September 2016

Trust in water

Costs and benefits of introducing competition to residential customers in England

www.ofwat.gov.uk

Ofwat

About this document

In November 2015, the UK Government asked Ofwat to assess the costs and benefits of extending retail competition to residential water customers in England. In July 2016, we published our emerging findings for consultation. This document is our final report to government.

We have assessed the costs and benefits of introducing residential retail competition to the water and wastewater sectors in England against a counterfactual in which the status quo is retained and residential competition is not implemented. Our approach mirrors that of Professor Martin Cave in his 2009 analysis of the merits of enhancing competition in the UK water market.

In our assessment, wherever possible, we have used data to estimate the scale of costs and benefits resulting from residential retail competition. However, some impacts can be difficult to quantify. Where we have been unable to find data to include in our quantitative analysis, we have made a qualitative assessment on the impacts. Even where it is not possible to quantify some of the costs and benefits, they remain important to consider in the assessment.

We have modelled four possible scenarios for the market and used these to estimate a range of possible costs and benefits of introducing residential retail competition, assessing whether introducing competition would have a net benefit or net cost.

We received strong support from stakeholders for our methodology and modelling. The approach of presenting a set of scenarios to illustrate the assessment was particularly welcomed. We have therefore continued this approach, updating our numbers where we have been able to add better evidence.

Scenario	Net present value
1. Low cost, widespread innovation, strong competition among retailers	£2,917 million
2. Low cost, less innovation, competition among retailers	£1,214 million
3. High cost, less innovation, competition among retailers	£185 million
4. High cost, little innovation and weaker competition among retailers	£-1,445 million

We explain our assumptions about the different drivers for costs and benefits in these scenarios and the possible outcomes for customers, retailers and wholesalers.

Having submitted our report, we are now ready and willing to work with the government as it decides how best to take this forward – including undertaking

further analysis of the possible impacts on different customer groups to understand how to best protect their interests.

Contents

1. Introduction

1.1 What we have been asked to do

On 30 November 2015, the government outlined its plan to introduce competition to the water sector in England in A Better Deal: boosting competition to bring down bills for families and firms. It highlighted changes being made in the business retail market and in upstream water markets, and announced that:

> Ofwat will provide an assessment by summer 2016 of the costs and benefits of extending retail competition to household water customers. Following this, the government will work with water companies to begin the transition to retail competition before the end of this Parliament.

The rationale for the potential introduction of competition for residential customers in the water sector in England sits within a broader vision, which the government expressed as:

> Opening up markets to new entrants promotes stronger competition and drives efficiency and innovation. The result is the creation of new and innovative products and services at lower costs, which benefits consumers across the UK… The government is taking action to open up markets to new entrants, driving greater competition and providing consumers with more choice.

In this document, we set out our final assessment of the costs and benefits of extending retail competition to residential customers.

1.2 Our approach

Following consultation, we published our terms of reference for the residential retail review in January 2016, setting out the principles to guide us through the review:

- the decision about whether, in what form and on what timeline the residential retail market in England will be opened to competition is a matter for UK government;
- our assessment of the costs and benefits of extending retail competition to residential customers will be evidence based; and
- we will follow an open and transparent process, seeking evidence and ideas from those in the sector and beyond.

In January, we also published our initial call for evidence to get views and evidence from stakeholders. We received 18 responses from a range of stakeholders, including customer representatives, water companies, potential new entrants to the market, regulators and investors. We held a workshop with a wide range of stakeholders (including water companies and customer representatives) on 20 April 2016, at which we discussed models of competition and initial customer research findings. There were also contributions from expert panellists with experience of markets in other sectors.

On 18 July, we published our emerging findings, setting out how we were guided by our terms of reference for the review, and how we considered responses from stakeholders through our initial call for evidence and through ongoing discussions with stakeholders.

Within that document, we set out the emerging results of our assessment for four potential scenarios. We also sought comments and any further evidence to feed into our analysis. As part of this consultation, we held a second workshop with a wide range of stakeholders, including water companies, potential new entrants, investors and customer representatives on 20 July 2016. We have also engaged bi-laterally where we have received requests to do so. The additional evidence we received was considered and incorporated into our analysis where appropriate. We set this out in Chapter 2.

This report is intended to inform the UK government's decision about whether and how best to extend retail competition to residential customers.

1.3 The structure of our final report

This report presents our final assessment of the costs and benefits of introducing competition to retail water and wastewater markets in England.

The content of the report is set out as follows:

- **Chapter 2** – how we have updated our assessment since publishing our emerging findings in July.
- **Chapter 3** – an overview of our assessment of the costs and benefits of introducing residential retail competition, along with a description of the results of the quantitative aspect of this assessment. We also expand on the scenarios used to assess the range of costs and benefits.
- **Chapter 4** – how retail competition for residential customers could affect different customer groups.

- **Chapter 5** – the measures we identified that could help ensure successful implementation.
- **Chapter 6** – our considerations for timing.
- **Chapter 7** – our overall assessment and next steps.
- **Appendix 1** – our updated detailed summary of assumptions and data sources.
- **Appendix 2** – our sensitivity analysis.

We have also published a number of documents to support our analysis and provide further evidence for our findings.

- Our customer research carried out by Accent. This report was published alongside our emerging findings and has not been updated. We have also considered customer research carried out for the Consumer Council for Water.
- An independent report by KPMG on lessons from the energy sector. This report was published alongside our emerging findings and has not been updated.

We have also published a Summary of Responses document setting out evidence submitted by stakeholders to our emerging findings alongside this document[1].

[1] We have received two submissions that were commercially confidential which cannot be published.

2. How we updated our assessment

As part of our publication on 18 July, we asked stakeholders for additional evidence and for their views about our quantitative and qualitative assumptions and analysis. We received 38 responses from a wide range of stakeholders, including incumbent retailers, potential new entrants, customer groups and interested parties. The responses are published alongside this document.

In this chapter, we explain how we updated our assessment of costs and benefits since our emerging findings published on 18 July 2016. We explain:

- the reasons for maintaining our approach and methodology, consistent with the emerging findings; and,
- the changes we have made since our emerging findings, including the areas which we have undertaken new quantitative analysis and new qualitative analysis and the evidence base which we have drawn on to support these changes;
    - the context of the potential net benefit for customers; and,
    - our key policy assumptions.

Stakeholders welcomed our approach to the assessment of costs and benefits and the use of scenarios. We did not receive any comments suggesting a different method to our analysis. Therefore our methodology for this review has remained the same as for our emerging findings (set out in detail in Appendix 1). We have focused on revising our inputs and assumptions where we received further evidence. In summary, as a result of the feedback we received, we have:

- reduced the proportion of customers active in the market who switch in a year. This better reflects the experience of other utility markets and applies to all our scenarios;
- added further evidence on the time customers spend searching out better deals in the market and increased our assumed costs;
- taken account of views that the cost to retailers of acquiring customers could be higher or lower than assumed in our emerging findings. To reflect this we included a wider range of costs across the scenarios;
- carried out a significant amount of further analysis around bad debt, which supported our initial assumptions. We did not receive any new substantive quantitative evidence that supported making any changes;
- carried out international comparisons of water efficiency to test our assumptions. Potential new entrants provided information on water efficiency services. As a

result, we updated our water efficiency assumptions and included information on energy and carbon savings that could also arise from water efficiency;
- considered further the potential for wastewater efficiency and resilience outcomes as a result of competition. We carried out further analysis to quantify benefits; and,
- used the latest information on the central costs of set up and the running costs of the business customer retail market to inform the costs of the residential retail market scenarios.

2.1 Summary of changes

This section summarises the main changes we have made since our emerging findings, and explains whether these changes resulted from additional research and analysis, or were in response to further evidence and views submitted by stakeholders.

In a number of areas, we have updated our analysis to include additional qualitative and quantitative analysis of costs and benefits that were not included in our initial findings.

Value of choice. We have updated our analysis to include a qualitative assessment of the value of choice to customers. By this, we mean the value that customers get from having a choice, rather than the benefit that customers get from making choices and acting on them. For a significant number of customers, the option of having a choice of supplier will be of value because it provides an alternative if they do not get the service they want from their current suppliers.

Wastewater efficiency savings. We have added an assessment of the potential benefits of competition with regard to wastewater. We consider two potential areas – treatment costs and resilience of the drainage system to extreme events. These savings would be achieved through increased customer water efficiency and other measures to reduce demand on the drainage system for example, by reducing surface water run-off from properties. This could benefit the customer through lower wastewater bills. We received information from a potential new entrant to support this assessment. They identified the opportunity for their business to offer surface water drainage and wastewater metering in a residential retail market. One respondent is already working with technology that would enable smarter wastewater management and explained how competition could promote its roll-out.

Our quantitative analysis now includes an estimate of the potential benefits of competition for reducing stress on sewerage and drainage. To inform this estimate,

we used information from the PR14 price review on customers' willingness-to-pay to avoid their property flooding.

As we note above, we acknowledge that a new market could encourage the development and introduction of technologies that would enable smarter wastewater management. However, we have taken a conservative approach to these estimates because of the lack of information available on the link between wastewater volumes and incidences of flooding. Nonetheless, we recognise that these savings could be translated into lower infrastructure expenditure by wholesalers, and increased resilience of current infrastructure at times of stress on the system. This could lead to higher benefits for customers and the environment than have been estimated in this review.

Water efficiency savings. We conducted further research into the benefits of water efficiency and have taken into account information from stakeholders, including potential new entrants, specifically around the link between water efficiency and savings on energy bills and carbon savings. Our quantitative analysis now includes an estimate of the potential benefits of competition for energy bills and carbon savings.

We have also included examples in our qualitative assessment of areas highlighted by potential new entrants as offering potential benefits through increased water efficiency being introduced into a market, as mentioned above. We took evidence from one respondent on the potential for surface water drainage and wastewater management in a competitive retail market.

Water resources resilience. We added additional qualitative discussion of the benefits of water efficiency for water resource resilience.

We have not attempted to quantify the value of potential resilience improvements nor the potential environmental benefits. The link between reduced demand and wider resilience on customer services is complex. Some companies have carried out willingness-to-pay research, looking at the value customers place on supply interruption, as part of the PR14 process. However, we found no information to quantify the link between demand reduction and lower frequency or duration of interruptions to supply.

Nonetheless, these are important benefits that should be considered in any decision about whether to introduce residential retail competition. Retailers are likely to challenge wholesalers on their customers' behalf if there are repeated supply interruptions.

Company costs. Our approach to company costs has changed in two areas. First, Water UK's submission on the costs of opening the business market has been taken into account. This led us to update our assumptions about companies' implementation costs, principally because set-up costs for the business market are higher than estimated in our emerging findings. We have not been able to scrutinise the degree to which these industry-level costs are efficient from the information we were given. We applied the same methodology as used in our emerging findings to scale up these costs for opening a residential market, in the absence of any additional quantitative evidence on that point from stakeholders.

Second, we have not included any costs associated with the voluntary restructure of businesses. We already have legally binding separate retail price controls and require accounting separation, which means that integrated companies would be able to take part in a competitive retail market. The choice of business model would be for companies to decide, and any costs associated with transferring, exiting or merging retail businesses should not be analysed as a cost associated with the introduction of competition.

Therefore, we increased companies' set-up and ongoing operation costs to reflect the Water UK submission. We excluded separation costs from the quantitative analysis. The overall impact of these changes decreases the overall net present value by a small amount for all scenarios.

Market operator costs. Some incumbent retailers submitted more up-to-date information on market operator costs in the business customer retail market. We used these to update estimated costs for opening a residential retail market, using the same method applied in our emerging findings. Unfortunately, potential new entrants were not able to provide evidence on this point.

This increases ongoing costs of operating the market, which decreases the net present value by a small amount for all scenarios.

Switching assumptions. We received feedback from Customer Challenge Group (CCG) chairs, existing retailers, the Consumer Council for Water and the Centre for Competition and Policy on the assumptions we made about switching, and we carried out additional research. Several stakeholders directed us to further evidence from experiences in other sectors, in particular from the Competition and Markets Authority energy market investigation.

We have reflected this in updated assumptions on the level of switching used to construct each scenario. Specifically, we have lowered our assumptions on the switching rates used for each scenario.

This change has an independent positive effect on the net present value of competition for all scenarios, compared with our emerging findings. This is because, over time, the same number of customers are active in the market, but with a lower level of annual switching among active customers, and lower customer search costs.

Customer search costs. We have increased assumed customer search costs to better reflect our own research and the evidence highlighted by some potential new entrants and incumbent retailers.

This change has an independent negative effect on the net present value of competition for all scenarios, compared with our emerging findings.

Companies' customer acquisition costs. In response to evidence submitted by stakeholders, we re-assessed our assumptions about acquisition costs. While some incumbent retailers argued for higher acquisition costs, some potential entrants set out the case for lower costs.

One potential new entrant provided information on their acquisition costs, which were likely to be lower than the Scenario 1 low estimate used in our emerging findings. This would be driven for example by their use of technology and multi-utility bundling to avoid market costs across their customer base. As this was not quantified, we retained our original assumption for Scenario 1.

Responses from some incumbent companies directed us to the acquisition costs for energy referenced in the Competition and Markets Authority energy market investigation. Taking into account this this and other evidence submitted by stakeholders, we have increased assumed acquisition costs across each scenario.

Bad debt. Incumbent retailers and CCG chairs were the principal stakeholders who submitted views and some qualitative evidence about our assumptions on bad debt, primarily relating to our comparison with bad debt in the energy market.

Taking this evidence into account, as well as further research we have carried out, we include significantly more qualitative analysis of potential additional bad debt savings. We were not surprised to note that current incumbents held particularly strong views on why it would not be possible to reduce bad debt levels in the residential market significantly, or that potential new entrants disagreed. After consideration, we think the additional analysis we have done supports retaining the assumptions made in our emerging findings.

We were also not surprised that incumbent retailers challenged the assumptions in our emerging findings around bad debt cost-efficiencies, as we would expect

entrants into the residential water retail market to bring the innovation that would drive those efficiencies. Even in our most optimistic scenario (Scenario 1), we assume that bad debt costs in water would be double those of the energy market.

2.2 Putting the potential net benefit in context

In the discussions on our emerging findings, some commented that the £2.3 billion net benefit in Scenario 1, which equated to £6 per customer per year, was small. The net benefit in Scenario 1 has risen to at £2,917 million (or £8 per customer per year) in our final findings. In this section we set out the wider context against which this figure might be judged.

First, we note that £2,917 million or £8 per customer per year is a substantial sum in the context of the other challenges to bills that regulation brings. In our last price review, at PR14, the difference between the WACC financing costs (weighted average cost of capital) that companies had included in their business plans and the financing costs that Ofwat estimated for the purposes of our final determination was (leaving aside the Water only Companies, WoCs) about 30 to 40 basis points. Indeed, it resulted in our setting the lowest cost of capital that a regulated utility in the UK had seen. This challenge from Ofwat saves customers about £2 billion in the period 2015-20.

Second, the £2,917 million potential benefit from residential retail competition in England also compares well against the benefits we have identified from market reform in other parts of the value chain. As part of our Water 2020 programme, we have analysed the potential for greater use of markets for providing new water resources and concluded that a net present value of up to £1,195 million could be achieved compared to the over the ‘do nothing’ option over a 30 year period in England only (2015-16 prices).

Third, we analysed the potential for greater use of markets to generate value in bioresources (sewage sludge) treatment, transport, recycling and disposal and concluded that a net present value of up to £1,312 million could be achieved over the ‘do nothing’ option over a 30 year period in England only (2015-16 prices).

Fourth, in our Water2020 programme, we saw scope for ‘direct procurement for customers’ (market testing by monopoly wholesalers of projects with a whole life total expenditure of more than £100 million) to deliver a net present value of between £400 million and £850 million over 30 years (2015-16 prices).

Finally, we note that the net present value estimate of £2,917 million in our analysis is considerably greater than the estimated net benefit of opening the business

customer market to competition, which according to government's impact assessment of introducing business retail competition in water – Introducing Retail Competition in the Water Sector - was £211 million (in 2009 prices) over a 30-year period.

2.3 Policy assumptions

Various issues have potential to influence the costs and benefits estimated in this quantitative modelling. We have assessed a wide range of relevant evidence, much of which has been provided by stakeholders. In line with our terms of reference, where we identify and discuss specific policy issues or make policy assumptions, this is only to illustrate our competition assessment so that our final assessment can best inform government and our regulation of the market. Our analysis assumes no changes to current government policy. We have not been asked by government to assess any specific policy changes and our analysis should not be taken as proposing any changes to government policy.

However, in the course of our analysis, various questions were raised about how a competitive water retail market for residential customers could work, in particular in how different groups would be protected and share in the benefits. We have noted some ways in which these questions could be addressed, and some of these involve policy choices for government. We have set out these considerations in Chapter 5.

In particular, this analysis of evidence has assumed the following:

- **Metering** – current metering policies continue; that metering residential premises is not mandatory and that customers can request a meter at their premises.
- **Retail exits and separation** – some form of retail market exit and separation is allowed for. The precise framework for such exit and separation would be subject to future policy decisions.
- **Social tariffs** – some form of protection would be in place for customers who struggled to pay their bills, although we have not taken any view on whether this protection would take the form of existing support schemes or some other form; and
- **Disconnection** – the existing prohibition in legislation on disconnecting residential customers remains in force.

3. Analysis

In this chapter, we describe how we estimate the costs and benefits of competition.

This section presents our approach to the analysis and our final findings. These findings do not represent a recommendation, nor do quantitative results represent the full range of considerations that should inform that decision. Any decision would also need to take account of the policy issues and potential market design and regulatory responses to those issues, which we highlight in Chapter 5 of this document.

3.1 An overview of our approach

Responses to our emerging findings supported our approach to the review and so we have used the same methodology as used for the emerging findings. Details of our approach can be found in Appendix 1. Our analysis explores the potential costs and benefits of residential retail competition in water and sewerage through a range of scenarios. It is based on the best information available to us in the time available.

Estimates associated with each scenario illustrate the potential net cost or benefit that could be realised dynamically over time under a range of conditions. The estimates of costs and benefits in the scenarios do not, therefore, constitute ranges; they do not show the upper and lower bounds of our estimates. They, simply illustrate what would be achieved in different circumstances. Neither does our analysis model the competitive process, customer behaviour or company behaviour. It therefore does not set out to identify which market rules and policies would lead to the most effective outcomes. However, in practice, unlocking these benefits would require policy and market design to create the right conditions for competition to work effectively and in customers' interests. We set out examples of how this could be achieved.

Costs and benefits have been quantified where possible within the scope of this work and, where quantification has not been possible, we have noted the costs and benefits qualitatively.

Our quantitative analysis is based on the following.

- Step 1: **construct a 'counterfactual'** to estimate how the water value chain would develop in the absence of competition but taking account of the opening of the business market to competition in April 2017.

- Step 2: where possible, quantitatively **estimate the potential costs and benefits** of residential retail competition, including their scale.
- Step 3: **estimate the costs of potential implementation and ongoing incremental costs** associated with setting up, operating and monitoring residential retail competition.
- Step 4: **compare potential costs and benefits to illustrate their scale** and potential drivers.

Our analysis takes a market-wide approach, in which individual company data on the current value chain (costs) is taken from our most recent price review (PR14) and aggregated. All assumptions on which the modelling is based are also made at an aggregate (market-wide) level. This is because the analysis seeks to identify the potential costs and benefits across the sector, rather than for individual companies or customer groups. In doing this, our approach mirrors analysis carried out for retail competition in water and wastewater (the 2009 Cave Review and government's impact assessment of introducing business retail competition).

For modelling purposes we estimate the overall effect of competition across the sector, taking into account costs and benefits when they arise. However this profile of costs and benefits does not represent bill impacts, which would depend on individual customers' circumstances and retailers' pricing, including how they may spread costs over time. For example, new entrants could offer customers lower bills immediately, whereas the overall profile of costs and benefit shows up-front costs balanced by increasing benefits over time.

Our quantitative analysis only includes potential costs and benefits for residential customers in England and for the water and wastewater sector in England. This includes all additional costs of setting up and running competition, including any costs incurred directly by retailers, the market operator, the regulator and government. However, we have not included costs and benefits beyond residential water customers and the water and wastewater sector (that is, costs and benefits to other sectors and to the economy as a whole, such as impacts on employment or economic growth)[2].

We have also included only those potential costs and benefits directly attributable to residential retail competition. This means only including costs that would be necessary as a consequence of market opening. It also means excluding any spend on systems that would be necessary even without the introduction of residential retail

[2] This analysis also only includes direct costs and benefits, not indirect nor induced costs and benefits.

competition, for example upgrading obsolete systems, or spend that is incurred as a result of commercial decisions.

To give an indication of the significance of these net present values, we have divided the totals by the number of customers, to provide an indication of the net present value per customer. We have also presented an average (un-discounted) 'per customer per year' impacts figure, including an average per customer per year. But these per customer per year figures are not bill impacts. Bill impacts would depend on the competitive strategies of different retailers, and on the extent to which regulation was used – to limit price dispersion, for example (we discuss this further in Chapter 5).

Our analysis does not show how any net benefits would be distributed. The extent to which customers benefit would depend on how effective competition was in passing on those benefits. Precisely which customers would benefit most would depend on:

- the dynamics of the market;
- which customers engaged most effectively; and
- the form of regulation and legislation used to ensure customers got a fair deal.

We do, however, recognise the importance of such analysis and are ready and willing to carry out further work with government (see Chapter 5).

To summarise, Table 1 below sets out the expected costs and benefits of potential residential market opening and indicates where we have quantified these in our analysis.

Table 1: Treatment of potential costs and benefits in our analysis

	Expected potential impact	Included in quantified net present value (£)?
DIRECT COSTS		
Costs to the economic regulator (Ofwat)	negative	✓
Market operator costs	negative	✓
Government costs	negative	✗
Company costs	negative	✓
Customer costs (time spent engaging with the market)	negative	✓
Company acquisition costs (necessary spend on gaining customers)	negative	✓
OTHER COSTS AND BENEFITS		
Customer experience and service quality	positive/negative	✗
Retail efficiencies	positive	✓
Wholesale efficiencies	positive	✓
Metering efficiencies	positive	✓
Bad debt efficiencies	positive	✓
Water efficiency (including heating bills and carbon savings)	positive	✓
Water resources resilience	positive	✗
Wastewater treatment costs	positive	✗
Wastewater efficiency and resilience (Drainage costs and flood damage)	positive	✓
Impacts on vulnerable customers	positive/negative	✗
Impacts on distribution of outcomes across customers	positive/negative	✗
Value of customer choice	positive	✗

It is important that the quantified impacts in our assessment are considered alongside the impacts that we have assessed qualitatively to give a full picture of the potential costs and benefits of residential retail market opening.

3.2 Quantitative analysis

In this section, we summarise our approach to quantifying the potential costs and benefits of introducing competition to the residential retail water market in England. Further detail on our approach can be found in Appendix 1.

Section 3.4 discusses impacts that have not been quantified but have been assessed qualitatively.

3.2.1 Quantified costs

We have estimated the following costs quantitatively.

Costs to the economic regulator

The costs to the economic regulator (Ofwat) would include designing and implementing market arrangements, including developing codes, licences, contracts and other market architecture. Costs would also include setting regulatory policy and market design that could be implemented through that new regulation. Ongoing costs of operating the market could include any monitoring and regulation associated with an active residential retail market.

These regulatory costs were estimated based on information from three sources:

- Ofwat's latest budget update for implementing business market opening in England[3];
- Ofwat's estimates of ongoing regulatory costs for our Water 2020 programme of work, monitoring and regulating wholesale competition, based on our requiring companies to make information available on their websites[4]; and
- the estimates made in the Cave Review for the additional ongoing costs associated with governing water and wastewater markets, based on implementing and monitoring licences for wholesale water and sewerage licences.

We then adapted information from these sources to allow for differences between residential retail and either business retail or wholesale competition.

Market operator costs

We quantified the costs of implementing appropriate systems to operate the market, including operations such as registering customers and facilitating the switching

[3] 'Revised budget for implementing the new water and wastewater retail services market in England – the Open Water programme' Ofwat, June 2015

[4] 'Water 2020: Regulatory Framework for wholesale markets and 2019 price review Appendix 6 Our approach to assessing impacts and Ofwat's regulatory costs', Ofwat, May 2016

process between retailers and the settlement process between wholesalers and retailers.

These estimates are based on costs associated with setting up the business retail market, specifically costs incurred by Open Water Markets Limited (OWML) and Market Operator Services Limited (MOSL). We took into account the differences between residential and business retail. Nonetheless, there is uncertainty about how this cost may differ.

Costs to companies

We quantified two types of company costs. These are the costs associated with interacting with the market and costs associated with acquiring customers, set out in more detail below.

Incumbent companies would incur costs in preparing for market opening and operating under new market arrangements. Costs would vary depending on the scale of the company and differences in their existing capabilities, but we include costs such as updating IT systems, implementing new processes to satisfy market requirements and staff training. We do not to include the costs of updates to systems that companies would need to do in any case. We estimated these costs with reference to the government's impact assessment of introducing business retail competition and Water UK's submission estimating company implementation costs.

In a competitive market, companies also incur costs associated with acquiring customers from their competitors. The costs of systems and processes needed for these processes and for interactions with the market operator to switch a customer are considered in the section immediately above. Additional acquisition costs could include marketing, advertising or commission payments to third-party intermediaries. Our estimates are guided by the hypothesis that overall, across the market, retailers would spend no more than the profit they expected to earn from acquiring a customer.

Costs to customers

We quantified the costs of the time spent of engaging in the market, over and above time already spent managing their account. For example time spent searching for a

better deal. We considered evidence from the energy[5] and banking[6] sectors to inform our estimates.

3.2.2 Quantified benefits

The benefits in our analysis are made up of the following efficiencies and savings. Further detail on the specific assumptions made and the rationale for these assumptions is set out in Appendix 1. Not all these potential benefits appear in every scenario and this is explained in section 3.3.2 below.

Efficiencies in the cost of retailers providing services

Retail competition would create the prospect of new entry, which could incentivise all players to offer better prices and quality. Competition can deliver innovation, improved service standards and more efficient costs. Retailers' improved service standards could benefit all customers because retailers could apply these across their customer base. And more innovative offers and more efficient costs could also benefit customers who are not active in the market, because of the threat of customers becoming active or regulation to ensure all customers get a fair deal.

Our analysis estimates one-off and ongoing efficiencies to retailers' costs, based on established estimates of retail cost efficiencies resulting from the introduction of competition (adjusted to avoid double counting savings from business market opening). In Scotland, business market opening has delivered large retail cost efficiencies. In January 2012 Business Stream reported that since the April 2008 introduction of retail competition for business customers in Scotland it had lowered its retail costs by 18%.[7]

Bad debt cost efficiencies

Competition gives retailers increased incentives to reduce their costs so that they can better compete in the market. Bad debt costs in water are particularly high, currently standing at 44% of total retail costs[8]. In the energy market figures on bad debt are not collected in the same way, so we cannot compare the two on the same basis. But we can convert bad debt levels in water into the same form as bad debt

[5] 'Appendix 9.1: CMA domestic customer survey results' (para 239), Competition and Markets Authority, June 2016.
[6] 'Increasing Transparency in General Insurance Markets', Financial Conduct Authority, December 2015
[7] 'Written Evidence submitted by Business Stream to the Environment, Food and Rural Affairs Committee', Business Stream, 2012
[8] Based on allowed revenues under Ofwat's price control PR14.

levels in the energy market. This shows that the total stock of residential bad debt in water stands at 22% of total revenue, compared with 4% of total revenue in energy. Energy retailers can disconnect or threaten to disconnect customers, or require them to use prepayment meters to repay debt. This adds complexity to the comparison between energy and water, which we explore in detail below. However, the comparison still gives us evidence of the potential for bad debt costs to be lowered significantly in the water sector.

In our analysis, we have assumed no change in the policy on disconnections. Our view is that substantial efficiencies could be achieved in respect of bad debt costs. We note that, if nothing else, the introduction of competition would require existing retailers to locate and register all their customers, which would reduce the amount of bad debt resulting from people consuming water and wastewater services without being billed[9]. Multi-utility entry may also provide greater scope for bad debt reduction, through cross-utility methods for managing customer debt, which could help bring bad debt levels down towards those in the energy sector.

