



Response to PR24 and
beyond: Creating tomorrow,
together

Thames Water

22 July 2021

Summary of our response

We welcome your consultation ‘PR24 and beyond – creating tomorrow together’. We believe that the interests of Thames Water are strongly aligned with what Ofwat is trying to achieve. We all want to see a resilient and sustainable water sector that is delivering for its customers, communities and the environment today and over the long term. We want to engage in a constructive dialogue with Ofwat about how best to achieve this.

We welcome many of the proposals in your consultation and offer some thoughts and suggestions on how the regulatory regime should evolve in PR24 and beyond.

The context for PR24 will be challenging

The context for PR24 could be one of significant challenges for our customers and the communities we serve. There is a plausible scenario in which inflation has ticked up, interest rates are rising and the UK economy has not yet fully recovered from the impact of the pandemic.

The context for PR24 is also a challenging one for our environment. The impact of climate change is already being felt in the UK and across the world. Between 1902 and 2015, global average sea levels have risen by 16cm, putting increased pressure on flood defences and also exposing those near shorelines to the adverse impacts of flooding.¹ 2020 saw the wettest February on records, whilst also recording the driest May on record. In the same year, the UK also experienced its wettest day in a daily series, with 31.7mm of average rainfall across the country.^{2,3} The National Infrastructure Commission has noted that “*with current plans, there is about a 1 in 4 chance over the next 30 years that large numbers of households will have water supplies cut off for an extended period because of drought*”.⁴

The need to adapt to climate change is creating the need for significant investment now to maintain the resilience of basic services. Beyond this, we also need to invest in measures to mitigate further climate change. The water sector must play its part in achieving net zero carbon by 2050, and to do this also requires significant and urgent investment.

Society’s expectations for the environment are rising too. While it remains legal under certain circumstances for waste water companies to discharge untreated sewage into rivers, it is clear that it is no longer acceptable for us to do so. Understandably, we also see a significant ratcheting up of the requirements for environmental improvements sought by the Environment Agency as part of the Water Resource Management Planning process.

And at the same time, we need to accommodate the needs of a growing population – the UK is expected to see a rise of 4.2% to 69.6 million by mid-2029 and a further rise of 7.8% to 72 million

¹ <https://www.metoffice.gov.uk/weather/climate-change/effects-of-climate-change>

² <https://www.metoffice.gov.uk/about-us/press-office/news/weather-and-climate/2021/record-breaking-rainfall-more-likely-due-to-climate-change#:~:text=In%20addition%20to%20increased%20frequency,series%20stretching%20back%20to%201891.>

³ <https://www.carbonbrief.org/met-office-why-2020-saw-a-record-breaking-dry-and-sunny-spring-across-the-uk>

⁴ [National Infrastructure Commission - Preparing for a drier future: England’s water infrastructure needs, p7](#)

in mid-2041, from population levels of 66.8 million in mid-2019.⁵ In Thames Water's region in our water resources planning we are expecting to see population growth of 7.8% from current levels to 11 million by 2029. Moreover, by 2041 the rise is expected to increase to 11.7 million. Within this we are expecting population growth in Thames Valley of 17.9% by 2041.

If we are to continue to deliver against the expectations of customers and society in terms of the quality and resilience of our water and waste water services, and improve our impact on the environment, we will need to make substantial investments. But, especially as our customers deal with the economic impact of the Covid-19 pandemic, the affordability of water bills seems likely to become an increasing concern and a major driver of trust and legitimacy.

We therefore strongly agree with you that 'this is the moment for fresh thinking and real change'.

We will certainly need to become more efficient. But we will also need real innovation that includes finding ways to make the water and wastewater system work better. And even with these things, we will still need to make some hard choices about priorities, which will need to be grounded in what we know about our customers' and stakeholders' preferences.

There is a lot that the sector needs to do to rise to these challenges. There is a lot that we need to do in Thames Water. But it will be critically important for the regulatory regime, and in particular PR24 to enable and encourage us to do those things, as well as to hold us to account. In that context, we welcome your consultation, and openness to changing your approach to the price review.

There are some important regulatory innovations that could improve the chance of good outcomes

Ofwat's 2014 and 2019 price reviews provide a good foundation on which to build.⁶ We believe that Ofwat's 'Future Price Limits' principles still provide a good basis for regulation. These set out a regime focussed on outcomes, based on customer engagement, with allowed revenues based on total expenditure (rather than treating opex and capex differently, thereby distorting incentives), and with companies incentivised to do well on things (like efficiency and outcome delivery) that benefit their customers.

But we agree that a further evolution of the regime is needed for PR24. Our full response to your PR24 'creating tomorrow, together' document provides our view on all your proposals and the issues you set out. But it seems to us that there are some key areas of your approach that will be critical for the success of PR24 and the ability of the sector to deliver against expectations over the long term, and we highlight those in this summary document.

A focus on the long term

We agree that an increased focus on the long term is important if we are to provide what customers and society need in a sustainable way. A focus on the long term opens up choices

⁵<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/overviewoftheukpopulation/january2021>

⁶ https://www.ofwat.gov.uk/wp-content/uploads/2015/12/pap_pos201205fplprincip.pdf

about how delivery may best be sequenced over time, to improve efficiency and maintain investment while keeping bills at an acceptable level. Crucially, long term focus also unlocks the potential for real innovation, which may well not even be deliverable, let alone pay back, within a 5-year control period. We therefore agree that companies should ground their business plans in the context of their long-term strategies. At Thames Water, we are currently developing a 2050 vision and strategy, which we expect will inform all of our work in the next price control period.

The benefits of companies taking a genuinely long-term approach will only be unlocked if the regulatory regime enables and encourages this. We would strongly support a move to include some measures to incentivise delivery of outcomes over the long term, beyond a single price control. We note and understand your concern that it may be difficult for you to set appropriately challenging targets and outcome delivery incentives beyond one price control period. But to exclude from the price review, incentives for delivery of genuinely long-term outcomes with a consistent multi-period incentive framework risks reinforcing a 5 year look ahead, and with it a lack of ambition and scant scope for genuine innovation. We would be pleased to work with you on how best to strike the right balance between stretching short term performance commitments and encouraging that long term focus. We think that this would complement some of the other ideas in your consultation document that support a more long-term approach, including your focus on asset health and desire to see more catchment management and nature-based solutions.

As a general point, company managements and investors are more likely to engage in genuinely long-term thinking and behaviour if they have a reasonable degree of certainty about how the regulatory regime will operate over time. In this context, it would be very helpful if Ofwat were able to say now where it sees the principles underlying its price setting enduring over time, and where it sees its approach as likely to evolve in future. As we face into some potentially very large, long term investments at a time of considerable uncertainty in respect of major factors such as climate change and the economy, certainty – or at least predictability – in relation to the regulatory regime would improve our ability to plan and unlock more options for efficiency and innovation to the benefit of customers and society.

Conversely, changes to any of the key features of Ofwat's approach need to deliver significant benefit above the associated costs. We note, for example, that your proposal to model water treatment costs as part of the water resources (rather than 'water network plus') price control should not necessarily lead to a revision of the boundary between the price controls. But, if you were to consider it, we would advocate a high bar on changing any wholesale price control boundary because of the need to change the allocation of the RCV and the negative impact this would have on the perceived predictability of the regulatory framework. RCV reallocation in this way creates the risk that Ofwat might shift RCV from price controls envisaged as applying to persistently monopolistic parts of the value chain and into those parts of the value chain that Ofwat sees as potentially competitive, and may seek to regulate in a pro-competitive way, creating a risk of asset stranding.

We consider that an effective long term regulatory framework should include a number of key features:

- Adaptive, shared long-term (2050) targets with stable financial incentives over multiple price control periods for performance commitments that contribute to long term outcomes will encourage companies to invest and deliver best value over the long term
- An explicit steer on the envelope of the levels of expenditure that customers can afford and how this is expected to evolve over the long term (supported by arrangements for those less able to pay)
- A clear long-term approach to asset health and resilience
- A predictable cost assessment approach that recognises and incentivises the need for nature-based solutions and achievement of Net Zero
- Clear, explicit linkages between existing strategic processes in the sector, notably the Water Resource Management Plan process, the Drainage Water Management Plan process and the process for the Water Industry National Environment Programme
- Clarity on the long-term information, through to 2050, that Ofwat would like to see included in business plan submissions.

A focus on outcomes, driven by customer and stakeholder engagement

Companies should focus on and be held to account for delivering the things that matter most to the customers, communities and wider stakeholders they serve. These things are 'outcomes' and by focussing your regulatory regime on the delivery of these things, you both enable and encourage companies to find new and better ways to deliver those outcomes. We can see that you intend to maintain a focus on outcomes at PR24, and we welcome this. We very much welcome your emphasis on 'public value' taking account of the impact of what companies do on the environment and on communities as well as narrower 'customer benefits. But there are some proposals in your document that could give rise to concerns, depending on how they are implemented.

Any price review needs to capture what customers will get for the revenue they supply to their company, and it is right that what they get – as well as what they pay – should form part of the price review settlement. Since PR14 this has been captured in a series of 'performance commitments', which have been subject to specific incentive mechanisms. After having seen a proliferation of performance commitments since PR14, we agree that it makes sense to have a smaller number. This would improve Ofwat's ability to compare and challenge those commitments, and it would also improve transparency and accountability in-period. For the same reasons we agree that there is scope for more common performance commitments between companies. We are keen to help Ofwat develop the common performance commitments through the outcomes working group so that they are designed, with appropriate definitions, to provide the desired transparency of performance.

However, we are concerned that Ofwat might make it too difficult for companies to have bespoke performance commitments, which take account of companies' specific operating environments. Customer and stakeholder priorities do differ between different companies and different companies do face different challenges. For instance, companies face differences in abundance of water resources – some companies are facing issues with water scarcity, typically in the South of the UK, whereas others have less of a concern with this issue. Another area where companies face differing challenges in priorities is in their geographic location. Those companies that operate in more rural areas have longer, less dense networks and smaller treatment works. This contrasts with urban companies (such as Thames Water in our London area) where they operate dense networks and larger treatment works. Linked to this, we are also concerned that Ofwat's desire to drive these common performance commitments using more 'national' customer research risks overlooking some of these differences in preferences. And more profoundly, we are concerned that – even though it is 'collaborative research' – this centralisation risks undermining the good work that has been done across the sector since PR14 to improve companies' connection to their customers. We recognise that company customer research has not always met Ofwat standards and that there is more to be done to build genuine customer insight into everything we do. But we think it would be better for everyone if we were to continue along that journey rather than take a step back to Ofwat's being seen as the 'headquarters' of the sector.

We are keen to work with you and the sector in developing the detailed approach to this collaborative national research. The recent UKWIR research project on '*How should customers' and stakeholders' views be used in regulatory decisions*' offers a useful framework and references. Given the importance of this research in informing the development of business plans – which has already started across the sector – time really is of the essence. To be useful for business planning we would need any information from customer research on customers' valuation of different levels of performance in different areas by the start of 2022.

We note your suggestion that improved support for vulnerable customers could be shifted outside the price review and subject only to reputational incentives. We consider it is important that the revenues we are permitted to recover from our customers reflect the (efficient) cost of delivering the outcomes that our customers and communities wish to see. If customers and wider stakeholders strongly supported radical change in our levels of support for vulnerable customers, this could require substantial investment that would affect bills. Indeed, we may need to trade this off against some other use of customers' money. So, we would like reassurance that, if you do shift towards excluding performance commitments that do not have financial incentives attached, from the scope of the price review, you will continue to consider any relevant trade-offs and cost recovery implications as part of the price review.

Given the importance we attach to an outcomes-focussed approach, we are uneasy at your suggested inclusion of a list of 'price control deliverables' in a company's price control decision. We can understand that you wish to understand the extent to which companies who spend less than their allowed totex are doing so by virtue of genuine efficiency or simply by not doing work, the effects of which may not be apparent in the short-term but which will compromise performance or resilience over the longer term. But if Ofwat returns to a pre-PR14 world holding companies to account for the delivery of specified schemes, this will be inimical to securing much efficiency and innovation, and will put back the cause of nature-based solutions and catchment management partnerships, to the detriment of customers and the environment. Much depends on how these 'price control deliverables' are operationalised. If they are simply monitored against,

this would be less damaging. But if they are to be monitored against, it will be important for you to be clear what will happen to companies who do, or do not, deliver against the list, either in-period or in subsequent price reviews, and not to take a punitive approach where companies choose more efficient ways to deliver desired outcomes. Even then, you should consider the potential for ex post scrutiny of the rationale for companies' delivery of certain outputs to work against precisely the kind of imaginative approach and company ownership of outcomes that are needed right now. It could encourage companies simply to do what Ofwat has 'told them' to do.

Finally, we very much support the work you are doing to improve focus on asset health. Although this is not an 'outcome' as such, we know that our customers, communities and stakeholders care deeply about the resilience of the services we provide, and maintaining a focus on asset health is critical if this resilience is to be maintained over the long term. A regulatory focus on asset health is therefore entirely appropriate, and we are happy to continue to work with you to develop an effective approach to assessing, monitoring and incentivising asset health.

Enabling and encouraging high quality business plans

High quality business plans should be incentivised because better quality plans increase the ability of companies to deliver for customers and improve Ofwat's ability to regulate effectively in the interests of customers and society; they provide good quality data for comparative modelling and are more likely to reveal efficiencies that can be used to set appropriately challenging benchmarks. We support the continued use of financial, reputational and procedural incentives for good quality plans. If these incentives are to drive company behaviour, they will need to be clear in good time, to inform the business planning process.

We understand why you are looking to streamline the price control process by reducing the number of stages. Of the three options you have set out, we prefer the two-stage option, which combines your 'initial assessment of plans' and draft determination stages, as this should make best use of the time available. This time is crucial in allowing companies to reflect on your feedback and make meaningful adjustments to their plan. It also provides scope to explore any misunderstandings or misinterpretation on both sides, which improves both the robustness of Ofwat's final determinations, and their effectiveness in driving changes in company behaviour. (In PR19, we felt that the gap between draft determinations and responses was too short and any attempt to reduce it further would be detrimental.) If you do adopt this approach, it will be important for you to provide sufficient time between the combined draft determination and IAP assessment and when responses to the draft determination are required.

We agree that Ofwat could do more to help companies produce good plans by providing early sight of its views in some key areas such as our base expenditure, performance commitment levels, incentive rates and the WACC. However, if your expectation is that these will enable better business plans, it is important that they are given full consideration and shared early enough for this to be the case. If you could share your view on these topics alongside your final methodology, along with a clear process for any updates when year 3 and year 4 data is known, this would mean we could take them into account.

Making good use of markets and competition

Markets enable efficiency-enhancing transactions and reveal useful information for decision-making. They can enable significant benefits for customers, communities and the environment. It will be important for Ofwat to enable and encourage markets if the sector is to achieve the step change in efficiency and innovation the challenges of climate change, population growth and rising expectations require, while keeping bills affordable for all. Where competition becomes effective, it holds the prospect of deregulation, allowing regulation to focus on where it is needed to enable and encourage good outcomes.

With this in mind, we welcome your proposals to provide additional incentives for projects subject to 'direct procurement for customers' as a form of market-testing. We believe that where projects have been subject to 'direct procurement for customers' (where Ofwat is satisfied that this was a meaningful market-test) this should provide Ofwat with sufficient comfort as to the efficiency of the cost of the project, such that Ofwat does not then need to model those costs further. Indeed, those costs should be taken into account in Ofwat's cost modelling as useful benchmarks.

We strongly welcome your wish to enable water companies to compete to deliver 'direct procurement' projects including those they are letting themselves. We understand that Ofwat may be concerned about the incumbent company having an unfair advantage in competing against third parties for direct procurement projects when the company itself is letting the contract, such that Ofwat will wish to put in place measures to ensure this is not the case. Such measures need to be proportionate, so as not to lose the benefits of having the incumbent company as an additional competitor – the need to compete against in-house provider could well sharpen incentives on third parties to provide keen prices and good service. In designing and implementing any such measures, we believe Ofwat should draw on lessons from other sectors (such as energy and telecoms).

We agree with the long-term objective of removing contestable connections from the price control framework and recognise that there needs to be a level of competition in a regional area before this can be achieved. We would also support the creation of separate price controls for new connections as a stepping-stone to the removal of price limits once sufficient competition exists in a regional area. Ofwat could set the threshold for sufficient competition as part of PR24 and undertake a review during the next control period to see if price limits can be dropped in any areas during that control period, before PR29.

Innovative thinking on regulation of big projects

As David Black has acknowledged⁷, the water sector is likely to require substantial investment in future. Some of these projects may generate step-change improvements in service quality and qualify as enhancements. Others may be large scale renewal projects, designed to future-proof existing levels of resilience in the face of cumulative population growth and climate change. Others may be investments in game-changing approaches to catchment system operation and

⁷ Keynote speech to WWT Water & Wastewater Treatment (WWT) - Water Security Conference 2021, 29 June 2021 - "The transformation of the sector over the next 30 years (or the next 5 price reviews) will require significant new investment,..."

<https://www.ofwat.gov.uk/wp-content/uploads/2021/06/David-Black-WWT-Speech-29-June.pdf>

catchment partnership that help transition of fundamentally different, more sustainable approaches to water and wastewater management in the environment.

In this context, we welcome Ofwat's openness to think differently about aspects of the price controls that could enable some more innovative approaches to regulation of such projects. This may be appropriate, for example, for projects which will take multiple price control periods to plan and deliver, where outcomes are clear but deliverables will require development, refinement and possibly iteration over time. It may also be appropriate where the risk profile of the project is materially different to that of a typical water company, or where it is appropriate to allocate risk differently to improve efficiency. Given our experience of different regulatory approaches including Thames Tideway and our two conditional allowances schemes, we would be happy to work with Ofwat and the sector to consider the nature of projects that could be subject to different approaches and what those approaches could comprise.

An appropriate challenge on costs

Ofwat's ability to benchmark water company costs and challenge on efficiency is an important part of its role. In our view, Ofwat's approach to cost assessment is well-established and well understood but has some scope for refinement.

In our view, PR19 made good progress on the modelling of base expenditure (botex) and provides a good starting point for cost assessment in PR24. However, we consider that there are a number of areas where improvements can be made. These include improved modelling of the elements of water production and a careful review of the cost drivers for all models to ensure that they reflect the underlying economic drivers and provide a more robust assessment of efficient costs. We provide further details in an extensive response to Q10.1

We also consider that there is a big opportunity to consider models for capital maintenance, which we consider should be modelled as a separate econometric model as a complement to the botex approach. While this is not a new topic, a 2003 paper published by UKWIR stated "there is a need to consider the impact of differences between future and historical periods in estimating future capital maintenance needs, with particular regard to historical investment cycles and the requirements of large or unusual assets; the structure of this analysis is not well defined, and yet is critical if future service problems are to be averted". We recognise it is not a simple job to resolve but with the increased focus on the longer-term and resilience, now is the time to devote significant effort to progressing this issue, which is of critical importance to customers. Separate modelling would help deal with the issue of lumpy capital maintenance and for tipping points that might come from for example, climate change or the cumulative impact of population growth/development.

While the robustness of the botex models can be improved to provide a better assessment of efficient costs, it has to be recognised that there are circumstances where the econometric models may genuinely not reflect a company's efficient costs. In such circumstances the cost adjustment claims process and engagement with companies remain an important part of the cost assessment process.

There is an opportunity to expand the use of econometric techniques particularly for enhancement cost modelling, which should make the assessment more robust and objective. In particular, we consider that dynamic panel models should be considered. We provided input to the CMA review and in their final determination the CMA noted " We note Thames Water's submission on the potential use of Dynamic Panel Data techniques when modelling enhancement costs, and regard it as meriting further consideration in the development of approaches to be used at PR24".⁸

The benefit of dynamic panel models is that they control for the lumpiness of expenditure for areas such as new connections. We will provide further details on this approach and our work to date in a paper to the Future Ideas Lab.

In addition, as noted above, an expansion of 'direct procurement for customers' should provide additional market-based cost information that can support enhancement modelling or potentially remove the need for it altogether in certain areas.

Changes are also required so that cost assessment can reflect the wider societal and environmental benefits, which are not currently captured. For example, in considering nature-based solutions, cost assessment needs to take into account the wider benefits from increased biodiversity, flood risk reduction, carbon sequestration etc. and a longer assessment period. This will support companies working together in partnership with local stakeholders in co-creating solutions that avoid the need to 'build concrete' solutions to problems and achieve net zero targets. If Ofwat has views on how best this should be done, it would be helpful to have them soon so that companies can build Ofwat's thinking into their business planning. This should in turn enable Ofwat to make better quality comparisons in the price review and make decisions that incentivise better outcomes.

An efficient allocation of risk, a reasonable return and financial resilience

Economic regulation is fundamentally about the allocation of risk and return. It is right that Ofwat should seek to allocate risk to whoever is best placed to manage that risk, as this will incentivise the most efficient management of the risk. But it is imperative that Ofwat's price controls allow investors a reasonable return, which appropriately compensates them for the risk that they will bear. While Ofwat may disagree with the CMA's approach in the recent water company redeterminations of 'aiming up' within the WACC range, it is correct to say that the effects of too low a cost of capital will be negative for everyone and perhaps mostly for customers, communities and the environment as – over time – investors will place their money elsewhere. Right now, given the scale and nature of the investment the sector requires to meet future challenges, this would be especially undesirable.

Overall, it is fair to say that the water sector is inherently less risky than many other sectors, especially in relation to revenue risk and taking account of the protections and predictability of the regulatory regime. But some activities within the sector do carry significant risk, such as large scale construction projects. There may be merit in considering variable returns for major

⁸ CMA Final report: Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations (p415)

investment projects reflecting the scale, complexity and risk profile of a company's proposed capital investment programme. And we believe that it would be inappropriate for Ofwat to take a prescriptive sector-wide approach to companies' financial structures, which may reasonably vary according to the nature of their business.

We note Ofwat continues to attach significant importance to companies' financial resilience and intend to take forward a programme of work on how financial resilience should best be achieved to protect customers, with a discussion paper due in the autumn. We would be very happy to work with you on this programme of work, which we consider should focus more on the extent to which an organisation's financial arrangements enable it to avoid, cope with and recover from disruption rather than simply the actual level of gearing.

We encourage Ofwat to consider the CMA's assessment of the current gearing sharing mechanism in that work. Gearing does have some relevance to financial resilience, but, in our view, using gearing as the primary measure of financial resilience risks oversimplification and potentially a distortion of conclusions. Customer and investor concerns over financial resilience are fundamentally aligned; both debt and especially equity investors stand to suffer potentially material loss in a situation of acute financial distress and therefore have protections in their commercial arrangements with companies (such as debt agreements, shareholder agreements and delegated authorities), to avoid entering into such situations.

We also note that this alignment of interests is especially the case where investors are genuinely long term in their nature, and where their decision to invest is driven by ethical, social and governance (ESG) factors. The more Ofwat can do to encourage such investors in the sector – including by taking a long-term approach to its regulatory framework *beyond* PR24 – the better for financial resilience.

In the consultation you propose exploring the merits of indexation of the cost of equity. We do not see a strong need to index the allowed return on equity and have concerns about the additional complexity that it would add for no real benefit to customers. Equity investors accept the existing risk of movements in underlying rates over a control period as part of their 'in the round' assessment of the risk of their investment in UK water. In our experience, stable, predictable cashflows are a key characteristic that makes regulated investments attractive to long-term infrastructure investors (both equity and debt) and the stability of a fixed allowed return on equity over a control period is more conducive to this. The additional volatility in returns may have the unintended consequence of increasing the cost of equity.

If you do wish to implement indexation, we would encourage you to avoid adopting measures which increase year-to-year volatility, particularly as unlisted equity investors' hurdle rates tend to smooth out short-term market fluctuations. Ways to avoid such volatility could include: an end-of-period true-up; a cap and collar to limit large changes; and deadbands to ignore *de minimis* fluctuations.

We note the proposal to fully transition from RPI to CPIH. We welcome the reduction in complexity that this would bring. However, it does create additional differential inflation risk and we consider that for PR24 you should make an early decision on this subject, so that companies have time to put in place appropriate risk mitigation options such as derivatives and allow the issuance costs

of such hedges to be provided for in allowed revenues. The transition will bring cash forward into AMP8 and this needs to be considered in any assessment of affordability.

Creating tomorrow, together

We are pleased to see that Ofwat intends to build on the success of PR14 and PR19. Evolution is to be preferred to revolution in this sector.

That said, there is a lot to do. A desire to focus on the long term must not become an excuse to kick the can down the road. The challenges of climate change, population growth, rising expectations and affordability are real today. PR24 represents an opportunity to put the sector on a path of real efficiency and innovation that leads to a bright, sustainable future; we must all seize that opportunity, together.

And we are committed to working with you to do this.

Response to consultation questions

2. Ambitions for PR24

Q2.1: Do you agree that the themes we have suggested for PR24 are appropriate for England and for Wales?

We welcome Ofwat's themes for PR24 which recognise the long-term challenges facing the industry and the wider social and environmental value, beyond our core activities, which the sector delivers for customers and communities. A regulatory approach, which allows the industry to address the long-term challenges of climate change, ageing infrastructure and protection of the environment allows a consistent approach with the strategic planning frameworks (WRMP, WINEP, DWMP etc.) and is necessary to respond to the urgent pressures raised by the National Infrastructure Commission and the Government's 25 Year Environment Plan.

