The background of the entire page is a close-up photograph of water. It features a central water droplet that has just hit the surface, creating a series of concentric ripples that spread outwards. The water is a deep, vibrant blue, and the lighting highlights the texture of the ripples and the clarity of the droplet. On the left side, there is a large, bright yellow trapezoidal shape that serves as a background for the text.

Towards a risk and reward framework for PR19: an exploration of the relationships between incentives, cost allowances and rates of return

A report for Thames Water Utilities Limited

March 2017



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Foreword

The regulation of the water sector has moved, very firmly, from a focus on the outputs that companies deliver to the outcomes for customers, with strong financial incentives linked to the delivery of outcomes. These developments support companies in delivering what their customers want and providing innovative solutions to the challenges arising from population growth, climate change and changing customer expectations, among others.

The regulatory framework includes a broad range of levers for Ofwat and water companies to use to reward more robust business planning, greater efficiency in expenditure and financing, and the delivery of outcomes that customers want. This range of levers increases the importance of considering risks and rewards as a coherent package so that, for example, companies are rewarded for planning to deliver sustainable services over the longer term.

We consider that the overall package of allowed industry cost of capital (WACC), outcomes delivery incentives (ODIs), totex allowance and totex incentives should be calibrated to ensure a notional efficient company can earn the overall required notional industry cost of capital. This is important when considering how to strengthen ODIs, as an inappropriate calibration, where for example the notional efficient company would not be financeable, would erode investor confidence and increase the cost of capital, to the detriment of customers. A balanced approach to risk and reward will help promote trust and confidence while supporting companies in delivering the services that are important to customers.

Given the importance of implementing a coherent, reasonable overall risk and reward package for the 2019 price review, we have commissioned EY to examine different ways in which the performance commitments, ODIs, totex allowances, totex incentives, the allowed rate of return and the required rate of return can be combined. EY's report shows that there are complex interactions between these different levers, so careful implementation will be needed at the next price control, particularly if a 'sliding scale' approach is used to enable companies to choose different types of risk and reward package.

We look forward to working with Ofwat in the development of its final methodology, to ensure it supports companies in delivering the best outcomes for customers in the short and longer-term, and retains investor confidence in the sector.

A handwritten signature in black ink, appearing to read 'Colm Gibson'.

Colm Gibson

Head of Economic Regulation at Thames Water



1. Executive summary

At PR14, Ofwat adopted a 'less prescriptive approach' to incentivising company performance that placed 'a key emphasis on outcomes' through the introduction of a range of outcome delivery incentives (ODIs)¹. These ODIs provided for penalties and rewards depending on whether companies meet target standards of service, known as performance commitments (PCs). At the same time, Ofwat adopted a totex based approach to setting companies' cost allowances, with rewards and penalties for over/under expenditure calibrated through a totex menu.

Now, with PR19 on the horizon and building on the approach at PR14, Ofwat has recently consulted (November 2016) on the outcomes framework for PR19². This consultation set out some initial views on how outcomes and ODIs should be determined and calibrated for the upcoming price review with a view to incentivising 'frontier-shifting levels of performance'³ and included a focus on a number of themes including:

- ▶ How companies' PCs can be made more stretching to deliver higher service levels; and
- ▶ How ODIs can be strengthened to encourage delivery on PCs.

In response to Ofwat's outcomes consultation, and with a view to informing Ofwat's upcoming PR19 methodology consultation (expected in July 2017)⁴, Thames Water Utilities Limited (TWUL) commissioned EY to consider the regulatory levers that Ofwat has at its disposal to create coherent overall risk and reward packages for PR19 and specifically:

1. The trade-offs and relationships between totex allowances, totex incentives, PCs and ODIs;
2. The relationship between those regulatory levers, the allowed rate of return on equity, and the required rate of return;
3. Whether a 'sliding scale' of risk and reward packages can be developed for PR19; and
4. The process Ofwat should follow to set the risk and reward package(s) at PR19.

Our analysis and assessment of these key issues suggests that:


- ▶ Encouraging companies to deliver higher service levels is not simply a matter of 'ratcheting up' PCs and/or ODIs, since setting more 'stretching' targets implies increasing risks borne by investors and also transferring more risk to customers;
- ▶ More specifically, it will not be in customers' interests to set implausible totex allowances and PCs, as this would transfer risk to customers (either of cost overruns, some of which would be passed on to customers, service failures (e.g., if innovation fails) or of upward pressure on the cost of capital (if investors' confidence in the regulatory regime is undermined) and would not represent value for money;
- ▶ Instead, the targets which are set for companies to achieve need, to a degree, to take into account the differences between them. Customers of different companies may have different preferences: customers of all companies may not want every company to strive for 'frontier-shifting levels of performance' if that means that customers have to take on more risk (e.g., of service failures). Some customers might only want to take on a lower

¹ Ofwat website 'future price setting for 2020' <http://www.ofwat.gov.uk/regulated-companies/improving-regulation/future-price-setting-for-2020/> accessed on 18 February 2017.

² Ofwat (2016a) 'A consultation on the outcomes framework for PR19', November.

³ *ibid*, pp4-5.

⁴ Ofwat website '2019 price review' <http://www.ofwat.gov.uk/regulated-companies/price-review/2019-price-review/> accessed on 18 February 2017.



amount of risk and consequently would be willing to accept their companies to strive for a less (but still) challenging set of totex allowances and PCs;

- ▶ There are complex interactions and trade-offs between PCs, ODIs, totex allowances, totex incentives, the allowed rate of return on equity and the rate of return required by equity investors in water companies such that if some companies were challenged to deliver targets that were more 'stretching' than others, those companies may require a different risk and reward package, i.e., a different package of incentives and a different required rate of return;
- ▶ Any risk and reward package needs to be carefully calibrated to be consistent with Ofwat's duties and avoid undermining investors' confidence in Ofwat's regulatory regime, distorting companies' incentives and customers bearing an inappropriate share of the risk (all of which could result in upward pressure on the cost of capital and ultimately customer bills);
- ▶ Combining the above, a 'sliding scale' of risk and reward packages could be developed for PR19 where some companies take on the greater risk associated with striving for frontier shifting performance and are compensated with a higher rate of return (and other companies strive for less (but still) stretching levels of performance and take on a lower level of risk and are compensated with a lower rate of return);
- ▶ Ofwat would need to ensure that implementing a risk and reward 'sliding scale' delivers the best outcome for customers. Setting some companies more stretching targets than others may entail transferring more risk on to customers of those companies, so it will be important that customers' preferences (particularly their willingness to accept risks of cost overruns, service failures if innovation fails and a higher cost of capital) are taken into account when determining which risk and reward category a company should be in;
- ▶ Ofwat would need to follow a clear and transparent process to implement this approach to risk and reward at PR19. This process would not only need to set out the sliding scale in detail, but also provide guidance to companies on how to demonstrate they have achieved a particular 'category' on the sliding scale in their business plans.

Given that there are both risks and opportunities for customers, companies and Ofwat to introducing a 'sliding scale' of risk and reward packages at PR19, significant further work would need to be carried out by Ofwat and the industry if it is decided to go ahead and implement such an approach at PR19. This work would relate to a number of areas including the design of the sliding scale, calibration of the individual risk and reward packages (and the differences between them) and developing (and describing transparently) a process for applying the sliding scale (including providing appropriate guidance to companies for the development of their business plans). If Ofwat is minded to introduce a sliding scale of risk and reward packages at PR19, it should consult on the key elements of its approach in the upcoming PR19 methodology consultation (expected in July 2017).



2. Introduction

At its most recent periodic review of water companies' allowed revenues, Ofwat overhauled its previous approach to incentivising company performance to take a 'less prescriptive approach' and 'place a key emphasis on outcomes'⁵. A range of outcome delivery incentives (ODIs) were introduced, providing for penalties and rewards depending on whether companies meet performance commitments (PCs) agreed in their Final Determinations. At the same time, Ofwat adopted a totex based approach to setting companies' cost allowances, with rewards and penalties for over/under expenditure calibrated through a totex menu.

The ODIs and PCs were calibrated by reference to customers' willingness to pay (WTP) information and estimates of the totex which would be required to deliver and exceed the PCs. Ofwat believe that these changes 'sharpened companies' accountability for the delivery of the things that matter to customers and society while giving them greater flexibility in how they deliver them'⁶.

Building on the approach at PR14, and recognising the other changes to the regulatory framework that Ofwat proposed as part of its Water 2020 programme in May 2016⁷, Ofwat has recently consulted (November 2016) on the outcomes framework for PR19⁸. This consultation set out some initial views on how outcomes and ODIs should be determined and calibrated for the upcoming price review and included a focus on four themes:

1. How companies' PCs can be made more stretching to deliver higher service levels;
2. How ODIs can be strengthened to encourage delivery on PCs;
3. How Ofwat can better reflect resilience in outcomes to ensure the interests of future customers are taken into account; and
4. How PCs can be made more transparent.

With a view to informing Ofwat's upcoming PR19 methodology consultation (expected in July 2017)⁹, this report focuses on the first two of these themes by exploring the relationship between the required rate of return that investors in water and wastewater companies need and considering the framework of performance standards, cost allowances and related incentive mechanisms. In particular, we look at the levers – including the allowed cost of equity, performance commitments (PCs), ODIs, totex incentives and allowed totex – that Ofwat has at its disposal to create coherent overall risk and reward packages for PR19 and the trade-offs between these levers.

