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Private & confidential
Water Services Regulation Authority
Centre City Tower
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Birmingham
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29.09.2023

Dear Director,

Report on the Analysis of risk exposure at PR24

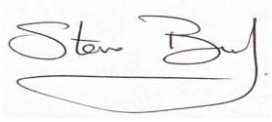
We attach a copy of the above confidential report dated [date] the ("**Final Report**") prepared by KPMG LLP ("KPMG"). The Final Report was solely prepared for Anglian Water Services Limited ("the Company").

KPMG has agreed that we may disclose the attached Final Report to you, on the basis set out in this letter, to enable you to verify that report have been commissioned by us and issued by KPMG in connection with the analysis of risk exposure at PR24, and to facilitate the discharge by you of your regulatory functions subject to the remaining paragraphs of this letter to which your attention is drawn.

KPMG's work was designed to meet our agreed requirements and the engagement activities were determined by our needs at the time. The Final Report should not be regarded as suitable to be used or relied on by any party other than us for any purpose or in any context.

In consenting to the disclosure of the Final Report to you, KPMG does not assume any responsibility to you in respect of its work for us or for the Final Report. To the fullest extent permitted by law, KPMG accepts no liability in respect of any such matters to you. If you rely on the Final Report or any part of any of them, you do so at your own risk.

Yours faithfully



Anglian Water Services Limited

KPMG

Analysis of risk exposure at PR24

Prepared for Anglian Water

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September 2023

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Important notice

This Report has been prepared for Anglian Water Services Limited (AWS) by KPMG LLP under a private contract, set out in our Engagement Letter and should be read in conjunction with the Engagement Letter.

AWS has commissioned KPMG to develop a report in relation to analysis of risk exposure for the PR24 price control. In preparing this Report we have not taken into account the interests, needs or circumstances of anyone apart from AWS even though we may have been aware that others might read this Report. We have prepared this report for the benefit of AWS alone.

The information in this Report is based upon publicly available information and reflects prevailing conditions and our views as of this date, all of which are accordingly subject to change. In preparing the Report, we have relied upon and assumed, without independent verification, the accuracy and completeness of any information available from public sources. Nothing in this Report constitutes a valuation or legal advice.

Although we endeavour to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future.

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Structure of the Report

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01

Executive summary

Executive summary

Importance of risk assessment at PR24

Striking the right balance between risk and return is important to support allocation of capital to the water sector. It is also critical for the regulator to ensure that companies can maintain long-term financial resilience and that the interests of customers are protected.

Aligning risk and return requires consideration of a range of factors: the level of risk to which the companies are exposed; the costs of obtaining and remunerating capital consistent with that level of risk, the ability of companies to access markets and the degree of financial resilience in the face of adverse shocks.

The water sector is facing a fundamentally different and increasing risk landscape at PR24 compared to previous price reviews. This is driven by an unprecedented level of required investment, heightened macroeconomic volatility, a more negatively skewed and stretching regulatory incentive package and challenges associated with asset resilience, net zero, population growth and climate change. Parallel to the increasing risks, there is a growing need for the sector to attract new equity capital, which will be contingent on an alignment between allowed returns and forward-looking risk exposure.

Risk analysis represents an important cross check on allowed returns and price control calibration to support financeability and financial resilience, especially in light of Ofwat's recent concerns around the financial resilience of the sector and the need to understand in the long term context the risks faced by companies, linked to the timing and scale of potential investment decisions.

A disconnect between risk analysis and returns is liable to result in a price control where risk and return are out of balance, leaving companies with investments that are not financeable, plans that are not viable and exposed to downside risks which they cannot manage. A balanced overall risk and return package is a necessary condition for the notional company to be able to finance its plan and attract both debt and equity capital at efficient rates and on a continuous basis. A substantive disconnect between the likely revenue at risk and the level of allowed returns would negatively affect the sector's ability to deliver for customers.

Commentary on and analysis of Ofwat's initial PR24 risk analysis

In the PR24 Final Methodology (FM) Ofwat has set out its proposed approach to assessment of RoRE risk at PR24, building on the approach it applied at PR19. Ofwat has recognised the importance of risk analysis, however the proposed approach it set out is contingent on a number of strong assumptions which appear to understate water companies' risk exposure, including *inter alia*:

- Ofwat's approach is based on historical performance and will not capture new risks or where risk exposure change over time (structural breaks in risk). Ofwat has predominantly relied on AMP6 performance data and has not yet included data from AMP7. The approach applied in the PR24 FM does not appropriately consider how exposure to risk might change on a forward looking basis. Ofwat does indicate that it will consider the impact of higher enhancement spend projected for AMP8 risk exposure, but PR24 FM RoRE risk ranges do not yet reflect this.
- Consistent with the approach adopted at PR19, Ofwat does not consider there should be an expectation that RoRE analysis for the notional company should include an expectation of financial penalties. This is on the basis that it expects that its Final Determinations will be set to allow companies sufficient funding to meet their obligations and commitments. As a result, the PR24 FM analysis does not reflect key regulatory mechanisms which could drive asymmetry, such as the impact of penalty-only ODIs, targets on ODIs (which might not be achievable on an expected basis), the impact of Price Control Deliverables (PCDs), as well as scope for fines and penalties.
- Ofwat's approach to risk analysis also does not include some long term risks such as for example risks relating to the cost of embedded debt, which could be outside management control due to different timing and frequency of issuance.

Overall approach and methodology for risk assessment in this Report

The risk analysis presented in this Report is based on Monte-Carlo simulations that generate probability distributions of expected performance for each risk category, informed by the standard deviations and mean returns in the sector.

This RoRE risk analysis is based on a granular analysis of past sector-wide and Anglian-specific performance—for example, actual totex performance vs allowances and actual performance vs PC targets.

Past sector and Anglian performance is used to simulate expected performance distributions over the next AMP based on Anglian's PR24 Business Plan and regulatory mechanisms. The approach assumed that AMP7 performance will persist through AMP8. This assumption may potentially understate the level of risk as potential variations in returns over AMP8 are likely to be higher than the values observed during AMP7.

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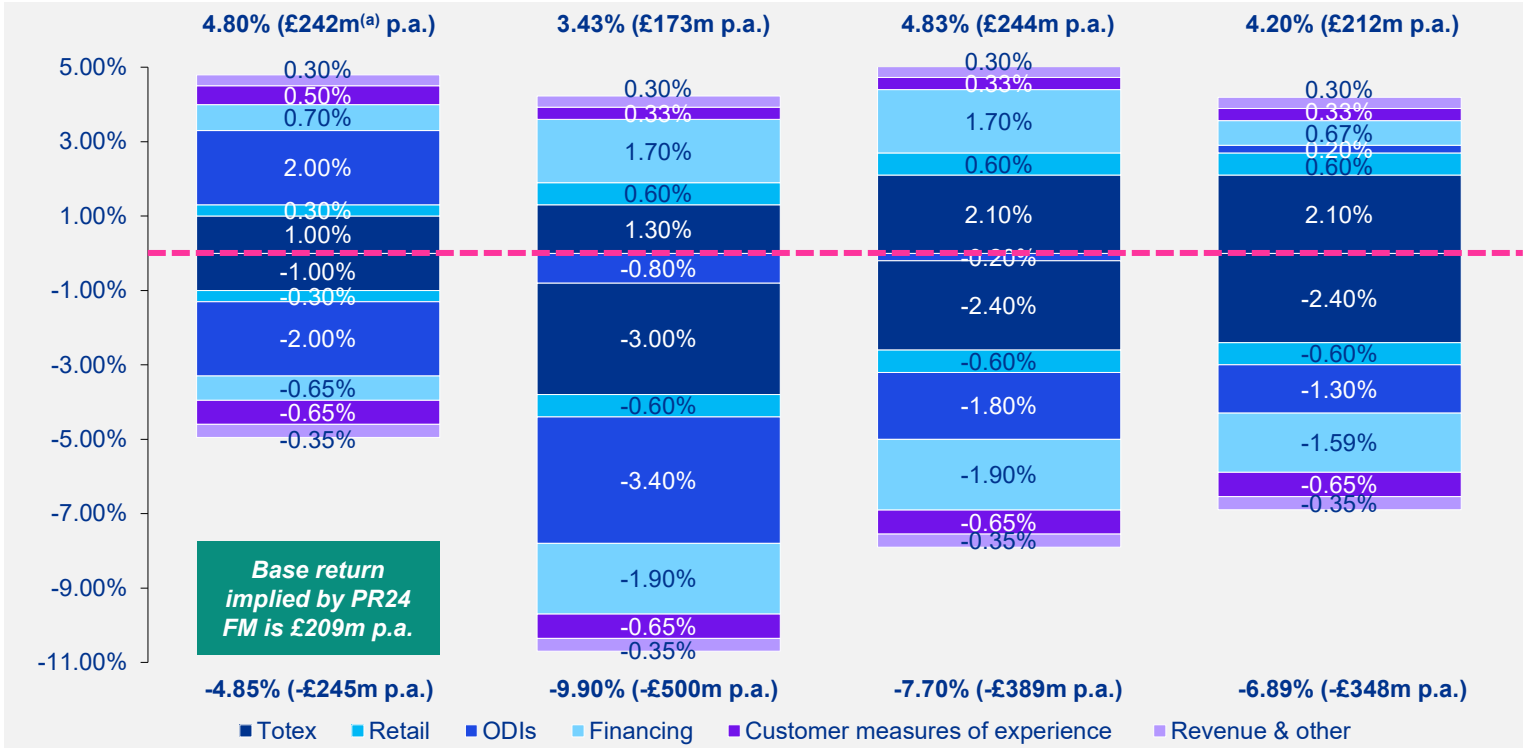
Summary of PR24 RoRE risk ranges under unmitigated and mitigated scenarios

The RoRE risk range estimated for Anglian Water at PR24 implies higher downside than Ofwat's assumed risk range set out in its PR24 FM, even after taking into account proposed mitigations.

The figure to the right first sets out the RoRE range from the PR24 FM and then RoRE risk ranges based on analysis in this Report on (1) an unmitigated basis, i.e. before taking into account risk mitigations; and (2) on a mitigated basis, taking into account mitigations included in the Anglian plan.

- Key drivers of higher downside exposure than assumed by Ofwat are totex (driven predominantly by higher potential for cost variation on enhancement relative to base, combined with the step change in the scale of the enhancement capital programme) and financing risk (as a result of the inclusion of risks relating to embedded debt as well as new debt).
- The high degree of asymmetry imply by the unmitigated range is driven by negatively skewed ODI risk package and the introduction of PCDs, which are assumed to limit scope for out-performance on totex and increase scope for under-performance as specified in the FM.
- Inclusion of mitigations significantly reduces the scale of downside exposure and negative skew for the notional firm through reducing risk at source. The risk range implies higher downside exposure and negative skew even on a post mitigation basis.
- The range for the actual company implies lower risk exposure, however price control calibration cannot assume company specific levels of performance observed for Anglian in the past persist in future.

	Ofwat PR24 FM	Assessment for Anglian – unmitigated notional	Assessment for Anglian – mitigated notional	Assessment for Anglian – mitigated actual
Mean	0.0%	-3.24%	-1.44%	-1.35%
P50[(b)]	0.0%	-2.3%	-1.1%	-0.7%



Note: (a) £m impacts are stated in FYA CPIH 2022/23 real terms
(b) Asymmetry of P50 position is estimated based on the ODI and totex RoRE range. It does not include asymmetry from financing risk exposure.

