

Accent

 PJM economics

# Outcome Delivery Incentive Research: Design of Methodology

## Industry Literature Review

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# Executive Summary

## 1. Introduction

Ofwat has commissioned Accent and PJM Economics to help develop a methodology for obtaining the customer evidence required to support outcome delivery incentive (ODI) rate setting for common performance commitments (PCs) at PR24 and to develop and test the materials based on this methodology. The first stage of the study will consist of development of the ODI methodology while the second stage will involve the development and testing of this methodology.

The present report is an interim deliverable for the study. It forms one part of an initial desk review for the study which, along with a consultation with companies and stakeholders, is intended to lay a solid foundation for the development of the methodology options that will form the principal content of the Stage 1 report.

This report contributes to this objective by reviewing the following:

- Research conducted by water companies for PR19, and how it influenced the setting of PC levels and ODI parameters
- Research conducted by energy companies for RIIO-2, and how it influenced the setting of output levels, consumer value proposition cases, and ODI parameters
- Guidance from Ofwat and CCW concerning customer engagement expectations for PR24.

In the course of the review of PR19 and RIIO-2 work, we summarise the approaches taken by different companies, in the context of regulatory guidance, consider their strengths and weaknesses, issues encountered in the development of customer outcomes and ODIs and draw out and comment on interesting methodologies. The intention is not to be exhaustive nor meticulous, but to identify potentially useful methodologies to support the development of options for the PR24 collaborative ODI research methodology.

## 2. Review of PR19 / RIIO-2

The review has focused on the approaches used in the water and energy sectors, and the supporting customer research, for:

- Developing PCs / outputs
- Setting PC / output levels
- Setting of ODIs

### Developing PCs / outputs

A key aspect of business planning for PR19 and RIIO-2 involved developing the list of PCs / outputs. Water and energy companies typically used uninformed research to obtain

high-level, top-of-mind, customers' priorities as a means of understanding customers 'as they are', primarily for communication purposes. By contrast, informed research was commonly used for prioritisation over specific policy choices or initiatives.

Water and energy companies conducted both traditional and innovative qualitative engagement activities to obtain customer priorities. In addition to conducting bespoke engagement activities, companies also often used ongoing / continuous customer engagement data sources to elicit customers' needs and priorities.

Examples of traditional activities used by water companies included ethnographic interviews, 'signpost' discussion groups, focus groups, customer forums and deliberative workshops. Examples of innovative engagement activities used by water companies included bus tours, water festivals, customer surveys at various public events via Facebook 'Chatbot', magazine surveys that included questionnaires in company magazines etc.

Examples of traditional activities used by energy companies included customer and stakeholder conversations, meetings, workshops, webinars, online surveys and consultations to obtain uninformed priorities. Examples of innovative engagement activities included a bespoke digital tool designed to obtain customers' priorities, the Alva sentiment analysis tool to gauge live and trending topics of interest to customers etc.

Overall, both water and energy companies used findings from their bespoke customer engagement activities and ongoing/continuous customer engagement data sources, reviewed the list of PCs and outputs consistent with Ofwat and Ofgem expectations, identified the list of bespoke PCs and outputs based on customer and stakeholder research, reviewed the draft list of PCs and outputs internally and with their stakeholders to develop the final list of PCs and outputs for PR19/RIIO-2.

Ofwat's Initial Assessment of Plans and Final Determinations raised some concerns regarding PCs developed by certain water companies. These issues related mainly to the lack of a clear and concise definition for the PCs, the manner in which some PCs were measured, and a lack of testing of some PCs with customers.

## Setting PC/Output levels

Setting stretching levels for PCs and outputs has a significant impact not only on proposed services to customers but also on companies' expenditure levels and hence on customer bills. Following guidance set by Ofwat's PR19 final methodology, water companies challenged their proposed PC levels for PR19 with their customers, CCGs and other stakeholders against six approaches: cost benefit analysis, comparative information, historical information, minimum improvement, maximum level attainable and expert knowledge.

Energy companies had three types of targets for outputs which included common outputs with common targets, common outputs with bespoke targets and bespoke outputs with bespoke targets. In the first two cases, Ofgem set the performance targets while for the remaining case, energy companies set their output target levels. Overall, in setting their target levels, energy companies considered several factors such as customer

priorities identified through bespoke engagement activities, business-as-usual operational contacts and through benefit valuation, expectations from regulators, stakeholders and government and their understanding of current and future performance and industry benchmarks.

## Approaches to valuation

A principal component of setting PC and output levels was using the cost benefit approach to determine the efficient service level i.e. the level where the marginal benefit for the service level was equal to the marginal costs of providing that service level. Marginal benefits were obtained via customer valuation research and triangulation. Following triangulation, these valuations were used, alongside costs, to set performance and output levels and ODI rates.

A number of water companies (e.g., Anglian Water, Bristol Water) completed an initial 'valuation strategy' in the initial phases of their PR19 business planning process. Completion of such a valuation strategy enabled these companies to focus effort proportionally on service attributes of high value to their customers, select appropriate valuation methods and hence build a robust, comprehensive and innovative societal valuation programme.

Water and energy companies utilised multiple valuation methods including a variety of stated and revealed preference methods, behavioural experiments, value transfer methods, subjective well-being approaches, gross value-added approaches, deliberative valuation workshops and market price studies to obtain customers' valuations for service measures. In addition to these methods, some companies also used improved graphical and user-friendly gamified methods of research as part of their business plans.

## Triangulation

Companies used both qualitative and quantitative methods for the triangulation of customer evidence sources.

- Qualitative approaches involved taking each source of customer evidence, extracting the relevant views and preferences and then creating a qualitative synthesis / database of customer insights around business plan outcomes. Water and energy companies used a qualitative framework to derive a list of triangulated customer priorities which helped in the development of PCs and outputs.
- Quantitative approaches involved utilising a range of data sources to obtain estimates of, and ranges around, key quantitative measures such as willingness-to-pay (WTP) values for service improvements.

## Setting Output Delivery Incentives

Setting ODIs at PR19 involved a number of component steps:

- Calculating ODI rates
- Estimating P10/P90 service levels
- Determining overall RoRE range

- Setting caps, collars and deadbands
- Setting enhanced ODI rates

ODI-specific research studies were widely undertaken by water companies at PR19 using both qualitative and quantitative methods to understand customers' views on the principles of ODIs and to obtain their feedback on the appropriate scale of ODIs and their willingness to accept bill changes.

Similar to the water sector, energy companies conducted extensive customer engagement programmes and followed expectations from regulators and stakeholders to develop ODI packages and consumer value propositions.

Energy companies proposed ODIs for outputs where there was a benefit / loss to consumers and stakeholders of them overperforming / underperforming their targeted performance levels. The ODI package included common financial and reputational incentives set in accordance with Ofgem's guidance. In addition, companies proposed bespoke financial and reputational incentives.

Rewards were associated with overperforming targets while penalties were associated with failing to meet their targets. Ofgem set the maximum reward and penalty rates for some common ODIs while energy companies set maximum reward and penalty rates for their bespoke ODIs.

Energy companies also proposed consumer value propositions for areas of the business plan going beyond Ofgem's requirements and beyond business as usual activities to provide additional value for consumers. Rewards were associated with consumer value propositions.

A principal component of setting ODI payments and valuing outcomes in the consumer value proposition was the use of WTP research studies. Energy companies used customer valuation evidence, where possible, for the valuation of benefits and other industry recognised sources of values such as Network Asset Risk Metric and the Ofgem Cost Benefit Analysis model. In cases where WTP and industry standard sources of value did not exist, other sources were used, such as HM Treasury, Defra, the Department for Business, Energy and Industrial Strategy (BEIS) and Woodland Trust. Many companies utilised a Social Return On Investment (SROI) tool to capture and forecast the costs and benefits of outcomes included in their consumer value propositions.

### 3. PR24 Customer Engagement Expectations

In May 2020, CCW commissioned Blue Marble Research to conduct a study to understand how consumers felt about the research processes they were asked to participate in, for the development of water companies' business plans and whether they felt they were able to make a meaningful contribution that adequately reflected their views. The study (CCW/Blue Marble 2020<sup>1</sup>) reported that most customers found certain aspects of the business plans to be highly technical and difficult to understand.

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<sup>1</sup> CCW/Blue Marble (2020). *Engaging water customers for better consumer and business outcomes*

Following this, CCW (2020), in its report titled “Lessons learned from the 2019 Price Review”, made several recommendations regarding Ofwat’s price setting methodology.

Table 1 in the main body of the report contains a summary of the general principles of good practice put forward by CCW/Blue Marble (2020) and CCW (2020) in pursuit of high quality customer engagement and research. The development of options for the PR24 collaborative ODI research methodology will seek to adhere to these, where relevant, in accordance with the principle set out in the project inception report that the methodology should be customer-focused.

# 1 Introduction

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In the course of the review of PR19 and RIIO-2 work, we summarise the approaches taken by different companies, in the context of regulatory guidance, consider their strengths and weaknesses, issues encountered in the development of customer outcomes and ODIs and draw out and comment on interesting methodologies. The intention is not to be exhaustive nor meticulous, but to identify potentially useful methodologies to support the development of options for the PR24 collaborative ODI research methodology.

The review of PR19 is contained within Section 2; Section 3 contains the RIIO-2 review. Chapter 4 concludes this interim report with a summary of CCW expectations regarding best practice principles for customer research at PR24.



# 2 PR19 Review

## 2.1 Introduction

This section presents a review of the work conducted by water companies at PR19 in relation to setting PC levels and ODIs. We have reviewed business plans and supporting documents, extracted the key aspects of these activities (customer valuation, triangulation and ODIs) and identified noteworthy aspects or methodologies and significant issues encountered.

The main aim of this section is to identify best practice methodologies that can be considered for the development of an approach to customer research for ODI rates that can be delivered consistently across all water company areas in England and Wales for PR24. We do not provide recommendations at this stage of the study as this will follow later in the project.

The PR19 review is structured into two sections: Section 2.2 summarises Ofwat's guidance on the development of customer outcomes for PR19 with the aim of establishing the context for the review, in Section 2.3, of water companies' work to support the development of customer outcomes and ODIs for PR19.

## 2.2 Ofwat guidance on Outcomes

The key areas of the PR19 outcomes framework for which Ofwat provided guidance<sup>2</sup> included the following:

- Developing PCs
- Setting PC levels
- Determining ODIs

The most relevant aspects of this guidance are summarised in the following.

### Developing PCs

As set out in Ofwat's Final PR19 methodology document, companies were required to develop a balanced and challenging set of PCs for the benefit of their current customers, future customers and the environment, including common and bespoke PCs.

The 14 common PCs for PR19 included the following<sup>3</sup>:

- Customer measure of experience (C-Mex)

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<sup>2</sup> Based on Ofwat (2017) Delivering Water 2020: Our final methodology for the 2019 price review. December 2017.

<sup>3</sup> An additional common PC relating to supporting vulnerable customers was added in January 2019.

- Developer services measure of experience (D-Mex)
- Water quality compliance- the Drinking Water Inspectorate's (DWI's) Compliance Risk Index (CRI)
- Water supply interruptions
- Leakage
- Per capita consumption
- Internal sewer flooding
- Pollution incidents
- Risk of severe restrictions in a drought (risk-based resilience metric)
- Risk of sewer flooding in a storm (risk-based resilience metric)
- Main bursts (asset health metric)
- Unplanned Outage (asset health metric)
- Sewer collapses (asset health metric) and
- Treatment works compliance (asset health metric)

In addition to including common PCs, Ofwat also required that companies include bespoke PCs that were innovative and consistent with their customer and stakeholder's preferences.

Besides providing guidance on common and bespoke PCs, Ofwat also laid out some additional principles that water companies were required to follow with regard to the development of their PCs. These principles included the following:

- A clear mapping of PCs to the outcomes that companies aimed to deliver to their customers. This required that the definitions for the PCs were clear, unambiguous, complete, concise and consistent across the price control period.
- No aggregated PCs at PR19. This ensured that companies delivered against each of their PCs and had no incentive to offset poor performance on one metric with better performance on another one.
- Utilising novel communication channels and tools (e.g. the Discover Water dashboard) to provide their performance information during the 2020-2025 period to customers, CCGs and other stakeholders.
- Using more customer and environment-focused PCs than scheme-specific PCs wherever possible. In the event that companies decided to set scheme-specific PCs (e.g., schemes with delivery times beyond 2025, or, that deliver inter-generational benefits to customers; schemes where there is a high degree of legal and technical uncertainty associated with completion etc.), Ofwat required them to adhere to the following principles:
  - Engage with their customers and CCGs on any scheme-specific PCs
  - Submit all details of the scheme-specific PC alongside its special cost claim. This should provide details of how their PCs and ODIs would ensure that customers would be compensated in the event of non-delivery or delay and
  - Provide details of the alternatives to scheme-specific PCs and ODIs that they had considered, customer engagement activities that they had undertaken to support

their approach and explain why they decided that the alternatives were not appropriate.

## Setting PC levels

Ofwat required that water companies forecast appropriate initial service levels for 2019-20, and for these to influence the level of their PCs for 2020-21 onwards. These initial service levels were to be set on the basis of the best available information available to companies at the time and was subject to scrutiny by the CCGs and Ofwat.

As set out in the PR19 Final methodology document, Ofwat required companies to challenge their proposed PC levels with their customers, CCGs and other stakeholders against six approaches or provide explanation if they failed to do so. These approaches were:

- cost benefit analysis
- comparative information
- historical information
- minimum improvement
- maximum level attainable and
- expert knowledge

Ofwat provided further guidance on specific aspects of each of the above approaches as follows:

- *cost benefit analysis*: Companies should use multiple sources of customer valuation evidence (instead of relying solely on stated preference WTP methods) and use forecasted efficient cost levels (instead of current marginal cost levels) to inform their PC levels
- *comparative information*: Companies should use comparative information (available from working closely with other water companies or accessing sources like Discover Water) to forecast the upper quartile level of performance for each year of the price control period and use this information to inform their proposed PC levels.
- *historical information*: Companies should utilise historical information on their best past performance to predict what their best future performance could be in 2024-25. This information should be used to inform their proposed PC levels throughout the price control period.
- *minimum improvement*: Companies should define the minimum improvement level for each of their PCs. This minimum level can be based on previous performance of the company or other companies but should consider forecasts of future technological improvements.
- *maximum level attainable*: Companies should define the maximum possible level achievable for each of their PCs, and then work backwards from the maximum level to propose their PC levels.
- *expert knowledge*: Companies should utilise expert knowledge about possible improvements that are not captured in the comparative or historical information of certain PCs such as asset health.

For common PCs, companies were expected to challenge their PC levels against the forecast upper quartile performance levels as there was likely to be comparable data available for them.

For leakage, specifically, Ofwat also required companies to achieve an annual percentage reduction of at least 15% from PR14 2019-20 PC level.

Besides providing guidance on setting stretching levels for common and bespoke PCs, Ofwat laid out some additional principles that water companies were required to follow with regard to setting of their PC levels. These principles included the following:

- Using annual data for their PCs, particularly for PCs with in-period ODIs, with the exception of leakage and per capita consumption (PCC) PCs for which companies were required to use three-year averages.
- Setting PC levels for all PCs for five years, and their projections for at least a further ten years.
- Proposing efficient service levels from the start of the price control period with no transition from their current performance level to their stretching PC levels.
- Keeping bills affordable for customers while at the same time providing better service for their customers. This should be possible given the scope for achieving efficient cost levels at PR19.

## Determining ODIs

For any PC to have a financial ODI attached, Ofwat expected that it should include at least an underperformance rate and satisfy the following criteria for an outperformance payment to be appropriate:

- be proposing a stretching PC level so that outperformance payments were for strong outperformance and not for carrying out the “day job” and
- demonstrate that there were benefits from improved performance and have customer support for its proposed outperformance payment.

## ODI rates

Ofwat’s PR19 Final methodology document contained a range of guidance with respect to the setting of standard ODI incentive payment rates. The important elements include the following:

- Companies should use the formula shown in Figure 1 for setting their underperformance and overperformance incentive payment rates, although this could be amended in order to utilise alternative customer valuations instead of only marginal stated preference WTP.
- Companies could propose changes to ODI rates calculated based on the existing formula provided these were supported by strong justification and high-quality customer evidence.

- Companies should use a bottom-up approach i.e. calculate their ODI rates on customer valuations and costs instead of calculating rates based on a pre-set RoRE range or amount of revenue, but should ensure that their calculated ODI payment rates, as a package, are consistent with Ofwat's expected RoRE range
- Companies should calibrate their ODI incentives in the context of the broader package of incentives at PR19 (e.g. total expenditure efficiency sharing or any other incentives that might apply to their performance).

**Figure 1: Formula for calculation of ODI incentive payment rates**

$$\text{ODI}_{\text{underperformance}} = \text{Incremental benefit}^{20} - (\text{incremental cost} \times p)$$

$$\text{ODI}_{\text{outperformance}} = \text{Incremental benefit} \times (1-p)$$

Where:

- incremental benefit for underperformance penalties is the value foregone by customers for a given level of under-delivery. Incremental benefit for outperformance payments is the value that customers gain from a given level of over-delivery. The benefits can be measured by different customer valuation techniques.

Companies can also include other marginal benefits in the incremental benefits part of the formula, such as benefits to the environment, biodiversity and natural capital that are not captured in the other methods for customer valuations and which are appropriate to add to it.

- incremental cost for underperformance penalties is an estimate of the expenditure, which can be avoided by the company for the given level of under-delivery. Companies should use forecast efficient marginal cost levels in their estimates of incremental cost in the underperformance penalty formula.

p = is the customer share of expenditure performance (this is from the totex efficiency sharing incentive). Companies should use 50% for 'p', unless they can provide good reasons for using a different percentage.

Companies can use marginal or incremental values in these formulas as appropriate<sup>21</sup>.

Source: Ofwat PR19 Final Methodology report, Appendix 2, page 91. Note: Ofwat suggests p=50% since companies' actual totex efficiency sharing rates are assumed to be close to 50%. Ofwat suggests p=0% for residential retail in Wales, business retail in Wales and bioresources as customers do not bear a share of cost overspending.

## Enhanced ODIs

Ofwat proposed a number of measures to incentivise companies to achieve a step change in their PC levels. These measures include the following:

- Companies should propose enhanced outperformance and underperformance payments for only the common PCs based on comparable data. This is to ensure that stakeholders were convinced that the enhanced outperformance threshold truly represented “frontier-shifting performance”.
- Companies should accompany any enhanced outperformance payment rate by an enhanced underperformance penalty rate for below-standard performance. This is to ensure that customers remain protected in the event that companies take unreasonably high risks to achieve high performance but end up with very poor performance.
- Companies should set the threshold for the enhanced outperformance payments at industry-leading level i.e. the performance level of the current leading company, or preferably higher
- Companies that are already industry-leading need to demonstrate the stretch in their proposed enhanced outperformance payment threshold levels
- Companies should provide justifications regarding how their enhanced outperformance payment threshold helps them achieve the maximum level possible, and how the threshold would help improve benchmarks for all water companies.
- Companies should set out the enhanced outperformance payment threshold in advance at PR19. The threshold could be set in advance to increase year by year.
- Companies’ enhanced outperformance payments will be cumulative after the threshold point i.e. companies each additional unit of outperformance will incur an additional unit of the enhanced outperformance payment. Companies will not be allowed to have one-off tranches of outperformance payment, due at the threshold point.
- Companies which propose enhanced outperformance and underperformance payments should provide an explanation in their business plans on how they intend to share the knowledge behind their success with all other water companies by the end of the price review period or soon after.
- Companies should apply enhanced underperformance penalties at least at their current lower quartile performance level. Companies which incur enhanced underperformance penalties will be required to submit an action plan to its CCGs, explaining in detail the reasons for their poor performance and how they intend to improve their performance.
- Companies can include wider externalities that might not be captured in their customer valuations to calculate the enhanced outperformance payment rate that applies beyond the threshold.

## Other aspects

In addition to the above guidance on ODI development, Ofwat laid out some additional principles that water companies were required to follow at PR19 with regard to ODI design. These principles included the following:

- Companies were strongly discouraged to setting PCs and ODIs in a way so as to shift the expenditure from totex into ODI outperformance payments for the PCs.
- Companies were strongly discouraged from proposing deadbands (i.e. zones of performance close to the PC level, for which no financial ODI applies, although the PC has a financial ODI) since deadbands were considered to disincentivise companies to improve their service performance.
- Companies can propose outperformance payment caps (i.e. maximum level of outperformance payments and underperformance penalty collars (i.e. maximum level of underperformance payments) on individual ODIs, provided these are well supported by customer engagement. Companies were required to consider the costs and benefits of such caps and collars.
- Companies were discouraged from the use of gated ODIs (i.e. in cases where earning an outperformance payment on one ODI depends on the performance on another ODI). However, it was expected that companies would take a responsible attitude to claiming ODI outperformance payments if they performed poorly in some areas.
- Companies were required to adjust ODIs for inflation, using November-to-November lagged CPIH as the index.
- Companies were not required to have common ODIs i.e. the same ODI rates across companies for the common PCs at PR19. Instead companies were expected to set their ODIs based on their customer engagement.
- Ofwat discouraged trigger ODIs (i.e. ODIs designed such that a lump sum outperformance or underperformance payment becomes applicable once a company's performance exceeds a certain threshold). Instead Ofwat recommended that most ODIs be cumulative (i.e. for each unit of performance beyond a threshold, the ODI payment increases) so that companies had an incentive to go beyond the threshold.

Further, Ofwat stated the following situations in which companies could consider introducing caps and collars on the individual ODIs:

- where data quality was lower
- where there was less comparative or historical information on performance;
- where the P10 / P90 levels were harder to estimate or
- where the evidence on customer benefits was not robust.

Ofwat discouraged companies from proposing deadbands around their PC levels also because it required a fair amount of judgement in setting the level which had the possibility of reducing transparency for customers.

