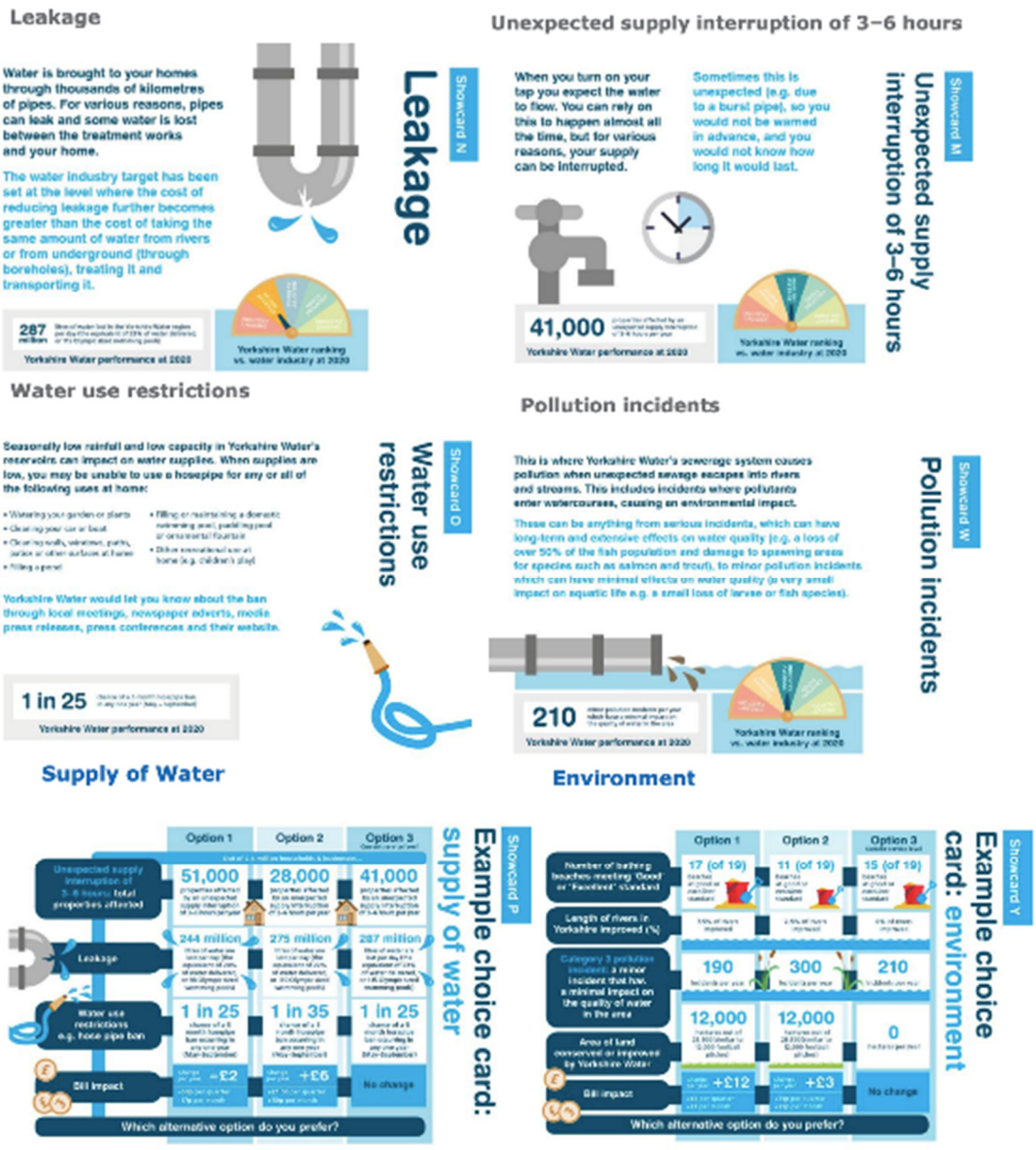
Participation in Frontiership Initiatives: This research comprised of immersive workshop sessions, face-to-face depths, immersive focus groups and in-depth interviews with community leaders and ambassadors to explore which aspects of service were most important and a priority to customers.