To explore these issues, the remainder of this report is structured as follows:

- ▶ **Defining the challenge** – this section summarises the objectives Ofwat will need to consider, and the levers that will need to be appropriately calibrated, in order to set an appropriate overall risk and reward package for PR19. It also identifies a number of key challenges that will need to be addressed;
- ▶ **Towards a risk and reward package for PR19** – in this section, we consider the challenges to setting the risk and reward package, and how they might be addressed in more detail; and
- ▶ **Conclusions and recommendations** – in this section we set out some key messages for Ofwat and the industry to consider as the risk and reward framework for PR19 is developed further.

Appendix A provides a glossary of terms.

⁵ Ofwat website 'future price setting for 2020' op. cit.

⁶ Ofwat (2016a) op. cit., p4.

⁷ Ofwat website <http://www.ofwat.gov.uk/water-2020-regulatory-approach-water-wastewater-services/> accessed on 18 February 2017.

⁸ Ofwat (2016a) op. cit.

⁹ Ofwat website '2019 price review' op. cit.



3. Defining the challenge

3.1 Ofwat's duties and objectives for PR19

When making its determinations for PR19, Ofwat is required to¹⁰:

- ▶ *'Further the consumer objective';*
- ▶ *'Secure that the functions of a water undertaker and of a sewerage undertaker are properly carried out as respects every area of England and Wales';*
- ▶ *'Secure that companies holding appointments ... are able (in particular through securing reasonable returns on their capital) to finance the proper carrying out of those functions';*
- ▶ *'Secure that the activities authorised by the licence of a licensed water supplier and any statutory functions imposed on it in consequence of the licence are properly carried out'.*

Ofwat will also want to be consistent with its overall vision for the sector and apply the principles of better regulation, such as transparency and proportionality.

A key element of PR19 will be the package of risk and reward. At the same time as ensuring companies are incentivised to deliver the performance that customers expect, Ofwat must also ensure that investors can secure reasonable returns on their capital, in line with their duties enshrined in legislation.

Failing to set an appropriate risk and reward package could undermine investors' confidence in Ofwat's regulatory regime, distort companies' incentives and result in customers bearing an inappropriate share of the risk. This could result (all else equal) in upward pressure on the cost of capital and ultimately customer bills.

3.2 The tools available to the industry to set the risk and reward package

The risk and reward package will influence the rate of return that investors expect to achieve. It must be calibrated in a way that ensures the expected rate of return, taking into account promised returns through the allowed rate of return and any expected outperformance of other aspects of the regulatory framework, is at least equal to the rate of return required by investors. If it is assumed that there is no expected outperformance of tax allowances or allowances for the costs of debt servicing, investors' expectations about outperformance of the price control allowances will depend on expectations of totex outperformance (a function of totex allowances and totex incentives) and of outperformance relative to performance targets (a function of PCs and ODIs). The expected rate of return on equity will therefore be a function of five key regulatory levers:

1. **Allowed rate of return on equity** – as part of the price control, the regulator will set an allowed rate of return on equity (sometimes referred to as the cost of equity). The allowed rate of return on equity will reflect the regulator's views about the riskiness of investing in a water company, as well as the regulator's views on wider market and financial conditions;
2. **Totex allowances** – the amount of expenditure Ofwat includes in the price control determination will be a key determinant of whether companies out/underperform, i.e., whether companies' actual totex is greater or less than allowed totex;
3. **Totex incentives** – totex incentives include the proportion of any over/underspend that investors are allowed (required) to retain which, when combined with the amount by

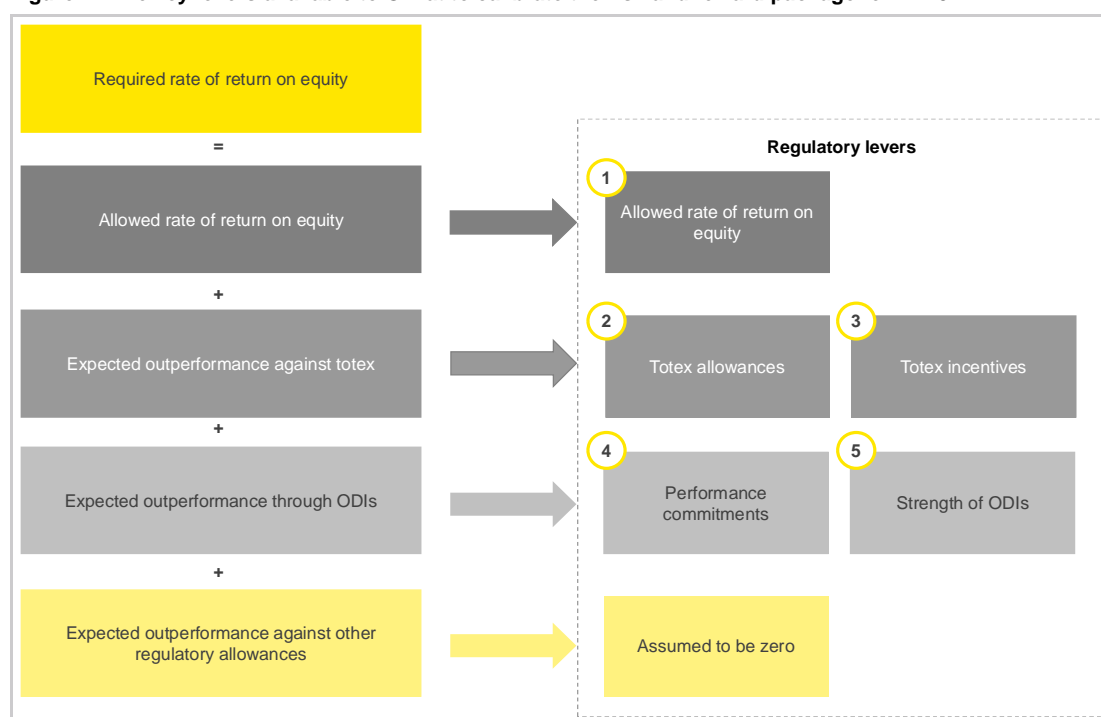
¹⁰ Water Industry Act 1991, Part 1, Sections 2 and 2A.

which outturn totex is greater or less than totex allowances, determines the size of rewards/penalties received/borne by investors for totex out/underperformance;

4. **Performance commitments** – the service levels that companies have committed to deliver, incorporated into price controls, is a key determinant of whether companies deliver a higher or lower level of service than required; and
5. **Strength of ODIs** –the strength of the rewards/penalties for out/underperforming against PCs depends on the design of the corresponding ODIs, including the incentive strength and the presence of any caps, floors, triggers or dead-bands in the design of the incentive mechanism.

Figure 1 summarises these five key regulatory levers that determine the overall risk and reward package, and their relationship with investors' expected and required rates of return.

Figure 1: Five key levers available to Ofwat to calibrate the risk and reward package for PR19



3.3 The key challenges for setting the risk and reward package

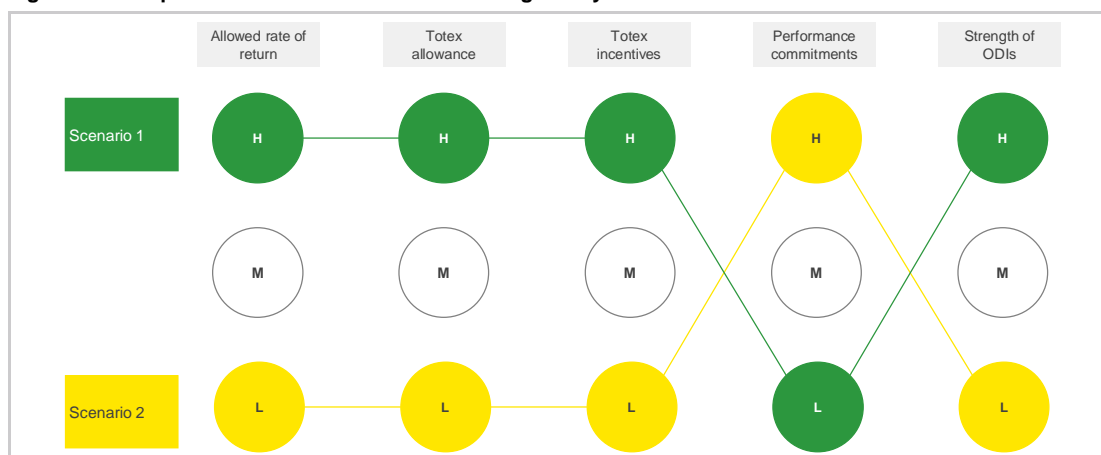
Each of these five levers could be set to a variety of values, some of which would be more favourable to investors and others less favourable. For simplicity, it could be assumed that each lever could be set to a High (H), Medium (M) or Low (L) position. For the allowed rate of return on equity, totex allowances, totex incentives and ODIs, a H setting would be more favourable for companies –: revenue allowances would be higher and the rewards for outperformance higher, all else equal. For PCs, a L setting would be more favourable for companies since this would imply easier performance targets for companies to try and achieve.

The fact that there are a variety of values to which each regulatory lever could be set means that calibrating the overall risk and reward package will require careful consideration of the appropriate position to set each lever to and of any trade-offs and relationships between the various levers.

To illustrate the challenge of calibrating the risk and reward package, we consider two scenarios, as shown in Figure 2 below.



Figure 2: Example of extreme calibrations of the regulatory levers



Scenario 1 – poor value for money for customers

Scenario 1 illustrates a risk and reward package that is likely to be inconsistent with Ofwat's duty to protect the interest of customers. This package is a combination of:

- ▶ Relatively high allowed returns;
- ▶ High totex allowances (i.e., the company's actual expenditures should be less);
- ▶ High totex incentives (i.e., the company would retain a high proportion of the difference between actual costs and allowed costs);
- ▶ Easy to achieve PCs; and
- ▶ Strong rewards for outperforming PCs via ODIs.