As with all aspects of setting ODI rates, Ofwat's guidance required that that companies should provide strong evidence and customer support for their proposed caps, collars and deadbands.

## 2.3 Outcomes and ODIs in PR19

In this section, we review the work of water companies on the development of customer outcomes and ODIs for PR19. As in Section 2.2, we focus our attention specifically on the development of PCs, setting of PC levels and the development of ODIs by water companies for PR19.

### Developing PCs

#### Overall approach

In developing their business plans, water companies conducted a multi-phased approach to customer engagement that corresponded with the phased development of their PR19 business plan. The different phases of customer engagement related to the development of their PCs were, in general, focussed on identifying priorities across their varied customer base, linking customer priorities to companies' outcomes (i.e., higher-level objectives resulting from activities undertaken in delivering water and wastewater services) and developing a final list of PCs by which the delivery of these higher-level outcomes could be assessed.

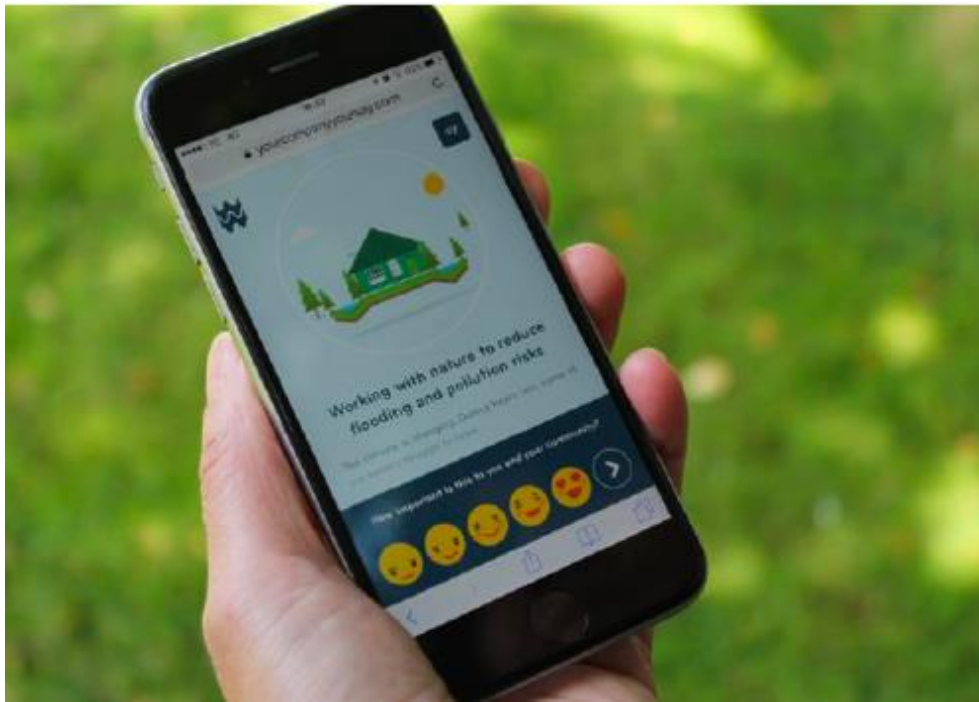
Water companies engaged with customers and stakeholders actively and effectively in order to gain an in-depth understanding of their needs and priorities. Companies tended to include research into customer priorities at an early stage in the programme. However, priorities research of various forms took place at different stages of the business planning process for different companies. Water companies conducted extensive customer engagement programmes that involved bespoke and targeted engagement, business as usual and activities and operational data analysis.

Overall, companies tended to use a mix of uninformed and informed research to obtain customers' priorities. Uninformed customers' priorities were, in general, used to determine the outcomes for business plans, based on which companies developed their PCs for PR19. For example, most water companies (e.g. Anglian Water, Northumbrian Water, South East Water, Welsh Water etc.) used uninformed research and business-as-usual research to help identify and confirm a list of high-level priorities which were then used to determine the list of PR19 PC measures. Informed priorities were elicited to gain customer feedback on specific aspects of the business plan such as bills and affordability, metering, water quality, vulnerability issues etc. Informed responses were considered essential in these often highly complex and technical areas for the research output to be meaningful and valid.

Water companies conducted both traditional and innovative qualitative engagement activities to obtain uninformed priorities. Examples of traditional activities included ethnographic interviews, 'signpost' discussion groups, focus groups, customer forums and deliberative workshops. Examples of innovative engagement activities included bus tours, water festivals, customer surveys at various public events via Facebook 'Chatbot' (see Figure 2); customer workshops in which participants wrote a postcard to a friend or recorded a 'water moments' diary-for-a-day (see Figure 3 and Figure 4) and magazine surveys that included questionnaires (see Figure 5) in company magazines.



Figure 2: Welsh Water: Customer Engagement Chatbot





Source: Welsh Water, PR19 Business Plan 2020-2025.

Figure 3: SES Water: Write a postcard

Dear friend

Our local water supplier is SES Water. They supply us with good tasting water, I am never tempted to buy bottled water for home. I have travelled a great deal around the country and around the world and it's always nice to return home where I know the water will taste the way I like it. If I had to make a constructive comment, I would prefer softer water as I am forced to use Calgon in my washing machine to stop the deposits. However, this is a small price to pay for the quality we get. We had a nearby water main burst last year but they sorted it quickly so that was good. No one likes to pay more for anything but I feel overall we get good value for money.

Best wishes  
Clive.



Source: SES Water, Our Business Plan 2020-2025.

Figure 4: SES Water: Water moments diary

**Day 2** **My different water usage moments**  
Mission 2: Record all your tap water moments today

< 1 2 3 4 >

1 Completed Wednesday 3rd May 2017 2:32pm UTC 131 seconds [View On Map](#)

14: Describe the usage moment  
Sam: Shower. I have a shower most mornings for 3-5 minutes. It's a necessity and it's a quick way to clean my body and always wakes me up in the morning.

15: Tell us how you feel  
Because I feel clean and ready for the day ahead now I'm more awake

15b: Why do you feel this way

Source: SES Water, Our Business Plan 2020-2025.

Figure 5: Wessex Water: A section of the magazine survey

**your say your future**

Customers are at the heart of everything we do, which is why your views are important to us so we can make plans for the future. We would like you to take part in our latest survey so we know what matters most to you and what you think about the services we provide. Once you've given us your view you'll be entered into a competition to win an iPad Air 2. Complete the survey online at [www.wessexwater.co.uk/survey2016](http://www.wessexwater.co.uk/survey2016) or return the form below to us.

**Q1 What's most important to you?**  
From the list opposite, which three things are most important to you and which three are least important to you?  
For example, if your top three are **A, B and C** they should be put in the 'Most important' boxes, then fill in the 'Least important' box with your least three, for example **D, E and F**.

Most important	Least important

- A** Improving the taste and appearance of water
- B** Helping you to save water and money
- C** Reducing the chance of your water supply being interrupted
- D** Reducing the amount of water that leaks from pipes
- E** Reducing Wessex Water's carbon footprint
- F** Ensuring the sea is cleaner
- G** Improving river habitats
- H** Providing more help and financial assistance for customers that need it most
- I** Reducing the chance of sewage flooding into properties and on to land
- J** Wessex Water taking on a greater role in flood prevention
- K** Ensuring Wessex Water's services are reliable even when extreme weather events occur

Source: Wessex Water: Appendix 1.1.U: Customer magazine and Facebook chatbot survey

In addition to conducting bespoke engagement activities, companies also used ongoing/continuous customer engagement data sources to elicit customers' needs and priorities. Examples of some of these data sources include the following:

- Customer satisfaction surveys (e.g. SIM and Bright surveys)
- Customer contacts and complaints
- Social media and online activity (i.e. blogs, websites, media)
- Online customer panel surveys
- Polls conducted on Facebook and Twitter

- Customer boards providing ongoing feedback on strategic issues

For example, Bristol Water developed a customer dashboard to collate customer priorities on a range of service attributes. Figure 6 presents a snapshot of the Customer Dashboard used by Bristol Water to identify customers' priorities.

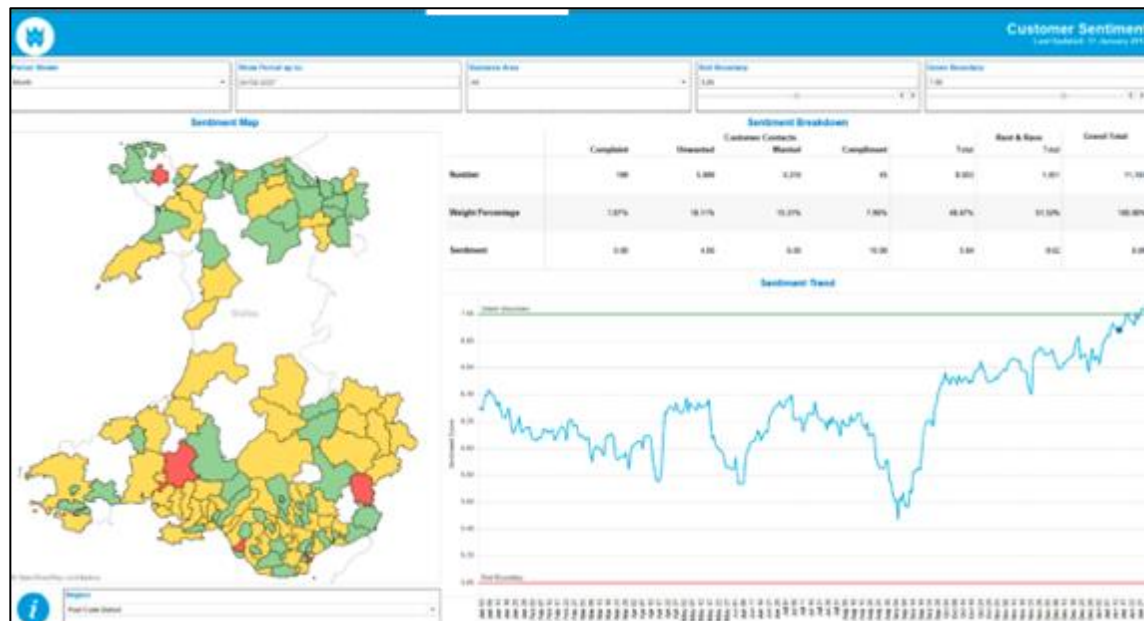
Figure 6: Summary of Bristol Water customer dashboard 2017/18

Service Attribute	Priority (%age of customers rating it very important or quite important)	Customer perception of performance (annual survey) average: 86%	Average satisfaction score from replica survey average: 84.6	SIM dissatisfied (% in 2017/18) n/a	Complaints (% in 2017/18) average: 7%	Inbound calls (% in 2017/18) average: 7%	Overall RAG
Quality	Provides water that tastes good and has no smell/provide water that looks good	99.0%	95.0%	88.6%	2.0%	8.0%	9.4%
Pressure	Ensured adequate water pressure	99.0%	94.0%	69.3%	17.0%	5.8%	6.8%
Reliability	Provides a regular water supply	100.0%	99.0%	84.9%	15.0%	2.7%	12.9%
Leakage	Repairs leaks as quickly as possible	100.0%	73.0%	83.7%	19.00%	8.4%	21.1%
Metering	Increases number of customers on meters	76.0%	64.0%	86.6%	2.0%	8.4%	3.3%
Affordability	Affordable bills	99.0%	83.0%				
Road disruption	Reduces traffic disruption	99.0%	65.0%			3.2%	0.01%
Environment	Helps protect the environment	98.0%	73.0%				
Lead	n/a			91.9%		0.4%	0.03%
Service	Resolves enquires promptly	99.0%	70.0%	82.80%	13.00%	17.40%	4.40%

Source: Bristol Water, Section C1: Engagement, Communication and Research.

Welsh Water developed the Customer Sentiment Dashboard (Figure 7), an interactive dashboard tool which was based on customer contact data and ongoing customer tracker data. The tool provided real time quantitative evaluation of customer sentiment across the Welsh Water supply region thereby helping Welsh Water identify and focus on the areas that were of importance to its customers.

Figure 7: Welsh Water: Customer Sentiment Dashboard



Source: Welsh Water, PR19 Business Plan 2020-2025.

Once the candidate lists of priorities were determined by companies, the most common methods used to measure them were:

- *Scoring method:* In this case, water companies asked customers to score the priority or importance of a service area/initiative on a scale from 1-10 or 1-5. For example, Affinity Water conducted an online survey which asked participants to score the importance of four of its customer outcomes as well as different aspects of each of the four outcomes on a scale from 1-10. Based on the responses, Affinity Water derived a priority ordering for the outcomes.
- *Top 1,2,3 method:* In this case, companies asked which service area/initiatives from a long list, customers would most like to see, next most like to see, etc. For example, South Staffs Water conducted an online survey which asked customers, uninformed, to choose their top three priorities from three areas: water quality & water supply, customer service & bills and planning for the future and then asked customers to choose their top three priorities from all the options together.
- *Ranking method:* Several water companies, including Affinity Water, Anglian Water, Bristol Water, South West Water, asked customers to put a full list of service area/initiatives into priority order. This method generated priority orderings for their PR19 service areas/ initiatives.
- *MaxDiff method:* MaxDiff exercises present customers with a sequence of questions asking which of a short list of four or so service areas/initiatives shown they would like to see given highest priority and which they would like to see given lowest priority. The set of service areas shown varies across the sequence of choice scenarios. The final output from the MaxDiff choice exercise is an index that summarises the relative priority given to each service improvement. A number of water companies including South Staffs Water, Anglian Water, Welsh Water and United Utilities used this approach at PR19.

Water companies used findings from their bespoke customer engagement activities and ongoing/continuous customer engagement data sources, reviewed the list of common PCs consistent with Ofwat's expectations, identified the list of bespoke PCs based on customer and stakeholder research, and reviewed the draft list of PCs internally and with their CCG and stakeholders to develop the final list of PCs for PR19.

Overall, companies reported in line with the majority of common PC definitions as developed by Ofwat in consultation with the industry and other stakeholders. For example, the definitions of seven of the common PCs (i.e. leakage, supply interruptions, internal sewer flooding, per capita consumption (PCC), unplanned outage, mains bursts, sewer collapses and external sewer flooding) had been developed by Ofwat through a joint project with Water UK; three PCs had been set out by regulators (i.e. CRI by the Drinking Water Inspectorate (DWI), treatment works compliance and pollution incidents by the Environment Agency); two risk-based resilience measures (i.e. risk of sewer flooding in a storm and risk of severe restrictions in a drought) had been developed in collaboration with the industry and two new PCs (i.e. C-MeX and D-MeX) were both developed in consultation with the industry and customers.

A number of companies tested the clarity of the definitions for some of their PCs with their customers. These PCs were technical in nature and hence were not easily comprehensible by customers. Anglian Water worked with a large number of customers to develop materials and conducted post-study focus groups to test and improve the

descriptions of the PCs via several iterations with customers. This testing was conducted in two phases: an initial ODI acceptability research and an ODI survey testing research.

Ofwat assessed companies' compliance with the definitions for all the common PCs (except for C-MeX and D-MeX and those set by and reported to the DWI and Environment Agency) by reviewing companies' Annual Performance Reports (APR). As part of the APR, companies were required to demonstrate compliance with the definition for each PC through a 'Red, Amber, Green' (RAG) rating<sup>4</sup>. Ofwat used this RAG reporting to determine the status of compliance with definitions for each PC.

Bespoke PCs proposed by companies were also assessed on the basis of Ofwat's guidance on bespoke PCs detailed in the PR19 Final methodology report. Specifically, Ofwat assessed the quality of customer evidence and support for the bespoke PCs including customers' WTP for the PC and any financial incentives associated with it. This assessment was combined with an assessment of the technical evidence supporting the PC, including any sector comparators or similar PCs, and historical evidence and precedents where available to make a final decision on the bespoke PCs.

Water companies included bespoke PCs for PR19 that focussed on the environment, affordability and vulnerability, ERI and void/gap properties. Some examples are listed below.

- *Environment:* Several companies included bespoke PCs that focussed on the environment. For example, Anglian Water included the "number of coastal bathing waters designated at the commencement of the 2020 bathing season in our region that attain excellent status, as designated by the Environment Agency (EA)"; Welsh Water included the "length (in km) of river with improved water quality in the region", Wessex Water included the "percentage of actions delivered to improve SSSI sites on Wessex Water landholding as agreed with Natural England" ; Yorkshire Water included "the number of pathways of invasive species spread, where biosecurity interventions have reduced the risk of that spread". etc.
- *Affordability and vulnerability:* Several water companies included bespoke PCs that focussed on affordability and vulnerability. For example, Affinity Water included the "Customers in vulnerable circumstances satisfied with our service", Anglian Water included "overall support provision for customers in vulnerable circumstances, based on a score out of 50", Welsh Water included the "Company level of bad debt: annual doubtful debt charge as a proportion of total revenue" as a bespoke affordability PC and the "number of customers who are benefiting from WW's social tariffs" as a vulnerability PC etc.
- *ERI:* Several companies included the Event Risk Index (ERI) (a measure of the risk arising from water quality events) as a bespoke PC. These included Anglian Water, Northumbrian Water, South East Water, Welsh Water and Wessex Water.

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<sup>4</sup> A Red rating for being "Not compliant with the guidance and having a material impact on reporting", an Amber rating for being "Not compliant with the guidance and having no material impact on reporting." And a Green rating for being "Fully-compliant with the guidance".

- *Gap and Void properties*: Most water companies included bespoke PCs that covered gap sites and voids properties. However, some water companies such as Bristol Water, Anglian Water and Welsh Water included a bespoke PC that covered void properties only. This was mainly because gap sites were not known to these companies, so they were unable to quantify the number of such sites.

## Issues encountered

### Ofwat Initial Assessment of Plans

In the Initial Assessment of Plans, Ofwat identified issues related to the definition of PCs for some companies. Some examples are listed below.

- Some companies reported unclear and ambiguous definitions for some of their PCs. For example, Anglian Water stated that it would measure the “Natural Capital” PC against “key metrics identified within the strategy”. But did not detail further what these were and how the final performance figures would be derived. Similarly, there was ambiguity in the manner that Welsh Water defined its “Lead supply pipes replaced” PC. Wessex Water: Wessex Water was asked to clarify the definition of the Tackling water quality at home and in the work place PC
- Some companies did not include the recommended PCs. Examples include Hafren Dyfrdwy which did not include any bespoke resilience PCs and Bristol Water which did not propose a bespoke PC covering business retail gaps and voids and also did not provide sufficient justifications for doing so.
- Ofwat raised concerns regarding the definitional components of some PCs. For example, Welsh Water proposed a “Customer trust” PC which appeared to have an overlap with CMeX. Northumbrian Water proposed a “Discoloured water contacts” PC but Ofwat recommended that the company choose a more comprehensive measure for customer contacts about appearance of water from the asset health long list included in the PR19 Final Methodology.
- Concerns were raised regarding the manner in which some PCs were measured. For example, Southern Water stated that the performance of the “Improve the bathing waters at excellent quality” PC would be measured based on the official samples taken as part of the revised Bathing Water Directive, rather than a commitment to use official samples taken by the Environment Agency. Yorkshire Water provided insufficient details of the underlying calculations for the “Risk of sewer flooding in a storm” PC.
- Concerns were raised regarding a lack of testing of some PCs with customers. For example, in the case of Affinity Water, Ofwat was concerned that the choices presented to customers were different to the definition of the “Environmental innovation - delivery of community projects” PC. In the case of Portsmouth Water, the “Catchment Management” PC was not tested with customers and the company did not provide sufficient evidence regarding the level of customer support for the PC.

## Ofwat Final Determinations

In its PR19 Final determinations report<sup>5</sup>, Ofwat mentions some issues that were encountered related to companies' compliance with the definitions for leakage, sewer collapses, unplanned outages and supply interruptions.

- *Leakage*: all water companies reported against the new definition as part of shadow reporting since 2017 but noted that they would report in line with the new guidance by 2020. Water companies which were actioned during the initial assessment of plans (IAP) and draft determinations stage set out their plans of further work to comply with the new measure.
- *Sewer collapses*: Ofwat updated the definition of sewer collapses in April 2019 based on a request by the water companies through Water UK. The revised definition for PR19 did not result in a change in reported levels compared to the previous definition for most companies barring United Utilities, Wessex Water and Severn Trent Water. United Utilities noted that adopting the updated definition led to it including more collapses than other companies, as they may be interpreting it differently. However, the company did not provide any evidence to Ofwat regarding its claim.
- *Unplanned outage*: all water companies, since 2018-2019, showed a significant improvement in compliance with the new definition and confirmed that they would be reporting in line with the new guidance by 2020.
- *Supply interruptions*: all water companies noted that they would report in line with the new guidance by 2020. Thames Water, however, stated that, in contrast to other companies, adopting the updated method led to it reporting many more properties and longer durations. However, the company did not provide any evidence to Ofwat to demonstrate that other companies were reporting on a different basis.

Following issues raised by Ofwat, water companies were required to provide sufficient information to show that the two common resilience PCs i.e. Risk of severe restrictions in a drought and Risk of sewer flooding, PCs were well aligned to their WRMP as well as the assumptions and intermediate calculations used by the companies with regard to these two PCs.

Ofwat's PR19 Final determinations report also mentions some issues that were encountered related to companies' bespoke PCs. These included the following.

- *Introducing a new bespoke PC*: Ofwat intervened on the individual components if it did not find them to be appropriate. For example, Ofwat in its feedback on Yorkshire Water's proposed definition for a bespoke environment PC i.e. "Length of river improved", noted that the company should provide an explanation of if and how double counting was avoided when the same stretch of river was being improved by more than one scheme in the NEP/WINEP programmes.
- *Retaining an existing PC* – Ofwat required companies to provide sufficient justification and evidence for retaining a PC. For example, South East Water had to provide

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<sup>5</sup>"PR19 Final determinations: Delivering outcomes for customers policy appendix" by Ofwat, December, 2019

evidence of customer support for retaining one of its PR14 bespoke PCs i.e. “low pressure”, in its list of PR19 bespoke PCs.