Metering cost efficiencies

We would expect retailers in competitive markets to see commercial advantage in increased metering, because it would allow them to offer innovative tariffs and manage their own wholesale costs. We would, therefore, expect retailers in a competitive market to roll out new metering solutions, which could include smart metering, perhaps alongside other products to improve water efficiency[10]. Economies of scope and scale could plausibly reduce metering costs.

Wholesale cost efficiencies

Competitive retailers operating at arm's length from wholesale businesses would have a significant incentive to challenge wholesalers on service levels and to reduce wholesale costs, which comprise 92% of residential water bills[11]. National retailers would compare services offered, service standards and charges in different areas

[9] One incumbent noted that companies would need to improve this information to be able to provide an effective and reliable switching process that customers could be confident in. This potential cost of market operation is included in estimates made in this analysis of company's costs associated with implementing competition. Competition would require such changes to be made and our analysis assumes no policy changes in its counterfactual, so is attributed to the introduction of competition in this analysis.

[10] We have not specifically quantified the costs and benefits of retailers' potential commercial decisions to roll out additional metering (over and above expectations today), as these would be subject to retailers' own strategies and we would expect this to happen only when retailers anticipated a commercial payoff.

[11] Based on PR14 allowed revenue for 2015/16,

and in some areas may be able to buy wholesale water resources from alternative suppliers[12] where this could lower costs or improve service for customers. This would complement and add to the effectiveness of the reforms we are putting in place through our Water 2020 programme, with the introduction of markets for new water resources, and for bioresource treatment, transportation, recycling and disposal.

Water efficiency savings

Competitive retailers would have an incentive to sell water efficiency services or leak detection to customers, as these could be more profitable than selling a litre of water. This is because the gross margin on a litre of water, on the basis of current retail costs, would be about 10%, compared to much larger margins available on water efficiency services[13]. Such services could be popular with customers where they help to reduce their bills and reduce the chances of costly and disruptive leaks on their property. This has been the case in the business customer market in Scotland. The residential market in England has more customers, each of whom use much less water. Conversely, a larger number of more homogeneous customers could lend itself to greater economies of scale when providing water efficiency services and devices.

The Accent research for this review showed that that 45% of participants said they would be likely to switch, even without lower prices, if a retailer were to offer new services such as water efficiency and leak monitoring. This appears high in comparison with other sectors[14], but is a good indication of customer interest.

There are further benefits in water efficiency. Saving hot water also lowers energy bills, with knock-on carbon savings and other environmental benefits. Better water efficiency could also reduce wastewater volumes, which is considered below. It could also improve water resources resilience, which is explored qualitatively in section 3.4.

We have estimated potential water-efficiency improvements with reference to savings from existing water-saving devices, comparison with previous water efficiency improvements in the UK and international comparisons of residential water demand. We have linked these water-efficiency improvements to existing estimates

[12] This would require legislative change similar to the Water Act 2014 which provides for non household retailers who serve business customers to procure water resources from alternative suppliers.
[13] Because water efficiency also reduces water (and wastewater) wholesale costs, which form around 90% of the total bill.
[14] Based on 'Empirical Evidence of Consumer Response in Regulated Markets', Journal of Competition Law and Economics, 2016

of the long-run cost of water resources, amount and value of energy and government's approach to valuing carbon saving. Some incumbent retailers perhaps not unexpectedly reported that our assumptions were optimistic, but provided no specific evidence to support that view. We note that the levels of water efficiency that we assume can be achieved in the long term are in line with existing water demand today in some other western European countries. We received a response to our emerging findings from a potential new entrant that recognised the potential for efficiency savings in this area. This company was particularly interested in using technology to drive efficiency and reduce prices. We have considered this in our qualitative assessment in section 3.4.

Wastewater efficiency savings

Wastewater efficiency applies both to water used within properties and returned to the drainage system and to run-off from properties, principally from rainwater. Lowering water consumption can reduce the volume of water put down sewers[15]. Drainage volumes and demand on the drainage system, can also be lowered by greater wastewater re-use, reducing the amount of surface water going into drains and by pre-treating trade effluent.

Competitive retailers could offer customers a differentiated or cheaper service by helping them to reduce the volume of wastewater they put into the sewers by offering schemes, such as technology to utilise grey water and rainwater harvesting[16].

Reducing drainage water volumes is unlikely to have a significant effect on treatment costs[17], but lowering sewer water volumes can improve the resilience of sewerage systems to extreme weather events. Such services could also, therefore, lower the costs of meeting the resilience standard through capital investment, and/or lower the costs of damage from flooding caused by sewer overflow. Some of these benefits could be accelerated if wastewater could be metered in a cost-effective manner for residential customers.

In our analysis, we have estimated the value of wastewater savings with possible savings from avoiding flooding. We aimed to set conservative assumptions given the lack of information on the link between wastewater volumes and incidences of flooding. Even then, our analysis suggests that these benefits could be significant, in

[15] 'Water – the facts', Waterwise, 2012
[16] Wastewater meters may also have a role in reducing the volume of wastewater, although the link between the roll-out of meters and competition is unclear.
[17] Wastewater treatment costs are typically influenced most by population size.

part reflecting the potential impact of climate change on increased surface water flooding and sewer overflow.

3.3 Results – quantitative estimates of costs and benefits

3.3.1 Breakdown of quantified costs and benefits

We have presented costs broken down by stakeholders, to the extent that we can disaggregate given available data. In all but Scenario 1, ongoing costs of operating the market form the largest share of costs in present value terms. This reflects the significant ongoing costs incurred across companies, the regulator, customers and the market operator. Benefits are broken down according to what drives the benefit. This reflects the methodology applied in estimating costs and benefits.

The distribution of costs and benefits between different customer groups would depend on how vigorous competition were, the business models retailers adopt and the extent of regulation in the market.

Table 2 shows the breakdown of costs and benefits for each scenario, in present value terms and 2012/13 prices. The scenarios are then described in detail in the next section.

Table 2: Present value of costs, benefits and net benefits, £ million (2012/13 prices)

Breakdown of costs and benefits (£ million NPV)	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Retail savings in active share of the market	1,053	551	551	140
Retail savings in inactive share of the market	669	871	871	561
Wholesale spill-over benefit	811	496	496	228
Additional metering benefit	177	0	0	0
Additional bad debt benefit	856	455	455	0
Water efficiency benefit	771	196	196	0
Wastewater resilience	55	26	26	0
Set-up costs (all parties)	-367	-389	-733	-746
Ongoing operating costs (all parties)	-414	-443	-1,129	-1,129
Switching costs (customers and companies)	-694	-548	-548	-499
Total net present value	**2,917**	**1,214**	**185**	**-1,445**

Source: Ofwat analysis

Appendix 2 explores the relative importance of the potential costs and benefits we modelled, in terms of their sensitivity to the ranges applied to each key assumption. For each scenario, we examine how altering individual assumptions affects the estimated total net impact, all others being held constant. This, therefore, illustrates the relative importance of each assumption, with each ranked according to the size of the assumption range.

3.3.2 Scenarios

This section describes the scenarios that are explored in this analysis. First, it sets out the assumptions that support each scenario and explains what would need to be believed about a competitive residential retail market to subscribe to that scenario. Second, it presents the results for each scenario.

We present the results in three ways. Firstly, we take the net present value of the total impact of competition over the 30-year period. Second, we take the net present value of the total impact of competition divided by the customers in each year. Third,

we take a mean average by dividing the total within-year impact per customer for each year by the number of years.

Scenario 1 – low cost, widespread innovation and strong competitive activity

Scenario 1 estimates the potential costs and benefits in a market with widespread innovation and a high level of competitive activity among retailers, where costs are generally lower per customer than for business market opening[18]. It does not reflect the best outcome possible under competition, as benefits could well be higher in practice, depending on market design and policy decisions. In this scenario, the market could be characterised by these conditions:

- **Implementation costs** (setting up and running the market). The market architecture for the business customer market in England is easily scalable to the residential retail market (for example, switching and settlement systems, codes) and this means that implementation costs for companies, the market operator and the regulator are only somewhat higher than estimated for business market opening[19].
- **Costs of operating in** the market for companies. Companies can scale changes to their billing and account systems, which they have already implemented for the business customer market in England, to the residential market. If retailers offer multi-utility products, they may be able to extend retail operations to water without incurring substantial additional costs.
- **Strong competitive rivalry** between retailers may result from a significant threat of entry or real entry from new retailers - for example, existing (monopoly) water retailers entering the market in other incumbents' areas, business market retailers entering the residential market, or other utility retailers entering the water market, such as energy retailers. We have firm but commercially sensitive evidence that non-water retailers are actively considering entering the market, making this a realistic possibility.
- Through competitive rivalry, retailers find **significant cost-saving efficiencies**. This could happen through multi-utility retailing, enabling retailers to spread fixed costs of serving customers across greater revenues.
- Retailers are incentivised to **improve the management of bad debt in** order to reduce bad debt costs, which currently comprise around 44% of total retail costs (and reduce to 21% in this scenario).[20] While still high, bad debt costs would be

[18] Where most costs are higher in absolute terms, but company costs are lower in relative (per customer) terms, we recognise that opening the residential market would apply to a much larger number of customers. This distinction applies throughout these scenario descriptions.
[19] Evidence on company estimates of the cost of business market opening was received after close of business on 11 July.
[20]Albeit this is 21% of a lower total retail cost.

reduced towards a level that is commensurate with bad-debt costs in some other sectors. Retailers improve data management capabilities as a result of competition, enabling them to better target bad debt and help customers find ways to pay their bills. The systems and switching processes associated with competition means that retailers have good information on identity of their customers and therefore and so can better recover revenue. If earlier and more frequent contact with customers saw a rise to the collection levels associated with council tax or energy, then the benefits would be substantially higher than in this scenario.

- Competitive rivalry results in **price and service-based competition**, leading to opportunities for customers to lower their bills by reducing their consumption. New entrants or current incumbent retailers offer innovative products and services. These could include multi-utility bundles or services that offer bill savings through greater efficiency (just in water, or across utilities, for example by lowering hot water usage or storage). They could also include wastewater meters and services to reduce the impact of residential wastewater on the drainage network, reducing costs and improving resilience.
- Retailers could make significant **savings on wholesale costs** through being able to challenge those costs and to compare charges across different wholesalers.
- Retailers seek to **reduce their wholesale costs**, for example by reducing demand for water resources or peak load drainage capacity.
- **New technology is developed** and/or promoted by retailers. New technology or better use of existing technology could enable improved water efficiency or give customers incentives to reduce their impact on drainage networks by managing surface water run-off. Ultimately, this could create a world of 'distributed infrastructure' with more customer-side activity providing water resources and smarter wastewater management.
- Customers find these benefits attractive and this stimulates **engagement in the market**. It is coupled with new technologies that make it possible for third parties to offer search and switching services for customers. This is happening now in energy, for example with the introduction of a service that offers to switch customers to a tariff that matches their pre-stated preferences. This increases the proportion of customers actively engaged with the market, so that more customers gain the benefits. Consequently, for retailers the cost of acquiring a customer is low.

Scenario 2 – low cost, some innovation and good competitive activity

Scenario 2 estimates the potential costs and benefits in a market with lower costs, but with less innovation and competitive rivalry among retailers. Under this scenario, the market could be characterised by the conditions set out below.

- **Implementation costs** (setting up and running the market) are somewhat higher than for the business retail market, as in Scenario 1.
- There is **less competitive rivalry** among retailers than in Scenario 1, but this rivalry is still significant and consistent with rivalry seen today in other competitive retail utility markets. This rivalry leads to some competitive pressure from potential entrants, or entry into the market. Retailers find less scope for reducing retail costs, but still lower costs significantly. Multi-utility retailers may enter the market, helping to put a downward pressure on costs.
- Unlike Scenario 1, **technology being developed in other sectors is not adopted in water**, for example services that switch customers' retailers for them on the basis of a customer's pre-specified preferences. Limited adoption of technology such as water and wastewater metering and apps means the service available to customers is less attractive than in Scenario 1. As a result, there is **more limited customer engagement** in the market, and customer engagement and the resulting competitive activity does not undergo any significant change in the next 30 years. Consequently **the cost of acquiring a customer for a retailer is higher** than in Scenario 1. No more than a third of the market participates actively in the market after 30 years. Multi-utility entry may deliver further retail savings, but not to the same degree as Scenario 1.

Scenario 3 – high costs, less innovation and good competitive activity

Scenario 3 estimates potential costs and benefits in a market with similar levels of competitive activity to Scenario 2, but where implementation costs are higher for the residential market than for business market opening (for set-up costs and for running costs). In this scenario, the market could be characterised by these conditions:

- **Implementation costs are higher** for companies, the market operator and the regulator than in Scenarios 1 and 2. This may happen if the market architecture (for example, switching and settlement systems and codes) for the business retail market in England are not scalable for the residential retail market and entail greater complexity.
- **Costs of operating in the market** for existing and new retailers are higher than in 1 and 2. This may arise if existing water retailers have to invest in new systems to enable them to compete, rather than building on systems implemented for business market opening, and/or if entrants from other sectors such as energy need to incur significant costs to adapt their systems for the water market.
- **Competitive rivalry** and activity among retailers is at the same level as in Scenario 2, so the same potential drivers identified above for Scenario 2 also apply here to Scenario 3.

Scenario 4 – high costs, little innovation and weak competitive activity

Scenario 4 estimates potential costs and benefits in a market with even less competitive rivalry than in Scenarios 2 and 3. As with Scenario 3, implementation costs are higher for the residential market than for the business retail market opening (for set-up costs and for running costs). Under this scenario, the market could be characterised by the conditions set out below.

- **Implementation costs are higher** for companies, the market operator and the regulator, than in Scenarios 1 and 2, and similar to those of Scenario 3. As with Scenario 3, this may occur if the market architecture (for example, switching and settlement systems, codes) for the business retail market in England are not scalable and entail greater complexity.
- **Costs of operating in the market** for retailers are even higher than Scenario 3. This may arise if existing water retailers have to invest in new systems to enable them to compete, and if entrants from other sectors such as energy need to incur significant costs to adapt their systems for the water market.
- There is **limited competitive rivalry** in the market, little threat of entry and retailers do not compete vigorously. This may occur if the costs of operating in the market act as a deterrent to entry or if a lack of customer engagement means that costs of entry are high and the cost of acquiring a customer for any retailer is higher than in Scenarios 1 to 3.
- This lack of vigorous competition means **retailers do not offer innovative products** and services. Water efficiency and wastewater management are not promoted. Bad debt costs are not reduced.
- As a result of this, and onerous search and switching costs, **customers do not engage with the** market, with slow development of the active share of customers to 15% of the market 20 years from market opening. This compounds the ineffectiveness of competition and consequently the costs of implementing and running competition outweigh the benefits.

The scenarios described above are summarised in Table 3. Detailed assumptions for each parameter can be found in Appendix 1.

Table 3: Summary of scenario assumptions

Area	Scenario 1 – low cost, widespread innovation, strong competitive activity	Scenario 2 – low cost, less innovation, good competitive activity	Scenario 3 – high cost, less innovation, good competitive activity	Scenario 4 – high cost, little innovation, weak competitive activity
Market opening	Takes two years, market opening in model year five	Takes three years, market opening in model year five	As previous scenario	Takes four years to open, market opening in model year five
Active share of the market	50% active, taking 10 years to develop	30% active, taking 15 years to develop	As previous scenario	15% active, taking 20 years to develop
Efficiencies applied throughout the value chain	Efficiencies based on precedent from Cave's analysis of the benefits of competition	As previous scenario	As previous scenario	Efficiencies approximately half those in other scenarios based on Cave
Switching	12.5% of the market switching each year, speedy engagement through apps, etc The same number engaging but not switching	7.5% of the market switching each year. The same number engaging but not switching	As previous scenario	3.8% of the market switching The same number engaging but not switching
Companies' acquisition costs	Costs companies c. £8 to acquire a customer	Costs companies £15 to acquire a customer	As previous scenario	Costs companies £40 to acquire a customer
Bad debt	Bad debt savings of 2% a year in addition to general efficiencies, reflecting scope for bad debt savings	Bad debt savings of 1% a year in addition to general efficiencies, reflecting scope for bad debt savings	As previous scenario	No further bad debt savings over and above general efficiencies
Metering	Additional savings to metering costs of 1% over and above general efficiencies	No additional savings to metering costs over and above general efficiencies	As previous scenario	As previous scenario
Water efficiencies	Metered customer in the active part of the market over time save 20% of their water consumption	Metered customer in the active part of the market over time save 10% of their water consumption	As previous scenario	No benefit
Resilience	Higher resilience benefit linked to greater reduction in consumption. Not quantified	Additional benefits of resilience from lower consumption. Not quantified	As previous scenario	No benefit

Area	Scenario 1 – low cost, widespread innovation, strong competitive activity	Scenario 2 – low cost, less innovation, good competitive activity	Scenario 3 – high cost, less innovation, good competitive activity	Scenario 4 – high cost, little innovation, weak competitive activity
Wastewater resilience	Reduction in wastewater entering sewers from active metered customers eventually reduces a proportion of total flooding costs from sewerage overflows by 2% (in 30 years' time)	Reduction in wastewater entering sewers from active metered customers eventually reduces a proportion of total flooding costs from sewerage overflows by 1% (in 30 years' time)	As previous scenario	No benefit
Companies' implementation costs	£326 million upfront, £20 million ongoing Greater than for business retail market opening. About twice as high as estimated set-up for the business market, with similar ongoing costs. Reflecting possibility of synergies despite higher customer numbers	As previous scenario	£653 million upfront, £65 million ongoing Significantly greater than for business retail market opening. About four times higher than estimated set-up for the business market, with ongoing costs roughly double. Reflecting stronger impact of larger customer numbers on cost	As previous scenario
Market operator costs, regulatory costs	Business retail implementation costs less 25%	Business retail implementation costs	Business retail implementation costs plus 25%	As previous scenario

Scenario 1 – low cost, widespread innovation and strong competitive activity

Given the assumptions in this scenario, the estimated net present value of potential costs and benefits is £2,917 million. Based on the number of connected residential customers, that amounts to a net present value of £120 per customer. The average undiscounted within-year impact over the 30-year modelling period is £8.03 per customer per year, based on the expected number of residential customers in each year[21]. The development of net present value over time is illustrated in Figure 1, which shows the cumulative impact of estimated costs and benefits over time, as well as the total net present value over the 30-year period modelled.

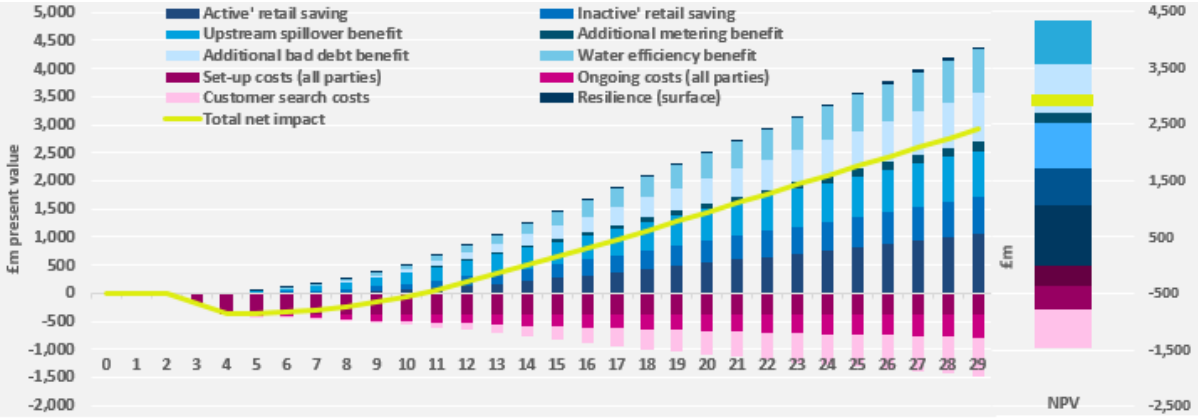
The per customer figures we present in our scenarios simply translate our net present value figure into a figure per customer or per customer per year; they are not based on any specific, evidence-based, assumption about how efficiencies in companies' costs are transferred to customers' bills. The extent to which these savings are passed on to customers would depend on the level of competitive pressure in the market.

Furthermore, costs might not be distributed as estimated in this modelling, for the purposes of estimating a net present value. We have made assumptions to estimate the profile of costs and benefits over time. In each scenario most costs are up front and the benefits increase over time.

If residential retail competition were introduced, the reality of customers' bills would not necessarily follow the cost profile estimated in this analysis. Retailers' pricing would be a consequence of various factors including the competitiveness of the market and each retailer's commercial strategy. It is likely in practice that companies would spread costs over time, and it is also possible that benefits would be delivered early on, especially where they are brought by early new entrants into the market, with lower retail costs and innovative services. Furthermore, the impact on individual customers' bills would vary depending on a range of factors.

[21] All results are quoted in 2012/13 prices.

Figure 1: Cumulative present value of costs, benefits and net benefits, £ million (2012/13 prices)

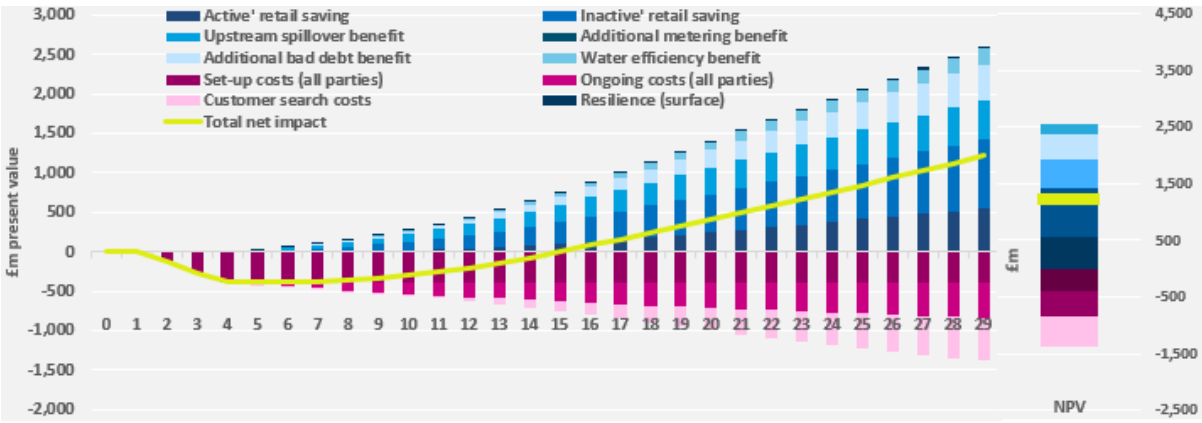


Source: Ofwat analysis

Scenario 2 – low cost, less innovation and good competitive activity

Under the assumptions in this scenario, the estimated net present value of potential costs and benefits is £1,214 million. Based on the number of connected residential customers, this amounts to a net present value of £48 per customer. The average undiscounted within-year impact over the 30-year modelling period is £3.67 per customer per year, based on the expected number of residential customers in each year. The development of net present value over time is illustrated in Figure 2, which shows the cumulative impact of estimated costs and benefits over time, as well as the total net present value over the 30-year period modelled. The same caveats apply to these figures and the distribution of costs and benefits as to Scenario 1 in the section above.

Figure 2: Cumulative present value of costs, benefits and net benefits, £ million (2012/13 prices)

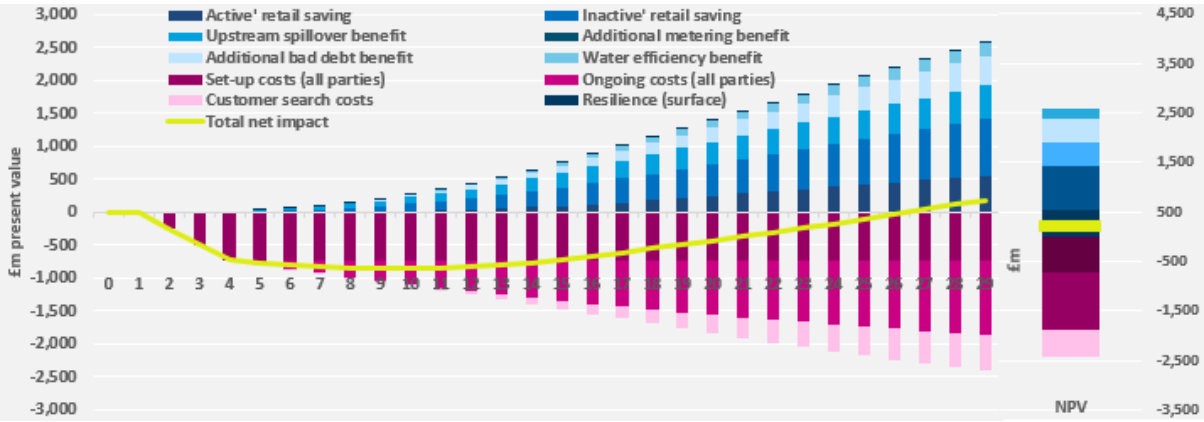


Source: Ofwat analysis

Scenario 3 – high cost, less innovation and good competitive activity

Under the assumptions in this scenario, the estimated net present value of potential costs and benefits is £185 million over a 30-year period. Based on the number of connected residential customers, that amounts to a net present value of £1.66 per customer over a 30-year period. The average undiscounted within-year impact over the total 30-year modelling period is £1.45 per customer per year, based on the expected number of residential customers in each year. The development of net present value over time is shown Figure 3, which illustrates the cumulative impact of estimated costs and benefits over time, as well as the total net present value over the 30-year period modelled. The same caveats as for Scenario 1 apply here.

Figure 3: Cumulative present value of costs, benefits and net benefits, £ million (2012/13 prices)

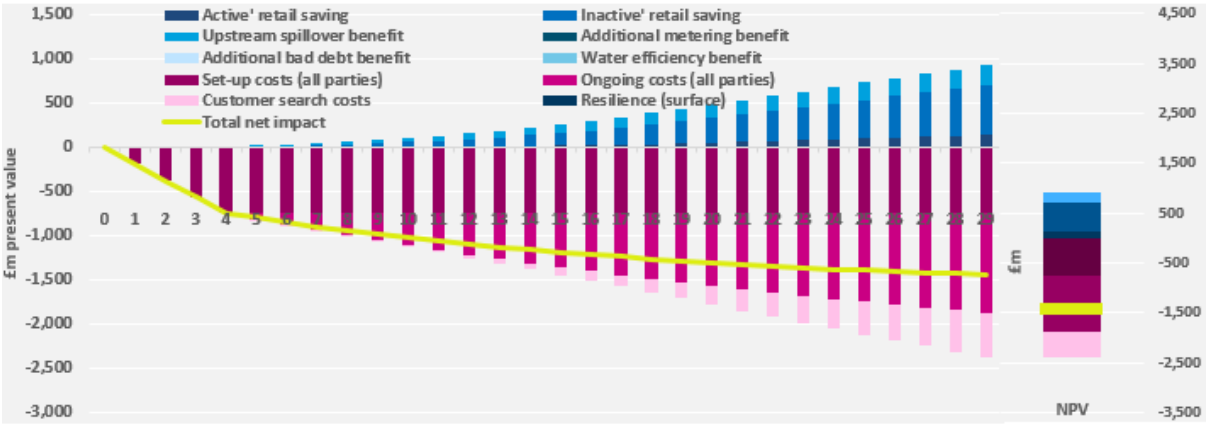


Source: Ofwat analysis

Scenario 4 – high cost, little innovation and weak competitive activity

Under the assumptions in this scenario, the estimated net present value of potential costs and benefits is £-1,445 million. Based on the number of connected residential customers, that amounts to a net present value of £-66 per customer, that is a net cost per residential customer of £66. The average undiscounted within-year impact over the 30-year modelling period is £-2.84 per customer per year, that is a net cost per customer per year of £2.84, based on the expected number of residential customers in each year. Figure 4 shows the development of net present value over the 30-year period modelled and the cumulative impact of estimated costs and benefits over time, as well as the total net present value over the 30-year period modelled. The same caveats apply to these figures and the distribution of costs and benefits as set out in relation to scenario 1 above.

Figure 4: Cumulative present value of costs, benefits and net benefits, £ million (2012/13 prices)



Source: Ofwat analysis

3.4 Qualitative analysis

3.4.1 Qualitative costs

Customer engagement

As well as the cost of someone engaging in the market (which we have quantified), the main issue from our customer research was a reluctance among some customers to engage with the market, linked to a scepticism about whether it would be worth the time and effort. This was also highlighted by some incumbent retailers and Customer Challenge Groups in response to our emerging findings. This is something that needs to be addressed by ensuring market design allows for simple, hassle-free switching and by maintaining customers' trust in the market, rather than an additional non-quantifiable cost. We discuss this more in Chapter 4.