Kelda Management Team Customer Closeness Sessions: This involved an innovative customer engagement channel in the form of customer closeness sessions based on a 'speed dating' format. This format enabled Directors and the senior management to engage directly with customers to understand their views and preferences regarding their most important areas of service, for example leakage and pollution.

Customer valuations programme: This involved a total of six rounds of research: two phases of stated preference, two phases of revealed preference and two phases of experimental methods.

(a) Stated preference: The first phase of the stated preference approach included using discrete choice experiments to estimate customers' valuations for a range of service measures. The second phase of the stated preference approach included using discrete choice experiments and MaxDiff methods to estimate customer values for different service levels across the various service measures. Quantitative surveys via a combination of Computer Aided Personal Interviewing (CAPI) and online panel with a total of 1,020 household and 542 business customers. Example showcards from the choice experiments are presented in Figure 36 below.

Figure 36 Yorkshire Water choice experiment showcard examples



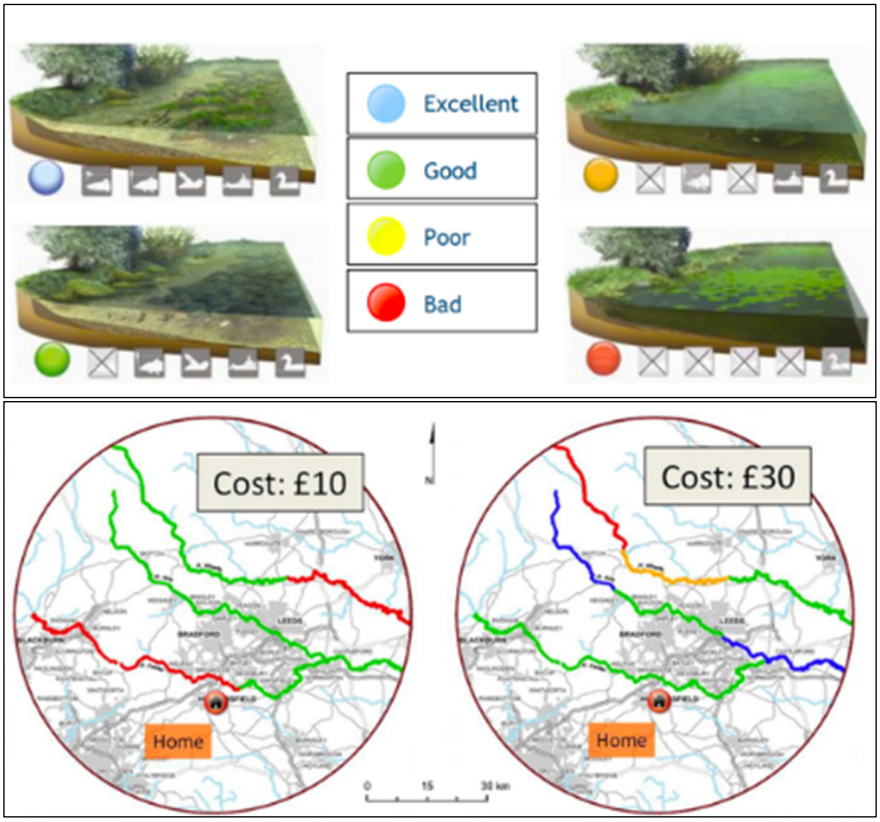
Source: Yorkshire Water Appendix 5e. Understanding Customer Values Stated Preference Report

Yorkshire Water noted a number of improvements to its approach to the stated preferences study compared to the previous planning cycle. It adopted a new approach to understanding the difference between 'use' and 'non-use' values for environmental measures; showcard materials used to describe service measures tested were created and designed by a graphic designer, to help with cognitive understanding; and, where available, industry comparative data was provided on these showcards. As a result of these improvements, ease of understanding of what was being asked of customers was improved from 74% in the equivalent stated preference study in PR14 to 91% in PR19.

(b) Revealed preference: The first phase of revealed preference approach involved using visitor survey results to estimate welfare values of river water quality improvements in the Yorkshire region. Two approaches were used to obtain the welfare values: a travel cost model and a visual spatial choice experiment.