- *Changing a PC definition* – Ofwat intervened if companies were unable to provide clear and easily comprehensible definitions or if they had unjustified exemptions. For example, Ofwat in its feedback on Welsh Water’s proposed definition for “Customer Trust”, noted that the definition as well as the exemptions for this bespoke PC was incomplete and unclear. To improve clarity, Ofwat suggested adopting the definition and methodology used by CCWater and providing a clear rationale for converting the average score generated by the CCWater survey into a percentage. Further, Ofwat asked Welsh Water to provide clarity on if and why business retailers or business customers were included/excluded from their proposed definition.
- *Discontinuing a PR14 PC* - Ofwat required companies to provide sufficient justification and evidence for discontinuing a PC. Most companies who discontinued some of their PR14 bespoke PCs did so either because they were superseded by new PCs, become redundant e.g. scheme-based PCs or were no longer a customer priority. For example, Southern Water had to provide evidence of a lack of customer support for discontinuing one of its PR14 bespoke PC i.e. “awareness of water hardness measure”.

For bespoke PCs that were similar across companies, Ofwat sought a consistency of wording where appropriate in definitions to enable comparisons across companies and provide transparency for customers.

## Setting PC levels

### Overall approach

In setting their PC levels, water companies considered several factors which included:

- customer priorities through bespoke engagement activities, business-as-usual operational contacts and thorough benefit valuation and stated preference evidence
- expectations from regulators, stakeholders and government
- their understanding of current and future performance.

Following guidance set by Ofwat’s PR19 final methodology, water companies challenged their proposed PC levels for PR19 with their customers, CCGs and other stakeholders against six approaches:

- *cost benefit analysis*: estimate marginal costs and marginal benefits to identify the economic level of service
- *comparative information*: use robust comparative information on the performance of other companies or other sectors to inform service levels
- *historical information*: utilise previous company performance including using best past performance to inform service target levels
- *minimum improvement*: use information on past improvements in service levels or predicted technological improvements to determine the minimum service level



- *maximum level attainable*: use information on past improvements in service levels, predicted technological improvements or other relevant information to determine the maximum possible service level and
- *expert knowledge*: use expert knowledge for e.g. use of engineering models to gain information on future service level improvements in asset health PCs. Such information may not be captured in comparative or historical information.

The PC levels developed on the basis of the above criteria were then tested with customers and stakeholders. For example, Affinity Water consulted with customers and stakeholders on its draft business plan via qualitative focus groups and quantitative acceptability testing to set their final PC levels. Similarly, Anglian Water tested their final PC levels with customers in the Anglian and Hartlepool regions through qualitative and quantitative engagement. In fact, the company set a more stretching PC level for external sewer flooding in response to this feedback.

A principal aspect of setting PC levels was using the cost benefit approach to determine the efficient service levels for both common and bespoke PCs. The efficient service level is defined as the service level where the marginal benefit for the service level equals the marginal costs of providing that service level. Companies calculated marginal benefits for service improvements at a granular level which was then aggregated to calculate marginal benefits at the PC level.

Marginal benefits were obtained via customer valuation research and triangulation. Following triangulation, these valuations were used, alongside forecasted efficient costs, to set performance levels and ODI payment rates.

## Approaches to valuation

Water companies utilised multiple valuation methods at PR19 including a variety of stated and revealed preference methods, behavioural experiments, value transfer methods, subjective wellbeing approaches, gross value-added (GVA) approaches, deliberative valuation workshops and market price studies to obtain customers' marginal valuations/ WTP for service measures.

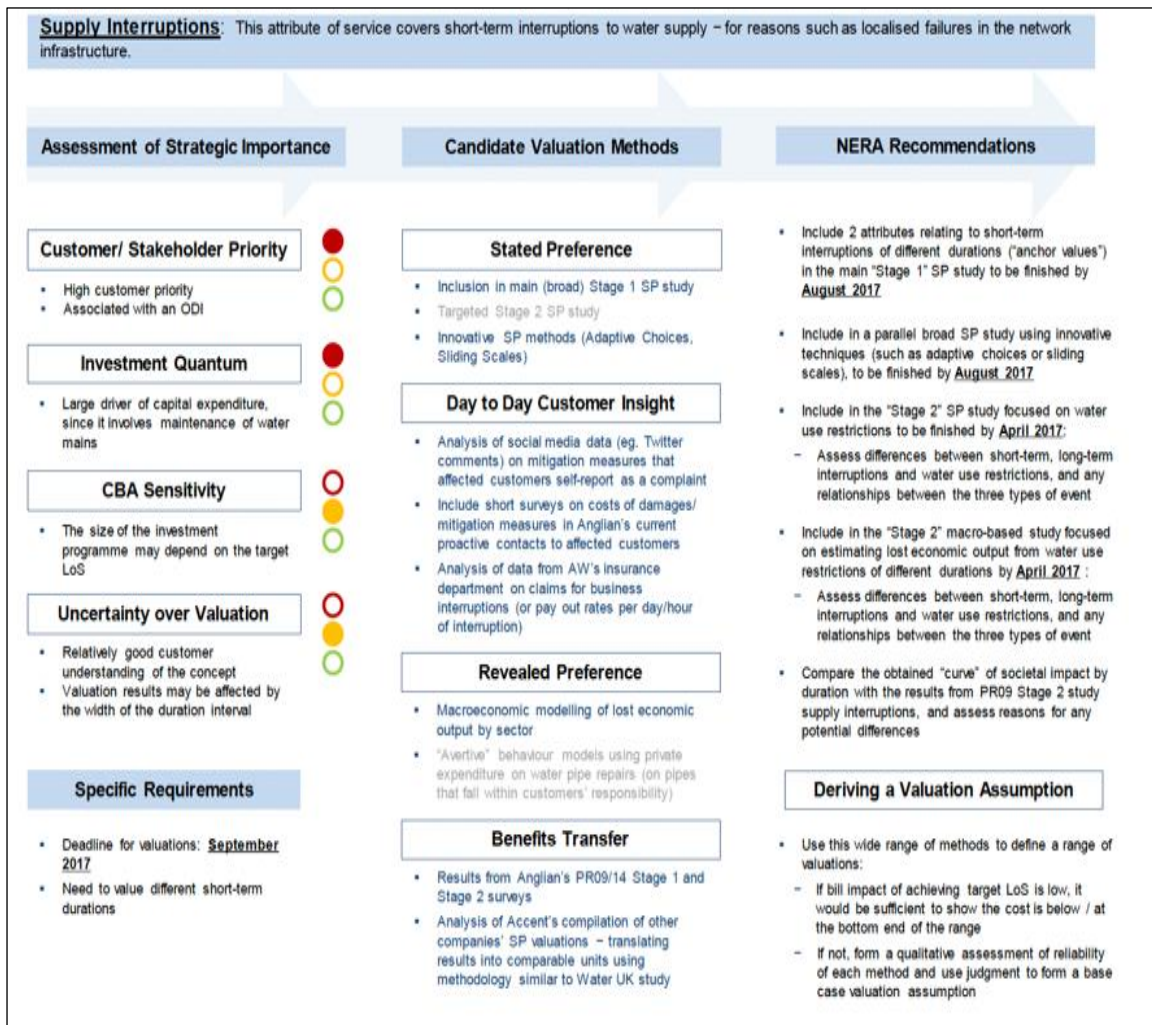
Anglian Water and Bristol Water both completed a 'valuation strategy' study at an early stage in the planning process for PR19, to ensure that the full range of required valuations was identified and matched to potential methods for their valuation.

Figure 8 illustrates the societal valuation strategy applied to supply interruptions by Anglian Water. The figure shows the following:

- The left-hand side of the figure summarises the high-level assessment of the relative importance of supply interruptions in the business planning process. The assessment reveals that supply interruptions is an area of high customer and business priority, while noting medium uncertainty and CBA sensitivity around valuation assumptions for this attribute. Specifically, the assessment highlights the fact that most of the uncertainty around the valuation of supply interruptions lies on the relationship between duration of the interruption and WTP to avoid it.

- The middle column describes the range of valuation methods that could be used to value supply interruptions and highlights (in dark blue text) the methods that should be used to value this attribute.
- The final column maps these valuation methods onto a range of valuation studies and notes how the valuation results emerging from this set of studies could be used to derive a valuation assumption, i.e., by “triangulating” a valuation.

Figure 8: Anglian Water: Societal Valuation Strategy for Supply Interruptions



Source: Anglian Water: Developing a PR19 Societal Valuation Strategy, Appendix 12e, NERA Consulting, 2017.

Completion of such a valuation strategy in the early phases of the business planning process, enabled the water companies to focus effort proportionally on service attributes of high value to their customers, select appropriate valuation methods and hence build a robust, comprehensive and innovative societal valuation programme.

In the following we provide an overview of the valuation approaches undertaken by water companies for PR19 and set out their pros and cons at a high level.

## Stated Preference Methods

Stated preference (SP) 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, SP methods invariably involve participants having to make trade-offs 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.

The most common SP methods, all used at PR19, include 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 (aka 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. Like best-worst scaling/MaxDiff, 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. The menu-based/slider approach has been said to have been used by companies to obtain WTP estimates. However, we have not seen an instance of a full original study that has been used validly in this regard.

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. At PR19, for example, this was the case for seven companies who reported using this approach. Only one company (Yorkshire Water) reported having varied the cost levels across the sample.

However, keeping costs fixed across the sample entails an inability to measure WTP as that requires variation in costs. As such, that approach is not fit for purpose if the aim is measure WTP. Furthermore, even in the case of Yorkshire Water who did vary cost across the sample, their report on the study did not contain any estimates of WTP.<sup>6</sup>

Most water companies at PR19 used multiple SP studies, rather than relying on just one survey. Typically, SP programmes included one or two 'Main stage' studies, between one and four 'Stage 2' SP surveys, and possibly also a menu-based/slider study or two for triangulation.

In the 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.

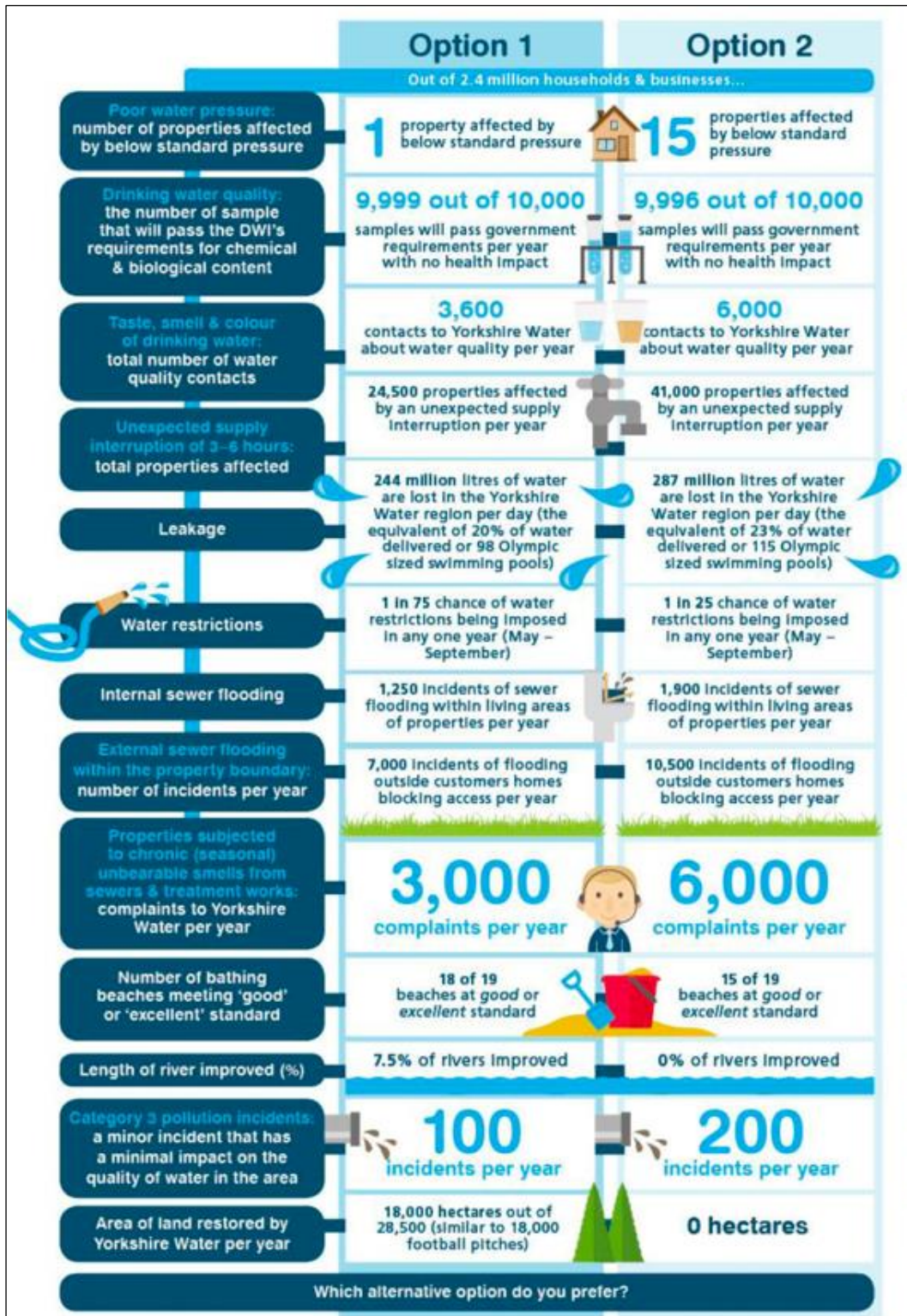
Figure 9 and Figure 10 show example choice cards for Yorkshire Water's Main stage WTP study i.e., package exercise coupled with discrete choice experiment respectively while Figure 11 presents an example choice card for Yorkshire Water's Stage 2 WTP study undertaken to explore WTP for additional dimensions of attributes included in the Main Stage study.

An innovative aspect of this study was the design of the choice cards that were presented to the customers as part of the WTP studies. The choice cards developed by Yorkshire Water were informative and visually engaging in order to assist customers' understanding of the concepts and materials presented to them.

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<sup>6</sup> AECOM (2017) PR19 Understanding Customer Values: Work Package 5 – Behavioural Experiment, A Report for Yorkshire Water.

Figure 9: Yorkshire Water: Main Stage WTP study-Package exercise



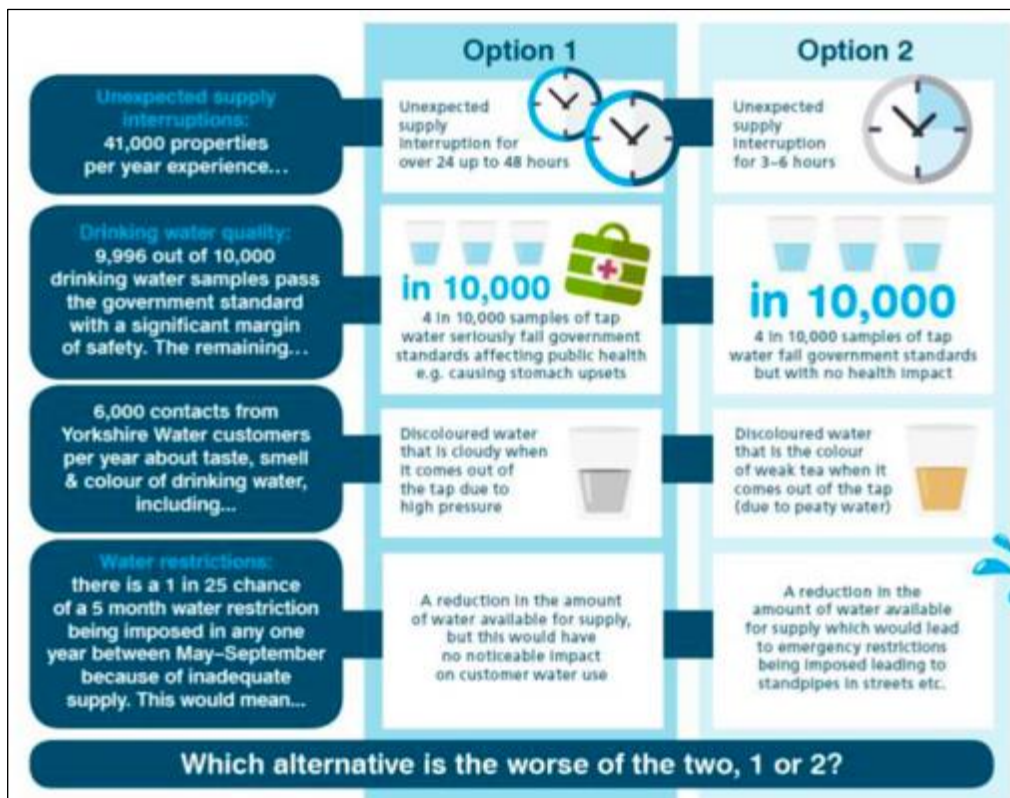
Source: Yorkshire Water-Appendix 5e: PR19 Understanding Customer Values-WP1-1<sup>st</sup> Round SP report

Figure 10: Yorkshire Water: Main Stage WTP study-Discrete Choice Experiment



Source: Yorkshire Water-Appendix 5e: PR19 Understanding Customer Values-WP1-1<sup>st</sup> Round SP report

Figure 11: Yorkshire Water: Second stage WTP choice exercise



Source: Yorkshire Water-Appendix 5f: PR19 Understanding Customer Values-WP2-2<sup>nd</sup> Round SP report

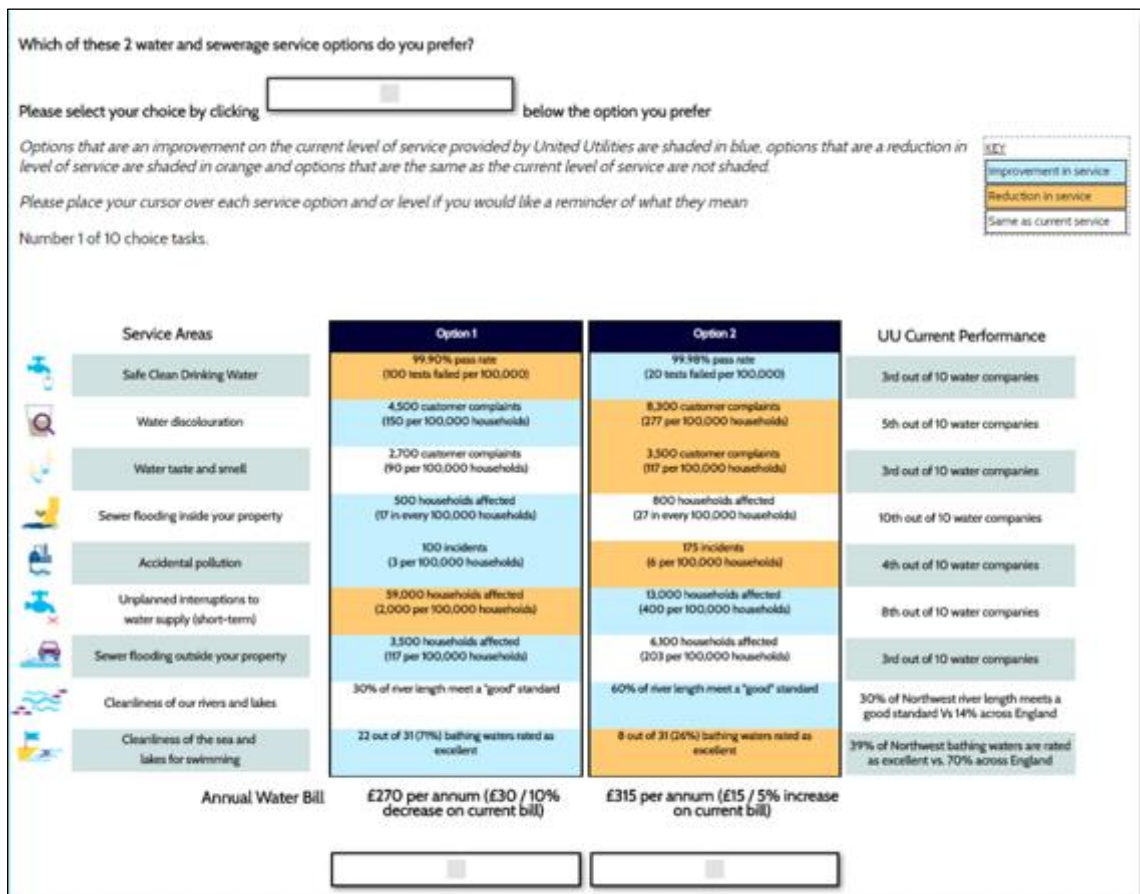
Following recommendations by Ofwat's customer engagement policy statement for PR19, most water companies supplemented their main stage WTP study with other valuation studies such as a menu-based/slider approach, or one of the innovative SP methodologies described below, in addition to exploring non-SP approaches.

In addition to these methods, water companies also used improved graphical and user-friendly methods of SP research as part of their PR19 business plans. 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 onscreen 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 its company within the water industry.

Figure 12 presents a notable example of a choice card that was developed by United Utilities as part of its customer valuation research. The choice cards were designed to make it as easy as possible for customers to understand the concepts presented to them and included the following information:

- Historical information of United Utilities with colour-coded service levels i.e. deterioration, improved and current and a key showing what the colours represented.
- A short description of the service areas for ease of understanding along with an option to access more detailed information by hovering over the short text
- Infographics related to each of the service areas so that customers could easily make associations and
- Comparative information on the right hand side of the choice card showing the performance of United Utilities in each of the service areas when compared to the industry as a whole.

Figure 12: United Utilities-SP choice card with historical and comparative information



Source: United Utilities: PR19 Willingness to pay survey report, July 2017.