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Executive summary (cont.)

The starting point for development of notional company RoRE risk ranges is the sector's historical performance in the first three years of the AMP7 price control, as this represents the most comparable incentive framework and is more likely to inform robust simulations of future performance. The notional company's RoRE risk ranges have also been structured to capture key changes in Anglian's projected risk exposure, including:

- **Larger and more complex AMP8 enhancement programme** driven by statutory requirements;
- **More extensive use of Price Control Deliverables (PCDs)**;
- **Stretching performance targets, removal of most ODI caps and collars, penalty-only ODIs, and not allowing exclusions related to the impact of severe weather events**; and
- **Increase in the level of interest rates and heightened macroeconomic volatility affecting financing risk.**

Analysis findings

- In its PR24 FM Ofwat considered that the overall balance of risk to be broadly symmetric at -4.85% (P10) to +4.80% (P90).
- KPMG risk analysis (on unmitigated basis) indicates the notional firm's RoRE exposure of -9.90% (P10, the low case scenario) to +3.43% (P90, the high case scenario), with mean-expected risk to returns of -2.30% (P50, most likely scenario).
- The overall RoRE risk range is significantly wider and more skewed to the downside than the illustrative range presented in Ofwat's PR24 FM (Figure 1).

Figure 1. Notional company RoRE ranges (unmitigated)

	Notional company RoRE range (KPMG)	Notional company RoRE range (Ofwat PR24 FM)	Difference
Upside (P90)	3.43%	4.80%	-1.37%
Most likely (P50)	-2.30%	0.00%	-2.30
Downside (P10)	-9.90%	-4.85%	-5.05%

Key drivers of higher downside exposure are:

- **Totex** (driven predominantly by higher potential for cost variation on enhancement relative to base, combined with the step change in the scale and complexity of the enhancement capital programme);
- **Retail costs** (retail RoRE ranges reflect sector under-performance in AMP7, which on average amounted to -60 basis points in terms of return on notional equity); and
- **Financing risk** (as a result of the inclusion of risks relating to embedded debt as well as new debt).

The higher asymmetry of the range is driven by the negatively skewed ODI risk package, the introduction of PCDs, which are assumed to reduce flexibility to reinvest out-performance on enhancements and asymmetric design of the experience measures, such as C-Mex.

- **Totex ranges are asymmetric** due to introduction of PCDs and the risk that totex allowance can be clawed back when part but not all deliverables are achieved. Ofwat is proposing to apply PCDs on a larger scale than in previous frameworks. PCDs are asymmetric mechanisms and increase the downside of the totex risk. Companies would incur a penalty if programmes are delayed in delivering PCDs, but would not be rewarded in the event of early delivery.
- **The asymmetry in the ODI RoRE range** stems from the presence of penalty only ODIs such as Compliance Risk Index (CRI) and Discharge Compliance, and other ODIs where the incentive regime is becoming more punitive, including supply interruptions and pollution incidents. While the sector is benefitting from a collar on supply interruptions in AMP7, the unmitigated notional company risk analysis assumes that the collar will no longer apply in AMP8, exposing companies to potentially very significant downside from one-off but severe events. Similarly, the downside on pollution incidents is increasing because pollutions occurring due to named storms will no longer be excluded from the penalties. Per capita consumption is another area of asymmetry where companies have limited ability to influence customer behaviour, as was evidenced by sector-wide under-performance in AMP7 due to a shift in customer consumption patterns during and after Covid-19.
- **C-Mex incentive asymmetry** is driven by Ofwat's proposal to move to comparative assessment of performance based on the wider economy. Water companies will have less scope for out-performance than for under-performance.

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Executive summary (cont.)

To address asymmetric risk exposure, Anglian has followed Ofwat's guidance and developed a range of risk mitigations that target asymmetry at source. The proposed mitigations included in the company's Business Plan are as follows:

- **A set of principles for the design of PCDs.** Acceptance of these principles implies specification of PCDs on a different basis to PR24 FM and mitigates downside totex risk exposure.
- **ODI reward/penalty rates different to Ofwat's for four PCs.** Alternative rates aim to reduce the overall incentive strength.
- **Deadbands for five PCs** (CRI, Discharge Compliance, Mains Repairs, Customer Contacts, Bathing Water Quality) and enhanced thresholds for six PCs (Supply Interruptions, PCC, Leakage, Total Pollution Incidents, Internal and External Sewer Flooding). This aims to expand the upside potential and to reduce asymmetry.
- **A 0.5% cap on supply interruptions.** The aim of this mitigation is to limit the downside risk exposure and to reduce the asymmetry.

Each category of mitigations improves slightly the notional company's RoRE risk range.

On a mitigated basis, the ranges of risk exposure on RoRE for a notional company become more narrow and less skewed. However, even with mitigations, risk asymmetry remains, hence the mean-expected return is still below allowed equity return (Figure 2). This is driven by an inherent asymmetric ODI package and PCDs.

Figure 2. Notional company RoRE ranges (mitigated)

	Notional company RoRE range (KPMG)	Notional company RoRE range (Ofwat PR24 FM)	Difference
Upside (P90)	4.83%	4.80%	0.03%
Most likely (P50)	-1.10%	0.00%	-1.10%
Downside (P10)	-7.70%	-4.85%	-2.75%

The residual asymmetry could be eliminated at source by setting softer performance commitment targets or increasing wholesale and retail totex allowances. It could also be addressed by appropriately adjusting the cost of capital allowance if no other changes to the incentive package occur.

The actual company mitigated RoRE risk range is materially less skewed to the downside compared to the notional company range, This is due to the use of company specific performance data for Anglian from AMP7 applied to AMP8 expected allowances and targets. However, even the actual company RoRE range has higher downside exposure compared to Ofwat's PR24 FM range and is still downside asymmetric.

Figure 3. Actual company RoRE ranges (mitigated)

	Actual company RoRE range (KPMG)	Notional company RoRE range (Ofwat PR24 FM)	Difference
Upside (P90)	4.20%	4.80%	-0.60%
Most likely (P50)	-0.70%	0.00%	-0.70%
Downside (P10)	-6.89%	-4.85%	-1.94%

The range for the actual company implies lower risk exposure, however price control calibration cannot assume company specific levels of performance observed for Anglian in the past persist in future.

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Executive summary (cont.)

Implications of the analysis

The analysis in this Report indicates that the initial RoRE ranges presented in the PR24 FM understate risks faced by the notional company.

Anglian under a notional capital structure is exposed to a materially higher level of downside risk than assumed based in Ofwat's initial analysis in its PR24 FM. This is driven primarily by the scale of delivery risk associated with the step change in capital programme, heightened performance risks on ODIs as well as risks on financing which are omitted from the range set out in the PR24 FM.

Downside risk exposure for the notional firm is likely to be significantly higher (7.7% RoRE) post mitigations than the allowed cost of equity (4.1%) set out in the PR24 FM, all else equal. This indicates that (1) the equity buffer implied by PR24 FM allowed returns on equity is not aligned with risk exposure for the notional firm; and (2) the notional firm is not financially resilient on this basis.

The notional RoRE range is also negatively skewed with a negative P50 which reduces the likelihood of the notional company earning the base allowed return.

All else equal, this suggests that the risk premium in allowed returns would need to be adjusted to reflect:

- required compensation for expected loss in the base case (mean expected return).
- An additional risk premium investors may require due to higher value at risk (value at risk)
- the change in systematic risk exposure associated with the PR24 plan (systematic risk exposure).

The analysis in this Report suggests that the **required equity premium for risk asymmetry is at least 1.1%** and that the required **equity risk premium for increased systematic risk exposure is 0.8%.**

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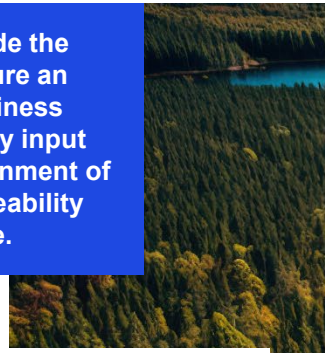
02

Context and approach

Introduction to risk analysis

Anglian Water has made the analysis of risk exposure an integral part of its Business Plan for PR24 and a key input into assessing the alignment of risk and return, financeability and financial resilience.



Objectives of risk analysis at PR24

Risk analysis plays a significant role in regulatory price determinations as it aims to measure the impact of the scope of activities in the business plan and incentive mechanism on the companies' ability to earn the allowed return and manage risk. It is a key input into the analysis of financeability and deliverability of the company's business plan, and it also provides insight into the appropriateness and robustness of cost of capital calibration given the required balance between risk and return.

Anglian Water is preparing its PR24 Business Plan submission. As part of that, it needs to assess its risk exposure over the next price control period (2025-2030). KPMG has been commissioned to prepare an assessment of the risk exposure that Anglian is likely to face during the next AMP. The objective of this assessment is to understand financial risk exposure implied by the company's Business Plan and the PR24 regulatory framework.

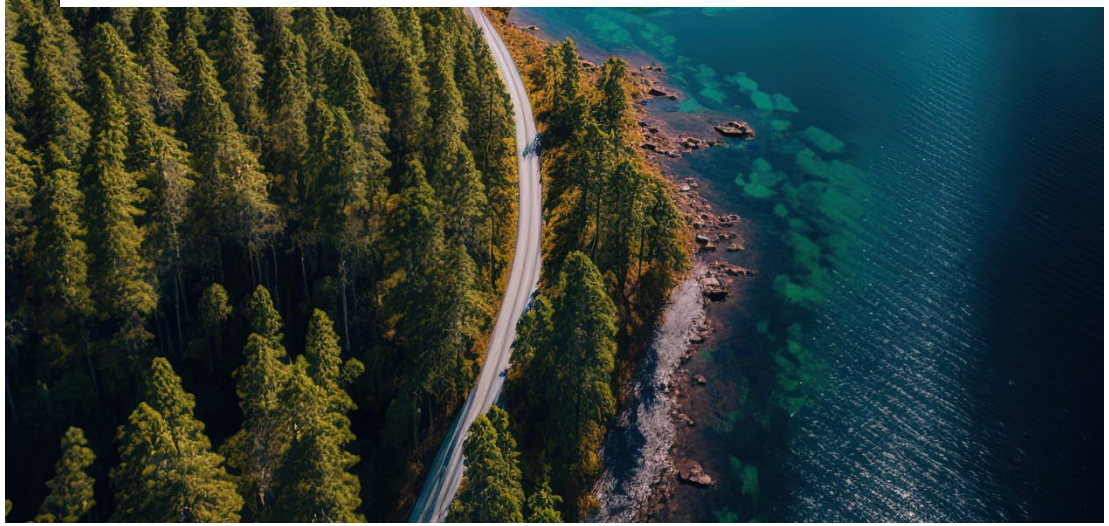
This Report assesses the risks which a notional company, defined as an average company in the sector, would face during PR24 in delivering its business plan. It also considers company specific or actual risks for Anglian. In this context, it provides analysis of and commentary on whether there is an appropriate balance between risk and return implied by the proposed PR24 incentive package.