3.4.2 Qualitative benefits

The value of customer choice

There is mixed qualitative evidence from other sectors about how some of the benefits identified by customers are realised in practice. We have considered evidence from regular surveys from the Institute of Customer Service on levels of

satisfaction with suppliers of goods and services[22]. These show that competitive utility providers (such as energy suppliers) tend to perform at similar levels to water suppliers. However, there is a reasonably wide range in satisfaction levels between different energy suppliers. New entrants to the market tend to outperform existing companies, which would imply that there are benefits for switchers in improved customer service. A poor quality switching experience, which involves hassle and risk, would be an additional cost for operating in the market (albeit one that should be addressed through the market design prior to market opening). Satisfaction surveys, however, do not quantify the value that customers place on the level of service they receive.

Customer service improvements

A wide range of stakeholders including incumbent companies and customer representatives, raised concerns about customer service in the energy market. We commissioned KPMG to produce a report[23] on lessons that could be learned from the experience of competition in the gas and electricity markets in Great Britain. KPMG's report also examined subsequent reviews of the market undertaken by sector regulator Ofgem and the Competition and Markets Authority.

One key finding was that the introduction of retail competition in water could not rely on the 'British Gas effect', in which a national monopoly was able to use its power to target the market share of regional companies in another market (electricity) and vice versa. However, there are a large number of regional water retailers who appear likely to enter market on a national scale, based on experience in the business market. There is also considerable scope for entry from adjacent utility companies, such as energy retailers.

We have considered evidence on the benefits of combined billing of services, alongside responses to our emerging findings from existing retailers and potential new entrants. Ofgem has stated that the majority of customers eligible to benefit from combined bills take combined gas and electricity deals[24]. According to Ofcom, 68% of UK residential telecoms customers have some form of bundled service (mostly combined landline and broadband, and about half also taking television services). This provides evidence that customers place a value on combined services in a variety of competitive sectors, although it is less clear whether their motivations are financial (in terms of offers available), convenience or a combination

[22] UKCSI reports are available to purchase from ICS. A summary of the findings of the most recent report is available on the ICS website.
[23] Ofwat household market review: Lessons from the energy sector
[24] See State of the Market Report 2014, paragraph 2.10. Note that around 20% of electricity customers do not have access to mains gas.

of both. New entrants indicated strongly that they see opportunity to create value by introducing combined utility billing in water, for example by lowering acquisition costs. A multi-utility bundle including gas, electricity and water could be a key driver for the market.

We can envisage that, as our customer research findings suggest and responses from potential new entrants confirm, competition could lead to new and innovative products and services that enhance the customer experience and create efficiencies for the retailer. This could cover many areas, including much greater use of mobile technology for bill monitoring and payment. Evidence from the opening of the energy market (where there was a significant uptake of direct debit) may not be a reliable guide, since innovation in payment methods has expanded significantly since the energy market opened[25]. The water sector remains largely unchanged in relation to technology and services offered for bill-paying. For example, we could only find two water companies offering an app for customers to manage their account. We note that protection of payment mechanisms could be introduced. Ofgem has, for example, retained licence obligations for suppliers to provide a range of payment methods for customers.

Potential new entrants reported in their responses to the emerging findings that they saw an opportunity to offer improved services to water customers in terms of accurate and timely (for example, monthly rather than twice-yearly) billing, and innovative ways for customers to manage their account.

Water efficiencies

For the purposes of calculating the costs and benefits, we do not assume that there will be any change to the currently forecast level of metering (which in the south-east of England is forecast to reach about 83%[26] by 2030 in any case), nor do we assume any smart metering. Indeed, we do not consider metering a prerequisite for retail competition, or promotion of water efficiencies, since it is possible to estimate water usage based on other factors such as house size and occupancy. Nonetheless, any increase in either, or both, could be one factor driving water efficiency improvements. We have not specifically quantified and included the costs of any such measures because, if they occur, they represent an investment made by retailers as part of a commercial decision.

We also note that the high level of metering achieved in the water-scarce areas of England by 2030 means that higher levels of metered properties should be where

[25] For example smart payments such as Paym.
[26] Ofwat calculation based on 2014 Water Resource Management Plans.

greater demand management is most needed to support further water efficiency benefits from residential competition. Indeed, the high uptake of metering emphasises the potential benefits that competitive retailing could unlock given the metering infrastructure that will be in place by 2030. Nonetheless, it is important to recognise even higher levels of metering as a potential source of additional water efficiency over and above what we have assumed in this analysis, particularly recognising the disparity in water use across the country, ranging from 128 litres/head/day to 185.5 litres/head/day[27].

Our research and responses from stakeholders have shown that there are new products and services available (and others likely to be developed) that can better enable changes in customers' water usage. We note the impact of new technologies in banking and energy that are driving different customer behaviours[28]. It is possible to envisage an equivalent kind of impact in water, and we have received responses to our emerging findings identifying opportunities in the water sector to use new technologies, either seen elsewhere or being introduced in the water sector now, to understand and influence customer behaviour – for example, through tailored services to meet their needs. These include demand management technologies and innovative tariff structures.

As well as leading to more efficient use of water for customers, greater use of technology would give value to customers (through lower bills and improved resilience), the retailer (through customer acquisition), the wholesaler (through less need for investment), other customers (through downward pressure on wholesale charges) and the environment (through reductions in abstraction). One new entrant highlighted a number of new technologies that are emerging, such as Leakbot, which helps to lower water bills by identifying leaks and could lower insurance costs for customers.

One potential new entrant told us of examples where retailers could link positive environmental benefits to lower wholesale charges, and pass the savings on to customers.

Resilience and environmental benefits

We recognise resilience[29] as the ability to cope with, and recover from, disruption. It also encompasses being able to anticipate trends and variability to maintain services

[27] 2014 Water Resource Management Plans for each water company forecast for 2015-16.
[28] Examples in energy include new ways of engaging with the market (see for example Flipper) and in-home energy management (for example Nest or Hive). The BBA reported on the influence of new technologies in the major shift in customer engagement in banking in a report in June 2015.
[29] 'Resilience Task & Finish Group', Ofwat, 2015

for people and protect the natural environment now and in the future. It is imperative that the water supply and wastewater systems are able to deal with population changes, climate change and acute extreme weather events.

Environmental organisations and incumbent companies recognise that water efficiency benefits could also lead to benefits for resilience. We recognise the value of resilience and consulted recently on how resilience should be metered. Retailers will have an interest in resilience, as their customers are affected by the resulting impact on services. Retailers will see which wholesalers are most involved in demand reduction and will challenge the less effective. Lower water consumption could cut the cost of resilience measures or provide greater water and wastewater resilience within any specific budget.

We have not attempted to quantify the value of potential resilience improvement from residential retail competition, nor the potential environmental benefits. The link between demand reduction and wider resilience on customer services is not straightforward. Some companies have carried out willingness-to-pay research into the value that customers place on continued supply, as part of the PR14 process. However, we have found no information that allows us to quantify the link between demand reduction and lower frequency or duration of interruptions to supply. Nonetheless, these are important benefits that should be considered in any decision on whether to introduce residential retail competition. Retailers are likely to challenge wholesalers on their customers' behalf if there are repeated supply interruptions.

The resilience of water supply and the wastewater system faces long-term pressures from population growth, development and climate change, which may increase the frequency of extreme weather. Residential retail competition could offer benefits for both resilience and the environment if retailers reduce residential customers' demand for water and their demand on the wastewater system. This is especially true if these reductions can be targeted specifically at times of system stress, through innovations in retailers' services. We have already recognised that suppliers have opportunities to innovate in their engagement with customers, find solutions to long-term challenges and evaluate alternatives to traditional engineering approaches.

With respect to environmental benefits, the Walker Review[30] noted that water company estimates for long-term marginal costs as a value of water saved "took

[30] Final report of 'The Independent Review of Charging for Household Water and Sewerage Services', Anna Walker CB

account of capital expenditure costs, but not the potential harm from over-abstraction and the alternative uses of water".

In light of these challenges, this assessment has not attempted to quantify the impact of residential retail competition on water nor wastewater resilience, nor the environmental benefits associated with lower water use. Nonetheless, it should be noted that the estimated value of water efficiency improvements exclude potentially significant improvements in both areas.

Wastewater efficiencies

We are aware of innovative technology, such as wastewater metering[31], from our own research and information provided by an incumbent and a potential new entrant. This could support more efficient management of wastewater and could drive reductions in surface water run-off, and bring value to customers (directly and more widely), wholesalers and the environment. We sought to quantify, where possible, these costs and benefits (see section 3.2), but recognise that it is not possible to quantify the wider resilience and environmental benefits, including the carbon savings from treating lower volumes of wastewater.

There are also a number of environmental benefits from more efficient management of wastewater that have been seen on a greater scale. This includes schemes to divert surface water to a community area with plants that absorb the water[32]. Schemes such as these reduce the pressure on the sewer network and improve resilience to flooding.

We have attempted to quantify potential benefits of wastewater efficiency, but these estimates are uncertain and only partially capture the factors described above, so should be treated cautiously. Nonetheless, it is important to recognise these potential benefits from retail market opening.

[31] For example, Wessex Water's wastewater metering trial.
[32] For example, see community schemes introduced by South West Water and Welsh Water

4. Impacts on different customer groups

In any competitive market it is inevitable that some groups of customers will do better than others. In our analysis we have not sought to identify which customers would be likely to do best, and which worst, in a competitive residential retail market. A range of stakeholders have argued that it is ‘self-evident’ that some groups of customers will be more attractive to retailers than others. However, there are examples of markets where most customer groups become attractive to at least some retailers over time, often with a market developing to serve particular types of customers on a niche basis. In the Scottish business customer water retail market for example, small and medium sized enterprises had been thought ‘unattractive’. However, Clear Business Water recently announced that it is targeting such customers.

Nonetheless, it is likely that customers who engage with the market and search and switch will do better than those who do not engage, as noted in the KPMG review of the energy sector which we commissioned. If the government indicates that it wishes to proceed with competition, then we think it is important to undertake further analysis to consider who is likely to get the best and worst deals. Depending what this analysis shows, we may then need to consider some form of regulation. In this chapter we set out further some of the issues that might lead to different levels of engagement and some possible mitigations that might be considered.

4.1 Maximising customer engagement

Engaged customers help ensure that competition works effectively. When customers are aware of the available options, able to make informed choices, and can easily act on those choices, this exerts pressure on retailers to offer competitive prices, good quality service and innovations which customers value. A key finding in our customer research was that customers think that the market should be one in which it is easy to switch in terms of time and cost, and is fair and open to all. Customers who switch can achieve better deals for themselves, but customer engagement can also benefit those who don’t switch if it drives cost efficiencies, improvements in service standards and new products and services. It is important to recognise that each customer chooses for themselves whether to engage with the market or not. A choice not to engage may be perfectly rational, even if a customer could gain from engaging to get a better deal, for example if the 'hassle factor' associated with search and switching were expected to be greater than the benefit. This has been highlighted in our customer research. It is also important to recognise that there will always be some customers who choose not to engage with the market.

There are a number of drivers which may influence customer engagement.

Customer participation in the market is, in part, likely to reflect levels of **customer trust in the market**. Maintaining safe, reliable supplies of drinking water and ensuring that wastewater is taken away, treated and returned to the environment will be key to this trust. This should be unaffected by the introduction of residential retail competition. Customers will need to be reassured that this is the case: the on-going provision of wholesale water and wastewater services will continue to be provided by the same companies under the same regulations as they are currently.

Customer trust also relies on them feeling as though they are **treated fairly by their supplier**. Customers in the water retail market, as in other markets, would need protection against mis-selling. And they would need timely and effective redress when things go wrong (for example through the extension of the existing alternative dispute resolution mechanism in the sector to retailers in the competitive market).

Information needs to be available in a form that customers can access and understand easily if it is to be useful. Economic regulators have continued to evolve their approaches to how such information should be shared with customers. For instance, the Competition and Markets Authority remedy proposals in the recent the energy sector inquiry were influenced by the insights of behavioural economics to differentiate between effective and ineffective interventions[33].

Behavioural economics can improve our understanding of the influences that impact on the way customers behave and make decisions in the market. Utility services, such as water and sewage, are essential but are not on customers' minds on a day to day basis. The process of switching supplier is also unlikely to be instinctive as it requires knowledge of consumption and tariff structures. Therefore behavioural biases may reduce customers' interest in and engagement with the market. As a consequence customers can be inactive or may not assess all market information when considering their supply options.

Customer behaviours and attitudes can inform regulators and policy makers in devising market arrangements, such as in the design, structure and communication of awareness and engagement programs to ensure they target appropriate customer segments that need additional support to participate in the market.

Third party intermediaries, such as price comparison websites, have been very helpful in other markets in enabling customers to compare alternative offers. These

[33] In a number of areas the CMA recommended the use of randomised controlled trials to refine the design of remedies and ensure they are as effective as possible in changing customer behaviour.

solutions are not 'silver bullets'. There have been concerns about the way some third party intermediaries have operated. Some price comparison websites have not always transparent about the commission they receive for referrals and whether they are disclosing all offers in the market. A lot of third party intermediaries are web-based and concerns have been expressed about the divide between those who have access to the internet and are easily able to use it and benefit from using these intermediaries and those who are unable to access them. But price comparison websites can be a significant tool to help customers to make and act on their choices and in a relatively easier and less time consuming fashion than in the past.

New types of third party intermediaries have recently entered the market to enable energy customers to search and switch. These use different business models. Some, such as Flipper[34] for example, offer services to energy customers to automatically switch them onto the best deal. Others, such as Voltz[35], allows users to switch retailers on their mobile phone. These services may address customer concerns about markets being too confusing or market engagement having too much 'hassle factor'. They rely on the availability and access to high quality customer data (e.g. customer identity, location and consumption).

If the government proceeds to open the residential water retail market to competition, it would be important to design the market architecture, and create the right incentives within it, to ensure that third parties could enter the market for search and switching services as well as provision of more traditional retail services.

An issue in the energy market that has been a significant factor in the level of customer engagement concerns the restrictive terms under which customers who are in debt are permitted to switch. This practice is known as "**debt blocking**". The rationale for this practice is to reduce risks to suppliers, in particular that customers would switch to avoid paying their outstanding debts, and to assist customers to manage their debt.

Debt blocking is controversial as it limits engagement for customers. It prevents customers who are often most in need of a better deal from switching. Ofgem has recently concluded that on balance it is in consumers' interests to retain the current debt objections regime in energy. Debt blocking will also be allowed in the water business retail market. If a policy decision is made that some measures will be

[34] Flipper provides energy customers with a new way of engaging in the market. For a fee, it monitors the market for the best deal and can 'flip' an account automatically. https://flipper.community/

[35] http://www.voltzapp.com/

required in the residential retail market we would look to build on the learnings from the business retail market and the energy market.

4.2 The extent of price dispersion and possible remedies

Competition can bring benefits to all customers, regardless of whether they are active. Non-price benefits such as service improvements, greater levels of efficiency, greater customer focus, and innovative forms of customer engagement customers benefit the entire population of customers.

However, certain price benefits are likely to be available only to active customers. This leads to an effect called ‘price dispersion’, whereby different prices are charged for essentially the same product. This is important because if this dispersion is too great, it can undermine customer trust in the market. This is more likely to be a problem in utility markets because it is relatively easy for retailers to identify inactive customers and charge them more.

The extent of price dispersion in energy markets was analysed by the Competition and Markets Authority in its recent inquiry. It conducted an analysis looking at gross margins on standard variable tariff customers (the tariff customers pay if they have not made an active decision to change tariff) and fixed tariff price customers (paid by customers who have actively sought a fixed price deal). For all firms covered by the analysis (bar one), a higher gross margin was generated on their standard variable (or variable when this was not split out) tariff customers for each fuel type than on their fixed tariff customers. The Competition and Markets Authority noted that while the costs to serve may be higher for variable tariff customers than for fixed tariff customers, the size of the differences in gross margins would mean that these costs would need to be significantly higher to explain fully the higher gross margins.

The analysis also indicated that the annual potential savings for customers on standard variable tariffs have risen substantially over the past two years, and reached their highest level in the most recent period of the analysis, Q2 2015, reaching an equivalent of between £310 and £360.

The structure of the residential retail market in water suggests that price dispersion will be less prevalent in water than in energy. This is because 90% of the average customer bill for water is made up of regulated wholesale charges, leaving a contestable gross margin of 10% to cover retail costs. In contrast, in energy

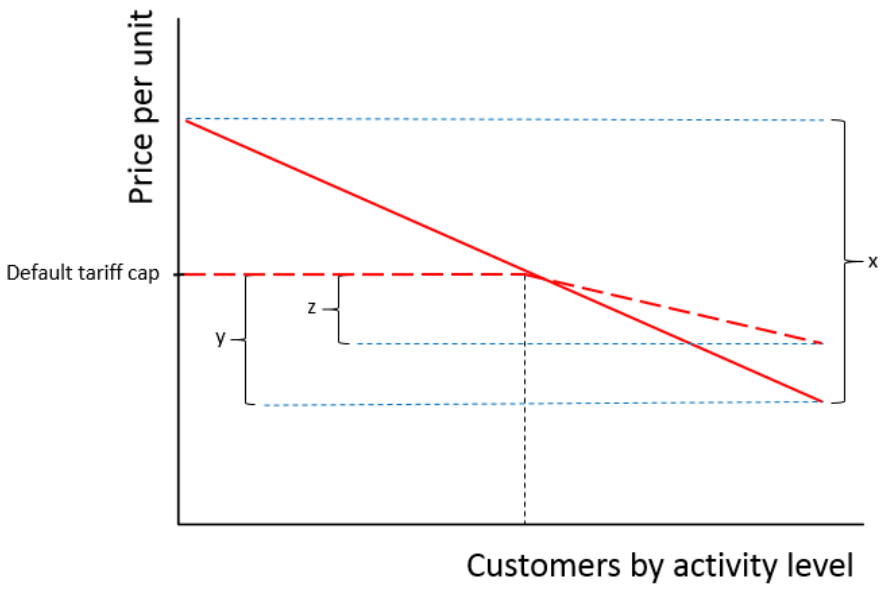
regulated network charges account only for 25%[36] of the average customer bill. In addition, whereas energy retailers are exposed to commodity prices through wholesale procurement, water retailers pay a regulated price for water resources. The transparency associated with wholesale water charges also helps reduce the likely extent of price dispersion.

To the extent that price dispersion was a concern, there are a range of regulatory tools that could be deployed to deal with it. These include, for example a customer activation database, default tariffs, and cost-reflective tariffs.

Customer activation database - The Competition and Markets Authority energy market inquiry suggested a remedy forcing retailers to share the database of inactive customers in order to allow them access to additional customers which is hoped will lead to greater customer activation.

Default tariff - Setting a default tariff in the residential retail market at the time of market opening, could provide protection for customers who remain on it until they opt to move to a different tariff. This would aim to ensure that customers who are not active in the market still receive a deal that is fair, even if it is not the best deal available in the market. Figure 5 below illustrates how such a default tariff could work.

Figure 5: Using a default tariff to limit price dispersion



[36] https://www.ofgem.gov.uk/information-consumers/domestic-consumers/understanding-energy-bills#

The aim of the default tariff is to avoid inactive customers "missing out" on at least some of the price benefits available to active customers. This would be particularly important if we found that vulnerable customers are disproportionately represented among inactive customers. Default tariff is fixed at a lower, more attractive price level than inactive customers would have otherwise received.

It is worth noting, however, that this regulatory intervention may have negative consequences for active customers. Under price dispersion, companies may choose to recover costs through a higher mark-up on inactive customers than active customers. If a default tariff prevents them from recovering all of the costs they were previously recovering through inactive customers, they will increase the tariff available to active customers in order to recover all costs. A default tariff therefore risks increasing price to active customers.

Furthermore, it may be overly simplistic to categorise customers as "active" and "inactive" as some customers may be active at some points in time but not others. For instance, in the mortgage market it is typical for customers to become active when their initial fixed interest rate period is over and less so at other times.

We also note that price dispersion that is too small may also be problematic as it may not, at least in the short run, maintain sufficient incentives on customers who are prepared to be active in the market and for retailers to compete for those customers. Whilst we would expect, in the long run prices to converge to a competitive level, price dispersion may be a feature in the short run.

In Figure 5 above the large price dispersion ("x") would therefore be reduced if retailers had not cross-subsidised tariffs ("y") and reduced even further if they had ("z"). In the latter case, it would be important to ensure that level of price dispersion "z" was sufficient to maintain the incentives on customers who were prepared to be active.

Cost reflectivity of tariffs - A further approach that has been considered in energy markets is the imposition of a cost reflectivity obligation on retailers. This was suggested to the Competition and Markets Authority by one energy company and would consist of a requirement that retailers be able to justify to Ofgem differences in their offers to different customers groups by reference to cost. This to some extent echoes the existing requirement in electricity and gas where a standard condition of the gas and electricity supply licences[37] requires that any differences in terms and

[37] SLC 27.2A

conditions between payment methods for paying charges for the supply of gas/electricity need to reflect the costs to the supplier of the different payment methods.

If applied in water, such regulation would have the effect of limiting the extent to which retailers could differentially recover costs (and make profit) from different groups of customers and would therefore also limit the extent of price dispersion. It might also distort incentives for new players to enter the market and compete, which could adversely impact on customers in the medium term. As we mentioned the nature of competition is heavily influenced by the market rules and regulations determined by governance authorities and will be the subject of extensive consultation with stakeholders should residential retail competition be adopted in the water sector.

5. Setting up for success

We recognise that, for the market to be successful, customers must have trust and confidence in it. To win that trust and confidence the right decisions must be taken about the design, opening and the ongoing regulation of the market.

Competition and competitors

A successful market needs competitors. There are currently 17 monopoly water retailers supplying residential customers in England. Experience in the business customer market suggests that not all of these may choose to remain in a competitive residential market. If policy decisions are made to allow it, as in the business customer market, inefficient incumbent companies, or those wanting to focus on their wholesale businesses, would have the choice to leave the retail market. This potential to exit would also create opportunities for new entry, innovation and for specialist retailers to use their specialism to good effect.

The opportunity for exit from the market by incumbent retailers and entry by new entrants is an important success factor for the market. Even the prospect of entry and the opportunity for exit could act as a strong incentive for existing retailers to be more efficient, which would be expected to benefit customers through lower prices and improved service.

In the energy market, British Gas, which had a national presence, was ready to enter and challenge incumbents at the opening of the electricity market, just as the electricity incumbents had targeted gas customers in their regional areas. In the absence of this rivalry in the water sector, facilitating entry from established players in other markets, such as gas and electricity, will be important to stimulate competition.

More generally, it would be important to design and operate the market in a way that does not create barriers to entry.

To ensure that customers had confidence that they would not be disadvantaged or put at risk during these transactions, customer protections would be essential, and market design would need to include safeguards to protect customers through a transfer process.

Public health and safety

Water and wastewater services are essential for life and health. With the introduction of residential retail competition, the same regional wholesale companies would retain responsibility for providing a reliable supply of safe drinking water to the tap, and for taking away wastewater, treating it and returning it safely to the environment. There would need to be a requirement for wholesalers and retailers to work together to maintain public health and safety – if there were a threat to a drinking water supply, for example.

Resilience and long-term planning

Wholesalers would continue to play a vital role in maintaining the resilience of water and wastewater services, and in planning to ensure this over the long-term. It would not be down to them alone, however.

Retailers, through their relationships with customers, could be able to encourage customers to use water more wisely. Changes to customer behaviour could have an important role in maintaining resilience, for example, by using water more efficiently or reducing wastewater discharge into drains.

Retailers would have an incentive to provide water efficiency services to customers to reduce their consumption and so offer lower bills – this happened when the business customer market in Scotland opened to competition. With the right approach to wholesale charges, retailers could benefit from cost reductions if they helped wholesalers deliver more resilient services (for example, if costly new investment were avoided as a result of water or wastewater efficiency).

Overall, wholesalers and retailers will need the right incentives to work together to maintain resilience, to enable wholesalers to plan over the long-term, to ensure decisions reflect customers' needs and that customers of the future have access to the water services they need at a fair price.

Treating customers fairly, enabling engagement with the market

General consumer law requires companies to treat their customers fairly. Beyond this, regulation could ensure that customers received good-quality, accurate information about their consumption, the services they receive and the price they pay. It would also be very important to ensure that customers had good-quality, accurate information about alternative deals and were not subject to misleading or high-pressure sales techniques.

Going further, we would want to ensure that it was as simple and easy as possible for customers to engage with the market. We recognise that this has been a challenge in many sectors, and that there will always be some customers who do not engage with the market. Customers who want to, however, should be able to compare deals easily, and switching should be as quick, simple and hassle-free as possible. This needs to be built into the design of the market and ongoing regulation.

As set out in our qualitative analysis, we expect competition to lead to better data and greater innovation in technology across the sector. We are learning about the potential for third-party services – such as Flipper in the energy market – to take the hassle out of comparing deals and switching supplier. Good-quality, standardised data about customers and their water consumption is key to enabling these services to develop. Market design and regulation can help ensure this data is available.

Treating customers fairly means ensuring timely, effective redress when things go wrong. This gives companies fair warning of what will be expected and the sanctions they could face, providing them with a further incentive to avoid the situation in the first place. The water sector has introduced an alternative dispute resolution scheme, and this could be further developed for a competitive market. We already have a set of minimum standards for water and wastewater services, and could consider how best to adapt these to provide protection in a competitive market.

Our research into vulnerability[38], showed that vulnerability can be a transient state and that any customer could become vulnerable at some point in their lives. There has been a 69% increase in the number of people signing up for support schemes in the past four years. Yet, the number of customers requiring targeted support is likely to be much larger than those that are signed-up, as research shows that those in a position of vulnerability are often unlikely to reach out for support.

Our commissioned customer research showed that 56% of customers had one or more characteristics that meant they could be considered vulnerable. It is important to ensure that customers in vulnerable situations receive appropriate help in any residential retail market. This could be achieved through a code of practice, and their retail licence could include the requirement to abide by this code.

We expect that competition would reduce bad debt levels in water, as retailers seek competitive advantage by reducing bad debt costs through better billing and debt management, particularly by improving the quality of data to help them identify

[38] Vulnerability Focus Report 2016

customers. With more bundle offers becoming available we could see bad debt level fall even further and become similar to those in other utility sectors.

There are some customers who genuinely struggle to pay their bill and it is essential that, in a competitive market, these customers receive the right assistance. Water companies have voluntarily introduced social tariffs as part of wider packages of measures to help these customers. It would be important to ensure that those customers unable to pay their bill continued to receive help in a competitive market. The extent to which such measures create additional costs for other customers is a matter of market design and so is for the government to decide.

It is inevitable in competitive markets that some customers would secure a better deal than others, and that those who shop around are likely to do better than those who don't. In some other sectors, such as energy, there are concerns about the extent to which customers not active in the market still receive a fair deal. The difference between the best and the worst deal in a competitive market for water, however, is likely to be less than the difference for energy.

In water, 90% of the customer bill is made up of wholesale services that are price-regulated by Ofwat, compared to 25%[39] of the customer bill in energy. Unlike oil and gas, water is not a globally traded commodity and is not subject to the extreme shocks seen in these markets. Prices are unlikely to change as much month to month and year to year. However, it is still important to consider how wide the difference in deals might be, and who might be likely to get the better deals and the worse ones.

We may need to consider some form of protection, such as tariff regulation. In its recent investigation into the energy market, the Competition and Markets Authority considered, for example, a default tariff that customers would remain on unless they chose a different deal.

Alternatively, one potential new entrant to the water sector proposed regulation that enabled companies to offer different tariffs to different customers, but only to the extent that the differences were justified by the differences in cost to serve those customers.

A strong, effective and independent regulator

Introducing competition to the residential retail water market would not remove the need for regulation. Indeed in the lead-up to market opening, and in the early stages

[39] Regulated network costs are 24%. See 'Understanding energy bills', Ofgem

of competition, the role of a regulator might be even more important to ensure the market operated effectively and that customers were protected and their interests represented. It is worth emphasising that this would be a competitive marketplace, not an unregulated one.

Regulation could be used to ensure appropriate assistance for vulnerable customers, including those who genuinely can't afford to pay, and to ensure that all customers received a good standard of service.