## Innovative Stated Preference Methodologies

### Valuation by impact of service failures

Several companies, including Welsh Water, Wessex Water, Bristol Water and Southeast Water, utilised a novel SP approach developed by PJM and Accent which simplified WTP surveys for PR19. This new approach avoided the need for participants to trade off lots of small risk changes against one another by focusing on the relative impacts of different types of service failure directly and using these relative impacts as the basis of measuring relative unit WTP rates. The key advantage of this approach was that it was simpler for participants to understand and answer the survey questions, which led to more meaningful expressions of customer preferences. Additional advantages of this approach included its ability to accommodate a greater number of service measures compared to the PR14 approach, and the fact that fewer SP exercises were needed within the survey to obtain the required data.

### Valuation by compensation required

PJM and Accent conducted an innovative study for Affinity Water to understand the level of payment that would fully compensate a customer for the inconvenience of a supply interruption. The research was based on a stated preference exercise that contained a sequence of questions involving varying levels of interruption types, interruption durations and compensation amounts. The customer was required to choose between two options: "interruption and compensation" or "no interruption". The results of the SP exercise produced compensation amounts that served as a willingness-to-pay (WTP)



estimate per avoided interruption. Figure 13 shows an example SP choice question that was presented to the respondents. The type, duration, and compensation levels were varied across the sequences of questions according to an experimental design. The attributes and levels included in the experimental design is presented in Figure 14.

**Figure 13: Affinity Water: SP Choice card for valuation of supply interruptions by compensation required**

<b>Type of interruption</b>	Planned (48 hours' notice given)
<b>Duration of interruption</b>	6 hours
<b>Compensation paid</b>	£60

Which option would you prefer?

Option A (Interruption + compensation)  
Option B (No interruption)

**Figure 14: Affinity Water: SP Attributes and levels**

Attribute	Levels
<b>Type of interruption</b>	Planned (48 hours' notice given)
	Unplanned (no notice given)
<b>Duration of interruption</b>	3 hours
	6 hours
	12 hours
<b>Compensation paid (£/hour)</b>	£2.50
	£5.0
	£10
	£20
	£30

Source: Affinity Water: Our Business Plan 2020-2025, Appendix 4: Our Outcomes and PCs, September 2018

### Menu-based / slider research

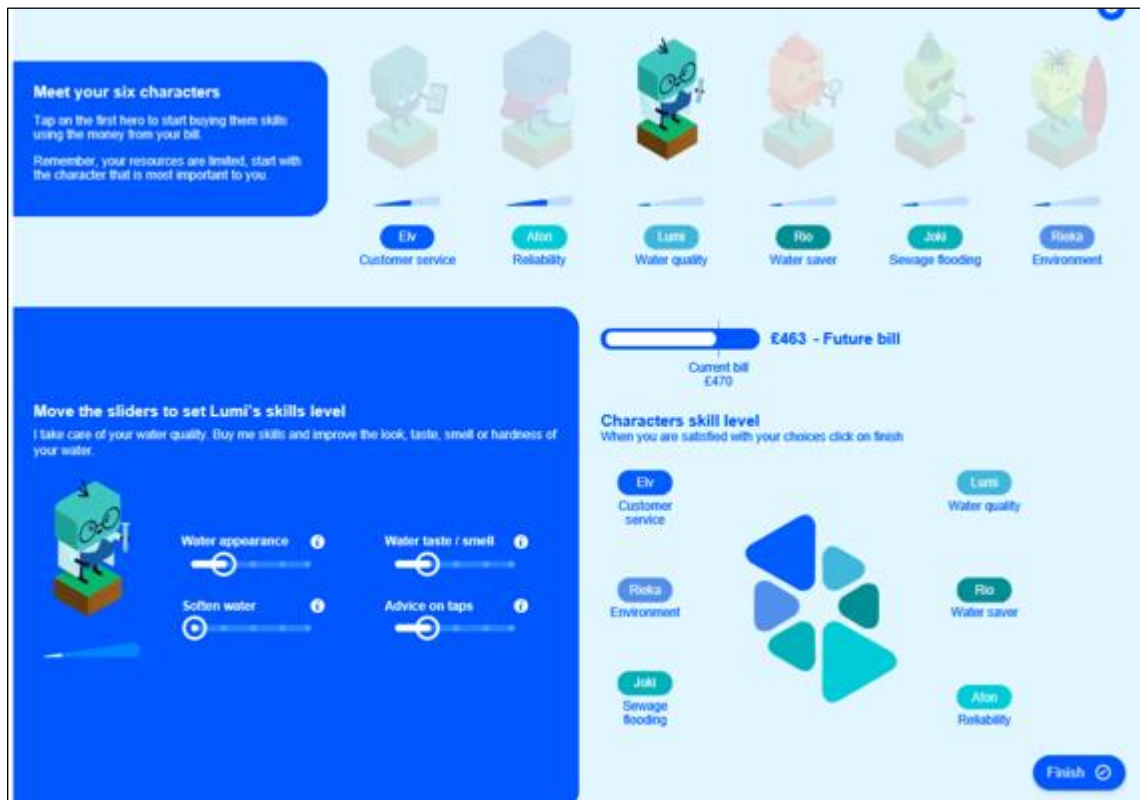
Many companies undertook valuation research using the menu-based approach, or sliders. For example, PJM and Accent developed an SP survey for Southern Water based around a menu-exercise. The menu exercise presented respondents with choice options involving varying levels of service measures in conjunction with the bill impact associated with delivery of each service level. In each scenario, respondents could select their preferred service level for the service measures across the different choice options with the overall bill varying in real time as the menu selections were made. The trade-offs made by respondents were used to triangulate against main-stage WTP estimates.

Slider SP tools were used by some water companies such as Bristol Water, Northumbrian Water, South Staffs Water and Wessex Water to understand customer preferences for service attributes. Slider tools required respondents to choose their preferred service level for each attribute simultaneously, using “sliding scales” on a computer or tablet

screen. As respondents adjusted the service levels, the sliders provided immediate feedback on the effects that this would have on their bill thereby showing the trade-offs between service quality and price.

Figure 15 shows a screenshot of an innovative slider tool i.e. the Supercharge online game presented to Wessex Water customers. This was an online interactive game designed to understand customers’ priorities 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 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. The final screen showed the bill impact of the choices that they had made and participants were allowed to adjust their choices if they wished to do so.

**Figure 15: Wessex Water: Screenshot of Supercharge online game**



Source: Wessex Water: Appendix 1.1.K: Supercharge game

### Q-Methodology

A novel SP methodology was applied in one of Anglian Water’s many valuation studies, which involved combining a choice experiment on customers’ WTP for river water quality improvements with an analysis of the customers’ subjective preferences for river water quality using ‘Q methodology’.<sup>7</sup> The first step of the study involved using Q methodology to characterise the range of opinions on river management. The second step involved augmenting the explanatory variables in the choice experiment analysis to include respondents’ subjective viewpoints (defined by the Q factors) to explore if and how

<sup>7</sup> “Q-methodology is a research technique, [...] originated and developed by William Stephenson, which focuses on the subjective or first-person viewpoints of its participants [...] and allows those viewpoints to be understood holistically and to a high level of qualitative detail” (Watts and Stenner, 2012).

subjective preferences influenced respondents' WTP for river improvements. This novel approach offers the promise of an additional point of value triangulation for water companies.

### Deliberative Valuation Methods

Deliberative valuation workshops were also conducted as part of some PR19 customer valuation programmes. For example, Bristol Water held deliberative workshops to examine how their customers valued resilience attributes (i.e. resilience relating to drought avoidance and 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.

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.

Proponents of deliberative valuation methods argue that these methods help overcome many of the limitations associated with the conventional economic valuation methods like stated and revealed preference (for e.g. reducing bias and non-response rates) and provide a more in-depth understanding of the motivations underlying people's values for services (Tonn et.al 1993, Sagoff, 1998, De Groot et al., 2010, Christie et. al 2012)<sup>8</sup>. In addition, these methods can be used to elicit service values where monetisation is considered to be particularly challenging using conventional economic valuation methods or felt to be inappropriate (such as aesthetic, ethical, shared and cultural values).

### Immersive Valuation

In an innovative study by United Utilities, participants were immersed in a simulated 14 day loss of water scenario, using mock-up text and phone messages, newspaper articles, supermarket stocks and water rationing activity. Customer behaviour was observed through the experiment and was then used to estimate customer compensation for long-term water shortages.

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<sup>8</sup> Christie, M. et al., (2012) An evaluation of monetary and non-monetary techniques for assessing the importance of biodiversity and ecosystem services to people in countries with developing economies. *Ecological Economics*, 83, pp.67-78.

De Groot, R. S., Alkemade, R., Braat, L., Hein, L., Willemsen, L. (2010) Challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making. *Ecological Complexity* 7(3): 260-272

Sagoff M, 1998 Aggregation and deliberation in valuing environmental public goods: a look beyond contingent pricing. *Ecological Economics* 24 213-230

Tonn B E, Peterson G L, Brown T, (1993) Using citizens juries for natural resource management, mimeo, Oak Ridge National Laboratory, Oak Ridge, TN.

## Revealed Preference Methods

In contrast to SP methods, RP approaches involve the analysis of behavioural choices made by people in the real world. The most common RP approaches included the following.

### ■ Averting behaviour

This method assumed that expenditures incurred on averting (i.e., defensive) behaviour are indicative of the value avoiding the issue in question. This method was used, 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 thus 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 in 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 RP methods.

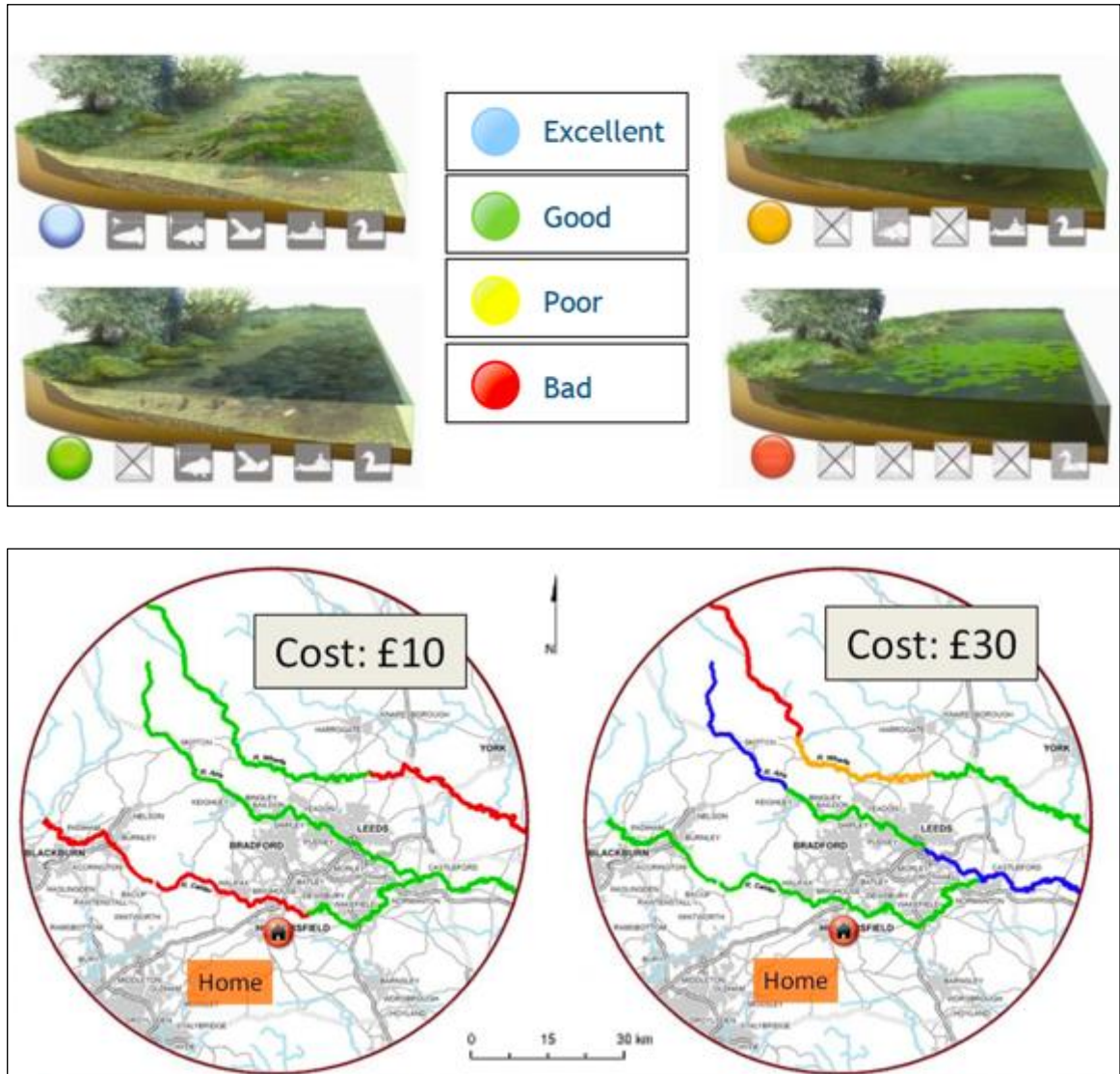
A review of PR19 business plans show that a number of companies used travel cost and averting behaviour models, in addition to the core stated preference study, to estimate WTP values. For example, Bristol Water conducted a revealed preference 'averting behaviour' survey which obtained valuations of supply interruptions by asking customers who had been affected by recent supply interruptions about the actions they had to take as a result of losing water supply. Welsh Water used revealed preference research using a travel cost approach to value bathing and river water quality. South West Water used both travel cost and averting behaviour methods: travel cost methods were used to obtain the recreational use value of beaches in the South West region while averting behaviour methods were used to estimate the value of preventing supply interruptions, low water pressure incidents and water aesthetic issues.

In an interesting and innovative example of the use of revealed preference research for customer valuations, Yorkshire Water conducted two phases of revealed preference research: 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 categorisation of river water quality (top part of Figure 16) 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 16). 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 16: 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 by Yorkshire Water 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 to alleviate water services failures.

Variation in house prices can sometimes be used to derive valuations of environmental features such as noise levels or the presence of local amenities. This approach relies on the fact that properties with good local environment features tend to be more highly valued, and hence more highly priced, than other properties all else equal. However,

none of the water companies used this methodology at PR19 to estimate WTP for service attributes. This could be because an earlier UKWIR study<sup>9</sup> analysed the impact of sewage treatment odour on house prices but did not find any significant effect.

## Subjective Wellbeing Method

A more recent innovation in the field of non-market valuation involves the analysis of subjective wellbeing data to derive value estimates. Typically, the question used for wellbeing valuation analysis is: “Overall how satisfied are you with your life these days?”, with answers recorded on a scale from 1-10. This is a widely asked question, including in national UK government surveys, and there are a number of estimates in the published literature concerning how much each point on this wellbeing index is worth in money terms. Thus, if there are data available to compare a population’s wellbeing with and without some service variation then there is a means to derive a monetary measure of that service variation’s value to the population.

The use of the wellbeing valuation method has grown in recent years and has recently been included in HM Treasury Green Book official guidance as a suitable method for valuing non-market impacts. The method has the advantage over SP methods, where it can be applied, in that the impacts measured are real impacts on wellbeing rather than stated choices on a survey.

However, its domain is more limited than in the case of SP research since it cannot value prospective changes that have not previously been experienced anywhere. Furthermore, it cannot reliably value impacts that have only a minor impact on wellbeing. Additionally, as with RP research, wellbeing valuation studies are not experimentally designed and so can suffer from the presence of confounding factors in the analysis beyond that which it is possible to control for in the analysis. Finally, wellbeing valuation studies rely on the assumption that subjective wellbeing, as defined in these studies, is able to adequately capture everything that people care about. If people care about the environment beyond their local area, for example, then they may be willing to pay for improvements even if those improvements have no measurable impact on their subjective wellbeing.

Both Thames Water and Anglian Water, as part of their PR19 business plans, conducted wellbeing valuation studies. However, of these, only the Anglian study was made public. This innovative study measured the impact of flooding and roadworks incidents on their customers’ subjective wellbeing. This impact was then converted into monetary terms by estimating the equivalent amount of income that customers would be willing to pay to receive (avoid) the proposed positive (negative) change in policy.

## GVA Method

A further type of valuation study implemented by a few companies at PR19 (Anglian Water, Bristol Water and South West Water) involved estimating the value of long-term water supply interruptions to non-domestic customers via the assumed impact of the restrictions on Gross Value Added (GVA) for different economic sectors throughout the

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<sup>9</sup> UKWIR (2008) A Framework for Cost Benefit Analysis in Odour Control Projects

economy<sup>10</sup>. This approach involved using UK regional Gross Value Added data (which provides historical output data by UK industry and region) combined with assumptions drawn from other relevant studies regarding the estimated average percentage of output that may be lost in a day of a water use restriction for each sector, to estimate the economic impact of supply interruptions (hosepipe bans, non-essential use bans, or standpipes/rota cuts).

An advantage of the GVA approach is that it covers all sectors of the economy thereby overcoming any issues with sample representativeness that are commonly associated with WTP studies. However, the GVA approach requires valid assumptions regarding the percentage losses in economic output following supply interruptions to produce robust value estimates. This limitation can be overcome to some extent by conducting primary surveys with non-domestic customers to assess their responses to water use restrictions and understand how their economic output would be affected following supply interruptions.

### Value Transfer/SROI

A further widely used method for monetary valuation is the value transfer / social return on investment (SROI) technique. This methodology takes value estimates from other sources, including SP, RP, wellbeing valuation or market prices, and translates them to be as applicable as possible to the initiative or improvement being valued. The advantage of this method is that it is often substantially quicker and less costly than undertaking a primary valuation study. However, there will generally be an error introduced when transferring values from one study to another and this may be substantial. Moreover, there may simply be insufficient evidence in important areas of interest to apply this methodology in some cases.

As part of their customer valuation programme for PR19, many water companies used value transfer evidence to estimate customers' valuations for certain attributes (coupled with stated preference surveys for the other attributes). For example, Affinity Water used a wide range of value transfer evidence, including WTP values obtained from other companies available in the public domain and other organisations such as Ofwat and EA to derive WTP values for specific service measures like disruption to other infrastructure (motorway, roads, pipelines etc.), noise from wastewater treatment plants, congestion on roads and motorways due to water and waste flooding etc. The company did not conduct original WTP research on these service attributes and instead used external sources for the required valuation evidence.

Customer valuations obtained via the aforementioned approaches were triangulated by water companies and used alongside costs, to set performance levels and ODI payment rates. The following sub section summarises the triangulation approaches adopted by water companies for PR19.

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<sup>10</sup> The GVA approach was first applied in a Water UK study to value the economic consequences of drought See Water UK (2016) "Water resources long term planning framework (2015-2065)", Appendices F.3 and F.5 for details.

## Approaches to triangulation

Ofwat's Customer engagement policy statement for the 2019 price review<sup>11</sup> included the guideline that companies should draw evidence from a wider range of customer research sources (internal and external) and, in addition, operational data including contacts and complaints, to supplement their stated preference WTP survey results.

A review of PR19 business plans suggests that water companies used a qualitative and/or a quantitative approach to triangulation. Customers' priorities obtained from engagement activities were used for triangulation in one of the following two ways:

- combined directly with core WTP measures in a qualitative framework to produce a list of triangulated priorities
- used to make a number of adjustments to the core WTP values and combined to derive their "triangulated" values.

Water companies that used a qualitative framework to derive triangulated priorities include Anglian Water, Thames Water, SES Water, Portsmouth Water. The triangulation process involved taking each source of customer evidence, extracting the relevant views and preferences and then creating a synthesis of customer insights around business plan outcomes. This was used to obtain a list of triangulated customer priorities which helped in the development of PCs.

Triangulated WTP values used in cost benefit analysis and hence in setting performance levels and ODI payment rates were generated via a quantitative triangulation method. Water companies that used customers' priorities to make adjustments to their core WTP values to derive their "triangulated" values include Anglian Water, South Staffs Water, United Utilities, Wessex Water, Yorkshire Water and Severn Trent Water and South East Water.

In general, the quantitative triangulation method involved three steps:

- Companies assessed different pieces of customer evidence such as primary data evidence (e.g. WTP studies, customer satisfaction data, customer contacts and complaints data etc.) as well as secondary data sources (e.g. external WTP evidence; relevant academic articles and reports by EA, Defra, CCW, Ofwat and others; relevant Experian and ONS data etc.) to identify potentially comparable measures
- Each of these candidate measures were critically assessed against a number of criteria e.g. theoretical validity, statistical validity, cognitive validity, research approach and fieldwork approach (e.g. assess if definition of candidate and target measures are similar, size and representativeness of the study sample, have results been derived using best practice methods etc.) and weights were assigned to these measures

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<sup>11</sup> Ofwat's customer engagement policy statement and expectations for PR19, May 2016.



- Finally, the measures were combined to obtain central triangulated values and ranges.

South Staffs Water, Anglian Water and United Utilities combined customers' priorities with WTP measures by assigning weights to all the different customer evidence sources based on theoretical and statistical validity criteria and then taking the weighted average of these values to derive triangulated WTP values for use in cost-benefit analysis.

PJM and Accent developed a novel triangulation approach for South Staffs Water known as the SMARTS (**S**creen, **M**ap, **A**ssess, **R**ate, **T**riangulate and **S**ensitivity test) method. The triangulation approach built upon and extended the ICF (2017) framework<sup>12</sup> to develop the SMARTS approach that involved the following six steps.

- *Screen*: data sources to identify those with potentially comparable measures
- *Map*: non-core evidence to core measures where possible to enable comparison
- *Assess*: theoretical and statistical validity of the resulting measures
- *Rate*: measures as Red/Amber/Green (RAG) depending on how well they perform with respect to the validity measures
- *Triangulate*: to conclude on the values to take forward based on applying RAG weights to obtain central values and ranges.
- *Sensitivity test*: to explore the sensitivity of the triangulated values to alternative reasonable judgements and perspectives.