This package would represent an overly generous price control determination for water companies given a high allowed rate of return, generous totex allowances and readily achievable rewards for outperformance of totex allowances and PCs.

Scenario 2 – unfinanceable companies

Scenario 2 illustrates a package that is likely to be inconsistent with Ofwat's duty to secure that water companies can (in particular through securing reasonable returns on their capital) finance the proper carrying out of their statutory functions. This package is a combination of:

- ▶ Relatively low allowed returns;
- ▶ Low totex allowances (i.e., the company's actual expenditure is likely to exceed the allowances);
- ▶ Low totex incentives (i.e., the company would retain a small proportion of any outperformance in respect of actual totex);
- ▶ Challenging to achieve performance commitments; and
- ▶ Weak rewards for outperformance of PCs via ODIs.

This package would represent an unsatisfactory price control determination for water companies with low allowed returns, very challenging totex allowances (meaning underperformance is likely) and hard to achieve rewards for outperformance of totex allowances and PCs (which, if investors were to expect a rate of return equal to their required rate of return, would need to be expected by investors in order to offset the other elements of the risk and reward package). In combination this could threaten the finance ability of the company.



4. Towards a risk and reward package for PR19

Noting the discussion in the preceding section, it is clear that the regulatory levers (the allowed rate of return on equity, PCs, ODIs, totex allowances and totex incentives) could be set to different values that would achieve risk and reward packages that deliver good value for money for customers and support the financeability of companies. Doing this appropriately would, however, include considering:

1. The trade-offs and relationships between totex allowances, totex incentives, PCs and ODIs – only by understanding these trade-offs could the overall package of risk and reward appropriately compensate investors for the risks associated with a given set of targets and incentives;
2. The relationship between these levers, the allowed rate of return on equity, and the required rate of return – if the required rate of return on equity can be influenced by the way the regulatory levers are set, then the way those levers (including the allowed rate of return on equity) are set needs to take into account their impact on the rate of return required by investors;
3. Whether a 'sliding scale' of risk and reward packages can be developed – if the regulatory levers can be set in different ways that imply more risk and reward for investors, and different required rates of return, then a sliding scale of risk and reward packages could be offered to companies at PR19; and
4. The process Ofwat should follow to set the risk and reward package(s) at PR19 – a clear and transparent process will be required to not only calibrate the risk and reward packages, but to enable companies to prepare their business plans with proper understanding of Ofwat's expectations.

We consider these key issues in more detail in the remainder of this section.


4.1 Issue 1: Trade-offs and relationships between totex allowances, totex incentives, PCs and ODIs

Two of the key themes of Ofwat's consultation paper on its approach to outcomes at PR19 are:

1. How companies' PCs can be made more stretching to deliver higher service levels; and
2. How ODIs can be strengthened to encourage delivery on PCs.

On the face of it, this may sound like simply setting tougher PCs for companies to achieve and putting in place stronger rewards and penalties to incentivise companies to meet their performance targets.

However, simply setting higher standards of service for companies to achieve does not necessarily make those standards of service more 'stretching', since whether a quality of service (QoS) target is stretching or not depends on the level of funding that Ofwat allows to meet those targets. For example, if Ofwat set higher standards of service, but at the same time allowed companies higher totex, then the degree of 'stretch' that this would imply could go up, down or stay the same, depending on the relationship between totex and QoS. In this case, this would result in higher bills for customers and Ofwat would need to consider whether this cost increase was in customers' interests. Assuming customers are not willing to pay for this higher standard of service, then the way in which PCs could be 'stretched' is by requiring companies to deliver higher service standards at the same (or similar) levels of totex.



Equally, simply increasing the strength of rewards and penalties does not take into account the impact of doing so on customers (e.g., rewards are so large that companies are willing to deliver higher standards of service even where the costs to customers outweigh the benefits).

Therefore, calibrating PCs, ODIs and totex in the interests of both customers and companies is not straightforward. However, some simple principles can guide this process:

- ▶ The portion of incremental costs funded by customers should be less than or equal to the customers' incremental benefit from the higher QoS; and
- ▶ The portion of incremental costs funded by companies should be less than or equal to the rewards to companies for achieving the higher QoS.

These issues were considered at PR14 as part of calibrating the risk and reward package for that price control. Specifically, at PR14, ODIs were calibrated as follows¹¹:

$$ODI_{penalty} = \text{Incremental WTP} - (\text{Incremental Costs} \times p)$$

$$ODI_{reward} = \text{Incremental WTP} \times (1 - p)$$

Where,

- ▶ p is the proportion of over-/under-expenditure relative to totex allowances which is borne by customers (meaning $(1 - p)$ is the proportion borne by companies); and
- ▶ WTP is customers' willingness to pay for improvements in QoS.

While the approach to calibrating ODIs at PR19 may not be the same as at PR14, ODIs will continue to need to be calibrated in a way that ultimately benefits both customers (e.g., where the additional improvements in QoS cost customers less than they are willing to pay) and investors (e.g., through financial rewards which exceed the costs of delivering the additional improvement in QoS) if a company outperforms its PCs. Ofwat's desire to set more stretching PCs needs to be considered in this context.

To explore how this may challenge may be met, the following sections discuss:

- ▶ The relationship between PCs, WTP and marginal (totex) costs which determines the appropriate level of PCs to target for an assumed level of totex efficiency;
- ▶ How more stretching PCs impacts on the risks borne by companies and investors, both in terms of performance against totex allowances and the likelihood of achieving (incurring) ODI rewards (penalties);
- ▶ How more stretching PCs could lead to probability distributions of expected rates of return which are wider and/or skewed to the upside or downside than previously; and
- ▶ How these impacts on the probability distribution of expected rates of return might be offset by re-designing either totex incentives or ODIs (potentially restoring the original probability distribution of expected returns).

4.1.1 The relationship between PCs, WTP and marginal (totex) costs

Prior to PR14, Ofwat's approach to incentivising companies to strive for improvements in QoS could be characterised as setting a target level of performance based on equating marginal cost and marginal benefit (proxied by estimates of customers' willingness to pay for those service improvements) and then overlaying a number of targeted incentive mechanisms which offered financial rewards and penalties for performance which exceeded or fell short of the QoS targets.

¹¹ Ofwat (2013) 'Setting price controls for 2015-20 – final methodology and expectations for companies' business plans: Appendix A – Integrating the calibration of outcome delivery and cost performance incentives', July.



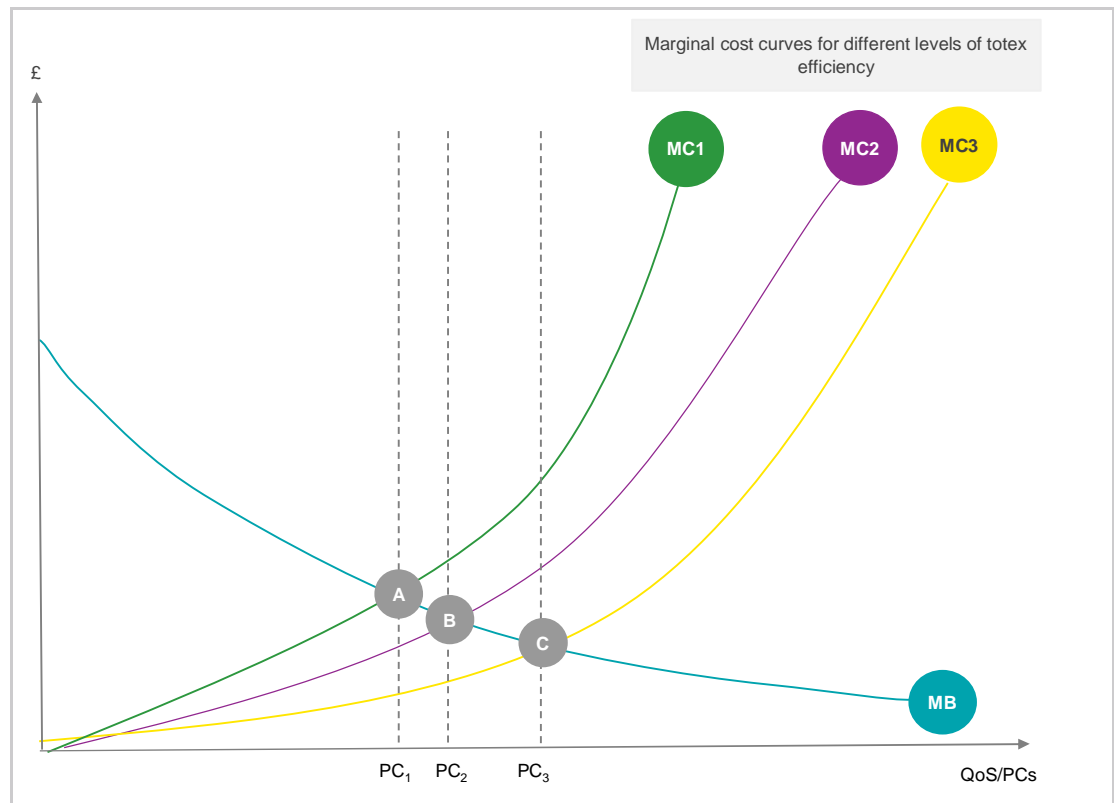
At PR14, as noted earlier, Ofwat sought to set more challenging performance targets (PCs) and to more explicitly link the rewards/penalties for out/underperformance (ODIs) to customers' willingness to pay and the incremental cost of delivering those service improvements (taking into account the proportion of those costs paid by customers and investors). The approach adopted meant that companies should not have been incentivised to strive to deliver QoS beyond PCs unless the companies were able to deliver those incremental improvements at lower cost than expected – in other words, companies needed to innovate in order to make over-delivery beneficial.