In other sectors, customer protection, such as Universal Service Obligations placed on all retailers, help to deliver good service for all. Something similar could be adopted in water. There may also be a continued role for social tariffs and there are alternatives ways these can be delivered, such as through a Universal Service Fund. It would be for the government to consider whether there was a role for tools that help customers with budgeting, such as prepayment meters and, if introduced, they could be regulated to ensure this was done fairly.

The regulator may also need to consider protection for customers who were not active in searching and switching to ensure they still received a fair deal. This would be crucial for customer trust and confidence. The regulator would need to focus on making sure all were treated fairly.

We know from the opening to competition of the business customer market, that it is important for new entrants to have a voice in how the market is set up to ensure that it works for all and not just for big incumbents. And ongoing regulation, through codes, licences, guaranteed standards scheme and competition law, would be needed to ensure companies that could influence the market did not distort it to their own advantage. We also expect good-quality data on customers and their consumption, and access to that data, would be key to ensuring new entrants were able to compete. If necessary, regulation could be used to ensure this.

As in the business customer market, retailers and wholesalers would need to be required to ensure public health and safety. The relationship between wholesaler and retailer would also be critical for long-term planning and investment to secure resilient, reliable supply for customers in the future. The regulator would need to set the right incentives to make sure those long-term interests were secured.

In designing the regulatory framework, it will be important to work in parallel with the design of the market. By considering these together, the two would complement each other and strengthen the interests of customers.

Given the fresh set of challenges involved in preparing for and implementing a competitive market, it would be important that there is a regulator with the powers, skills, capacity and capability to carry out these functions. The regulatory regime would also need to respond quickly and effectively to ongoing developments as the market evolved, ensuring it offered the right protection without creating barriers to entry or competition.

6. Timing

There are two fundamental decisions for the government on timing. The first is when to make a decision in principle on **whether** to open the market to competition. The second is **when** to open the market.

6.1 When to make a decision

Companies are currently preparing for the introduction of competition in the business market, which opens on 1 April 2017. We know through engagement with the sector that companies and their investors would welcome an early indication of whether competition will be extended to the residential retail market, as it will allow them to plan ahead and minimise cost by identifying the best approach. There are a number of reasons for recommending an early decision.

Firstly, we are currently developing our approach to the 2019 price review. We will be consulting on the methodology for this in July 2017 and issuing the final methodology in December 2017. Existing companies are keen to understand how extending retail competition to residential customers would affect the price review. An early decision would allow us to incorporate provisions for market opening into our review methodology and give certainty to companies and their investors. We do note, however, that the regulatory process can adapt to different timings for market introduction through price reviews, and this has been the case for the business retail market.

Secondly, an early decision would help existing companies and potential entrants think about their retail market strategies. For existing water companies, knowing whether the residential market would open to competition could be a material factor in their decisions on whether and how to engage in the business customer market. It would also allow potential entrants and new investors to assess opportunities.

Thirdly, clarity on any decision would provide existing retailers, wholesalers and potential new entrants the time to prepare for the opening of the market. The preparation process helps incumbent companies identify and resolve areas that require specific design measures from those that are arise from the general uncertainty from change. For example, accuracy of customer data would improve as part of preparing for the market preparations, as happened in the business retail market.

6.2 When to open the market

There is a choice between having a phased opening or opening the market for all customers at once. The first could be for example via a pilot phase on a geographical basis, which would have logic given the regional monopoly structure we have in the wholesale part of the value chain. There are also other categorisations which a phased approach could use. A phased opening would allow for any teething problems to be identified and remedied before they could have a wide impact. Opening to all, however, would allow all customers and companies to benefit from opportunities and face risks at the same time. Phased approaches were used in the energy markets.

A competitive residential retail market in England would be the largest competitive water retail market in the world and would affect every residential customer in the country. So, time would be needed for planning and delivery to be thoroughly tested at key points. It would also be important to consider how the date of residential market opening could be best-timed to enable those involved in the business customer market to take advantage of the experience and skills, and capture the lessons from that process.

We have noted in our analysis that there could be significant benefits from the development of a multi-utility market. There are a number of very significant changes expected in the energy market within the next five years which will affect both energy suppliers (some of which may consider entering a retail water market) and third party intermediaries (who may play a significant role in facilitating a multi-utility market). These should be considered in the market design if the decision is made to introduce residential retail competition.

7. Our assessment and next steps

We believe that the introduction of competition in the residential retail market in England would be likely to result in a net benefit. The scenarios we have created and considered are illustrations only and do not give an upper or lower limit on the net benefit or cost. We have also not ascribed a probability to each scenario. We do, however, have the evidence that:

- new entry on the basis of innovative business models is more likely than not;
- multi-utility service bundles are more likely than not;
- technology that is emerging in other sectors is likely to help reduce customer search and switching costs; and
- new entrant business models could bring significant benefits in terms of water efficiency and wastewater management, and therefore resilience.

If the market can be designed and regulated appropriately, the potential benefits available are significant – those we have been able to quantify amount to £2,917 million. We have not, however, been able to quantify all benefits, including some potentially significant ones such as better customer service through innovations in technology and resilience of water and wastewater services. We have also highlighted in this report our customer research, which shows that 56% think choice in the water markets would be a good thing (section 3.4.2). This is partly because they expect competition to reduce price and improve services, but also because customers value the ability to vote with their feet if their supplier does not provide the service they expect.

There are no guarantees of how successful competition would be. To maximise the likelihood of success, we have set out some key requirements in Chapter 5. Customers must have trust and confidence in the market. This means that the right decisions must be taken about the design, opening and ongoing regulation of the market. It will also need a strong and effective regulator to mitigate against the risks that could undermine the market and its effectiveness.

The design of the market would need to support competition and allow for retailers to enter and leave the market. Access to good information and new technology need to make it simple and easy for customers to engage with the market i.e. search and switch.

The design would also need to consider social and environmental policy issues, particularly where there are concerns for public health and resilience. There are

policy choices available for dealing with these issues to avoid them undermining the market and its effectiveness.

In competitive markets some customers get a better price and service than others. It is possible that some customers could be worse off. We expect the difference between the best and worst deals for residential customers in water to be far less than in the energy market today, with wholesale price regulation covering about 90% of the total bill in water compared to 25% in energy. The design of the market and ongoing regulation need to mitigate the risk that customers are treated unfairly and miss out on potential benefits. It is also important that the market design and regulation ensure customers have access to the right support and that those who are struggling with their bills receive timely, effective help.

Next steps

This is our report to the government on the costs and benefits of extending competition to the residential part of the water retail market in England. It is for the government to decide how to proceed.

Given the importance of regulation for the success of the market and Ofwat's important role in protecting customers, we are ready to work with the government to carry out additional analysis, help in designing the market and carrying out implementation as required, and subject to appropriate resourcing.

Appendix 1 – Our analysis in detail

This section describes our analysis, including the quantitative estimate of costs and benefits. Quantifying the benefits (especially dynamic benefits) of competition is difficult. For our initial analysis for our Emerging Findings publication, we included a qualitative assessment of the benefits where, at that point, we had not been able to quantify them. We highlight in this appendix where we received evidence from stakeholders in response to our emerging findings or carried out further analysis. In some cases, this has allowed us to include a quantitative assessment of the benefits. In others, we have updated the qualitative assessment. The unquantifiable costs and benefits remain an important part of our assessment.

The table below is repeated here as it gives an overview of our analysis.

Table 4: Summary of costs and benefits (also shown in section 3)

Type of impact	Potential impact	Included in quantified £NPV?
DIRECT COSTS		
Costs to the economic regulator (Ofwat)	negative	✓
Market operator costs	negative	✓
Government costs	negative	✗
Company costs	negative	✓
Customer costs (time spent engaging with the market)	negative	✓
Company acquisition costs (necessary spend on gaining customers)	negative	✓
OTHER COSTS AND BENEFITS		
Customer experience and service quality	positive/negative	✗
Retail efficiencies	positive	✓
Wholesale efficiencies	positive	✓
Metering efficiencies	positive	✓
Bad debt efficiencies	positive	✓
Water efficiency (including heating bills and carbon savings)	positive	✓
Water resources resilience	positive	✗
Wastewater treatment costs	positive	✗
Wastewater efficiency and resilience (Drainage costs/flood damage)	positive	✓
Impacts on vulnerable customers	positive/negative	✗
Impacts on distribution of outcomes across customers	positive/negative	✗
Value of customer choice	positive	✗

Approach to quantitative analysis

In this section, we set out our technical approach to the quantitative analysis. As the approach was supported by a wide range of stakeholders in response to our emerging findings, we have retained this approach for the final report. The quantitative estimates are based on the best possible evidence obtainable in the time available.

Timeframe and timing of competition

The modelling timeframe is thirty years, following standard government practice for policy assessment and following previous analysis of the introduction of retail competition into the business water sector[40]. The quantitative modelling assumes that market opening occurs five years into the modelling period. Set-up costs are modelled over a two- to four-year period prior to market opening, depending on the scenario[41].

This assessment uses a 'present value' approach that discounts future costs and benefits over time. It uses a discount rate of 3.5%, as recommended in the Green Book for policy appraisals over the timeframe considered here[42].

This analysis also takes into account the fact that competition develops over time. It does so by creating a proxy for the development of competition, profiled over time. Many of the costs and benefits (and measures of customer engagement) are assumed to be linked to this profile, such that annual costs and benefits increase as competition develops. The full extent of efficiencies and costs is not applied until this profile reaches its maximum after a specified amount of time, set out for each scenario. All direct efficiencies applied to the retail portion of the value chain are subject to this profile (including one-off and ongoing efficiencies)[43].

In the central assumption used in Scenarios 2 and 3, this profile is set to 15 years. This is a reasonable time period for the full effects of competitive rivalry, potential consequent separation, potential new entry and alternative business models to take effect. Comparison with other utility markets, such as telecoms, indicates that competition can take time to develop. Wider dynamics can also have significant effects on the development of retail competition, such as the effect of increasing wholesale prices in energy, or the continued fast pace of technological change in mobile telecoms. Therefore, none of these markets can be taken as wholly representative of the time period needed for competition to develop. Factors affecting the development of competition in residential water supply are difficult to predict.

[40] 'The Green Book – appraisal and evaluation in central government' (para 5.11), HM Treasury, July 2011
[41] With market opening at the end of the specified year.
[42] Ibid
[43] One-off efficiencies are still applied over time, as the 'abatement factor' expands over time. For example, if one-off efficiencies of 10% are estimated, the application of these one-off efficiencies to the relevant part of the market is phased in over the period that these efficiencies are assumed to take to reach maximum effect.

Geographic coverage

This analysis estimates possible costs and benefits from introducing residential retail competition in areas currently served by companies based wholly and mainly in England. This is based on the current legislative boundary for any UK government decision regarding residential retail competition in water.

Estimating the counterfactual

All estimated potential costs and benefits are compared with a counterfactual, described in detail below. This seeks to capture what is currently known about how the sector and value chain will develop without residential retail competition.

The counterfactual describes a best estimate of what would happen without the introduction of residential retail competition, taking into account all known policy decisions and their future impact. The counterfactual is drawn from individual company data from PR14 to 2019/20. The value chain is built up from the wholesale element of the value chain, then adding the retail element to the wholesale. This is the benchmark against which our estimates of the impact of residential retail competition are compared.

PR14 data is the basis for the wholesale element of the value chain to 2019/20, comprising the following (with further details set out in the PR14 section of our website[44]):

- the number of residential customers connected (metered and un-metered for water only, wastewater only and for water and wastewater);
- the share of costs in company submissions for PR14 (to break down allowed revenue into categories); and
- allowed revenues for wholesale, taken as the best proxy for retailers' wholesale costs, split by water and wastewater.

Beyond 2019/20, the counterfactual requires assumptions to be made about how the value chain will develop over the modelled period. Defra has analysed future influences on the price level of water bills in its water bills projection modelling[45], including the influence of changing enhancement expenditure, operational expenditure, and capital maintenance. We have avoided double-counting benefits

[44] 'PR14 final determinations', Ofwat
[45] 'Cumulative impact of regulation and policy on future water bills', Defra, July 2015

from key policy changes by virtue of their inclusion in Defra's water bills projection model on which the counterfactual is based:

- ongoing efficiency savings from regulation;
- the introduction of business retail competition; and
- the introduction of wholesale market reform.

Defra assumed that ongoing efficiencies from regulation diminish over time – specifically, that ongoing efficiencies are 1% per annum from 2020-25 and 0.5% per annum thereafter[46]. This reflects the view that, while comparative regulation in the water sector has led to significant cost-savings for customers in early price control periods, gains from comparative regulation have diminished over time. Defra's modelling is built using the Water Resource Management Plans baseline data on supply and demand and PR14 Final Determination data on costs and financing. This approach means that efficiency savings applied to the counterfactual take into account what is currently known about likely developments in the value chain, including future policies.

Some incumbent companies reported that this approach is too conservative in its estimation of the ongoing benefits of regulation, but this data is the best available and no specific evidence was received to support an alternative proposal. Therefore we have retained our assumptions relating to ongoing efficiency savings from regulation at the same value as in our emerging findings.

Based on Defra's water bills projection model, we estimated the average compound annual growth rate implied by estimates of total expenditure to 2040 in Defra's water bills projection model and applied this rate to the full period included in this model. This growth rate is applied to wholesale costs to estimate total wholesale costs in the value chain. This method reflects the Defra modelling, but also allows the use of the latest available PR14 data as the basis for the counterfactual to 2019/20.

Counterfactual wholesale costs are assumed to change at a compound annual growth rate of -0.66% in the counterfactual. A 'high' sensitivity reflects Defra's 'high drivers' scenario, and costs are assumed to change at a compound annual growth rate of 0.78% beyond 2019/20. Defra's 'high drivers' scenario comes from setting all sensitivities to the high end to give an absolute maximum. The main drivers in this scenario are efficiency gains, Weighted Average Cost of Capital (WACC), real price effects and the impact of policies. However, this has not been used in the scenarios

[46] Ibid

described here, because Defra considers it as illustrative and with a very low probability of occurring.

For the retail element of the value chain, the following PR14 data has been used for the period to 2019/20:

- operational expenditure in retail; and
- capital expenditure (depreciation) in retail[47].

Counterfactual retail costs are estimated using the same methodology. Retail costs beyond 2019/20 are based on how much allowed retail revenue changes over time in Defra's water bills projection model. Our modelling is based on the average compound annual growth rate implied by estimates of allowed retail revenue to 2045 in Defra's water bills projection model (the end of the modelling period considered in this analysis: 2015/16 to 2044/45). Retail costs are assumed to change at a compound annual growth rate of 0.72% in the counterfactual.

This analysis allows for the costs of bad debt and the costs of meter-reading to be included or excluded from the cost base to which competitive efficiencies are applied, or for additional efficiencies to be applied specifically to those cost items. Nonetheless, in all scenarios considered in this analysis, bad debt costs and metering costs are included as 'retail services', in line with the definition of retail services for the business customer market.

Bad debt and metering costs are estimated as a component of total retail costs, based on the share of costs included in companies' submissions to PR14, applied to allowed revenue for PR14:

- metering, which includes all aspects of metering operations, but excludes the assets; and
- bad debt, which separately comprises debt management costs and costs associated with doubtful debts.

We do not have any specific information on how either of these costs will change as proportions of total retail costs over the modelling period. Companies' submissions for PR14 indicated that the proportion of total cost accounted for by bad debt would remain roughly constant to 2019/20. Therefore, we assumed that their respective proportions of total retail costs remain constant over the modelling period. The

[47] For simplicity, we have assumed that total depreciation of assets at the retail level is equal to capital expenditure.

proportions of metering costs and bad debt costs that make up retail costs are 17% and 43% respectively.

Each assumption used to estimate the value chain beyond 2019/20 is applied universally across all companies. It was not possible nor appropriate to differentiate these assumptions by company. This analysis does not seek to forecast or estimate the impact of individual companies' performance or behaviour, but to give an overview of the value chain as a whole.

Competitive margins

The introduction of business, charity and public sector retail competition was accompanied by a higher net margin (from 1% to 2.5%) for companies wholly or mainly in England[48]. We note a range of stakeholders' views, including incumbent companies, that a higher margin than 1% would be required to attract new entrants if the residential market were opened. Any short-term increase in margin would represent a transfer from customers to water companies, rather than an overall net cost, but may also have no impact on bills overall under certain circumstances, such as if deducted from the wholesale WACC. For the purposes of this assessment, we made no assumption on the margin required to attract sufficient new entry.

Modelling the effectiveness of competition

This analysis takes into account the time taken for competition to develop and the limits to its effectiveness. We split the market (and customers) into an active share and an inactive share, with different benefits applied to each share. Some segments of a potential residential retail market may be more effective than others, but retailers provide shared services such as customer services centres or switching systems, generally used by all their customers, even if customers can be segmented. Some cost-efficiency savings in the active share would be likely to spill over to any less active part of the market.

The share of customers likely to receive the full potential benefits of competition is debateable. Assumptions made in this analysis are based on previous work and evidence from other markets, though no direct comparison with residential retail competition in water is available.

[48] 'Consultation on the review of non-household retail price controls', Ofwat, November 2015

This section explains the active share of the market assumed in our analysis and how this relates to the overall switching rate assumed for each scenario.

Evidence on the active share of the market

Professor Cave's assessment of business retail competition for the Water Act 2014 assumed that, for business customers with a consumption of less than one mega litre, 10% of the cost-base was 'contestable'. This does not mean, however, that the review assumed that 10% of customers switched suppliers. Provided that there is a threat of competition and customers are engaged and active, it is not necessary that customers change retailers to realise the benefits of competition. In Scotland, few customers initially switched retailers, but many were offered better deals by their existing supplier[49].

Professor Cave and Ofwat recognise that this 10% assumption is conservative. Indicators in other sectors show a higher the level of engagement. About 30% of residential gas and electricity customers still with their incumbent are now no longer on that supplier's more expensive 'standard variable rate' tariff[50]. This underestimates the total across the market, by excluding customers with suppliers that are not incumbents, who are necessarily engaged in the market. This could underestimate the active share of the energy market by about 10%. The Competition and Markets Authority found in its recent energy market investigation that 66% of energy customers asked had ever considered switching supplier; 40% of customers had shopped around to compare different tariffs, and 36% had done so in the past three years. So, 40 to 50% appears a reasonable estimate for the level of engagement in the energy market, given that there are many different ways to measure engagement.

The size of energy bills and any potential savings in energy could help to encourage engagement. Customer engagement may, though, be driven by several factors, and some customers are likely to switch with no price difference at all[51]. About 25% of current account customers either switched or considered switching in 2014[52], although switching rates tended to be lower.

[49] 'Ofwat's review of the evidence base for retail competition and separation' Ofwat, 2011
[50] 'Energy market investigation – summary of provisional findings report', Competition and Markets Authority, July 2015
[51] 'Empirical Evidence of Consumer Response in Regulated Markets', Journal of Competition Law and Economics, 2016
[52] 'Current Account Switch Service – effectiveness and potential enhancements' (p8), YouGov for Financial Conduct Authority, January 2015

In Scotland, about 40% of the market (about 45,000 business customers) renegotiated their tariff[53] and, as of 2013, 60% of business customers were getting lower bills than would have been the case without competition[54]. In that market, the benefits of competition have extended to engaged customers beyond those customers who switched (5% of customers by June 2013)[55].

Our customer research shows that 50% of customers would be interested in switching their supplier. This, therefore, appears to be a plausible benchmark for Scenario 1, in which the active share of the market is set to 50%. In Scenarios 2 and 3, which represent a more pessimistic view that residential retail competition in 30 years' time would be no better than the energy market today, we take the energy market precedent and assume that 30% of residential customers are active.

Several stakeholders including incumbent companies, commented that 50% engagement was too high because the energy market today does not exhibit that level of engagement. While that may be true (we estimate 40 to 50% above), the energy market is not well functioning for all customers, as evidenced by the recent market investigation by the Competition and Markets Authority. This analysis captures the level of engagement that could plausibly be reached in a mature competitive residential water and wastewater market. Further, some of these stakeholder views were based on a misunderstanding that the level of engagement represented an annual switching rate. We therefore keep to our assumptions about the plausible share of the market that could be engaged under each scenario.

A more salient point raised by stakeholders, such as the Consumer Council for Water, is that customers may be less engaged in a market where savings are lower. This may be true, but other factors driving the level of engagement, such as the cost of switching, new business models, the ease of comparison, new products and services and possibly multi-utility bundling, could all support this level of customer engagement. We also include a range of levels of potential engagement across the four scenarios that we considered. We therefore retain the assumptions from our emerging findings on the level of engagement for each scenario.

[53] 'Competition in the Scottish water industry – achieving best value for water and sewerage customers 2009-10' (p7), WICS, December 2010
[54] 'Water and sewerage services in Scotland: an overview of the competitive market' (p6), WICS, October 2013.
[55] Ibid

The relationship between the active share and level of switching

A customer does not need to switch every year to be considered active in the market. We therefore also consider the relationship between switching and the active share of the market.

With customer engagement in the energy market at about 40 to 50%, 44% of energy customers have switched their supplier at least once and 25% have switched supplier in the past three years[56]. Annual switching rates are approximately 10 to 12% (depending on the period in question), which suggests switching rates of about a quarter of the share of the market that is engaged.

In banking, the FCA commissioned YouGov to consider the extent to which customers switched their current account in 2014[57]. They interviewed 2,188 adults (of whom 2,117 said they had a current account). The results show that 25% of customers either switched or considered switching in 2014, while only 5% of customers switched in 2014. This suggests that switching rates are about one fifth of the active share of the market.

We have also considered stakeholder views, including incumbent water companies and the Consumer Council for Water, that the levels of switching across our scenarios in our emerging findings appeared high. Some stakeholders were of the view that switching rates were unlikely to be as high given that savings on the water bill may be smaller than in other sectors. While a switching rate of 30% might be plausible, as demonstrated by the case of vehicle insurance shown in Figure 6 below, it is unusual. We recognise this, and that the ratio of customers switching to the active share of the market was greater in Scenario 1 than Scenarios 2, 3 and 4.

Taking into account these views and the evidence set out above, we have adjusted our emerging findings assumption on the ratio of switching to the active share of the market. Our emerging findings applied a ratio of 1:3 (switches a year to active share) across Scenarios 2 to 4, with a higher switching rate in Scenario 1. In this final analysis, however, we apply a consistent ratio across all scenarios. The annual switching rate is therefore assumed as one quarter of the active share of the market, which is broadly consistent with the evidence from the energy and banking sectors today. In summary, this brings down the switching rate required to deliver the

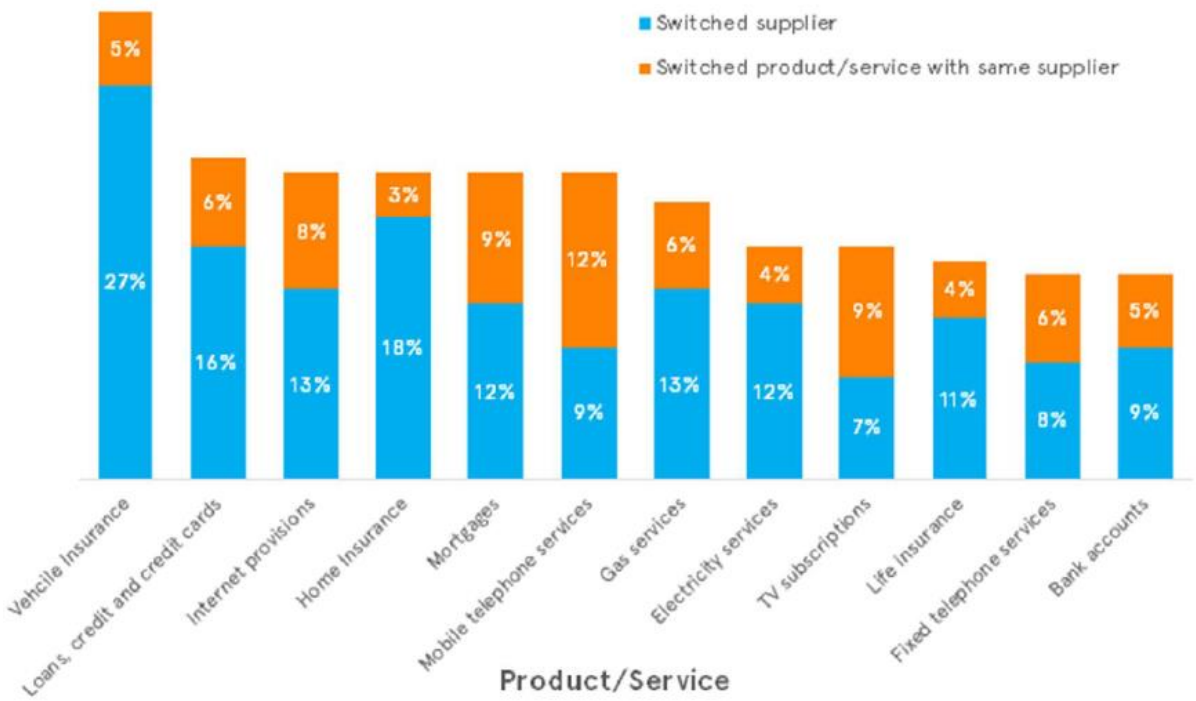
[56] 'Energy Market Investigation – CMA domestic customer survey results', Competition and Markets Authority, July 2015
[57] 'Current Account Switch Service – effectiveness and potential enhancements' (p8), YouGov for Financial Conduct Authority, January 2015

efficiency savings that we have assumed, which remain unchanged from our emerging findings.

Table 5: Active share and switching

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Active share of the market	50%	30%	30%	15%
Annual switching rate (emerging findings)	30%	10%	10%	5%
Annual switching rate (final findings)	12.5%	7.5%	7.5%	3.8%

Figure 6: Percentage of UK population switching suppliers or product/service in 2013, by product/service



Source: EUROPA consumer dashboard, 2013 data

Reproduced from: The Behavioural Insights Team for Citizens Advice (May 2016), Applying Behavioural Insights to Regulated Markets, p10.

This update to our assumptions has knock-on consequences for our assumption on acquisition costs, which are discussed separately in the relevant section of this document.

Effects of bundling

Following the introduction of competition in the residential retail market, there may be scope for companies to offer multi-utility bundles to customers. This could provide savings for companies by reducing the costs of engaging customers or by delivering economies through providing services that could be shared across utilities. It could also create savings for customers by reducing the amount of time they spend engaging with the market, although that would depend on how bundled products are priced, marketed and sold. Bundling could also help to lower bad debt costs if it provides new ways to improve retailers' revenue recovery from water customers.

In previous analysis (both Professor Cave's and the government's analysis of business retail competition), possible discounts from bundling efficiencies have been specifically quantified. This approach recognises that bundling efficiencies would lead to savings over and above the sector-specific estimates of potential productivity improvements that support estimates of efficiencies in the supply chain. In the business sector, this rationale is supported by scope for multi-site bundling, where business customers with many sites could save costs by bundling the billing for multiple sites. This is not relevant for the residential market.

This analysis wraps bundling into overall efficiency savings applied throughout the value chain. In particular, Scenarios 1, 2 and 3 accommodate scope for multi-utility bundling in the estimates of greater efficiency savings in retail services (although Scenario 1 assumes greater efficiency, implying more widespread multi-utility offerings supported by emerging technology).

Estimating costs from introducing retail competition

Our analysis quantifies costs where feasible on the basis of the evidence from implementing business retail competition and competition in other sectors.

We are not aware of any other estimates of costs specific to residential retail market opening. Many of our cost estimates are based on business market opening costs. Indeed, some stakeholders, in particular incumbent companies, submitted quantitative information on business market costs. But little additional information was submitted on the estimation of residential market opening costs, based on cost estimates for business market opening. There appears to be consensus that residential market opening would be more costly for companies than business market opening, but how much greater remains uncertain, as no detailed estimates have been made by companies at this stage.

This analysis, therefore, uses existing information to estimate costs, in a way that could be updated with residential-specific evidence as it becomes available. The extent to which these costs were efficient, rather than reflecting past inefficiencies that the market was designed to remove would need to be assessed.

Our analysis considers the following costs:

- costs to Ofwat;
- market operator costs;
- company costs; and
- customer costs.

For each category, **set-up costs** and **ongoing costs** have been considered[58]. All costs were estimated on a market-wide, aggregate level, and individual companies' costs may vary.