We also support the emphasis on gaining a clearer understanding of customers and communities, recognising that we as an industry can have a positive and lasting impact on society, the natural environment and the communities that we serve.

Innovation is widely recognised to be a key driver of economic growth and productivity⁹. We welcome Ofwat's continued focus on this important theme, which will allow us to better serve our customers and communities, including through the use of data, and address the challenges of climate change and resilience.

Q2.2: Do you have comments on the considerations we've identified as relevant to the design of PR24?

Clarity over Ofwat's long-term approach to future price reviews would give the industry visibility to plan on a multi-AMP basis towards meeting the long-term challenges of climate change and resilience and to sequence investments in a way that addresses the affordability challenges posed by the need for significant investment.

In our experience, developing schemes outside of the price review process e.g the SROs and our conditional allowances has been effective, enabling consideration within AMP of optimal solutions for large investments.

Q2.3: How should we evaluate our progress, and how can we best develop or use appropriate metrics to do so?

Emphasis should be placed on developing metrics which capture the wider environmental and social value, which the sector creates for our customers and communities. We welcome the opportunity to work with Ofwat, the industry and stakeholders on how this is developed and reflected in the approach to PR24.

⁹ https://media.nesta.org.uk/documents/The_invisible_drag_on_UK_RD_22.08.2019.pdf

3. How we regulate

Q3.1: How can we best regulate the water sector to deliver value for customers, communities and the environment? Do you agree, or have comments on, our suggestion to maintain our 'building block' approach based on outcomes, costs and risk and return?

The vast majority of the activities of water companies are more efficient as monopoly providers and therefore the building blocks of outcomes, costs and risk and return remain the core elements of the price control.

The outcomes framework is a powerful mechanism and therefore it is important that the right outcomes are incentivised i.e the outcomes that society wants at a price it is willing to pay. There are proposals in the consultation to reduce the number of performance commitments and streamline customer research and the calculation of incentive rates. While we support these aims, it will be important to ensure we do not over-simplify and end up incentivising the wrong outcomes or levels of performance. We provide further considerations in response to Q6.1 and Q9.1.

It is clearly right that customers should only pay an efficient cost for services. However, as highlighted by Ofwat "...Water and wastewater companies operate in complex systems. They interact with each other, different bodies across the sector as well as organisations outside the sector. They also interact with the natural environment in many ways..."¹⁰ and it is not always appropriate to condense expenditure levels down to a few econometric models. We welcome Ofwat's willingness to better understand the relationship between costs and service levels. This will be important with the aim of setting longer term objectives and will need to reflect the inherent differences in the geography and topology of companies that affect the ability to deliver the same levels of service and resilience.

We welcome Ofwat's encouragement for more nature-based solutions and this will require changes to methods of cost assessment. We provide further details in response to Q10.4.

We appreciate that Ofwat's views on risk and return are still developing and there will be further discussion papers later in the year. We note that Ofwat remain concerned about financial resilience - "*We are also taking forward a programme of work to determine what more we should do to ensure customers are adequately protected from the financing decisions companies make.*"¹¹ We consider that the interests of investors and customers are already well aligned on the issue of financial resilience and we would encourage Ofwat not to go down the path of devising a modification of the PR19 gearing sharing mechanism. We note the CMA were fairly clear that "*...we have not been presented with evidence demonstrating that either the risks or consequences of these companies experiencing financial failure are likely to be large.*"¹² We provide further considerations on this subject in response to Q11.7.

Q3.2: To what extent is greater co-ordination required across the sector? In what ways might we promote better co-ordination across companies and with other sectors, and how might this benefit customers?

Greater co-ordination and collaboration across the sector is necessary to deliver sustainable change in complex challenges at scale. This is particularly true for challenges such as climate

¹⁰ PR24 and Beyond, creating tomorrow, together, p27

¹¹ P24 and Beyond: creating tomorrow, together, p120

¹² Competition and Markets Authority, 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determination - Final report', March 2021, para. 9.1223

change and affordability that are complex, interdependent, and emergent and for which solutions are likely to be multifaceted.

At the regulator level greater co-ordination between Ofwat, the EA and DWI would reduce uncertainty and reduce transaction costs. There are areas where there is already a good level of alignment, for example in the WRMP and through RAPID, but greater alignment would be helpful. Areas for improvement include agreement on timetables so that, for example, finalisation of the WINEP programme and agreement of the statutory WRMP are aligned with the price control.

Better co-ordination and agreement between regulators through the strategic frameworks would be beneficial so that the issues covered by the strategic frameworks are dealt with once in those processes and do not need to be duplicated in the price review.

The RAPID initiative has been a good example of an area where co-ordination of strategic water resources across the whole sector has been useful in encouraging companies to collaborate together on a regional basis to find better solutions. Other areas where similar co-ordination could be useful include enhancement to treatment capacity particularly for bioresources and for water efficiency.

Water efficiency is an important area and we are keen to take a leading role in this area, for example we understand we are the only company undertaking smarter business visits and are leading the installation of smart meters. However, there are a number of factors affecting water efficiency where more co-ordination between regulators, companies and the Government, would be beneficial, for example over white product labelling and building regulations. This would help to reduce water demand and lessen the environmental impacts of water abstraction.

4. Increasing focus on the long term

Q4.1: What are your views on the need for greater focus in companies' regulatory business plans on how they will deliver for the long term?

We agree that an increased focus on the long term is important if we are to provide what customers and society need in a sustainable way. A focus on the long term opens up choices about how delivery may best be sequenced over time, to improve efficiency and maintain investment while keeping bills at an acceptable level. Crucially, a long term focus also unlocks the potential for real innovation, which may well not even be deliverable, let alone pay back, within a 5 year control period. We therefore agree that companies should ground their business plans in the context of their long-term strategies. At Thames Water, we are currently developing a 2050 vision, which we expect will inform all of our work in the next price control period.

Company business plans need to be able to articulate an adaptable long term vision of the level of performance they are heading towards (supported by customers and stakeholders and ideally shared by Ofwat and other regulators); the challenges and uncertainties ahead and how they are being managed; a long-term understanding of their assets and resilience and the likely levels of expenditure and bill levels needed to achieve the vision.

To support this the regulatory framework needs to adjust and should include:

- Adaptive, shared long-term (2050) targets with stable financial incentives over multiple AMPs for performance commitments that contribute to long term outcomes will encourage companies to invest and deliver best value over the long-term.
- An envelope of the levels of expenditure that customers can afford to fund over the long term (supported by arrangements for those less able to pay).

- A clear long-term approach to asset health and resilience.
- A cost assessment approach that recognises and incentivises the need for nature-based solutions and achievement of Net Zero, with some recalibration of what is considered efficient investment as long term-planning could result in investment ahead of need.
- Clear linkage between existing strategic processes – WRMP, WINEP, DWMP.
- Clarity on the long-term information, through to 2050 to be included in business plan submissions.

All these points suggest the regulatory framework should be reasonable stable from AMP to AMP and focussed on facilitating delivery of the shared vision. Changes should only be made to respond to new information, events and developments. Changes that are not material to delivery of the shared vision should not be introduced. An example of this may be consideration of indexing the cost of equity, which will not have a significant impact on delivery of the shared vision and would add to the price control complexity.

We recognise that the framework cannot remain static and must be adaptable to new information and situations, and so changes should be the result of a clear need and be likely to contribute materially to the delivery of the shared vision. We note that the consultation title includes “*creating tomorrow, together*” and we agree that for the industry to succeed there must be collaboration between companies, Ofwat and other stakeholders.

With long-term planning there may be an increased level of risk associated with utilisation of assets arising from forecasting variations due to exogenous shocks not considered in the price control. Investment may appear more or less efficient in cases where the asset is only partially utilised especially in the early years of its commissioning or in cases where it takes a long time ramp up. Taking a historic example outside the regulated sector to demonstrate the point, the capital-intensive Thames flood barrier was not utilised for two of its first five years and only four times in the same period. In its peak year (2013-14) it was used fifty times and now ranges from two to nine times in the last three years. Taking a short-term perspective would imply a poor investment decision if the benefits of the option to close are not taken into account.

Q4.2: What should long-term strategies seek to cover and what details should we expect companies to set out in business plans? Would common requirements help us and other stakeholders to understand each company's approach?

We fully support the principle of developing long term strategies and approaches. We think there are some important design issues that need to be considered to deliver this outcome. There are a few *prerequisites* that need to be in place before long term strategies can be developed:

- Agreement on the type of water system that is desirable in the first place.
- Shared vision of long-term performance.
- A shared understanding of the envelope of allowable expenditure that would be affordable to customers, that would permit long term investment to realise the vision.
- Sustainable asset maintenance and resilience approaches.
- A broad timetable of when the long-term vision must be implemented.

There are some regulatory design issues that need to be thought through. Long term thinking within the context of a price control carries its own risks. The robustness assumptions about future- demand, economic growth increase uncertainty. Also, assumptions about future

technological capabilities inevitably shape long term planning yet can be speculative in nature. Societal values will also inevitably change in the desirability of certain outcomes, for example, changes in willingness to pay for nature-based solutions could be transformative and alter the view of what constitutes a desirable water system. Any long-term strategy has therefore to be adaptable to new information from AMP to AMP.

We support the introduction of a limited set of common requirements, which should be flexible to the specific circumstances of individual companies.

Q4.3: How would this build on the work completed in strategic planning frameworks?

The long-term strategy and vision need to be consistent with and build on the three main strategic planning frameworks – WRMP, WINEP and DWMP. These strategic planning frameworks have different approval mechanisms and it is important that the various regulators are aligned across these processes. Decisions made in respect of these fundamental elements of water businesses should be respected in the price review process.

While there has been improved alignment between the WRMP and price reviews in recent years, there remain differences in the various timetables that create uncertainty in the price review process.

Q4.4: How can we allow such strategies and plans to adapt to new information at future reviews while continuing to hold companies to account to deliver expected benefits into the future?

We agree that strategic planning will inevitably change as new information is available. There is also a risk that due to the inherent uncertainty there will be a bias towards smaller investments with larger projects being deferred, which may not be in customers long-term interests. We note the OBR's recent comment "*In making the transition to net zero, delaying decisive action to tackle carbon emissions by ten years could double the overall cost.*"¹³

In setting the strategic direction and aims companies should be able to take into consideration the known uncertainties, such as climate change and population growth, and put forward sensible strategies that take into consideration risks and uncertainties. Factors and developments that may change future direction or timing can be highlighted. In future AMPs, there could be a clear explanation of what assumptions have changed in the light of new information, technology changes and events and which therefore have clear consequences on the previous plan. The changes from the previous plan would then have a clear audit trail of the external factors and new information that have changed the long-term plan and that are beyond management control.

This process would also need Ofwat to accept that decisions taken in the past, based on the best information available at the time, that no longer look optimal, were nonetheless the best decisions at the time and should not be judged with the benefit of hindsight. Instead an approach of adapt and learn should be employed.

Ofwat should also follow a similar approach with changes to the regulatory framework having an audit trail of what has changed to require a change in the regulatory framework.

¹³ Office of Budget Responsibility: Fiscal Risks Report (July 2021) p22:

[Q4.5: Would providing our views on comparable aspects of companies' plans in advance of business plan submission streamline the price review process?](#)

We support this suggestion as it is likely to expose differences between the regulated companies and the regulator faster than would otherwise be the case. This would allow time for companies to either support their case better and close the gap or to alter plans.

Early views on base cost, common PC PCLs & ODI rate, WACC will also help streamline the business plan process so that companies can focus on the exposed variations and more importantly long-term investment development and the IAP process. We recognise that establishing these early views has linkage with cost assessment, outcomes framework, collaborative customer research and companies' annual APR submission. We suggest having these early views alongside the PR24 final methodology in Dec 2022, with a mechanism to update when year 3 and year 4 performances become available.

It may also be possible to reduce the required business plan submissions in areas where companies are in agreement with the early view.

[Q4.6: Should we adopt a collaborative approach to developing Welsh companies' plans at PR24? If so, how should we go about doing this?](#)

No comment.

[Q4.7: What are your views on how we could provide clarity over the long-term regulatory framework?](#)

It is a necessary objective that is to be welcomed. Adaptive long-term targets that provide strong incentives without creating unintended consequences in the short-run are needed. Our aim is for stable and outcomes-oriented regulatory incentives for multiple AMPs for performance commitments that contribute to long term outcomes, for example, net zero, drought resilience, water efficiency, leakage and river quality.

Some of the key aspects that would provide clarity include:

- Adaptive, shared long-term (2050) targets with stable financial incentives over multiple price control periods for performance commitments that contribute to long term outcomes will encourage companies to invest and deliver best value over the long term
- An explicit steer on the envelope of the levels of expenditure that customers can afford and how this is expected to evolve over the long term (supported by arrangements for those less able to pay)
- Stability of the key elements of regulatory framework (including cost assessment, outcomes, risk and return).
- A clear long-term approach to asset health and resilience
- A predictable cost assessment approach that recognises and incentivises the need for nature-based solutions and achievement of net zero
- For major projects or programmes agreement on longer-term treatment and returns.
- Clear, explicit linkages between existing strategic processes in the sector, notably the Water Resource Management Plan process, the Drainage Water Management Plan process and the process for the Water Industry National Environment Programme

- Clarity on the long-term information, through to 2050, that Ofwat would like to see included in business plan submissions.

Greater clarity over the risk and return framework would particularly resonate with equity investors. In our experience, stable, predictable cashflows are a key characteristic that makes regulated investments attractive to long-term infrastructure shareholders such as ours. The existing regulatory framework means that the allowed return on equity is re-determined every five years, with such re-determination being subject to market movements as well as changes in methodology. As most investments have a payback period of >5 years, equity investors have had to accept the risk to returns from one AMP to the next and fall back on the stability that the RCV affords. This, however, does not mean that the framework couldn't be improved to reduce the perceived regulatory risk to equity returns and encourage investment, potentially at a lower hurdle rate due to the increased certainty, both of which would benefit customers.

Ofwat could consider the following options (and these should be read in conjunction with our comments in response to Q11.3):

- For traditional, capital intensive investment solutions, setting an allowed rate of return for a period greater than five years, or linked to key project milestones where risk would change materially, is important. The rate of return could be entirely fixed or fixed with respect to methodology with indexation of certain parameters and/or re-openers.
- For nature- and other opex-based investment solutions, providing certainty over the recovery of incremental opex costs beyond the current price control is important. The NPV approach posited by United Utilities¹⁴ could be an appropriate framework.

Q4.8: Are there barriers to water companies changing how they deliver their core functions to deliver greater environmental and social value? How can we address any barriers?

A current focus on providing greater environmental and social value is through nature-based solutions (NBS). We have used this example to consider some of the barriers that may exist.

Cultural

- Companies, and indeed the sector, have historically built expertise in delivering asset-based plans, processes and interventions. There is considerably less expertise and resources in planning and delivering catchment and nature-based solutions (NBS). It marks a significant change in culture and resources of water companies and will take time to develop.
- Regulator has expertise in understanding technical efficiency, this will need to change if NBS are widely adopted. This is because these models do not effectively cost amenity or environmental value in the same way a price of carbon can easily be identified. In addition, the outcomes from NBS are less certain and therefore Ofwat will have to adjust its approach to recognise this inherent uncertainty and follow an adapt and learn approach.

Geographical

- Costs and opportunities for NBS are much more variable geographically than traditional solutions tank, pump and chemical approaches. This makes inter-company comparison in terms of plans and costs harder as they will reflect the natural endowments of network areas.

¹⁴ United Utilities, 'Evolving the Water Industry National Environment Programme to deliver greater value', January 2021

- Current approaches incentivise cost efficiency rather than best value across the catchment. NBS approaches are only sometimes more efficient than conventional approaches, so incentives may be needed to bridge the gap.

Financial

- From our current knowledge of NBS there could be insufficient security of funding across AMPs for long term commitments, but this of course could change with experience.
- In the current control process, we note that historic weight of evidence on NBS on which to base cost models is negligible and not currently part of Ofwat econometric models. This would have to be addressed in future consultations.
- Benefits of NBS typically take at least seven years to fully mature – evaluation of progress within five-year cycles can be premature and some outcomes need to happen sooner.
- Valuing social and environmental benefits are not straightforward. There may need to be some standardisation of estimated values from difficult to value areas such as public amenity.

Policy change

- From a technical point of view, we need to understand how to ensure that benefits of NBS are maintained in perpetuity after delivery?
- Most opportunities for NBS will need to move away from single point compliance for the reach of river. This will be a policy shift for the EA.
- Source apportionment of some of the key environment issues that need resolving can mean there is limited opportunity to replace conventional solutions with NBSs.

Q4.9: Do you have any further suggestions for increasing the focus on the long term? If so, what are these?

We suggest that there are some analytical changes that would certainly help long term thinking. In determining the long-term goals there are some modelling practices that could be considered and might help:

- Using adaptive scenario modelling. This is where the regulator and water companies can identify investments to get to a desired long-term goal. This is done by adjusting plans to match predicted scenarios.
- Using normative scenarios. In this case we agree a series of “forecasting experiments” based on what *should* happen.
- Exploratory modelling: using this approach allows us to guess details then identify an “ensemble of models” that produce plausible results. Though they are not reliable they are computational experiments that illustrate how the world could work.

Using a new(er) set of concepts would focus attention on how to understand or measure long term performance. Concepts such as “ethical discounting” and “inter-generational equity” are useful tools to this end. We suggest thinking about how to measure efficiency differently, for example in the longer term beyond five years.

5. Strengthening incentives

Q5.1: Should we undertake an initial assessment of plans at PR24? If so, what areas should we focus on in this assessment?

Yes, we should undertake an initial assessment of plans at PR24 where there are relevant and proportionate incentives in place.

Ofwat have stated that companies need to effectively manage the development of their business plans to build challenge from and engagement with regulators and stakeholders into the process and submit their best business plan, first time. An IAP with relevant and proportionate incentives supports this objective.

Providing companies with incentives to deliver a high quality, stretching and innovative plan early on reduces the burden on both the company and the regulator that can result from multiple iterations of business plan submissions.

It is worth noting several of the companies that received 'slow-track' did not materially amend their business plans following the IAP. This indicates that either companies had confidence in the plan they put forward initially; or there was no incentive to make material changes or there was insufficient time to reconsider key aspects of the business plan that had taken months of preparation.

At PR19 the IAP criteria were broad, covering a wide range of areas and ambitions. PR19 also asked companies to deliver high quality, stretching and innovative plans across all these areas. The test areas focused less on the sustainability of performance levels and the appropriateness of the levels of expenditure proposed, both key areas as Ofwat and the industry work toward improved long-term planning and management strategies and embracing public value.

Historically, the IAP has rewarded companies with the lowest reasonable cost and most stretching performance commitments. There is a risk that this focus (which we acknowledge requires innovation, efficiency improvement, and consideration of the environment and other stakeholders) deters companies from proposing more sustainable performance improvements over a longer period and a totex plan that reflects more enduring, environmentally conscious solutions.

Taking these learnings from PR19 on board, for the PR24 IAP process to succeed the objective of the IAP must be clearly defined so that it considers:

- sustainability of performance and expenditure,
- longer term planning,
- public value, and
- the regional and company specific challenges in delivering performance and targeting improvements and innovation in specific areas.

We do not feel it is necessarily appropriate or cost beneficial to seek significant improvements, stretching cost savings, and innovation across all areas simultaneously. Companies should be encouraged to and rewarded for their ability to prioritise and sequence these competing and often conflicting objectives rather than promising to deliver more than is possible across all of them at the same time.

This also supports Ofwat's ambition of taking a longer term approach to business planning and price review cycles and recognises that it may not be in customer interest to incentive the lowest

cost, most stretching performance plan in the short term, if this comes at the expense of future performance and affordability.

Refining the areas of focus and allowing flexibility within the IAP process for regional and company differences is important. We consider the following areas to be of particular importance for PR24:

- Sustainability of performance, recognising customers value reliability, and a framework that does not incentivise short term outperformance, which may be followed by poor or more volatile service in future periods.
- Stability of expenditure commitments; steady spend and consequently stable customer bills are important (PC rewards given when service demonstrated as being sustainable).
- Long term focus on affordability (with particular focus on vulnerable customers) with further consideration of intergenerational fairness.
- Whole life cost, recognising nature-based solutions may be more expensive in the short term.
- Clear long-term policies for capital maintenance/asset health and resilience.

We also consider there may be value in adopting some of the assessment criteria applied by B-Corp, including:

- Governance: policies and practices are aligned to and support our mission, ethics, accountability, and transparency.
- Workers: contribute to our employees' financial, physical, professional, and social well-being.
- Community: contribute to the economic and social well-being of the communities in which we operate.
- Environment: improve our overall environmental stewardship.
- Customers: improve the value we create for customers and the consumers of our products or services.
- Disclosure Questionnaire: Identify any potentially sensitive practices, outcomes or fines/sanctions.

[Q5.2: Should we consider adopting a more light touch approach at PR24 for companies with a strong track record of delivery during the PR19 price review period? If so, what factors should we consider in our assessment and why?](#)

Yes, a light touch approach for companies with a strong track record of delivering against their business plan submission is an efficient and effective approach to PR24. It allows Ofwat an opportunity to allocate the limited time and resource (particularly during the time constrained price review period) to the companies that require additional support and greater diligence.

Light touch regulation relies on principles, rather than rules, being sufficiently embedded and embraced by the regulated companies. We believe Ofwat have made significant progress since PR14 in moving toward a more principles-based approach, moving to a totex and outcomes focused framework. PR19 went further by increasing focus on innovation and affordability, and PR24 goes even further bringing greater attention to communities, public value, and our natural environment. Provided a company can demonstrate that these principles are driving their decision-making processes, lighter touch regulation would be appropriate.

We consider the role of the regulator in challenging and holding companies to account is key to effective regulation. Perhaps a more appropriate way to think about it is not 'lighter touch'

regulation, but rather ‘targeted’ regulation, where the regulator can be more focused and specific in their areas of scrutiny and challenge.

In adopting a lighter touch, more targeted approach to regulation, the following factors should be considered:

Internal governance and control frameworks

The scale and areas of investment, outcomes and performance will vary by company. Company specific proposals are the product of several drivers including, for example, asset health, population growth and the natural environment.

Considering the challenge of assessing the appropriateness of each business plan, particularly given the constraints around the availability and comparability of data, it may be more efficient to assess the internal governance and controls framework, within which a company operates. In this manner, it is the effectiveness of a company’s governance and internal control processes that are considered. Provided the governance and controls in place are robust and operating effectively, the outcome can be relied upon with much greater confidence.

The other benefit to considering governance and control, is that it helps mitigate the risk of fraud, misreporting and other unethical practices. The regulator has a very important role to play in holding companies accountable for their performance. This lends itself to a more preventative approach that is likely to be more efficient (less costly and less time consuming overall) than a detective alternative.

Attitude toward risk

A company’s risk tolerance, and maturity in assessing resilience to risks, are both important factors to consider when determining whether there is an opportunity for lighter touch regulation. A company with a low tolerance to risk, whether operationally, financially (in terms of their leverage), or otherwise will likely be able to perform more reliably and with less scrutiny from the regulator. It remains important for the regulator to challenge companies on their risk appetite and resilience assessments, ensuring there is sufficient rigour in the process to warrant the lighter touch regulation.

Employee moral/engagement surveys which demonstrate a company’s ability to continue to perform. (indicator of outcomes and performance¹⁵)

Employee engagement, capability, and morale are important aspects of a company’s ability to deliver against its business plan. Where lighter touch regulation is an option, considering the sentiment and capability of employees may be a useful exercise that provides some assurance of the deliverability of a plan.

Employee surveys or reviews could also provide useful insight into how principles orientated a company is, the transparency and honesty it encourages, and the behaviours it is embedding to support a principle based regulatory framework.

Commitment to public values

A firm commitment from senior leadership that public values are a top priority, whether through articles of association, B-Corp or other certification as an overarching ambition and requirement in the day to day running of the company, provides a level of comfort and assurance to the

¹⁵ <https://hbr.org/2015/12/proof-that-positive-work-cultures-are-more-productive>

Regulator. It does not imply that companies will always be right, but rather demonstrates their commitment to getting it right.

Authenticity and credibility informed by past performance

Past performance consistent with previous submitted business plans is an indicator of a company's ability to deliver on its new business plan. In isolation, however, this can penalise companies with poor past performance that may also have strong internal controls and governance, engaged employees, and a firm commitment to public values. It is important to consider past performance relative to the cost and performance commitments companies have made. For example:

- Has a company been transparent about its performance and the challenges it has faced?
- Has the company done what it said it would? For example, has it spent in line with its commitment? Has it delivered on its promises?

In assessing authenticity and credibility, the Regulator can determine whether there is sufficient transparency, modesty, and honesty to believe what a company is saying.

Investment cycle

Certain points in an investment cycle may benefit from greater scrutiny, to support a company in making sure it is on the right track to deliver for the longer term. Once a programme of prioritised investments has been agreed, and there is timely and transparent reporting on these investments in place, then there would be an opportunity to step back and apply lighter touch regulation.

Q5.3: Should we streamline the price review by combining different steps in the process? If so, which of the three options outlined in this paper should we consider? And are there other options we can usefully consider?