In the visual spatial choice experiment, participants were first introduced to the categorization of river water quality (top part of Figure 37) and then asked to choose between two future scenarios for the main rivers in the study area, with each scenario associated with a cost in the form of an annual increase in the household water bills payable by each household in the region (bottom part of Figure 37). The innovative aspect of this work was the (i) presentation of hypothetical scenarios to participants in the form of colour-coded and annotated maps with each map showing a different spatial pattern of water quality change and (ii) estimation of models based on combined stated preference and revealed preference data to derive use and non-use values derived from water quality improvements.

Figure 37 Yorkshire Water visual spatial choice experiment



Source: Yorkshire Water Appendix 5g, Understanding Customer Values: Revealed Preference River Quality Report

The second phase of the revealed preference work involved using the averting behaviour approach to estimate the expenditure of businesses in Yorkshire on water service-related devices, e.g. pumps, filters, and back-up supplies, in order to alleviate water services failures and maintain their business operations.

(c) Experimental methods

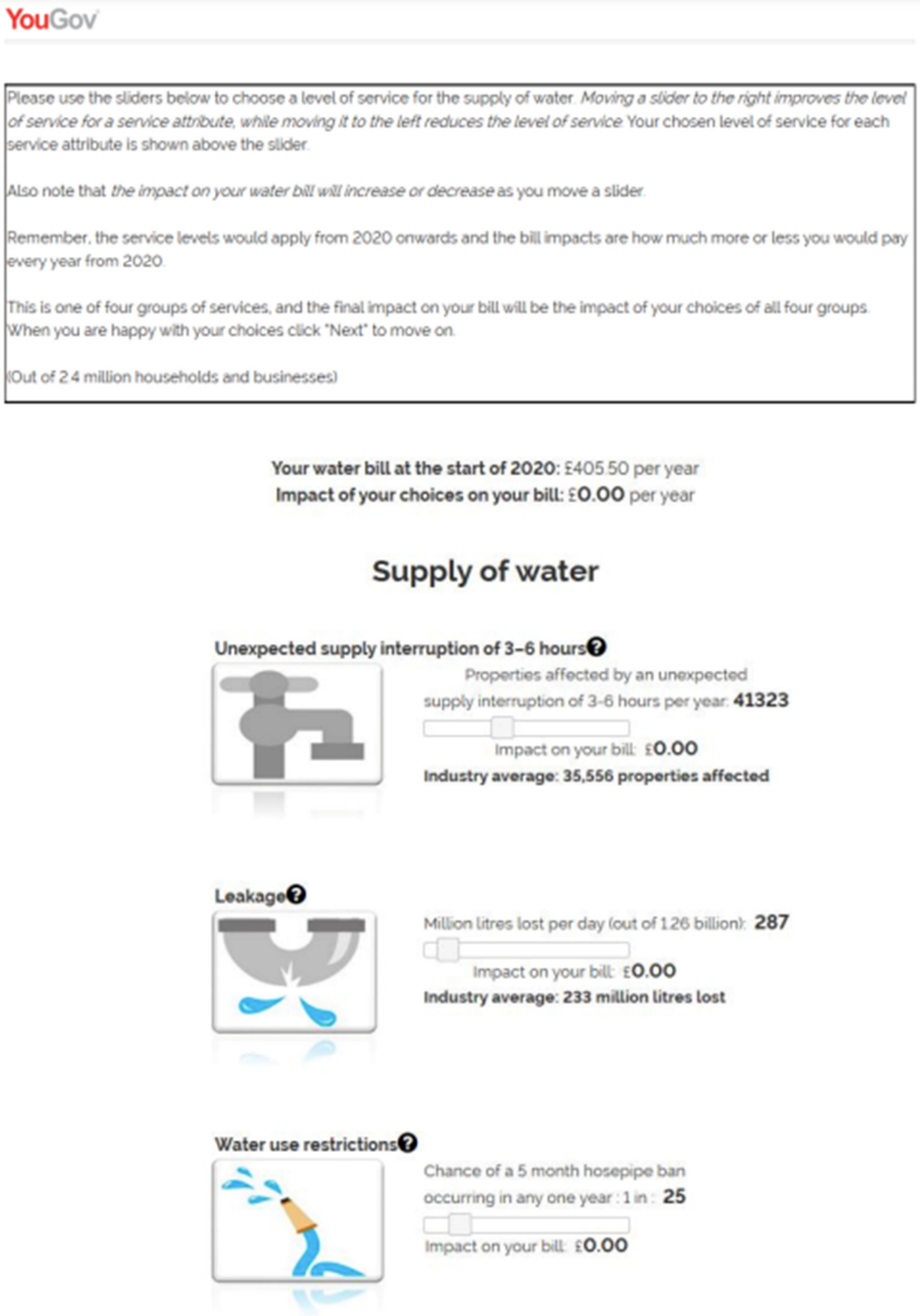
- **Behavioural experiment:** online interactive tool which allowed customers to alter service levels and observe in real time the effects this would have on their bill. Customers were shown the impact of bill changes on their disposable income and comparative information on Yorkshire Water's performance on service levels vs. that of other companies. The likelihood of events happening was communicated in frequencies rather than quantities. Customers were able to adjust service levels for the same 13 service attributes examined in the stated preference surveys, grouped into four categories (water quality, supply of water, sewerage services, environment) and were shown the same showcards created for those studies. A sample of 2,027 respondents completed this experiment (1,732 responses were considered valid, as the rest did not move the sliders)