To address the uncertainty around costs, we have created ranges around central estimates for each category of benefits, based on the available evidence. We have not scrutinised these costs as would be done for regulatory challenges to determine to what degree they are efficient.

Costs to the economic regulator

Costs to the economic regulator (Ofwat) include work to design and implement market arrangements including development of codes, licences, contracts and other market architecture. These would also include setting regulatory policy and market design that would be implemented through that new regulation. Ongoing costs of competition could include monitoring and regulating the market.

Set-up costs were estimated based on our latest budget update for implementing the business market opening in England[59]. This is more up-to-date than evidence available from the set-up costs of implementing business competition in Scotland and the assumptions made in Professor Cave's review. Ofwat's total costs of setting up the business market are now anticipated to be £5.6 million (over three years from 2014/15 to 2016/17, when competition will be introduced – 2013/13 prices).

[58] Set-up costs are those that occur only once (eg an investment in new systems); ongoing costs are recurring (eg running those new systems).
[59] 'Revised budget for implementing the new water and wastewater retail services market in England – the Open Water programme', Ofwat, June 2015

Costs for a similar work programme to implement residential retail competition would depend on how competition was implemented and on decisions about the market design. On one hand, opening the residential market would require policy questions specific to the residential market to be examined. On the other hand, some market opening tasks may cost less to implement, if lessons can be applied from business market opening. For example, if some of the same market architecture could be used or replicated for residential competition.

A reasonable central estimate of regulatory set-up costs would be approximately equivalent to the £5.6 million it is anticipated to cost to set-up the business retail market for opening. This value is, therefore, taken as the central estimate of one-off costs. These costs are estimated as spread evenly over the time period that it takes to introduce competition. High- and low-cost scenarios use +/- 25% around this central estimate, recognising the potential for synergies and differences between set-up for the business and residential market.

Ongoing costs are estimated based on two sources. Firstly, we have estimated ongoing regulatory costs of £1.2 million for our Water 2020 programme of work, monitoring and regulating wholesale competition, based on us requiring companies to make information available on their websites[60]. Second, Professor Cave's review estimated an ongoing cost to us of £2.4 million (in 2015/16 prices) for governing water and wastewater markets, based on implementing and monitoring two sets of licences, for wholesale water and sewerage licences.

Residential market opening would require only one set of licences, but potentially greater monitoring and complexity compared with wholesale markets, in particular the need to monitor customer outcomes. Therefore, this analysis assumes that our ongoing monitoring costs will amount to £2.4 million per year in 2015/16 prices[61], double our estimate of ongoing costs associated with Water 2020 work.

For all economic regulator costs, we retain our emerging findings assumptions because no further evidence was submitted in relation to these.

[60] 'Water 2020: Regulatory Framework for wholesale markets and 2019 price review – Appendix 6: Our approach to assessing impacts and Ofwat's regulatory costs', Ofwat, May 2016

[61] 'Revised budget for implementing the new water and wastewater retail services market in England – the Open Water programme', Ofwat, June 2015

Table 6: Summary of economic regulator costs

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Economic regulator set up costs (one off) £m	£4.2m	£5.6m	£7.0m	£7.0m
Economic regulator ongoing costs (per year)	£2.4m	£2.4m	£2.4m	£2.4m

Market operator costs

Set-up costs are the costs of implementing the systems required for market operation. For the introduction of business retail competition, these were borne initially by Open Water Markets Limited (OWML). As of June 2015, these costs were estimated to be £6.4 million over the three years from 2014/15 to 2016/17 (in 2013/14 prices)[62].

Additional costs beyond those initial set-up costs are being incurred by Market Operator Services Limited (MOSL), which is responsible for delivering the IT systems that will enable registration, customer switching and settlement between wholesalers and retailers. MOSL's anticipated set-up costs are £26.2 million over the three years to 2016/17.

As with our set-up costs, costs for residential retail competition would likely differ because of the different nature of challenges associated with implementing retail competition. However, a market operator would potentially have to deal with a significantly greater amount of data and scale its systems accordingly. The effect of such scaling on set-up and ongoing costs is unknown in the absence of any specific information. Therefore, we have made a starting assumption for set-up costs of approximately two times the costs for business market opening, at £60 million, with low and high sensitivities of +/-25%.

We estimated in 2015 that ongoing costs would be £5.6 million a year for the business retail market opening. Some of the ongoing costs associated with market operation may be lower for the residential retail market than for the business market, if arrangements put in place for business market opening can be scaled up to accommodate residential market opening. However, it should also be recognised that systems need to be in place to deal with larger numbers of connected customers and this could increase costs. In our emerging findings, ongoing costs from the

[62] Ibid

residential retail market were assumed to be £5.6 million a year in our central estimate, with a low and high sensitivities of +/-25%.

Several incumbent water companies noted more up-to-date evidence for ongoing market operator costs in the business market. We have therefore updated our estimate to reflect this information, while retaining the assumption that ongoing costs for the residential market would be the same as for the business market. One respondent noted that market operator costs in the energy market are significantly higher. However, this view was not widely reported by respondents and we do not think these cost estimates are directly comparable, given the additional complexity of the energy market, including its codes and balancing requirements.

We have, therefore taken as our central assumption the mid-point of £8.4 million per year of the range reported by MOSL of £7.6 million to £9.2 million per year[63]. MOSL reported that these costs were early estimates and highly likely to change. The 2017/18 budget would need a substantial provision for changes to codes and systems in the first full year of the market being open as experience grows.

Table 7: Summary of market operator costs

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Market Operator set up costs (one off) £m	£45m	£60m	£75m	£75m
Market operator ongoing costs (per year)	£6.3m	£8.4m	£10.5m	£10.5m

Government costs

The government's incremental costs for residential retail competition are assumed to be zero. This assumption is made on the basis that the government policy-making needed to introduce and maintain residential retail competition would be carried out with existing budgets and resources. This assumption is retained from our emerging findings, as we did not receive any stakeholder responses that questioned this assumption or any relevant evidence to the contrary.

[63] 'Revised budget 2016-17', MOSL, 2016

Company costs

This section considers the following types of company costs:

- operational costs (customer acquisition, interaction with market operators);
- customer acquisition costs;
- separation costs; and
- financing costs.

Immediately before releasing our emerging findings, we received evidence on incumbent companies' latest implementation costs for business market opening. This evidence could not be considered at the time, but has been used for these final findings. It describes estimates of central programme costs, internal programme costs, market readiness costs, wholesale service centre costs, compliance and equivalence costs and expected market operator charges.

As with our emerging findings, our company cost estimates are principally based on known costs for business retail market opening. In comparison, some aspects of introducing competition could cost more for the residential market overall, while others could cost less. Despite calling for specific evidence on the likely relationship between the two, we received no clear quantitative evidence to support an updated estimate of the relationship between the two.

In practice, we will only consider costs that are directly attributable to the introduction of residential retail competition and which are reasonably and efficiently incurred. For example, while system upgrades to interact with a central market operator would be attributable to residential retail competition, costs associated with improving data-management or customer services capabilities would not. The latter costs would be a commercial decision for the retailer and should not be attributed to any policy decision for retail competition.

Updated estimates for business market opening have been compared in the following sections. These replace the basic estimate of business market opening costs in our emerging findings.

Operational costs

Following the introduction of residential retail competition, companies may incur an additional cost associated with acquiring and retaining customers. Incumbent companies would incur the following costs from residential market opening:

- a company-specific share of market operator costs; and
- company-specific market opening costs.

In this analysis, the first of these two is considered within 'market operator' costs in the previous section. This section examines the second – the company-specific market opening costs.

Incumbent companies would incur costs in preparing for market opening and operating under new market arrangements. Costs would vary across companies depending on their size and existing capabilities, but would likely include the following:

- reviewing proposed codes and understanding the impact on internal processes and IT systems;
- preparing data and upgrading IT systems ahead of the market go-live date;
- developing and implementing new processes and any organisational changes needed to satisfy market and operational code requirements;
- necessary testing and trialling of market-facing systems and processes to ensure new systems work properly ahead of the go-live date; and
- staff training and communication.

All incumbent companies choosing to stay in the retail market before market opening could incur some or all of these costs. Companies choosing to leave the retail market would also incur some proportion of the costs in preparation for exit.

Information submitted by Water UK on incumbents' costs for business market opening has replaced our previous estimate of companies' market opening costs (which was about £100 million of set-up costs and £27.5 million of ongoing costs).

In our emerging findings, we noted that there were about 22 million residential customers, compared with about 1.25 million business customers. This could significantly increase costs within some of the categories outlined above. Several stakeholders also noted this point in their responses. However, several other factors would also influence the relative scale of residential market opening costs, compared with business market opening costs, including:

- A significant share of IT systems costs are fixed, suggesting that significant economies of scale should flow through from implementation of the business retail market. This may be combined with economies of scale realised through companies' experience of business market opening. Any retail exit and consequent mergers would deliver further economies of scale[64].
- Many of the activities above would not need to be scaled up from business market opening were the residential market to be opened, therefore costs should not be scaled up according to the number of customers. Examples include dealing with market codes, which arguably may take less effort, rather than more, following experience from the business market opening; and
- New entrants without legacy systems may be able to enter and implement IT at significantly lower cost than current incumbents. Arguably, this assessment should not incorporate any costs over and above the potential new entrant system cost in this analysis – as such expenditure would be over and above the amount that would be efficiently occurred. Conservatively, though, we include estimates of incumbents' system costs in this analysis.

Several stakeholders including incumbent companies, reported that residential market opening costs were likely to be much greater than business market opening costs. Water UK noted in its costs submission that household and non-households markets would be of a materially different scale[65].

However, despite specifically identifying this as an area of uncertainty in our emerging findings, we have not received any specific quantitative evidence that sheds further light on how much costs should be scaled up. We therefore retain the assumption from our emerging findings. Taking all these factors into consideration, we assume that upfront costs for residential retail market opening are higher than for business market opening, by a factor of two in the low costs estimate and a factor of four in the high costs assumption.

We then considered the additional evidence submitted on the costs of business market opening. We compared Water UK's estimates for business market opening with our estimates of the costs of residential market opening in the table below. Water UK noted that its estimates have not been independently verified and so may not be fully accurate.

[64] For example, Severn Trent and United Utilities deciding to merge their retail functions for business market opening in 2017.
[65] Published with other stakeholder responses to our emerging findings.

Table 8: Company costs

All values in £m a year	Water UK evidence for business market opening (£ million)	Ofwat emerging findings estimate
Pre-market/set-up costs		
Central programme (Open Water/MOSL)	38.2	60
Market implementation		
Internal programmes	43.5	100
Market readiness (including systems)	105.8	
Wholesale service centre development	13.9	
Market implementation subtotal	163.2	100
Post-market/ongoing costs66		
Expected market operator charges (Open Water/MOSL)	8.4	5.6
Wholesale service centre	16.6	27.5
Compliance and equivalence	2.25	
Subtotal for ongoing costs included in our estimates of company costs	18.85	27.5

Water UK included market operator costs in its cost estimates, because these are charged back to companies. In our analysis, we have included these costs as a separate cost category above. As noted above, these market operator costs have been updated to reflect the more recent information submitted by Water UK. As a result, we have omitted market operator costs from the Water UK estimates when comparing with the earlier 'company cost' estimates used in our emerging findings:

- our emerging findings estimate of business market set-up costs for companies was £100 million , compared with Water UK's estimate of £163.2 million; and
- for ongoing costs, our estimate was £27.5 million, compared with Water UK's estimate of £18.85 million.

As noted above, we have no further quantitative information on the scaling-up required to estimate residential market opening costs to companies, compared with business market opening costs. We have, therefore, applied the same scaling-up factors to set-up costs that were applied in our emerging findings, based on the

[66] Water UK's estimates for post-market opening costs were presented as totals for the three-year period from 2017-18 to 2019-20. We have, therefore, divided these totals by three to convert its estimates into an annual cost.

qualitative analysis above. Consequently, we update our estimates of companies' set-up costs from £200-400 million to £326.4-£652.8 million.

Our initial analysis assumed that ongoing costs would be £20 million a year in all scenarios. Water UK's estimates above provide some broad evidence supporting these assumptions, so we retain these in Scenarios 1 and 2. However, in recognition of the uncertainty around these estimates, we also include a higher estimate of ongoing costs in Scenarios 3 and 4, set out below.

For Scenarios 3 and 4, we tested the ratio of set-up to ongoing costs submitted by Water UK against the rule of thumb applied in our emerging findings. In their analysis, annual ongoing costs are 11.6% of set-up costs, but this does include some set-up costs that are incurred after market opening, so are not ongoing costs for the purposes of our modelling. Bearing in mind that this includes some set-up costs, it supports our assumption that ongoing costs are 10% of set-up costs. We therefore updated our estimates of ongoing costs to £65.3 million a year for Scenarios 3 and 4. Scenarios 1 and 2 keep our original assumption of £20 million a year. These adjustments reflect the uncertainty in this area, with Scenarios 1 and 2 illustrating a market with low ongoing costs for companies and Scenarios 3 and 4 illustrating a market with high ongoing costs for companies.

Table 9: Summary of company operational costs

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Company operational set-up costs (one-off)	£326.4 million	£326.4 million	£652.8 million	£652.8 million
Company operational ongoing costs (per year)	£20.0 million	£20.0 million	£65.3 million	£65.3 million

Customer acquisition costs

In a competitive market, companies also incur costs associated with acquiring customers from their competitors. The costs of systems and processes required to interact with the market operator to switch a customer are considered above. This section considers only those costs that companies incur over and above these – including marketing, advertising or commission payments to third-party intermediaries.

The Cave Review assumed that companies would not invest any more in acquiring or retaining customers than the contribution they were estimated to make to the firm's profit. This cost was assumed to be equivalent to 5% of the retail cost base.

The government's business impact assessment followed Professor Cave's approach, stating the contestable cost base as £56 million and assuming a year acquisition and retention costs would be equal to 5% of this.

In our analysis, we estimate only acquisition costs that companies must incur to maintain market share, given the level of churn in the market (not those incurred to increase market share, for example). Costs over and above that should not be included. This is a challenging task.

A range of stakeholders submitted evidence on costs in other utilities, most notably energy. But differences in the service provided and its value limit the relevance of these comparisons. For example, telecoms or energy retailers may be willing to spend a greater amount on acquiring a customer because the associated expected profit gained is higher than it would be for retail water and wastewater services. In particular, we note that several respondents quoted acquisition costs in energy. However, these relate to a market in which bills are larger, switching may differ (at least compared with Scenarios 1 and 4) and profits differ too. We have, therefore, not used these as a specific benchmark, although they do offer a comparison with our assumptions.

Our emerging findings estimated acquisition costs based broadly on the hypothesis that overall, across the market, retailers would spend no more than the profit they might expect to earn from acquiring a (marginal) customer. This expected profit is taken as the retention rate for active customers (implied by assumptions on the switching rate in the active portion of the market and the active share of the market) multiplied by profit at a 1% retail net margin, equal to the current regulated retail net margin. This method recognises that retailers would be willing to spend more to acquire a customer if they thought they would keep the customer for longer. In theory, retailers should spend no more than this amount to acquire a customer or that customer would be unprofitable. We think this method is sound, and stakeholders with experience of other sectors agreed with this approach.

Nonetheless, we have updated our estimate to reflect the following.

- A potential new entrant[67] reported that they could acquire customers in the water market at significantly lower cost than our original estimates. We have taken this into account by adjusting our assumptions so that acquisition costs are, as an estimate of the efficient (not actual) cost, lower than the theoretical maximum implied by customer retention rates.

[67] Utility Warehouse response, to be published on our website on 19 September 2016.

- In a more competitive market with more new entry (Scenario 1 and, to a lesser degree, Scenarios 2 and 3), new entry would likely bring down the efficient cost of switching as new business models penetrated the market.
- Respondents noted that the profit margin assumed was low at 1% and should be consistent with the scenario. Moreover, our method should be based on profits from the marginal customer, which would be higher than the average margin on which our original assumption was based. For the calculation of acquisition costs, we have therefore included a higher profit margin of 2% in Scenarios 2 and 3, and 3% in Scenario 4, reflecting the overall efficacy of competition illustrated in each scenario.

We have, therefore, updated this assumption in Scenario 1, 2 and 3 in these final findings, halving our estimate of the cost of acquiring a customer in those scenarios. We retain our original assumption for Scenario 4, on the basis that this scenario is the worst-case scenario, in which no new entry occurs and therefore the efficiency of customer acquisition does not fall. Therefore, our final assumptions on acquisition costs are as follows.

- **Scenario 1 – £8.30:** a potential entrant has indicated that they could acquire customers for less than this value, but our assumed value needs to be an estimate of switching costs across the market and it is doubtful that the lowest cost of acquisition could be repeated for all switches, particularly for the high active share and switching rates assumed in Scenario 1. On balance, it is appropriate to retain the assumption in our emerging findings, on the basis that, in this scenario, acquisition costs are likely to be considerably lower than the expected financial benefit of gaining a customer.
- **Scenarios 2 and 3 – £15:** this scenario is a more conservative view of the development of competition, with low-cost acquisitions from new entrants likely to be a smaller share of switches. Acquisition costs are, therefore, likely to be closer to the theoretical maximum that a retailer would pay to gain a customer.
- **Scenario 4 – £40:** this scenario represents a more conservative view of the development of competition than even Scenarios 2 and 3. A lack of new entry could bring significantly higher acquisition costs. However, acquisition costs would likely remain lower than current estimates of the acquisition for energy. Furthermore, even in this pessimistic scenario, some switches will occur with zero acquisition cost, so that, on average, switches will cost significantly less than the theoretical maximum implied in this scenario. We therefore estimate switching costs at two-thirds of the updated theoretical maximum.

Table 10 summarises this final position.

Table 10: Switching assumptions for each scenario

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Implied value of an acquired customer (emerging findings)	c. £8.30	c. £15	c. £15	c. £15
Active portion of the market	50%	30%	30%	15%
Switching rate	12.5%	7.5%	7.5%	3.8%
Implied retention period	Four years	Four years	Four years	Four years
Profit per customer a year	£5	£10	£10	£15
Implied maximum value of an acquired customer	c. £20	c. £40	c. £40	c. £60
Assumed efficient acquisition cost	£8.30	£15	£40	£40

Separation costs

The cost incurred by an incumbent to separate its wholesale and retail functions are assumed to be voluntary in our analysis. In our emerging findings, we included separation costs, since some of the benefits of competition could depend on separation, despite no regulatory requirement to separate. We did not take account of additional benefits to companies from voluntary separation, although efficient companies would only do this if separation were profitable.

In assessing the separation costs companies would face following the introduction of competition, Professor Cave based estimates on evidence from the experience of introducing competition to the business water market in Scotland. This involved an assessment that calculated the cost of separation based on the costs incurred when Business Stream was separated from Scottish Water. The analysis in the Cave Review assumed an overall one-off cost of separation of £137 million across the sector.

The Non-Household Impact Assessment approached separation costs in more detail than the Cave Review. The impact assessment stated that separation costs would vary between companies, as some had already outsourced/legally separated retail functions. Depending on the size of the water company (water and sewerage company, large water-only company, small water-only company) and the degree of separation that has already happened (in-house, outsourced, legally separate), the Non-Household Impact Assessment assumed different set-up and ongoing costs.

The information submitted by Water UK on incumbents' costs for the business market opening, which we used to replace our previous estimate of companies' market opening costs, was clear that this did not include the cost of setting up competitive retail businesses and promoting of new services to customers. These costs are not related to separation. However, existing companies preparing for the business retail market would have included in these estimates the cost of preparing for the market, among them activities that would ultimately enable them to legally separate business retail functions. Therefore, we have revised our approach and do not include upfront and ongoing separation costs in our analysis. This is to avoid double-counting costs associated with accounting and price control separation.

We also include only costs that would arise as a direct result of regulatory requirements associated with the potential introduction of competition. Accordingly, there are two other factors that we considered. Firstly, since the Cave Review and the government's latest impact assessment for the business retail market, Introducing Retail Competition in the Water Sector, Ofwat introduced detailed accounting separation rules which identified separate residential retail costs. Secondly, there are now legally binding separate retail price controls. These controls require identification and attribution of costs to the relevant price control. Therefore, there are now no additional regulatory requirements that would result from residential retail competition.

We noted in our emerging findings that including further costs of separation would not take into account companies' experience of previous separation of business retail, nor any economies of scale or scope in separating residential retail; nor do they allow for separation of residential retail businesses that may have occurred otherwise (in the counterfactual). Although the needs of residential customers are somewhat different from those of business customers, and this may be reflected in differences in operations, the cost data and other potential costs of separation that were considered in the assessments for the business retail market are also needed for accounting separation of residential retail costs and income and the legally binding separate retail price controls now in place.

For this updated analysis, we have not included these costs beyond the company set-up and ongoing costs outlined above. Our departure from the approach in the Cave Review in this area reflects the substantive changes in the sector since that analysis was carried out. It is important to note that we do not consider any form of separation, legal or functional, necessary for the overall package of potential benefits to be realised following the introduction of residential retail competition.

For reference, the separation costs included in our emerging findings are shown in the table below. These costs are not included in our updated findings for the reasons given above.

Table 11: Summary of company separation costs

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Company separation costs (one-off): emerging findings	£60m	£80m	£100m	£100m
Company separation ongoing costs (a year): emerging findings	£4.1m	£5.5m	£6.9m	£6.9m
Company separation costs (one-off): final report	£0	£0	£0	£0
Company separation ongoing costs (a year): final report	£0	£0	£0	£0

Financing costs

We considered including the potential impact on the cost of companies financing their activities in our quantitative analysis. The Cave Review describes these potential impacts. In the short-term, transitional costs may be incurred, including breaching debt covenants or necessary de-gearing. In the longer term, investors may demand a higher cost of capital to compensate them for any perception of increased risk associated with opening the retail market to competition.

However, after talking to stakeholders, Professor Cave decided not to include financing costs in his analysis. This was based on three reasons. First, introduced appropriately, retail separation is unlikely to incur such costs. Second, the share of Regulatory Capital Value discount in retail is very small. The third reason, which does not apply here, was that retailing functions relating to domestic customers account for the bulk of retail costs will remain a monopoly. Experience in the water sector at the time also suggested that financing costs would not be a significant factor in the costs of introducing retail competition. For example, Professor Cave reported that for Wessex Water (where separation was voluntary), separation did not have a significant cost implication.

It is not clear that residential retail competition would lead to an increase in overall risk within the sector; rather it could simply represent a transfer of risk between different parties. Therefore, this analysis assumes that no new risk is introduced as a result, so no additional costs associated with an overall increase in financing costs has been included in our analysis. We do recognise the importance of market design

in this regard, where credit terms between wholesalers and retailers will be an important determinant of whether any extra financing costs are incurred.

Some stakeholders reported that financing costs would increase. One incumbent water company submitted an independent report that explored potential credit risks in a future residential retail market[68]. This reported that counterparty credit risk might be positively or negatively affected by such a change, and that any such change could feed through to companies' cost of debt via impacts on their credit ratings. The report also noted that other standalone retailers in major markets had investment-grade credit ratings, but cautioned that the regulatory regime, particularly around default, could affect eventual outcomes.

We did not receive any specific quantitative evidence or assessment from stakeholders that could be used to support such a case, nor on which to base any assumption. We remain of the view that any eventual impact would depend crucially on market rules and regulation and potential effects could be positive or negative. We have, therefore, continued to exclude any impact on financing costs in our quantitative estimate.

Customer costs

For competition to operate well, customers need to spend time searching for information and switching supplier. This final analysis updates our emerging findings and increases our estimate of the amount of time that customers spend engaging in the market.

Stakeholders responding to our consultation reported that our customer search costs appeared low and said we had underestimated the time needed for customers to engage in the market. We have reviewed the evidence available including that in stakeholders' responses and updated our assumptions in these final findings. In summary, we have significantly increased the customer search costs that we have assumed in each scenario. Our updated assumptions and evidence base is set out below.

Financial Conduct Authority (FCA) work found that customers spend one hour switching or negotiating with their current supplier in the general insurance market[69].

[68] 'Counterparty credit risks in a future English household water retail market', FTI Consulting for Thames Water, March 2016
[69] 'Increasing transparency in general insurance markets', Financial Conduct Authority, December 2015

Its evidence, collected in a survey of customers, found that at one firm, 50% of consumers who did not shop around believed it would take more than 1 hour to do so, whereas only 31% of consumers who did shop around actually spent more than 1 hour. At another firm, 56% believed it would take more than 1 hour and 57% actually spent this time[70].

The Competition and Markets Authority reported that 39% of energy customers spent less than an hour searching for information about other suppliers and comparing to their own supplier, while 48% spent between one and four hours (although the survey did not state how long) and 13% spent more than four hours[71]. These estimates do not distinguish between customers who searched and did not switch and those who did switch.

However, existing evidence presents a snapshot of customer interactions in today's markets. This analysis uses a forward-looking estimate of search costs, over the thirty-year period of analysis. New business models being applied in the energy market today suggest that over time at least some energy customers will spend considerably less time engaging in the market. Examples such as Flipper, Swuto and Voltz demonstrate that even today some customers spend no time on engaging with the market (although they pay for this or share the savings they make).

Our emerging findings assumed that customers would spend between 7.5 minutes and 22.5 minutes searching and switching – an amount of time that was assumed to be equal for switchers and active customers who do not switch. These values are lower than suggested by evidence from the energy market today, which we took into account in updating our assumptions in our final findings.

Stakeholders, including an expert academic and potential new entrants, noted two further points with regard to our estimates, which we have taken into account in these updates. First, that some customers switch without any search costs, which would lower the average time cost assumed for switchers, and second, that customers searching and switching would likely need longer to engage, given the time required to carry out the switch, which would increase the average time cost assumed for switchers. Though we agree with these points, no specific evidence has been found on the magnitude of these factors. In our updated analysis therefore, we assume that these factors cancel each other out. Consequently, we have estimated potential time taken for customers to engage using the same methodology as in our emerging findings, but we have updated our estimates of the amount of time taken to engage taking into account the factors above. The final analysis increases our

[70] Ibid
[71] 'Appendix 9.1: CMA domestic customer survey results' (para 239), Competition and Markets Authority, June 2016

assumptions about the amount of time customers spend engaging in the market to those set out in Table 11.

Table 11: Customer search costs for each scenario (compared with our Emerging Findings assumption)

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Emerging findings – search cost assumption (£/switch)	1.8	3.5	3.5	5.3
Value of time (£/hr)	14	14	14	14
Average time spent engaging (minutes)	30	45	45	90
Updated search cost of each switch (£/switch)	7	10.50	10.50	21

How the assumption is applied

As in our emerging findings, our analysis applies this search cost to each customer who switches according to the switching rate in each scenario. Customer switching rises over time based on the assumption about how competition develops in each scenario, Switching rises to the maximum specified level, over the specified time period over which competition develops. In the case of customer search costs, it is assumed that, for every customer switch, a customer incurs the same search cost, but does not switch.

The modelling assumes for simplicity that search costs for individual customers are constant over time. Assumptions must therefore take into account that search costs may be lower over time (particularly in Scenario 1 where technology has a considerable influence).

Estimating the benefits of introducing retail competition

All calculations used to estimate the benefits of introducing retail competition are for an overall, market-wide level, against the status quo described earlier. This modelling allows us to specify a one-off cost reduction to be applied at the beginning of the period when competition is introduced and an ongoing efficiency saving to be applied annually over time. Cost-efficiencies were also linked to an assumption about the timing of the introduction of competition, such that benefits only apply from

that date[72]. All benefits are phased in according to the development of competition described above.

To address the uncertainty around benefits, ranges have been created around central estimates for each category of benefits. Sensitivity analysis has been conducted within these ranges, as summarised earlier. These ranges are generally set to +/- 25%, except where there is specific evidence or a rationale for identifyinga different range.

Customer experience and service quality

Our qualitative assessment of the benefits for customer experience and service quality is described in section 3.4 and chapter 4 of this report.

Cost-efficiencies for retailers providing services

This section describes the cost-efficiency savings applied to the retail supply chain in the active share and the inactive share as described earlier. The analysis modelled ongoing benefits from competitive rivalry between retailers, beyond the ongoing efficiency savings from comparative regulation that are already built into the counterfactual. These are applied as a compound annual percentage saving, then compared with the counterfactual to estimate a benefit figure.

This saving is applied to operational and capital expenditure, using the same methodology. While, in practice, efficiencies may differ between operational and capital expenditure, this simplified assumption was made in the absence of good evidence to support any difference.