We agree with Ofwat's proposal to streamline the price review process. This will reduce the administrative burden of additional steps and improve overall efficiency. It also helps companies and Ofwat to maintain momentum and may also encourage more frequent and informal engagement between companies and the regulator to ensure alignment of expectations throughout the price review process.

In streamlining the process, companies should be given sufficient time to develop their response to Ofwat's draft determination. This is particularly important in the presence of an IAP. The IAP rewards companies for putting their best plan forward first, which we think is beneficial to the overall process. However, it makes addressing Ofwat's questions and concerns more challenging, as the company has already shared what it believes to be the best plan.

Our preference to streamline the process is Option 1 with the IAP and draft determination combined. We consider that this option provides the most amount of time for a sensible response to the IAP/DD and meaningful engagement between companies and Ofwat.

Using the business plan submission date of the 2nd October 2023, set out in the consultation, this would allow:

- Ofwat seven months to assess the plans and issue draft determinations in April 2024 (which should be achievable if Ofwat have issued early views on key elements of the business plan and allow some time for engagement with companies between submission of business plan and IAP/DD)

- Companies could then have until the end of August 2024 to engage with Ofwat, consider the IAP/DD feedback and make considered adjustments to the plan and/or provide additional evidence.

Option 2 would be acceptable only where there is opportunity between the IAP and Draft Determination to engage directly with Ofwat and influence the outcome of the Draft Determination.

We do not support Option 3 or maintenance of the status quo.

Q5.4: Is a different approach needed for the initial business plan assessment for companies in England and in Wales?

We do not consider that a different approach is required for the initial business plan assessment for companies in England and Wales. Provided the IAP criteria are relevant to customers, communities and the environment, and the incentives (reputational and financial) are sufficiently rewarding, a consistent IAP approach should be taken.

Q5.5: What incentives should we provide for high quality plans at PR24? If we don't make use of early draft determinations, how else might we strengthen incentives to table high quality plans on first submission?

The combination of financial and reputational incentives are a powerful tool to encourage companies to submit high quality plans for PR24. Incentives to encourage high quality plans may include:

- Categorisation as a top performing company is an important reputational incentive
- Procedural incentives (publication of the DD with a “no-worse” guarantee for fast track companies) provides early certainty and the opportunity to get on with the plan
- Higher cost of capital

The “no worse” guarantee for fast-track DDs, as was used in PR14, allows fast-track companies to commence delivery of their plan in the knowledge that the FD will be no worse. Without this guarantee there remains uncertainty, which can slow delivery of the plan and benefits for customers.

Q5.6: How might we set cost sharing rates at PR24? Should we consider an approach based on our ability to monitor companies' asset health status?

In setting cost sharing rates at PR24, the following factors should be considered:

- Who will benefit from the expenditure? (for example, customers or shareholders, or both?)
- What level of risk is each party exposed to and over what time frame? (for example, shareholders may have a shorter window of exposure to the outcome of a particular level of expenditure, while customers may be exposed for decades).
- Do the proposed rates incentivise efficiency without compromising the ability to focus on long term solutions and whole life cost?

Costs should be ultimately borne by those parties that benefit from them. In the context of PR24, both customers and shareholders benefit from investment, supporting the use of a cost sharing rate. With no additional information, an even cost sharing rate of 50/50 would be a reasonable and appropriate rate to apply.

Where there is greater opportunity for investors to benefit, perhaps due to the cyclical nature of investment profiles, or the historical level of performance delivered, it may be reasonable to weight the cost sharing ratio such that they pick up a greater share of the additional investment. Alternatively, if the customer is more likely to be the main recipient of any benefits from investment, this may lend itself to a rate that is more heavily weighted towards the customer, where they pick up a greater share of the additional investment.

As well as the benefits received by customers and shareholders, we should also consider the level of risk borne by each. At PR14, the introduction of totex offered c50/50 cost sharing between shareholders and customers, with the risks and rewards of out and underperformance evenly shared.

The cost sharing mechanism serves to distribute risk between customers and shareholders. An issue is that customer risk horizon is longer than the risk horizon for a shareholder. Shareholders may choose to exit the business, and in doing so, may look to maximise their position by underspending where possible, or investing less than is optimal. Incentives to underspend should therefore not be too strong.

We understand the rates for overspend are intended to incentivise efficiency. However, where they are punitive, they can act as a distraction from the focus on sustainable longer-term investments that benefit customers and the environment. With the enduring and significant risk to customers, it may be more beneficial for companies to invest above the FD today, where it is efficient to do so. Within the constraints of affordability, we also consider efficient investment today to be in the customer interest.

With this in mind, we would recommend a cost sharing ratio which does not encourage underinvestment, and a more stretching reward and penalty regime that the investments are intended to deliver. In effect, reframing the problem statement:

- From: How little can we spend to deliver a specific level of performance?
- To: What is the right level of investment to deliver sustainable, innovative and stretching performance that addresses the needs of customers, communities, and the environment?

This is consistent with the aspirations outlined by Ofwat's in the PR24 consultation, which include incentivising innovation, longer term planning and protecting and improving the environment. In this context, the cost sharing rates should encourage and enable shareholders to make additional investment beyond what was allowed in the FD where it is efficient, affordable, and in the interest of customers to do so.

We agree with Ofwat, who have also recognised similar challenges with cost sharing in the PR24 and Beyond consultation document, specifically stating: *"High cost sharing rates may also adversely impact on incentives to maintain asset health, since the effects of under-investment are unlikely to be observed in the short term. This might incentivise companies to cut back on asset health, to benefit from savings secured under the high cost sharing rate. If this is the case, it may be appropriate to set lower cost sharing rates and take account of our ability to monitor companies' asset health status, to provide additional protection for customers."*¹⁶

We support an approach with cost sharing rates which do not penalise necessary investment and provides for greater accountability for asset health.

¹⁶ PR24 and beyond, p49

Q5.7: Which areas should we be considering targeted challenges for at PR24, and why?

Targeted challenges for water efficiency and wastewater spills will strengthen the industry's focus on these critical areas to build a sustainable environment, this should be tested with customers to ensure this reflects their priorities. We also recognise that we won't be able to build our way out of such huge challenge, therefore there is a need to actively explore new ways of working, including customer participation, big data and new technology, system intelligence and resilience. In particular, to eliminate all harm from storm overflow by 2050, would require a major wastewater network redesign. It should be recognised that such a step change in performance may lead to increased costs over and above modelled costs.

We consider that it is very important that the water efficiency should cover both household and business customers. Business customers account for around 40 percent of water demand in our area. We understand we are currently the only wholesale water company undertaking a scaled programme of physical water efficiency visits and improvements to non-household (NHH) sites – approximately 3-4k Smarter Business Visits (SBV) per year. Although the water savings achieved fall outside of the PCC ODI, our SBV initiative delivers significant and cost-effective demand reductions.

In addition, we consider that the current water efficiency metric (PCC) needs to be amended both so that it can incorporate business customers and because the Covid19 impact has highlighted and amplified the known flaws with the PCC metric, which make it unsuitable as a water company performance commitment.

PCC is a mass-balance metric influenced by a wide range of society and market factors such as weather (temp and rainfall), quality of population data, performance standards of products on the market, performance standards of buildings, level of awareness and cultural water use practices of a populations, meter penetration and type, water efficiency interventions. Of these influencing factors, only metering and water efficiency activities are within the control of a wholesale water provider.

Q5.8: Should we use innovation specific incentive mechanisms at PR24? If so what would these be, and what would they add in addition to the other mechanisms outlined in this chapter?

Innovation is difficult to incentivise through mechanisms and competitions. It relies more on the culture of a company and the environment in which it operates, including the rewards from outperformance. Any innovation specific incentive mechanisms where they focus more on the enablers of innovation rather than the actual outcome or output of the innovation process.

For example, mechanisms that reward enablers of innovation include:

- A culture or internal framework that recognises the need for failure and can accommodate failure, recognising that innovation is the product of an iterative process marked by multiple failures along the way. For example, an adaptive learning process, a field based or test and learn framework where new ideas can be trialled on a smaller scale.
- Diversity in the workplace, supported by several studies that show the positive effect diversity and inclusion have on innovation in the workplace.
- Learning and development – recognising that everyone has a role to play in innovation and thinking differently, with particular focus on breaking down silos of R&D and innovation and embedding the need to think differently throughout an organisation.

- Right time and place – innovation doesn't always happen between 9am-5pm in the workplace, but instead new ideas come to people when they are driving, falling asleep, listening to their favourite song. A company that provides the tools to capture ideas generated outside of work, and perhaps even outside their own area is important.
- Focus on process innovation as well as product and asset. Sometimes the most beneficial innovation can take the most basic form. Reframing the ambition from 'innovating' to 'thinking differently' may help to bring other aspects of the water industry into the frame and broaden the opportunities for innovation.

Innovation is recognised as a key driver of economic growth and productivity. One would therefore expect the incentives given to senior leadership to encourage innovation. A report published by Nesta¹⁷ examined the corporate incentives within FTSE 350 companies for encouraging innovation. This study shows that where innovation-related metrics are used, they invariably sit alongside, and are frequently outweighed by, short-term financial measures which can be enhanced by cutting innovation. In light of this, some recommendations for driving innovation emerge, which may offer additional opportunities to incentivise innovation at PR24, including:

- Company remuneration committees should ensure that remuneration packages are balanced in promoting appropriate innovation.
- Institutional investors and shareholders should not approve remuneration packages which clearly discourage innovation.
- Ofwat could explicitly include innovation within their considerations of regulatory frameworks for effective stewardship.

We recognise that to be truly innovative companies and their leadership need to be willing to accept a higher level of risk and uncertainty. This is not an approach that is typically aligned with water and wastewater management. We also note the propensity for smaller start-ups to generate greater innovation and advance their ideas through entrepreneurial spirit. Where water companies are more risk averse and less entrepreneurial, it may be helpful to seek to acquire their innovation through a greater focus on acquisitions. Support for this process, through additional funding for small start-ups and the possibility of acquiring them later (in effect outsourcing innovation to smaller, more agile, and less constrained companies) may also lend itself to a mechanism to incentivise innovation.

Q5.9: In what ways might we promote the themes of EBR through PR24?

We welcome the introduction of EBR and suggest that it is for companies to decide how to proceed and implement. The key challenge to EBR is making ethical multidimensional trade-offs across different perspectives, time and resources. Such trade-offs mix social, environmental, intergenerational, and economic factors that can impact on how public value is provided and perceived by different stakeholders – customers, employees, communities, Government, local authorities and regulators. External factors that have an impact the development of EBR include:

- Social – population growth, demographics of customer base.
- Environmental – climate and weather, topography, soil type.

¹⁷ https://media.nesta.org.uk/documents/The_invisible_drag_on_UK_RD_22.08.2019.pdf; The invisible drag on UK R&D

- Economic – ratio of urban: rural, level of industry and growth and the impact on employment, state of financial markets.
- Situational - age of existing infrastructure.
- Conflicting perceptions of value from different stakeholders.

From the above, it may be difficult to determine the appropriate course of action that would satisfy different stakeholders and this is why water companies should reflect regional characteristics.

There are also some implementation challenges for regulated companies within EBR:

- Defining research, dialogue, and general ongoing engagement of our customers in an EBR context.
- Developing new reporting lines of our performance.
- Finding ways of auditing our activities and charting our performance.
- Building in agility of our response to what could be dynamic consumer interests.
- Community communication and listening strategies across diverse groups with different values and political viewpoints.
- Developing metrics to identify tangible EBR outcomes.
- EBR activity may include loss making activity or things that might look like they are inefficient if judged using the standard economic model.
- How can EBR be demonstrated by identifying what behaviours are not wanted by exception?
- How do we demonstrate cultural change? Audited internal research?
- How do we demonstrate compliance? Use of case studies?
- The choice of existing non-core services within our communities and how these would be considered within a framework that assesses “optimal” public value outcomes e.g. education and training, recreation, and volunteering. We may need to assess the impact on these areas and the potential to integrate them into public value delivery.

We do not think these issues are insurmountable, but we think they are best resolved within companies. EBR has been used in finance and aviation (air safety). In Scotland, WICS have used the principles of EBR for their most recent strategic review of charges for Scottish Water, SRC2. We agree with the regulator that being clear at the outset about what we expect to see from companies throughout the process, including in business plans and also in companies’ behaviours is the right approach.

6. Reflecting customers’ preferences

[Q6.1: What are your views on the merits of our proposals for a collaborative approach to standardised and/or nationwide customer research to inform company business plans and our determinations?](#)

A consistent approach to generate evidence of customers’ preferences will enhance confidence in the results, in areas of common concern to all customers across the industry, especially in cases where consumer preferences are likely to be stable. Collaborative customer research could help to achieve such consistency, and in a way that reduces costs.

We also need to consider how we include the preferences of other stakeholders including NHH retailers, NAVs, SLPs, business customers and other stakeholders.

Q6.2: Do you have any suggestions for how we best implement the collaborative approach to customer research for the price review?

Whilst customers would share common concern in certain areas, it is important to capture the dispersion of customers’ views so that the evidence fairly represents customer preferences from different regions and demographic backgrounds. We also need to recognise that companies may have specific timing and granularity requirements for the evidence of customer preferences in order to inform their business plan decisions.

It is essential that individual companies have the opportunity to input into developing the approach. Early clarity is needed for the timing, scope, format and methodology of collaborative research.

- **Timing:** Recognise the timing of different customer research needed in the business planning process, research findings should be delivered in time for them to inform decision making.
- **Segmentation and sample size** in collaborative nationwide/standardised research can proportionately represent the geographic and demographic differences that companies serve. Findings may differ within company boundaries as well as between companies. The number of interviews needs to be broadly proportional to the number of customers served rather than using the same fixed number of interviews for each company.
- **Format** – nationwide or standardised: Consider the suitable format of collaborative customer research to provide feedback on different issues. For example, affordability and acceptability tests are likely to be iterative and therefore a standardised approach would be more pragmatic. Valuation research on common PCs aims to address the comparability concerns from PR19. Nationwide research could help strengthen the consistency and reduce costs, if the research can be delivered in time.

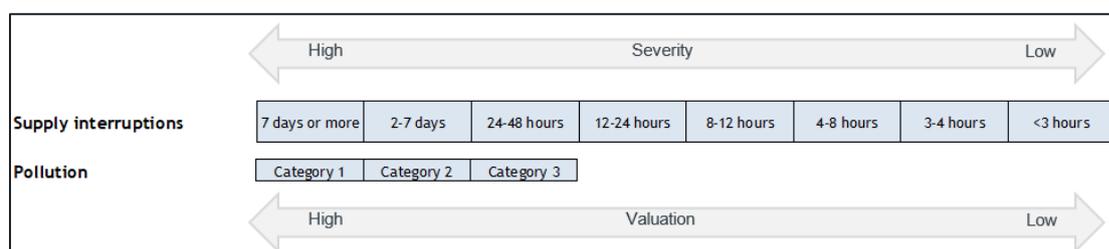
Potential scope and format of national research

Potential scope	Timing	Potential format	Comment
Affordability	2022 -24	Standardised	Companies need early view on affordability to consider PR24 business plan in the long-term context. The research is likely to be iterative to understand recent covid impact on affordability at regional level, and to reflect refined PR24 business plan at core stages.
Acceptability	2022 -24	Standardised	Likely to be iterative to test companies’ business plan and to further reflect customers’ preferences in the plan.
Valuation for common PCs ODI rates	early 2022	Nationwide/ Standardised	The wide spread of customer valuation on AMP7 common PCs is the key concern on company-led research, nationwide/standardised research helps to strengthen consistency and credibility. Companies will need these valuations by early 2022, to inform investment appraisals.

Source: Thames Water

- **Testing common PCs coverage:** Ofwat also suggest including current and long-term priorities in the collaborative customer research; we think companies themselves are better placed to directly engage with their customers at community level to understand customers’ current and long-term priorities. These engagements also tend to occur early on in the process, for example, we have already started engaging customers on long term priorities as part of our WRMP & DWMP development. If the purpose is to test the coverage of common PCs, it could be achieved through reviewing existing insights, or through nationwide research to test the list of common PCs. This should be done no later than early 2022 ahead of the valuation research.
- **Granularity of valuation research:** The granularity of nationwide research on customer valuation for common PCs needs to be sufficient to inform individual companies’ investment appraisal decisions for cost benefit assessment purpose. Valuation can vary based on the severity (duration, frequency, scale, category) of specific metrics, for example, valuation varies for different duration of supply interruption, or different category of pollution incidents (see illustration below). If nationwide research results cannot provide the necessary granularity, individual companies would still need to carry out their own valuation research including common PCs to inform their investment appraisal.

Valuation varies with severity of impact



Source: Thames Water

- **Interaction** with local research/insights: The collaborative nationwide/standardised research could interact with individual companies’ local research or ongoing customer insight development. There may also be opportunities for the collaborative research to include elements on company-specific proposals.
- **Governance:** Water companies are ultimately responsible for managing their relationships with their customers and responding to their needs. Therefore, we consider individual company should have the opportunity to input into the design of collaborative research, and to be sufficiently involved in implementing the research. Regulators (Ofwat, EA, DWI) and other groups (CCW, Citizen’s Advice) could form an advisory group to ensure the collaborative research focuses on the price review agenda and reflects customers’ common concerns. Industry bodies such as Water UK could also support this process.

Q6.3: Are there aspects of negotiated settlements that could be reflected in our price review framework?

Customers and stakeholders can have strong preferences on specific aspects of company’s business plans that directly affect local communities, for example, stakeholder advocates on chalk streams protection and London local authorities strongly promote sustainable surface water management. We can potentially use a simplified ‘negotiated settlement’ process to agree such specific long-term investment and associated bespoke outcomes with highly engaged and empowered ‘customer forum’ representing customers’ interests.

As a prerequisite, PR24 regulatory framework needs to have the mechanism to facilitate, assess and validate such simplified negotiated settlement. Otherwise, customers and stakeholders will be discouraged and lose confidence on the price review if their views and negotiations are disregarded.

Q6.4: What are your views on our proposals for customer challenge of business plans and assurance of customer engagement?

We consider that company level CCGs can continue to play an active role in both the price review and in-AMP delivery to help the company to focus on delivering for customers. We welcome the support from Ofwat on how the CCG input will be used going forward, recognising the valuable contribution the CCG can make toward informing our PR24 outcomes. We are keen to actively work with Ofwat to improve the design of the CCG in providing assurance at future price reviews.

We would like more clarity and alignment on accountabilities between PR24 Challenge Panel, governance group for collaborative customer research, and individual company's assurance structure (e.g. CCG) to ensure

- Effective challenge & assurance function, and
- Efficient resource allocation.

Potentially, PR24 Challenge Panel could provide governance for collaborative customer research (e.g. advisory group) and the chair from individual company's assurance structure (e.g. CCG chair) could sit alongside the PR24 Challenge Panel in this aspect of their role.

We provide further thoughts on the role of the PR24 Challenge Panel in response to Q7.3.

Q6.5: What are your views on whether we should develop minimum standards or provide guidance in other areas?

We welcome Ofwat's proposal to work with CCW and the rest of the sector to develop and agree minimum standards for high quality research, independent customer challenge and independent assurance.

As part of setting minimum standards in these areas, it is necessary to provide clarity on how each minimum standard will be assessed in the price review, what does the good look like in meeting or exceeding these minimum standards.

We also think it is a great opportunity for companies to share best practice and define an industry approach together for triangulation. We expect customer engagement to interact with nationwide/standardised research, companies' local research and on-going insight development. We also expect that both customers and stakeholders may have strong preferences in specific aspects of companies' business plan. We note CCW's recent publication on PR19 triangulation review and best practice.

Q6.6: How well does our proposed approach to customer engagement take appropriate account of the different regulatory frameworks in England and Wales?

We recognise that the UK and Welsh governments are currently reviewing their strategic priorities statements ('SPSs') for Ofwat in England and Wales respectively. This may in turn influence future investment priorities and / or customer preferences. The sector will need to consider the implications of the revised SPSs once these are published.

7. Planning together for PR24

Q7.1: How can we ensure that companies bring together the outputs of the strategic planning frameworks in the most coherent and effective way for business plans?

Companies will naturally include the latest iteration of the strategic planning frameworks into their business plans. It would be easier if the strategic frameworks and the price review worked to the same timeline. In the absence of this, greater involvement by Ofwat in the strategic frameworks would be beneficial.

Q7.2: What are your views of our thinking on our and companies' roles in engaging with other regulators between business plan submission and our issuing of the final determinations?

We have regular contacts with other regulators and part of our understanding of what is feasible is guided by these meetings. The contacts can be deepened during our business planning process. This should create a shared understanding of the technical rules that define our boundaries as to what is a feasible plan.

Just as Ofwat can commit to sharing information ahead of future controls so it would be useful for other regulators to provide information relevant to our plans. Often the risks we face are regulatory in nature and may have an impact on our ability to, for example, source water

The RAPID model is a good example of regulators joining together and it would be useful to extend the RAPID model to other areas of the price control. This could be in the form of standing groups focused on issues that impact on business planning.

Q7.3: How could we best involve a 'PR24 Challenge Panel' in the price review process to help ensure that our decisions best reflect the interests of customers, communities and the environment?

In our view a PR24 Challenge Panel is a good development that will help Ofwat ensure that the price review supports the delivery of the needs of customers, communities and the environment over the long-term in a sustainable way.

The Ofwat Challenge Panel needs to be complimentary to the panels, whether CCG or some other means, that companies use to assist them in the development of their plans. We found our CCG challenge to be very helpful in developing our plan in PR19 and intend to use a similar CCG approach in PR24.

It is crucial to have coordination, clarity and alignment of accountabilities amongst the PR24 Challenge Panel, Governance Group for collaborative customer research, and individual company's assurance structure (e.g. CCG). This would avoid potential divergence of challenge that could not easily be resolved between panels and provide an effective challenge and assurance function for the water companies and efficient resource allocation.

To mitigate this risk the PR24 Challenge Panel could, as one of its roles, provide governance for the collaborative customer research, with the chair from individual company's assurance structure (e.g. CCG chair) sitting alongside the PR24 Challenge Panel in this role.

In addition, Ofwat's Panel could usefully challenge its own policy development of the regulatory framework as it produces the final methodology, to ensure it will deliver on the aims of the price review. In the later part of the price control process, the panel could again help challenge Ofwat's internal thinking.

In the most recent price control, Ofgem's panel also challenged individual companies' plans directly notwithstanding the fact that the companies had their own panels. This, we understand worked well and is something Ofwat could consider.

In our view it would be good to have a wide range of perspectives included in the panel and its role should be advisory highlighting areas of weakness / strength in a company's business plan in a qualitative way rather than to rank or score them.

It would also be useful if the panel could have a clear focus on where it can add value. For example, a focus on sustainability - balancing the costs of the resilience, environmental and biodiversity agenda with consumer affordability – could be beneficial, whereas cost of capital, efficiency etc. are perhaps areas for the technical specialists within Ofwat, subject to a sense check on the results from the panel.

8. Design and implementation of price controls

Q8.1: Do you agree with, or have any comments on, our general approach to the design and implementation of controls, i.e. to retain separate controls with the same broad structure as at PR19, but with improvements to our implementation?

Controls have two main objectives:

- Facilitate competition where there is market opportunity.
- Provide cost information to inform econometric models and benchmarking needed to determine allowances.

We consider that the current structure of price controls is appropriate to facilitate competition and could be extended to include developer services. We comment on this more fully in response to Q8.2

For the latter to be realised, the controls must be as closely aligned with the underlying activities as possible. The more costs that can be directly attributed, rather than allocated, the more accurate, consistent, and comparable the costs across time and companies. To this end, we consider the current price controls are effective, and welcome the iterative refinement of boundaries as processes and systems are better understood and cost boundaries can be drawn more discreetly.

Feedback on wholesale controls

We value the continued focus on cost allocation and improving comparability across the industry which should lead to more appropriate and proportionate incentives, for example for water resource activities.

We agree with the objectives of the price control design, though we do not consider they are dependent on the price controls themselves. We would expect companies to consider regional and national solutions where it is in the customer interest to do so. This is also the case for contracting and trading bulk supplies of water, where there are already some incentives which could be improved further, to encourage water trading activity.

We would welcome clarity over whether there will be a new London Tideway Tunnel price control for AMP8, or whether it will be included in the Waste Network plus control, with any remaining running cost, integration cost, and land sales requiring an enhancement case.

Q8.2: Do you agree with, or have any comments on, our proposals for specific parts of the value chain, i.e. for water resources, developer services, residential retail and business retail in Wales?

We are supportive of Ofwat's aspiration to increase competition in areas where it will deliver enduring customer and environmental benefit. Specifically, we consider the three key areas of focus include:

- Water trading.
- Bioresources.
- Developer services.

For these markets to be successful, there are several characteristics to consider, including:

- The number of firms that will be able to compete.
- The homogeneity of the products offered.
- Whether firms are themselves price takers (unable to influence the market price of their product).
- Whether market share has an influence on price.
- Whether firms can enter and exit the market with minimal barriers (including cost).
- Whether buyers have complete information about the products being sold and the prices charged for them.

Reflecting on the above characteristics, we consider developer services to be an area of opportunity. We support CEPA's suggestions of either adapting the current regulatory approach by improving cost assessment and reconciliations, or through a more fundamental change in the approach to regulating, where contestable services would be excluded from the price control and subject to a capped regulated margin.