The analysis can inform risk mitigations required for the notional company selection of a point estimate of the allowed return on equity, and business plan assessment of financeability and financial resilience.

The risk modelling and analysis presented in this Report estimates financial risks to the company arising across key risk categories including *inter alia* totex, retail costs, ODIs, measure of experience and financing.

Risk ranges are estimated by reference to the return on regulatory equity (RoRE) metric and quantified the relative materiality of risks in relation to the notional equity by calculating RoRE risk ranges which set out potential variations around the base allowed return. This framework allows assessment of the overall scale of risk to which the company is exposed relative to returns, as well as the company's ability to earn the allowed return on a mean-expected basis. It also informs the analysis of potential mitigations that would bring the risk exposure more in line with the Capital Asset Pricing Model (CAPM) principle that returns are clustered around the mean with a symmetric distribution.

The risk modelling which underpins the assessment of risk will inform the financial resilience assessment of the Anglian Water business across AMP8.



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RoRE as a tool to assess balance of risk and return

- Return on Regulated Equity or RoRE is a regulatory metric of returns to shareholders, which is used to assess the scope for out- or under-performance with respect to different operational and financial parameters.
- RoRE is used as a tool to assess financial risks companies face *relative to the allowed return on equity*.
- RoRE estimates potential returns to shareholders as a percentage of the equity funded component of Regulatory Capital Value ("RCV"):

$$\text{RoRE} = \frac{\text{EBIT – tax – (cost of debt x average net debt)}}{\text{equity component of RCV}}$$

- Ofwat estimates RoRE ranges based on the notional capital structure (i.e. gearing of 55%, consistent with the allowed cost of capital calculation).
- Ofwat considers that RoRE analysis can align customer and company interests by clearly articulating the risks companies face and the implication for equity returns.
- Projected RoRE estimates are used on a prospective basis as part of the price review process to assess whether risk and reward are in balance.

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Evolution of the risk landscape at PR24

The risk landscape is evolving at PR24, driven by step changes in capital investments, changes to the design of the regulatory framework and wider macroeconomic volatility. This slide outlines key changes in the risk landscape anticipated at PR24.

Inherent risk exposure, specifically addressing the challenges arising from statutory obligations in relation to environmental drivers, the transition to Net Zero, and asset resilience.

- The water sector is experiencing an increasing demand on services driven by population growth and climate change. There are large scale water resource schemes that represent a significant challenge for delivery through competition. The sector is also exposed to additional risks associated with supply schemes driven by the need to deliver new and untested projects.
- **Transition to Net Zero** fundamentally changes the ways how the water sector operates. The industry is exposed to uncertainties associated with appropriate technology and investment requirement to enable the transition.
- **Increasing frequency of storm overflows** represent a significant risk for water companies driven by the concerns associated with the untreated wastewater discharges and the large scale investment required to address them.

Risk exposure driven by step change increases in capital programmes at PR24.

Key risk drivers associated with PR24 capital programmes include areas where (1) scale of the investment is significantly higher (2) spend is **first of a kind (FOAK)** in nature and (3) requirements are uncertain.

FOAK risk stems from the increasing prevalence of new, untested, unfamiliar, and uncommon methods of investment. Water companies are encouraged to move to nature-based solutions which are relatively new and may require working in partnership with others (nitrogen removal, phosphorous removal).

Large-scale capital programmes can present inherent difficulties in budgeting/planning. Cost forecasts may be affected by **optimism bias**, leading to optimistic estimates that fail to capture the true costs involved. These factors contribute to increased risks of overspend and overrun.

Managing a larger portfolio of capital programmes implies **greater complexity**. This includes, coordinating multiple projects simultaneously, ensuring proper oversight of the supply chain, managing conflicts and interdependencies between projects, greater resource requirement from the organization. This complexity increases the risk of unforeseen amendments to projects and so increases the risk of costs differing from allowances.

The **complexity of Water Resources Management Plans (WRMPs)** is also increasing due to factors such as the implementation of adaptive pathways in WRMP24, the need for alignment with other plans like Drinking Water Management Plans (DWMPs) and Long-Term Development Strategies (LTDSs).

Risk exposure associated with supply chains

The step up in the investment programmes could **strain the capacity of suppliers**. There is significant concurrent investment in other infrastructure sectors, for example HS2, energy network investment. There will likely be competition for resources between water and other infrastructure projects.

There will likely be an increased requirement for specialist labour. This may result in a **shortage of skilled labour** or a need for rapid training. There may be additional challenges due to Brexit and immigration constraints.

Risk exposure which could arise from cost-service disconnect

At PR24, Performance Commitment Levels (PCLs) are expected to become more stretching. This risk is asymmetric in nature, with a **higher likelihood of under-performance** than meeting the target, especially when aiming for 100% compliance in areas such as discharge compliance.

Ofwat requires cost **efficiency improvements** at PR24. Ofwat normally uses an upper range of estimated frontier shift challenge and does not provide any risk mitigations for downside scenarios. Ofwat is expected to set more stretching catch-up challenge at PR24 compared to PR19 while the choice of challenge is not linked to cost model quality.

Ofwat is putting a **double challenge** for improving performance through cost efficiently and PCL targets, but there is **no clear link** between the two, which imposes a significant under-performance risk to the sector.

Risk exposure from macroeconomic volatility

There is a risk of **input price volatility** and pressures due to, for example, global supply chain constraints arising from Covid and Russia-Ukraine war. To the extent that input cost increases are not well proxied by the changes in the CPIH index, this could create additional pressure absent additional regulatory protections. Input price changes affect the required cost estimates. Cost categories where Real Price Effects are not provided are exposed to inflation risk. At PR19, Ofwat did not allow an energy RPE and as a consequence the water sector faced a significant cost pressures due to the increase in energy prices.

Financing implications, for example, the scale of the debt and equity capital required to fund the increase in capital programme in the context of high macroeconomic volatility, recent step change in interest rates, dividend restrictions and the implied shift from water companies being income stocks to being growth stocks.

There is a fundamental shift in the form of remuneration for investors. Water companies could be seen as becoming more like growth stocks, i.e. generate limited returns through dividends and rely on potential for generating returns through RCV growth. This means that duration of cashflows is increasing, i.e. distributions are effectively deferred to support current investment which increases the payback period for investors in the notional firm.

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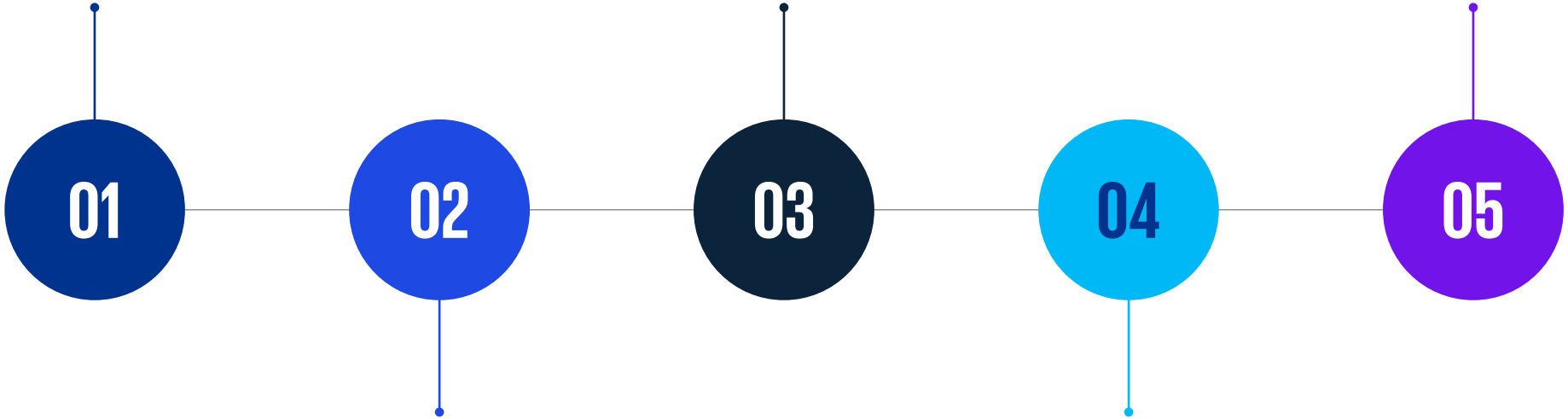
Overview of key challenges for estimation of risk exposure at PR24

Risk analysis is inherently forward-looking and past performance may not be a good proxy for future risk exposure – particularly as it is expected that a number of risk are increasing at PR24, as outlined on the previous slide.

There is limited data for simulating and assessing certain risks. Granular data on risk drivers is not typically collected as part of regulatory reporting.

A number of PR24 regulatory parameters are still unknown or subject to change at this stage of the process.



The **quantification of risks is inherently difficult** as it requires specifying multiple input assumptions.

Some of the most material risks that water companies face include non-compliance to regulatory standards, health & safety risks, inability to identify significant or catastrophic events quickly enough – which are inherently difficult to estimate.

Interlinkages between risk areas – common drivers, causation and correlation (e.g. the cost service relationship or correlation across ODIs) can also be difficult to measure.

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Specification of approach to risk analysis

Approach to quantifying financial exposure

An appropriate alignment of risk and return that balances the provision of service delivery and provides support for the long term sustainable and efficient financing of the notional company underpins a financeable business plan.

The operational challenges observed in AMP7 across the sector, significant changes in risk anticipated in AMP8 and the need to attract new equity capital to fund increased investment, makes the alignment between future risks and allowed returns particularly important.

To assess the balance between risk and return, the approach to risk analysis is **calibrated based on observed sector performance in AMP7 to date and regulatory mechanisms set out in the PR24 FM**.

Probability distributions of future performance are estimated based on historically observed variances on costs, outcomes and financing costs against regulatory targets for the sector as a whole.

Monte-Carlo analysis is used to simulate potential outcomes on a forward looking basis PR24.

The diagram to the right sets out a high-level mapping of the approach to risk assessment. The next slide provide further details of each modelling step.

Schematic view of the approach to risk assessment

Sector inputs

- Actual totex performance vs. allowances per company (base vs enhancement and water vs waste)
- Actual performance of the sector on each PC versus targets, per company

Company-specific inputs

- PR24 regulated equity
- PR24 totex programme
- PR24 Enhancement spend subject to PCD
- DPC estimated spend
- PR24 cost-sharing rates
- Ofwat's proposed PR24 ODI rates
- PR24 expected UQ ODI targets

Standard deviation

% deviation from the cost allowance across the sector

% deviation from the ODI target across the sector

Monte-Carlo analysis

Constructing a distribution of historical performance with parameters specified per PC, measure of experience and totex categories

Simulate expected performance

Using historical distribution of performance and the PR24 BP assumptions and regulatory expectations to simulate expected performance distribution of PR24 financial impact

Convert expected performance in RoRE terms

Converting the distribution of expected PR24 financial impact into RoRE terms

Outputs

Distribution of financial impact in RoRE terms per each risk driver

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Key steps for estimating risk exposure

01. Data collection

- **Sector input data** for actual and allowed costs has been collated the AMP7 period, including the split between base and enhancement costs for wholesale controls and the split between water, wastewater and retail controls. Data on actual and target performance levels has been collected for the PR14 and PR19 period, based on Annual Performance Reports. Market data on risk-free rates is collected from Bank of England, historical and forecast inflation rate data from OBR. Forward risk-free rate have been calculated using the spot yield.
- **Company-specific data** for the PR24 Business Plan has been provided by Anglian Water. This includes Anglian's forecast of regulated equity, the scale and composition of the PR24 totex programme (including the split between controls and cost categories), as well as proposed ODI targets and rates for each PC.