- **Trust experiment:** Yorkshire Water used a trust experiment to understand the relationship between service measure failures and water bill payments. The analysis involved undertaking a a literature review on the measurement and valuation of trust. Information came from company-wide / aggregate data on service measure failures and payment records, and Customer Tracker survey data. The analysis allowed the

identification of opportunities for Yorkshire water to increase the levels of trust in its customer base. The logic chain for this was: Service measure failure(s) → Change in levels of trust → Change in no. of customers refusing to pay water bills → Change in YWS cost recovery / level of debt.

An illustration of the online slider tool used in the behavioural experiment is in Figure 38.

Figure 38 Screenshot of Yorkshire Water's online slider tool, supply of water choices



Source: Appendix 5i Understanding Customer Values_ Behavioural Experiment Report

Vulnerability research: Qualitative research comprising 10 focus groups and 48 depth interviews in order to gain an in-depth understanding of the unique needs of vulnerable customers what considerations are need to ensure provided services meet customer needs. Vulnerable customers as well as key charities that represent their interests and the Consumer Council for Water were all involved in this research.

PR19 customer insight research: acceptability testing of the draft PR19 business plan. An extensive qualitative and quantitative research with household, non-household, vulnerable and future customers, structured around the five big goals (water supply being one of these).

Summary of groups consulted

- Households and non-households.
- Yorkshire Forum for Water Customers (made up of key groups in Yorkshire who collectively represent Yorkshire Water's customers.
- Yorkshire Forum for Water Customers' Environment Sub-Group (established to support the main Forum in challenging the company's activities on issues relating to the environment. Discussed the draft WRMP19 and examined the guidance, drivers, approach, environmental impacts, proposed solutions, technical papers, assurance, Board assurance and public consultations. Also involved in consultation representations, statement of response and drafting WRMP19.
- Staff participation and engagement.

How results were used

Outputs from the customer engagement and research projects have been used throughout the WRMP and business plan development. Conversations with customers have helped Yorkshire Water at various points during the planning cycle, such as having input into shaping and developing their long-term strategy; developing performance commitments; informing the leakage reduction and water efficiency strategies; assessing which demand management and water supply options would deliver the greatest benefit; informing the decision-making process in developing the preferred programme.

References

a) Water Resources Management Plan. Yorkshire Water Services Ltd. April 2020. Appendix C: Customer engagement for PR19 and WRMP19 planning.
b) Yorkshire Forum for Water Customers PR19 Assurance Report
c) PR19 Appendix 5a - Customer and Stakeholder Engagement
d) PR19 Appendix 5e - Understanding Customer Values Stated Preference Report (.pdf)
e) PR19 Appendix 5g - Understanding Customer Values Preference River Water Quality Report (.pdf)
f) PR19 Appendix 5i Understanding Customer Values_ Behavioural Experiment Report