Based on our experience, we consider that it would be beneficial to separate developer services into its own price control, ahead of implementing a capped regulated margin. A separate price control including contestable work would have several benefits, including:

- Removal of the revenue adjustment for under or over recovery of DS revenue.
- Focus management attention on the particular activity thereby bringing efficiencies and quality improvements.
- Allow Ofwat to focus on potential sources of cross subsidisation between different activities, which in turn would benefit competition through greater confidence that alternative providers are competing on equal terms, and on any volatility changing developer services revenues affecting end-customer bills.

As identified in our response to the Bioresources consultation¹⁸ there are significant barriers to the rapid development of the Bioresources market.

With respect to water resources and network plus, we do not consider that it is necessary to re-define the boundaries for competition to succeed. The current price control structure is already capable of facilitating water resources competition through water trading. While there were difficulties in defining a water resources cost model in PR19, we consider that there are

¹⁸ Review of Bioresources market – consultation, May 2021

opportunities to improve water resources modelling in PR24 as set out in response to Q10.1. These should be explored before opting for a treated water model, which would be dominated by water treatment costs. There are benefits to maintaining consistency in the price control structure with PR19, including allowing companies to place greater focus on enabling competition and less effort expended on re-defining boundaries, re-allocating RCV and updating reporting processes.

Q8.3: Do you agree with, or have any comments on, our proposals spanning multiple parts of the value chain, i.e. for major projects and future reconciliations?

Ofwat's proposal for major projects:

The water sector is likely to require substantial investment in future. Some of these projects may generate step-change improvements in service quality and qualify as enhancements. Others may be large scale renewal projects, designed to future-proof existing levels of resilience in the face of population growth and climate change. Others may be investments in game-changing approaches to catchment system operation and catchment partnership that help transition of fundamentally different, more sustainable approaches to water and wastewater management in the environment.

In this context, we welcome Ofwat's openness to thinking differently about aspects of the price controls that could enable some more innovative approaches to regulation of such projects. This may be appropriate, for example, for projects which will take multiple price control periods to plan and deliver, where outcomes are clear but deliverables will require development, refinement and possibly iteration over time. It may also be appropriate where the risk profile of the project is materially different to that of a typical water company, or where it is appropriate to allocate risk differently to improve efficiency. Given our experience of different regulatory approaches including Thames Tideway and our two conditional allowances schemes, we would be happy to work with Ofwat and the sector to consider the nature of projects that could be subject to different approaches and what those approaches could comprise.

In this light we are supportive of Ofwat's consideration of a potential softening of their approach on DPC, including the opportunity for companies or their associates to bid for their own projects, as this should provide more competition and ensure customers obtain the best outcome. While we agree that suitable safeguards through a bid assessment framework would need to be included to prevent companies or associates having an undue advantage, these should be proportionate and not so onerous as to make the projects unattractive to incumbents or their associates and thus lose the additional competitive pressure.

We are also supportive of changes to SIP regulations so as to allow large and complex projects to have their own licence, similar to TTT.

We agree with Ofwat that more collaborative work on capacity enhancements across companies and/or with third parties would be beneficial to bioresources. Given the link with energy production, and the potential DPC changes mentioned above, this could be an area of development for companies that would benefit customers.

For future reconciliations:

We agree with all Ofwat's proposals in respect of simplifying and streamlining the future reconciliations process. Specifically, we are in support of:

- Ensuring the balance of annual and end of period reconciliations is maintained, and that work is not duplicated.

- Producing a reconciliation workbook for PR24 (we welcomed the publication of the PR19 reconciliation rule book).
- Ensuring the number of reconciliations is proportionate - and we would also suggest relevance and materiality are helpful considerations.
- Simplifying and standardising reconciliations.
- Consolidating reconciliation models.

9. Outcomes

Q9.1: What kinds of performance commitments should we include in the price review? What outcomes require financial incentives for all companies for the foreseeable future?

We are supportive of the longer-term focus and are keen to work with Ofwat to make this work. Fewer performance commitments (PCs) with enduring interests for customers and the environment can effectively drive business planning towards long-term outcomes.

Performance commitments for AMP8 period need to take account of the long-term ambitions that the sector is aspiring to deliver and reflect customers' and stakeholders' long-term priorities at the regional level. Performance commitments, as a whole, should provide a balanced incentive package for companies to deliver current and long-term priorities for customers and the environment.

We recognise there are gaps in existing common performance commitments to further incentivise the delivery for net zero, environmental outcomes, asset health and resilience. These need to be addressed in both the outcomes framework and cost assessment together.

AMP7 common PCs have a comprehensive coverage of core service outcomes in water, wastewater and customers' experience, but require some refinement to better address asset health and resilience aspects and also to further incentivise environmental outcomes. We also need to recognise the interactions among PCs to avoid duplicated or contradictory incentives and to consider whether they also meet the needs of business customers. The figure below maps how well existing common PCs reflect enduring interest of household customers and the environment.

Mapping of current common PC to enduring customer interests

AMP7 common PC	How well does current common PC reflect enduring interest of customers & the environment? (High <->Low)			Comments
	Excellent customer service everyday	Environmental outcomes	Asset health & operational resilience	
Mains repairs				Lagging indicator. Contradictive incentive with leakage
Unplanned outage				
Water supply interruptions				
Leakage				Not an outcome, but important to other outcomes
Per capita consumption				Water efficiency incentive needs to cover HH & NHH
Water quality compliance (CRI)				
Risk of severe restrictions in a drought				Low consistency & efficacy, high complexity
Treatment works compliance				Compliance itself is an obligation
Sewer collapses				Lagging indicator
Internal sewer flooding				To better measure impact
Risk of sewer flooding in a storm				To improve modelling consistency
Pollution incidents				
D-Mex				Drive short-run focus
C-Mex				Drive short-run focus
Priority services for customers in vulnerable circumstances				Vulnerability needs more cross sector collaboration. Better to be managed outside PC.

Source: Thames Water

- AMP7 asset health common PCs are largely lagging indicators like mains repairs, which includes both proactive and reactive repairs. This would contradict with leakage common PC, when companies need to expand their proactive mains repairs to aggressively reduce the level of leakage.
- The recent asset maturity assessment provides a great opportunity to review asset health leading indicators and good practice across the industry. Building from this exercise, the common PCs for asset health could adopt a more leading-indicator approach, and drive the asset standard in the industry.
- We also encourage Ofwat to consider incorporating an environmental metric like natural capital, at the industry level, to incentivise companies to deliver wider environmental benefit over the long term. This could be in the form of 'top up' ODI or additional cost allowance for delivering natural capital net gains. We further highlight the importance of considering natural

capital in the cost assessment for an appropriate measurement of productivity and forward-looking efficiency challenge.

In addition, we also shared our views in the Ofwat Outcomes Working Group and our 121 meeting with Ofwat to refine some AMP7 common PCs for PR24. These include:

- Sewer flooding: We are collaborating with other members in the Water UK Task & Finish groups on sewer flooding metrics and wastewater resilience metric (known as risk of flooding in a storm), to develop the approach to assess the impact & severity of sewer flooding and promote the consistency of reporting. Outputs will be proposals to refine related common PCs definition for the PR24.
- Drought resilience: We recognise the low inconsistency and high complexity of the metric. Companies have varied interpretations on the PC definition in baseline, target and in year reporting; the binary approach to assess 1:200-year drought resilience offers little insight on the extend of companies' resilience level. We suggest reviewing this metric in the context of wider water supply/demand PCs, to avoid duplicated incentive and ensure the approach suits for purpose.
- Water efficiency: PCC is not the best metric for water efficiency as many factors have material impacts on PCC but are outside water companies' control (e.g. appliance labelling, building & fittings standards, weather, pandemic). Water efficiency metric should incentivise consumption reduction in both household and business customers. We recommend revisiting the AMP6 approach to measure water efficiency by ml/d saved. The higher penetration of smart meters enable companies to target water efficiency activities on where it is needed the most, and to more accurately assess the amount of water saved through these activities.

We recommend Ofwat consider the following PCs as additional new PR24 common PCs. We are keen to work with Ofwat to develop the common definitions.

Potential new common PCs for PR24

PC name	Potential new common PCs for PR24			Comments
	Excellent customer service everyday	Environmental outcomes	Asset health & operational resilience	
Low pressure				To measure impact & resolution of water low pressure
Clearance of blockages				Comparable bespoke asset health PC in AMP7
Sludge treated before disposal				Pending on the EA's review on sludge use/disposal metric
Greenhouse gas emission				To measure progress towards net zero for operational and embedded carbon emission.
Natural capital				To incentivise wider environmental benefit and promote nature-based solutions

PC name	Potential new common PCs for PR24			Comments
	Excellent customer service everyday	Environmental outcomes	Asset health & operational resilience	
Sewerage discharge				Normalised metric to incentivise the reduction of sewerage discharges to rivers
External flooding				Comparable bespoke PC in AMP7. To combine with internal flooding to measure overall flooding impact on customers

Source: Thames Water

Common PCs with financial incentives are powerful tools to drive the management focus. For the same reason, common PCs as a whole need to provide a balanced package reflecting current and long-term priorities for customers and the environment. Stable financial incentives over multiple AMPs for performance commitments that contribute to long term outcomes will encourage companies to invest and deliver best value over the long-term.

[Q9.2: How do you think we should monitor outputs that are not clearly linked to the outcomes incentivised in the price control? Would it help to distinguish between PCs that monitor outcomes and PCDs that monitor outputs? What other options could we consider?](#)

We are uneasy at your suggested inclusion of a list of ‘price control deliverables’ in a company’s price control decision. We can understand that you wish to understand the extent to which companies who spend less than their allowed totex are doing so by virtue of genuine efficiency or simply by not doing work, the effects of which may not be apparent in the short-term but which will compromise performance or resilience over the longer term. But if Ofwat returns to a pre-PR14 world holding companies to account for the delivery of specified schemes, this will be inimical to much efficiency and innovation, and will put back the cause of nature-based solutions and catchment management partnerships. Much depends on how these ‘price control deliverables’ are operationalised. If they are simply monitored against, this would be less damaging. But if they are to be monitored against, it will be important for you to be clear what will happen to companies who do or do not deliver against the list, either in-period or in subsequent price reviews.

If PCDs are used for specific major schemes, the assessment of the delivery should be outcome-oriented wherever feasible, to provide flexibility for companies to incorporate new technology and solutions over time to deliver the intended benefit for customers and the environment. The delivery assessment also needs to recognise factors that are outside companies’ control.

One potential application of PCD is lead pipe replacement. However, metering clearly contributes to leakage and water efficiency and therefore it is better managed through outcomes.

We note Ofgem use PCDs to monitor WINEP delivery in the energy sector, this may not be the desired default approach for the WINEP programme in the water sector. The WINEP Taskforce is exploring more outcome-oriented delivery, we are working collaboratively with the EA and other stakeholders to develop the suitable approach.

Q9.3: Do you consider there are aspects of company performance where it would be better not to set expectations as part of the price control? What approaches should we consider in these cases, so that companies act in the interests of customers?

Companies need to review the purpose of their bespoke PCs to assess whether they reflect the enduring interests of customers and environment, and whether there are effective processes in place to ensure that companies act in the interests of customers.

Most AMP7 bespoke PCs do not need to be managed within the price control going forward as they are generally in the following categories

- AMP7 specific delivery, e.g., Tideway tunnel related bespoke PCs for Thames Water, these should be largely closed after the AMP. The operation and stakeholder management become parts of the business-as-usual process.
- Performances being measured by other regulators and groups, e.g., the EA monitor WINEP timely delivery, DWI monitor water quality event, water quality contact.
- AMP7 mandatory bespoke PC themes:
 - Void, gap: companies manage void & gap sites in the daily operation to improve fair billing, if companies can demonstrate strong processes in place in these areas, there is no need to have a bespoke PC in the price control.
 - Vulnerability: protecting and supporting vulnerable customers goes beyond meeting a performance commitment. The extent of vulnerable customer protection and support isn't fairly reflected in one performance commitment. We are proactively identifying customers who may need support and are offering a wider range of options to support customers' individual circumstances. Furthermore, this is the area that needs cross sector collaboration instead of competition.
 - AIM (abstraction incentive mechanism): this is not material and can be managed better within companies' routine operations rather than through the price control.
 - Asset health, resilience, environment: we need to review whether they are material and comparable, whether they already contribute to other common PCs. These will help refine common PCs in these areas and remove less material /duplicated incentives.
- Other bespoke PCs: we need to review whether they are material, whether they already contribute to other common PCs, to remove less material /duplicated incentives from the price control but manage them within the business.

We also recognise there are other effective incentives outside Ofwat's price control and other regulators governance. Investors increasingly care about companies' ESG (environmental, social, governance) performances in delivering greater public value along their core functions.

Companies will still need some bespoke PCs to reflect their customers' and stakeholders' long-term priorities at the regional level, which are different from the industry common priorities. Bespoke PCs are also useful to monitor the outcome delivery of individual company's enhancement investment cases that address specific regional priorities.

Q9.4: What should be our aim in setting the levels of performance commitments? Do you agree with the proposal that performance commitment levels should be set, as a starting point, at what can be achieved by an efficient company with base costs and that deviations from this are proposed in company business plans? If not what alternative proposals should we consider?

Performance commitment levels for AMP8 needs to be set in the long-term context. Companies may be at different stage and pace on their roadmap to deliver long term commitments like net zero.

Target setting also needs to recognise the long run relationship between performance, cost and risk

- Asset condition/risk underpins performance delivery. South east companies generally have poorer asset condition and generally perform worse than the rest of the industry.
- Good current performance in service outcomes may not be sustainable in the long-term if asset health is not being maintained. Need to consider efficient cost and performance in the long-term context.

Ofwat's proposal of using the level of performance that an efficient company can achieve from base costs as the starting point for setting PCLs offers an approach to start linking cost with performance, although it is important that target levels reflect differences in company circumstances beyond their control, and take account of the asset condition and associated risk.

Performance commitment levels should be realistic. No company is upper quartile in cost and performance across a range of measures at the same time. Performance commitment levels should represent the P50 position of performance that can be achieved by an efficient company with totex allowances.

Adaptive long-term targets that provide strong incentives without creating unintended consequences in the short-run are needed.

Q9.5: What approach should we take to setting ODIs? How should we take account of marginal costs and marginal benefits in setting ODI rates? What are the risks and benefits of the approaches that we set out, or any others that you propose?

Proposals to simplify setting ODI rates seem sensible, although we need to work through the detail design to ensure there are no unintended consequences.

We recognise the challenge and inconsistency of incorporating marginal costs in setting ODI rates, albeit marginal costs provide the reference level to compare against marginal benefits in the cost benefit assessment of investment cases.

If we solely use customer valuation to determine the ODI rates, it is necessary to consider what kind of reference level we can use to validate the outputs from customer valuation research, especially when they are materially different from the incentive rates applied for AMP7 common PCs. Individual companies may still need to carry out more granular valuation research to inform its investment optimisation, in addition to collaborative customer research for common PCs. We welcome an approach to take account of insights from different research in setting ODI rates.

Stable financial incentives over multiple AMPs for performance commitments that contribute to long term outcomes will encourage companies to invest and deliver best values over the long-term.

10. Cost assessment

Q10.1: What should be the priorities for improving our approach to cost modelling and assessment?

PR19 was a good step change in improving cost assessment (CA) framework by implementing, for example, more disaggregated price controls or econometric models. We believe that this should continue during PR24 and beyond. However, we also think there are some areas of CA with a significant potential for improvement in terms of the approach to cost assessment and modelling techniques. We believe that the priorities can be categorised into two areas:

- Approach to cost assessment.
- Approach to cost modelling.

We consider each of these areas below.

1. Approach to cost assessment

In this section we consider the boundaries in the value chain where cost will be assessed for efficiency and allowances, in particular the water resources boundary as this was difficult to model in PR19 and Ofwat are considering a change in the boundary of water resources in PR24. We also consider issues of scope to be considered when modelling totex v botex.

a. **Boundary:**

In PR19 there was not a water resources cost model that matched the water resources price control. Instead Ofwat used a Water Resources Plus (WRP) model with a portion allocated to the water resources price control. The current boundary of the (WRP) econometric model used at PR19 is limited in terms of its specification and drivers used and in some of its statistical characteristics. On one hand, the specification of the current models are heavily weighted to the water treatment part of the water production process¹⁹. The models disregard any cost driver related to the sources of water that each company faces to extract water from the environment such as boreholes, reservoirs, and rivers. These surface and ground water sources are not controlled for in the models giving some room for potential misspecification and endogeneity econometric issues that will affect efficiency and estimation of the coefficients. In this way these models look more like a “Water Treatment Plus models” rather than WRP. In addition, amongst all the wholesale water models, the WRP models are the ones with the lowest R², which suggests there is some room for improvement.

We understand Ofwat’s aims at PR19 of having a water resources price control (e.g., controlling for specific drivers to help to identify inefficiencies, development of markets, etc.). We also recognize the issues identified, such as incentives created that might affect water resources management control as some costs are apportioned between water resources and water network (e.g., pumping stations for abstraction and raw water transport).

Ofwat also identified a potential area of perverse incentives between water resources and water treatment. For example, the initial source of water extraction (e.g., surface or ground) can have

¹⁹ By water production we mean the process that compiles extraction/resources, raw water transport and treatment.

a significant impact on water treatment costs, hence focusing only on water resources could distort incentives as to what scheme is more efficient.

We believe that the PR19 approach and models could be improved as stated in [Appendix – Examining the boundary of the targeted control for water resources](#). We consider that Ofwat's proposals are in the right direction to reach a better understanding of the economic structure of water production (e.g., robust econometric models, efficiency, etc.). It is hard to predict which approach will work either (resources) or (resources + raw) or (resources + raw + treatment), hence a more practical approach could be taken by exploring all approaches. Ofwat will need to ensure that the data that covers the potential extension of that boundary in the water production chain for key assets is captured as consistently as possible.

It makes sense from the economic point of view to split the wholesale water controls by water production and water distribution, where the former is more open to competition (albeit mainly the water resources element) and the latter reflects the natural monopoly position of companies. Moreover, this approach is in line with Ofwat's current PR19 econometric framework for wholesale water models.

We also have another view related to the modelling approach. The water resources model at PR19 as presented in the econometric consultation of 2018²⁰ might have specification issues as this kind of model should include controls for the type of water sources, such as surface and ground. For example, when water comes from underground sources you would expect a model that includes the depth to groundwater or the energy effort to extract²¹ or simply a consistent robust measure of average pumping head²² is crucial. By omitting significant drivers in the model, we might be incurring endogeneity issues that lead to inconsistent econometric results (e.g., magnitude and sign of the coefficients, etc.).

The models on water resources included in Ofwat's 2018 econometric consultation, only included two drivers, Number of Connected properties, and Average pumping head²³. The [Appendix – Examining the boundary of the targeted control for water resources](#) paper proposes some hypotheses on how to improve the PR19 approach (e.g., changing boundaries) but they need to be tested. Moreover, these changes do not guarantee the success of the models. Some questions remain unanswered robustly: Are these boundaries the right specification of the models? For this we suggest being open in understanding the data. Do we correctly understand the production process? Have we collected/included the appropriate costs drivers? These questions are important to explore alternative cost drivers with the industry. Are we taking just an engineering approach and missing the economic component of modelling a cost function? This last question takes us to our next point on the scope of the models.

b. Scope:

We believe that the approach to be taken in the definition of the econometric models for base costs should be based on economic principles. This approach will reflect the economic

²⁰ Cost Assessment for PR19 – a consultation on econometric cost modelling, March 29, 2018

²¹ See for example, [Sears, Louis, David Lim, and C.-Y. Cynthia Lin Lawell](#). (2019). Spatial groundwater management: A dynamic game framework and application to California. *Water Economics and Policy*, 5 (1), 1850019.

²² We appreciate the efforts made during PR19 to construct a robust measure. However, due to inconsistencies and companies submitting different versions of the definition, distorted the real impact of the driver and its role in the econometric models.

²³ Moreover, the models presented by CEPA also missed other potential costs drivers. They explored cost related to the sources of water such as the proportion of water extracted from boreholes, rivers, and reservoirs. For instance, CEPA did not get the expected negative sign for reservoirs either. Is this something that is supported by the theory?

and its relation with the accounting approach of enhancements) in the specification of the model and its potential forms of measurement.

Moreover, a proper economic identification of the cost function would also help us to identify the type of economic costs that we are trying to model and the appropriate econometric approaches that we should explore for modelling purposes (e.g., Variable Costs, $VC=opex$ or until certain degree $botex$ using static panel models; Fixed Costs (FC) or Sunk Costs (SC) = *Enhancements* using dynamic panel models).

This accounting and economic link could also be beneficial in the determination of the level that we should take into modelling purposes of the costs. For instance, starting at the $totex$ level we can see the economic and econometric implications that this level can bring in the modelling stage of the costs. At this level we would need to think carefully on how to deal with variable costs and fixed or sunk costs and the econometric and economic implications of taking this potential approach to get sensible econometric results²⁸.

The time distinction between short v long run cost functions would also be in line with Ofwat's view of the long term. Hence, it should be part of the scope of what type of economic cost function regarding its position in time we are trying to model with econometrics. This will impact efficiency scores as well as allowances.

Finally, to complement the scope section we would like to add the structure that an efficient cost function should follow. The efficiency principles on economic regulation theory and incentives are linked to the microeconomic theory of cost minimisation. Assuming that a company minimises costs, the optimal reduced form of the cost function in the long-run suggests the following structure:

$$C_{it} = f(Q_{it}, P_{it}, Z_{it})$$

Where, **C** is the cost (e.g., $botex$, $totex$, etc.), **Q** is the output (e.g., water delivered, efficient water delivered (water delivered – leakage), customers, etc.; Q should also incorporate a dimension of quality as this is one of the dimensions of the output), **P** represents all input prices such as price of labour (e.g., although in a regulatory framework to avoid perverse incentives we proxy this variable with Regional Wages), price of materials, price of energy, price of capital among others and **Z** represents all other environmental characteristics such as engineering, topography, density, etc. If the cost is a short-run cost function, we should see the structure of the optimal cost function that is the ideal representation to assess efficiency as:

$$C_{it}^{Short-run} = f(Q_{it}, P_{it}, Z_{it}; \bar{K}_{it})$$

Where \bar{K} is the fixed capital in the short-run or capital stock for company i in year t ²⁹. We will explain in the next paragraphs potential ways to measure capital stock (e.g., MEA, length of mains) among other variables.

paper you could see also [Reiss and Wolak](#) (2007). Structural Econometric Modelling: Rationales and Examples from Industrial Organization. *Handbook of Econometrics*, chapter 64, vol. 6A. section 9.

²⁸ A good example on how this link should be used can be find at [Destandau and Garcia](#) (2014) "Service quality, scale economies and ownership: an econometric analysis of water supply costs". *Journal of Regulatory Economics*, 46:152–182. This paper estimates a Botex model (e.g., $Opex + Maintenance$) which is then treated as a Variable Cost Function within the Short-Run framework.

²⁹ In this type of cost functions, it is clear that the price of capital will not play any role. It is fundamental to set-up the appropriate cost function if we are keen to understand efficiency and other economic concepts such as economies of scale or density. A consistent link between microeconomic cost minimisation and economic incentive regulation theory of natural monopolies is fundamental and it will take us to more appropriate and objective econometric models.

It is crucial that we follow this approach to be consistent with the economic regulation incentives theory and the cost minimisation problem of the firm. The structure of the cost function is fundamental from the economic and econometric point of view for modelling purposes. This structure helps us to capture the appropriate specification of the model to avoid or mitigate misspecification issues of the real dgp in a natural monopoly regulated industry.

2. Approach to Modelling

For improvements on the modelling side of cost assessment we have some general thoughts that we consider are important for more objective results at PR24 and beyond (e.g., PR29, PR34 and PR39)³⁰. Building on the PR19 framework and CMA inputs is important, as we have made good progress in the models. We identify that some areas can be improved and while these might require time to develop, we believe that if we do not spend time on these issues now, we might end up with the same issues as in PR19 and that we will continue with the same modelling problems at least until PR29.

In principle, a simplistic approach to the models is always welcome but at the same time we need to recognise that keeping the same approach will not help improve the modelling of capital maintenance or the link between service and costs that are needed to resolve the long-term challenges (climate change, population growth, ageing of the network, carbon net zero etc.) set out in the PR24 consultation. Therefore, some degree of complexity in the models will be required. By complexity we mean, the implementation of more advanced econometric techniques, an improvement in the measurement of some cost drivers, such as quality of the service, and a more economic approach to the general framework of the current “econometric” models³¹.

We set out below views on:

- Frontier adjustment/efficiency challenge.
- Collection of data and potential new cost drivers.
- Expanding econometric techniques.
- Capital maintenance.
- New models.

a. **Frontier Adjustment / Efficiency Challenge**

Ofwat’s catch-up and forward-looking efficiency challenges could be improved to have a more consistent and objective approach.