For PR19, Ofwat has signalled that it wishes to take this approach further, and set even more stretching PCs and stronger ODIs that incentivise companies to deliver 'truly frontier-shifting performance'. To achieve this – assuming that customers' willingness to pay remains broadly unchanged from PR14 – then the size of the incremental improvement in QoS that companies would have to deliver to earn the higher ODIs must be increased. A larger incremental improvement in QoS will be valued more highly (in total) by customers, meaning there is more incremental value which can be shared between companies and customers if companies are able to deliver the more stretching levels of performance.

These concepts are illustrated in Figure 3 below.

If it was assumed that, at PR14, companies were challenged to become more efficient by moving from point A (where marginal cost curve MC1 intersects the marginal benefit (MB), or incremental willingness to pay, curve) to point B (where a lower, more efficient, marginal cost curve MC2 intersects MB) on the diagram, then challenging companies to deliver more stretching targets at PR19 might require challenging companies to move from point A to point C. This would mean challenging companies to deliver service improvements from PC1 to PC3 (rather than PC1 to PC2) and requiring companies to drive greater improvements in efficiency, thereby shifting their marginal cost curve from MC1 to MC3 (rather than only as far as MC2). In practice, this might mean that, for PR19, companies could need to deliver a larger improvement in QoS than at PR14 for a similar level of totex allowances. Customers might be willing to pay more for these larger improvements in QoS, meaning more value is available to be shared between customers and companies, the latter via stronger ODIs.

Figure 3: Calibrating more stretching PCs and stronger ODIs at PR19





4.1.2 The impact of setting more stretching PCs and stronger ODIs on the probability distribution of expected rates of return

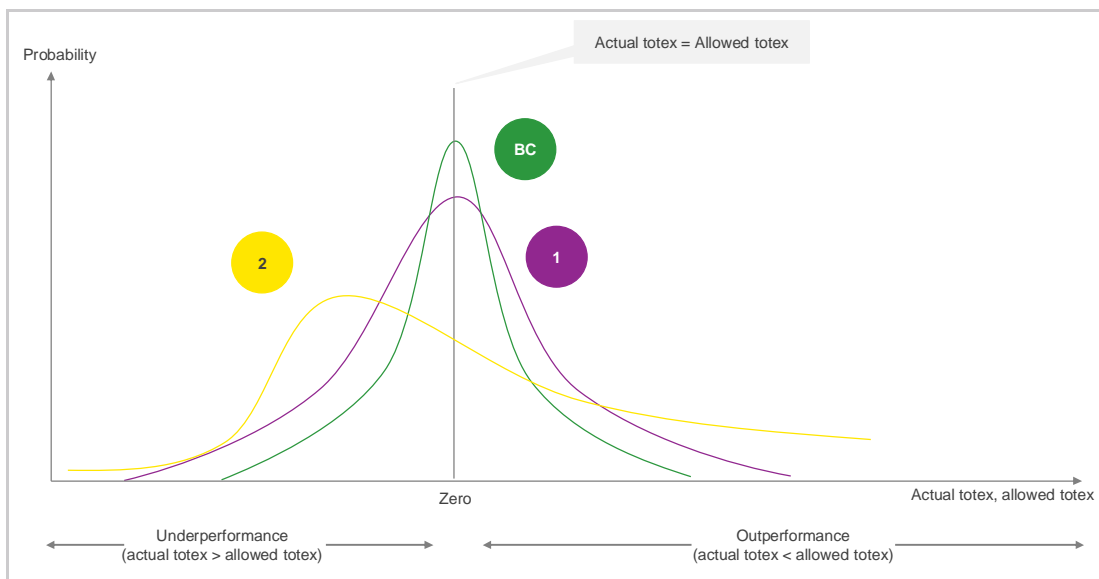
Striving to achieve a particular set of PCs will impact on companies' actual totex, depending on their ability to achieve efficiency gains and/or their ability to successfully innovate. Companies may overspend relative to their totex allowances in order to meet their PCs if they cannot identify sufficient efficiency gains or if their attempts at innovation fail. Consequently, the level of risk and challenge in the totex allowances (for a given set of PCs) will determine the shape of the probability density function of outturn actual totex.

Figure 4 below illustrates a number of scenarios:

- ▶ **Base case (BC)** – in this case, companies are expected to continue to deliver the same QoS for the same cost. This is equivalent to staying at point A on Figure 3 above. This is essentially a continuation of companies' existing business models (rather than requiring significant innovation or efficiency gains), so would be relatively lower risk. As a result, the probability distribution of outturn totex would be relatively tightly clustered around the totex allowance, as illustrated by BC in Figure 4 below;
- ▶ **Scenario 1** – in this case, companies are expected to deliver incremental improvements in QoS for a similar level of allowed totex (moving from point A to point B in Figure 3). While this is a more challenging target compared with delivering to point A, companies expect to be able to make the required totex efficiency savings necessary to achieve the incremental improvement in QoS within the totex allowances, i.e., companies expect to be able to shift from MC1 to MC2. As a result, expected actual totex continues to equal allowed totex in this scenario. However, because meeting this challenge does require some efficiency gains relative to the Base Case, companies are less certain of success and face a higher level of risk. The probability distribution of outturn totex would therefore be wider than in the Base Case, as illustrated by Scenario 1 curve in Figure 4 below; and
- ▶ **Scenario 2** – in this case, companies are expected to deliver 'frontier-shifting levels of performance', i.e., significant increases in QoS with a small increase in allowed totex (moving from point A to point C in Figure 3). Since the incremental increase in totex is significantly less than the expected incremental cost of delivering the targeted improvement in QoS, such improvements in performance are more likely to require innovation and dynamic efficiencies, which are inherently risky and uncertain. As a result, companies faced with these stretching challenges may be more likely to fail to achieve the target QoS for the given level of totex allowances than in Scenario 1 or the Base Case. The probability distribution of outturn totex would therefore be skewed to the downside: companies would expect to underperform, so the mean and median of the probability distribution function of actual totex would be greater than allowed totex. This is depicted by the Scenario 2 curve in **Error! Reference source not found.** below. At the same time, the potential to underperform even further than the expected level of totex may be limited if failure to innovate would mean reverting to delivery through 'business as usual' (albeit after some unproductive expenditure on ultimately failed innovation attempts). On the other hand, there may be scope for companies which successfully innovate to achieve greater outperformance than companies which do not set themselves such stretching targets. This is illustrated by the Scenario 2 curve lying above the Scenario 1 and Base Case curves on the extreme right hand side of Figure 4 below.



Figure 4: Possible probability distribution functions of outturn totex relative to totex allowances for a given set of PCs

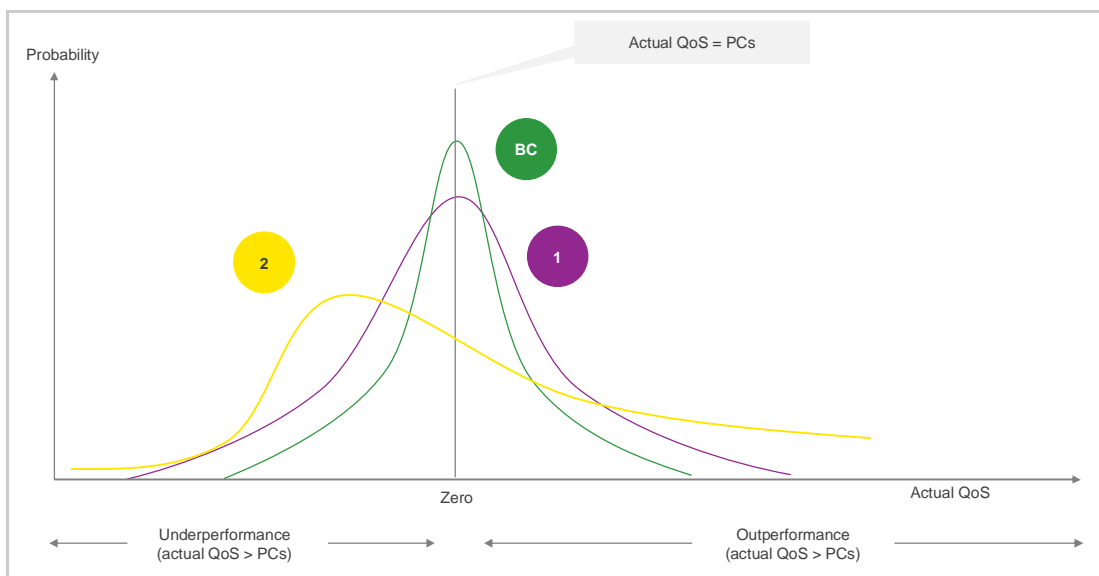



Another way of looking at the impact of setting more stretching PCs and stronger ODIs on the probability distribution of expected returns is to assume companies would out/underperform against their PCs rather than adjust their level of actual totex to try and meet their PCs, i.e., companies could deliver higher/lower QoS for a given level of expenditure.

So, for example, if a company decided it would spend precisely the totex allowance it had received, then the company's ability (or inability) to deliver the PCs for that level of expenditure would be reflected in the outturn standard of QoS. In that case, rather than the distribution of potential outturn actual totex being driven by the company's ability to successfully drive efficiency gains (including through innovation), it would be the distribution of potential outturn QoS that would be driven by the ability to drive efficiency and innovation.