02. Quantification of probability

- Historical information is used to estimate distribution parameters for each proposed PC and totex (e.g., st. deviation, mean etc.). Estimation of distribution parameters is carried out at the sector level. This widens the evidence base for risk simulation and is likely to better proxy risk for the notional firm. For PCs where Ofwat does not apply fixed target across the industry, the historical performance is standardised by computing the % deviation from target for each company each year.
- Cumulative AMP data to date is used. Cumulative performance across the AMP is more closely related to full AMP performance than performance relating to individual years. While there are fewer data points in a cumulative approach, the resulting output is a better proxy for full AMP outcomes.
- Using distribution parameters derived from the historical performance data and by Monte Carlo simulation approach, the distribution of performance on specific performance and cost category is estimated.

03. Quantification of risk impact

- The simulated performance from the Monte Carlo simulation is converted into a distribution of financial outcomes.
  - Estimated probability distributions for financial outcome are applied to Anglian Water's PR24 cost data. Cost-sharing rates are assigned to each cost category, in line with Ofwat's PR24 FM proposals and cost performance distributions post-cost sharing rates are estimated. PCDs are applied to enhancement cost performance distributions.
  - Expected performance on common PCs are transformed into an estimated penalty or reward payments using assumed ODI rates and Anglian Water's proposed targets.

04. Analysis of results

- The expected distribution of financial outcomes is converted into RoRE terms across the entire price control period for the notional and actual companies.
- Results are analysed to understand whether the levels of risk in the overall package is skewed. A series of combination of scenarios are estimated to assess how changes in regulatory package, such as, incentive rates, caps, collars, deadbands and enhanced thresholds influence the overall risk exposure and distribution of risk. Based on the this assessment, where asymmetry is identified, risk mitigations are considered to address the risk asymmetry identified at source.
- The impact from proposed mitigations on the RoRE risk range is estimated for the notional and actual companies.

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Specification of assumptions and scenarios to analyse risks

Notional company specification for risk assessment

The risk assessment is conducted for a 'notional' company with Anglian Water's characteristics. Analysis on a notional company basis means that conclusions from risk analysis can inform price control calibration as they are not contingent on company specific past performance.

An appropriate specification of the notional company is important for producing meaningful RoRE risk ranges that are achievable in practice. It should reflect objective and realistic characteristics of an efficient water company that can achieve the set package of cost efficiencies and standards of service.

Ofwat's objective is to incentivise companies to achieve further gains in cost efficiency together with stretching service quality targets to improve outcomes and reduce bills for customers. The efficiency assumptions must be also practically achievable based on realistic assumptions about possible performance improvements.

The notional company's ODI RoRE risk range is calibrated based on sector-average performance on ODIs. The forward-looking probability distribution is informed by the sector's mean performance and the sector's standard deviation around the mean, which effectively assumes that the notional company achieves sector-average performance on each of the performance components. This may not be achievable in practice given performance observed across the sector on ODIs in AMP7 to date.

For the analysis of the notional company's totex RoRE range, it is assumed that Anglian Water's proposed BP totex is achievable in the base case (mean expected performance on totex is set to zero). Cost sharing rates of 50/50 are used in line with Ofwat's proposal in FM for outstanding and standard BP quality category.

Financing performance includes risk on embedded and new debt based on cost of debt observed across the sector in AMP6 and AMP7 to date (WaSCs and large WoCs).

Actual company specification risk assessment

The range of potential RoREs faced by the actual company be different from that estimated based on the notional company's risk exposure. This is due to company-specific factors affecting performance and potential for future performance in different risk categories.

Estimating company specific risk exposure is important to understand the extent to which the company is financially resilient. Ofwat's analysis of the risk is carried out at the sector level. This widens the evidence base for risk simulation. However this approach also risks omitting company specific drivers of risk based on the features and characteristics of its region, as well as company specific performance.

The actual company's ODI risk range is calibrated based on Anglian Water's average performance on ODIs. The forward-looking probability distribution is informed by Anglian Water's mean performance and the sector's standard deviation around the mean, which effectively assumes that Anglian Water's past performance is a good proxy for expected future performance in the base case.

For the actual company totex RoRE range, it is assumed that Anglian Water's proposed BP totex is achievable in the base case.

This will depend on the robustness of the specification of base and enhancement cost models, as well as Ofwat acceptance of Anglian Water's proposed cost adjustment claims and frontier shift/RPE assumptions.

Ofwat has not yet published its proposals for enhancement models, efficiency challenges and RPEs and is still consulting on base cost models. The assumption on mean expected performance for costs should be re-visited after Ofwat publishes its decisions on these areas.

Risk assessment under the mitigated scenario

Ofwat noted that it would seek to address any perceived asymmetry within the balance of incentives at source because it considered this preferable to adjusting allowed returns. It also commented that it would seek to limit the exposure of companies to risks they cannot effectively manage or control. To address notional company risk asymmetry, Anglian Water has developed a range of risk mitigations that seek to address key drivers of asymmetry at source.

RoRE risk ranges under mitigated scenario assume that Anglian Water's proposed risk mitigations in its Business Plan (PCD principles, ODI targets, ODI rates, caps/collars, deadbands and enhanced thresholds) are accepted by Ofwat.

Risk assessment under the unmitigated scenario

RoRE risk ranges under mitigated scenario assume Ofwat's default incentive package. This scenario assumes that proposed mitigation in Anglian Water's Business Plan are not accepted.

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Initial analysis of risk implied by the PR24 FM

Overview of Ofwat's approach to RoRE analysis based on the PR24 final methodology

Ofwat has set out its proposed approach to assessment of RoRE risk at PR24, building on the approach it applied at PR19:

01 Ofwat's approach relies on historical information the assumption that "*PR24 is an **evolution of the past determinations** and so **historical information remains the most appropriate guide** for the overall balance of the framework and is relevant as a reliable source of performance information Reported by the companies*" (PR24 FM)

02 Ofwat has primarily simulated financial exposure on costs based on past performance across 2015-20 but not AMP7 to date

03 Ofwat has not carried out analysis at this stage of how exposure to risk might change in future, although it notes it may consider implications of new data in relation to AMP7 performance for its risk ranges. Ofwat also indicates that it will consider the impact of higher enhancement spend projected for AMP8 risk exposure

04 Consistent with the approach adopted at PR19, Ofwat does not consider there should be an expectation that RoRE analysis for the notional company should include an expectation of financial penalties. This is on the basis that it expects that its final determinations will be set to allow companies sufficient funding to meet their obligations.

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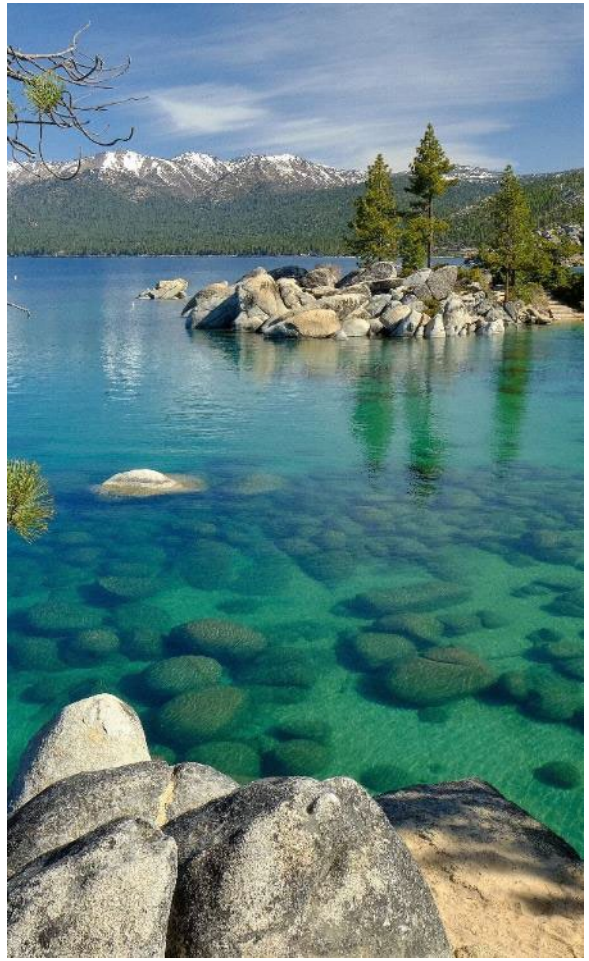
Gaps and weaknesses of the PR24 FM approach to risk analysis

- The approach to RoRE risk analysis set out in the PR24 FM is predicated on historical performance and **does not capture new risks or where risk exposure changes over time.**
- **The analysis also assumes that the base case position is achievable on an expected basis,** e.g. hence assumes that the regulatory determination is achievable, rather than using risk analysis to inform calibration of the determination.
- **The analysis does not capture or reflect key regulatory mechanisms which could drive asymmetry**, such as the impact of penalty only ODIs, unachievable targets on ODIs, the impact of PCDs on flexibility, and wider potential for regulatory fines and penalties.

Risk area	Potential gaps implied by the PR24 FM approach
Totex	• The PR24 FM assessment of risk is: - based on only **PR14 totex performance** and does not consider results from first two years of PR19. - does not delineate between risk on **base vs enhancement,** while these cost areas carry different risk profiles. Ofwat's current range does not delineate between risk in **water vs wastewater controls.** - has used an assumption of 50/50 sharing rates, but does not consider bioresources control separately where Ofwat is proposing no sharing mechanism.
ODIs	• **Ofwat considers that PR19 range for ODI performance remains appropriate at PR24.** Ofwat provides a preliminary view of RORE range, +/- 2% as indicative point estimate. • This does not account for new incentives or changes to incentives, and does not simulate exposure based on past performance.
Financing	• Ofwat does not consider interest rate risk on embedded debt and hence how **volatility in interest rates can create long term financial exposure on CoD.** • Ofwat simulates exposure to inflation but assumes that variance in inflation is constrained to +/-1% (materially lower than recently observed volatility)



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Key improvements in the approach to this initial risk analysis compared with the assumptions in the PR24 Final Methodology