We did not receive any further evidence form stakeholders and have retained the assumptions from our emerging findings.

Efficiency savings in the active share of the market

In previous analysis of the introduction of business retail competition carried out by Professor Cave, ongoing efficiencies in the absence of competition are assumed to be 2% a year. The Cave Review is clear that the benefits of retail competition are higher. The counterfactual for this analysis, based on Defra's future water bills work,

[72] This is a simplified assumption made for modelling purposes. In practice, some benefits might be realised before market opening, particularly if separation, retail exit and/or mergers occur.

assumes that efficiencies realised through comparative regulation decrease over time. Specifically, Defra's work, on which this counterfactual is based, assumes that efficiency savings from competition are 1% a year for what will be PR19 and 0.5% from then on.

The government has estimated efficiencies that the introduction of business retail competition will bring to the residential retail value chain. These benefits over and above comparative regulation (for businesses) have already been 'banked' and so must not be double-counted in this analysis. Those benefits are incorporated into the counterfactual for this analysis and are removed from the incremental efficiencies from the introduction of competition. Consequently, this analysis reduces its estimates of incremental efficiencies in the residential retail value chain by the amount of spill-over benefit assumed in the government's impact assessment of the Water Act 2014.

Our previous work described a range of estimates of upfront and ongoing efficiencies that could arise from the introduction of retail competition, in the context of introducing business retail competition[73]. These estimates detailed a range of sources that were considered to support assumptions in the Cave Review that one-off efficiencies from the introduction of competition would amount to 10% in the counterfactual, with a low and high sensitivity of 5% and 20% respectively. Similarly, those sources were considered reasonable in support of the Cave Review assumption of 1.5% ongoing efficiencies from competition, with low and high sensitivity of 1% and 2% respectively. These assumptions were not specifically for the business part of the water sector, so can be applied in the same way to the residential water retail. Little additional evidence has been found since we last considered these estimates.

For this analysis, two further considerations were taken into account. To avoid double-counting benefits already assumed in the analysis of business retail competition, estimates were scaled down by the spill-over benefit already applied to residential retail[74].

In Scotland, the introduction of retail competition in business supply has led to large benefits over time. In January 2012, Business Stream reported that, since the April 2008 introduction of business retail competition in Scotland, it had lowered costs by

[73] 'Ofwat's review of the evidence base for retail competition and separation' Ofwat, 2011 (section 5.1)

[74] The latest Non-Household Impact Assessment applied 18.75% of the efficiencies achieved in non-household supply to household retail activities, as spill-over efficiency improvements. Therefore, this analysis applies 81.25% of the headline efficiency figures set out here, avoiding double-counting the 18.75% that is already likely to occur from the introduction of non-household retail competition.

18%[75]. However, Business Stream deals with only one water undertaker so there is no equivalent comparison with England. This cost reduction was achieved despite significant efficiencies realised through regulation in the period leading up to competition – a 35% reduction in costs from 2002 to 2012[76]. WICS identified in 2011 that ongoing efficiencies were realising efficiencies of 1% per year, over and above the status quo of comparative regulation, applied to the entire business retail cost base.[77]

Taking all this evidence into account, it is reasonable to assume the same generalised efficiency savings as for business competition, scaled down to avoid double-counting benefits already assumed in the business competition impact assessment. Potential efficiency savings for the active share of the market are assumed to be 8.13% up-front and 1.22% per year ongoing as a central scenario. A low sensitivity has been added, with upfront efficiencies of 3.75% and ongoing efficiencies of 0.75% per year respectively. No high sensitivity has been added, reflecting a conservative approach that seeks to avoid over-estimating efficiencies (over and above levels that the literature suggests possible).

The government impact assessment of business retail competition notes the large body of academic evidence that suggests a 30% uplift in ongoing efficiencies as a result of competition over regulation is likely to be a conservative assumption. In other regulated sectors, empirical evidence suggests that the efficiency gains following the introduction of competition (beyond those of regulation) is anywhere between 15% and 87%, with simple average rates of around 40%[78]. Over the modelling period considered in this analysis, assumptions applied to Scenario 2 lead to efficiency savings of 32% overall by the end of the period (comparing total costs per customer with today). The respective figure for Scenario 1 is 46%. This sense-check suggests that the most optimistic Scenario 1 is plausible.

Efficiency savings in the rest of the market

As described above, government's assessment of the benefits of business retail competition incorporated spill-over benefits to the residential retail cost base. These benefits were applied throughout this base.

[75] 'Written Evidence submitted by Business Stream to the Environment, Food and Rural Affairs Committee', Business Stream, 2012
[76] 'Retail Competition: the story so far, the journey to come', WICS, 2011
[77] Ibid (p17)
[78] As noted in the government's impact assessment of non-household retail competition.

We previously noted that drivers of productivity growth from competition could be expected to affect whole businesses and, therefore, costs associated with serving contestable but inactive customers[79]. This incentive would only not apply if a whole company were subject to insufficient rivalry to put pressure on their costs. These transfers of knowledge, practices or cost-savings could occur within retailers in response to competitive pressure from existing retailers, new retailers, the threat of new entry, or through retailer mergers or acquisitions.

Similarly, cost-savings made in the active share of the residential retail cost base could be expected to spill over to the remainder of the residential retail cost base to some degree. Some efficiencies that retailers make in the active share of the market are also likely to apply in the inactive share, because of common activities, processes and assets across the two parts of the market (call-centres or billing systems, for example). This spill-over assumption captures the transfer of knowledge, best practice or economies of scale that could be realised even within the cost base that is not serving the active part of the market.

No precedent was found for setting the level of spill-over from one part of the residential retail market to another[80]. In the absence of relevant evidence, this analysis assumes that one-off and annual ongoing efficiency savings in the inactive share of the market are half the values for the active share of the market.

Table 12: Summary of retail cost-efficiency assumptions

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Active share of the market	50%	30%	30%	15%
Active retail cost-efficiencies: one-off	15%	8.13%	8.13%	3.75%
Active retail cost-efficiencies: ongoing (per year)	1.22%	1.22%	1.22%	0.75%
Inactive spill-over retail cost-efficiencies: one-off	7.5%	4.07%	4.07%	1.88%
Inactive spill-over retail cost-efficiencies: ongoing (per year)	0.61%	0.61%	0.61%	0.38%

[79] 'Ofwat's review of the evidence base for retail competition and separation' Ofwat, 2011 (para 147)
[80] The spill-over assumption applied in Professor Cave's analysis is relevant to spill-over effects from non-household retail to residential retail, which differs to the application in this analysis.

Wholesale cost-efficiencies

The Cave Review estimated that the introduction of business retail competition would result in one-off wholesale efficiencies of 0.5%, applied to total wholesale operating expenditure. The rationale was that separation would lead to transparency of wholesale costs and rivalry between retailers would result in them putting pressure on wholesalers to lower prices. This would result in cost reductions. We viewed this estimate as conservative in our 2011 evaluation[81], on the basis that only the effect of wholesale and retail separation was estimated, whereas the effect of retailers championing the needs of customers was not.

In the government's updated impact assessment of business retail competition, a saving of 0.5% was applied to total in-house wholesale water and sewerage costs (totex), scaled down by the proportion spent in-house.

The Water Act 2014 provides for opening wholesale markets to competition. The opening of wholesale markets is under development. We set out our policy framework in May 2016, with links to wider government policy on bringing relevant parts of the Water Act 2014 into force, as well as water licence abstraction reform. Some parts of wholesale services are a natural monopoly and not likely to be open to competition – water distribution and wastewater collection, for example. Our framework focuses on water and bio-resource processing and disposal, which together are about 15% of the customer bill, while raw water distribution and treatment amount to another 10% of the bill.

The extension of retail competition from business customers to residential customers would expand the proportion of the downstream market open to competition from about 30% to 100%. This would significantly increase scope for retailers to buy water resources from third parties rather than rely on existing wholesalers. Water resources are likely to remain local and, therefore, significant market share at retail level in relevant areas is likely to be important to market development.

We identified[82] major efficiency gains in water resources from avoiding the costs of expensive new water resources. The extension of the competitive proportion of retail from is likely to significantly increase scope for retailer/third party water resource providers. This assumes that the same framework for business customer retailers for engaging in wholesale market applied to residential customer retailers, although this is not the only potential source of this benefit as we explain below.

[81] 'Ofwat's review of the evidence base for retail competition and separation' Ofwat, (para 171)
[82] 'Water 2020: our regulatory approach for water and wastewater services in England and Wales', Ofwat, May 2016

This analysis of potential residential retail competition applies a 0.5% efficiency saving to all wholesale totex as a central assumption, applied to the wholesale cost base, profiled over time as competition develops. Although the proportion of water purchased by competitive retailers would increase from about 30% to 100% of the total market, this analysis applies the same efficiency saving to wholesale costs. This may seem conservative, but appears prudent for reasons we explain in this report.

Several stakeholders, in particular incumbent water companies and their Customer Challenge Groups, questioned the assumption that water retailers would exert pressure on wholesalers to lower their costs and requested that we set out the specific mechanism through which this could occur. In our view, this would occur through two mechanisms:

- Competitive retailers would act on behalf of their customers to challenge charging disparities across wholesale companies. We note, as identified by some stakeholders, that under current charging rules wholesalers would consequently have to change their charges for all retailers. This is true, but it is hard to see that either incumbent retailers and new entrant especially would ignore such eventualities, as lowering wholesale charges would offer the opportunity for higher profit in any market that was not perfectly competitive. Pressure will come from two sources – the evidence retailers will have about what customers want from their relationship with them, and from involvement in developing plans for wholesale.
- Furthermore, residential retail competition would increase the significance of Ofwat's wholesale market reforms, particularly for water resources (with 100% of the downstream water market open to the bilateral market for water resources, rather than 30%).

Given uncertainty around the potential value of efficiency savings, this analysis compared overall efficiency savings implied by these assumptions with our own estimates of the benefits of wholesale competition as part of our Water 2020 programme. We identified the present value of companies' future spending plans on water resources at £2.5 billion from 2020/21 to 2049/50[83]. These plans reflect the current regulatory framework and a limited role for market mechanisms. This work also identified that significant differences in costs between and within companies

[83] 'Water 2020: our regulatory approach for water and wastewater services in England and Wales – Appendix 3 Tackling water scarcity – further evidence and analysis', (p40), Ofwat, May 2016

may indicate potential gains that markets could unlock. This work also identifies evidence that wholesale markets could deliver significant efficiency gains[84,85].

Our 2015 analysis estimated the present value of efficiency gains in investment in new water resources at £125 million to £250 million for England, based on 5-10% improvements in the efficiency of investment in new resources only[86]. This analysis also estimated the present value of efficiency gains from existing water resources at £75 million to £226 million, based on a total efficiency saving of 1-3%. These estimates, therefore, total between £200 million to £476 million of benefits. By comparison, the estimated present value of potential water efficiency improvements from residential retail competition is £0 to £771 million, depending on the scenario[87]. Expanding the retail market from about 30% of the market (by consumed volume) to 100% might be expected to deliver double the efficiency savings, supporting the assumptions that we have made about efficiency savings in wholesale costs.

Taking these factors into account, we have retained our emerging findings assumptions. These conservatively scaled wholesale efficiency savings considerably below the equivalent assumed in the government's analysis of the business market opening. This is despite the likelihood that pressure from residential retailers would be significantly greater than that exerted by business retailers.

No specific adjustment has been made to avoid double-counting from the Non-Household Impact Assessment, because this figure represents efficiencies driven by new pressure on wholesale costs from new retailers, rather than any change in behaviour among retailers serving business customers. Low and high sensitivities of 0.25% and 0.75% have also been created to inform additional scenarios.

How the assumption is applied

To reflect the fact that any company separation that drives wholesale efficiency will not happen immediately, these efficiencies are nonetheless assumed to be realised over time, rather than applied at the outset of residential retail market opening.

[84] 'A study on potential benefits of upstream markets in the water sector in England and Wales', Ofwat, 2015
[85] 'Water 2020 – water resource planning and third-party options', Frontier Economics and South East Water, July 2015
[86] 'Water 2020: our regulatory approach for water and wastewater services in England and Wales – Appendix 3 Tackling water scarcity – further evidence and analysis', (Table 5, p44), Ofwat, May 2016
[87] These values are not directly comparable because estimates in this analysis are in 2012/13 prices and estimates in Ofwat's Water 2020 analysis are in 2015/16 prices.

Table 13: Summary of wholesale cost-efficiency assumptions

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Spill-over wholesale cost-efficiencies: one-off	0.75%	0.5%	0.5%	0.25%
Phased in over time taken for competition to fully develop	10 years	15 years	15 years	20 years

Additional metering cost-efficiencies

Metering costs incurred by retailers are those associated with meter operation activities, such as reading meters and managing customer data. The costs associated with meter ownership are not included, as in this analysis retailers are assumed not to own the meters.

We considered whether residential retail competition had the potential to lower metering costs, beyond general efficiencies applied across retail services. Competitive retailers would be likely to roll out smart technology where it has value – and this is an area with fast-paced technological development. Retailers can put pressure on incumbent meter services, similar to arrangements in business retail, which could put downward pressure on metering costs. In the absence of specific evidence, however, savings on top of efficiencies already assumed are more likely to arise with more active levels of retail competition, so are set at a zero (at the low end). A high saving of 1% is applied only in Scenario 1.

How the assumption is applied

As with our approach to additional bad debt efficiency savings set out below, our analysis applies the additional metering cost savings over and above general retail efficiencies applied throughout the value chain. As with general retail efficiency savings, additional efficiencies to metering costs are profiled over time, rising according to assumptions about the development of competition in each scenario, rising linearly to the maximum specified level and over the specified time period for the development of competition.

Table 14: Summary of additional metering cost-efficiency assumptions

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Assumed annual additional metering cost-efficiencies (%)	1%	0%	0%	0%
Phased in over time taken for competition to fully develop	10 years	N/A	N/A	N/A

Additional bad debt cost-efficiencies

Efficiency savings in bad debt costs are also considered in this analysis, beyond the general efficiencies applied to the residential retail value chain. Companies facing competition would have new incentives to lower their costs, to increase margins or offer more competitive offerings to residential customers. We include additional efficiency savings over and above this, to reflect the fact that bad debt costs in water appear significantly higher than other sectors such as energy. This means there could be further opportunity for competitive retail incentives and improved customer data as a means to lower bad debt costs.

Comparison between water and other sectors

A wide range of stakeholders have identified several factors that have an influence on companies' ability to control bad debt costs:

- whether a retailer can disconnect (or threaten to disconnect a customer);
- whether a retailer can force a customer to have a prepayment meter and thereby enforce a repayment plan; and
- the ability to identify individual customers to recover payments.

How important is the disconnection regime?

In the energy market, few customers are disconnected each year (233 across gas and electricity in 2014). Some stakeholders have argued that the threat of disconnection may be just as important in deterring customers from not paying their bills. However, in practice, not all water companies used disconnection prior to the ban and this did not seem to affect their bad debt rate. We also note that the number of disconnections in energy has fallen by more than 99% compared to the 10 years ago, but there appears to be little impact on bad debt, which suggests that simple assumptions about the link between the disconnection regime and bad debt are not supported by the evidence.

One water company provided analysis to support its argument that the threat of disconnection was more of a factor on debt collection than the actual number who disconnected. In 1997, the industry was still allowed to disconnect residential customers for non-payment and, although it cut off more customers than any other supplier, levels were still very low. Once disconnections were prohibited, bad debt began to rise more rapidly, illustrating the importance of the threat of disconnection for customers.

Another stakeholder noted that 43% of customers surveyed by Step Change[88], a debt-management charity, had been threatened with disconnection for non-payment of energy bills, but only 1% had been disconnected by their energy supplier. This indicates the potential importance of the threat of disconnection as a way to encourage customers to pay bills, even if few customers are actually disconnected. Several stakeholders reported the importance of self-disconnection, with many more energy customers having self-disconnected through prepayment meters.

However, it is important to recognise that there are many other ways in which suppliers support the reduction and repayment of bad debt. For example, Ofgem has put in place principles for debt management that large suppliers must follow. These state that suppliers should make proactive contact with customers to prevent debt build-up and agree affordable debt repayment rates[89]. These measures do not rely on disconnection nor on the threat of disconnection. Ofgem has stated that suppliers must not disconnect domestic customers for non-payment of debt unless they have taken all reasonable steps to recover debt using alternative repayment methods[90]. While this supports the view above that the threat of disconnection can be important, it also illustrates that there are many other possible ways to recover debt.

We conclude that the threat of disconnection in energy may well be a factor contributing to its lower bad debt costs, but there is also evidence to contradict this. We did not receive any evidence that helped to quantify the relative importance of this factor compared with other actions taken by energy suppliers to recover debt and reduce customers' default rates.

[88] 'Creditor and debt collector conduct', Step Change, July 2016
[89] 'Domestic suppliers' social obligations: 2014 annual report' (p34), Ofgem, September 2015
[90] Ibid (p46)

How important are prepayment meters?

In the energy market, retailers are permitted to install prepayment meters to recover debt. They must first attempt to contact customers in debt to arrange repayment, which typically involves at least one visit to a customer's premises[91].

Disconnections for energy debt remain low – just 223 customers had their service cut off in 2014. However, a range of stakeholders referenced a Citizens Advice report that, if temporary self-disconnections are included, 1.62 million customers had their service cut off in 2014[92]. This figure, though, should be interpreted with caution in this context. Citizens Advice say that this figure includes customers doing so because of "high costs, difficulty topping up or faulty meters", the latter two reasons being facets of prepayment meters that actually contribute to disconnection in the wider sense noted above, rather than an indicator that a customer would otherwise not have paid their bill. This is a complex issue with many potential causes of self-disconnection, and neither figure above represents the full picture.

In the energy market, prepayment meters can be effective in tackling debt. They prevent a customer going back into debt once the initial debt is gone, and prevent any subsequent customer at the same premises (on change of tenancy/ownership) from getting into debt. Prepayment meters can reduce customer default rates if installed in premises (private-rented sector, or social housing) where occupiers change frequently and/or are particularly susceptible to debt. Therefore, debt levels (and bad debt) could be higher in energy in the absence of prepayment meters, as they can help to prevent debt build-up in the first instance.

In comparing relative levels of debt in energy and water, we recognise that the presence of prepayment meters in energy as a debt prevention tool (as opposed to debt recovery) is a significant difference. However, we do not have sufficient evidence to conclude that the option of prepayment meters explains a lower cost of debt and debt management for energy than water.

However, there are other important ways to recover debt and the threat of disconnection or prepayment is not a necessary part of the process, as demonstrated in energy, where 83% of repayment plans do not use prepayment meters[93]. Alternatives include direct debit repayment arrangements (60%) and budget payment schemes (13%). Fuel Direct offers another alternative in energy[94], but is seen as a last resort. Water Direct is an equivalent option in the water sector.

[91] Ibid (p34)
[92] '1.62 million prepayment energy consumers cut off each year', Citizens Advice, October 2014
[93] 'Domestic suppliers' social obligations: 2014 annual report' (p24), Ofgem, September 2015
[94] Ibid

This suggests that even though prepayment meters may reduce the number of customers getting into bad debt – and prepayment meters are widespread – they are not an essential component of repayment plans for a large majority of customers.

The scale of bad debt in energy compared with water

In energy, we estimated that the value of outstanding debt without a payment plan across electricity and gas was around £0.59 billion and the value of outstanding debt with a payment plan at £0.49 billion, based on Ofgem data[95]. This amounts to around £1.08 billion of outstanding debt, around half of which is being repaid by customers through a repayment plan. In comparison, £2.2 billion of residential water revenue was outstanding in 2014[96]. This despite industry revenues from residential energy customers being just under £27 billion[97], set against total industry revenues of around £9.8 billion for residential water and sewerage customers[98]. These figures reflect the fact that water bills are, on average, less than a third of energy bills[99].

In other words, in energy the total stock of bad debt (including debt being repaid and debt not being repaid) is around 4% of total industry revenues. Whereas in water, the total stock of bad debt is around equivalent to around 22% of total industry revenues for residential customers, or around 5.5 times the proportion observed in the energy market.

In our emerging findings report we also compared water with council tax collection. Incumbent companies and consumer representatives reported that this was not a valid comparison because councils can prosecute people not paying their council tax. It is not clear to what extent this feature contributes to effective collection rates, but it does represent a significant difference between utilities and council tax, also noted be several stakeholders. We have therefore not pursued this comparison further here. However, our original analysis suggested that an early relationship with the customer and more frequent contact, a common feature to energy and for council tax, went some way to explaining lower bad debt compared to the water sector.

[95] 'Supplier performance on social obligations', Ofgem. Estimates take outstanding debt multiplied by number of customers with debt outstanding. Using latest available data, for quarter four, 2014.
[96] 'Affordability and debt 2014-15', Ofgem, December 2016
[97] 'Energy market investigation – final report' (para 2.137, p123), Competition and Markets Authority, June 2016
[98] Ofwat data on total allowed revenue across wholesale and retail price controls for PR14, in 2015/16.
[99] Comparing an average energy bill of £1,280 a year with an average water bill of £385 a year, according to 'A better deal: boosting competition to bring down bills for families and firms' (p5), HM Treasury, November 2015

The role of competition in reducing bad debt in water

We have estimated the impact of competition on bad debt costs compared to the counterfactual. One existing company noted that retail competition would require retailers to identify individual customers, rather than billing households, because retailers could not switch customers without this information. This would help water retailers recover bad debt[100]. Another company said that this could be challenging and we noted that improving data could be a significant proportion of the necessary costs of introducing competition, and would be unlikely to be cost-effective for bad debt alone, given existing levels of debt. Introducing competition may not be the only way to improve retailers' data, but it does provide a necessary incentive for companies.

Retailers may also innovate to find new ways to recover bad debt. Unlike the energy market, disconnection and mandated prepayment meters would not be an option without further policy changes, but other methods for recovering debt are available. Retailers will focus on revenue management by establishing a relationship with the customer on acquisition. Furthermore, innovative retailers may also develop new ways to lower bad debt costs. Multi-utility entry may also provide greater scope for bad debt reduction, through cross-utility methods for managing customer debt. If multi-utility retailers were prevalent in the market, we might expect the bad debt rate in water to move towards other sectors.

Our assumptions for this analysis

Several incumbent companies reported their view that additional bad debt efficiency savings would not be triggered by competition. However, based on the evidence and rationale set out above, we remain of the view that there are good reasons to think that competition would deliver additional efficiency savings to bad debt costs. We recognise that introducing competition would be likely to reduce the flow of new bad debt to a greater degree than the stock of existing bad debt (some of which dates back a number of years). We have taken this into account when setting additional bad debt efficiency savings, compared to the total effect of our assumption on the annual cost of bad debt.

Some stakeholders interpreted our analysis as based on reducing bad debt to levels in energy. However, the assumptions made in our emerging findings were more

[100] One stakeholder noted that companies would need to improve this information to be able to provide an effective and reliable switching process that customers could be confident in. This potential cost of operating in the market is included in estimates made in this analysis. Competition would require such changes to be made and our analysis assumes no policy changes in its counterfactual, so is attributed to the introduction of competition.

conservative than that. In our most optimistic Scenario 1, annual bad debt costs fall to 45% of what they otherwise would have been, by the end of the 30-year period modelled, equivalent to around £1 billion of water bad debt. This would imply bad debt levels of around 10% of total annual revenue, which remains well above that seen in energy.

No specific quantitative estimates of the potential effect of competition on bad debt costs have been provided to date. In the absence of specific information, this analysis seeks to quantify the effect of reduction in bad debt at a plausible rate in comparison with other sectors, as illustrated above. Scenarios 2 and 3 illustrate the potential effect of bad debt costs decreasing by 1% per annum beyond efficiency assumptions applied to the rest of the retail cost base. This assumption, combined with general efficiency savings, leads to a total reduction in bad debt costs of 22% by the end of the modelling period (beyond general efficiency savings). This still assumes that bad debt in the water sector remains well above the level of the energy market. Low and high sensitivities have also been created (0% and 2% respectively) and applied in alternative scenarios.

Our analysis quantifies the scale of benefit that could be achieved by lowering bad debt cost towards efficient levels and draws on evidence from other sectors. As with other assumptions, market design and policy will be very important in determining the extent of efficiencies that are realised, and how quickly this occurs.

On this basis, our assumption on bad debt efficiency savings, in particular the well-functioning market applied in Scenario 1, appear reasonable – this is even when taking into account some considerable differences between the water sector and other sectors as noted by some stakeholders. Responses from new entrants and those operating in the energy market did not raise these same concerns or suggest that benefits would not arise. We also anticipate that the benefits from improved revenue management when acquiring a customer will means that these efficiencies arrive earlier than the gradual improvement that we have assumed.

How the assumption is applied

As in our emerging findings, our analysis applies the additional bad debt efficiencies over and above general efficiencies applied throughout the value chain[101]. As with general efficiency savings, additional efficiencies for bad debt are profiled over time, rising, according to assumptions about the development of competition in each

[101] Additional bad debt efficiency savings are applied after taking into account general efficiencies.

scenario, rising linearly to the maximum specified level, over the specified time period for the development of competition.

Table 15: Impact of annual bad debt cost-efficiencies in 30 years' time

Savings by year 30	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Assumed annual additional bad debt cost-efficiency (%)	2%	1%	1%	0%
Total bad debt costs as proportion of status quo bad debt costs (%)102	45%	61%	61%	88%

Water efficiency

We have analysed the potential effect of residential retail competition on water efficiency. With competition, retailers will look to attract customers with services to help them lower their bill, rather than competing on retail costs alone. Responses from new entrants to our emerging findings indicated how water efficiency could be used as part of their business model, including combining water and energy efficiency offers to customers. There are, however, two key factors that make these potential costs and benefits challenging to estimate. Firstly, the extent to which market developments will lead to water savings is uncertain. Secondly, the value of those savings is also uncertain, in terms of overall reduction in water demand and also in terms of potential improvements to resilience of supply. These factors are explored below.

There is evidence of water efficiency savings from competition in the business retail market in Scotland. Business Stream and other retailers in Scotland were able to reduce consumption by an average of 2% for all customers[103]. These savings were largely attributed to the increased incentive for existing companies to help businesses lower their water bills. This is one way in which the benefits of competition extend to many more customers than those that have switched. In total, Business Stream achieved more than £35 million in water efficiency savings[104].

[102] This takes into account retail efficiencies applied across retailers' cost base and the additional bad debt efficiency savings that we have assumed over and above those retail efficiencies. It therefore represents the total impact of competition on bad debt costs over the 30-year period that we modelled.
[103] 'Competition in the Scottish water industry and the environment: submission to the EFRA committee', WICS, 2009
[104] 'The benefits of competition', Business Stream

The Non-Household Impact Assessment concluded that, in a competitive market, retailers have the incentive to improve water efficiency, as this reduced customers' total cost and allows retailer and customer to share savings. The assessment applied the 2% efficiency savings in Scotland to the contestable segment of the market in England, which was equal to 930,833 Ml. This saving was given a monetary value by adapting a long-run marginal cost estimate from the Walker report of £400/Ml[105]. Gains were assumed to take five years to materialise, allowing for the development of competition. Benefits were then profiled according to the development of competition over the estimated time period, under the voluntary separation assumption.

The Water Industry Commission for Scotland found that bespoke billing arrangements, environmental solutions and water efficiency advice offer retailers opportunities to differentiate services in addition to cost savings[106]. It also reports observing many examples of 'gain-share' arrangements, in which benefits and reduction in wastewater have been shared between the retailer and the customer.

These examples demonstrate that, in principle, retail competition effectively promotes water efficiency. However, businesses generally have larger water bills and so have larger potential absolute gains to make. Therefore, residential retailers would have to find cheaper means of helping residential customers to save water. On the other hand, potential water savings may be one of the easiest and quickest ways that retailers can offer customers lower bills, given that wholesale costs form such a significant part of the overall customer bill (currently around 92% of the total residential water and wastewater bill). New customer contact methods, such as greater use of mobile apps, and new understanding of effective ways to influence and communicate with customers from behavioural research provide new scope for effective engagement with customers on a mass scale. This suggests that the enhanced incentives for water efficiency arising from competition can deliver significant benefits.

Below, we explain the method used in this analysis to estimate how much water might be saved and to estimate the benefit of saving that volume of water.

The potential scale of water efficiency savings

This analysis examined evidence on the potential for residential retail customers to improve their water efficiency.