The distribution of potential outturn QoS, relative to PCs, would be the mirror image of the distribution of potential outturn actual totex relative to allowed totex (all else equal), as Figure 5 below illustrates.

Figure 5: Possible probability distribution functions of outturn QoS relative to PCs for a given level of totex allowances



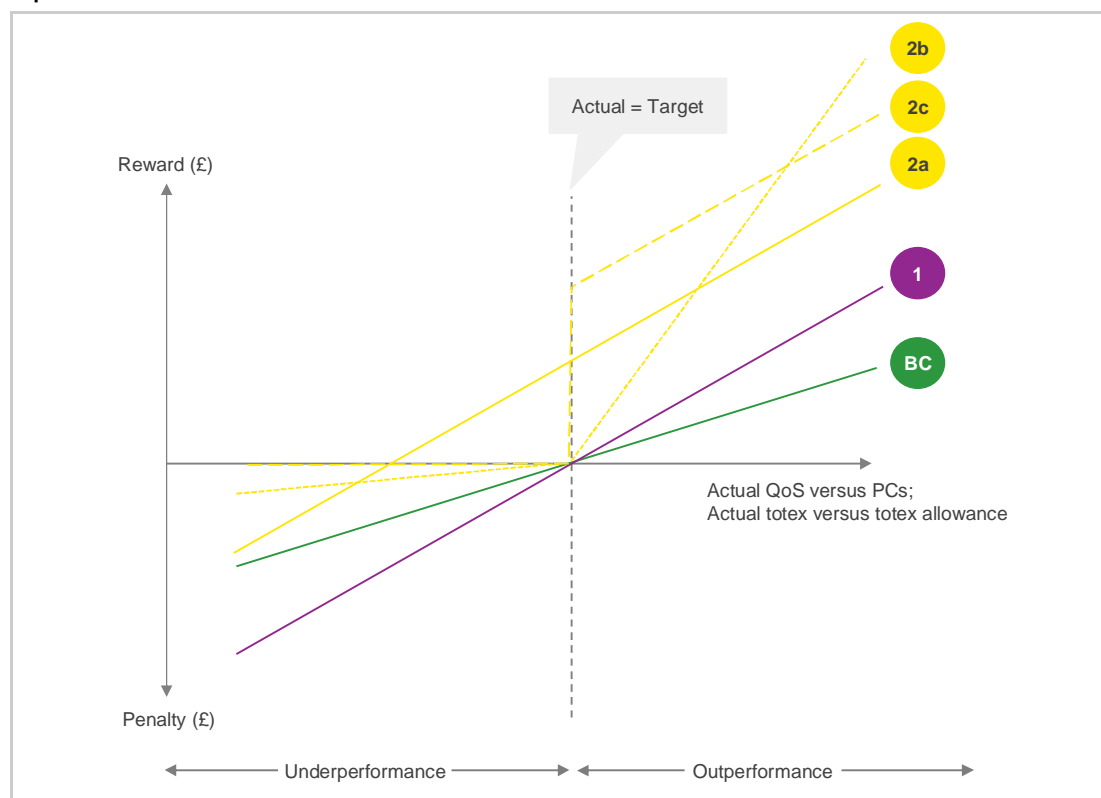


The discussion around Figure 4 and Figure 5 above focuses on the probability of out/underperformance (whether relative to totex allowances or PCs), but not the impact of that out/underperformance, i.e., the rewards/penalties that would apply. Those rewards and penalties are a function of not only the level of under/outperformance, but also the strength and design of totex incentives and ODIs. Consequently, to fully understand the impact of setting more stretching PCs and stronger ODIs, the design of incentive arrangements – which could mitigate or exacerbate some of the issues described above – also needs to be taken into account.

For example, Figure 6 below demonstrates a number of approaches to calibrating totex incentives and ODIs that could be adopted in each of the scenarios described above. We consider several variants of Scenario 2 because there are a range of ways in which incentives could be designed to mitigate risks. The approaches illustrated below are:

- ▶ **Base case (BC)** – in this case, the company would face relatively low-powered incentives (illustrated by a relatively flat line on Figure 6), since it has taken on a low level of risk. Significant out/underperformance would be required to result in a material reward/penalty;
- ▶ **Scenario 1** – in this case, the company has taken on more risk and faces stronger powered incentives (illustrated by a steeper line on Figure 6). For the same level of performance as a company under the Base Case, the company achieves (incurs) a higher reward (penalty);
- ▶ **Scenario 2a** – because the distribution of potential outturns a company faces under Scenario 2 means underperformance is more likely than outperformance, Ofwat might respond by only applying penalties where performance is significantly below target and offering rewards simply for hitting targets. This might involve shifting the penalty/reward line up by a fixed amount on Figure 6;
- ▶ **Scenario 2b** – the incentive package applied in Scenario 2a could dampen incentives for companies to strive to deliver the ‘frontier shifting’ performance they had targeted because there would be financial rewards even where a company failed to achieve its targets. An alternative might be to apply weak penalties for underperformance, but high powered rewards for outperformance. This is illustrated by a kinked line on Figure 6; and
- ▶ **Scenario 2c** – Scenario 2b would still mean that companies expected to underperform (i.e., incur a net penalty) since the penalties/rewards applied under incentive mechanisms would not be large enough to offset expected totex overspends for most levels of outturn performance. One response to this, illustrated in Figure 6 below, might be to offer companies a reward for meeting the target (with such rewards increasing with even better performance) and not impose penalties for underperformance. This would have the effect of shifting the distribution of potential outturn rewards/penalties to the right. As a result, expected (i.e., mean) rewards under the incentive mechanisms would increase, potentially offsetting any underperformance against totex/PC targets.

Figure 6: Calibrating totex incentives and ODIs in response to the probability of potential outturn levels of expenditure and QoS



Other variants of Scenario 2 could also be developed, e.g., introduction of dead-bands so no penalties are applied for minor underperformance.

While the discussion above is somewhat theoretical, we note that Ofgem, the energy regulator, has previously calibrated its totex incentive menu (sometimes referred to as the Information Quality Incentive (IQI)) for the RIIO (Revenues = Incentives + Innovation + Outputs) price controls for gas distribution (RIIO-GD1) and gas and electricity transmission (RIIO-T1) so that companies received additional income (above the allowed cost of capital) for meeting the efficiency challenge (totex allowance) set by Ofgem. For example, Ofgem decided that 'for GD1, we intend to calibrate the IQI such that companies who submit efficient cost forecasts will earn a positive financial reward (above their financing costs). We will define efficient costs in such a way that some companies' cost forecasts will be below our benchmark costs, i.e., they will earn a positive financial reward. For RIIO-T1, we intend to calibrate the IQI such that companies who submit a cost forecast equal to our view of their efficient costs, and then deliver on this, will earn positive financial rewards (i.e. above WACC).'¹²

4.1.3 Understanding the implications of the risk and reward package for Return on Regulatory Equity (RoRE)

Combining the probability density function of outturn performance (actual totex relative to allowed totex and actual QoS relative to PCs) and the design of incentive mechanisms, a probability distribution function of rewards and penalties attached to different levels of performance can be calculated. To keep things simple, as illustrated in the top panel of Figure 7 below, we have assumed a symmetric probability distribution of outturn totex relative to allowed totex (or, alternatively, QoS relative to PCs) as in the Base Case scenario presented earlier and a simple linear incentive mechanism that rewards outperformance and penalises underperformance equally.

¹² See Ofgem (2011) 'Business Plans, Innovation & Efficiency Incentives', March, pp45-46.