Assumption	PR24 FM approach	Key improvements in this risk analysis compared with Ofwat's PR24 FM
Sample period for historical performance assessment	**Primarily AMP6.**	**3 years of AMP7.** PR14 totex performance does not allow delineation between base and enhancement costs due to the lack of data. Additionally, there were substantial changes in ODI methodology in PR19 relative to PR14, hence PR14 data may not be suitable for PR24 projections.
Base/enhancement split	**Totex performance analysed as one block.**	**Base and enhancement costs analysed separately** as they have fundamentally different risk profiles.
Correlations between risk categories	**No correlations used.**	**A small negative correlation between base and enhancement cost categories informed by the historical data.** **Correlation assumptions between ODIs informed by the company-specific performance data where available.**
Distribution assumptions	**Normal distribution assumed for all parameters.**	**Normal distributions for all totex categories and for most ODIs, except for penalty-only ODIs** (triangular distribution was used for CRI and discharge compliance).
Sharing rate assumptions	**50/50 sharing rate as a starting point for base & enhancement cost, no sharing rate in retail or bioresources controls.**	**This analysis assumes 50/50 sharing rate for wholesale water and wastewater network plus and no cost-sharing rate in bioresources and retail controls.** **An aggregate ODI sharing mechanism has been applied to the ODI risk ranges in line with Ofwat's PR24 FM**: 0% below +/- 3%, 50% between +/- 3% and +/- 5%, 90% applies after +/- 5%.
Treatment of timing adjustments and outliers	**Not reflected.**	**Timing-related adjustments to reported totex included** to capture underlying performance and look through phasing of expenditure across each AMP. **Analysis also includes cross-checks on probability distributions in relation to ODIs** to ensure logical bounding of physical performance on performance commitments (e.g. supply interruptions can't be negative)
Adjusting for the impact of PCDs	**Not reflected.**	**PCDs limit the notional company upside of the RoRE range** given that PCDs will have an effect of reducing the enhancement allowances if deliverables have not been achieved. Due to the lack of historical data, an initial assumption has been made in relation to the application of PCDs: these reduce the notional company out-performance on enhancement totex by c. 40% due to PCDs being applied to c. 80% of the enhancement spend, with 50% of overspend being at risk of clawback.
Adjusting for the impact of DPC / Alternative delivery routes	**Not reflected.**	**50/50 split between delivering via DPC and via alternative delivery routes**. DPC (depending on how it is structured) can remove a significant component of related company risk; ny contrast alternative delivery routes can remove a more limited amount of risk. **50% risk retained on alternative delivery routes and 0% retained risk on DPC:** these are averaged together for the model's estimated sharing rate of 75% applied to the standard deviation similar to enhancement spend.
Approach to modelling financing risk	**Modelled inflation stress test on a +/- 100 bps fluctuation from OBR target of 2%.**	**Considers the impact of an inflation stress test on a +/- 2% fluctuation from OBR target**. **Considers the impact of inflation wedge on inflation-linked debt** **Also considers basis risk and risks relating to the cost of embedded debt** (not included in the PR24 FM range).

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Totex risk assessment

Methodology and assumptions for totex risk assessment

Totex is a key driver of operational out- or under-performance for water companies and represents a material component of overall RoRE risk.

- Ofwat sets cost allowances ex ante on the basis that companies can expect to recover efficiently incurred costs. Cost allowances are set ex-ante and take into account the view of expected efficiency improvements over the price control.
- In theory, under the assumption that Ofwat's cost assessment framework is accurate, the actual cost performance against the Ofwat's allowances can be used as a measure of additional efficiency or inefficiency on top of required improvements during price control period. However, in practice, under-performance or out-performance against regulatory allowances could be due to a number of exogenous factors (outside management control) which are not related to efficiency.
- Water companies are exposed to significant risk based on the difference between their outturn and allowed Totex, subject to the prevailing cost sharing rates.

Ofwat's RORE ranges are based on assessment of the range of performance on Totex in AMP6. Ofwat considers that the assessment of the range of performance on totex in PR14 is likely to be a reasonable starting point for the view of the RoRE ranges for PR24 framework.

Approach to assessment of totex risk

The Report analyses water companies' actual risk exposure observed across the sector during PR19 as a proxy for potential risk exposure over PR24. This is carried out on a more granular basis (base vs enhancement costs and water vs wastewater controls) than Ofwat's approach, which also uses historical (Ofwat relies solely on AMP6) data as a starting point but does not disaggregate between base and enhancement costs.

The analysis of totex risk for PR24 is based on the observed variation in totex actual performance against Ofwat's cost allowances for the sector in the first three years of AMP7. The observed past variances against allowances are used to estimate the totex risk exposure in PR24 relative to baseline.

Historical information is used to estimate distribution parameters (e.g., standard deviation). Estimation of distribution parameters is carried out at the sector level. This widens the evidence base for risk simulation and provides a better proxy for the notional company.

The analysis uses cumulative data from AMP7 to date. Cumulative performance across the AMP is more closely related to full AMP performance than considering individual years. While there are fewer data points in a cumulative approach, the resulting output is a better proxy for full AMP outcomes.

The expected PR24 totex performance distribution is estimated based on parameters informed by historical performance and using Monte Carlo simulation. The distribution of performance is estimated on specific totex categories (e.g., water vs wastewater, base vs enhancement) and for the overall totex package.

The analysis estimates variation for water and wastewater price controls separately. This enables capturing differences in risk profiles across these two controls.

The analysis estimates variation for enhancement separately to base costs. This analysis indicates that enhancement costs have higher variation than base costs. Separating enhancement assessment from the base also captures the implication of the increase in the scale of capex on totex risk.

PCDs are considered in the assessment to capture the potential impact on the scope for out-performance on totex risk.

Key assumptions

The starting point for the analysis of totex risk is the assumption (subject to Ofwat's decisions) that there would be no expected out- or under-performance on a mean expected basis at PR24 as Ofwat re-calibrates the cost framework through the PR24 Business Plan process.

A normal distribution has been applied to simulate possible performance outcomes over PR24. A 50% sharing rate is applied in Wholesale Water and Network Plus Wastewater controls. In Bioresources, no sharing rate is applied in line with the PR24 FM.

The resulting sector averages across different risk categories were reviewed for outliers. This resulted in the removal of Hafren Dyfrdwy's from the sample.

A timing adjustment to historical performance is applied to correct for any out- or under-performance due to timing (e.g. due to front-loading or back-loading of investment). The adjustment is based on timing variations Reported in Ofwat's published 'Water companies performance reports' for totex and is assumed to relate predominantly to enhancement costs.

90% of enhancement costs are assumed to be subject to PCDs. In an unmitigated scenario, a 65% probability of claw back of allowances is assumed under an out-performance scenario and 33% under under-performance scenario, based on company expectations. Anglian proposed PCD mitigations are assumed to reduce the exposure by 50%.

The baseline assumptions of zero out- or under-performance may be upward biased. AMP7 variances from ex-ante expectations indicates the presence of underlying cost calibration uncertainty, driven by:

- **RPEs** – input price changes affect the required cost estimates. Cost categories where RPEs are not provided are exposed to inflation risk.
- **Imperfect framework** – scope for errors in cost models and the selection of catch-up and ongoing efficiency challenges.
- **Changes in cost drivers** – allowances are based on forecast of cost drivers which are locked in after the ex-ante allowances are estimated.

At PR19 Ofwat applied stretching efficiency targets and did not allow energy RPEs which appears to have contributed to over-spend across the sector in AMP7 to date.

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Delineating between risk on base vs enhancement

> ***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. This difference between base and enhancement costs means that the focus of our assessment framework is different between the two.***
>
> – Ofwat, PR19 Draft Determination

Ofwat's notional company assessment considers totex as a single block, which may not take into account fundamentally different risk profiles across base and enhancement costs.

- **Base costs** are typically routine, year-on-year costs, which companies incur in the normal running of the business to provide a base level of service. Although base costs are relatively stable over time, companies are still exposed to performance risk, driven by unexpected events and input price movements where appropriate RPEs are not provided. The water sector has faced significant energy price pressures in the last few years. The high energy inflation was not anticipated at PR19; it was not included in cost allowances nor was there an RPE indexation mechanism to recover it.
- **Enhancement expenditure** relates to investment for the purpose of enhancing the capacity or quality of service beyond a base level. It may be driven by a number of factors including new statutory obligations and strategic priorities companies develop in consultation with their customers. Enhancement costs are less certain and are more difficult to forecast, also acknowledged by Ofwat.

AMP7 sector performance on base and enhancement costs shows a clear difference between these two cost categories. In AMP7 (a price control period with a relatively lower scale of investment challenge compared to what is expected at PR24), enhancement costs are observed to have a larger variation (both positive and negative) compared to base costs.

To ensure that the risk exposure inherent to each category of spend is appropriately captured, totex spend in this risk assessment is broken down into five components: base water costs, base wastewater costs, bioresources base costs, enhancement water costs, and enhancement wastewater costs. The approach to totex risk accounts for a higher variation in performance on enhancement costs relative to base costs, informed by observed historical variances.

Water companies face a major step up in investment requirements which in turn will result in an increase in enhancement spend. At PR24, the water sector is exposed to additional risk exposure due to this expected step up in capex. The increasing risk factors covers the scale of capex and complexity of investment. The first relates to the absolute value of expenditure whereas the second reflects the operational and technical complexity of the projects.

Overall totex in AMP8 is expected to increase for Anglian by £2bn (almost double the size of AMP7 enhancement costs). This is primarily driven by the WINEP programme, which includes required investment in storm overflows, phosphorus removal and nutrient neutrality. The sector is also increasing its expenditure as per companies' WRMPs, which includes targets to reduce leakage, increase water efficiency and expand supply options to respond to population growth and climate change.

Delineation between risk on base vs enhancement costs could capture the change in the totex risk portfolio driven by the significantly increased proportion of capital spend in total expenditure.

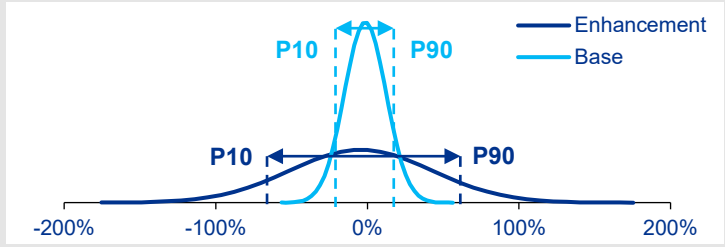
Historical cumulative performance over AMP7 is considered across cost areas, with the mean and standard deviation of sector performance vs the allowance used to inform expected PR24 cost performance distributions.

Summary for input parameters

Totex category	Mean (assumed)	Standard deviation	Distribution type
Base (ww)	0.0%	26%	Normal
Base (www)	0.0%	16%	Normal
Enhancement (ww)	0.0%	31%	Normal
Enhancement (www)	0.0%	32%	Normal
Bioresources	0.0%	16%	Normal

Enhancement costs are observed to have a higher variance compared to the base costs (see table above) which are reflected in the expected cost performance distributions. The figure below illustrates the difference between the expected performance distribution of enhancement costs relative to the base.

Base vs enhancement cost performance distribution (illustrative)



Monte Carlo analysis enables testing hypotheses around the extent to which different cost performances are correlated with one another. A small negative correlation of -0.2 is assumed between base and enhancement cost performance, informed by historical data. This may represent a conservative assumption given the potential impact from more extensive use of PCDs at PR24.

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Price Control Deliverables (PCDs) at PR24

Ofwat is proposing to apply PCDs on a larger scale at PR24

In the PR24 FM, Ofwat set out an expectation for companies to use price control deliverables (PCDs) as a tool to protect customers from under- or non-delivery of funded enhancements. Ofwat has also provided additional guidance for water companies on expectations regarding how PCDs should be proposed at the 2024 price review. Ofwat explains that PCDs aim to encourage on time delivery. If companies fail to deliver in line with PCD requirements then PCD payments, together with any related outcome delivery incentive under-performance payments and cost sharing arrangements, should return to customers more than the allowed cost of the enhancement, and should reflect any foregone benefits.