Catch-up efficiency challenge: The Random Effects (RE) model used at PR19 assumes a random variable that captures unobserved individual heterogeneity (α_i). This model assumes that the unobserved random individual effect is distributed independently of the regressors (e.g., cost drivers). The error of the model then can be written as a composed error term (e.g. $u_{it} = \alpha_i + e_{it}$) assuming that this error term is not correlated with any of the regressors (e.g., the fixed effects model relaxes this assumption). Ofwat is not clear on what the α_i is actually capturing in their

³⁰ Some of them have already been described in our third-party response to the CMA See Thames Water response at: https://assets.publishing.service.gov.uk/media/5eda3e8ed3bf7f4604912108/Thames_Water_submission.pdf

³¹ We see the current models more in a framework of accountingmetrics or engineeringmetrics rather than econometrics. Accounting because of the use and definitions of costs as totex and engineering because of the approach taken to specify the models based on scale, complexity, topography and density.

models. None of the IAP, DD or FD supplementary technical appendixes define or clarify the role of the unobserved heterogeneity. Not even the CMA clarified this³². For example,

- Is α_i capturing inefficiency?
- Is α_i an unobserved heterogeneity such as geographical characteristics?

This determines whether the composite error is company specific and therefore needs to be adjusted to be consistent across the industry efficiency rankings.

Depending on what is assumed to be captured by α_i then it is possible to have a better understanding on the efficiency catch-up calculations and its impact on base cost calculations.

Forward-looking efficiency challenge: Including an appropriate treatment of time trend in the cost function models or estimating a production function to forecast or extrapolate productivity levels for AMP7 would be a good complement to the current approach that Ofwat has imposed for AMP7.

The current approach used in PR19 could be too subjective by “selecting” different sectors linked to the water and wastewater industries which has brought a lot of discrepancies across the industry (e.g., see Europe Economics (EE) and the sectors chosen for the analysis and all the different responses from consultants).

In addition, the EE approach is based on TFP which relies on different assumptions such as perfect competition and the absence of measurement error³³. These assumptions would need to be explored for the industries that have been chosen to test their robustness, otherwise we could end up in over/underestimated indexes of TFP.

As stated by [Berry et al. \(2019\)](#)³⁴ “industries are so heterogeneous that careful industry-specific studies are also required, and sorely needed.” This emphasises the different structures and technological patterns that each industry has. Applying the current Ofwat approach of taking similar industries and their different levels of productivity challenges (TFP) to produce a single TFP that applies to water and waste is forcing the industry to have the same efficiency improvements that similar peers have, which could be damaging and misleading. It also omits the large heterogeneity and incentives that are presented in each industry (e.g., water, waste, manufacturing, construction, etc.) as mentioned by [Berry et al. \(2019\)](#) and [Syverson \(2012\)](#)³⁵.

An objective approach would be, for example, using parametric approaches to the estimation of production functions in order to understand the productivity of the sector itself³⁶. Using a parametric approach or any other methodology that helps us to understand the productivity trends of the industry could bring an important picture of the technological improvement patterns of the industry. This analysis of the industry could help to control more accurately the heterogeneities that belong exclusively to the water and wastewater industries and its results could also be balanced out (e.g., combining/weighting) with the current Ofwat approach that is based only on external industries that have different technological and economic incentives.

Finally, Ofwat’s consultation quotes Frontier Economics (FE) report on the productivity figures of the water sector. For example, it is said that the industry between 1994 and 2010 achieved an

³² Although, the CMA mentioned in their Provisional Findings Report – p4.278, p.161.

³³ See [Biesebroeck van, J. \(2007\)](#) Robustness of Productivity Estimates. *Journal of Industrial Economics*, Vol. LV.

³⁴ See [Berry, S., Gaynor, M. and Morton, F. \(2019\)](#). Do Increasing Markups matter? Lessons from Empirical Industrial Organization. *Journal of Economic Perspectives*, Vol 3. Number 3. Pg. 44-68.

³⁵ See [Severson, C. \(2012\)](#). What Determines Productivity? *Journal of Economic Literature*. 49:2, 326-365.

³⁶ See for example, [Abbot, M. and Cohen, B. \(2009\)](#). Productivity and Efficiency in the water sector. *Utilities Policy*, 17, 233-244, for a summary of different approaches in the water sector for productivity estimations.

average productivity growth of 3%. Moreover, since 2011 the productivity growth seems to be weaker. We think that these figures might be under/over estimated as the way FE has calculated the numbers using a non-parametric approach of the Tornquist TFP Growth Index. Using this methodology implies a calculation of the output and inputs of production. In these inputs, FE use capital that is proxied using perpetual inventory method adjustment of the MEA capital stocks, labour, materials, and fuel as the key inputs of production in water and waste. Clearly, this view misses a fundamental driver of production in water which is Natural Capital. Missing this input would affect significantly the productivity estimations and therefore the forward-looking efficiency challenge. A study from the [OCDE](#) (2013) at the country level found that “*Results suggest that failing to account for natural capital tends to lead to an underestimation of productivity growth in countries where the use of natural capital in production is declining because of a dwindling natural capital stock. In return, productivity growth is sometimes overestimated in times of natural resource booms, if natural capital is not taken into account as an input factor*”³⁷. We believe that future estimations of productivity in an industry like Water should include Natural Capital input as a more appropriate way to estimate productivity forward-looking efficiency challenges.

b. Collection of Data and “New” Cost Drivers

We think that the models could be extended/improved with the appropriate inclusion of the following cost drivers: i) Regional Wages, ii) Stock or Price of Capital, iii) Scale/Output, iv) Time trends and quality and v) other new drivers. We describe each of them below.

Regional Wages: In principle, regional wages have a strong economic sense as a driver to be used in estimating efficient costs. Regional wages (RW) is a proxy for the price of labour in a regulatory framework to avoid perverse incentives (see [Shleifer](#)³⁸ (1985) or [Wolak](#) (1994)). With respect to the construction of RW for PR19 by Ofwat, we identified the following points that could improve its measure in PR24.

However, in practical terms it has been a challenge to appropriately accommodate the driver in the models since PR14. During PR19 the industry and Ofwat dedicated some time in improving this driver. The initial econometric results of the coefficient of regional wages were not the ones expected.

Ofwat decided in their final models to exclude regional wages as it was correlated with density, hence, the effect of wages should be already covered by the density driver. We identified some issues in PR19 that might be worth exploring again with Ofwat in the potential construction of the regional wages variable using ONS data from the ASHE data. It is not clear enough to us how the comments we provided in PR19 were explored/addressed by Ofwat and whether it is worth exploring them again for an improvement of the driver in PR24. With respect to the construction of the version of the regional wage index for PR19 provided by Ofwat, we identified the following issues based on Ofwat’s RW working excel file:

- Potential problems with the allocation of FTE by companies (Inconsistencies; for example, it is hard to understand why some companies have 23% of FTE allocated to Caring, Leisure and Service Occupations while for most of them it is close to 0%)

³⁷ [OCDE](#) (2013) “Productivity Measurement with Natural Capital”. OECD Economics Department Working Papers No. 1092.

³⁸ [Shleifer](#) (1985). “A Theory of Yardstick Competition.” *Rand Journal of Economics* 16 (3): 319-327.

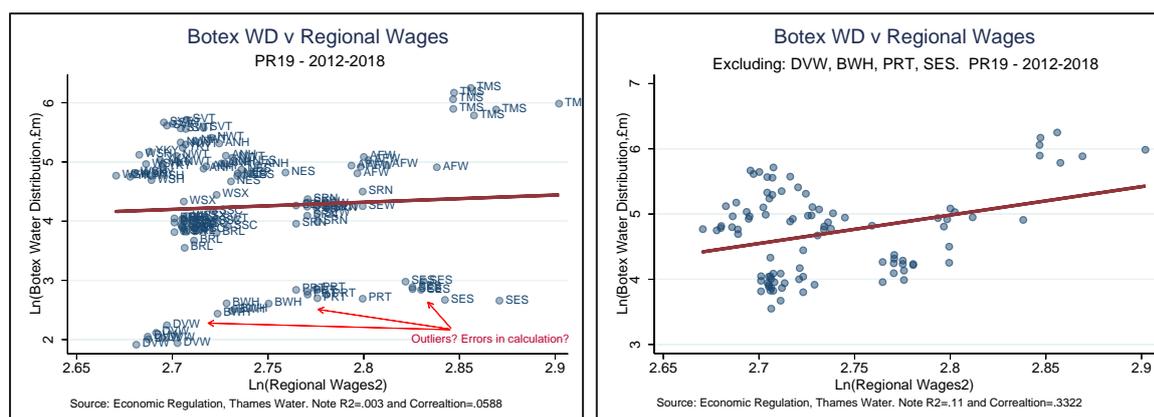
- There are occupations that do not seem to be relevant to the water/waste industry. How can we define a proper structure of the occupations related to the water/waste industries? (For instance, Frontier Economics (FE) uses seven occupation categories (SOC) to construct the regional wage for Ofgem models (however, arbitrary), see Total cost benchmarking at RIIO-ED1-Phase 2 – Vol. 1, pg. 30-35; At the end FE uses a SIC classification instead of SOC).
- Only seven water/waste companies submitted the SOC classification in PR19.
- Significant differences between SOC across companies might be explained by the different interpretations that companies have on the occupation definitions.
- Was the ONS raw wage data deflated by the 2017-18 CPIH prices? If not the regional wages need to be adjusted.
- In addition, Ofwat seems to use the excluding overtime information instead of the gross version of hourly pay (FE considers the gross version for Ofgem, see *ibid.* pg. 32; CEPA report is not clear/convincing on why it does not use the gross version, it appears to be taken as an assumption with no evidence provided). Hence, it could be worth exploring the gross version to check for robustness of results.
- Time inconsistency (ONS data v Regulatory financial year; FE considers this issue for Ofgem, *ibid.* pg. 33.).

Having the wrong weights/allocation of the occupations, impacts the calculation of the RW. The result of the final calculation of RW is sensitive to these weights (see Ofwat excel file using different scenarios to see the impact; the occupation weights are an industry simple unweighted average).

The current PR19 econometric models might have some endogeneity issues as RW is positively correlated with density (0.7). Hence, a proper distinction of RW is crucial to avoid inconsistencies.

As an illustration, we have explored a bit further the current status of one of the regional wages variables calculated by Ofwat in PR19, regional wages SOC2. We have explored the relationship with botex water distribution and found a very weak correlation of 0.05 and an R^2 of 0.003, suggesting that the current measure of the driver has the poor correlation (see chart on the left below).

However, we have noticed a set of companies that sit at the bottom of the chart. In particular, DVW, BWH, PRT and SES. Three of these companies are in the south of England and one in Wales. These companies appear to be outliers. Is there an error in the calculation of regional wages? As far as we understand not all companies submitted information on the proportions of occupations (SOC). Only 7 out of 17 companies submitted this information and for the remaining 10 companies a simple average was applied.



The regional wages calculation is very sensitive to these occupational proportions. Moreover, companies have different allocations and use of labour resources, so a simple average applied to companies that have not submitted information is very limited and creates noise in the estimation of regional wages. Hence, we believe that an appropriate and more rigorous procedure in the way regional wages is calculated is worth undertaking and needed to obtain a better estimate of this crucial driver. Consistent information from all companies on the occupational weights is fundamental to get a robust calculation. In this way, we believe we can have a robust measure of regional wages to include in the econometric models.

Capital Stock (K) / Price of Capital (r): Capital is a fundamental economic variable in the production process of water and sewerages companies. Moreover, in a natural monopoly industry a large fraction of their total costs are capital costs. This component of the costs is a structural driver of the microeconomic costs structure of the company.

The specification of Ofwat's models disregard this driver completely. Any microeconomic model of cost functions traditionally covers labour costs (or regional wages as a proxy to control for perverse incentives) and the cost of capital. Theory suggests that if the cost model being specified sits on a *short-run* time framework the cost function must control for its *capital stock* (K) whereas if the cost function is set up in the *long-run* context the *price of capital* (r) should be included. This driver is fixed in the short term as it is not as flexible as labour, for example. This could be taken into the estimation of a variable cost function conditional on the capital stock (K).

Given the large amount of fixed capital cost in the water industry, it is crucial to control for this variable otherwise we could end up with a serious misspecification of the econometric models³⁹. The literature on this is large and many examples are available⁴⁰.

Capital stock (K) can be measured either by using a *capacity* measure or a *cost* measure applying the perpetual inventory technique, where the latter method is theoretically more appropriate. With respect to these two ways of measuring we have:

- *Cost Measure:* A potential way to measure *capital stock* (K) for each company across years can be the Modern Equivalent Asset (MEA) methodology⁴¹. Frontier Economics in the paper *Productivity Improvement in the Water and Sewerage Industry in England since Privatisation* has a good application on how to calculate this driver. Ideally, for modelling purposes we should have K for at least the water production (e.g., resources-raw-treatment which might help to mitigate some of the issues in water resources boundary), water distribution (e.g., network) and wholesale water (already calculated by FE).
- *Capacity Measure:* Some studies have used proxies for the capital stock such as length of mains among others. For example, these proxies could indicate that the current Ofwat water distribution model does not contain a scale driver, as mains could be read as a scale driver as well as a capital stock. For example, in the current water distribution model, we could say that length of mains is currently capturing a scale as well as capital stock.

It is hard to say how much of each is captured and if there is any missing part that could be correlated with the error creating some endogeneity issues. Hence, a proper measure of capital stock such as MEA would be more appropriate/accurate to avoid misinterpretations of the efficiency scores.

³⁹ Perhaps the current models are already incurring this.

⁴⁰ Here are some examples on how different models of estimation of cost function in the water industry control for capital stock.

⁴¹ $MEA = (\text{Cost Disposals} + \text{Additions}) - (\text{Depreciation_Disposals} + \text{Charge for year})$

If we specify a *long-run cost function*, then the cost function must control for the price of capital (r). This r can be measured in different ways. As an example, in [Bottasso and Conti](#)⁴² (2009) r (rate of return or price of capital) is measured as:

$$r = \text{Depreciation Rate} + \text{WACC}$$

Where Depreciation rate = the depreciation and infrastructure renewal charge divided by the capital stock (K) (see for example, [Joskow](#) (2007) or [Wolak](#) (1994)). In this way, we will mitigate econometric problems such as misspecification and we will be able to target accurately the dgp.

Scale/Output drivers: for each production process such as abstraction, treatment, and distribution we need to understand the economic output being produced. Utilities are network industries. “*Cost must in general depend on the entire distribution of demands over space.*”⁴³ The distribution of the demand or the nature of the network, as it relates to the economic output or output density. In principle, the economic output being delivered in the network (e.g., water distribution) has three dimensions (see [Torres and Paul](#) (2006) and [Schmalensee](#) (1978)):

- *Output* (e.g., water volume (scale); Output Quality (leakage, etc.)).
- *Number of customers* (e.g., connections or density).
- *Service area size* (e.g., distance; length of mains or area in Km²; as a potential new driver, we could distinguish between transmission and distribution mains for a capital maintenance model for example).

So, in principle, the economic output being delivered in the network (e.g., water distribution) has three dimensions (although quality is another dimension of the output being produced that also needs to be included). The impact on costs of an increase in output (volume) must be considered under the existing conditions of the network. Therefore, “*A full measure of economies of scale or size requires recognising that increasing “scale” involves also expansion of the network, and thus depends on a balance of costs associated with water volume, connections and distance*”⁴⁴.

In theory, an appropriate way of capturing the impact of the output in water distribution should include these three dimensions of the output. However, in practical terms this is hard to control in the models as the sample size of the industry is small and the three variables are highly correlated causing, for example, multicollinearity issues in the econometric models.

Having said this, a potential set of variables within this category to be reconsidered at PR24 is the volume of water and wastewater in the case of the network. Similarly, other appropriate scale drivers should be also considered in the models. For instance, in the case of water treatment (e.g., Water Resources Plus) the volume of water treated should be an appropriate output/scale driver.

Average pumping head (APH): the importance of average pumping head as an important cost driver in water production is recognised across the industry. Generally, it captures how efficiently are companies using the amount of energy needed to pump water across extraction and distribution, for example.

⁴² See [Bottasso and Conti](#) (2009). Scale economies, technology and technical change in the water industry: Evidence from the English water only sector. *Regional Science and Urban Economics*, p. 138–147.

⁴³ See [Schmalensee](#) (1978). A Note on Economies of Scale and Natural Monopoly in the Distribution of Public Utility Services, *The Bell Journal of Economics*, Vol. 9, No. 1. P. 270-276.

⁴⁴ See [Torres and Morrison-Paul](#) (2006). Driving Forces for Consolidation or Fragmentation of the US Water Utility Industry: a Cost Function Approach with Endogenous Output. *Journal of Urban Economics*, 59:104-120.

We believe that the current definition of APH defined in the RAG. 2.08 is a measure that contains all the engineering elements to capture consistency across the industry. However, the potential problem with companies reporting APH resided on the different interpretations that companies might have used in the past.

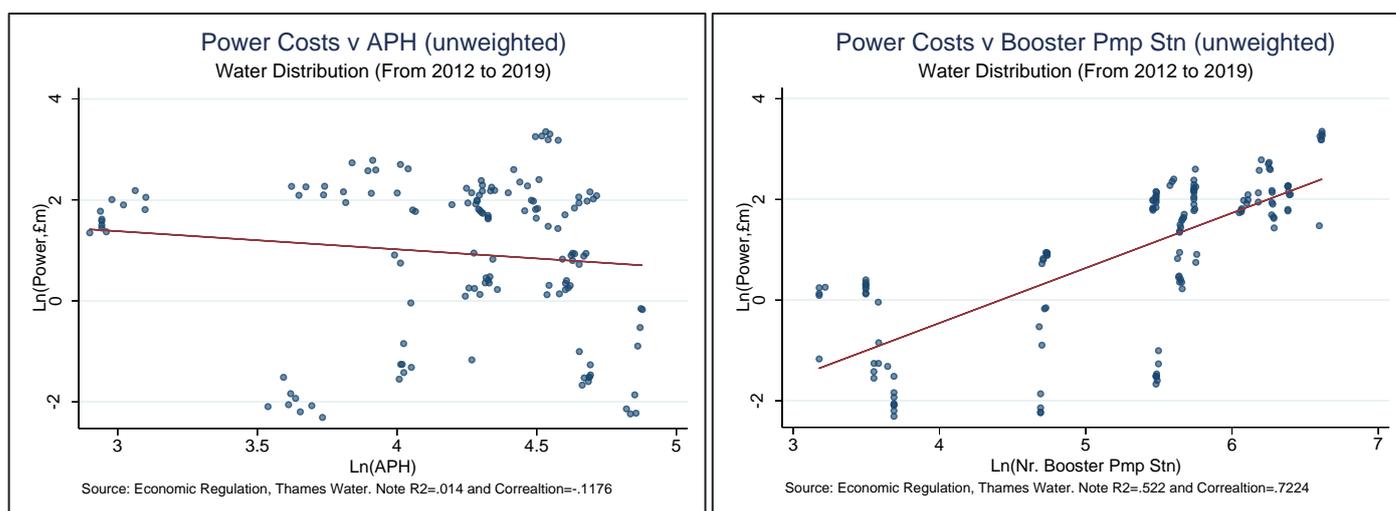
A potential audit could help to mitigate the risks on the reporting process in order to improve consistency across companies and price controls. We will need to proceed with a reporting mechanism like this or similar at PR24 to avoid the issues presented in PR14 and PR19⁴⁵. We need to ensure that we do not exclude the driver because companies are reporting differently and then distorting the real economic impact of the variable, or because we are not properly weighting the variable. This could induce the model and the interpretation of the driver as a Type I/II error.

The issue of how to measure and include APH in the models was discussed during the PR14 and PR19 CMA redeterminations. The following is just a brief summary of that discussion:

1. At PR14 in the totex model developed by CEPA, APH was a *weighted* measure: $\text{Ln}(\text{APH} \cdot \text{DI})$.
2. The CMA during the appealing process at PR14 incorporated an *unweighted* measure in the Ln's aggregate costs models: $\text{Ln}(\text{APH})$. The reason was to avoid potential multicollinearity issue. However, there was no evidence of this in their pooled OLS models (e.g., VIF).
3. At PR19, Ofwat tried an *unweighted* version as suggested by CMA $\text{Ln}(\text{APH})$ in different specifications without robust results across water wholesale. Ofwat also argued that the confidence grades of number of pumping stations was greater than APH. However, does it make sense to compare something that is easier to calculate like *counting* (*Nr. Booster Pmp Stn*) v something that requires an *engineering calculation* (APH)? Using these weak arguments we could end up in dismissing the real impact that theory suggest through APH (e.g., Type I/II error).
4. In PR19, the CMA supported Ofwat's choice of booster pmp_stn. They argued that the quality of APH is weaker compared to booster pmp_stn, in terms of measurement, statistical level significance and cost modelling approach (e.g., botex v power).

So, *what is the evidence suggesting on APH and Booster_Pmp_Stn?* When looking at the correlation between power costs and APH (unweighted) in water distribution we can find a negative correlation of -0.11 (see left chart below) which is not aligned with the expectations. Hence, during PR19 Ofwat chose a proxy for APH: "*number of booster pumping stations per length of mains*" (*Booster_Pmp_Stn*). We correlated this proxy using just the number of booster pumping stations (unweighted) with power costs and found a positive correlation of 0.72 (see right chart below). At this stage both measures are unweighted and it seems that *Booster_Pmp_Stn* is a good predictor.

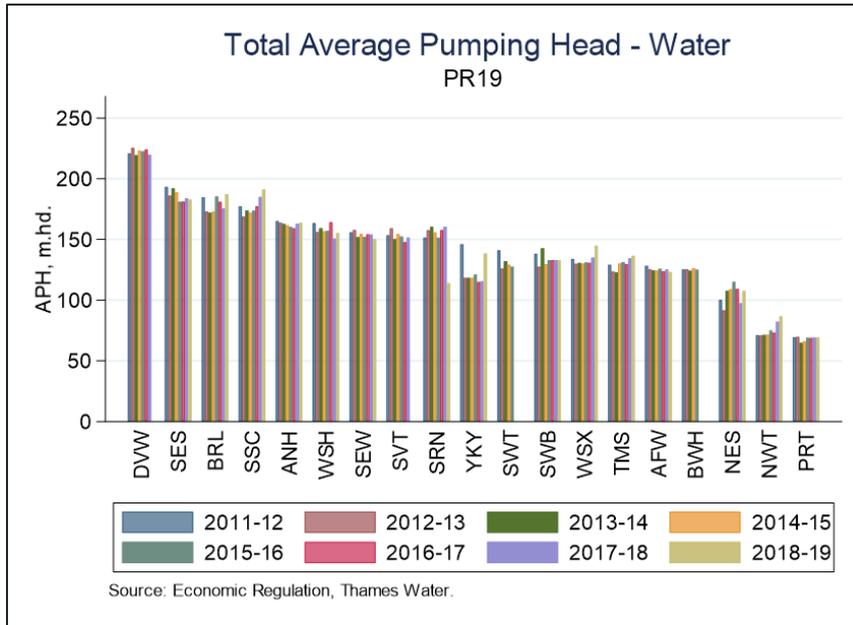
⁴⁵ In PR14 APH was used only in the general model of Totex but was excluded from all Botex models. Moreover, APH was weighted either using Distribution Input or Water Delivered.



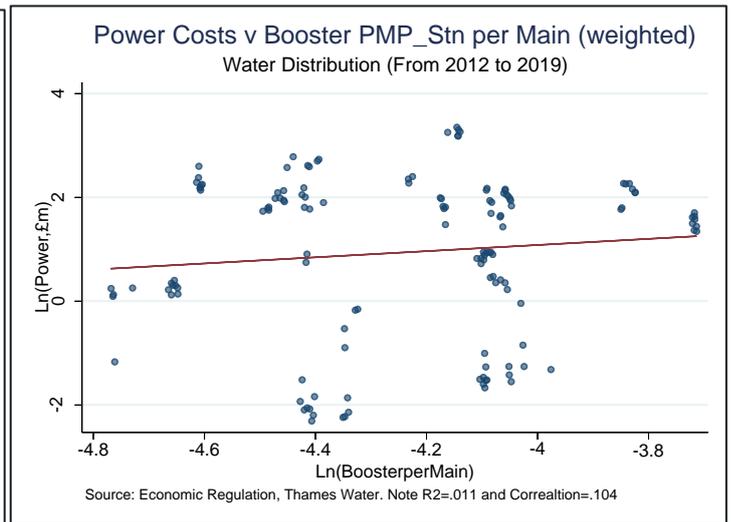
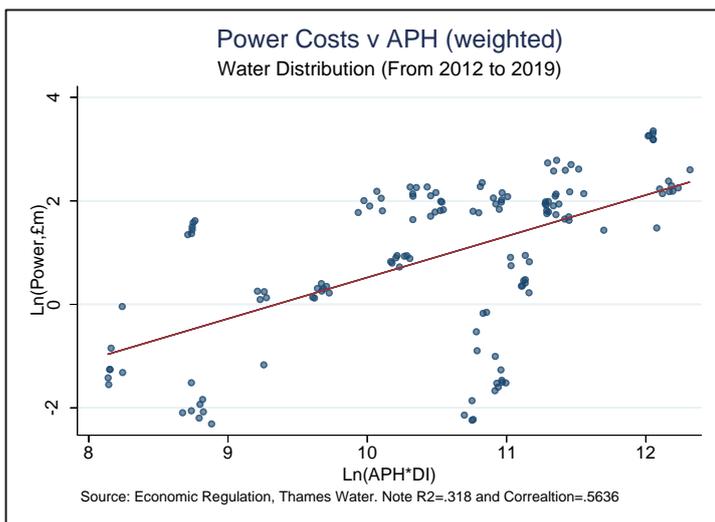
Do we need to weight in order to consider APH in the models? We need to consider APH in the following form; Average pumping head is a measure of the average vertical distance each unit of water supplied is 'lifted' from source (e.g., river or borehole) to tap (e.g., customer). This means it represents the average water system topography. There is little that can be done to change the APH, except if customers were to move their water demand from high head systems to lower head ones (or vice versa).