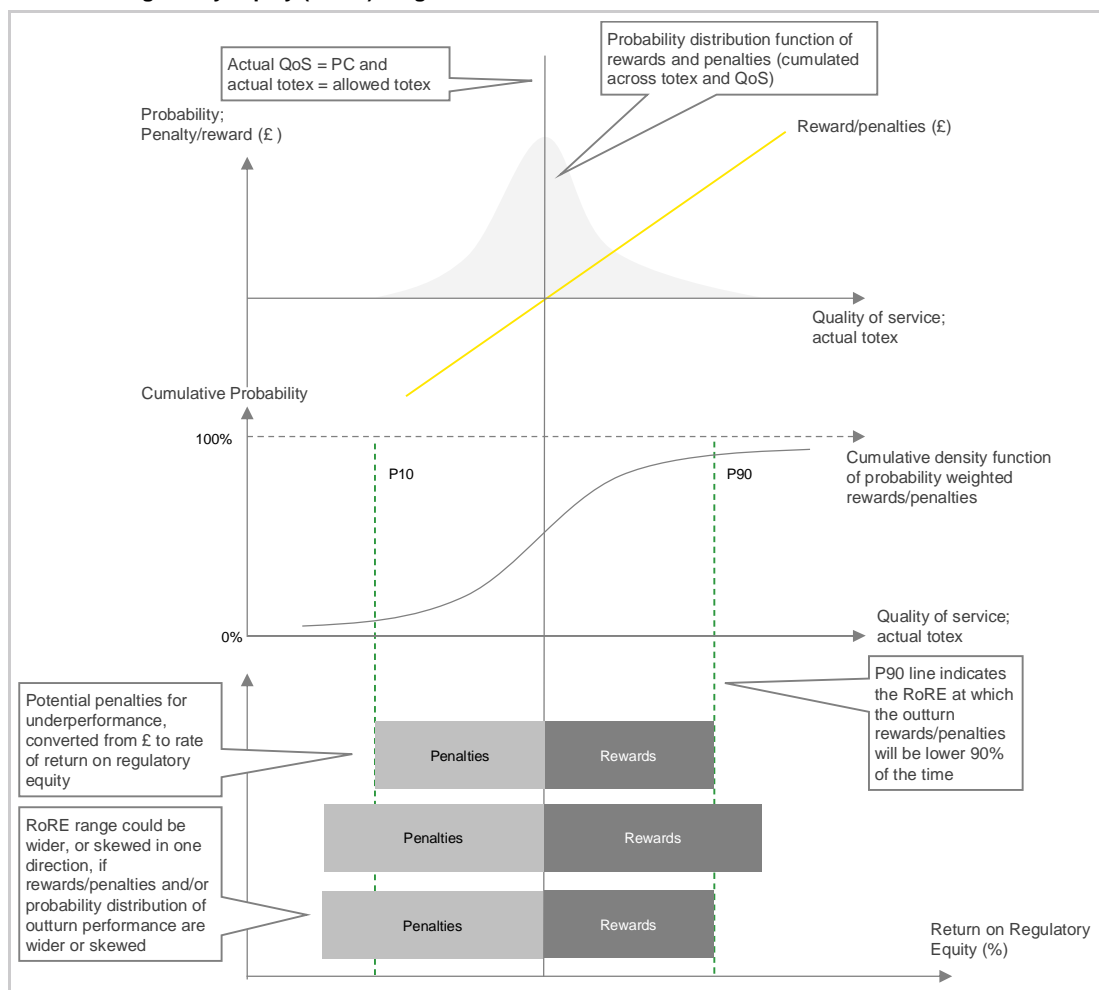


This probability density function of rewards and penalties can be added to the allowed rate of return on equity to calculate a probability distribution of the Return on Regulatory Equity (RoRE), a measure of the rate of return equity investors in a company with a notional capital structure would earn. This probability density function can then be summed to calculate a cumulative distribution function for RoRE, as shown in the second panel of Figure 7 below. We focus on RoRE in the remainder of this report as this is a familiar concept for the water industry, having been applied at PR14.

The second panel of Figure 7 illustrates RoRE ranges from P10 to P90 levels (i.e., the 10th and 90th percentiles of the probability distribution of outturn RoRE) as this was the way that they were illustrated at PR14, but other ranges could just as easily have been shown. Presenting these ranges in this way indicates that only 10% of potential outturn RoRE levels would sit in each end of the tails of the distribution, i.e., above or below the range shown. The P50 level of RoRE (the median level) would be associated with a company earning the allowed rate of return on equity determined by Ofwat (assuming the probability distribution of RoRE is symmetrical).

The contributions of totex incentives and ODIs to the RoRE ranges would depend on the respective probability density functions of outturn performance and strength of incentives. As the bottom panel of Figure 7 shows, the RoRE range could be wider (more upside/downside) or skewed in one direction or another depending on the way that totex allowances, PCs and incentive mechanisms are calibrated. For example, a ‘penalties-only’ incentive regime would skew RoRE to the downside, while a stronger (but symmetrical) incentive regime would widen the RoRE range.

Figure 7: Translating probability distribution functions of outturn performance and rewards/penalties into Return on Regulatory Equity (RoRE) ranges



The discussion so far implicitly assumes that the only driver of the RoRE range is companies' performance against their targets. However, there may be reasons to limit the upper or lower RoRE ranges, e.g., to protect the financeability of the company or to avoid excess returns to shareholders. For example, Ofgem has previously calibrated its RoRE ranges with the lower bound set 'at or below the cost of debt'.¹³ We also note that Ofwat had a 'cap and floor' on ODIs' impact on RoRE at PR14, though we note Ofwat has signalled that it may remove this cap for PR19.¹⁴ Relatedly, the role of company-specific bespoke ODIs may also need to be considered as part of calibrating the overall RoRE range. These issues are not considered further as part of this report, but will need to be considered as the risk and reward package for PR19 is developed further.

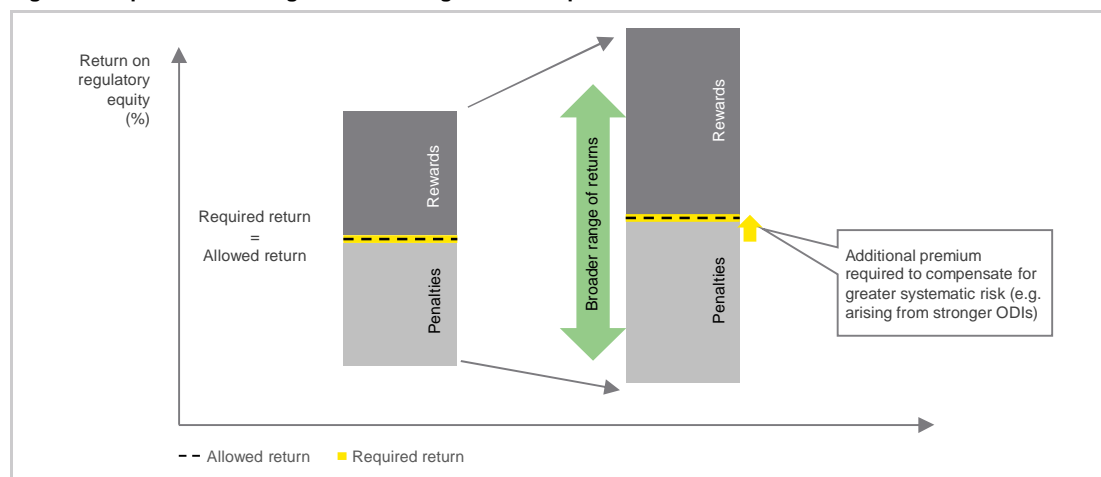
4.2 Issue 2: Ability to influence the required rate of return through the various levers available to Ofwat

As discussed above, different combinations of totex allowances, totex incentives, PCs and ODIs can generate different RoRE ranges. The examples discussed above implicitly assume that changes to the risk and reward package do not impact the rate of return required by investors. However, this will not always be the case, i.e., setting the regulatory 'levers' to different 'positions' might influence investors' required rate of return. In order to test the ability of Ofwat and companies to influence the risk faced by investors, we explore below the relationship between the risk and reward package and investors' required rate of return in a number of scenarios.

4.2.1 The wider the range of potential returns, the greater the required rate of return

Increasing the strength of ODI rewards and penalties (as is the case in Scenario 1 described earlier) will, all else equal, widen the range of potential rates of return for equity investors, as Figure 8 below illustrates.

Figure 8: Impact of widening the RoRE range on the required rate of return



If that range of potential returns expands, the asset beta¹⁵ of water companies would be likely to increase. This is because a wider range of returns increases the potential volatility (variance) of returns and an increase in the variance of water company returns would increase the asset beta of such investments.¹⁶ All else equal, this would increase the rate of

¹³ Ofgem (2012) 'RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas: Finance supporting document', December, p23.

¹⁴ Ofwat (2016a) op. cit., p23.

¹⁵ The asset beta is a measure of the non-diversifiable risk of investing in a particular company, adjusted to remove the effects of the company's gearing.

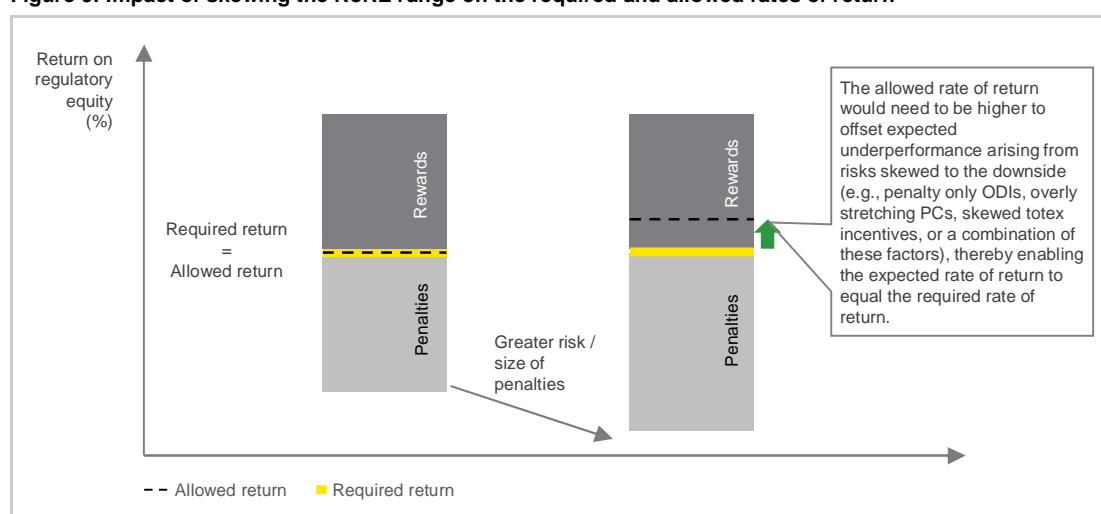
¹⁶ Unless it is assumed that this increase in variance is completely uncorrelated with the variance of the market, a scenario which seems highly unlikely given historical asset beta estimates indicate the variance of water company returns is correlated with the wider market.

return required by investors, though the materiality of this impact would need to be tested empirically.