Companies are required to propose PCDs in their business plans for material enhancements. Ofwat defined material investments as 1% of relevant totex. This indicates that companies should provide PCDs on granular schemes, which may significantly limit the flexibility of companies to re-invest and optimise spending across enhancement categories. Ofwat states that the level of aggregation may be revised at Draft Determination.

Potential challenges from PCDs

1. **PCDs are asymmetric mechanisms and increase the downside of the totex risk.**

Companies would in effect pay penalties in the event that there is a delay in delivering PCDs, however there is no corresponding reward (for example for early delivery). Hence, PCDs introduce a downside skew into totex risk ranges, which is not accounted for in the initial PR24 FM approach to risk analysis.

The scale and complexity of capital programs at PR24 may limit the ability to forecast the precise timing of the delivery of the output or to estimate the precise level of output that needs to be delivered. This may result in companies ether delivering a proportion of programmes earlier than initially estimated or *vice versa*, delivering programmes later than was anticipated on ex-ante basis. Additionally, companies may overdeliver some programmes and underdeliver others due to changing circumstances and scope driven by external factors

Ofwat's proposed PCD mechanism will penalise companies in the scenarios of later delivery or under-delivery. There is no corresponding incentive mechanism to reward companies if outputs are delivered earlier or companies deliver more than initially estimated. Hence, Ofwat's proposed one-sided PCD approach is asymmetric. It exposes investors to a downside risk of a penalty, but does not provide a corresponding upside scenario.

2. **Companies are exposed to a significant downside risk from non or partial delivery or different delivery due to change in the scope.**

The scope of PR24 enhancement programmes may change during price control period, driven by factors outside management control. Ofwat has indicated that it will not allow PCDs to change in period and PCDs will not be linked to any permits or notices, subject to in period changes. Companies therefore are exposed to any delivery risk around unexpected events. Additionally, disallowing in-period changes provides perverse incentives. It also creates a risk that companies in order to avoid PCD penalties may deliver an investment that is no longer needed or deliver the wrong solution.

3. **Not allowing any uncertainty mechanisms related to PCDs or in-period changes is not in line with regulatory precedents**

In contrast with Ofwat's approach, Ofgem distinguishes between mechanistic and evaluative PCDs. Evaluative PCDs are set in cases where the exact work delivered has potential to vary in part from the company submission, either in cost or output. For Evaluative PCDs, licensees may deliver an alternative specification or scope.

4. **Introducing PCDs makes totex more risk difficult to estimate, and could expose companies to additional regulatory risk.**

Application of PCDs in practice may be data-intensive and time-consuming which increases the regulatory burden and does not reflect Ofwat's simplification agenda. There is limited clarity on how PCDs would work in practice and hence material uncertainty around circumstances under which PCDs might be triggered. Uncertainty around PCDs include: the level of aggregation, circumstances where PCDs will be applied, and the potential for adjustments for late-delivery. This could in turn introduce additional regulatory risk which needs to be captured in RoRE risk ranges.

> ***Companies are expected to develop price control deliverables (PCDs) for material investment that would not be adequately protected using PCs and ODIs.***
>
> – Ofwat, PR24 FM

> ***We do not expect companies to propose to link price control deliverables to permits or notices which might be subject to in period changes. Companies should be able to manage any delivery risks around unexpected events over the five-year control period.***
>
> – Ofwat, Further guidance on price-control deliverables for PR24

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Price Control Deliverables (PCDs) at PR24 (cont.)

Key areas of regulatory risk which could arise from current specification of PCDs:

1. Asymmetric risk for companies. Scope for penalties in the event of non-delivery (or late delivery) based on ex post regulatory assessment implies downside-only regulatory risk
2. Detailed prescription of outputs by Ofwat could require companies to implement ex ante plans and disincentivise efficient outcomes and optimisation.

5. The combination of ODI and PCD payments could duplicate regulatory incentives

If companies do not deliver an enhancement investment on time they can expect to incur ODI under-performance payments. In PR24 FM Ofwat highlights that in general, it will not expect outcome delivery incentive payments to be netted off from price control deliverable payments and companies are expected to incur penalties where benefits are not delivered (i.e. PCD not met). Ofwat's proposal for PCDs could lead to **double penalties** for under-performance in AMP8 on some measures.

6. PCDs could limit financial flexibility to deliver stretching capital programmes.

Limited scope for in-period changes to the specified ex-ante scope could limit scope to optimise expenditure across a portfolio of projects.

> **Ofwat previously has stated:**
>
> ***A more outcome-focused approach would mean not prescribing or holding the companies to account for the way in which they deliver outcomes, but allowing them scope to find alternative approaches. So, the companies would be incentivised to find the best way to deliver outcomes, with the freedom to choose between different outputs to achieve them.***

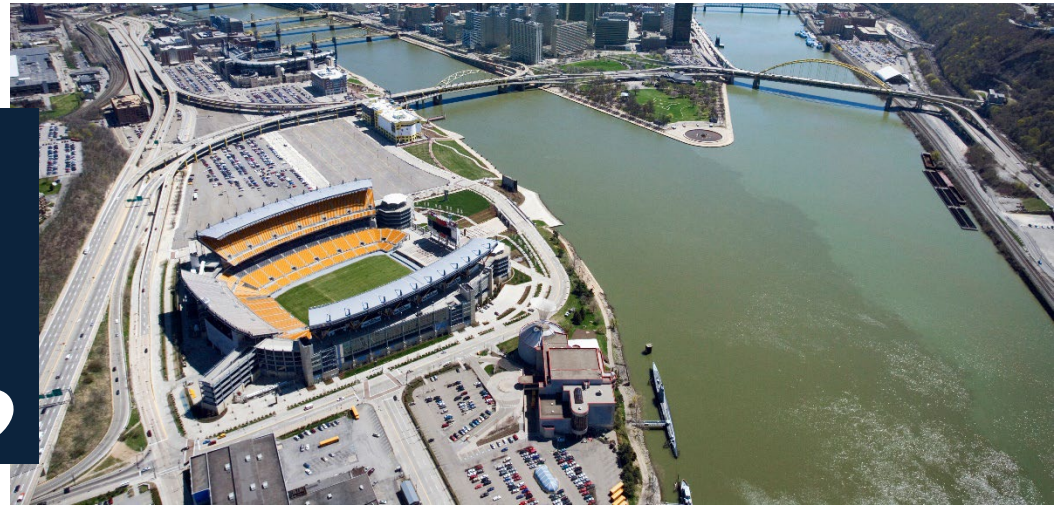
Source: Ofwat, Inputs, outputs and outcomes – what should price limits deliver? A discussion paper, 2015

PCDs in practice could result in a lower financial flexibility across a portfolio and limit companies' ability to reinvest in different parts of the enhancement programmes and to innovate and find new ways of delivering outcomes.

7. Tension between PCD design and long-term delivery focus.

Ofwat places the PR24 price review in the context of adaptive long-term delivery strategies. Without in-period changes, adaptive planning to changing circumstances is confined to the next quinquennial review. This could limit scope for adaptive planning and encourage companies to adopt a shorter term focus.

Anglian has set out in its business plan key principles which it considers should govern design and specification of PCDs to support right incentives and financial flexibility. If Ofwat is planning to retain the PCD approach in its current form, additional downside risk should be priced into RoRE analysis and a corresponding adjustment should be made to allowed returns.



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Approach to estimating the impact of PCDs on risk exposure

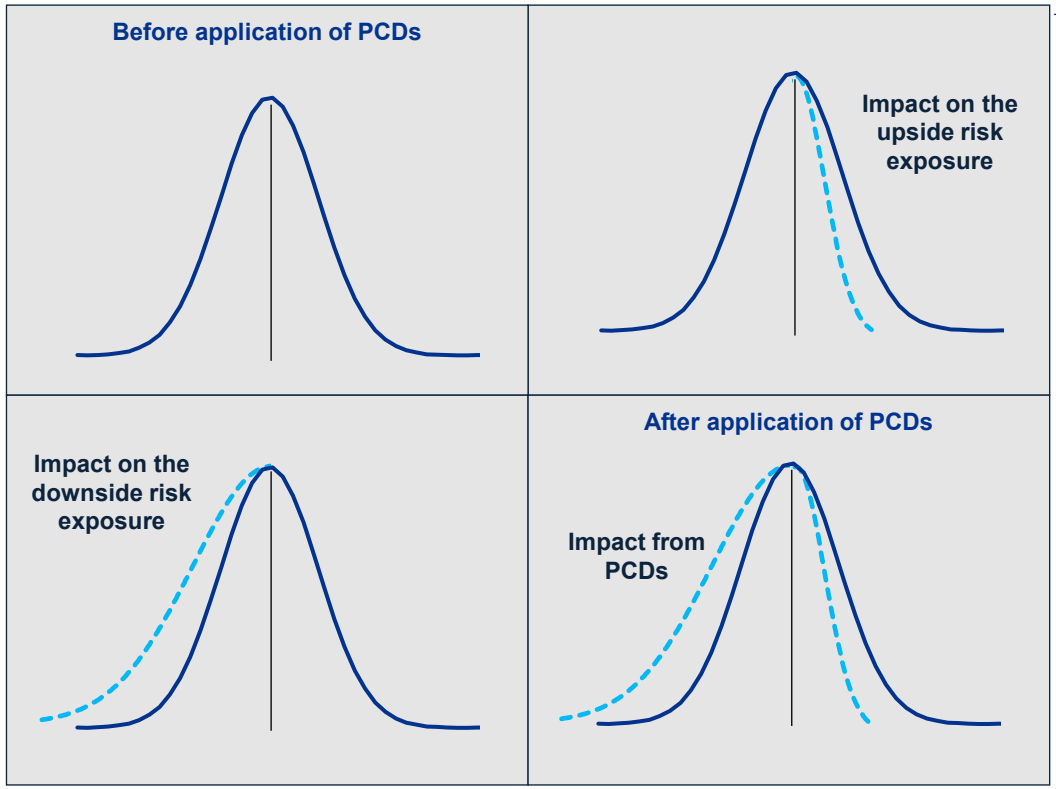
PCDs as currently specified in PR24 guidance are expected to impact on totex risk in several ways:

- **Totex out-performance scenario (upside risk):** PCDs are likely to reduce scope for Totex upside as variance between cost and allowance could be clawed back under certain scenarios (Ofwat has noted in it further guidance for PCDs at PR24 that "*price control deliverables allow funding to be returned to customers*"). This means that companies may not be able to benefit from cost savings if they do not deliver the required PCDs specified ex ante (for example due to a change in scope or timings). Potential benefits of diversification of risks across a portfolio projects would be limited as it is more difficult to offset the risk of under-performance on one project with out-performance on another project.
- **Totex under-performance scenario (downside risk):** Downside risk could increase if PCDs are not fully delivered but some of the Totex allowance has been spent. In this case, a clawback of the Totex allowance or penalties could contribute to under-performance.

Approach to estimating the impact of PCDs on RoRE

- PCDs are taken into account by considering both the portion of spend subject to PCDs (c.90%) and the delivery risk (c.60%) of not meeting PCD commitments. The estimation of delivery risk is largely qualitative at this stage as there is limited data available to simulate the probability of PCDs being applied at a granular level and guidance in relation to how PCDs might apply in practice may be refined across the PR24 process.
- This analysis assumes a larger impact from PCDs on the upside risk exposure (60% probability of Ofwat disallowing benefits from out-performance) compared to the downside (30% probability of additional penalty on top of under-performance payment) as companies in case of non or partial delivery appear more likely to underspend than to overspend against cost allowances. The combination of the assumed proportion of costs subject to PCDs and delivery risk (above) is used to (1) reduce scope for outperformance on enhancement under the assumption that a component of outperformance could arise from different delivery to the ex ante scope (2) increase the scope for underperformance on enhancement costs.