[105] 'The independent review of charging for household water and sewerage services (Walker Report)', Defra, 2009
[106] 'Overview of the competitive retail market for water and sewerage services', Ofwat, January 2014

Historically, monopoly providers have had some success in reducing demand. Large providers in the south-east of England have reduced consumption by around 10% over the past15 years, despite rising population. Consumption per head in England has reduced by around 8% in the same period[107]. However, the highest per head rate of residential consumption is currently 40% higher than the lowest (comparing company averages). This suggests significant scope for further improvements in water efficiency. Both the best and average performance for water efficiency lags behind other European countries. Along with developments in technology and understanding how to communicate and influence customer behaviour, competitive retailing has considerable scope to reduce demand.

Waterwise reported on how much water can be saved in a residential property through using a variety of devices[108]. It found that a water-efficient showerhead could save the average residential customer 3,762 litres of water a year and a dual-flush toilet could save 8,371 litres of water a year, or about 2.8% and 6.2% of average residential consumption respectively[109]. These examples demonstrate the scale of savings that could already be made by residential customers using simple devices to lower consumption.

Competitive retailers can help customers to save water by providing information, water-saving devices, or water-saving programmes such as that offered by Water Corporation in Australia[110]. Retailers may also offer smart meters to help their customers save water. Sønderlund et al found in a survey of evidence from Europe and Australia that smart meters can reduce consumption between 3% and 53.4%, with an average of 19.6%[111].

Although these possibilities are available in the market today, residential retail competition could give retailers reason to promote such devices to help their customers save money. As noted above, this could offer retailers significant potential to differentiate themselves from their competitors on overall bills, and also in terms of brand, service quality or non-price factors such as environmental considerations.

We also compared residential customer water use in England and Wales with other European countries where data was available. Several European countries have

[107] Ofwat calculations based on EA annual returns submitted by companies.
[108] 'Green Deal guidance for the water sector', Waterwise, November 2012
[109] Based on per household consumption submitted by companies (for England and Wales) in PR14.
[110] 'Water saving programs', Water Corporation
[111] 'Using smart meters for household water consumption feedback: knowns and unknowns', Procedia Engineering (89, 990-997), 2014

significantly lower consumption per residential customer than England and Wales (Figure 7)[112].

Figure 7: Comparison of customer consumption for metered properties (individually-metered properties with data), in litres per customer per day

Source: Environment Agency[113]

On this basis, savings of 20% of projected water demand appear plausible over 30 years for metered customers, particularly given that we only apply this assumption to metered customers who are active in the market. Some stakeholders said our assumption on efficiency savings was optimistic and that our counterfactual was not appropriate in this context. Although some gave examples of individual savings planned or water-saving programmes that should be taken into account in the counterfactual, none provided specific quantitative evidence to update it. We also consider that the counterfactual, based on companies' own water resource management plans, represents the best available information on water companies' expectations of consumption trends (both overall and per residential property).

We apply assumptions on additional water efficiency improvements only to active and metered customers[114]. This is to reflect that only customers with meters can

[112] 'International comparisons of domestic per capita consumption' (p26), Environment Agency, December 2008. This compared northern European countries with similar climate conditions and examined metered household consumption, although noting that in some countries a considerable proportion of metered households are in apartment blocks, which do not have individually metered properties. This was particularly true in Belgium and Germany, and to a lesser degree in the Netherlands. This study concluded that water prices partly contributed to declining consumption in some of these countries, but that household size and national water charges did not explain differences in average national per capital consumption.
[113] Ibid
[114] This estimate assumes that metered customers are no more likely to be active than inactive. This may also be a conservative assumption. In practice, metered customers are perhaps more likely to be

lower their bills by saving water. Residential customers who are metered have a much higher probability of investing in water-efficient equipment compared to residential customers who pay a flat fee[115].

One stakeholder interpreted our counterfactual as being based on constant per customer water consumption over time. In fact, metered per customer consumption in our counterfactual decreases by 5% over the modelled period, based on Defra's future water bills modelling.

In this analysis, we do not assume that there will be any change to the level of metering (which in south-east England is forecast to be at 83% by 2030 in any case[116]), nor smart metering. Nonetheless, any increase in either, or both, could be one factor driving water efficiency improvements. We have not specifically quantified and included the costs of any such measures because, if they occur beyond our counterfactual scenario, they represent an investment made by retailers as part of a commercial decision. It is important to recognise this as a potential source of additional water efficiency, however, beyond that assumed in this analysis.

Given that this assumption applies only to a small portion of the market (metered residential customers in the active part of the market), we still believe that this assumption is reasonable in Scenario 1.

The value of potential water efficiency savings

Attributing a monetary value to water efficiency savings requires an estimate of the cost of producing and providing extra water resources. However, there is currently no standardised approach for this in the water sector in England. NERA found inconsistent approaches to estimating the cost in a survey of concepts applied in the water industry in England and Wales and in Australia[117]. In particular, it highlighted the 'lumpy' (high cost, low frequency) nature of capital expenditure on water resources. Large variation in development costs across England and Wales also creates challenges for our estimates. We reported recently[118] that water

active than non-metered customers, many of them having already engaged with their water supplier to choose metering.

[115] 'Household adoption of water-efficient equipment: the role of socio-economic factors, environmental attitudes and policy', Millock and Nauges, 2010

[116] Ofwat analysis based on 2014 Water Resource Management Plans.

[117] In particular, regulators take varying approaches to estimating the value of water and no consensus was observed as to whether to use an average incremental cost or long-term marginal cost methodology. See 'Incorporating marginal costs in water supply tariffs: prospects for change', NERA, 2014

[118] 'Water 2020 Regulatory framework for wholesale markets and the 2019 price review, Appendix 2 – Water resources – supporting evidence and design options', Ofwat, December 2015

development costs vary by more than £200/Ml between the highest and lowest cost of the next-cheapest scheme in each area.

This analysis has not attempted to calculate estimates of the value of water. Instead, it uses an existing (simple) estimate also used for the Non-Household Impact Assessment, which was based on information provided in the Walker Review[119] of £400/Ml. Other estimates quoted by NERA[120] indicate a value of around AU$2,000/Ml. However, this comparison is distorted by exchange rate movements and significantly different local demand and supply conditions that determine the value in Australia, so this estimate is not likely to be representative of the value in England and Wales. The estimate we used has drawbacks, but is the most recent estimate specifically applicable to England and Wales. The true value of water over the time period of this analysis is challenging to estimate, particularly given the 'lumpy' and uncertain future need for extra water resources.

Benefits from hot water efficiency savings

Any improvement to water efficiency that helps customers save hot water could also have additional benefits in terms of reduced energy use, carbon saved or environmental protection. These benefits are linked to the use of water-saving devices, which can also save energy for some customers, particularly if water is heated on demand.

These potential savings are not reliant on multi-utility retailing, but could contribute to further water efficiency and combined savings on energy bills. For example, the Water Research Foundation found that customers prefer a joint approach to energy and water-saving schemes[121]. It also demonstrated that retrofit of water efficiency devices by water companies not only saves customers money on their water bills through reducing consumption, but also reduces energy bills and carbon-dioxide (CO_2) production[122]. This study also builds on earlier Environment Agency work in this area, which included a comprehensive literature review to collate the evidence on the costs and benefits of energy and water retrofit replacement[123].

[119] The Walker Report reported that the long-run marginal cost of water is between £160/Ml to £660/Ml; 'The independent review of charging for household water and sewerage services' (para 7.3.5 p75), Defra, 2009
[120] Ibid
[121] 'The links and benefits of water and energy efficiency joint working', Water Research Foundation, 2012
[122] Ibid
[123] 'Cost benefit assessment of water and energy efficiency retrofitting measures', Environment Agency, 2011

The Water Research Foundation also reported that its findings could be taken as firm estimates of energy efficiency and carbon emission reductions associated with hot and cold water efficiency measures in residential properties. It reported that "a combined retrofit [of] showerhead, tap aerators and cistern displacement devices across 1,000 homes could save over 8.37 Ml of water, £20,151 off average water bills, £9,265 off energy bills and domestic carbon emission reductions of 40.8 t CO_2 per year"[124].

We used these values to estimate the additional value of hot water and carbon savings associated with water efficiency improvements. We used a long-term marginal cost of water to estimate the value of potential water-savings arising from residential retail competition. The values presented by the Water Research Foundation, on the other hand, are annual bill savings, which are not directly comparable. Furthermore, of the measures examined in this study, only showerhead devices save hot water and reduce energy bills. So, only some of the water efficiency measures that would produce the additional water-savings in our analysis would also produce energy-savings. This is accounted for in the estimates presented by the Water Research Foundation, which are an average across several water efficiency measures.

We therefore take the ratio of water bill savings and energy bill savings as a rough proxy for the value of energy-savings associated with each mega-litre of water saved. Our analysis uses a long-term marginal cost of water of £400/Ml. Our proxy for the value of energy saved implies that the associated energy-saving can be estimated at £244/Ml of water saved[125]. Combining these two effects gives a total value of energy- and water-saving of £644/Ml saved.

The Water Research Foundation work implies that the carbon-saving associated with water-saving is 4.9 tonnes per Ml. Our analysis, therefore, incorporates the carbon value of water saved by multiplying the volume of water saved by this estimate, then multiplying the carbon saved by the value of that carbon. Following the Stern review on the economics of climate change and work commissioned by the Interdepartmental Group on the Social Cost of Carbon, UK government policy appraisal no longer uses the social cost of carbon[126]. Instead, it uses a projected carbon price that is updated each year. We follow this approach and use the latest

[124] Water Research Foundation, 2012 (p9)
[125] This is a rough proxy for the following reasons. The ratio of bill savings depends on how water and energy bills develop over time. Energy bills, in particular, can vary considerably over time, depending on commodity prices. Levies also comprise a proportion of the energy bill, but would not contribute to the long-term marginal cost of energy.
[126] 'Carbon valuation', Department for Business, Energy and Industrial Strategy

values published by the Department of Energy and Climate Change, as an estimate of the value of each[127].

Combining the estimated value of energy- and water-savings gives a total saving of £644/Ml of water. The value of carbon-savings associated with energy-saving increases over time in line with the DECC estimates.

How the assumption is applied

All quantitative estimates of water efficiency benefits are linked to assumed water demand savings, which, as described above, are directly linked to the development of competition and apply only to active, metered customers.

Table 16: Summary of water efficiency assumptions

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Reduction in water consumption over the modelling period, for active, metered water customers only	20%	10%	10%	0%
Time period to achieve this reduction for all active metered customers	10 years	15 years	15 years	20 years

Water resources resilience

Our qualitative assessment of the benefits for water resources resilience is described in section 3.4.

Wastewater treatment costs

Wastewater is both water used and discarded by properties and surface water run-off from properties, principally from rainwater. Wastewater volumes can be lowered through water efficiency[128], wastewater reuse, reducing surface water drainage to sewers and pre-treatment for trade effluent customers.

[127] 'Updated short-term traded carbon values used for modelling purposes', Department for Energy and Climate Change, November 2015. DECC's values do not extend beyond 2035, but are constant between 2030 and 2035. We therefore assume, in the absence of further information, that carbon values also remain constant beyond 2035.
[128] 'Water – the facts', WaterWise, 2012

Competitive retailers could offer customers a differentiated or cheaper service by helping them reduce the volume of wastewater they put into the sewers by offering schemes, such as technology to utilise grey water and rainwater harvesting[129].

Neither is likely to have a significant effect on wastewater treatment costs[130], as this impact is most likely to apply to business customers. Therefore our qualitative assessment is that whilst there will be some consequential benefits from wastewater efficiency on wastewater treatment costs, for residential customers this benefit is unlikely to be material based on currently deployed technology. We quantify reductions in volume of wastewater, rather than on concentration of wastewater, which has a more significant effect on treatment costs.

Wastewater efficiency and resilience

Lowering the volumes of wastewater in sewers can improve the resilience of sewerage systems to extreme events. It could also, therefore, lower the costs of meeting resilience standards, and/or lower the costs of damage from flooding caused by sewerage overflow. Some of these benefits could be accelerated if surface water run-off and/or wastewater discharged from properties could be metered in a cost-effective manner for residential customers. One potential new entrant responded to our emerging findings by explaining that they had identified the potential for surface water drainage and wastewater metering as part of their business model for a residential retail market. They were working with technology that would enable smarter wastewater management and explained how competition could promote its roll-out.

We have estimated the value of wastewater savings with reference to the cost of flooding damage. These estimates should be treated as uncertain because of a lack of information on the link between wastewater volumes and incidences of flooding. They do, however, indicate savings that could be made from reducing flooding from overloaded sewers. We also think the estimates are conservative given that this only values one aspect of the potential benefits in this area.

We have little evidence about the amount of water that could be saved from reuse, or about the value of delaying or removing the need for investment in the drainage system. Nonetheless, these savings could be translated into lower expenditure on

[129] Wastewater meters may also have a role in reducing the volume of wastewater, although the link between the roll-out of meters and competition is unclear.
[130] Wastewater treatment costs are typically influenced most by population size (strength of waste) that treatment supports.

infrastructure, or increased resilience of current infrastructure to infrequent times of stress on the system. Resilience of the drainage system is likely to become more important over time as climate change and population growth put pressure on the sewerage network[131]. This was also recognised by the Ofwat Resilience Task and Finish Group in its recommendations on the resilience of water infrastructure in England and Wales[132].

This potential benefit of competition is therefore important to capture in our quantitative analysis, but should be treated with caution as it is subject to a high level of uncertainty. We considered two alternative approaches to estimating the potential benefits of reduced rainwater volumes.

Firstly, we estimated the potential value of the effect of residential retail competition on resilience by relating it to overall losses from flooding. Defra reported in 2012 that losses from coastal and river flooding in England and Wales could rise from an annual average of around £1.2 billion then to between £1.6 billion and £6.8 billion by the 2050s[133]. Rainfall is identified as a key cause of surface-water flooding in particular (as opposed to coastal flooding)[134]. In one company's area, residential properties accounted for around 40% of surface water run-off into drains[135]. We carried out a high level assessment to determine whether this was within the range expected across England. This demonstrates the significance of water run-off from residential properties and the potential for reduced use of drainage systems in lowering the costs of flooding.

There is a link between the volume of wastewater and surface water run-off from residential properties and the required capacity of sewerage systems. While wastewater produced by residential properties is linked to water consumption, run-off from properties can be lessened by either capturing and storing surface water or using surface water as a water efficiency measure[136].

Some simple practices can significantly reduce run-off in times of unusual rainfall, reducing the overall drainage capacity needed. These practices could include capturing water draining off roofs, or directing run-off to porous areas such as planted beds or lawns, rather than onto hard surfaces. Metering residential

[131] 'Creating a great place for living – enabling resilience in the water sector' (p14), Defra, March 2016
[132] 'Resilience Task and Finish Group', Ofwat, December 2015
[133] 'Climate change risk assessment', Defra, January 2012
[134] 'News and commentaries: Economic impacts of flooding in the UK', London School of Economics, January 2016
[135] Provided within a commercially confidential tariff model.
[136] Internal Ofwat analysis shows that property drainage accounts for approximately 60% of total drainage, and residential properties account for 77% of that figure.

customers' wastewater could, therefore, offer retailers opportunities to encourage customers to manage wastewater better to lower water run-off, including during infrequent rainfall events (typically once in 30 year events) that drive wastewater capacity decisions. This could delay or remove the need for investment in renewing or supplementing existing drainage. Some water companies are already trialling this sort of initiative, including Wessex Water's trial of a wastewater meter at a residential property[137]. Although wastewater meters at residential properties are very much in their early stages, a range of products for measuring wastewater are available and could be modified for residential properties in the foreseeable future.

Customers may have an increasing incentive to use grey water recycling systems at their properties, particularly if wastewater meters become commercially viable. For example, water drained from having a shower could be used to water the garden. This could bring a benefit to some customers, as they would get a discount off their sewerage bill in companies' charging schemes[138]. These schemes are designed to be reflect costs and therefore give an indication of the monetary value that could be saved through wastewater efficiency. This sort of action mirrors the implementation of sustainable drainage systems (or SuDs), which reduce the volume of water entering drainage systems. In one example of the potential effectiveness of such measures, a downpipe disconnection programme in Portland Oregon was applied to 42,000 homeowners and removed more than 1.3 billion gallons of storm water a year from the sewer system[139].

While this potential benefit of residential retail competition is particularly challenging to quantify, we have attempted to do so and included this within the overall case.

We do not know how much effect residential retail competition could have on reducing flooding, but the estimates above underline the very significant cost that flooding has each year. Even a 0.2% reduction in flood costs as a consequence of residential retail competition would lead to a saving of around £8m per year, if applied to the mid-point of costs estimated above. Modelling the effect of a 0.2% saving on flood damage costs could deliver an estimated £75 million of benefit in present value terms.

That figure is based on total flood damage, including many potential causes of flooding. We therefore also considered an alternative method, based on the

[137] 'Wessex Water's wastewater metering trial is a world first', Water and Wastewater Treatment, 2014
[138] For example, see South West Water Charges Scheme 2016-17 (www.southwestwater.co.uk) and Thames Water's Charges Schedule 2016-17 (www.thameswater.co.uk).
[139] 'Downspout disconnection program', City of Portland

frequency and cost of residential property flooding caused by overloaded sewers. In 2014/15 sewerage companies recorded 800 cases.

Some companies offer discounts to customers to implement certain measures to reduce rainwater drainage into sewers, while all offer discounts to customers who channel all rainwater away from sewers.

Our simplified method estimates the benefit of reducing the cost of floods, if retail competition could deliver reductions in water run-off that would reduce the damage from flooding by 2% in our high case, with a central estimate of 1% and a low estimate of zero. In our model, this reduction increases over time as competition develops, only reaching the maximum of 2% once competition is fully developed. This appears a reasonable estimate given the large proportion of rainwater that drains into sewers from residential properties (around 40%). It demonstrates the scope for actions to reduce the pressure on drains from rainwater flooding.

The number of floods avoided a year was multiplied by an estimate of the cost of each flood (£110,000, which is a median value from PR14 data on companies' willingness-to-pay). To estimate this total cost into the future, we profiled our estimate of current household flooding costs from overflowed sewers according to the same profile implied by Defra's estimate of total flooding costs. This profiling suggests that such flooding costs rise from around £100 million a year today to just under £350 million a year in 2044-45. While the causes of each type of flooding are different, this captures the increased likelihood of such flooding in future.

The potential benefit of retail competition is then estimated according to the percentage reduction in the cost of household floods caused by sewer overflows. This method implies that, under our high assumption of the impact of competition, avoided flooding costs rise to a maximum of around £7 million a year and a present value over the modelled period of £62 million. Our overall cost-benefit analysis uses this second approach, as the lower and therefore more conservative estimate, of the two set out above.

How the assumption is applied

The reduction in flood risk to the 800 properties estimated a year to be flooded because of overloaded sewers is achieved over the time period for competition to become fully effective. This only values flooding from surface water drainage, with the percentage reduction reflecting that only 40% of the surface water in sewers is estimated to come from household properties. A median customers' willingness-to-pay value for reduction of internal flooding at PR14 of £110,000 a year was used to

value the benefits. The use of median values reduced the risk that outlying company data from PR14 would affect this calculation.

Table 17: Summary of wastewater efficiency assumptions

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Proportion of flooding from overloaded sewers reduced	2%	1%	0%	0%
Time period to achieve this assumption	10 years	15 years	N/A	N/A

Impacts on vulnerable customers

A number of respondents to our emerging findings, in particular incumbent companies and their Customer Challenge Groups, questioned whether current protection for vulnerable customers would be eroded by a competitive retail market. We stated in Chapter 5 of this report that customers must have trust and confidence in a market for it to be successful. To win that trust and confidence, the right decisions must be taken.

We did not receive a significant amount of new evidence on the impacts on vulnerable customers in addition to that received for our emerging findings, which was summarised in the appendix document – 'The costs and benefits of introducing retail competition to residential customers in England: report on stakeholder views and issues'. The customer research report we commissioned for this review also identified that customers in vulnerable circumstances were as supportive of choice in a competitive water market as other groups.

We have not, therefore, identified any specific costs of residential retail competition associated with vulnerable customers.

Impacts on distribution of outcomes across customers

A significant number of responses to our emerging findings report, including incumbent companies and customer representatives, raised issues relating to the distributional impacts of introducing competition. They suggested that we should identify the current scale of cross-subsidies for different groups of customers and model the potential impacts of retail competition. Our analysis on this topic is set out in Chapter 4 of this report. At this stage we have not done detailed analysis. If

government does indicate that it wants to proceed with competition then we think it is important that we carry out further analysis in this area.

The value of customer choice

As part of this review, we commissioned Accent to carry out customer research and this is published alongside this document. This research has given us a strong steer around customer preferences. It confirmed that factors besides monetary savings are also important to customers. Customers expected that they would be able to gain in both price and service either by switching to a new retailer in the market or through being offered a better deal by their existing supplier. There was a range of customer views about whether prices, services or a combination of the two were likely to result in them switching suppliers in a competitive water market. Another group of customers said they were not likely to engage in the market unless they had problems with their existing supplier.

Customers also identified a number of other, more qualitative, costs and benefits that could arise from competition. Research highlighted, for example, the importance that many customers placed on being able to exercise choice –56% of customers said that being able to choose their retailer in a water market would be a good idea. As well as a general belief in the principle of choice and an expectation that competition would help to deliver keener prices, customers also identified other potential benefits from competition – improved customer service and greater convenience from combined billing[140]. Customers also agreed that choice could bring benefits through new products and services. Only a narrow subset of these, such as water efficiency, can be quantified in this assessment of competition. This would seem to suggest that competition would be valuable to customers for both financial and less quantifiable reasons.

In terms of costs, in addition to the time-cost of engagement (which we have quantified), the main issues that our research drew out were a reluctance among some customers to engage with the market, linked to a scepticism about whether it would be worth the time and effort. We consider this represents a reluctance to exercise choice rather than an additional non-quantifiable cost.

There is mixed qualitative evidence from other sectors about how some of the benefits identified by customers may be realised in practice. We have considered

[140] This could include both combined water/wastewater billing for customers in areas where customers are currently billed separately for these services, and combined water services and energy billing for all customers.

evidence from regular surveys from the Institute of Customer Service on levels of satisfaction with suppliers of goods and services[141]. These show that competitive utility providers (such as energy suppliers) tend to perform at similar levels to water suppliers. However, there is a reasonably wide range in satisfaction levels between different energy suppliers. New entrants to the market tend to out-perform former incumbents, which would imply that there are customer service benefits for switchers. We are also aware from the energy sector that the quality of the switching process, and in particular the extent to which it is hassle-free and risk-free, has a big effect on satisfaction levels[142]. A poor-quality switching experience, which involves hassle and risk, would be an additional cost of operating in the market (albeit one that should be addressed through the market design prior to market opening). Satisfaction surveys, however, do not quantify the value that customers place on the level of service they receive.

Evidence on the benefits of combined billing of services is much stronger. Ofgem has stated that the majority of customers who are eligible to do so take combined gas and electricity deals[143]. According to Ofcom in the telecoms sector, 68% of UK households have some form of bundled service (the majority have combined landline and broadband, and around half of these also including television within the bundle). The evidence is, therefore, reasonably strong that access to combined services is valued by customers across a variety of competitive sectors, although it is less clear whether their motivations are financial (in terms of offers available), convenience or a combination of both.

We can envisage that, as customers in our research suggest, competition could lead to new and innovative products and services. This could cover many areas, including the range of payment methods available. Evidence from the opening of the energy market (where there was a significant uptake of direct debit) may not be a reliable guide, since innovation in payment methods has expanded significantly since the energy market opened, with paperless/online self-service options[144]. However, we do note that Ofgem retained licence obligations for suppliers to provide a range of

[141] UKCSI reports are available to purchase from ICS. A summary of the findings of the most recent report is available on the ICS website.
[142] Citizens Advice Supplier Performance League Table ranks suppliers by complaints and weights different complaints by levels of seriousness. This shows a more mixed picture than that from UKCSI, with no clear pattern between existing companies and new entrants and some significant movement in rankings each quarter. Data from Ofgem shows that, in the first quarter of 2016, six out of eight new entrants had unweighted complaint levels significantly below the average of the so-called Big 6. All eight new entrants had unweighted complaint levels at about half the Big 6 average in the first quarter of 2016.
[143] See State of the Market Report 2014, paragraph 2.10. Note that around 20% of electricity customers do not have access to mains gas.
[144] For example smart payments such as Paym.

payment methods for customers. We also note that some water companies have recently committed to continuing to offer paper billing. And we further note that by moving customers onto direct debit and self-service, and thereby removing the customer contact that paying a bill creates, this could reduce an opportunity for retailers to influence customer behaviour.

New products and services might also change customers' water usage. We note the impact of new technologies in banking and energy that are driving different customer behaviours[145]. It is possible to envisage an equivalent impact in water, but we do not have evidence to estimate the scale of that impact, nor the value it could have. Innovative technology leading to more efficient use of water could bring value to the customer (through lower bills and improved resilience), the retailer (through customer acquisition), the wholesaler (through avoided investment), other customers (through downward pressure on wholesale charges), and the environment (through reductions in abstraction).). Similarly, innovative technology, such as wastewater metering, leading to more efficient management of wastewater through reductions in surface water run-off for example, could also bring value to customers (directly and more widely), wholesalers and the environment.

Consistency of our scenarios

This section outlines our analysis around the two areas for which stakeholders requested us to assess the consistency of each scenario.

- It is important that customer savings are consistent with assumed search costs, such that enough customers can save more than the time-cost of switching to be consistent with the scenario; and
- It is important that company acquisition costs are consistent with the scope of retail cost-efficiencies.

For customer savings, we recognise that it is important that sufficient numbers of customers find it beneficial to switch for market churn rates to be realised under each scenario. However, as noted by a range of stakeholders, savings on offer to individual customers will vary widely according to their circumstances. There is an important difference between the overview level of our analysis and the outcomes and choices that individual customers will face. Furthermore, customers have different motivations for switching. Nevertheless, both our customer research and

[145] Examples in energy include new ways of engaging with the market (see, for example, Flipper), and of in-home energy management (for example Nest or Hive). The BBA reported on the influence of new technologies in the major shift in customer engagement in banking in a report in June 2015.

that of the Consumer Council for Water provided evidence on the potential bill savings that customers might require to be motivated to switch.

For these reasons, we included a qualitative analysis of this in the relevant section of this appendix, rather than attempting to quantify customers' propensity to switch in a hypothetical market. Nonetheless, the specification in our scenarios does reflect the necessity that switching rates are broadly consistent with the savings on offer, while noting that savings are not the only reason customers choose to switch and that some are likely to switch even if no savings are on offer.

For company acquisition costs, we have added analysis of the various factors mentioned by a range of stakeholders – mostly notably, that in a less competitive market, margins may be higher, which might motivate retailers to pay more to acquire customers (because they are worth more in terms of the expected profit). We have also taken into account that the market structure is likely to be different in each scenario. In scenarios with more competition, new entrants would likely account for more switches, compared to existing companies, thus lowering average acquisition costs. This was evidenced in a response to our consultation from a potential new entrant.

Summary of assumptions

The following table summarises the assumptions made in the counterfactual, without taking into account the marginal impact of competition. Note that the scenarios we consider are different combinations of low, central and high assumptions, as discussed earlier in the document.