4.2.2 The more skewed a returns package is to the downside (upside), the higher (lower) the allowed rate of return will need to be

If (as in Scenario 2) the probability distribution of possible rates of return to investors is skewed to the downside (either because penalties exceed rewards or underperformance is more likely than outperformance), then the expected rate of return on equity will be lower than the allowed rate of return on equity set by Ofwat. As Ofwat has recognised, investors would require a higher allowed cost of equity in order to expect a rate of return equal to their required rate of return: ‘[i]f investors were asked to invest in companies with a regulatory system that only allowed for penalties, or downside risk, customers would pay for this through a higher cost of capital’¹⁷. This is illustrated below in Figure 9.

Figure 9: Impact of skewing the RoRE range on the required and allowed rates of return



Conversely, if the probability distribution of possible rates of return to investors was skewed to the upside (e.g., because Ofwat had set a risk and reward package that offered companies strong rewards for outperformance), then the allowed rate of return could be set lower than the required rate of return, with the expectation that the rewards from expected outperformance would close the gap. Such an approach could be consistent with Ofwat requiring water companies to earn part of the required rate of return through expected outperformance of totex/ODI.

In either case, the allowed rate of return on equity would need to be carefully calibrated, taking into account expected out/under performance to ensure that investors had confidence the expected rate of return equalled their required rate of return. An absence of confidence in this exercise might lead to investors applying an additional risk premium on the required rate of return to compensate for any perceived additional regulatory risk.

4.3 Issue 3: Developing and implementing a sliding scale of range of risk and reward packages for PR19

One implication of the foregoing discussion is that Ofwat could identify multiple different risk and reward packages by calibrating totex allowances, totex incentives, PCs and ODIs in different ways. These different packages could be calibrated such that the required rate of return on equity would be different in each case, but equivalent on a risk-adjusted basis. Such an approach could be consistent with Ofwat’s proposal to ‘recognise that where companies are putting in additional effort and taking on additional risk to deliver frontier-shifting levels of performance, they should make a return on that effort and risk-taking’¹⁸.

¹⁷ Ofwat (2016a) op. cit., pp6-7.

¹⁸ Ofwat (2016a) op. cit., pp4-5.



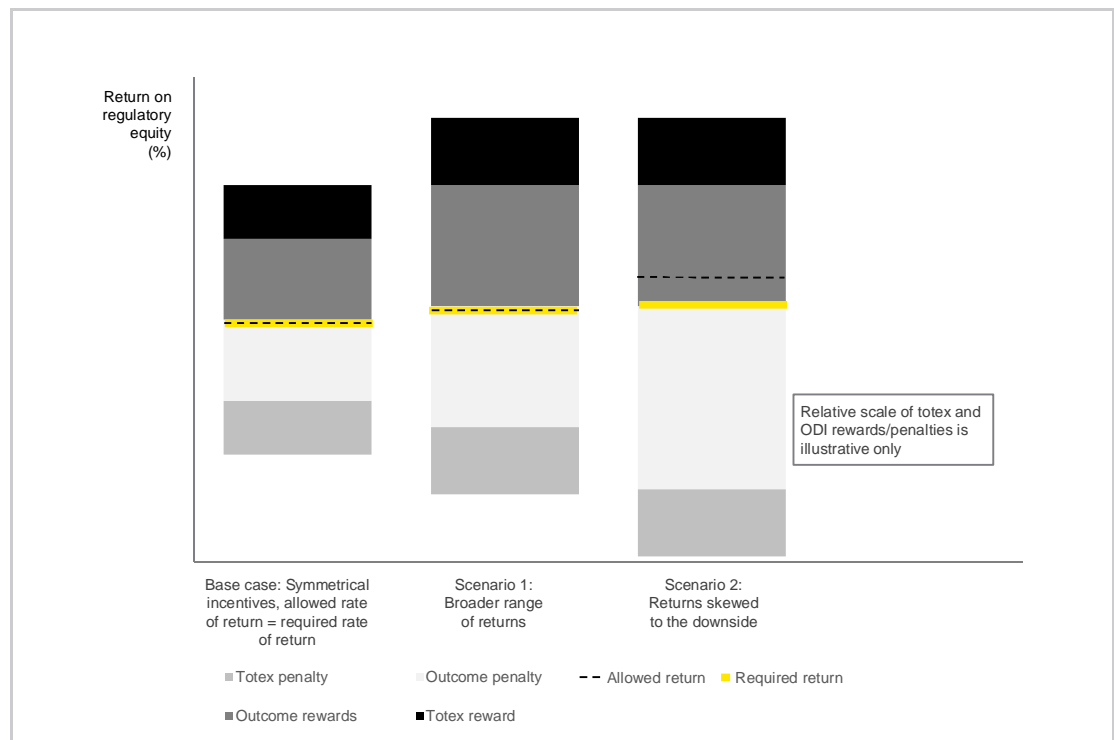
Such an approach would, however, require identifying which companies were ‘taking on additional risk to deliver frontier-shifting levels of performance’ and for there to be some reason not to expect all companies to deliver the same frontier-shifting levels of performance.


One reason why some companies might not strive for frontier-shifting levels of performance is that it might not be in customers’ interests. To see this, note that, as illustrated by Scenario 2 in Figure 4 earlier, setting very stretching targets for companies to achieve could lead to companies expecting to underperform, i.e., to overspend against their totex allowances and/or fail to meet their PCs. Customers bear a share of these risks since a portion of overspends will (subject to the design of the incentive regime) be passed through to customer bills and customers are affected by service failures. Setting overly stretching targets could also undermine investor confidence (if expected returns are less than required returns), which would also ultimately be to the detriment of customers (via upward pressure on companies’ cost of capital). It will not, therefore, be in customers’ interests to set totex allowances and PCs that it is implausible to expect companies to deliver.

Noting the above, the targets which are set for companies to achieve need, to a degree, to take differences between companies into account. Customers of different companies may have different preferences: some may be more willing to take on risk (e.g., of service failures) than others. Customers of all companies may not want every company to strive for ‘frontier-shifting levels of performance’ if that means that customers have to take on more risk. Some customers might only want to take on a lower amount of risk and consequently would be willing to accept their companies to strive for a less challenging set of totex allowances and PCs. In forming those views, customers may have regard to the actual performance of their companies (e.g., their track record of delivery) and of their expected performance (e.g., informed by plans for innovation set out in company business plans).

If some companies were challenged to deliver targets that were more stretching than others, those companies may require a different risk and reward package, i.e., a different package of incentives and, as we discussed earlier, a different required rate of return. For example, companies striving to deliver frontier-shifting levels of performance might face stronger totex incentives and ODIs (such as in Scenarios 1 or 2 in Figure 10 below), increasing rewards if those companies do successfully deliver their target performance, than companies striving for less (but still) challenging levels of performance (which might then have a risk and reward package similar to the Base Case in Figure 10 below).

Figure 10: Illustrative risk and reward packages (not drawn to scale)





Building on the above logic, a sliding scale of risk and reward packages might begin to emerge if:

- ▶ Companies which took on a 'normal' amount of risk faced a particular set of RoRE outcomes, such as in the Base Case; and
- ▶ Companies which took on greater risk faced a wider range of potential RoRE outcomes, and therefore investors in these companies required a higher rate of return on equity, such as in Scenarios 1 or 2.

As discussed above, a sliding scale of risk and reward packages could potentially be in customers' interests. It would, however, represent a change in how Ofwat has approached these issues in the past: instead of incentivising all the companies in the industry towards a common notional level of efficiency and performance, more emphasis would need to be placed on customer engagement (informed by an assessment of the risks a company's customers would take on in different scenarios) to determine which category of the risk and reward sliding scale would be appropriate for a company and its customers. And while we have discussed above how such an approach could be in customers' interests, it also needs to be recognised that there are risks in adopting such an approach: ensuring that all customers get the best possible outcome from PR19 would require the sliding scale to be calibrated and implemented carefully.

As such, the detailed workings of such a sliding scale of risk and reward packages would require careful consideration, an issue we turn to in the next section.

4.4 Issue 4: What process should Ofwat follow to set the risk & reward package(s) at PR19?

The discussion above has been largely theoretical, which raises questions about how Ofwat and the industry could go about setting risk and reward packages at PR19. To try and address some of those practical questions, this section considers practical step-by-step guidance, including for company business plans, that Ofwat and the industry could follow to developing risk and reward packages for PR19. This process may need to be updated and re-applied at different points in the PR19 cycle (e.g., if companies need to re-submit their business plans and/or between Draft and Final Determinations).

Step 1: Define a 'Base Case' risk and reward package

Ofwat should begin by defining a notionally efficient company, including the PC and totex benchmarks (e.g., upper quartile/median, etc.) that it has assumed. This risk and reward package should be calibrated so that the allowed cost of equity equals the required rate of return, with additional (reduced) returns available through rewards (penalties) for good (poor) performance against totex and ODIs. It may be appropriate to calibrate this 'Base Case' risk and reward package similar to the risk and reward package at PR14 so that it can act as a reference point for calibrating other risk and reward packages on the sliding scale (discussed below).

For this Base Case risk and reward package, Ofwat should then determine the rate of return equity investors would require for taking on this level of risk.

Ofwat should then determine an appropriate probability distribution of potential outturn rates of return for this Base Case risk and reward package based on cash flow modelling of scenarios and sensitivities (e.g., via Monte Carlo analysis of probability density functions of ODI and totex performance). This probability distribution of potential outturn rates of return could then be translated into a RoRE range to provide an overview of expected returns and the range of potential upside and downside available. The RoRE range could be presented at a P90 to P10 range, as at PR14, but other ranges would be possible.



Step 2: Set out views on trade-offs between totex, PCs and ODIs

Alongside this Base Case risk and reward package, Ofwat should set out its views on the relationships between totex allowances, totex incentives, PCs and ODIs for the notional company. For example, Ofwat should state clearly the additional expenditure it believes would be required to improve service delivery from one level of PCs (say median) to another level (say upper quartile). This information can then be used to set more stretching targets for other categories on the risk and reward scale (discussed below).