It is therefore perfectly possible for a very small water company to have the same average pumped head as a very large one. *Consequently*, APH could be the same whilst the cost of supplying water could be very different. In order to *benchmark* effectively we could either divide the cost by MLD and compare to APH, or multiply the APH by MLD and compare to cost. Either would allow for effective comparison of efficiency. For example, using Distribution Input or Water Delivered, or Water Treated.

In reality larger water companies are more likely to have multiple systems with higher and lower pumped head, whereas small water companies will have fewer systems and therefore the average pumped head of their smaller data set of systems is more likely to be influenced by a few either high or low pumped head systems. As a result, the smaller water companies with lower costs are likely to sit as relative outliers in the range of APHs as illustrated in the figure below (e.g., DVW and PRT).



What does the evidence suggest on APH and Booster_Pmp_Stn when weighted? When we weighted both variables, APH by Distribution Input (DI) and Number of Booster Pmp_Stns by Length of mains, both variables suggest a positive correlation with power costs as expected. This evidence also suggests that the use of APH (weighted) is stronger (0.56) than the Booster Pmp_Stns (0.10) (weighted). We use this approach as the appropriate way to proceed when APH is used in the models.



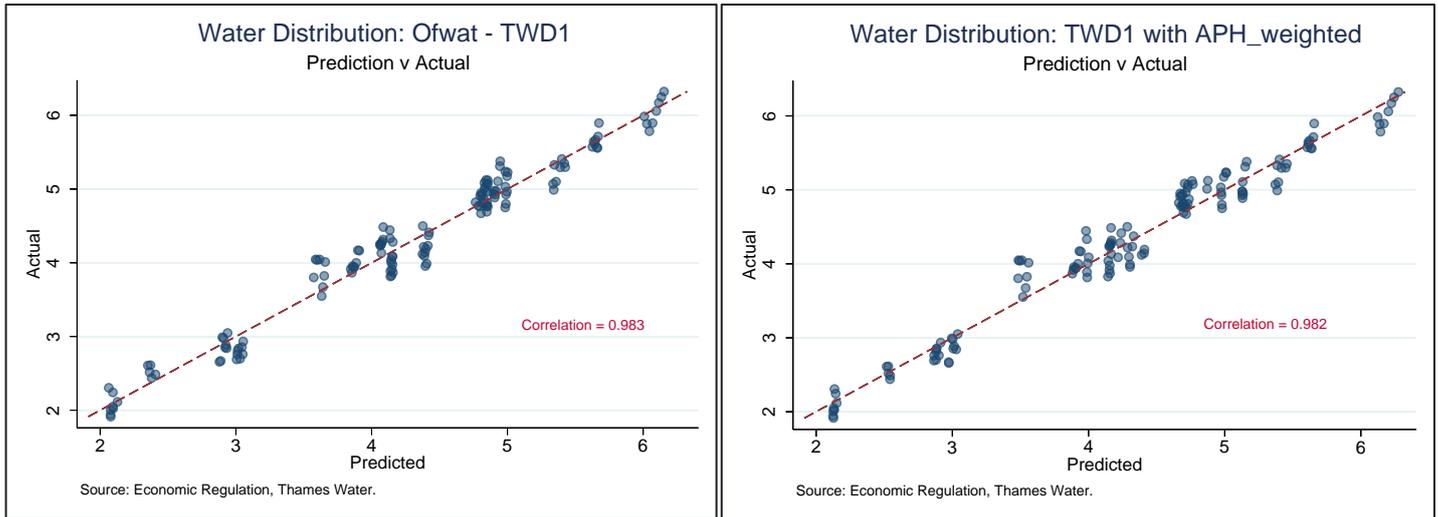
So, how could we improve our understanding of APH? After some internal discussion with engineers in the business we concluded that: i) The current definition of APH is adequate to capture the energy used to pump water and the topography conditions that are particular to each company as explained before, ii) Companies could provide all the components of APH calculation in order to understand potential anomalies in the reporting across companies and price controls, iii) A potential audit could help to mitigate the risks on the reporting process in order to improve consistency across companies and price controls.

As an illustration, what could be the effect of using an APH weighted in the TWD PR19 model? We took the treated water distribution model (TWD1) as an example. The table below shows the

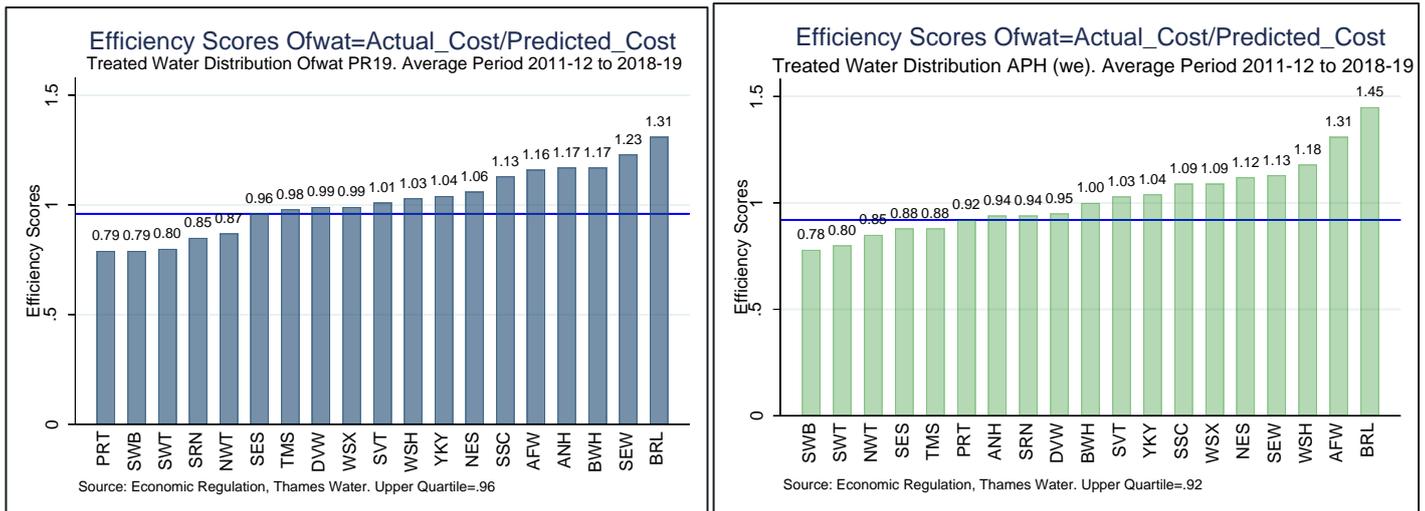
econometric results we have run. The first column shows Ofwat TWD model whereas the second one shows an unweighted version of the model for pumping stations. The third and fourth columns show similar approach but using APH instead. The question is how should we use these different modelling options to avoid Type I/II error in the econometric models and misspecification issues on the dgp and its consequences in inconsistency, for example.

Static Panel-Data Models: PR19 Botex Water Econometric Models TWD1 v TWD_APH.				
	TWD1 (we) b/se	TWD1 (un) b/se	TWD_APH (we) b/se	TWD_APH (un) b/se
Length_of_Mains	1.049*** (0.038)	0.593*** (0.191)	0.950*** (0.060)	1.084*** (0.031)
Pumping_Stn_per_Main	0.455*** (0.168)			
Population_Density	-3.120*** (0.406)	-3.120*** (0.406)	-3.642*** (0.474)	-3.806*** (0.445)
Population_Density^2	0.248*** (0.028)	0.248*** (0.028)	0.273*** (0.035)	0.288*** (0.032)
Pumping_Stations		0.455*** (0.168)		
APH_DI			0.138** (0.057)	
APH				0.121** (0.054)
constant	5.686*** (1.344)	5.686*** (1.344)	5.693*** (1.537)	5.755*** (1.493)
R2_Overall	0.967	0.967	0.964	0.963
Wald_Chi2	2592.527	2592.527	1565.690	1515.617
RESET_P_value_Ofwat	0.12	0.12	0.09	0.10
Observations	141.00	141.00	141.00	141.00
Lambda_median	0.71	0.71	0.73	0.74
StdDev_Ind_Effect	0.16	0.16	0.17	0.18
StdDev_Idiosy_error	0.14	0.14	0.14	0.14
Corr_comp_error	0.58	0.58	0.62	0.63
Source: Economic Regulation, Thames Water. Note: we=weighted, un=unweighted * p<0.10, ** p<0.05, *** p<0.01				

No significant difference between the predictability power of these models. The chart on the left shows the current predictivity power of the Ofwat PR19 TWD1 model, whereas the one on the right shows the same result using the same model but substituting Booster pumping stations per length of mains with APH weighted. There are no significant differences between the two models in terms of predictions overall or across the industry.



However, there is a significant change on Efficiency Scores (ES). The chart with blue bars shows the TWD1 efficiency scores per company using TWD1 Ofwat model, where PRT is the most efficient company. The chart with the green bars shows the ES when APH is weighted, with a significant difference on the ES with respect to model TWD1. SWB becomes the most efficient company whereas PRT drops to the sixth position. In addition, the Upper Quartile frontier changes from 0.96 to 0.92. These results show how sensitive are the ES to changes in the drivers and hence the material consequences that this can have in efficiency allowances indicating the lack of robustness of the models and the potential Type I/II error that we are incurring.



Time trends or time effects: In our view, any assessment of efficient costs should either control for the appropriate treatment of time trend in the base cost models. The theoretical principle is clear, as this time variable will act as a proxy of technological change⁴⁶. Another alternative is to include time dummy variables to capture time aggregate effects. We recognise the potential issue when the estimated results need to be taken to forecast cost efficiency allowances. However,

⁴⁶ Assuming duality between production and cost functions, the Time variable is a proxy of A in a traditional production function $Y=Af(K,L)$, where represent technological change or productivity.

using techniques such as [Suits \(1984\)](#)⁴⁷ will take these estimations into the forecast framework in a consistent way.

Overall, we think that the effect of technological change could be explored in different ways as briefly described below and not just a simple linear effect:

- A linear effect (T).
- A squared effect (T²).
- A cyclical Effect (sin/cos(T)).

Quality: Each part of the value chain reflects a quality dimension of the output being produced at that process of production (e.g., volume of water abstracted, volume of water treated, volume of water distributed, etc.). Cost assessment need to reflect this either within or outside the models to get consistent estimations of the econometric parameters.

If excluded from the models the econometric implications could be severe. Ofwat will need to balance the cost of excluding service quality drivers in the model versus adding them, otherwise as stated by [Destandau and Garcia \(2014\)](#)⁴⁸ “*Issues related to service quality are crucial for water utility management and regulation. Omitting these aspects, especially when they are treated as exogenous, can lead to large biases in estimating cost functions as well as to misleading information concerning technology*”. In the regulatory framework, the consequences are reflected in the efficiency scores, catch-up efficiency frontier and estimation of efficient cost allowances. In econometric terms, the implications of endogeneity driven by omitted variables are severe, and therefore the models will be weak for future AMPs and the long-term view.

In response to question 10.5 we provide more details on how the quality variable should be considered for the next price reviews. We take an approach of considering the quality service link both with cost from the econometric model point of view and assessed separately from the models.

Finally, we consider that the CEPA report published in 2018 during the econometric consultation is limited and it could be improved/expanded to tackle the quality dimension of the output in the econometric models.

Other New Cost Drivers: We think that the information collected in the water and waste datasets during PR19 have a significant set of relevant cost drivers for each price control that should be kept (e.g., age of the network).

The set of drivers not used in PR19 should be explored further in PR24. For example, in a water resource model variables such as the proportion of water abstracted from reservoirs or rivers are essential.

Water: We could extend/improve the list of drivers already collected at PR19 with the following specific cost drivers. In particular, drivers related to environmental, public value metrics, or maintenance:

- Km of chalk streams restored/enhanced.

⁴⁷ See [Suits, D. \(1984\)](#). Dummy Variables: Mechanics V. Interpretation. *Review of Economics and Statistics*.

⁴⁸ A good example on how service or quality is included in an econometric botex model can be found in [Destandau and Garcia \(2014\)](#) “Service quality, scale economies and ownership: an econometric analysis of water supply costs”. *Journal of Regulatory Economics*, 46:152–182.

- Public amenity – m² of public access space created.
- Number of third party community partners/charities involved in projects.
- Number of National Environmental Programme (NEP) schemes delivered.
- Customer or renewable metrics.
- Type of meter installation, meter technology.
- Distinction between transmission and distribution mains.

Waste: In waste, we have identified the following new cost drivers that could be included in the current list of drivers collected by Ofwat:

	New Variables/Cost Drivers
Sewage Collection	Total No of Mechanical assets (SPS)
Sewage Treatment	Total No of Civil Assets (Concrete)
	Total No of Civil Assets (GRP)
	Total No of Mechanical assets
	Total No of ICA assets
Bioresources	Total No of Civil Assets (Concrete)
	Total No of Civil Assets (GRP)
	Total No of Mechanical assets
	Total No of ICA assets

Source: Economic Regulation, Thames Water.

Retail: The set of cost drivers used at PR19 covered a significant part of the retail costs. However, we believe that the list of cost drivers could be extended for PR24 to explore and improve the current models. Some cost drivers that could be explored include:

- Proportion of connected households rented (this could be used as an alternative method of capturing transience).
- Council tax rate as a proxy for propensity to default should be revisited (Although Ofwat mention the updated Council tax ONS data reduced the statistical validity, Council tax collection rates are probably one of the most dependable sources of information).
- Other measures of capturing customer's ability to pay e.g. unemployment rate, regional wages and proportion of customers moving on to social tariffs.

Variables Under Management Control (MC) and other Criteria: How can we define MC (e.g., objective v subjective; what degree of MC should we accept)?

In principle all variables are under MC. In PR19, MC was one of the most common reasons Ofwat used to discard essential cost drivers without any objective definition of MC.

By doing this we could limit the scope of the models. We can also incur the wrong *dgp* which produces inconsistency in the estimated parameters of the models and could also take us into

Type I/II errors (e.g., APH v Number of Booster pumping Stations) among other econometric endogeneity issues.

Other Criteria: In principle, a simplistic approach to the models is always welcome but at the same time we need to recognise that keeping that approach will not help to resolve the challenges imposed by the long-term view (e.g., climate change, population growth, ageing of the network, carbon net zero, capital maintenance, etc.).

We need to progress and move on from the simplistic approach suggested by CEPA (2011) which has been the standard approach in the last 10 years in terms of modelling. Therefore, some degree of complexity in the models will be required. By complexity we mean, to implement more advanced econometric techniques when applicable (e.g., dynamic panel models, time series), improvements on the measurement of some drivers such as quality and capital stock, regional wages and the economic structure of the econometric models.

- c. **Expanding Econometric Techniques:** Improving enhancement models by using econometric techniques that are more appropriate for this type of investments/costs.

Enhancements:

1. There is scope to expand the methodologies already explored at PR19.
2. CMA has given credit to explore **Dynamic Panel Models** as an alternative to the traditional approaches suggested by consultants and regulators. This econometric technique controls for the lumpiness of this expenditure for areas where data is available such as metering, or New Developments & Connections (Growth). See CMA Final Report https://assets.publishing.service.gov.uk/media/60702370e90e076f5589bb8f/Final_Report_-_web_version_-_CMA.pdf (p. 415, footnote 1429).
3. In the 2018 Econometric consultation Ofwat proposed Static Panel Data models for water and waste enhancements activities. For the DD and FD, Ofwat used a simpler set of econometric or unit cost models (e.g., for instance, in enhancement metering, a cross-section econometric model is used; and growth was included in botex models).
4. Ofwat recognises the key issue on enhancement modelling: *“the efficient level of enhancement costs is more difficult to estimate than for base costs. Due to their irregular nature, there is less opportunity to compare the cost of required enhancement solutions between companies, and in some areas the exact requirements may be subject to uncertainty”*⁴⁹. The challenging part of enhancement modelling is therefore the irregular nature of investments/enhancements or the lumpy patterns observed across the industry (within companies and between companies) on different types of enhancements activities in water and waste, within and between companies.
5. With respect to other approaches such as smoothing, the CMA has stated its disadvantages in the final redetermination for the case of capital maintenance *“With respect to using a smoothed model to address the capital maintenance issue we do not see a clear justification to use the smoothed approach. The approach may introduce a distortion between the time covered by the cost variable and the time covered by the cost drivers.... if there is a correlation between costs drivers and the peaks and troughs or the ‘lumpy’ capex, this will not be picked up by the smoothed model. Therefore, we decide not to use smoothed data in our econometric modelling”*.

⁴⁹ Ofwat, 'PR19 draft determinations: Securing cost efficiency technical appendix', July 2019, pp. 35-37, Section 4.1.

6. Therefore, we believe that the dynamic panel data modelling approach could be an alternative to model some expenditures of enhancements. This econometric approach would be convenient and objective to this type of costs.

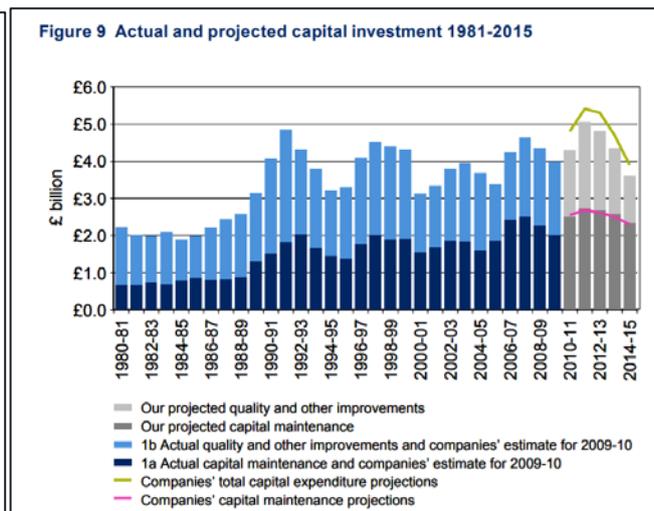
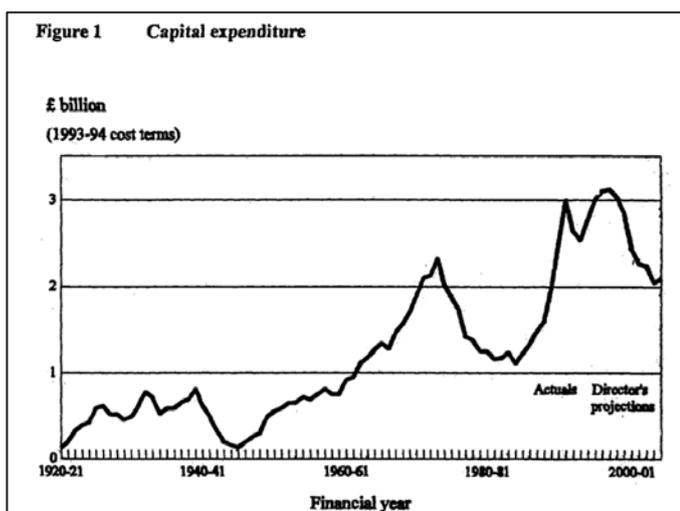
d. **Capital Maintenance:** We consider that capital maintenance could be modelled as a separate econometric model. It could be considered as a complement to the botex approach currently used. For this approach, we think that two ways can be explored:

- **Company Level:** A capital maintenance model using all companies (e.g., panel-data or time-series econometric approach), or
- **Industry Level:** A capital maintenance model for the whole industry (e.g., time-series approach). We will describe briefly these modelling alternatives in the next paragraphs.

It is recognised that the current allowances on capital **maintenance** in the last price reviews have been based on historical data. For example, the allowances for AMP7 are based on a period of eight years from 2012-2019. These allowances that are based on a short period of historical data might be an issue for capital maintenance allowances in the long-term.

This is not a new topic. This is an issue that has been present at least since privatisation. In 2003 in a paper published by UKWIR⁵⁰ stated “*there is a need to consider the impact of differences between future and historical periods in estimating future capital maintenance needs, with particular regard to historical investment cycles and the requirements of large or unusual assets; the structure of this analysis is not well defined, and yet is critical if future service problems are to be averted*”.

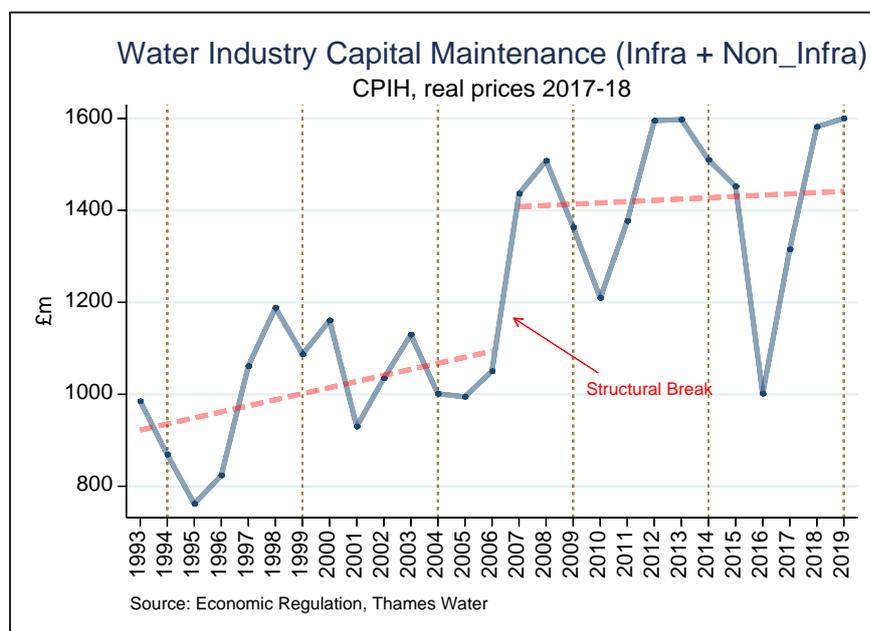
For context, the chart on the left shows the historical levels of investments over a period of 80 years on capital expenditure, while the one on the right shows the capital maintenance levels (dark blue) from 1981 to 2015. These charts suggest some potential cyclical patterns at the industry level.



⁵⁰ UK Water Industry Research (UKWIR, 2003) Capital Maintenance Planning: Implications for Maintenance of in the asset base.

The chart below shows the levels of capital maintenance in the water industry only since privatisation (1994-2019). This chart follows similar patterns as the one presented by Ofwat’s charts for the period 1981-2015 in the previous figures.

The chart below was constructed based on the annual returns and cost assessment data for all companies since privatisation. This is an illustration of the expenditures in the industry. In this capital maintenance time-series for the industry we have tested for cyclical patterns and structural breaks⁵¹.



By using a cyclical trend⁵², we find evidence of cyclical patterns between 1993 and 2006 with a structural break in 2007. This period is also being followed by a cyclical pattern between 2007 and 2019. Hence, the capital maintenance figure follow a cyclical pattern at the industry level similar to the capex expenditure presented since the 1920’s.

The cyclical hypothesis should be tested empirically using a long time series at the industry level as the one constructed since the 1920’s. It would be really important as a step-forward in our understanding of capital maintenance if we can test empirically for a longer time-series with potential structural breaks along the way. We think that Ofwat could use the historical information

⁵¹ By running a structural test check, we have identified this in the year 2007 as it is also suggested in the chart:

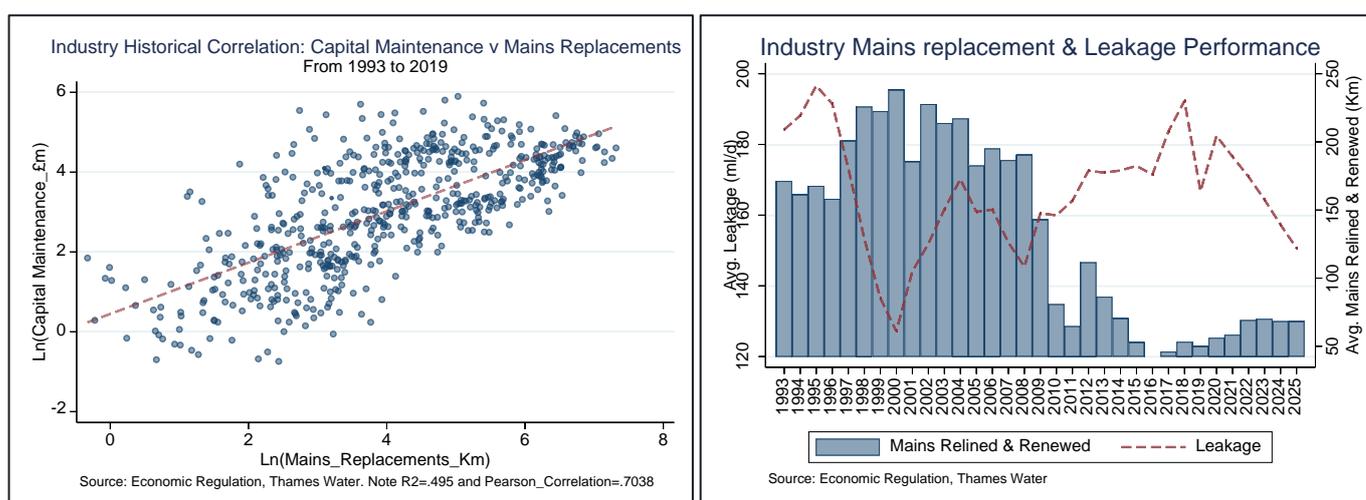
Test for a structural break: Unknown break date			Test for a structural break: Unknown break date		
	Number of obs =	27		Number of obs =	26
Full sample:	1993 -	2019	Full sample:	1994 -	2019
Trimmed sample:	1998 -	2015	Trimmed sample:	1998 -	2016
Estimated break date:	2007		Estimated break date:	2007	
Ho: No structural break			Ho: No structural break		
Test	Statistic	p-value	Test	Statistic	p-value
swald	16.7596	0.0052	swald	56.2336	0.0000
Exogenous variables: year			Exogenous variables: D1_indu_capital_mainte		
Coefficients included in test: year_cons			Coefficients included in test: D1_indu_capital_mainte_cons		

⁵² We test this by incorporating a trigonometric function on the time trend between 1993 and 2019 and found that the cyclical pattern represented by this trigonometric function was statistically significant at the 5% and 10%, for the periods 1993-2006, and 2007-2019, respectively using a cosine function.

they hold for modelling purposes either at the company or industry level. This evidence suggest that historical cyclical patterns are crucial to be modelled appropriately if we want to forecast sensible allowances for capital maintenance. A time-series modelling approach could be an alternative to this, or also a dynamic panel model.