The novelty of the SMARTS approach was that it utilised and mapped supplementary non-valuation data sources to validate WTP values for service improvements and used that evidence to adjust the core WTP values in order to derive their "triangulated" values for incorporation in business plans. The triangulated values derived using this approach, led to seemingly robust estimates of the true priorities/WTP values that could be utilised to reflect customers' preferences within water companies' Multi Criteria Analysis investment tool and used within their CBA approach as part of the process of setting PC levels, and for setting ODI rates.

Wessex Water and Yorkshire Water combined customers' priorities with WTP measures by adjusting weights assigned to triangulated WTP values. As an example, the triangulation process of Wessex Water consisted of assigning weights to each of the valuation studies based on a number of criteria including cognitive validity, choice architecture, completeness and statistical significance. Next, these weights were adjusted to take account of other study characteristics such as the age of the research. Additional adjustments were made to the weights based on evidence emerging from qualitative customer research studies and finally the results were combined to produce triangulated customer valuations. The details of how adjustments were made based on the qualitative evidence is not provided in the publicly available reports.

Severn Trent Water and South East Water used their own judgement to combine customers' priorities with WTP measures. The triangulation process involved utilising customer valuation studies in a triangulation framework to generate triangulated WTP values for customers. Next, the valuation studies were critically assessed against a number of criteria such as statistical validity, cognitive validity, research approach etc.

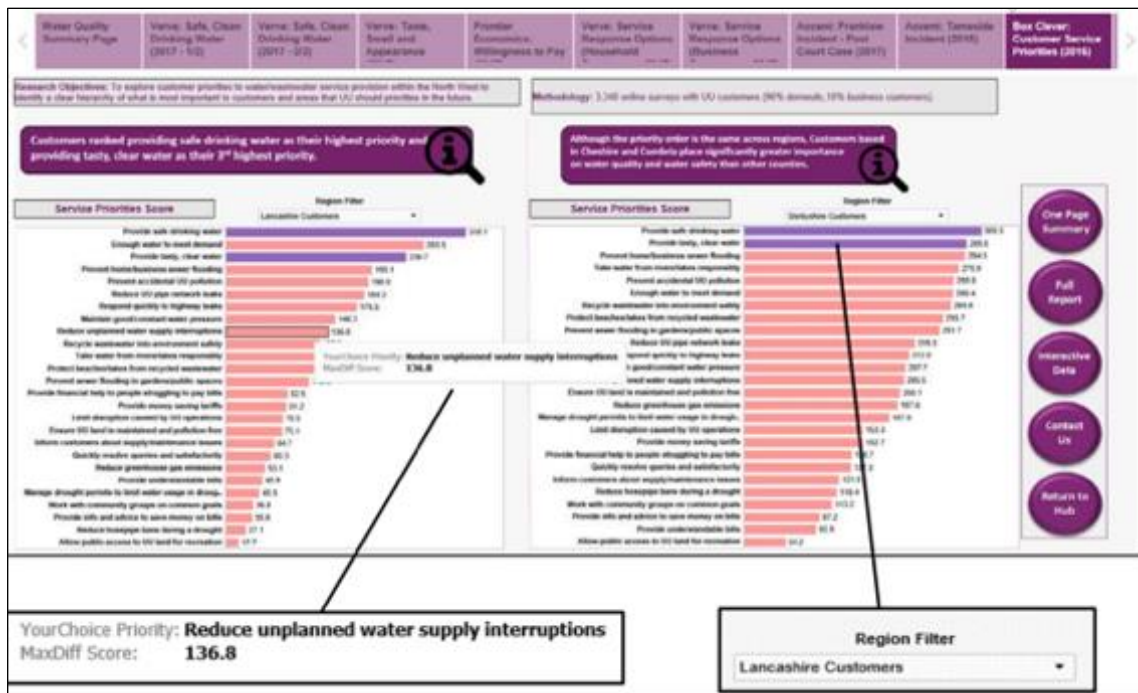
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<sup>12</sup> ICF (2017) Defining and applying triangulation in the water sector, Report for CCW, July 2017.

and assigned weights accordingly. Further, the triangulated valuation results were cross-checked against customer contacts data and the qualitative customer research data and decisions were made based on sound judgement by internal experts on how to combine the results in order to generate WTP values for use in cost-benefit analysis.

An important aspect of triangulation is the collation of all relevant customer evidence in one structured location. An innovative and interesting example in this regard is the development of an interactive digital platform, the Customer Insights Hub (Figure 17) by United Utilities for its PR19 customer engagement programme. This tool collates customer contacts data and outputs from bespoke customer research projects in one location and has proven to be extremely effective in accessing, analysing and triangulating customer insights for long-term business planning. Further, this tool should prove useful if water companies decide to participate and share data on a water sector-wide digital platform, as recommended by Ofwat in its recent “Time to Act, together” strategy paper.

Figure 17: United Utilities: Customer Insights Hub



Source: United Utilities: Customer Insights Hub: Chapter 2: Supplementary document.

Overall, triangulation serves a useful purpose in improving the customer evidence base that is crucial for effective decision-making. However, there are some challenges associated with triangulation, the most important being the complex nature of the approach and its sensitivity to analyst judgements.

The triangulated customer valuations obtained via the aforementioned approaches were used alongside costs, to set performance levels and ODI payment rates.

## Issues encountered

### Ofwat Initial Assessment of Plans

Ofwat in its Initial Assessment of Plans (IAP) reviewed the PC levels submitted by each company and assessed whether its proposed methodology had been followed consistently. Examples of some concerns raised regarding the setting of PC levels are discussed below:

- Some companies did not meet Ofwat's expectations for stretching PCs. For example, Welsh Water did not propose to meet the upper quartile (UQ) service level by 2024/25 for internal sewer flooding and its proposed performance levels for external sewer flooding and water supply interruptions were considered to be insufficiently demanding. Similarly, the Severn Trent Water's proposed performance level for supply interruptions was significantly worse than the upper quartile and there were concerns regarding the evidence for the proposed stretch of a number of bespoke PCs.
- Companies such as Thames Water proposed initial levels and 2020-25 service levels for some PCs, primarily supply interruptions, that were insufficiently demanding.
- Some companies such as Yorkshire Water and Portsmouth Water proposed performance levels for the *Treatment works compliance* PC and the *Compliance risk index (CRI)* PC that were lower than the statutory requirement.

### Ofwat Final Determinations

Based on evidence provided by the water companies and a wide range of relevant evidence, Ofwat, in the PR19 Final determinations, proposed stretching levels for the following common and comparable bespoke PCs:

- *common performance level measures* – supply interruptions, pollution incidents and internal sewer flooding;
- *reducing water demand* – leakage and per capita consumption;
- *statutory measures* – compliance risk index (CRI) and treatment works compliance;
- *asset health measures* – mains repairs, unplanned outage, sewer collapses, external sewer flooding, sewer blockages, water quality and low pressure;
- *resilience measures* – risks of sewer flooding in a storm and severe restriction in a drought;
- *vulnerability measures* – the priority services register (PSR) and
- *customer experience* – C-MeX and D-MeX

As an example, Ofwat set a stretching performance level for two of the common performance level measures i.e. pollution incidents and internal sewer flooding at the forecast industry upper quartile. The forecast upper quartile values for each year of the price control period was based on all companies' September 2018 business plans and the performance levels were set to reflect the values calculated for each year of the 2020 to 2025 period. For the statutory measures, Ofwat set a level of 0 for CRI (with a deadband

of 2 for the whole 2020-25 period) and 100% for treatment works compliance for all companies. Furthermore, Ofwat set PC thresholds across all companies for PSR as follows:

- Companies must have a minimum level of 7% of households on the PSR by 2024-25.
- Companies must make actual contact with 17.5% of households on the PSR in the first year of the 2020-25 period (based on one year's data) and 35% of households on the PSR every two years for subsequent years of the 2020-25 and
- Companies must attempt to contact 45% of households on the PSR in the first year of the 2020-25 period (based on one year's data) and 90% of households on the PSR every two years for subsequent years of the 2020-25 period.

Details regarding the proposed levels for the other common and comparable bespoke PCs as well as some common bespoke PCs (e.g. residential gaps and voids where Ofwat does not apply a common performance level across all companies but propose a common assessment approach) can be found in Ofwat (2019), *PR19 Final determinations: Delivering outcomes for customers policy appendix*. The final determinations relating to all other bespoke PCs proposed by companies are detailed in Ofwat's '*Delivering outcomes for customers final decision*' documents for each company.

In its PR19 Final determinations report, Ofwat mentions some issues that were raised by companies related to a number of methodological aspects of setting PC levels. We summarise and discuss some examples below.

- Some companies such as Welsh Water, Severn Trent Water and Hafren Dyfrdwy raised concerns regarding Ofwat's approach of using the forecast industry upper quartile as the proposed PC levels for internal sewer flooding and pollution incidents. In particular they felt that the upper quartile forecasts were too optimistic given that actual levels in 2018-19 were worse than expected. Ofwat retained the proposed levels for the internal sewer flooding and pollution incidents for all companies and provided detailed justification for doing so. An exception was made, however, for Hafren Dyfrdwy for pollution incidents where Ofwat set the performance level at the company's proposed level. In this case, Ofwat considered specific circumstances of Hafren Dyfrdwy and allowed the exception since it was well justified.
- Several companies (Anglian Water, Welsh Water, Hafren Dyfrdwy, Severn Trent Water, and Thames Water) raised concerns regarding Ofwat's proposed PC level for supply interruptions and stated that it was unachievable. Based on these concerns and on evidence relating to the historical rate of improvement Ofwat considered that the forecast upper quartile (i.e. an average of three minutes per property per year) was not a valid expectation. This led Ofwat to adjust the 2024-2025 PC level for water supply interruptions to an average of five minutes per property per year.
- Several companies such as Anglian Water, SES Water and South Staffs Water challenged Ofwat's proposed level for leakage and the associated funding decisions at draft determination. These companies noted that they would be unable to achieve the proposed leakage levels without additional funding. Anglian Water argued that the proposed leakage reduction levels did not consider the higher costs of

maintaining its current leakage performance and the costs of improving from this strong base. In response to these concerns, Ofwat adjusted Anglian Water's PC levels to consider its current frontier leakage performance and the additional funding allowed at final determinations. A sum of £50 million uplift to Anglian Water's base allowance was granted, where leakage was a significant variable driver of this uplift for the company.

- Several companies raised concerns regarding the proposed levels for CRI and treatment works compliance. Anglian Water, Welsh Water and Yorkshire Water noted that since CRI was a new and volatile measure, it was important for the deadband to account for such volatility in CRI performance. Anglian Water, South West Water and United Utilities stated that the deadband was too tight which would lead in many companies incurring underperformance payments. This in turn would negatively impact public perception of water quality. Ofwat retained the final determination deadband of 2.0 and provided sound justifications for doing so.
- Some companies raised concerns regarding specific aspects of the vulnerability measure i.e. PSR PC. For example, South Staffs Water noted that it was unclear if it was permissible to include customers who were only receiving support as part of affordability schemes to be counted towards their household target for the PSR PC. Bristol Water stated that the actual contact target for PSR should be based on individuals, not households. In response, Ofwat dissuaded SSW from including customers who were only receiving support as part of affordability schemes towards their household target but encouraged Bristol Water to submit information at the individual level, where it was available.

The following section reviews the PR19 approach of setting ODIs for companies to deliver on their proposed PC levels.

## Setting Outcome Delivery Incentives

### Overall approach

Overall, water companies followed Ofwat guidance in setting ODI payment rates as well as the potential scale of ODIs (out and underperformance payments). The incentive rates were derived from customer valuations placed on service improvements. These valuations were, in most cases, based on a robust and comprehensive valuation programme that included a rigorous triangulation process. Details regarding the valuation and triangulation approaches undertaken by companies for PR19 have been discussed in the previous section.

### Setting ODI rates

Companies in general used the ODI formula for setting the underperformance and overperformance payment rates. In cases where incremental benefit values were difficult to assess, companies made certain adjustments. For example, Affinity Water did not seek customers' valuations for some of its PCs such as unplanned outages, CRI and Environmental innovation. In the case of these PCs, Affinity Water set marginal benefits

equal to marginal costs. Severn Trent Water did not have customer valuations nor marginal cost information for certain measures such as sludge compliance. Hence the company used the inflation-adjusted PR14 valuation for this as a proxy for the marginal benefit value.

### Setting P10/P90 levels

In order to calculate ODI payments, companies had to make projections for its future performance. The potential outperformance and underperformance payments were usually examined at P10 and P90, a 10-percentage probability of performance being lower or higher than the target performance. The P10 and P90 levels were determined through statistical analysis of company data and/or management judgement.

Companies used a wide range of information in developing the P10/P90 levels. This included information on factors such as industry performance, scale and scope of companies' future investment, maintenance of assets, operational experience, past performance of companies, variability in input costs etc. Companies also used management judgement in developing their performance projections. For example, Anglian Water used the following sources of information to determine their potential P90 and P10 for each PC.

For P90s these included:

- Frontier performance
- Their Performance commitment level
- Their best ever performance
- Best possible performance from their long-term strategies (e.g. WRMP)
- Judgement of plausible upside scenarios.

For P10s these included:

- Their worst ever performance
- Industry lower quartile performance and
- Judgement of plausible downside scenarios

South West Water used information related to a forward-looking assessment of the risk to their performance from natural variations in external factors (e.g. weather, third party damage, etc.) coupled with an assessment of their targeted future cost efficiencies. Southern Water used information based on historical Southern water performance, historical industry performance, their forecasts and expert knowledge (e.g. engineering judgment to determine the most likely range). Hence, the performance projections i.e. the P10/P90 levels were in many cases subject to a fair degree of analyst judgement.

In many cases, the companies' business plans did not provide a detailed explanation of how the P10/P90 levels were estimated. Some companies such as South East Water however mentioned estimating their P10 levels based on their worst historical performance and expert judgement on what the P10 level was likely to be for each PC. South East Water estimated the P90 levels based on what experts felt would be a real stretching level for the company to achieve in 2020 to 2025. Other companies such as Welsh Water, Wessex Water and Yorkshire Water used statistical techniques to generate probability distributions of possible performance in each year for each PC.

For example, Welsh Water used a three-step method to estimate the P10/P90 levels:

- First, monthly performance data for each PC was bootstrapped to obtain 50,000 simulated annual performance levels to create the estimated distributions for each PC. The unadjusted P10, P50 and P90 levels for each PC were obtained from these distributions. These P10 and P90 levels were based on historical performance.
- Second, monthly data for each PC was adjusted to consider the improvement in PC level each year.
- Finally, simulations were undertaken on the adjusted data to estimate the forecast distribution for the target performance levels, thereby shifting the probability distribution consistent with the targeted improvement in performance. The future P10 and P90 levels were then calculated. Note that management judgement was also used in conjunction with the statistical analysis for some PCs.

Yorkshire Water set P10/P90 levels based on two sources: (i) a historical analysis of its outturn ODI performance at PR14 and used this to derive probability distributions; (ii) held an internal workshop in which experts were consulted regarding an underperformance scope to generate additional probability distributions. The final P10/P90 levels were based on a combination of both approaches.

### Setting Overall RoRE range

Once the P10/P90 levels were estimated, companies then calculated the financial impact of the ODIs for the P10 and P90 levels for each PC. This was usually based on multiplying the difference between the P10 / P90 levels and the PC level in each year with the underperformance/outperformance payment rates. The financial payoffs for ODIs were then used to calculate the overall RoRE range.

In general, companies used two approaches to calculate overall RoRE range:

- Under the first approach companies calculated the total RoRE range by summing the P10 financial impacts for all PCs to determine the total downside, and then all of the P90 financial impacts to determine the total upside. This approach assumed that the P10 or P90 values for each PC were likely to all occur together. Companies then calibrated the over and underperformance payments using caps, collars and deadbands, to be consistent within the expected indicative RoRE range.

For example, pre-calibration, Affinity Water had an ODI package which exceeded the indicative range. As a result, Affinity Water included underperformance collars for some of its PCs e.g. leakage, PCC, unplanned outage, low pressure etc. In most of these cases, the collar level was applied at performance levels worse than the P10 level. Further, the company included outperformance caps for two PCs, leakage and PCC and deadbands for supply interruptions and CRI. For leakage, the company set an outperformance payment cap 0.1% beyond the forecast P90 for each year while for PCC, an outperformance payment cap at 1 l/h/d beyond the forecast P90 for each year was set. A deadband for CRI was set at the level of the company's current shadow

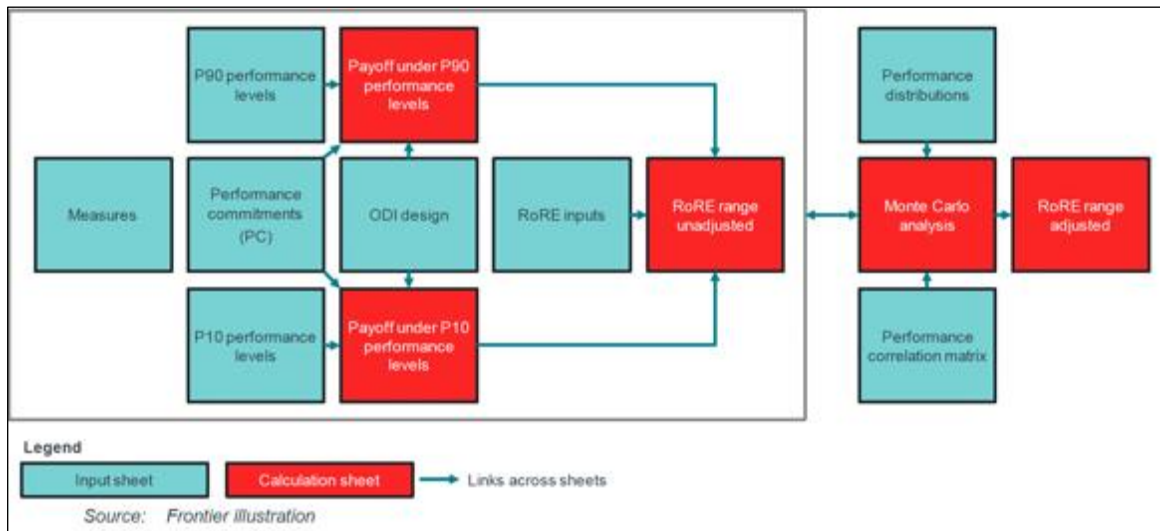
reporting average of 2.8. The application of these caps, collars and deadbands on individual ODIs ensured that the ODI package was more balanced across Affinity Water's suite of PCs. However, the company did not provide evidence of any customer engagement related to caps and collars, which would have helped to support its case.

- Under the second approach, which was used by most companies (e.g. South East Water, South Staffs Water, South West Water, Wessex Water etc.), an Excel-based tool was used to undertake a Monte Carlo analysis. This approach considered the fact that it was unrealistic to assume that performance on PCs would be perfectly correlated. In fact, PCs that were independent of one another would most likely compensate for high/low scenarios of other PCs. Based on this fact, companies made some assumptions around the correlation between the performance on the PCs. The modelling then used either the probability distributions for the performance on each PC or an assumed distribution (e.g. South East Water assumed a normal distribution) for the performance on each PC in conjunction with the assumed correlations between the PCs to carry out multiple simulations for calculating the total financial impact of the ODIs. This was done by following the steps below:
  - Based on probability distributions and correlation matrix, the tool generated companies' performance for each PC for each year of the price control period
  - Next, the tool calculated the number of units of outperformance and underperformance relative to the PC in each year for each measure. Further the tool calculated the number of units of standard outperformance, standard underperformance, enhanced outperformance and enhance underperformance for each measure, considering deadbands.
  - The net present value of financial payoffs was then calculated based on the different simulations.
  - Finally, the NPV of payoffs resulting from the different simulations were ranked to estimate the aggregate P90 and P10 financial payoffs and these were expressed as a percentage of RoRE.

Figure 18 shows a diagrammatic representation of the RoRE range tool developed for Wessex Water.



Figure 18: Overview of Wessex Water's RoRE range tool



Source: Wessex Water Business Plan 2020-2025, Appendix 3.5.B – Third party report on analysis of RoRE for ODIs.

### Setting caps, collars and deadbands

Under both the above approaches, companies proposed a number of caps, collars and deadbands. In most cases, companies set the caps and collars at the P10/P90 levels. Companies used different assumptions to set deadbands. For example, Affinity Water set a deadband for CRI at the level of the company’s current shadow reporting average of 2.8. Welsh Water set a deadband for CRI at the level of performance which the top third of customers in England and Wales receive. Bristol Water set a deadband for CRI at below their 2016/17 performance, which was their best performance (excluding 2017/18 a potential outlier of the most recent performance).

Overall, however, companies did not provide a detailed explanation of the approach that they used to set caps, collars and deadbands or sufficient evidence and justification for their proposed caps, collars and deadbands.

### Setting Enhanced ODI rates

Some companies such as Affinity Water, Bristol Water and Welsh Water did not propose enhanced outperformance payments or underperformance penalties for any of their PR19 PCs. The reasons cited for this decision was either that there was a lack of customer support for these payments or that the existing PC levels and standard incentive rates were sufficiently stretching so that applying enhanced ODIs could lead to an overall RoRE range falling outside of Ofwat’s indicative range.

For companies that did propose enhanced ODI payments, there was substantial variation in the approaches that they used when proposing the level for enhanced ODI rates.

For example, Anglian Water and Wessex Water proposed enhanced multipliers based on the top-down approach which accounted for the positive externality resulting from the frontier company’s outperformance in PR19. Wessex Water set enhanced performance and underperformance rates on ODIs based on a multiplier of 4.3. This was based on a calculation of the benefits that customers of other water companies would obtain in the

future if those water companies improved their performance as a result of the frontier company's outperformance in PR19.