Table 18: Assumptions made in the counterfactual

Variable	Description	Approx. value	Comments
Wholesale costs	2015/16-2019/20: PR14 data	Data	From our final determinations
	2020/21-2044/45: Compound average growth rate calculated from trend in Defra bill model	Central: -0.66% a year High: 0.78% a year	Incorporates ongoing gains from regulation, business retail competition and wholesale reform
Total retail costs	2015/16-2019/20: PR14 data	Data	From our final determinations
	2020/21-2044/45: Compound average growth rate calculated from trend in Defra bill model	0.72% a year	Incorporates ongoing gains from regulation, business retail competition and wholesale reform
Proportion of metering costs that make up total retail costs	2015/16-2019/20: PR14 data	Data	Calculated by using proportions suggested in the company submissions at industry level
	2020/21-2044/45: Holds above proportion from 2019/20 in PR14 constant	17% of total retail costs	-
Proportion of bad debt costs that make up retail costs	2015/16-2019/20: Holds above proportion from PR14 constant	Data	Calculated by using proportions suggested in the company submissions at industry level
	2020/21-2044/45: Holds above proportion from 2019/20 in PR14 constant	43% of total retail costs	-
Customer numbers (metered and unmetered)	2015/16-2044/45: Water Resource Management Plan data*	Data	WRMP data goes up to 2040, then we continued the trend to 2045

Table 19: Assumptions on estimated costs of introducing competition

Cost	Description	Approx. value	Comments
Regulatory	Cost incurred by the regulator to set up and monitor a competitive residential retail market	Set-up: Central: £5.6 million Low: £4.2 million High: £7 million	-/+0.25% applied for low/high case
		Ongoing: £2.4 million a year	
Market operator	Cost incurred by the market operator to set up and maintain a competitive residential retail market	Set-up: Central: £60 million Low: £45 million High: £75 million	-/+0.25% applied for low/high case
		Ongoing: Central: £8.4 million Low: £6.3 million High: £10.5 million	
Government	Government cost of setting up and overseeing the market	£0	Zero cost assumed, as resources would be spent on other areas and not seen as a priority to incorporate the opportunity cost into the model
Company: operational	Costs associated with getting ready for market opening	Set-up: Low: £326.4 million High: £652.8 million	-
	Costs associated with operating under new market arrangements	Ongoing: Low: £20 million a year High: £65.3 million a year	-
Company: customer acquisition	Costs associated with acquiring customers from their competitors and retaining current customers	Switching rate: Central 7.5% Low: 3.8% High: 12.5%	Switching rate is 25% of the active portion
		Active portion of the market: Central: 30% Low: 15% High: 50%	
		Implied retention period: Four years	

Cost	Description	Approx. value	Comments
		Implied maximum value of an acquired customer: Central: c. £40 Low: c. £20 High: c. £60	
Company: financing	Not included in our analysis	n/a	-
Company: separation	Not included in our analysis	n/a	-
Customer	The costs associated with choosing their supplier (search and information-finding, as well as costs involved in switching)	Switching rate: Central 7.5% Low: 3.8% High: 12.5%	-
		Value of time (£/hr) Central: 45 Low: 20 High: 90	
		Search cost (£/switch) Central: 10.50 Low: 7 High: 21	

Table 20: Assumptions on estimated benefits of introducing competition

Benefit	Description	Approx. value	Comments
Active share of the market	The share of total residential customers likely to receive the full potential benefits of competition	Central: 30% Low: 15% High: 50%	-
Retail efficiency savings – active portion of the market	Efficiency saving applied to the contestable portion of the retail market	One-off: Low: 3.75% High: 8.13%	-
		Ongoing (per year): Low: 0.75% High: 1.22%	
Retail efficiency savings – spill-over to the inactive portion of the market	50% of the efficiency saving that applies to the active portion of the residential retail market is assumed to spill-over to the inactive portion of the residential retail market	One-off: Low: 1.88% High: 4.07%	-
		Ongoing (per year): Low: 0.38% Central: 0.61%	
Spill-over efficiency savings to wholesale	One-off efficiency gains realised in the wholesale segment of the market through a spill-over from residential retail competition	One-off: Central: 0.5% Low: 0.25% High: 0.75%	-
Water efficiency savings	Proportion of water consumption reduced, developed over the modelling period (2045)	Ongoing: Central: 10% Low: 0% High: 20%	Applied only for active and metered customers
	Value used to convert the water efficiency-saving into a monetary value	£588.8/ML	-
Wastewater resilience	Estimated value based on customer willingness-to-pay to avoid internal flooding from overloaded sewers	Central: 1% Low: 0% High: 2%	-
Bundling costs	No specific assumption	n/a	Overall efficiency savings from bundling are wrapped up in the total retail cost-efficiency savings assumption, as well as the additional saving from bad debt and metering

Benefit	Description	Approx. value	Comments
Additional saving to bad debt costs	Efficiency savings on bad debt costs additional to savings realised on overall retail costs	Ongoing: Central: 1% Low: 0% High: 2%	-
Additional saving to metering costs	Efficiency savings on metering costs additional to savings realised on overall retail costs	Ongoing: Low: 0% High: 1%	Metering costs may fall as a result of new technology and multi-utility approaches

Table 21: Summary of data used

Area	Year	Data source
Wholesale costs	2015-2020	PR14 final determinations
	2020-2045	Projection based on Defra's future bills model
Retail costs	2015-2020	PR14 final determinations
	2020-2045	Projection based on Defra's future bills model
Water consumption, meter penetration, customer numbers	2015-2040	WRMPs
	2040-2045	Trend based on data from the WRMPs
Inflation	2006-2016	ONS

Appendix 2 – Sensitivity analysis

This section explores the relative importance of the potential costs and benefits we modelled, in terms of their sensitivity to each of the key assumptions made in our modelling set out in the Appendix 1.

This sensitivity analysis does not illustrate a possible range of potential net present value impacts across each scenario – this is estimated above for each scenario. It is instead an illustrative analysis that shows the weight of each assumption in contributing towards the net present value estimated under each scenario, by flexing individual assumptions in isolation, holding all other assumptions constant for each scenario. Each variant presented in this sensitivity analysis therefore, does not represent a new scenario – as, in reality, circumstances are represented by combinations of related assumptions.

This sensitivity analysis, therefore, illustrates the relative importance of each assumption, each ranked according to the size of the assumption range. Those ranked highest have the largest effect on the total net present value. For this testing, we assume that the probability distribution between the low, central and high assumptions is uniform – no one value of assumption is more likely to happen than another within the specified range for each assumption.

For each scenario set out below, a table of sensitivity shows how much the total net impact (£ million NPV) varies when each assumption changes from low to high, holding everything else constant. Changes in total net impact are described by the minimum and maximum values, as well as the value of the overall range, for each assumption. The assumptions are ordered in terms of the magnitude of the effect changing them has on total net impact, from one to 14.

We also include a figure to illustrate how flexing assumptions to the high value and the low value affects the total net impact. Where an assumption is set at the high value in a scenario, the impact illustrated is by the figure is how the net impact would change, holding everything else constant. Similarly for low values. Where an assumption is set at the central value in a scenario, the impact illustrated is how the net impact would change for both the low and high value assumption.

In summary:

- The relative importance of assumptions is broadly consistent across scenarios, with two exceptions. The impact of our assumptions on a company's cost of acquiring a customer and customer search costs gets smaller when moving from

Scenario 1 to Scenario 4. This reflects variations in the number of active customers for each scenario.

- The impact of our assumptions on bad debt costs are consistently high on the total NPV impact throughout the scenarios. This reflects the large scale of potential gains in this area that could be achieved through effective competition.
- Generally, our results are more sensitive to our assumptions on ongoing efficiencies than one-off efficiencies. This is simply because adding an ongoing efficiency over time yields a larger impact than the initial one-off efficiencies. Similarly, our results are more sensitive to our assumptions on ongoing costs than upfront costs.
- The impact of our assumptions on market operator costs and regulator costs are consistently low on the total NPV impact in all the scenarios. This reflects the relative scale of these costs, compared with other impacts. The impact of our assumptions on wastewater efficiency gains is also consistently low. However, if efficiency savings can be made in this area, it is likely that our high assumption is conservative.

Scenario 1

The NPV total net impact for Scenario 1 is £2,917 million and the table below shows the effect of changing each assumption in isolation.

The cost to a company of a switch and customer costs have the two highest impacts on the total net impact. This is because of the high level of active customers assumed under this scenario – 50% of customers in the market are in the active share and 12.5% switch a year.

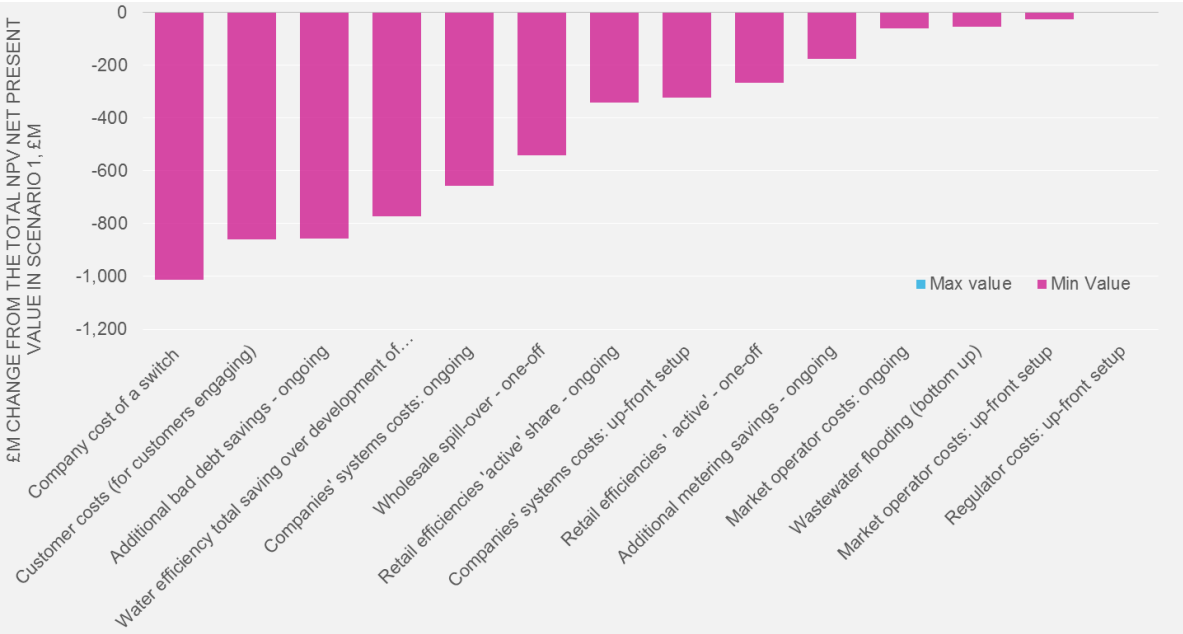
Table 22: Summary of the sensitivity analysis for Scenario 1, assumptions ranked in order of largest effect on £NPV, highest first

Assumption input into the model					Variation in total net impact (£ million NPV)		
Assumption		Central	Low	High	Min	Max	Range
1	Company cost of a switch	£ -15 per switch	£ -8.3 per switch	£ -40 per switch	1,905	2,917	1,012
2	Customer costs (for customers engaging)	£ -10.50 per switch	£ -7 per switch	£ -21 per switch	2,059	2,917	858
3	Additional bad debt savings: ongoing	-1% a year	0%	-2% a year	2,061	2,917	856
4	Water efficiency total saving over development of competition	-10% per metered customer in active share	0%	-20% per metered customer in active share	2,146	2,917	771
5	Company systems costs: ongoing	£ -20 million	£ -20 million	£ -65.3 million	2,261	2,917	656
6	Wholesale spill-over: one-off	-0.50%	-0.25%	-0.75%	2,376	2,917	541
7	Retail efficiencies active share: ongoing	-1.219%	-0.75%	-1.219%	2,574	2,917	343
8	Company systems costs: upfront set-up	£ -326.4 million	£ -326.4 million	£ -652.8 million	2,594	2,917	323
9	Retail efficiencies active: one-off	-8.125%	-3.75%	-8.125%	2,652	2,917	265
10	Additional metering savings: ongoing	0%	0%	-1%	2,740	2,917	177
11	Market operator costs: ongoing	£ -8.4 million	£ -6.3 million	£ -10.5 million	2,858	2,917	59
12	Wastewater resilience total saving over development of competition	-1% per metered customer in active share	0%	-2% per metered customer in active share	2,862	2,917	55
13	Market operator costs: upfront set-up	£ -60 million	£ -45 million	£ -75 million	2,890	2,917	27
14	Regulator costs: upfront set-up	£ -5.6 million	£ -4.2 million	£ -7 million	2,914	2,917	3

Source: Ofwat analysis

Figure 8 depicts the £ million change in total net impact when the assumptions are set at their lowest and highest values.

Figure 8: Summary of sensitivity analysis breakdown between positive and negative impacts compared with Scenario 1, £NPV, highest ranked first



Source: Ofwat analysis

Scenario 2

The NPV total net impact for Scenario 2 is £1,214 million and the table below shows the effect of changing each assumption in isolation.

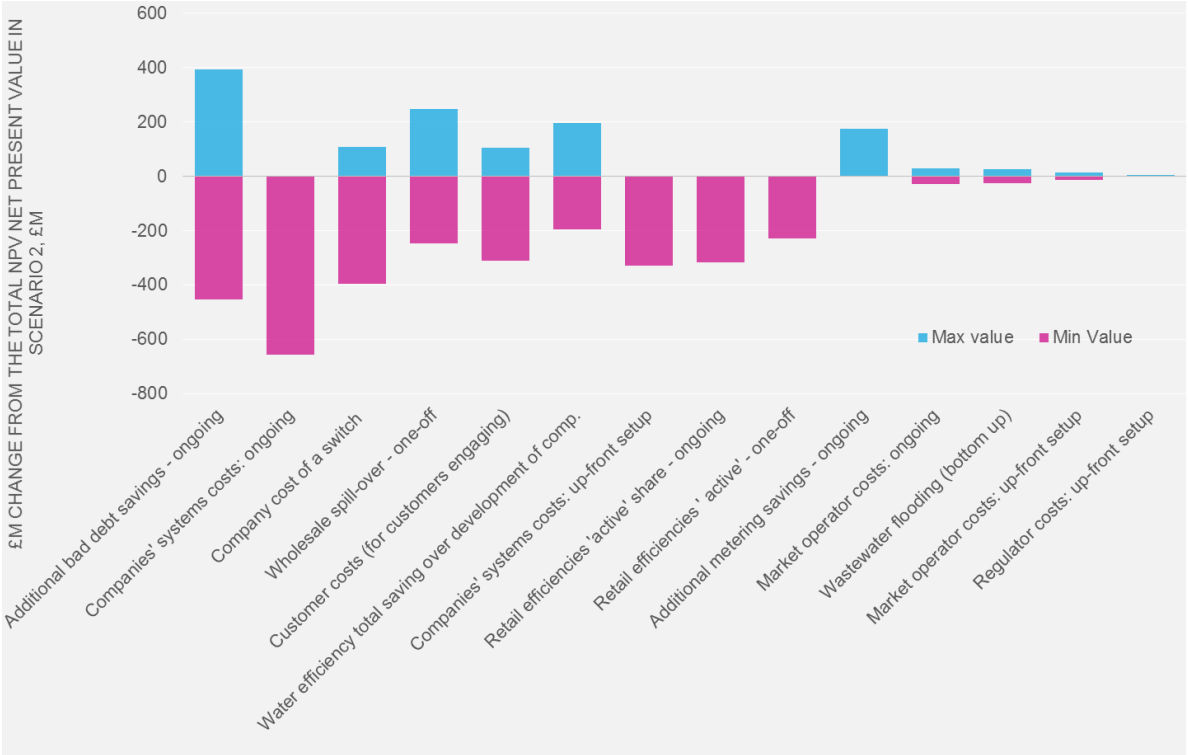
Table 23: Summary of sensitivity analysis for Scenario 2, assumptions ranked in order of largest effect on £NPV, highest first

Assumption that is input into the model					Variation in total net impact (£ million NPV)		
Assumption		Central	Low	High	Min	Max	Range
1	Additional bad debt savings: ongoing	-1% a year	0%	-2% a year	759	1,605	846
2	Company systems costs: ongoing	£ -20 million	£ -20 million	£ -65.3 million	558	1,214	656
3	Company cost of a switch	£ -15 per switch	£ -8.3 per switch	£ -40 per switch	818	1,320	503
4	Wholesale spill-over: one-off	-0.50%	-0.25%	-0.75%	966	1,462	496
5	Customer costs (for customers engaging)	£ -10.50 per switch	£ -7 per switch	£ -21 per switch	903	1,318	414
6	Water efficiency total saving over development of competition	-10% per metered customer in active share	0%	-20% per metered customer in active share	1,018	1,410	391
7	Company systems costs: upfront set-up	£ -326.4 million	£ -326.4 million	£ -652.8 million	885	1,214	329
8	Retail efficiencies active share: ongoing	-1.219%	-0.75%	-1.219%	897	1,214	317
9	Retail efficiencies active: one-off	-8.125%	-3.75%	-8.125%	985	1,214	229
10	Additional metering savings: ongoing	0%	0%	-1%	1,214	1,390	176
11	Market operator costs: ongoing	£ -8.4 million	£ -6.3 million	£ -10.5 million	1,184	1,244	59
12	Wastewater resilience total saving over development of competition	-1% per metered customer in active share	0%	-2% per metered customer in active share	1,188	1,240	52
13	Market operator costs: upfront set-up	£ -60 million	£ -45 million	£ -75 million	1,200	1,228	27
14	Regulator costs: upfront set-up	£ -5.6 million	£ -4.2 million	£ -7 million	1,213	1,215	3

Source: Ofwat analysis

Figure 9 depicts the £ million change in total net impact when the assumptions are set at their lowest and highest values.

Figure 9: Summary of sensitivity analysis breakdown between positive and negative impacts compared with Scenario 2, £NPV, highest ranked first



Source: Ofwat analysis

Scenario 3

The NPV total net impact for Scenario 3 is £185 million and the table below shows the effect of changing each assumption in isolation.

The results here are similar to the sensitivity analysis for Scenario 3.

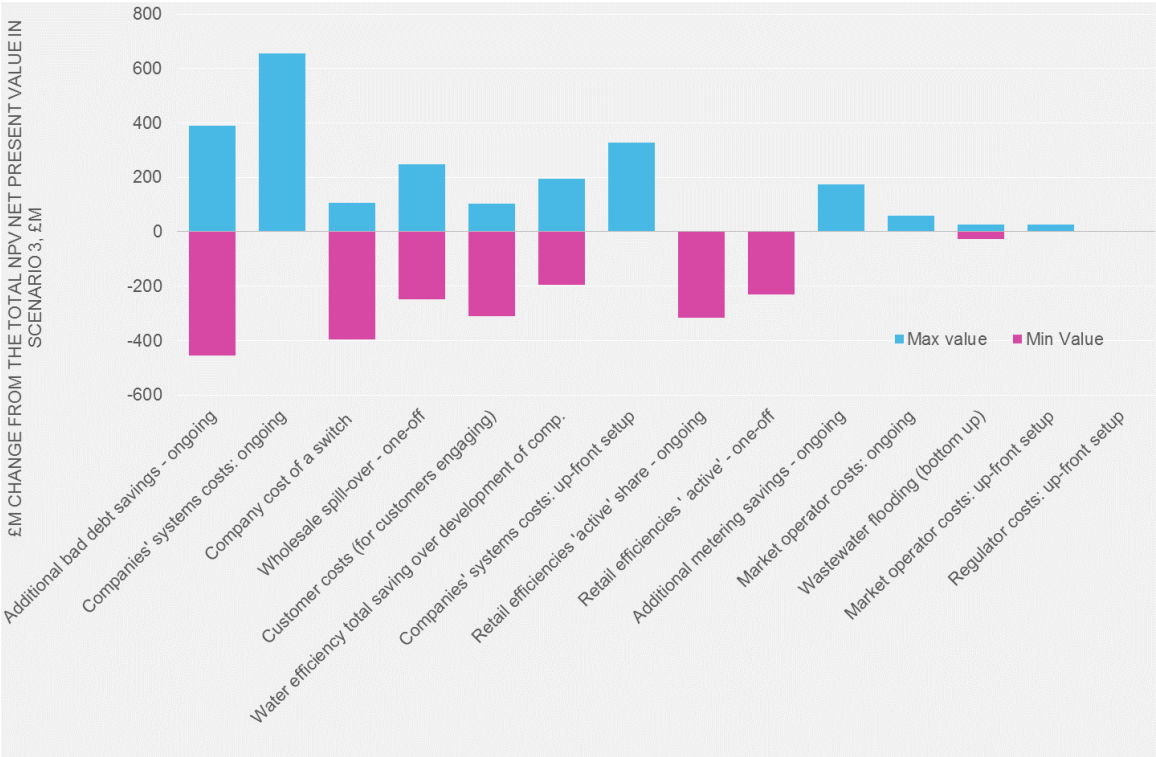
Table 24: Summary of sensitivity analysis for Scenario 3, assumptions ranked in order of largest effect on £NPV, highest first

Assumption that is input into the model					Variation in total net impact (£ million NPV)		
Assumption		Central	Low	High	Min	Max	Range
1	Additional bad debt savings: ongoing	-1% a year	0%	-2% a year	-271	576	846
2	Company systems costs: ongoing	£ -20 million	£ -20 million	£ -65.3 million	-212	291	503
3	Company cost of a switch	£ -15 per switch	£ -8.3 per switch	£ -40 per switch	-63	433	496
4	Wholesale spill-over: one-off	-0.50%	-0.25%	-0.75%	-126	288	414
5	Customer costs (for customers engaging)	£ -10.50 per switch	£ -7 per switch	£ -21 per switch	-11	380	391
6	Water efficiency total saving over development of competition	-10% per metered customer in active share	0%	-20% per metered customer in active share	185	514	329
7	Company systems costs: upfront set-up	£ -326.4 million	£ -326.4 million	£ -652.8 million	185	840	656
8	Retail efficiencies active share: ongoing	-1.219%	-0.75%	-1.219%	-133	185	317
9	Retail efficiencies active: one-off	-8.125%	-3.75%	-8.125%	-45	185	229
10	Additional metering savings: ongoing	0%	0%	-1%	185	360	176
11	Market operator costs: ongoing	£ -8.4 million	£ -6.3 million	£ -10.5 million	185	244	59
12	Wastewater resilience total saving over development of competition	-1% per metered customer in active share	0%	-2% per metered customer in active share	159	210	52
13	Market operator costs: upfront set-up	£ -60 million	£ -45 million	£ -75 million	185	212	27
14	Regulator costs: upfront set-up	£ -5.6 million	£ -4.2 million	£ -7 million	185	187	3

Source: Ofwat analysis

Figure 10 depicts the £ million change in total net impact when the assumptions are set at their lowest and highest values.

Figure 10: Summary of sensitivity analysis breakdown between positive and negative impacts compared with Scenario 3, £NPV, highest ranked first



Source: Ofwat analysis

Scenario 4

The NPV total net impact for Scenario 4 is £1,145 million and the table below shows the effect of changing each assumption in isolation.

Our assumptions on ongoing and one-off retail efficiencies in the active share are ranked five and six in the sensitivity analysis for this scenario, despite the proportion of customers in the active share amounting to 15%. This is because the efficiency gains to the inactive share (85% of customers in this scenario) is dependent on the active share efficiency gains - 50% of efficiency gains realised in the proportion of the market equal to the active share is realised in the proportion of the market equal to the inactive share. Therefore, the total net impact in Scenario 4 is relatively sensitive to our assumptions on retail efficiencies in the active share, (caused by the implication for our assumption on the retail efficiencies in the inactive share).

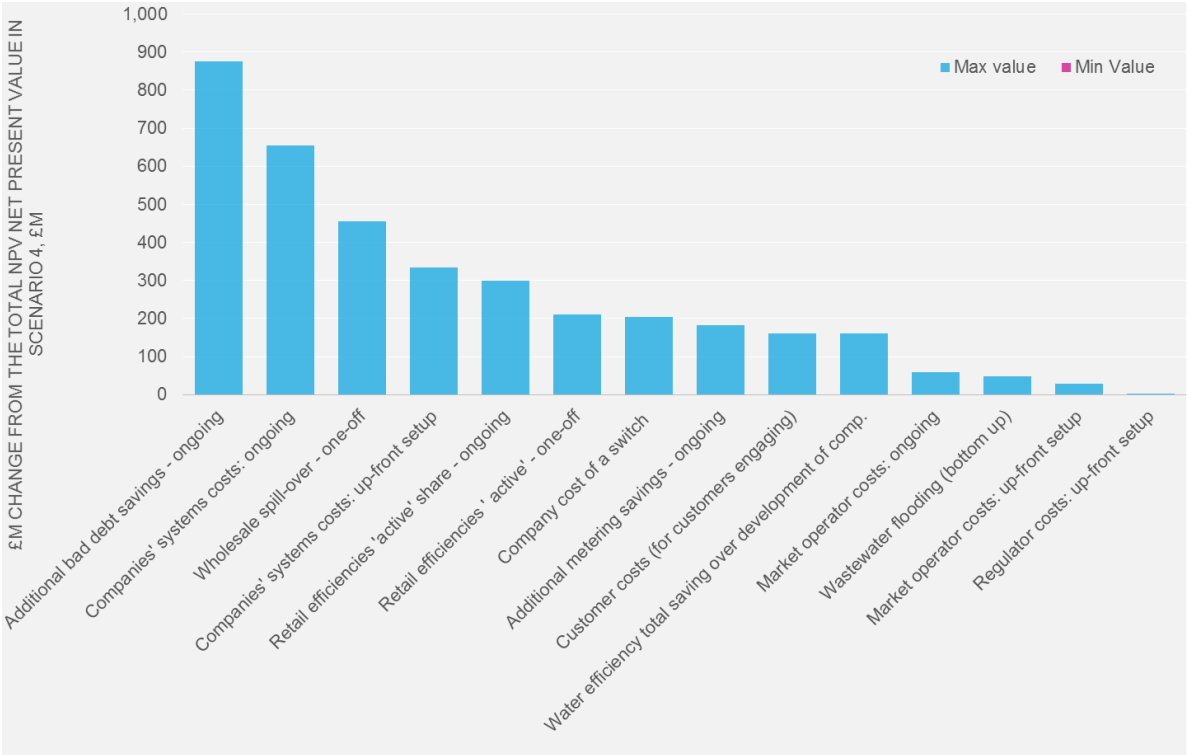
Table 25: Summary of sensitivity analysis for Scenario 4, assumptions ranked in order of largest effect on £NPV, highest first

Assumption that is input into the model					Variation in total net impact (£ million NPV)		
Assumption		Central	Low	High	Min	Max	Range
1	Additional bad debt savings: ongoing	-1% a year	0%	-2% a year	-1,445	-570	875
2	Company systems costs: ongoing	£ -20 million	£ -20 million	£ -65.3 million	-1,445	-789	656
3	Wholesale spill-over: one-off	-0.50%	-0.25%	-0.75%	-1,445	-989	455
4	Company systems costs: upfront set-up	£ -326.4 million	£ -326.4 million	£ -652.8 million	-1,445	-1,110	335
5	Retail efficiencies active share: ongoing	-1.219%	-0.75%	-1.219%	-1,445	-1,145	300
6	Retail efficiencies active: one-off	-8.125%	-3.75%	-8.125%	-1,445	-1,234	210
7	Company cost of a switch	£ -15 per switch	£ -8.3 per switch	£ -40 per switch	-1,445	-1,241	204
8	Additional metering savings: ongoing	0%	0%	-1%	-1,445	-1,263	182
9	Customer costs (for customers engaging)	£ -10.50 per switch	£ -7 per switch	£ -21 per switch	-1,445	-1,284	161
10	Water efficiency total saving over development of competition	-10% per metered customer in active share	0%	-20% per metered customer in active share	-1,445	-1,285	160
11	Market operator costs: ongoing	£ -8.4 million	£ -6.3 million	£ -10.5 million	-1,445	-1,385	59
12	Wastewater resilience total saving over development of competition	-1% per metered customer in active share	0%	-2% per metered customer in active share	-1,445	-1,397	48
13	Market operator costs: upfront set-up	£ -60 million	£ -45 million	£ -75 million	-1,445	-1,417	28
14	Regulator costs: upfront set-up	£ -5.6 million	£ -4.2 million	£ -7 million	-1,445	-1,442	3

Source: Ofwat analysis

Figure 11 depicts the £ million change in total net impact when the assumptions are set at their lowest and highest values.

Figure 11: Summary of sensitivity analysis breakdown between positive and negative impacts compared with Scenario 4, £NPV, highest ranked first



Source: Ofwat analysis

Ofwat (The Water Services Regulation Authority) is a non-ministerial government department. We regulate the water sector in England and Wales. Our vision is to be a trusted and respected regulator, working at the leading edge, challenging ourselves and others to build trust and confidence in water.

Ofwat
Centre City Tower
7 Hill Street
Birmingham B5 4UA

Phone: 0121 644 7500
Fax: 0121 644 7533
Website: www.ofwat.gov.uk
Email: mailbox@ofwat.gsi.gov.uk

Printed on 75% minimum de-inked post-consumer waste paper.
September 2016

ISBN 978-1-910739-68-18

This document is also available from our website at www.ofwat.gov.uk.

Any enquiries regarding this publication should be sent to us at mailbox@ofwat.gsi.gov.uk.

OGL