Drivers: We have some insights on the correlation between capital maintenance and Mains replacements as one of the potential drivers explaining capital maintenance costs. We have found a high correlation for the period 1993 to 2019 of 0.7 with an R^2 of 0.49. This suggest that almost half of the capital maintenance expenditure variation historically has been explained by mains replacements. This also suggest that there is a significant scope to include or expand other drivers in the model to get a better explanation of what has been driving capital maintenance costs.

In addition to this basic empirical relationship (e.g., capital maintenance costs and mains replacements) we have illustrated this correlation in the left chart below in addition to the historical levels of mains replacements in the industry to appreciate its potential link/effect on the levels of leakage, for example.



With respect to other drivers, there is some literature on econometric models on capital maintenance. In this literature there are different cost drivers that explain capital maintenance in addition to the potential effect of mains replacements. In a paper by [Mullen and Williams](#) (2004) it is highlighted the effect that maintenance and utilization rates have on capital maintenance in addition to the cost of capital proxied by the WACC⁵³. This paper also uses different econometric methodologies and proposes a structural econometric model for capital maintenance.

With respect to the two approaches of modelling at the company or industry level, we describe them with more details as follow:

A capital maintenance model using all companies: Building a historical dataset is necessary to understand patterns in the long-run that are not captured by the current short time window static panel data models that are used to forecast efficient capital allowances for the future.

We believe that there is a great opportunity for a significant and serious research on this area. At the same time, we also need to recognise that we cannot keep pretending to solve a difficult issue

⁵³ [Mullen and Williams](#) (2004). "Maintenance and repair expenditures: determinants and trade-off with new capital goods". *Journal of Economic & Business*, 483-499.

such as the forecast of efficient capital maintenance allowances with simple econometric approaches. As a minimum we need to move to a dynamic model framework if we want to have models that include forward-looking pressures.

We have other ideas on moving the modelling techniques into more sophisticated approaches. This might sound ambitious, but we think this should be the way to proceed or at least to start developing a more complex model to calculate appropriate levels of expenditures for areas such as capital maintenance. We consider that a long-term view of cost assessment is needed in general and in particular for capital maintenance. As one example on these approaches we could explore a capital maintenance *panel VAR model* that would allow us to include forward-looking pressures such as climate change (e.g., forecasts of temperatures), population growth (e.g., ONS forecasts) or ageing of the network. Using time series that provides the information of long-term scenarios in a more structural form, where all variables interact among each other, would be a convenient way to control for different scenarios in the long-run and also to control for the cyclical patterns that this type of expenditure has.

If a panel VAR model is not suitable, we could also explore a standard dynamic panel-data model to capture the different dynamics that capital maintenance expenditure presents across the industry.

This would require making some assumptions on the data to make it consistent across time and companies. But by not doing it, we will keep putting the industry at risk of underfunding in the long-run in such a critical areas like asset management and capital maintenance. We will need to assess pros and cons of this modelling and data versus keeping the current simplistic approach we have been using in the last 30 years.

A capital maintenance model for the whole industry: An alternative modelling view, would be more at the Industry level. Given the historical evidence and data that Ofwat seem to have with respect to capital maintenance (e.g., capital expenditure since 1920's or 1980's) it would be very valuable to estimate an econometric time-series model to forecast the capital expenditure of the industry as a whole. Therefore, if we can use the historical data that Ofwat seem to hold it could be a great step forward in building better information and evidence in this area. This information could also be useful for modelling purposes and control on the efficient levels of capital maintenance at the industry level.

This could help Ofwat and the Industry to have better information of what an efficient level of expenditure could look like. In this way, we will be able to use more historical data/observations that captures the different time-patterns observed across time (e.g., cycles). In addition, we could also incorporate time-series of weather or population to combine with capital maintenance. In this form we would be able to add dynamic patterns and forward-looking pressures.

The gap between the industry model forecast and what is currently estimated by the botex models could be used as an assessment indicator of the current allowances. For example, if the actual approach is under/over financing the allowances for capital maintenance, this could be calculated as the difference between an industry model and the current modelling approach used at PR19 for capital maintenance. If there is a significant gap then this will be an indicator for necessary extra adjustments.

Data Issues: With respect to *data* and consistency across time for capital maintenance in the industry, we recognise that there might be different challenges. To make the data consistent as possible we have identified the following potential adjustment.

Adjustment: No retrospective application of changes in estimates (capitalisation rates for overheads, manhole covers etc) or minor policy changes (leak detection). To apply accurately we would need data we currently do not hold. These should not be overly material, and changes may have resulted in opex going up as well as down – note in recent years most changes have resulted in higher capex vs opex.

A crude adjustment could be made for the change from UK GAAP to IFRS. When we converted, we restated Thames figures for the prior year comparison (for statutory accounts only - not the regulatory accounts). Therefore, we could potentially use this to calculate a crude % adjustment between opex and capex. The issue is that there is only one years' worth of data. Comparing to other companies may give some comfort although naturally there will be differences based on mix of activity and policies.

On comparing companies, the only adjustment which we could do is for those under UK GAAP (we do not believe there are many left) – adjust the figures by the blended rate change that others have seen from a conversation to IFRS. We would have to acknowledge that each will have their own unique local estimates and policies which would create differences across the sector.

As an example, we have used data from 2014/15 and 2015/16 accounts. The table below shows the basic calculation using the data from the operating expense note. The 2014/15 operating cost is 11% higher under IFRS then it was under UK GAAP.

Difference in operating expenses between UK GAAP and IFRS

Values per 2014/15	Restated	Original
Total operating expenses	1,398.0	1,348.8
Less: depreciation	-477.3	-522.2
Adjusted operating expenses	920.7	826.6
% increase in opex under IFRS	11%	

Source: Thames Water

- e. **New Models:** We think that there is some work to do in developing a wholesale wastewater model to bring consistency across water and waste.
 - By omitting a wholesale wastewater model, we are not only incurring inconsistencies between the models used in water and waste, but also, we could bring some triangulation bias by omitting this type of model.
 - Moreover, we also believe that there is an opportunity to check for consistency by exploring multiproduct models (e.g., water and waste) to check for the effects of economies of scope that are being missed, at the moment, from the general approach. Multiproduct firms (e.g., wastewater companies) are also very important to understand from the regulatory and efficiency point of view in natural monopolies. We should start thinking of this kind of model as well for future price reviews.

Q10.2: In what areas (both historical water sector and external) can we improve the range of benchmarks we use in cost assessment?

Historical Benchmark

As we described in question 10.1, we believe that there are several ways to keep improving the models. In particular:

- *Enhancements models* where data allows for feasibility of more objective and accurate econometric approaches such as dynamic panel models and others.
- A potential *capital maintenance* model based on time series would be more informative and adequate for modelling purposes. This could bring opportunities to control properly for the lumpiness of this type of expenditures and to insert forward-looking pressures of the long term such as climate change, net zero, population growth among others. This will depend on the process of gathering data correctly and using the historical data in the most beneficial way. The treatment of this data should be a balance between the benefits as mentioned before and the cons on excluding this information because of accounting issues.
- *Quality or the cost-service link*. If we cannot put the quality variables in the models, we could explore a benchmark analysis separately that set up efficiency levels for Performance Commitments (PC) for each company. As an alternative, separate cost functions for each PC would be also beneficial if the data can be collected for the most material cases.

External Benchmarks

We feel that the use of external markets could be useful at some stage. However, the practicality part could be a challenge for different reasons, and this might represent a considerable opportunity cost of not focusing on other priority areas.

If we want to put into practice this approach, firstly, we will need to make sure that we are comparing like-to-like as a first instance. Secondly, we will also need to find an objective way to decide which areas/cost lines need to be considered for benchmarking purposes. In a nutshell, which costs are significant for comparable purposes? How to disaggregate cost lines to assure consistency across these levels? This can bring two dimensions for the assessment:

- If the benchmark is at the geographical level between regions or cities, or similar water companies in the world. However, this kind of analysis could be tricky as different companies face different regulatory regimens and incentives, making fair comparisons difficult.
- If the benchmark is brought at the industry level using other industries such as energy among others, we believe that these industries although they share similar infrastructure characteristics, might also face different regulatory incentives, or technological and innovation pace that would make the comparison challenging.

We think that in principle, the external benchmark could be a positive tool in the analysis but at the same time it can bring an opportunity cost of not dedicating the attention to more crucial issues such as capital maintenance or the cost-service link.

Q10.3: How can we take account of longer term ambitions such as delivering net zero and increasing public value in our approach to assessing costs?

In this response we have focused on net zero carbon and only referenced the additional public value benefits associated with of net zero carbon, as opposed to wider public value on its own merit.

Ofwat's approach to assessing cost should recognise the merits of investment for the long-term, including the benefits of doing so in a timely manner.

To achieve net zero the water industry will be required to take significant action to reduce harmful carbon emissions, especially those from its operations; these emissions will not be addressed by others as is the case with the decarbonisation of the electricity system. Whilst this represents a challenge, there are also significant opportunities, especially if action is taken now. Operational carbon emissions, for example, are continuous – the benefits of investment are sustainable in the long-term. The sooner we are able to invest to reduce them, the sooner customers and the environment will see the benefit. This contrasts with a long-term view of embodied emissions, where there is the risk that these emissions are simply deferred to a later date and not prevented at all.

We would like to highlight that there are many aspects of water companies' operations that need decarbonising. However, the easiest options have already been taken. This means that the industry will need to explore new solutions, alternative approaches and embrace new technology, including greater levels of innovation and collaboration than we've ever had before.

Some of the greatest opportunities are associated with more challenging operational requirements, including:

- Investing in processes which produce fewer direct emissions, these will include innovative solutions which brings new risks and costs.
- Capturing fugitive methane from our sludge processes, which can be used by ourselves or others as a fuel.
- Reducing our use of fossil fuels which will reduce local air emissions but which may require investment in new resilience solutions.
- Electrifying our vehicle fleet, which will also reduce local air and noise pollution, and may mean we setup electric vehicle charging stations for use by our own fleet as well as for public use.

These need addressing now if the industry is to be successful in fundamentally transforming the way water services are provided and realise the long-term benefits associated with this transformation. However, it must be pointed out that the cost of providing water services might increase in some instances. There's often an incremental technology cost associated with reducing our emissions, especially when this involves replacing old assets with lower carbon alternatives. When an outdated technology reaches the end of its life, a like for like replacement is often not an option since this would 'lock us in' for many years to come. Therefore, the transition to net zero will inevitably require some enhancement investment above and beyond base costs. Ofwat's cost assessment approach will need to adapt and recognise this.

We would need more details of what was being proposed, but in principle we support:

- Asking companies to identify the carbon reduction benefits resulting from base expenditure and existing enhancement programmes as part of their business plan.
- Using the outcomes framework to compensate companies if they go beyond the carbon reduction that can be delivered through base costs and existing programmes.
- Allowing additional or incremental carbon reduction costs where proposals are well evidenced and demonstrate benefits over and above purely carbon benefits alone
- Benchmarking incremental unit costs of carbon reduction to provide an efficient additional cost allowance for carbon reduction, where feasible.

- Ofwat's approach of prioritising investment to decarbonisation our own activities ahead of purchasing offsets delivered by others.

Similarly, we would emphasise the merits of distinguishing between netting-off our own emissions with investment in our own processes ahead of offsetting by purchasing or investing in actions taken by others. We would like Ofwat to support investment to net-off the sectors' own emissions, as this generates significant sustainable benefits and is an enhancement to the service we provide:

- Generating and exporting renewable electricity when we do not need it to power our sites supports decarbonisation of the national grid.
- Generating biomethane for grid injection decarbonises the gas grid, or allows it to be used as a transport fuel for the difficult to decarbonise heavy goods vehicles (HGV). Both these sectors are widely recognised as more difficult to decarbonise.

There are several netting-off activities which we could choose to undertake and that would realise long-term benefits to society and the environment. The frameworks for taking account of the carbon value have yet to be established though, so in order for them to be delivered they may also need to be incentivised by Ofwat. To drive water companies to deliver the greatest benefits for our customers and the communities we serve, Ofwat would need to support a carbon accounting and reporting framework which takes into account the carbon benefits of the following activities:

- Recovering low carbon heat from sewage effluent for use in heat networks to heat our own and other local premises.
- Recovering carbon dioxide, ammonia and other products from our processes to be reused by ourselves or others. This nets-off the emissions associated with the production of these materials via other means.
- Continuing to send our sludge to land to be used as a soil conditioner, which locks-away carbon dioxide in the soil that was captured during crop production, as well as reducing the need to produce fertiliser.

It should be recognised that there are multi-dimensional benefits of reducing our carbon emissions. We feel it is important to setup the price review in such a way as to incentivise solutions which reduce carbon, and to recognise that these have wider societal and environmental benefit, but may not have a return within AMP, ie are not the lowest Totex.

If the price review took account of the enduring carbon cost/benefit of a solution, this would help incentivise long term investment in low carbon solutions.

In conclusion, Ofwat needs to tailor its cost assessment approach to the long-term nature of net zero investments. In particular, we are supportive of a bespoke approach that would ensure:

- Companies' spend to achieve net zero is assessed separately from the rest of the business plan.
- Net zero investments are considered on a totex basis and with respect to whole life cost, to ensure a proper consideration of any capex-opex trade-off that is often associated with the long-term nature of these investments.

- Using a benchmarking approach (or any other assessment approach) that takes full account of the cost of carbon, to ensure the wider benefits to society and the environment are properly accounted for.

In addition, where companies have made commitments such as net zero operational carbon by 2030, companies should be able to use the outcomes framework to lock-in those ambitions to their business plans, especially where those align with longer term government targets.

Ofwat should recognise that companies are responding to the climate emergency, attempting to expand their operational decarbonisation plans, and that this will result in enhanced levels of expenditure in the short-term.

In addition, companies face numerous headwinds to plans to reduce carbon, such as:

- Improving water quality using higher energy and chemically intense processes.
- Treatment techniques required to deliver the WINEP programme.
- Additional process capacity required to meet population growth.
- Scarce water resources requiring use of energy intensive alternatives such as water reuse or desalination.

Incentivise Reductions to Capital Carbon

Ofwat should consider the need for flexibility to deliver solutions through alternate routes that still provide end benefit to customers e.g. local effluent heat recovery solutions and SuDS, where we might fund the work, but it is delivered through Local Authorities. These are also examples of where wider benefits accrue around energy reduction, avoidance/delay in new capital schemes with embodied carbon.

Q10.4: Do we need to amend our cost assessment approach to take account of nature based solutions?

We recognise that nature-based solutions can offer better customer value than conventional solutions in certain circumstances and we have successfully used this approach for many years for drinking water protection.

There are, however, circumstances where nature-based solutions do not appear efficient when compared to conventional solutions under Ofwat's historic cost-assessment approaches. Partly this is because nature-based solutions are not always suitable when addressing the issue in question, partly because the scope for employing nature-based solutions is not sufficient to achieve the outcome desired, without using conventional solutions as well, and partly because the enhancement cost-assessment framework is single parameter focussed.

While the first two points cannot be addressed through a change to the cost-assessment approach, the latter issue of single parameter based assessment could be adjusted to recognise the additional wider value that nature-based solutions can deliver, such as biodiversity gains, flood risk reduction, carbon sequestration etc (albeit noting that changing to a wider value approach may also justify more composite solutions combining nature-based and conventional approaches). Nature based solutions are more likely to be assessed favourably if the full societal value they offer is considered, rather than a single benefit parameter (e.g. phosphorus reduction).

One option to address this would be to undertake a deep dive on nature-based solutions to test in detail whether company proposals are cost-beneficial and cost-efficient, however given the direction for companies to significantly expand the utilisation of this approach, this may require considerable additional resource to assess all companies' proposals.

Another option would be to determine/set what efficient costs are for the single parameter in question, potentially in terms of £/kg of pollutant removed/avoided for various levels of reduction targets (recognising that incremental costs per kg of pollutant removed increase proportionally to the scale of reduction required) and enable a "top up" of additional allowance for additional natural capital/societal outcomes delivered. Potentially this top up could be provided through an ODI, ideally common to all companies and based on standard values, such as those listed in Defra's ENCA (Enabling a Natural Capital Approach) guidance.

It would also be advantageous to ensure that environmental costs are also considered when considering efficient costs of measures proposed. Some end of pipe solutions are carbon and/or chemical intensive, for example, and these societal disbenefits/costs are currently not exposed using conventional cost-assessment approaches. Nature based solutions often do not have material disbenefits and could appear relatively inefficient without considering wider costs.

The cost-assessment approach may also have to consider certainty. Nature-based solutions do not often offer the level of certainty that conventional solutions can achieve in terms of scale and timing of outcome achieved. It would be helpful if costs are assessed consistently between types of solutions, for example, through specifying a P50 forecast of benefits and requiring whole-life benefits and costs to be determined.

In combination, these suggestions would yield a comparable net present value per unit of environmental outcome, which would enable a true assessment of efficient costs to be determined.

Additionally, it would be helpful if benefits/outcomes are forecast using a consistent methodology between companies (e.g. using Defra's Farmscoper model for certain nature-based solutions) to ensure nature-based solutions are assessed fairly, however this approach would only work at a programme level as local circumstances may mean that a given scheme delivers greater or fewer benefits than the model assumes.

While not directly related to cost assessment, we would also like to note that most nature-based solutions are opex orientated and therefore will need specific allowance within future botex models for ongoing maintenance, and consideration of the totex assumptions about the notional assumed split between opex and capex if there is to be a material shift from capex to opex solutions.

Companies that do not own the land where nature-based solutions may also be at a disadvantage compared to companies that have large landholdings, as the investment cannot add direct value to those companies' portfolios.

Q10.5: Where can we enhance our evidence base on the relationship between costs and service?

As previously mentioned in our response to question 10.1, we believe that the link between cost and service quality is a fundamental one. Quality of service is an economic output dimension of the production process of water and waste companies. Each part of the value chain reflects a quality dimension in multiple forms. The current PR19 approach of excluding this driver will be limited in time, as companies will face more pressures in the long term. Besides some obvious reasons of the importance of quality, there are some severe technical econometric implications of excluding these drivers from the models (e.g., with the unknown effects of being excluded and

its endogeneity – for example omitted variables)⁵⁴. Cost assessment needs to reflect this either within or outside the models if we want to construct robust models for the long-term. Our suggestions for these two visions of treating service and its link with cost are the following:

- **Within Models:** In practical terms, we see two alternatives of how quality can be treated in econometric models:
 1. **Output Quality Adjustment:** This will require the adjustment of the output/scale driver in any particular botex model (as an example, if the output is water delivered, the correct adjusted method should take $\text{Efficient Water Delivered} = \text{Water Delivered} - \text{Leakage}$. We will need to take similar approaches for each part of the value chain).
 2. **Quality is multidimensional** across companies⁵⁵ and between the different parts of the value chain. Moreover, this multidimensionality can be seen within each part of the value chain (for instance, we could construct an index for each part of the value chain using principal components analysis (PCA) to reduce the dimensionality of quality that could help to avoid econometric issues):
 - a. Water
 - Resources: rivers, boreholes, aquifer (ground v surface water).
 - Treatment: Complexity of treatment works 4-6, Mean Zonal Compliance, appearance, taste, hardness, lead (e.g., water customer complaints).
 - Distribution: Leakage, pressure, loss of supply, burst.
 - b. Waste
 - Collection: blockages, burst, collapses, overflows
 - Treatment: bathing waters, odour, load treatment in bands 1-3, load with NH3.
 - Bioresources: disposal land restauration.
- As a good practice example in an econometric environment, we recommend the academic article [Destandau and Garcia \(2014\)](#) “Service quality, scale economies and ownership: an econometric analysis of water supply costs”. *Journal of Regulatory Economics*, 46:152–182.

⁵⁴ If excluded from the models the quality drivers the econometric implications could be severe. Ofwat will need to balance the cost of excluding service quality drivers in the model versus adding them otherwise as stated by [Destandau and Garcia \(2014\)](#) “*Issues related to service quality are crucial for water utility management and regulation. Omitting these aspects, especially when they are treated as exogenous, can lead to large biases in estimating cost functions as well as to misleading information concerning technology*”.

⁵⁵ We could start by taking the 15 PC as an initial point of departure in the common dimensions of quality across the industry.

- **Outside Models:** we see another two potential approaches on how to deal with services and costs:
 1. **Quality Cost Functions:** Separate cost functions to assess quality for the different types of quality dimensions (e.g., PCs) could be used. Information on separate type of costs on leakage, supply interruptions etc, would need to be collected and used to benchmark what should be the efficient costs to spend on leakage, etc, while controlling for potential cost drivers affecting each of the most material PCs and reflecting any regional differences.
 2. **PC benchmark:** To establish a benchmark level for each company, we could explore empirical models that explain the efficiency level for the most material PCs. In this way we could provide a baseline that could guide the allowances. This could also be expanded to some Environmental PCs to incorporate in the CA framework.

Retail Benchmark: We also think that there might be an opportunity to understand costs and quality links related to retail services. We could explore unit cost models to understand cost per call, cost per complaint amongst others so that we can benchmark across utilities. This could allow the modelling of trends and potential scenarios. The link between cost and quality should also be considered in the cost models to reflect the efforts of companies in providing quality service to customers.

Q10.6: What mechanisms should we consider for the efficient funding of performance levels, set in a long-term context, that vary from those an efficient company would deliver through its base allowance?

Base allowances essentially allow a company to continue to maintain the capability of its existing activities without significant enhancement in scale, capacity or quality. An efficient company would be expected to make some improvements through efficiency and innovation and this is reflected in the efficiency factor used in cost assessment to reduce cost allowances.

Significant changes in scale, capacity or quality should be provided through enhancement allowances assessed either via enhancement models (which could be improved from PR19) or deep dives, recognising that the scale variables in the econometric modelling of base allowances will provide for some enhancement.

An alternative approach would be to set PC levels at current upper quartile levels (reflecting any regional factors) and allow incentive payments to recovery the marginal costs and thereby fund improvements delivered.

Q10.7 – Is there more that we need to do to reflect future pressure on operational resilience in our approach to cost assessment?

We think that this is the case with capital maintenance. As stated in our answer to question 10.1, there is an opportunity to start improving our data and long-run modelling approach in this area. This will be an essential cost in the long term, and we need, as an industry to tackle this from now, for example, by gathering the right data for future modelling purposes.

In this context and using capital maintenance as an example, we strongly support an increased focus on operational resilience from Ofwat. There is little to no maturity in the structures that would be needed to cost assess resilience through comparative regulation of the industry:

- Definitions that allow the consistent reporting of resilience expenditure.
- Common processes, best practice guidance or similar on the assessment of resilience.
- Common metrics that allow for the consistent reporting of resilience.

Putting this in place in the next 30 months would be very challenging. Using PR24 for the grounding and development of such standards/metrics for use at future price reviews and avoid the need to back-cast data would be a sensible approach.

The processes created under WS-SRP (Water Supply – System Resilience Programme or Resilience Conditional Allowance) this AMP have made good progress in this area and we would support building upon them for the future and across-industry. The approach to cost assessment must be embedded in a systems approach and particularly focus on asset criticality.

In this way resilience has perhaps a broader view than previously considered. Critical assets within systems are open to failure and regardless of cause, external hazard or asset failure, outage of these assets cannot be managed operationally without impacting service to customers. In fact, often the most critical assets can be the hardest to maintain as even planned outages of these assets can be impossible or of insufficient duration to do all the work required.

If comparative regulation or benchmark in the area of resilience is not practical at PR24 then 'deep-dive' reviews of individual company plans where investment is material is required. The six tests⁵⁶ Ofwat applied in deep-dives during PR19 appear to be necessary and sufficient tests to assess the appropriateness of any claim. A useful addition to this process would be guidance or best practice examples, particularly to provide insight around the level of evidence required.