Enhancement cost performance distribution pre and post PCDs (illustrative)



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Key findings – totex risk on an unmitigated basis is higher and downward asymmetric compared with Ofwat's analysis

Anglian Water's estimated RoRE risk range on totex compared to Ofwat's proposed range as set out in PR24 FM implies:

1. Higher downside exposure

A wider range compared to Ofwat is primarily driven by larger and more complex AMP8 enhancement programme and a combination of (1) higher assumed delivery risk on enhancements relative to base costs (2) a step change increase in the scale of the enhancement6programme.

2. Asymmetric risk exposure

Totex RoRE risk asymmetry is driven by expected impact from application of PCDs on enhancement cost performance at PR24.

Faded bars on the figure indicate impact from non provision of Cost Adjustment Claims (CACs) on RoRE risk range.

Key sources of differences compared to Ofwat's range are further explained on the following slide.

Projected range of totex performance over PR24

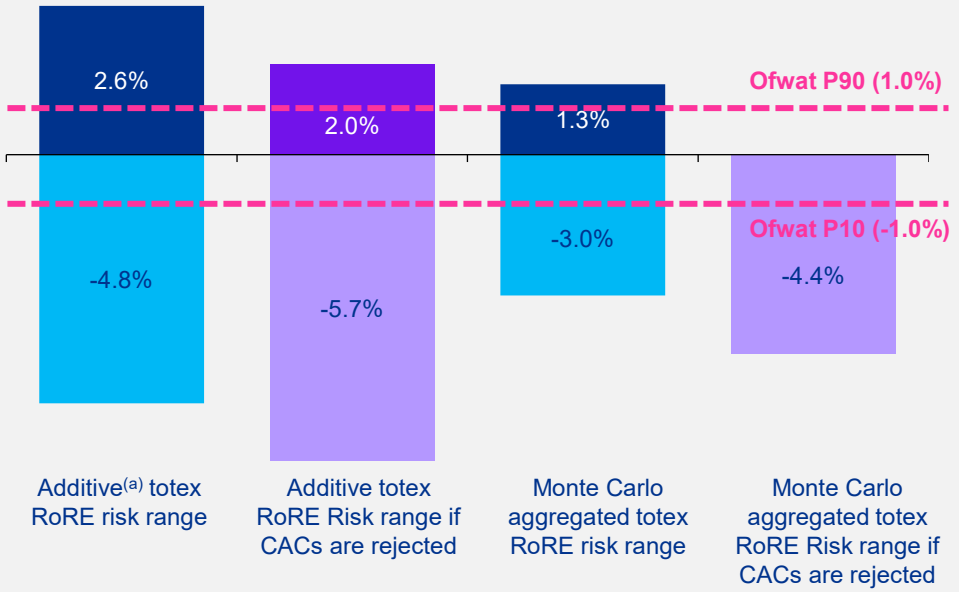
Values are projected for the entire AMP and do not reflect potential outcomes for a single year. The ranges capturesintra-year correlations.

The RoRE range is estimated post application of a 50% sharing rate for water and wastewater network plus and no sharing rate applied to bioresources costs, in line with the PR24 FM.

Wholesale Totex cost performance, % (Monte-Carlo aggregated range) – unmitigated		
	Pre cost-sharing and PCDs	**Post cost-sharing and PCDs**
P10	-16.7%	-8.6%
Mean	**-4.1%**	**-2.1%**
P90	6.7%	3.8%

Totex RoRE risk range pre Anglian proposed mitigations

P50	Mean	P50	Mean	P50	Mean	P50	Mean
0.0%	-1.1%	-1.4%	-2.5%	-0.8%	0.9%	-2.2%	-2.3%



Note: (a) Enhancement water, enhancement network plus wastewater, base water and base network plus wastewater cost RoRE ranges are added up, outside of the simulation approach

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Key sources of differences compared to Ofwat's range include higher delivery and regulatory risks

Key drivers of higher exposure on totex

The estimated RoRE risk range on totex for Anglian implies *higher* downside exposure than Ofwat's proposed range as set out in PR24 FM as:

The approach to estimation of risk on totex accounts for a higher variation in performance on enhancement costs compared to base costs

Higher delivery risk: Large-scale projects and capital programmes tend to be inherently more complex and subject to greater uncertainty than smaller, less complex programmes. Step changes in levels of expenditure can create heightened exposure to *inter alia* supply chains, input costs, changes in scope and deliverability. There also may be fewer relevant prior projects to underpin ex ante estimates. Overall there is more scope for variance (positive and negative) on enhancement programmes and this can be observed from historical performance on enhancement costs in the water sector.

> ***We recognised enhancement costs can be less certain than base costs***
>
> – Ofwat, PR24 FM

Higher regulatory risk: There will be challenges for Ofwat;s calibration of the regime. Ofwat is liable to have lower quality benchmarking evidence to estimate costs for additional totex. Ofwat's approach to setting allowances for enhancement may have a higher risk of regulatory scrutiny and challenge compared to botex assessment due to strong reliance on forecast rather than historical data.

> ***It is often more difficult to forecast enhancement allowances than base cost allowances because enhancement spend tends to be more idiosyncratic and often relates to novel activities.***
>
> – CMA, PR19 re-determination

The estimated ranges reflect the scale and complexity of the enhancement programme at PR24

The increased scale of enhancement costs at PR24 has a heightened effect on the totex RoRE range as the proportion of higher risk costs i.e. enhancement costs are projected to increase significantly as a proportion of the overall totex.

The investment needed to deliver Net Zero and other requirements means the scale Anglian's totex programme in PR24 is much larger than it was in PR19. This means that, even on the base level of risk under PR19-type conditions, there would be an increase in the absolute exposure to risk. Since the RAV is only incrementally increased by higher levels of totex in a relatively short 5-year period, this implies a proportionately increased exposure of investor capital to risk.

> ***We acknowledge that current forecasts suggest that enhancement spend in 2025-30 could be greater than that funded in 2015-2020, and this could impact on the final risk ranges for PR24.***
>
> – Ofwat, PR24FM

Key drivers of asymmetric exposure on totex

The estimated RoRE risk range on totex for Anglian implies *asymmetric* downside exposure. Although totex performance is simulated on the basis of normally distributed probability functions with a mean zero assumption, it is likely that totex performance in PR24 will be asymmetrically distributed, with higher probability of under-performance than out-performance.

The asymmetry relates to Ofwat's position stated in the PR 24 FM to apply Price Control Deliverables (PCDs) on a larger scale than at PR19. This is likely to imply a significant downside risk and reduce flexibility to re-allocate out-performance across a portfolio of projects. PCDs are by design asymmetric mechanisms with no or limited upside and unlimited downside.

The approach accounts for potential asymmetry created by more extensive use of PCDs at PR24

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Summary of totex risk mitigations assumed in the Anglian plan

Anglian's assumed totex mitigations reflected in RoRE risk ranges

Ofwat is proposing to introduce PCDs a on a larger scale at PR24 than corresponding measures in PR19.

PCDs appear based on current design and specification to be inherently one-sided, asymmetric mechanisms, which could result in asymmetric totex risk exposure at PR24.

Anglian in its PR24 Business Plan is proposing set of principles for the design of PCDs.

These aim to mitigate asymmetric downside risk and avoid restriction of flexibility to effectively manage emerging risks.

The key principles included in the plan are as follows:

- PCDs are not required for all portfolios (Ofwat principle 1)
- Avoid interim milestones to avoid risk of penalties if the programme is delayed but still completes on time
- Use of high level outcome focused outputs where appropriate
- Retain flexibility over optioneering – seek to define metrics that allow delivery teams to pursue better value solutions (Ofwat principle 4)

Anglian also considers that PCD may not be necessary for all cost areas. For example, cost categories that are already linked to performance improvement targets may not require to be subject of PCDs.

Acceptance of these principles would specify PCDs on a different basis to PR24 FM and could substantively mitigate asymmetric risk exposure.

Additional totex mitigations assumed in the Anglian plan

Anglian is submitting Cost Adjustment Claims (CACs) as part of its Business Plan to request funding for efficient costs that are not captured by Ofwat's cost models.

- Anglian is proposing Cost Adjustment Claims (CACs) to address the gaps in Ofwat's base cost assessment models.
- The most material components of Anglian's PR24 claims is a request for energy costs.
- The estimated RoRE ranges, both mitigated and unmitigated, assume that submitted CACs are accepted. If Ofwat does not allow CACs, the company could be exposed to additional downside risk.
- CACs submitted by Anglian correspond to factors that are potentialy not captured by Ofwat's cost models, including company-specific circumstances. Rejecting them could risk miscalibration of cost framework and the company may not be able to recover efficiently incurred costs.
- Additional downside risk exposure from CAC disallowances is illustrated by shifting the mean expected value.

In addition, Anglian has included efficiency and RPE assumptions for PR24 period in its business plan.

- Anglian's proposed frontier shift assumption is 0.8%. Anglian's proposed efficiency challenge is designed to reflect unforeseen challenges in productivity improvements over PR24.
- Anglian's view Real Price Effect (RPE) assumptions mitigate risk from input price movements.
- Ofwat's PR24 parameters for cost efficiency and RPEs are unknown at this stage. Ofwat has not yet finalised its suite of base cost models and has not published details on enhancement cost assessment.
- As a result, this risk analysis does not consider the impact from Ofwat's potential deviation from Anglian's proposals in the baseline RoRE ranges.
- Anglian is also considering whether to propose RPE indexation in relation to energy costs in light of recent volatility of energy prices. If this mechanism is included in the final Anglian plan, the impact on RoRE risk would need to be taken into account.

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Key findings—risk mitigations result in less asymmetric totex risk but some inherent asymmetry remains

Application of Anglian's proposed PCD mitigations on totex RoRE risk ranges

Anglian has included a set of principles for the design of PCDs which mitigates asymmetric risk.

Under the mitigated scenario, the impact of PCDs on delivery risk is assumed to be one-third of the risk estimated for unmitigated scenario (see slide 25/26). The analysis of mitigated totex risk assumes a company specific delivery risk factor of 17% (instead of 60%) on scope for out-performance. This is used to reduce the scope for outperformance on enhancement to simulate the impact of PCDs based on Anglian's business plan principles. Similarly, the 10% (instead of 30%) delivery risk factor is used to increase the scope for underperformance on enhancement as a result of PCDs.o

Analysis of mitigated Totex RoRE risk results in a significantly less asymmetric range compared to the unmitigated scenario. However, some asymmetry remains as PCDs remain inherently asymmetric.