Anglian Water proposed an enhanced multiplier of 4.29 (i.e. enhanced rates equal to the standard rates multiplied by 4.29) to be applied to all common measures where it proposed to add enhanced incentives. This multiplier was also based on a top-down approach. Under this approach, multipliers were derived for all water companies where the multiplier for each company was set equal to the size of the water company relative to the industry size. The reasoning behind this was that the smaller the company was relative to the industry, the greater the ratio was likely to be between the customers in other companies to benefit from improvements in sector performance and the own customer base that paid the standard incentive rate.

Anglian Water set its enhanced multipliers on those faced by the largest water company in England & Wales, in terms of customers i.e. Thames Water. The multipliers for Thames Water were 6.8 for water and 4.29 for wastewater. Rather than have two separate multipliers (one for water and one for wastewater) Anglian Water applied the lower, more conservative figure of 4.29 for all measures. For PR19, Anglian proposed enhanced outperformance payments for leakage only.

Severn Trent Water proposed enhanced ODI rates based on its customer valuations used to set the standard ODI rates. Rather than the enhanced rate reflecting 50% of the customers' valuation of changes in service levels), the enhanced rate was based on 75% of the customers' valuation. In effect, this meant that the enhanced ODI rate was set at 1.5 times the standard rate.

Yorkshire Water used the 'maximum evidence source' approach to set enhanced incentive rates for supply interruptions, pollution incidents and internal sewer flooding and an approach of 'incrementally driving the UQ' for its leakage outperformance. In contrast to its standard benefit rate that was based on a triangulation of customer evidence sources, the maximum evidence approach assigned a 100% weight to the evidence source giving the highest customer value for the measures. The approach to set leakage outperformance rate was based on calculation of Yorkshire Water's marginal effect on the upper quartile (UQ) and assuming that by shifting the UQ, every other company would subsequently increase its performance by that amount. The incentive rate was then calculated as the sum of the value of the change in UQ performance for each company – thus considering the wider benefits of Yorkshire Water's performance.

There was substantial variation across companies in the setting of enhancement thresholds too. Given that Anglian Water was already the frontier performer for leakage, the company proposed setting the enhanced threshold at the level of its PC – i.e. it would earn enhanced outperformance payments for every unit of outperformance beyond the PC.

Portsmouth Water and Yorkshire Water set the enhanced under performance penalty threshold at at least the current lowest quartile performance and the threshold for the enhanced outperformance at the current leading company or higher. Enhanced payments were accompanied by an enhanced under performance penalty rate for below standard performance.

Severn Trent Water set the threshold for enhanced reward at the point that represented double its improvement from the expected end-of-AMP-6 performance to the stretch PC level set for PR19. The enhanced penalty was set by an amount below its end-of-AMP6 performance that was equal to the difference between its performance for the final year of AMP7, and the performance forecast for the final year of AMP6.

## ODI-specific customer research

Many companies conducted ODI-specific research consisting of both qualitative and quantitative methods to understand customers' views on the principles of ODIs and to obtain their feedback on the appropriate scale of ODIs and their willingness to accept bill changes. This was a step change from PR14 which had focussed solely on engaging with customers for the derivation of valuations for service improvements.

Water companies such as Welsh Water, Northumbrian Water, South West Water and Wessex Water conducted qualitative ODI research in the form of focus groups and hall tests to explore customers' perceptions of the concept of ODIs in general, their views on the company receiving an outperformance/underperformance payment for achieving/failing to meet targets, to understand which PCs were appropriate for an outperformance payment, underperformance penalty or, purely a reputational impact, their views on caps, collars, deadbands, enhanced rates and the timing of ODI payments.

Northumbrian Water, South West Water, Southern Water and Thames Water conducted quantitative research in the form of online surveys to test customers' WTP for service improvements beyond the levels that were already incorporated in the business plan. For example, Southern Water developed an online slider tool and asked customers to move the sliders if they were willing to pay for further improvements. As the customers moved the sliders, they could see the immediate bill impact of their decisions, thus allowing them to easily calibrate their decisions. Figure 19 shows a snapshot of the slider SP tool used to set ODI rates.

Thames Water, Bristol Water, Anglian Water set out the incentive type, calculation of marginal benefits and costs, the design of financial incentives and the balance of risk and reward for its customers and then presented the final ODI package to test their support for the overall RoRE range that was proposed in the business plan.

South East Water used a mix of qualitative and quantitative methods i.e. cognitive and CATI interviews for the purpose of setting ODI rates. The key objective of the ODI research was to understand the principles (and bill impacts) around whether the company's performance should be penalised/rewarded, whether there should be enhanced rewards/penalties, whether there should be caps/collars, what should the overall size of rewards be and whether rewards should be in part/full reinvested into vulnerable or community schemes.

Some water companies such as South West Water and Wessex Water also conducted ODI research to obtain customers' views on how the outperformance fund should be returned to them. The options suggested were: lower bills, defer to offset future bills, reinvest in improving services or in a charity etc.

Figure 19: Southern Water: Slider WTP research to set ODI

**Instructions:**

- The slider to the right starts at Southern Water's future commitment in addressing internal flooding incidents.
- By moving the slider, you show how you feel about Southern Water's level of commitment to this area.
  - Moving the slider to the right means that you would like a greater level of commitment in this area.
  - Moving the slider to the left means you would like a lower level of commitment.
  - Leaving it means you are happy with the planned level of commitment to this area.
- Your bill will be affected depending on whether you want Southern Water to do more or less than planned. Please take this into account when making your decision.
- Click [the ? button](#) to see the information on the category again.

**Water leakage**

**Background information:**  
Southern Water's future commitment in addressing internal flooding is higher than its current level of service. Southern Water is currently among the top performers in this area.

**Southern Water does less tackle leakage**  **Southern Water does more to make to tackle leakage**

**Bill impact of tackling water leakage:**  
**£0.00 per year**

Source: Southern Water: TA 6.1 Our approach to PCs and ODIs Technical Annex

Ofwat in its initial assessment of plans, raised a number of issues related to the setting of ODI rates. The issues raised are discussed in the following section.

## Issues encountered

### Ofwat Initial Assessment of Plans

Ofwat in its Initial Assessment of Plans (IAP) reviewed the ODI methodologies submitted by each company and assessed whether its proposed methodology had been followed consistently<sup>13</sup>. Overall, the issues identified by Ofwat are summarised as follows:

#### *ODI types*

Ofwat raised concerns regarding the approach taken by some companies in determining the types of ODIs. For example, Welsh Water's approach to ODI types was inappropriate since the company assigned its largest ODI outperformance payment to the Customer Trust PC but customers did not seem to support any financial incentive for this measure. Thames Water proposed underperformance and outperformance payments for several PCs such as low pressure and surface water management and acceptability for which its customers supported underperformance only ODIs. Additionally, the company proposed financial incentives when its customers preferences were for these to be nonfinancial incentives.

#### *ODI timings*

Ofwat raised concerns regarding ODI timings for e.g. South Staffs Water chose end-of-period incentives for all its financial ODIs with insufficient justification at an individual level and did not test the benefits of having in-period ODIs with its customers.

<sup>13</sup> Ofwat (2019), Technical Appendix 1: Delivering outcomes for customers

### *Indicative range for ODI*

Ofwat raised concerns regarding the indicative ranges proposed by some companies. For example, Anglian Water did not provide sufficient evidence of why its overall ODI package was outside the Ofwat recommended indicative RORE range of  $\pm 1\%$  to  $\pm 3\%$  on the upside using the P10/P90 range of probabilities. Welsh Water did not provide sufficient evidence that it had tested its RORE range with customers. Northumbrian Water did not provide evidence that it had tested the overall acceptability/affordability of the ODI package with its customers.

### *ODI payment rates*

A number of issues were raised regarding the setting of ODI payment rates. These included the following.

- There was substantial variation across companies in their proposed ODI rates for the common and comparable bespoke PCs (e.g. external sewer flooding). Such variation was considered to have resulted from large differences in marginal costs and marginal benefits (customer valuations) across companies for incremental changes in the same unit of performance. Further, it was found that the extent of such variation could not be reasonably explained by company-specific factors such as company scale, comparative and historical performance or regional differences in household income or water stress.
- There were a number of instances where companies did not provide sufficient and high-quality evidence underlying the calculation of marginal costs and benefits. Also, companies did not provide sufficient details to explain how they used their triangulation approach to obtain a single marginal benefit estimate.
- Some companies did not provide sufficient details regarding the calculations that they used to derive their standard ODI rates. In cases where companies decided to deviate from the Ofwat formula, for e.g. use top-down approach to allocate a pre-set revenue amount to some ODIs, this was not sufficiently justified.
- A number of areas were identified for most companies where insufficient protections from unexpectedly high outperformance payments was considered for customers. Some companies did not provide sufficient evidence regarding if and how they would protect customers via bill reductions/reinvestment schemes. Further, some companies avoided customer protections on certain ODIs that had large incentives and formed a significant proportion of their possible returns.

Some examples of company-specific issues related to ODI payment rates include: Welsh Water conducted WTP research for only a subset of measures and applied ODI rates based upon an allocation methodology according to the level of customer importance which was contrary to Ofwat's guidelines. Severn Trent Water uplifted the WTP values used within its final marginal benefit calculation for both sewer flooding ODIs based upon its "Choices" research. However, it did not provide any evidence of third-party assurance for this research, which also formed the basis for a number of other ODI rate adjustments. Also, the company did not provide P10 and P90 estimates for some measures and did not clearly set out its ODI calculations in a number of cases. Southern Water calculated marginal benefits based on a triangulation methodology that assigned a greater weight

to recent observations and also did not estimate the maximum WTP. Further the company did not provide evidence to justify the 10% uplift it applied to the Ofwat formula for PCC and leakage. Wessex Water did not estimate WTP in case of some measures and hence some ODI rates are calculated based upon marginal cost only.

### ***Enhanced ODI***

There was substantial variation in the approaches adopted by companies when proposing the level for enhanced outperformance payments. Some companies noted that it was important to maintain a balance between the incentive to deliver frontier shifting performance and to protect customers from having to pay outperformance payments that exceed their own WTP for the improvements.

For example, for the leakage PC, Anglian Water proposed enhanced outperformance payments that was greater than its own customers' WTP and no standard ODI underperformance payments. Severn Trent Water set target thresholds for enhanced outperformance and underperformance payments that were inconsistent with Ofwat's expected frontier level for the 2020-2025 period.

### ***Caps, collars and deadbands***

Ofwat raised concerns regarding companies' approaches for setting of caps, collars and deadbands. For example, Anglian Water's approach to setting caps, collars and deadbands were insufficiently evidenced. The company proposed a large number of caps, collars and deadbands across its ODI package but did not provide suitable justification for doing so. Welsh Water proposed a large number of caps/collars set at P10/P90 levels that were subjective and based on management judgement. Southern Water proposed a number of underperformance collars without providing convincing justification. The company proposed collars for water quality compliance, pollution incidents and mains bursts, which were all set very close to the proposed deadbands / PC levels. Yorkshire Water did not propose caps and collars on its ODIs. This was concerning since there was a possibility that the absence of outperformance caps on certain PCs could lead the company to earn outperformance payments for levels of outperformance that its customers did not value highly.

Overall, therefore, based on Ofwat's assessment and our review we identify a number of underlying issues related to ODI methodologies used for PR19. We summarise these issues below.

## **■ WTP evidence**

The issues related to WTP estimates include some practical issues that could be solved with survey design and better sequencing of business decisions.

- In some cases, companies did not have customer valuations for certain measures either because it was difficult to estimate valuations for such measures or because the final list of measures was not prepared before their customer valuation research. In these cases, companies used proxy values which were subject to limitations. For example, Anglian Water had sought customers' valuations of service level improvements only. Hence the company translated customers' valuation of reducing sewer flooding to the sewer collapses asset

health PC. Further the company linked the valuation for CRI to boil water notices and the WINEP programme to river water quality in terms of kilometres improved.

- There was substantial variation across companies in their proposed ODI rates for the common and comparable bespoke PCs (e.g. external sewer flooding). Such variation was considered to have resulted from large differences in marginal costs and marginal benefits (customer valuations) across companies for incremental changes in the same unit of performance. A recently published study submitted to Ofwat’s Future Ideas Lab uses a meta-analysis of household PR14 WTP values across 18 water companies and shows that the majority of the observed variation in WTP estimates could be explained by differences in the scope of service change offered<sup>14</sup>.

### ■ Triangulation approach

- In most cases, companies did not provide a clear and transparent approach to their triangulation process i.e. the underlying assumptions and calculations that they used to derive a single triangulated marginal benefit estimate.
- In general, the triangulation process involves a fair degree of subjective judgement. For example, weighting of the different data sources based on theoretical and statistical validity is sensitive to analyst judgements. Further, in some cases, companies used qualitative customer evidence to adjust their triangulated WTP values. This too involved a fair degree of analyst judgement. Using subjective reasoning to derive triangulated values is likely to have an impact on ODI rates. For example, in some cases, triangulated values have resulted in large over and underperformance payments for sewer flooding and small ODI payments for most other measures. However, customer research has shown that customers care about a range of measures and prefer a balanced incentive package.

### ■ ODI formula adjustments

In some cases, companies made ad-hoc adjustments to the ODI formula to derive the ODI rates. For example, as mentioned above, some companies such as Welsh Water conducted WTP research for only a subset of measures and applied ODI rates based upon an allocation methodology according to the level of customer importance which was contrary to Ofwat’s guidelines. Wessex Water did not estimate WTP in the case of some measures and hence some ODI rates were calculated based upon marginal cost only. Furthermore, putting together marginal benefit values and marginal costs led to negative incentive rates in the case of some measures which led to adjustments in the ODI formula. For example, Severn Trent Water and Southern Water uplifted the WTP values used within their final marginal benefit calculation to calculate adjusted ODI rates. However, these companies did not provide any evidence of third-party assurance for this adjustment.

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<sup>14</sup> P. J. Metcalfe & A. Sen (2021): Sensitivity to scope of water and wastewater service valuations: a meta-analysis of findings from water price reviews in Great Britain, *Journal of Environmental Economics and Policy*, DOI: 10.1080/21606544.2021.1984314

## ■ Overall RoRE package

- As discussed above, companies, in most cases, used information based on their historical performance, historical industry performance, their forecasts and expert knowledge to set the P10/P90 levels. Hence, the performance projections i.e. the P10/P90 levels were in many cases subject to a fair degree of analyst judgement. This in turn had a significant impact on the calculation of over and underperformance payments and the overall RoRE range.
- Overall, companies did not provide a detailed explanation of the approach that they used to set caps, collars and deadbands. Further companies in most cases did not provide sufficient evidence and justification for their proposed caps, collars and deadbands.

Ofwat in its initial assessment of plans, included a number of criticisms of companies' approaches to the application of customer engagement evidence in setting ODIs. Indeed, problems in this area can be seen to have caused the downgrading of otherwise exceptional customer engagement programmes (e.g. United Utilities). This indicates the need for a clear and consistent approach to application of value evidence as well as the generation of such evidence.

## Ofwat Final Determinations

Post the Initial Assessment of Plans, Ofwat outlined assessment criteria regarding ODI types, ODI timings and ODI rates for common and comparable bespoke PCs in its PR19 Final determination. Some of these criteria related to the following:

- *ODI types*: Ofwat considered a company's proposal for an outperformance incentive related to customer facing common and comparable bespoke PCs (i.e. supply interruptions, internal sewer flooding, pollution incidents, leakage, PCC, external sewer flooding and customer contacts) if the PC had a stretching performance level and if there was evidence of customer benefit and support for the outperformance incentive. For non-financial incentives proposed by a company, Ofwat considered both customer support and company performance. The reasoning behind considering company performance was that underperformance payments could protect customers from poor service if a company was a poor performer.
- *ODI timings*: Ofwat considered that all companies should adopt in-period ODIs as a default, should have in-period ODIs for the common PCs, should explain their overall balance between in-period and end-of period ODIs in their business plans, should set out their proposal to manage bill volatility over the period and should link any end-of-period ODIs to revenue rather than the Regulatory Capital Value (RCV) by default.
- *ODI payment rates*: Given that substantial variation in ODI rates were identified at IAP, Ofwat conducted a series of checks across companies' ODI rates for common and comparable bespoke customer facing PCs. The aim of these checks was to identify the reasons for such variation and intervene accordingly. These checks included:



- *Reasonable range check*: if proposed ODI rates of companies differed substantially from the industry average
- *WTP/Triangulation check*: if companies had derived marginal benefit component of ODI rate appropriately and checked quality of valuation and triangulation research
- *Past performance check*: if companies had under- or outperformed on its equivalent PC during previous price control period for it to have an incentive to under- or overstate the marginal benefit or cost components of its ODI rates given the likelihood of it out- or underperforming.
- *Symmetry check*: to ensure that outperformance rates were not higher than underperformance rates
- *PC level stretch check*: if the PC stretch level relative to current PC level was under or over the industry average
- *2015-20 rate cross-check*: if the proposed underperformance/ outperformance rate was lower /higher than equivalent rate for 2015-20 period in absolute terms
- Overall quality of customer valuation and triangulation check: if companies had undertaken high quality research and triangulation across its entire package of ODIs

Given these checks, Ofwat made recommendations regarding setting ODI rates. Some of these recommendations included:

- Companies should set their ODI rates within a reasonable range for the majority of PCs or provide sound justification for not doing so. This range is defined as  $\pm 0.5$  standard deviations around the industry mean
- The reasonable ranges for each PC should be constructed from companies' ODI rates normalised across the number of households and the relevant unit of measurement (i.e. £ per household per normalised unit). This assumes that, all else equal, a household should attach a similar value to an equivalent increment in performance.

■ *Enhanced ODIs*: Given the substantial variation in the approaches adopted by companies for Enhanced ODIs, Ofwat made the following recommendations:

- *Enhanced rates*: companies should consider the enhanced outperformance rates, calculated by Ofwat by estimating the benefit to all customers when a company delivers excellent performance that will improve sector benchmarks and hence push the sector forward in the next price control period. Ofwat referred to this as the benchmarking externality which was adjusted where necessary for distributional concerns. As with standard ODI rates, Ofwat recommended that enhanced underperformance rates should be at least as large as enhanced outperformance rates.
- *Enhanced thresholds*: a single industry threshold level of performance beyond which companies should receive enhanced outperformance payments should be considered for each relevant PC. This is because the single industry level represents a level that improves the industry frontier as a whole, and does not

reward companies that are underperforming for simply catching up with the rest of the industry. For enhanced underperformance thresholds for each PC, companies should consider the threshold to be at least at the lower quartile of industry performance (the actual lower quartile performance of all companies applied to each year of the 2020-25 period is used).

- *Enhanced caps and collars:* companies should be able to earn outperformance payments using standard ODI rates on performance up to the enhanced outperformance threshold beyond which a cap will be set on the enhanced outperformance payments that can be earned from any one enhanced ODI in any year equal to 1% of either water or wastewater regulated equity as relevant. Companies should consider enhanced underperformance collars to be set at the lower decile of actual company performance for each relevant PC. Standard underperformance payments would apply up to the enhanced underperformance threshold.
- *Knowledge sharing:* Companies earning enhanced ODIs should share their knowledge with other companies and provide evidence of this to Ofwat. Ofwat, would consider this in the determination of ODI payments.

In its PR19 Final determinations report, Ofwat mentions some overarching methodological concerns raised by companies related to the above-mentioned recommendations. We summarise and discuss some examples below<sup>15</sup>.

- Some companies e.g. South Staffs Water, Wessex Water, Anglian Water, Welsh Water and Bristol Water raised concerns about the use of the industry reasonable ranges to set ODI rates as opposed to companies' high-quality customer valuations. In response Ofwat noted that the main aim of using the industry reasonable ranges was to mitigate the risk of methodological differences, rather than customer preferences leading to substantial variation in ODI rates.
- Companies such as Affinity Water and South East Water noted that the use of the mean in constructing the reasonable ranges was inappropriate in cases where data quality was poor where there were outlier data points. United Utilities and South East Water stated that the use of standard deviations for calculating the range was less robust than using quartiles for small datasets containing outliers. In response, Ofwat mentioned that using the arithmetic mean and standard deviation was a standard approach. However, Ofwat noted that using the median and inter-quartile range were most appropriate for three PCs i.e. low pressure, sewer blockages and sewer collapses due to data skew and presence of outliers
- South East Water and Bristol Water stated that past delivery was not an appropriate criterion for setting incentive rates. However, Ofwat retained this check to ensure that companies with poor past performance did not have an incentive to understate their underperformance ODI rates in order to limit future underperformance payments.

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<sup>15</sup> Details regarding company-specific representations and Ofwat's assessments are contained in the individual company 'Delivering outcomes for customers final decisions' reports.

- Hafren Dyfrdwy proposed normalising all ODI rates on a per-household basis, rather than a per-household-per normalised unit basis. In particular, the company noted that normalisation by using total mains and sewer lengths disproportionately affected small companies with small networks, leading to high ODI rates. Ofwat, however, disagreed with this argument and noted that the proposed normalisation accounted for aggregation effects present in companies' raw ODI rates (i.e., all else equal, a company that serves more households should have a greater ODI rate).
- Some companies such as Anglian Water and Northumbrian Water raised concerns regarding the tightening of the thresholds at which enhanced ODI payments apply. South West Water raised concerns regarding the scaling down of the benchmarking externality for smaller companies.

Details regarding Ofwat's policy approach for the final determination of non-customer facing asset health-type PCs as well as common bespoke PCs (e.g., residential gaps and voids) can be found in Ofwat (2019), *PR19 final determinations: Delivering outcomes for customers policy appendix*.

Overall, therefore, water companies conducted an extensive customer engagement programme to develop PCs, PC levels and ODI payments for PR19. Having reviewed the PR19 business plans and examined the strengths and weaknesses of the various approaches undertaken as well as the issues encountered in developing customer outcomes and ODIs, we now turn to the next section in which we discuss the work undertaken by energy companies for developing RIIO-2 customer outputs and ODIs.