Q10.8: Are the most significant challenges to the operational resilience of the sector adequately captured within current strategic planning frameworks?

The current strategic planning frameworks are focussed on specific issues, for example the WRMP is focussed on drought resilience, and so there is a need for a long-term focus on operational resilience as a whole to be captured through the price control process, recognising that some aspects of resilience are dealt with through other processes.

Q10.9: How can we strengthen incentives for long-term operational resilience and improve the assessment of resilience enhancement expenditure while continuing to protect customers' interests?

Enhancement assessment

There is little to no maturity in the structures that would be needed to assess resilience through comparative regulation of the industry:

- Definitions that allow the consistent reporting of resilience expenditure.
- Common processes, best practice guidance or similar on the assessment of resilience.
- Common metrics that allow for the consistent reporting of resilience.

To apply comparative regulation for resilience at PR24 these structures would need to be developed, back-cast (to extend data sets to usable timeframes) and assessed for consistency

⁵⁶ Need for investment, need for cost allowance, management control, best option for customers, robust and efficient costs and customer protection. From Section 2.1 of Appendix 12 to PR19 methodology document.

within the next 30 months. This initially seems like a very challenging schedule and an alternative of doing this development work now to enable it to be used in the subsequent price review (PR29), which would avoid back-casting data, should be considered for comparison of risks and benefits.

If comparative regulation in the area of resilience is not practical at PR24 then 'deep-dive' reviews of individual company plans, where investment is material is required. The six tests⁵⁷ Ofwat applied in the deep-dives during PR19 appear to be necessary and sufficient tests to assess the appropriateness of any claim. A useful addition to this process would be guidance or best practice examples, particularly to provide insight around the level of evidence required, covering impacts of:

- Cost – evidence, should be commensurate with the cost to customers. Investment adding 10p to bills would, all other things being equal, need a lower standard of evidence to justify its allowance than investment adding £10 to bills.
- Benefit/risk – the scale of net benefit or risk offset, if this is robustly assessed as being very high then such a case, all other things being equal, would need a lower standard of evidence than a case with low net benefit or risk offset.
- Availability of evidence – a case that demonstrates all practical efforts to gather evidence and thoroughly examines that evidence is an appropriate starting requirement. But where that data is not available it may be appropriate to consider lowering the bar for the required standard if the evidence that does exist supports the case. Example: data on the impact of soil conditions on asset deterioration relative to the industry is necessary to evidence a case. Practical efforts to collect this data through projects like the UKWIR National Mains Failure Database have been made in the past but the data collected is incomplete. There may be good reasons for these data gaps. For companies where soil conditions are either predominantly benign or relatively uniform it may be inefficient to collect and store such data and therefore it is not available to share with the industry when requested.

Following this approach, cases which have low cost, high benefit and a thorough examination of the limited evidence which is practically available might only require proof on the balance of evidence i.e. 50.1% or greater certainty. Whereas cases with high costs, low net benefit and readily available evidence might require proof up to the level of beyond a reasonable doubt, i.e. greater than 99% certainty.

Incentives

Until a robust common baseline of resilience assessment exists for the industry it may be difficult to create direct incentive mechanisms which fairly reward/penalise companies. This still leaves the possibility for subjective assessments or reputational and process incentives.

In a similar manner (or under the umbrella of) the work already initiated by Ofwat for the Asset Management Maturity Assessment an assessment of companies' capabilities for planning and delivering resilience of service could be made. Perhaps this could be done by an independent third party such as the IAM or a panel of former NIC commissioners. The real benefit of such an assessment would be, if agreeable, the sharing of best practice from any reporting on the process.

⁵⁷ Need for investment, need for cost allowance, management control, best option for customers, robust and efficient costs and customer protection. From Section 2.1 of Appendix 12 to PR19 methodology document.

The results of assessment could also be reported on the Discover Water website for a reputational incentive. If there was sufficient confidence in the robustness of a subjective assessment, then Ofwat could consider a financial incentive mechanism. Further a procedural incentive such as scheduling the best performing companies to have their resilience cases assessed by Ofwat as a priority at PR24 allowing more time for those best performing companies to act on feedback and whilst the worst performing companies get less time to action feedback from Ofwat they do get more time to improve the quality of their initial submission by applying best practice revealed through the assessment.

The requirement at PR19 for companies to prepare Resilience Action Plans (RAP) should be retained. Lessons learnt from PR19 should be used to refine guidance for these including demonstrating ownership of the RAP through the structure of the company. We could also consider how to better integrate RAPs with existing resilience planning frameworks such as the WRMP and Drought Plan and their associated guidance.

It is also worth noting that post-hoc resilience incentives already naturally exist through normal performance ODIs. Failures of system resilience to cope with an extant hazard will result in severe failures against performance metrics such as interruptions to supply or flooding. The scale of this incentive may be limited where caps exist on ODIs and perhaps should be offset where the hazard exceeds current or efficient design standards for the system resilience. It would clearly be more preferable if these incentives were not reliant on the chance of extreme hazards being realised and much more so that customers were not subject to service failures. So a continued effort to design proactive incentives which promote efficient investment to prevent these failures is definitely warranted and it is also worth considering the interaction of new incentives with existing ones in the design of any package.

Customer research

It is important that customer research to determine support for resilience plans is not single issue or topic specific but is part of a programme of research whereby:

- Valuations are derived from initial anchor values which allow customers to trade-off a full range⁵⁸ of performance and bills.
- trade-offs outside the water bill are considered, i.e. a household budget study to assess affordability and customer preference in context of other goods and services. This may need involvement with other industries rail, gas, electricity, telecoms, etc.
- Valuations are informed by as much appropriate research as possible including; industry wide surveys, call centre contact volumes and satisfaction scores, revealed preference studies, etc.
- A contingent valuation exercise, gamification study or similar is again performed at a bill-payer (or higher i.e. household budget) level to capture support for final plans and elements thereof such as resilience.

Cross-learning between companies, CCW, other utilities, market research agencies, etc. for best practice on engagement approaches and language usage is important to accurately capture preferences in customer and stakeholder research.

Customer protection

⁵⁸ Prioritised against limits for cognitive capacity for each individual respondent.

The development of the ODI mechanism at PR14 is an important component of customer protection that should be kept. Insight from previous applications of ODIs should be applied to help design ODIs such that incentives are well aligned between customers and the company and that performance being incentivised is targeted at what is within management control⁵⁹.

If no standard metrics for resilience are sufficiently mature to apply in ODIs across the industry, then bespoke ODIs should be used. The hierarchy of types of bespoke metrics in descending order of quality for providing customer protection:

- A metric that is robustly and directly measuring resilience – for example a validated model using robust valuations that shows a financial value of resilience delivered by investment.
- A metric that indirectly measures resilience – for example number of customers living in single feed zones.
- An output-based metric – for example has the agreed scope of each project in the investment plan been delivered to the planned schedule.

11. Risk and return

Q11.1: Are there areas of our risk allocation framework where mechanisms could be added, simplified or removed in a way which would benefit customers?

We consider the overall balance of risk allocation between companies and customers under the PR19 regime could be improved. We identify areas for modification in response to the specific questions relating to the cost of equity and financial resilience. We agree with the key principle that risks should be best allocated according to the extent to which companies can manage, or control, risks.

We have found it particularly helpful for the PR19 reconciliation models to be published shortly after the publication of the FD and be used for FY21 regulatory reporting purposes, as this promotes consistency, transparency and understandability of (often highly complex) areas.

We would support the removal or simplification of reconciliation mechanisms whereby the complexity, administrative burden and risk of error outweigh the value that the mechanism adds to companies and customers. At this early stage of AMP7, we do not have any suggestions for change. We would suggest that a key consideration is that such removal or simplification would not lead to a materially different balance of risk and reward but, if it were to, Ofwat should factor this into the allowed rate of return.

Q11.2: How should we improve our use of RoRE risk ranges to provide insights into the balance of risk and reward, and improve comparability across companies?

We encourage Ofwat to explore options to improve the insight and useability of RoRE. Our experience from AMP6 was that our investors, both equity and debt, as well as rating agencies tended to use their existing, established measures and tools for evaluating risk versus reward when assessing existing or prospective investments in Thames Water. As a high-level summary:

⁵⁹ Performance outside of management control should not necessarily be excluded, but the balance of risk for performance outside of management control across an entire package of ODIs at price control level should be assessed to ensure there is no systematic biases in the balance or else the impact of this should be considered when assessing overall risk and WACC.

- Our equity investors tend to rely on equity valuation and yield – both based on cashflows to equity and RCV growth – as the key measures. They use various micro- and macro-level sensitivities to stress test the base case and establish the degree of risk and reward against those measures. Sensitivities include in-AMP totex over/underspend, ODI and CMex rewards/penalties, cost of new debt, inflation and base interest rates; however, as equity valuation is generally more sensitive to longer-term assumptions (i.e. post-current AMP), investors place a high degree of focus on these.
- Our debt investors and rating agencies focus mainly on the current AMP and use a range of gearing- and cashflow-based measures, particularly those linked to our WBS covenants, to assess risk and reward. They tend to focus on downside sensitivities to understand the impact on those measures.

As a company, in recent years we adopted RoRE as a key measure for determining long-term incentives for senior management. As a commitment to using RoRE longer term, we are currently embedding this measure further down in the management structure and in the business planning process to ensure greater alignment between our decision-making and the RoRE outcome.

We believe RoRE has further potential to add value for companies and investors and see benefits in greater consistency and comparability between companies and between price reviews. We have had some experience of seeing Monte Carlo methods being used to assess variability of returns, including between price review periods, and welcome Ofwat exploring this further as the degree of relative risk between price review periods did not appear to create much focus during the PR19 analysis of the allowed return on equity.

We encourage Ofwat to consider and provide guidance around:

- Whether RoRE should primarily be a tool for assessing value creation or level of risk, recognising it is difficult for a single-measure to be an all-encompassing tool; if the latter, whether RORE should also include other risk drivers to revenues such as the Revenue Forecasting Incentive.
- Whether RoRE should primarily be a tool for helping Ofwat assess risk and reward, and set parameters such as the allowed rate of return, for decision-making at a price review or for helping the industry make decisions during an AMP; if the latter, how Ofwat would ideally see RoRE being used more rigorously for decision-making by the industry through the AMP.
- If RoRE should continue to be accruals-based or become more cash-based, noting that debt investors and rating agencies tend to focus on the latter to assess risk. For example, a revenue-based ODI penalty would be captured in year T under RoRE, but only in year T+2 under our covenant PMICRs and other cashflow-based metrics employed by ratings agencies.
- Depending on the above, whether RoRE can be simplified to make it easier to explain to our external stakeholders and allow it to be used more widely.
- Whether issuing more prescriptive, parameter-based guidance around a common set of scenarios for use at PR24 to help companies and investors assess downside (and upside) risk. For example, Ofwat could set out common downside scenarios involving weather, economic growth and population growth, with associated assumptions, to help companies assess potential impacts on totex and ODIs and, importantly, financeability and financial resilience. Ideally assumptions or at least guidance could be issued around co-variability to make these risk scenarios more applicable for the real world (for example, an extreme weather scenario would likely impact certain Performance Commitments but not others).

Companies could also augment these scenarios with bespoke ones which they consider to be relevant and material to the price review, and would need to provide transparency around these. This could provide more meaningful outputs than notional P10/P90 scenarios, which we have found to be more subjective, less comparable and represent a theoretical risk.

- If some measure of variance in RORE should also be included to assess relative risk between companies (especially in the context of the risk scenarios above) and between Price Review periods.

Q11.3: Should we index the allowed return on equity, and if so, how ought this to be implemented?

We do not see a strong need to index the allowed return on equity. We consider that our equity investors accept the existing risk of movements in underlying rates over an AMP as part of their 'in the round' assessment of the risk of their investment in UK water. Unlike new debt, equity is not raised or marked-to-market on a regular basis at the prevailing base rates such that indexation of equity would not provide a useful hedge (as, for example, the indexation for new debt does). As mentioned in our response to Q4.7, stable, predictable cashflows are a key characteristic that makes regulated investments attractive to long-term infrastructure investors (both equity and debt) such as ours, and the stability of a fixed allowed return on equity over an AMP is more conducive to this.

If there were to be a strong desire in implementing indexation, we would encourage Ofwat to avoid adopting measures which increase year-to-year volatility, particularly as unlisted equity investors' hurdle rates tend to smooth out short-term market fluctuations. Ways to avoid such volatility could include: an end-of-AMP true-up; a cap and collar to limit large changes; and deadbands to ignore de minimis fluctuations. In any case, it would be reasonable to sense-check that the impact of any indexation measure does not perversely increase the volatility of returns, otherwise an adjustment to the allowed return on equity may be required to compensate investors for the additional risk.

More generally, we consider that the principle that the allowed return on equity should be commensurate with the risk faced by an efficient company over 2025-30 should appropriately accommodate the relative scale, complexity, risk profile and construction period of a company's proposed capital investment programme. This may be relevant in the context of both DPC and non-DPC projects.

For example, the decision to ringfence and carve out the Thames Tideway Tunnel-related activities and obligations from Thames Water and transfer into a special purpose vehicle was, among other things, a recognition that such activities and obligations would alter Thames Water's existing risk profile so materially to the point whereby the application of the industry-wide allowed rate of return would no longer compensate investors for the incremental risk generated by the TTT project. Whilst this is a more pronounced example, the principle we seek to highlight is that it is not unforeseeable that investment projects (such as those contemplated during PR19 and under consideration for PR24) could result in a significant distortion of Thames Water's existing risk profile due to their size, complexity, risk profile and construction period. Feedback from investors and rating agencies has indicated that our large annual capital investment programme, relative to sector average, creates additional risks to financeability, which are priced into our cost of debt.

We would therefore welcome Ofwat exploring alternatives to the standard industry-wide allowed return framework. In principle, this could be based on two approaches:

- An addition of company-specific overlays to the industry-wide allowed return to reflect the incremental and non-diversifiable risk borne by the company as a result of taking on one or more major investment projects.
- A bespoke rate of return applicable to designated major investment projects reflecting their increased complexity and risk profile. This rate need not necessarily be higher, but could be set for a period greater than 5 years to provide greater certainty to investors funding the project/s.

We note there are precedents in UK and other mature regulatory regimes whereby a different rate of return has been attached to companies with a significant investment need or to investment projects deemed to generate a particularly desirable outcome for customers and/or attract a higher risk profile:

- The CMA Final Determination acknowledges situations “where a higher cost of capital could affect the level of investment and bring benefits to customers⁶⁰” and ‘aiming up’ would be appropriate⁶¹.
- The Thames Tideway Tunnel presented a challenge due to the additional risk and complexity of the construction phase. This was dealt with by providing for a differential allowed return between the construction phase and the operational phase, with the construction phase being also being set for a period of 15 years. In RIIO -T1 Ofgem provided differential returns on equity reflecting different levels of risk - *“One of the key principles introduced as part of the RIIO approach is that the (base) allowed return for network companies should reflect their exposure to cash flow risk. This principle means that, where there are material differences in cash flow risk, the allowed return may be different across and within sectors.”*⁶² This approach was reflected in different levels of allowed return between the three electricity transmission companies (SSE, SP, NGET) and the gas transmission company (NGG) which was significantly affected by size and complexity of the different investment programmes.
- US Federal Energy Regulatory Commission providing additional returns for electricity transmission capex since mid-2000’s to accelerate replacement of ageing infrastructure and increase of capacity and resilience, amongst other objectives⁶³.
- Ofgem, in March 2021, announced BT Openreach could access a more favourable pricing regime for its fastest services for a further 10 years in recognition of the need to incentivise rapid investment⁶⁴.

We consider that equity investors seeking stability and predictability of returns would place greater value on an allowed return on equity which has greater recognition of the non-diversifiable risk of a company’s capital programme than of movements in underlying market rates.

⁶⁰ Competition and Markets Authority, ‘Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determination - Final report’, March 2021, p. 1064

⁶¹ Refer also to Competition and Markets Authority, ‘Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determination - Final report’, March 2021, para. 9.1269

⁶² RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas, Finance supporting document, p13

⁶³ Federal Energy Regulatory Commission, “FERC Proposes Reforms to Electric Transmission Incentives Policy” press release, 19 March 2020

⁶⁴ Ofgem, “Ramping up the rollout of full-fibre broadband” press release, 18 March 2021

Q11.4: To what extent should we place weight on a) balance sheet data; and b) index data when setting the allowed return on debt?

We support the PR19 approach, in the round, in placing greatest weight on index data. Our scale and frequency of issuance means that index data is generally a meaningful and accurate proxy for the cost of our debt. We see value in using balance sheet data as a cross-check, but believe it should not form the primary basis for setting the allowed return on debt. The complex and technical nature in which debt and derivatives are accounted for under IFRS means that results may be distorted and not fairly reflect the underlying cost of debt. Placing too much reliance on balance sheet data and actual costs of debt also risks reducing the incentive for companies to issue debt as efficiently as possible.

A possible refinement to the trailing average approach used in PR19 to set the cost of embedded debt, could be to not only consider the percentage of the sector's outstanding debt but also the distribution of times when the sector's outstanding debt was issued. Towards the end of AMP7, we expect there to still be a material portion of Thames Water's outstanding debt which was issued in the mid- to late-2000s at significantly higher coupons compared to debt issued post-Global Financial Crisis and is very long dated. We also expect other companies to have similar characteristics in their debt portfolio reflecting a bona fide attempt at the time to prudently manage refinancing risk by issuing longer tenor debt. If a 15-year trailing average were to be used, this would exclude all debt issued before late 2009, assuming the observation is performed in late 2024. A 15-year trailing average may still cover a substantial portion of the sector's outstanding listed bonds, but the remaining portion is expected to have a disproportionate effect on a company's weighted average actual cost of debt. On the basis that a notional company could have debt from the pre-Global Financial Crisis era, Ofwat could consider a longer trailing average but appropriately volume weighted according to the time distribution of issuances.

Q11.5: Should we allow adjustments to the sector allowed return based on company size -and how should this be assessed?

We recognise that the discourse on this topic has tended to be centred around smaller companies in relation to constraints around illiquidity and infrequency of issuance. Over the last few years, we have observed a growing challenge affecting Thames Water as the largest issuer in the water sector and one of the largest global corporate issuers in the Sterling bond market.

Due to the size and rapid growth of our RCV, the absolute quantum of our outstanding debt and new issuance requirements has resulted in a number of our investors reaching exposure limits. As a consequence, we are increasingly reliant on diversifying our sources of funding via different currency markets that are not factored into the Sterling iBoxx indices that feed through to the cost of debt. There are also additional credit charges involved in using derivatives to hedge the currency and interest rate risk involved in these transactions.

We would therefore welcome further engagement on this issue, and recognise that diversifying access into different debt markets can be a positive factor for long-term financial resilience.

Q11.6: Should we make different assumptions for the PR24 notional structure compared to PR19, and how should such a change be implemented?

Refer also to our response to Q11.8; it is not immediately clear to us the benefits that a change to notional capital structure would bring. Using the PR19 allowed WACC as an illustration, all else being equal, a reduction to the notional gearing would increase the proportion of return on equity in the WACC calculation, but the impact of this this would be largely offset by the re-levering effect

on the equity beta, resulting in an immaterial change to the allowed WACC. We query whether this *per se* would provide a sufficient economic incentive for companies to alter their gearing.

Q11.7: Do you have any suggestions for mechanisms which could incentivise financial resilience within the price control process?

We agree that financial resilience is a highly important consideration in the price control process. We also welcome further clarity from Ofwat as to whether mechanisms to incentivise financial resilience are primarily designed to share the economic benefits of financial outperformance with customers or, as a principle, to set harder limits on capital structure freedoms such as gearing.

We consider the following comments on financial resilience by the CMA, in the context of the GOSM, to be compelling:

*“Our assessment found that there is weak evidence of a regulatory gap after considering the range of relevant regulatory tools. We acknowledge there is a risk that gearing can be too high. However, in this case, for the Disputing Companies and within the foreseeable future, we have not been presented with evidence demonstrating that either the risks or consequences of these companies experiencing financial failure are likely to be large.”*⁶⁵

We would also provide the following views:

- Customers and investor concerns should be fundamentally aligned when it comes to financial resilience; both debt and equity investors stand to suffer potentially material loss in a situation of acute financial distress and therefore have protections in their commercial arrangements with companies (such as debt agreements, shareholder agreements and SoDAs) to avoid entering into such situations.
- Our equity investors are long-term (and, in many cases, multi-decade) investors – partly due to the scarcity of high-quality investments such as UK water companies – and strong financial resilience supports the market valuation of their investments.
- Higher leverage companies are typically those which are subject to ‘whole of business securitisation’ (“WBS”) covenants, which offer tighter protections for lenders with respect to gearing, other financial metrics and a company’s permitted activities than companies with lower leverage. The financial covenants are complementary in protecting the customer interests as they act much sooner than (for example) the Special Administration mechanisms under our licence. In any case, our licence requirement to maintain an investment grade rating at TWUL places tangible limits on leverage.
- Using gearing as the primary measure for determining financial resilience risks oversimplification and potentially a distortion of conclusions. For example, a UK water company’s debt can be priced at materially different levels to peer company despite gearing levels being substantially similar, as other factors such as rating and operational performance are also key. Debt pricing is relevant as it is partially driven by the market’s view of a company’s financial resilience.
- Market-based credit ratings by Standard & Poors, Moody’s and Fitch, as well as the published analysis, are multi-dimensional and can be a useful tool for assessing riskiness and resilience alongside gearing.

⁶⁵ Competition and Markets Authority, ‘Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determination - Final report’, March 2021, para. 9.1223

Q11.8: To what extent should we further increase the share of the notional company RCV which is indexed to CPIH in our assumptions for the period 2025-30, and how should this be implemented?

The transition at PR19 to 50/50 CPIH/RPI-linked RCVs was helpful in mitigating the impact on our ability to effectively manage basis risk as it retained a material portion of the RCV and allowed returns which are linked to RPI, against which our RPI-linked debt and derivatives is hedged. However, this has created administrative complexity (and some ambiguity) in tracking the RCV and reporting associated measures, such as gearing for debt compliance purposes.

We consider that increasing the percentage indexed to CPIH would bring minimal net benefit as the administrative burden would remain. On balance, we consider a full transition to CPIH to provide the greatest net benefit, and note that this would likely create a material basis risk for companies with RPI-linked debt or derivatives until the CPIH-linked debt and derivatives market significantly matures.

A possible regulatory mechanism to mitigate this risk could be to include an ex-post wedge true-up, potentially as a midnight RCV adjustment at PR29, based on the notional capital structure. This shifts the basis risk to customers but the disadvantage of this approach is that it does not necessarily incentivise companies to issue more (and thereby encourage demand for) CPIH-linked instruments, which would be beneficial for the development of the CPIH-linked market.

To address this, instead of the wedge true-up, Ofwat could provide a specific allowance for the incremental cost of issuing CPIH-linked debt or derivatives to allow a notional company to manage the basis risk. We encourage Ofwat to continue consulting with the industry and other CPIH market stakeholders to further its understanding of the risk and potential costs. Early clarity would be considered helpful to give companies time to adapt before the implementation of any changes.

12. Next steps for PR24

Q12.1 - What are your views on the draft timetable for PR24?

We have no objections to the timeline proposed.

As set out in response to Q5.3, we consider that the timetable for the period between business plan submission and response to draft determinations should follow the two stage process and allow sufficient time for both Ofwat to assess the plans and make the assessment and companies to reflect on the IAP and draft determination. We suggest the following timeline:

- Business plan submission 2nd October 2023
- IAP and draft determinations in April 2024
- Response to IAP & DD end of August 2024

Appendix - Examining the boundary of the targeted control for water resources

Q14.1 - How can costs and incentives for the existing water resources control be targeted more effectively?

At PR19 Ofwat were unable to create a standalone water resources cost model. The water resources plus model included water treatment and was dominated by the costs and drivers of water treatment, as these costs are much larger than in water resources. However, as set out in response to Q10.1, there are further options that could be explored to create a standalone water

resources cost model. This would be beneficial as the current water resources boundary more closely reflects the area of likely water trading.

The current WRMP process requires companies to consider a wide range of factors in developing its plan for the supply of water. We consider that this process, linked with the SRO process, and combined the water trading incentive and the totex cost incentive, provide the right incentives for best value planning for water resources.

[Q14.2 - Would amending the boundary to include raw water distribution or to extend it further to include water treatment improve the operation of the control? What are the issues involved?](#)

The creation of the water resources boundary in PR19 was to enable better targeted regulation and an increased management focus on this key area of the value chain. The control was also intended to facilitate the further development of markets for new water resources.

The control was created following extensive analysis and consultation and we do not see that the reasons for creating the control has changed in the last five years.

At present we do not see the benefits from extending the water resources boundary.

Changing the boundary would require a licence change, changes to RAG definitions and reporting processes and to the RCV allocation. While these can be changed there is a cost involved in doing so. These additional costs should be considered against any benefits from changing the boundary.

In addition, the re-allocation of RCV, which was established during PR19 following a lengthy exercise to ensure an appropriate allocation between water resources and network plus, could be perceived as increasing instability and risk for the industry. This is because the RCV for water resources has a lower level of guarantee than the network plus control.