To inform this analysis, Ofwat may need to set out the information it is seeking from companies (e.g., through business plans) if it intends to use such information to estimate the relationships between the regulatory levers. The kinds of information Ofwat may wish to request could include any cash flow modelling it requires companies to perform and information on expected additional costs of delivering a higher target level of PCs. These information requirements should be set out well before companies are required to submit business plans.

Step 3: Define additional risk and reward packages

Building on the Base Case risk and reward package (Step 1), and using the relationships between totex allowances, totex incentives, PCs and ODIs that it has estimated (Step 2), Ofwat can then calibrate additional risk and reward packages, e.g., with more stretching PCs and stronger ODIs. For these additional risk and reward packages to be consistent with companies 'taking on additional risk to deliver frontier-shifting levels of performance' the totex allowances and PCs would need to be more challenging than in the Base Case.

To make options more transparent, and recognising that the establishment of the risk and reward relationship is an imperfect science, it may be appropriate for the number of risk and reward packages to be limited to a small number of categories.

For each of these additional risk and reward packages, Ofwat should then determine the required rate of return on equity. This exercise will require undertaking cash flow modelling of scenarios and sensitivities (e.g., via Monte Carlo analysis of probability density functions of ODI and totex incentive performance), taking into account the specific package of incentives applied in each risk and reward package.

Ofwat should determine the RoRE range for each of these additional risk and reward packages based on the cash flow modelling used to inform the required rates of return and incentive packages. The RoRE range should be presented on the same basis as for the original Base Case risk and reward package.

For the sliding scale of risk and reward packages to influence companies' behaviours, there may need to be material differences between the risk and reward packages (and consequently the required rates of return). The differences between allowed rates of return considered by Ofwat in its cost of debt consultation paper (which range up to 140 basis points) need to be considered further to determine if those magnitude of differences is appropriate.¹⁹

Step 4: Test financeability of each risk and reward package

For each risk and reward package, Ofwat should conduct financeability testing to ensure that in reasonable downside scenarios the notionally efficient company would remain financeable. Where appropriate, this may mean curtailing the bottom end of the RoRE ranges, i.e., placing a floor on the range.

¹⁹ See Ofwat (2016b) 'Water 2020: consultation on the approach to the cost of debt for PR19', September, p41.



Step 5: Check customers will benefit

Ofwat should confirm that the sliding scale will operate to customers' benefit. This should mean that customers (both of an individual company and at an industry aggregate level) will be net-beneficiaries if (a) companies which are set more stretching targets (i.e., are adopting a riskier package) actually deliver those packages; (b) companies which adopt more stretching targets do not deliver those targets; and (c) companies are not able to secure some benefit, at the cost of customers, by targeting a less risky package.

Ensuring that the sliding scale works to customers' benefit will, as discussed earlier, also mean that only companies with customers who are willing to accept the additional risks that come from striving to deliver the more stretching targets are able to take on the riskier risk and reward packages. Part of ensuring that customers will benefit from the sliding scale will be ensuring that companies appropriately engage with their customers when developing their business plans, including around companies' ability to deliver 'frontier-shifting performance' and the risks that this could entail for their customers.

Step 6: Complete risk and reward sliding scale

Combining each of the different risk and reward packages identified in steps 1 and 3, a sliding scale of risk and reward packages can be developed for PR19.

Step 7: Issue business plan guidance

Ofwat should also provide clear guidance for companies and customer challenge groups, well before business plans are submitted, about the different risk and reward packages that may be available. The definitions of each of the different categories will need to be clear (e.g., the relative levels of risk and the required rates of return in each category), along with the criteria for qualifying for each category. And, as noted earlier, Ofwat will also need to issue guidance on the information it requires companies to supply alongside business plans in order for Ofwat to appropriately design and apply the risk and reward sliding scale. To the extent that Ofwat requires information from companies to inform its approach to Steps 1 to 6 above, it may need to request information from companies earlier in the process, before then concluding on the risk and reward sliding scale and issuing business plan guidance to companies. If Ofwat also wishes to receive comments from customer challenge groups on companies' proposals, Ofwat should describe what it expects from these groups early on in the process.

Ofwat will then need to apply the guidance and criteria transparently and objectively. Should Ofwat decide to re-assign a company from one risk and reward category to another, Ofwat should be clear about both the reasons for that decision and the precise adjustments it had made to the plan (e.g., changes to PCs, ODIs, totex allowances and incentives).



5. Conclusions and recommendations

The risk and reward package (i.e., the combination of allowed rates of return, performance targets and incentive mechanisms) faced by companies is a key determinant of customer bills, the allocation of risk between investors and customers, and ultimately whether customers receive value for money. It will therefore be a key component of Ofwat's regulatory framework and approach to incentivising companies to deliver for their customers at PR19.

With a view to building on its approach at PR14 and incentivising companies to deliver even better value for money for customers, Ofwat has recently consulted on the outcomes framework for PR19 which included a focus on a number of themes, including:

- ▶ How companies' PCs can be made more stretching to deliver higher service levels; and
- ▶ How ODIs can be strengthened to encourage delivery on PCs.

Our assessment of the relationships between PCs, ODIs and other regulatory levers that affect the risk and reward package, as set out in this report, suggests that:

- ▶ Encouraging companies to deliver higher service levels is not simply a matter of 'ratcheting up' PCs and/or ODIs, since setting more 'stretching' targets implies increasing risks borne by investors and also transferring more risk to customers;
- ▶ More specifically, it will not be in customers' interests to set implausible totex allowances and PCs as this would transfer risk to customers (either of cost overruns, some of which would be passed on to customers, service failures (e.g., if innovation fails) or of upward pressure on the cost of capital (if investors' confidence in the regulatory regime is undermined) and would not represent value for money;
- ▶ Instead, the targets which are set for companies to achieve need to, to a degree, take into account the differences between them. Customers of different companies may have different preferences: some may be more willing to take on risk (e.g., of service failures) than others. Customers of all companies may not want every company to strive for 'frontier-shifting levels of performance' if that means that customers have to take on more risk. Some customers might only want to take on a lower amount of risk and consequently would be willing to accept their companies to strive for a less (but still) challenging set of totex allowances and PCs;
- ▶ There are complex interactions and trade-offs between PCs, ODIs, totex allowances, totex incentives, the allowed rate of return on equity and the rate of return required by equity investors in water companies such that, if some companies were challenged to deliver targets that were more 'stretching' than others, those companies would require a different risk and reward package, i.e., a different package of incentives and a different required rate of return;
- ▶ Combining the above, a sliding scale of risk and reward packages could be developed for PR19 where some companies take on the greater risk associated with striving for frontier shifting performance and are compensated with a higher rate of return (and other companies strive for less (but still) stretching levels of performance and take on a lower level of risk and are compensated with a lower rate of return);
- ▶ Ofwat would need to ensure that implementing a risk and reward sliding scale delivers the best outcome for customers. Setting some companies more stretching targets than others may entail transferring more risk on to customers of those companies, so it will be important that customers' preferences (particularly their willingness to accept risks of cost overruns, service failures if innovation fails and a higher cost of capital) are taken into account when determining which risk and reward category a company should be in;



- ▶ Ofwat will need to follow a clear and transparent process to implement this approach to risk and reward at PR19. This process would not only need to set out the sliding scale in detail, but also provide guidance to companies on relevant information to include in their business plans.

Given that there are both risks and opportunities for customers, companies and Ofwat to introducing a sliding scale of risk and reward packages at PR19, significant further work would need to be done by Ofwat and the industry if Ofwat it is to implement such an approach. This work would include a number of areas, including the design of the sliding scale, calibration of the individual risk and reward packages (and the differences between them) and developing (and describing transparently) a process for applying the sliding scale (including providing appropriate guidance to companies for the development of their business plans). If Ofwat is minded to introduce a sliding scale of risk and reward packages at PR19, it should consult on the key elements of its approach in the upcoming PR19 methodology consultation (expected in July 2017).

Appendix A Glossary of terms

Term	Definition
Cost of Equity/Allowed Rate of Return on Equity	The rate of return allowed by Ofwat on the notional equity of a water company. The cost of equity is set on a post-tax, real basis.
Outcome Delivery Incentive (ODI)	Provides companies with 'rewards' for performance above PCs and 'penalties' for performance below PCs. Different ODIs are attached to each PC.
Performance Commitment (PC)	The standard of service that a company commits to deliver. A PC is set for each outcome the company is measured against.
Quality of Service (QoS)	The standard of service provided by a water company.
Return on Regulatory Equity (RoRE) range	This is the range of possible outcomes for the rate of return on notional (regulatory) equity, taking into account the allowed rate of return on equity, penalties and rewards for under/outperformance (e.g., of totex allowances, PCs or other allowances such as the allowed cost of debt or tax allowances), and reflects the notional capital structure assumed by Ofwat.
Totex Allowance	The amount of total expenditure (totex), comprising capex and opex, a company is allowed to spend over a given period.
Weighted Average Cost of Capital (WACC)	The WACC is the rate of return that Ofwat allows a company to make on its Regulatory Capital Value (RCV). This is a weighted average of the allowed rate of return on equity and the allowed rate of return on debt.
Willingness To Pay (WTP)	The maximum amount that an individual is willing to sacrifice in order to receive something in return. In the context of the water industry this is the increase in bills that customers are willing to pay for a given improvement in quality of service.

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