# 3 RIIO2 Review

## 3.1 Introduction

This section presents a review of the work conducted by energy companies covering the gas distribution, electricity transmission and electricity distribution companies into development of consumer outcomes that informed the RIIO-2 business planning process. For the review, we have considered the activities of each company (as reported in their business plans and supporting documents), extracted the key aspects of these activities (customer priorities, customer valuation, triangulation, ODIs and consumer value proposition) and highlighted some interesting examples in this regard.

The main aim of this chapter is to identify best practice methodologies that can be considered for the development of an approach to customer research for ODI rates that can be delivered consistently across all water company areas in England and Wales for PR24. We do not provide recommendations at this stage of the study as this will follow later in the project.

The review is structured into two sections: Section 3.2 summarises Ofgem's guidance on the development of customer outputs for RIIO-2 and Section 3.3 reviews the work of energy companies on the development of customer outputs and consumer value propositions for RIIO-2.

## 3.2 Ofgem guidance on Outputs

Based on the RIIO-2 Framework, Ofgem required network operators to deliver on three principal customer areas. These areas were:

- Companies must deliver a high quality and reliable service to all network users and consumers, including those in vulnerable situations
- Companies must deliver a safe and resilient network that is efficient and responsive to change and
- Companies must enable the transition towards a smart, flexible, low cost and low carbon energy system for all consumers and network users.

Ofgem grouped these RIIO-T2 outputs into four categories as follows:

- *Licence Obligations (LOs)*: minimum standards of performance which network companies must achieve through their baseline funding, failing which they may be subject to the use of enforcement action or penalties by Ofgem.
- *Price Control Deliverables (PCDs)*: these are specific outputs that are directly funded through the price control where the funding provided cannot be transferred to a different output or project. Each PCD is defined by the output specified in the licence

that network operators are expected to deliver, the date by which the output is to be delivered in full, and the price control allowances associated with that PCD.

- *Output Delivery Incentives (ODIs)*: incentives for energy network companies to deliver their outputs. These encourage improvement in service levels and are not funded through the base expenditure allowance. ODIs involve financial or reputational rewards for outperforming outputs and reputational or financial penalties for not delivering an output.
- *consumer value proposition*: these are areas of a business plan (these could be commitments, outputs or incentives) that go beyond Ofgem's minimum requirements and beyond business as usual activities and lead to benefits for consumers. These capture the additional value that a business plan delivers so that rewards can be associated with consumer value propositions.

Ofgem, in the RIIO-2 Business Plan Guidance<sup>16</sup>, included information that gas and electricity network companies were expected to include in their business plans. Some of these recommendations related to bespoke customer outputs are as follows.

- Companies should undertake a robust and comprehensive engagement programme with its stakeholder in order to inform outputs.
- Companies can propose bespoke outputs in collaboration with their stakeholders and CEGs/UGs. This could include bespoke PCDs or ODIs.
- Company proposals for bespoke outputs should capture the activities and costs of the company and be measurable and reportable
- Companies should propose bespoke outputs in a way that allows comparison of performance across companies if and where there is commonality
- Companies should set stretching targets for their outputs which are well-evidenced and deliver clear outcomes/outputs
- Companies should propose bespoke outputs that deliver consumer value
- Companies should propose bespoke outputs that are backed by robust and high-quality evidence such as cost-benefit analysis and demonstrate value for money for existing and future consumers
- Companies should propose bespoke outputs that justify the value that consumers will receive from a proposed service level change and, by extension, the associated reward and/or penalty, and the extent to which these are symmetrical, in terms of value and likelihood of outcome
- Companies should provide an independent measure of the existing level of service that consumers receive and the extent to which the target level being proposed represents an improvement on this
- Companies should address the level of service provided by other companies (where available) and the activities (and indicative cost) associated with achieving the targeted level of service, when proposing its bespoke outputs

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<sup>16</sup> Ofgem (2019) RIIO-2 Business Plan Guidance

- Companies should provide proposals for licence conditions and/or penalties if performance falls below existing service levels.

Following the RIIO-2 Sector Specific Methodology document, we outline proposed guidelines of Ofgem when setting financial and reputational ODIs<sup>17</sup>:

- Apply ODIs to reflect the fact that the baseline level of allowances provided by Ofgem is associated with a baseline level of service delivery when measured across all network's customers.
- Seek to equalise incentives to improve service quality or cut costs at the margin, by setting baseline service quality levels so that the marginal benefit to consumers of further improvements is proportionate to the marginal cost in higher network charges.
- Seek to reflect the value to the consumer of the service improvement (or the detriment caused by service deterioration), measured by methods such as WTP, in calibrating rewards or penalties for improving/falling short of the required standards
- Use relative incentives in cases where outputs are broadly comparable across network companies and where value to the consumer is difficult to assess.

In all other cases, Ofgem stated the use of reputational rather than financial incentives. Ofgem also considered the possibility of incentives that included both a financial reward and penalty, and/or a combination of financial and reputational incentives. Similarly, Ofgem could specify some outputs as a combination of licence conditions (for instance, for a minimum standard) and/or ODIs (for performance targets above a minimum standard) and/or PCDs.

Ofgem also proposed areas for which companies could be considered for consumer value propositions. These included some of the following instances:

- service quality levels higher than existing levels and delivered at similar or lower cost
- bespoke outputs with respect to service provision not reflected in the companies' existing framework of outputs
- initiatives to reduce the environmental impacts of the network that would result in measurable outcomes that are valued by consumers
- uncertainty mechanisms that highlight risks to consumers of which Ofgem would not otherwise have been aware
- innovation strategy likely to drive forward energy system thinking and address consumer vulnerability

Ofgem's recommendations related to consumer value propositions are as follows.

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<sup>17</sup> Ofgem (2019) RIIO-2 Sector Specific Methodology – Core document

- Companies should demonstrate the additional value generated by its business plan for existing and future consumers and vulnerable consumers. The reward associated with the consumer value proposition may be linked to delivery where relevant.
- Companies should demonstrate the extent to which the proposal represents additional value to consumers, allowing for the functions typically undertaken by an energy network company as business as usual.
- Companies should demonstrate the extent to which their proposal incorporates consumer expectations, priorities and value (which may include WTP).
- Companies should demonstrate that their proposal has been reviewed and supported by the Ofgem RIIO-2 Challenge Group, companies' CEGs and UGs.
- Companies should provide an estimate of the consumer benefit and a clear explanation of the methodology underlying such benefits.
- Companies should include details of any arrangements that it will make in the event of non-delivery of a commitment within RIIO-2 and also the extent to which these arrangements can be suitably implemented.

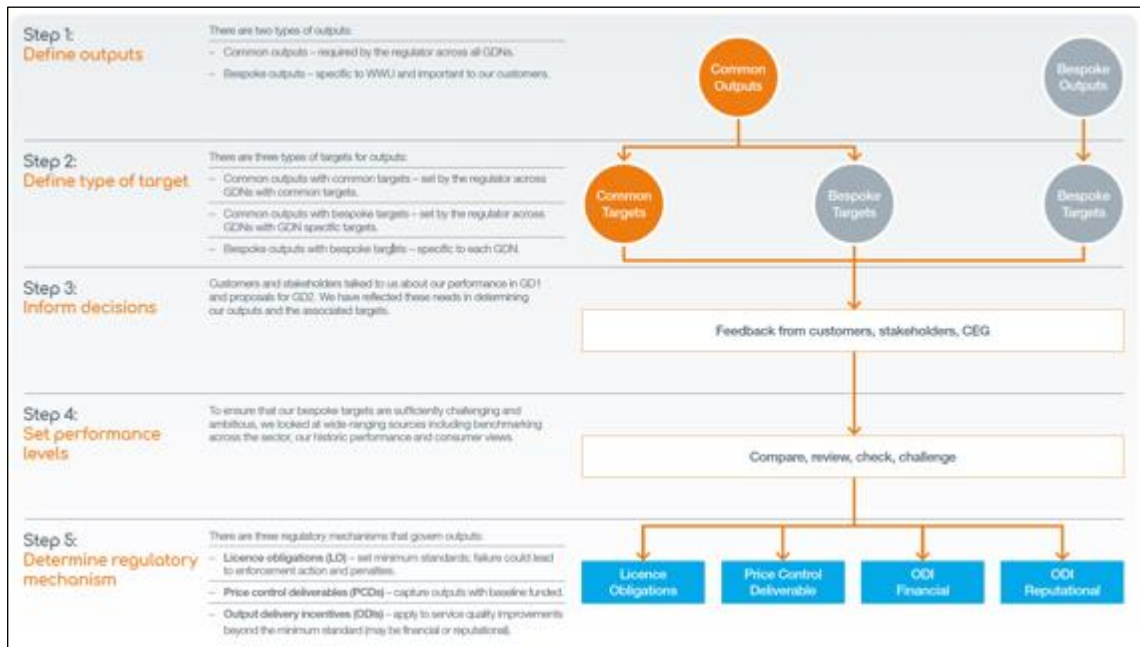
### 3.3 Outputs and ODIs in RIIO-2

In this section, we review the work of energy companies on the development of customer outputs for RIIO-2. As in Section 3.2, we focus our attention specifically on the development of consumer output commitments, setting of commitment levels and the development of ODIs and consumer value propositions by energy companies for RIIO-2.

Our discussion focuses on Gas Distribution Networks (GDN) which include Cadent Gas Ltd, Northern Gas Network (NGN), Scotia Gas Networks (SGN) and Wales and West Utilities (WWU) and Transmission Operators (TO) which include National Grid Electricity Transmission (NGET), National Grid Gas Transmission (NGGT), Scottish Hydro Electric Transmission (SHE) and Scottish Power Transmission Limited (SPTL).

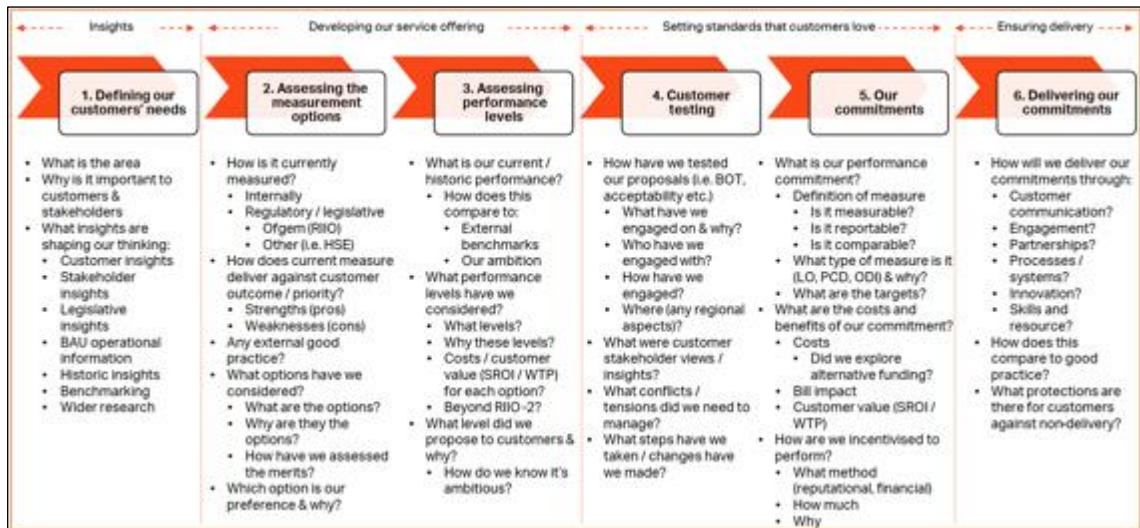
The overall process of setting outputs and targets by energy companies are quite complex. Figure 20 shows a schematic diagram of the steps followed by Wales and West Utilities in setting their outputs while Figure 21 provides a more detailed overview of the systematic approach adopted by Cadent Gas in developing its outputs for RIIO-2.

Figure 20: Wales and West Utilities: Setting outputs and incentives



Source: Wales and West Utilities: Business plan for 2021-2026

Figure 21: Cadent Gas: Approach to determining outputs



Source: Cadent Gas Business Plan for 2021-2026

## Development of output commitments

In developing their business plans, energy companies were required by Ofgem to engage with customers and stakeholders actively and effectively in order to gain an in-depth understanding of their needs and priorities. Companies tended to include research into customer priorities at an early stage in the programme. However, priorities research of various forms took place at different stages of the business planning process for different companies.



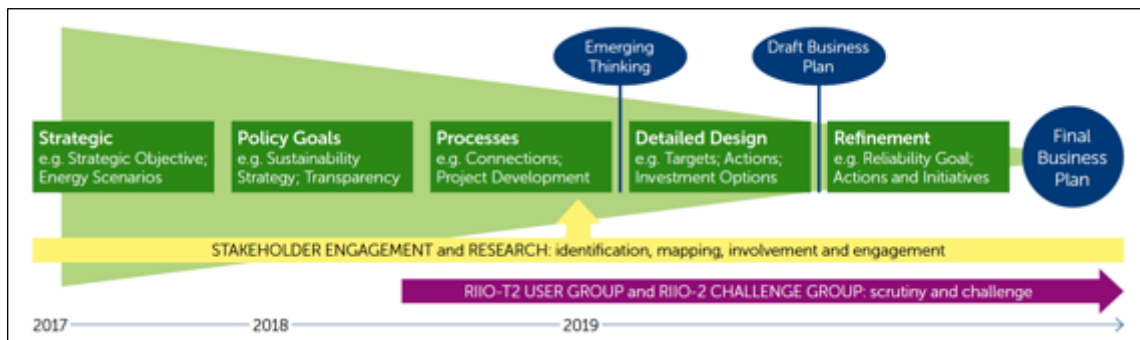
Energy companies, in general, adopted a structured and phased stakeholder engagement process for the development of their RIIO-T2 business plan. This process involved the following:

- Establish the priorities of customers and stakeholders
- Build plans with stakeholders and consumers by priority
- Bring together a holistic business plan with stakeholders, customers and consumers

In the initial phases, energy companies conducted a number of activities to gain a general understanding of stakeholder’ issues and concerns regarding service expectations and explore their attitudes and opinions on business priorities. Based on these activities, companies established stakeholder and consumer priorities around which the business plan was based. In the next phase, companies engaged with stakeholders to identify specific focus areas within each of the high-level priorities identified in the initial phase. In the final phase, companies refined and developed their final business plans. Stakeholder feedback on and scrutiny and challenge of the business plan by the RIIO-T2 user and challenge groups were integral aspects of the entire business planning process.

Figure 22 presents an example of the structured approach to stakeholder engagement adopted by Scottish Hydro Electric Transmission (SHE).

**Figure 22: SHE Approach to stakeholder engagement**



Source: SHE: Report on our RIIO-T2 Business Plan Stakeholder Engagement, December 2019.

At RIIO-2, companies tended to use uninformed research to obtain high-level customers’ priorities and informed research to identify customers’ priorities regarding specific areas of their business plans. Uninformed customers’ priorities were, in general, used to determine the outputs for business plans, based on which companies developed their output commitments for RIIO-2. Informed priorities were elicited to gain customer feedback on specific aspects of the business plan such as transition to the future energy system, improvement in connection to the network, reliability of the transmission network, reducing greenhouse gas emissions and overall carbon footprint etc.

GDNs and TOs mostly used traditional qualitative engagement activities such as customer and stakeholder conversations, meetings, workshops, webinars, online surveys and consultations to obtain uninformed priorities. Examples of innovative engagement activities used to obtain uninformed priorities included the bespoke digital tool designed by SPTL (see Figure 28 ) and the Alva sentiment analysis tool used by WWU to gauge live and trending topics of interest to customers.

The bespoke digital WTP online tool was developed to provide information around key service areas to the users. Exercises were included in this tool to gain an understanding of priorities. SPTL was the first electricity network to develop and implement this innovative digital tool to engage with large volume of customers. The Alva sentiment analysis tool generated monthly reports which recorded both positive and negative feelings of stakeholders across a number of topics such as safety and gas outages, community sponsorships etc. These reports were collected and tracked monthly by WWU in order to determine areas that were important for its stakeholders.

Energy companies conducted a mix of qualitative and quantitative engagement activities to obtain priorities. For example, NGET conducted research to gather stakeholder views on their priorities and the future role of electricity transmission, including around the decarbonisation of electricity, transport and heat, and whole system solutions. Initial qualitative workshops were held to introduce the topic at a high level followed by an online discussion document to inform stakeholders. Next, an online quantitative survey was conducted to consult and obtain informed stakeholder priorities.

NGET developed an interactive online tool (see Figure) as a gamified way of explaining the business plan and asked what choices consumers wanted NGET to make.

**Figure 23: NGET Interactive online tool**



Source: Annex A6.05-Interactive Online tool research report, December 2019.

The objective of the interactive online tool was to understand what customers' priorities were, the value that consumers placed on service areas and to understand the acceptability of investment in each key area and the desirable investment level.

Once the candidate list of priorities was determined by companies, it was important to use appropriate methods to measure these priorities. Energy customer priorities were usually measured using the ranking method. For example, SPTL asked participants to rank key service areas in order of their priority via a bespoke digital tool (see Figure 28). NGN conducted a priorities research prior to a WTP survey to explore service areas that were of greatest importance to stakeholders. An important aspect of this research was a quantitative exercise which engaged with stakeholders to measure the importance of the

business options using a MaxDiff methodological approach, and then combined this with factor analysis to prioritise the output options.

In addition to conducting bespoke engagement activities, energy companies also used ongoing/continuous customer engagement data sources to elicit customers' needs and priorities. For example, in its first phase of business planning, Cadent Gas utilised business as usual data collated by its Customer Insights team to identify customer and stakeholder priorities. The sources of BAU data included the following:

- customer interactions with field engineers
- call centres and complaints and enquiries team
- CSAT findings
- real time rant and rave SMS text messages and inputs from the Stakeholder Advisory Panel

WWU used data mining and customer segmentation methods to identify high-level priorities among the varied customer base. WWU consulted with over 20,000 customers and stakeholders and analysed over 1.45 million pieces of annual customer data to gather this evidence. The customer segmentation also helped WWU understand the most relevant topics and communication channels that it needed to use to engage with the different customer segments in order to increase customer satisfaction with the services.

In most cases, energy companies used a qualitative triangulation approach to bring together findings from their bespoke customer engagement activities and ongoing/continuous customer engagement data sources to identify and develop the final list of output commitments. Details regarding the triangulation approaches adopted by energy companies is discussed in the following subsection.

## Approaches to Triangulation

Overall, energy companies used qualitative triangulation approaches to inform business priorities. NGET and NGGT adopted a principle-based approach to triangulation which involved collating all evidence from stakeholders, customers, research studies and secondary sources and assessing them against a set of principles such as impact, recency, robustness, consistency and relevance. Based on these assessments, trade-offs were considered for each topic area and decisions were made to inform the business plan.

SPTL followed a four staged approach to triangulation which involved the following stages:

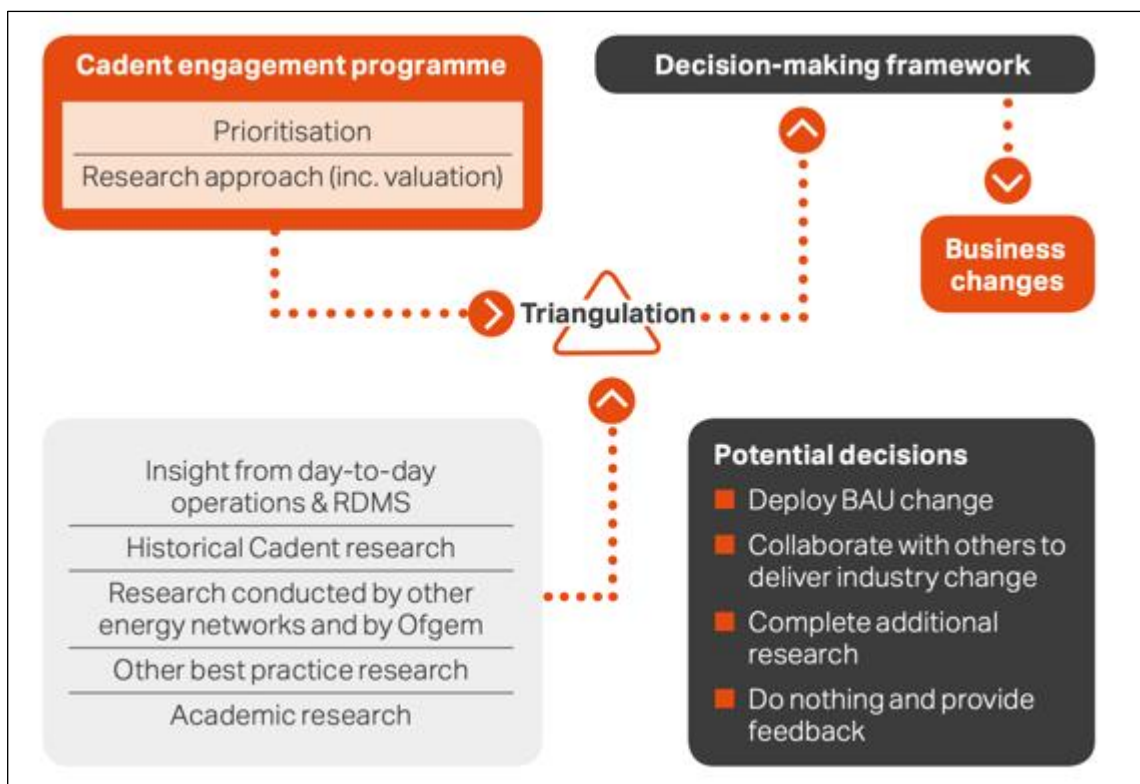
- Identify evidence-based decision making: this involved collating evidence based on stakeholder research and engagement activities
- Feedback and stakeholder analysis recorded on Tractivity: this involved recording, tracking and monitoring key engagement activities via the online engagement tool Tractivity
- Prioritisation/weighting of feedback: this involved analysing stakeholder feedback and insight and reconciling diverging pieces of feedback into a single specific position to help inform business plan priorities and

- Embed feedback during strategic decision-making: this involved presenting feedback to senior executives to ensure that the insight could be used to inform the strategic direction of business priorities.

SPTL also created a ‘triangulation tracker’ which consisted of a database of stakeholder feedback and insight collected throughout the RIIO-T2 planning period. The tracker contained details of what and how stakeholder feedback was considered, how the feedback influenced the business plan as well as the reasons for not including some insights in the plan.

Cadent Gas conducted an iterative and qualitative triangulation programme based on its engagement activities. An innovative aspect of its triangulation process was the development of the Relational Database Management System (Figure 24). This system uses Artificial Intelligence to recognise themes and patterns across millions of data points sourced from stakeholder feedback and customer sentiment capture. This information is shared throughout the business as well as being triangulated with additional data.

**Figure 24: Cadent: Relational Database Management System (RDMS)**



Source: Cadent Gas Stakeholder Engagement Incentive Submission 2019/20 – Part 1

For most output commitments, Cadent Gas used results from the various engagement activities for triangulation, based on relative weightings and robustness of the data sources.

In case of seven output commitment, however, there appeared to be conflicts between views of different customer and stakeholder groups that required a two-phase approach to triangulation. Figure 25 presents the two-phase triangulation approach. In each of these cases the two-phase approach was followed to analyse each of the data sources

together to synthesise the feedback first on a bottom-up and then on a top-down basis. In order to develop the final output commitments, weighting was applied to the conflicting aspects of the feedback. The relative weightings were based on several criteria including majority customer preference, specific customer segments, stakeholder/expert views, benchmark and trends and political agenda

Figure 25: Cadent: Two phase triangulation approach



Source: Cadent business plan 2021-2026, December 2019

NGN conducted triangulation of all the evidence by combining operational feedback, targeted engagement findings and third-party insights. This iterative triangulation process resulted in clear insights that helped shape the final business plan. SGN and WWU also triangulated customer evidence sources to produce clear insights that helped shape their final business plans.

## Setting output commitment levels

Setting stretching levels for output commitments has a significant impact not only on proposed services to customers but also on companies' expenditure level and hence on customer bills. Therefore, output target levels are at the core of determining the balance of risk and reward in companies' business plans.

As indicated in Figure 20, there were three types of targets for outputs:

- Common outputs with common targets
- Common outputs with bespoke targets and
- Bespoke outputs with bespoke targets

In the first two cases, Ofgem set the performance targets while for the remaining case, energy companies set their output target levels.

Overall, in setting their target levels, energy companies considered several factors which included:

- customer priorities through bespoke engagement activities, business-as-usual operational contacts and through benefit valuation
- expectations from regulators, stakeholders and government
- their understanding of current and future performance and industry benchmarks

A principal component of setting target levels was the use of the cost benefit approach to determine the efficient service levels for output commitments. The efficient service level is defined as the service level where the marginal benefit for the service level equals the marginal costs of providing that service level.

Marginal benefits obtained via customer valuation research were used, alongside costs, to set output target levels, ODIs and consumer value propositions. Details of the customer valuation research conducted by companies is provided in the following subsection.

## Approaches to valuation

Energy companies utilised multiple valuation methods at RIIO-2 which included a variety of stated preference methods, revealed preference methods and value transfer methods to obtain customers' valuations for service measures.

### Stated Preference Methods

Customer valuation research was conducted jointly by the four Transmission Operators (TOs) in Great Britain (National Grid Gas Transmission, National Grid Electricity Transmission, SP Transmission and Scottish Hydro Electricity Transmission) to estimate consumers' WTP for improvements in the service provided by the TOs to domestic and

non-domestic gas and electricity consumers. The joint study was conducted to maintain consistency in research methods across all transmission operators.

The valuation research was conducted in four stages:

- Set up and design of the survey including selecting the valuation method
- Survey testing through cognitive interviews and pilot analysis.
- Fieldwork consisting of face-to-face interviews and online surveys and
- Econometric analysis of the data to derive WTP estimates and sensitivity and robustness checks

The stated preference survey questionnaire presented to participants included a choice experiment and a contingent valuation exercise. Both the choice exercises were included to understand how valuations stated for subsets of attributes changed when consumers were presented with a full set of attributes in the contingent valuation exercise.

In the choice experiment, participants were asked to make trade-offs between bill changes and service changes, while keeping in mind that changes in their bill would affect their disposable income, and that their bills might change due to other factors.

Figure 26 presents an example choice card used in the Domestic Gas Survey. An interesting aspect of this exercise was that rather than presenting traditional show cards to participants (and thereby requiring them to read a significant amount of material), videos and voice-overs were used to provide detailed descriptions of attributes. This approach made the survey engaging and understandable for the respondents.

Using mixed logit models, the study estimated WTP for each attribute in the Choice Experiments. Consumers' WTP for each attribute was then compared to their overall WTP in the CV exercise, and the CE WTP results were scaled down. The scaled WTP estimates presented a conservative estimate of customers' WTP for the attributes.

Figure 26: Domestic Gas Survey: Choice experiment card example

Which of the following packages do you prefer?

Down the left hand side of each table you will see all of the service areas that were explained in the videos you have watched. You can click on each of these to see a short description or to watch the videos again.

Colour coding has been used to help you compare Package A and B. If a row has shading it means there are changes to the service, if there is no shading it means Package A and Package B are the same for that service. The last row in each table will always be shaded, this row relates to the impact on your bill.

1 / 5

	Package A	Package B
<a href="#">Reducing the risk of a transmission interruption to the gas supply</a>	<b>Same</b> probability as today (1 in 12,500 households per year)	<b>Same</b> probability as today (1 in 12,500 households per year)
<a href="#">Improving the environment around transmission sites</a>	15 large sites and 30 smaller sites	4 Large sites
<a href="#">Supporting local communities</a>	<b>Maintain current level</b> of community schemes <b>and provide additional funding</b> to charities and other organisations to support consumers	<b>No</b> community schemes
<a href="#">Investing in innovation projects to create future benefits for consumers</a>	<b>No</b> innovation projects	<b>No</b> innovation projects
<a href="#">Supporting those in fuel poverty</a>	Continue as is - no proactive support	Continue as is - no proactive support
<b>Change in your gas bill excluding inflation</b>	<b>No change</b> Your gas bill between 2021 and 2026 would be £660.00 per year	<b>Your gas bill would be £5 less per year</b> Your gas bill between 2021 and 2026 would be £655.00 per year

Package A
  Package B
  Don't Know

Source: Consumers' WTP: Scottish Hydro Electric Transmission plc, RIIO-T2 Business Plan

Post the survey, a number of checks were carried out to ensure the validity of the survey data and the statistical robustness of the model results. SPTL conducted a bespoke qualitative WTP study to support the quantitative outputs of the joint Transmission wide WTP study. SPTL held deliberative focus groups involving domestic customers and in-depth interviews involving consumer representative stakeholders for this study.

- In the deliberative focus groups, SPTL representatives presented key information around various aspects of the business to consumers via short presentations and videos. Discussions of each of the focus groups were audio recorded and worksheets collated for a subsequent thematic analysis.



- In-depth stakeholder interviews were held with consumer representatives via telephone to gain a wider perspective on various aspects of the business plan. The telephone interviews were also supported by an online task.

The overall observations and results of the WTP study was based on the Transmission wide WTP research as well as the SP Energy Networks specific WTP research.

Cadent Gas used a stated preference method a choice experiment wherein customers were asked to choose between packages of service and associated bill levels. NGN conducted a WTP research study based on a large-scale quantitative survey which covered both current and future bill payers. The survey asked customers how much they would be willing to pay for different service packages. The survey was mainly conducted online and supplemented with telephone and face to face interviews. The survey used stated preference methods to estimate customers' WTP for the service areas covering safety, supply interruptions, customer service, environment and vulnerable customers.

Prior to implementation of the WTP survey, participants were provided with relevant information about the gas industry to ensure that they made informed choices. Further, NGN engaged with ECP to obtain their feedback on the design, wording and content of the survey questionnaire.

Customer valuation research of SGN was conducted in various phases of its customer engagement programme. In the second phase, SGN conducted a quantitative WTP survey to understand how much domestic and small business customers would be willing to pay for service improvements. Additional WTP studies were conducted with hard to reach customer groups. In the fourth phase, SGN conducted a second round of WTP research to estimate customers' values for specific environmental initiatives. The WTP studies were based on discrete choice experiment and MaxDiff methods.

WWU conducted two WTP surveys: the first was the 'willingness to pay as a price perception of importance' acceptability testing which involved survey and focus groups and covered stakeholders across all categories and the second was the 'bill increase willingness to pay' acceptability testing which involved survey and face-to-face interviews and covered domestic and SME customers as well as hard to reach customers.

Slider tool studies were also conducted by Transmission Operators such as SPTL. SPTL designed a bespoke digital WTP online tool to provide information around key service areas to the users. Exercises were included in this tool to gain an understanding of priorities and indicative WTP of the users. SPTL was the first electricity network to develop and implement this innovative digital tool to engage with large volume of customers (see Figure 27, Figure 28 and Figure 29 below).

To obtain WTP, users were asked to use sliders to allocate the total flexible amount of their electricity bill across eight priority areas, above or at the same as current levels of spend. Average WTP values for the priority areas were then calculated based on the responses of the slider study. However, without variation in prices, this tool cannot be considered to have obtained valid estimates of customers' WTP in the usual sense.

Figure 27: SPTL WTP Digital tool: Information



Source: SP Energy Networks RIIO-T2 Business Plan Annex 5: Co-creating the plans with our stakeholders, December 2019 submission

Figure 28: SPTL WTP Digital tool: Prioritisation task

Source: SP Energy Networks RIIO-T2 Business Plan Annex 5: Co-creating the plans with our stakeholders, December 2019 submission

Figure 29: SPTL WTP Digital tool: Electricity bill breakdown



Source: SP Energy Networks RIIO-T2 Business Plan Annex 5: Co-creating the plans with our stakeholders, December 2019 submission

## Revealed Preference Methods

In contrast to SP methods, RP approaches involve the analysis of behavioural choices made by people in the real world. Gas distribution network companies such as Cadent also used revealed preference focus groups and surveys to estimate WTP values for their services.

## Subjective Wellbeing Method

SGN implemented a study to value the impact of works disruptions and supply interruptions using the wellbeing valuation method.

## Value Transfer/SROI

Gas distribution network companies like Cadent also used value transfer methods, in addition to the core stated preference method, to estimate WTP values for their RIIO-2 business plan. Some energy companies, including Wales and West Utilities and Scottish Power Energy Networks, incorporated value transfer evidence alongside costs within a formal social return on investment (SROI) tool. Scottish Power Energy Networks produced an SROI tool to capture and forecast the costs and benefits of outcomes included in their consumer value proposition. This included WTP evidence plus evidence from published data, e.g. BEIS, HSE, NHS, etc. WWU collated value transfer evidence from external sources, e.g. BEIS shadow prices of carbon, within an SROI tool to value outcomes in the consumer value proposition.

Overall, therefore, WTP evidence obtained via customer valuation research was combined with evidence from external sources to set ODI payments and value outcomes in the consumer value proposition.

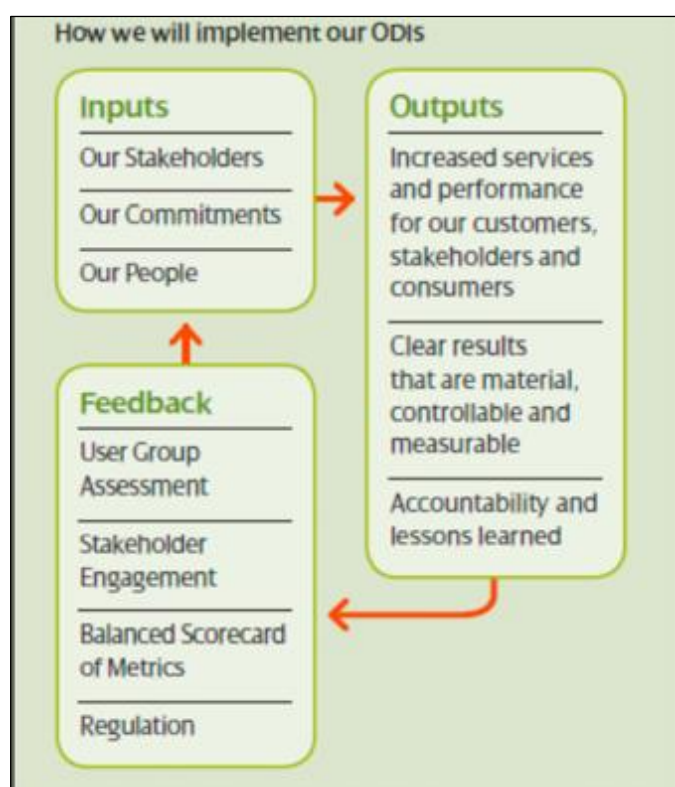
## Setting ODIs and consumer value propositions

Energy companies proposed ODIs for some of their outputs where there was a benefit / loss to consumers and stakeholders of them overperforming / underperforming their targeted performance levels. Rewards were associated with overperforming targets while penalties were associated with failing to meet their targets.

The ODI package included common financial and reputational incentives that were set out in Ofgem's RIIO-2 Sector Specific Methodology Decision (SSMD). In addition, companies proposed bespoke financial and reputational incentives that the RIIO-2 framework encouraged companies to do.

Figure 30 presents a diagrammatic representation of the approach of SP Energy Networks to ODI implementation.

**Figure 30: SP Energy Networks-Implementation of ODIs**



Source: SP Energy Networks, RIIO-2 Business Plan, Appendix 12

The above figure illustrates the relationship between SP Energy Networks' commitments (inputs), outputs associated with the ODIs and the feedback that would enable the company to make annual improvements. The company aimed to submit annual reports to the User Group containing a Balanced Scorecard of the ODIs. The Balanced Scorecard incorporated:

- The company's performance in respect of its ODIs
- The company's progress on delivering against our commitments
- The company's performance in respect of a set of core metrics

Ofgem set the maximum reward and penalty rates for some common ODIs. For example, Ofgem set penalties and symmetrical financial exposure of +/-0.4% base revenue for the “Time to connect” ODI. This ODI was proposed to incentivise DNOs to reduce the connection times for customers seeking a small, or minor, connection to the distribution network. Similarly, Ofgem set a penalty only financial ODI for the “Complaints Metric” at a financial exposure of -0.5% base revenue. This ODI was set to incentivise DNOs to improve their handling of customer complaints.

Energy companies set maximum reward and penalty rates for the bespoke ODIs. For example, NGET proposed a bespoke ODI i.e. “Environmental scorecard” related to delivering an environmentally sustainable network. The environmental scorecard used seven targets from the Environmental Action Plan covering the following areas:

- alternative fuel vehicles
- reducing business mileage emissions
- waste recycling
- waste reduction
- water use reduction
- environmental value of their non-operational land and
- net environmental gain on construction

NGET scored their annual performance on a scale of -14 to +14 based on how well they performed against the seven targets. The ODI payments were then linked to these scores, with the with the maximum penalty of £4m for a score of -11 to -14 and the maximum reward of £4m for a score of +11 to +14.

Energy companies also proposed consumer value proposition for areas of the business plan (these could be commitments, outputs or incentives) where they went beyond Ofgem’s requirements and beyond business as usual activities to provide additional value for consumers. Rewards were associated with consumer value propositions.

Companies used a range of data sources to value outcomes in the consumer value proposition. For example, SP Energy Networks used the following different sources to calculate the benefit:

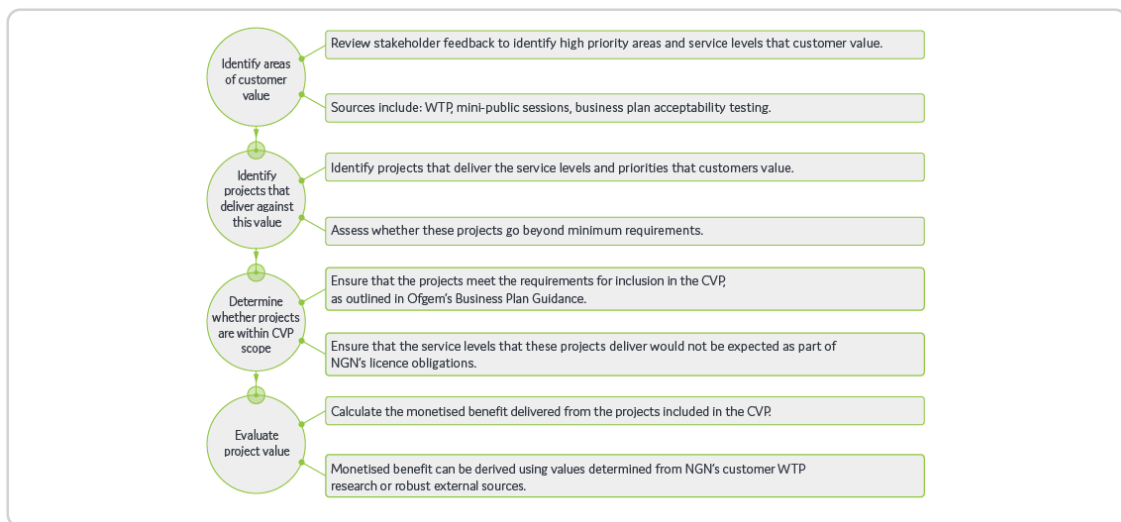
- *Ofgem cost benefit analysis model*: a model developed by Ofgem in collaboration with other network operators. This model allows benefits such as carbon savings to be calculated in a consistent manner
- *Network Asset Risk Metric methodology*: the benefits from the company’s non-load programme was calculated based on the Network Asset Risk Metric methodology to ensure consistency and comparability
- *Innovation related data* and statistics derived from innovation related project reports and plans
- *SP Energy Network SROI tool*: this tool calculated the net benefit to customers for each pound that the company spent on service.

A principal component of setting ODI payments and valuing outcomes in the consumer value proposition was the use of WTP research studies. As indicated above, companies used their WTP research where possible, for the valuation of benefits and other industry

recognised sources of values such as Network Asset Risk Metric and the Ofgem Cost Benefit Analysis template.

In cases where WTP and industry standard sources of value did not exist, other sources were used, such as HM Treasury, Defra, the Department for Business, Energy and Industrial Strategy (BEIS) and Woodland Trust. In order to capture wider benefits of service changes, companies utilised a Social Return On Investment (SROI) tool to capture and forecast the costs and benefits of outcomes included in their consumer value proposition. Details of the valuation methods adopted by energy companies have been discussed in the above section. The following figure shows an example of the process followed by NGN to develop and appraise their customer value proposition.

**Figure 31: NGN consumer value proposition Development and Appraisal Process**



The figure shows that the process involved assessment of customers' and stakeholders' evidence to identify high priority areas and specifically areas where customers preferred companies to be more ambitious and go beyond their normal activities. Companies identified these areas as those that delivered additional value beyond what customers expected, assessed these against Ofgem's RIIO-2 Business Plan Guidance, discussed with other stakeholders and valued this benefit to include in their consumer value proposition.

Overall, therefore, similar to the water sector, energy companies conducted an extensive customer engagement programme to develop its output commitments, ODI package and consumer value propositions. Having reviewed the RIIO-2 business plans and highlighted some interesting examples in this regard, we now turn to the next section in which we discuss the requirements and expectations for PR24 customer engagement and outcomes.

# 4 PR24 Requirements and Expectations

## 4.1 Introduction

Following PR19, CCW commissioned or published several reports related to the requirements and expectations for PR24. This section summarises the findings and recommendations of these reports related to customer engagement.

## 4.2 Customer engagement

In May 2020, CCW commissioned Blue Marble Research to conduct a study to understand how consumers felt about the research processes they were asked to participate in, for the development of water companies' business plans and whether they felt they were able to make a meaningful contribution that adequately reflected their views. The study reported that most customers found certain aspects of the business plans to be highly technical and difficult to understand. These aspects included among others, the setting of performance commitment targets and performance incentives. Most consumers agreed that these regulatory measures should be decided by experts, the government or the water companies.

CCW (2020a) "Lessons learned from the 2019 Price Review", made several recommendations regarding Ofwat's price setting methodology, and includes some further recommendations for customer engagement. Likewise, CCW (2020b) "CCW's View on Consumer Engagement at PR19: What Worked Well and How to Build On This, Nov 2020" contained further recommendations.

Table 1 contains a summary of the general principles of good practice put forward by CCW/Blue Marble (2020)<sup>18</sup>, CCW (2020a) and CCW (2020b) reports in pursuit of high quality customer engagement and research.

**Table 1: Principles of good practice in customer engagement and research**

Principles of good practice
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)

<sup>18</sup> CCW/Blue Marble (2020). *Engaging water customers for better consumer and business outcomes*

Companies should rebalance the use of 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)
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)
Water companies should publish the original research materials and accompanying research reports including the research materials, methodologies and a consideration of learning points, rather than their own summaries of research (CCW 2020a <sup>19</sup> )
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 2020a)
Make research and engagement more accessible to seldom-heard groups, and consider the implications where there is low representation of these (CCW 2020a)
More research should be conducted centrally to allow for comparability. This should include acceptability testing of business plans and customers’ views of core services that are common to all companies (CCW 2020b) <sup>20</sup>
Good practice should be shared across the sector in terms of customer engagement techniques and how to triangulate different sources of customer evidence (CCW 2020b)

Sources: CCW/Blue Marble 2020, CCW,2020a and CCW,2020b

The development of options for the PR24 collaborative ODI research methodology will seek to adhere to these guidelines where relevant in accordance with the principle set out in the project inception report that the methodology should be customer-focused.

<sup>19</sup> CCW (2020a) Lessons learned from the 2019 price review, Oct 2020.

<sup>20</sup> CCW (2020b) CCW’s View on Consumer Engagement at PR19: What Worked Well and How to Build On This, Nov 2020.