Projected range of Totex performance over PR24

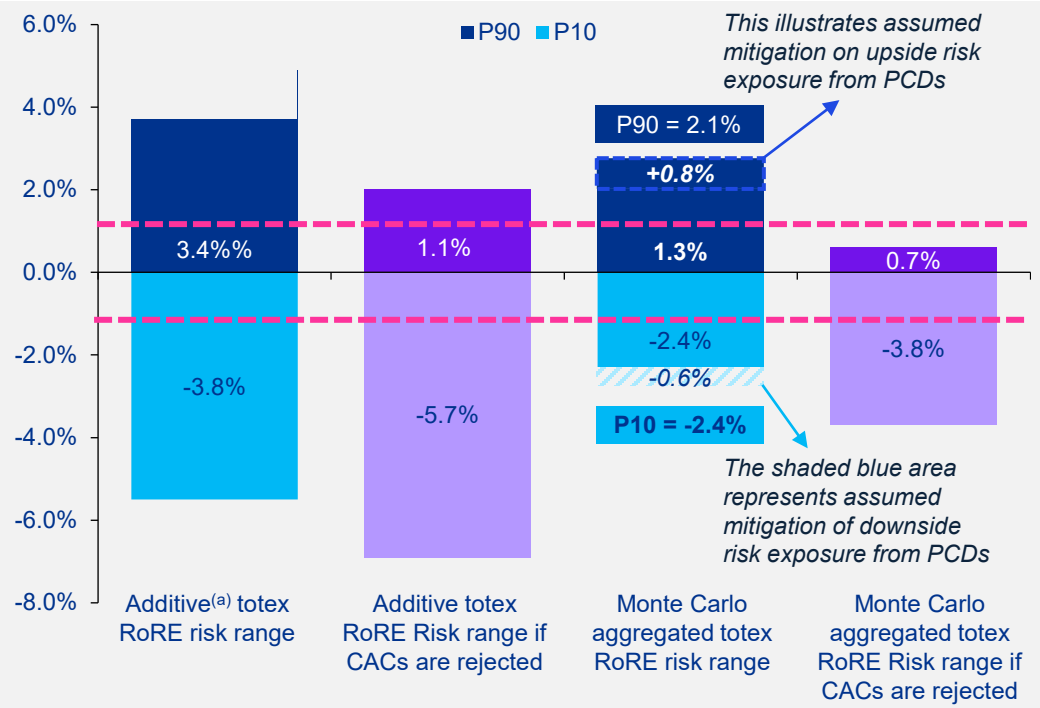
Values are projected for the entire AMP, and do not reflect potential outcomes for a single year. The ranges captures intra-year correlations. The RoRE range is estimated post application of a 50% sharing rate for water and wastewater network plus and no sharing rate applied to bioresources costs, in line with the PR24 FM.

Wholesale Totex cost performance, % (Monte-Carlo aggregated range) – mitigated		
	Pre cost-sharing and PCDs	Post cost-sharing and PCDs
P10	-13.9%	-7.0%
Mean	**-1.2%**	**-0.6%**
P90	11.9%	6.2%

The totex risk range will also depend on the robustness of Ofwat's cost assessment framework. Ofwat has not yet published PR24 enhancement cost models. Ofwat has not published its view of efficiency challenges and RPE assumptions at PR24 and is consulting on base cost models.

Totex RoRE risk range pre Anglian proposed mitigations

P50	Mean	P50	Mean	P50	Mean	P50	Mean
0.0%	-0.2%	-1.4%	-1.6%	-0.1%	-0.2%	-1.6%	-1.6%



Note: (a) Enhancement water, enhancement network plus wastewater, base water and base network plus wastewater cost RoRE ranges are added up, outside of the simulation approach

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Reservoir costs risk assessment

Anglian is investing in two new reservoirs, Lincolnshire and Fens, to help provide resilience to future droughts and climate change. These new developments are structured in the Anglian plan as a separate price control and affect the overall Totex risk exposure that the company faces at the Appointee level.

It will be important to ensure that the impact of risk of these arrangements is appropriately reflected in the calibration of the regulatory package and in risk allocation for the separate price control, to support the financeability and financial resilience of investment in the reservoirs on a standalone basis.

Approach to assessment of totex risk

The reservoir development costs of £233m opex are allocated into a separate (additional) price control (outside water resources and network plus) in Anglian's PR24 Business Plan. Performance risks related to the reservoir development opex are considered as a separate totex risk category in this assessment.

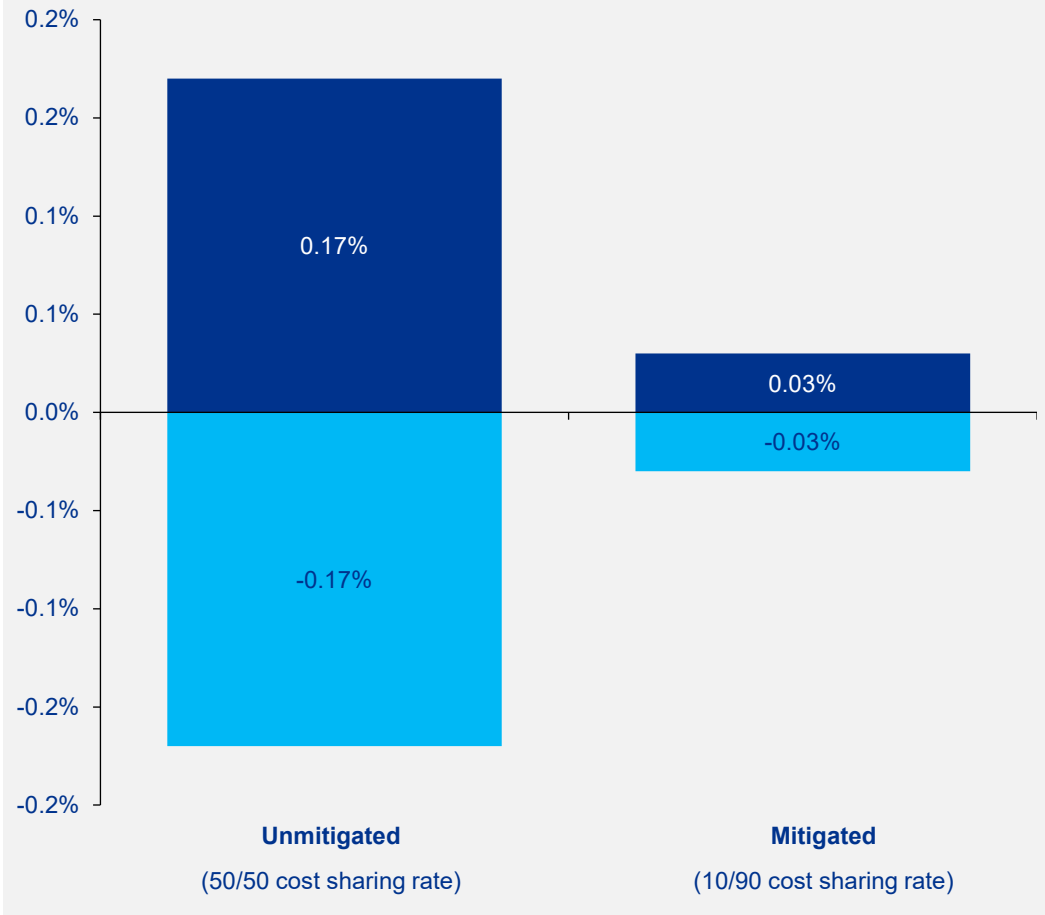
Key assumptions:

- The starting assumption in the analysis of cost risk is that there is no expected out- or under-performance on a mean expected basis.
- Sector-wide past performance on PR19 enhancement programmes (e.g., actual spent against Ofwat's allowances) is used to inform the expected variation on performance on reservoir opex. This can be considered as a conservative assumption given the scale, complexity and uncertainty around the investment.
- A normal distribution has been applied to simulate possible reservoir opex performance outcomes over PR24.
- A symmetrical cost-sharing rate of 50/50 is assumed in line with Ofwat's proposals in PR24 FM.

Proposed mitigations

Anglian is proposing 10% cost sharing rate to reduce the exposure on reservoir opex as a potential mitigation in its Business Plan (e.g., Anglian to bear 10% of overspend or underspend and the other 90% to be borne by customers).

Reservoir development opex RoRE risk range



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05

Retail cost risk assessment

Methodology, assumptions and findings

Retail costs represent a key driver of operational out- or under-performance for water companies and a material component of overall RoRE risk.

Approach to assessment of retail cost risk

Ofwat's assessment of retail cost risk is based on the average outturn expenditure compared to allowance across PR14. Ofwat has indicated a retail RoRE range of between -0.20% and +0.30%.

This risk assessment considers the retail performance for the sector over the first three years of AMP7.

Using distribution parameters (st. deviation) informed by historical performance, we run Monte Carlo simulation to estimate retail cost performance distribution.

At PR14 and PR19 Ofwat applied no cost sharing mechanism for over or underspend of retail costs (and has not indicated that it is likely to introduce one at PR24). The reason behind this is that the retail control is an average revenue control and Ofwat assumed it de-risks over/under spend. Specifically, it removes the 'volume' or 'workload' risk associated with the number of households to serve. This means that any over or underspend is borne fully by companies.

At PR19 the retail controls were not indexed to a measure of general inflation. At its initial assessment of business plans (IAP), Ofwat stated that any inflation risk in retail is lower than in wholesale and companies would be expected to manage input costs as part of ex-ante allowances.

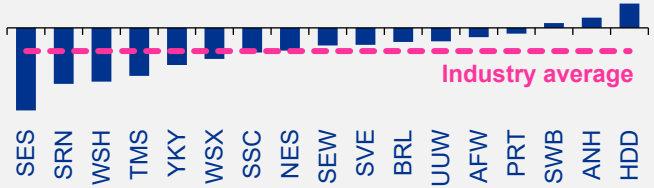
The same approach is expected to be applied again at PR24 and sector may be exposed to additional retail cost risk from potential uncertainties on input prices over the price control period.

Key assumptions

The starting point of the analysis of retail cost risk is the assumption (subject to Ofwat's decisions) that there would be no expected out- or under-performance on a mean expected basis at PR24 as Ofwat re-calibrates the cost framework through the PR24 Business Plan process.

Zero mean expected performance is a conservative assumption. At PR19 the sector has significantly underperformed on retail costs.		
Assumed	P10	-26.5%
	P90	26.5%
PR19	P10	-45.2%
	P90	7.8%

% out(under)performance again retail cost allowances at PR19



Historical sector retail cost performance (against retail cost allowances) information is used to estimate distribution parameters (e.g., standard deviation).

Input parameters for totex performance distribution		
Mean (assumed)	Standard deviation	Distribution type
0%	21%	Normal

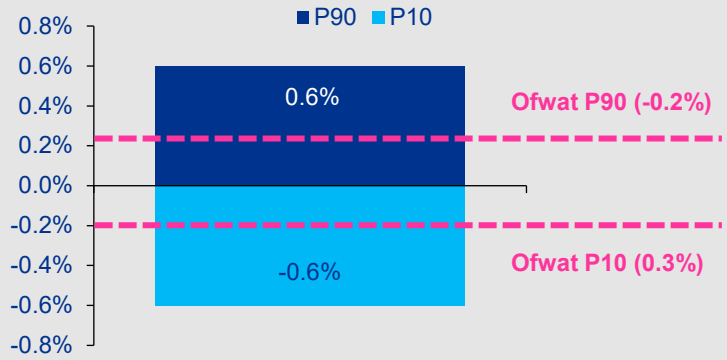
A normal distribution has been applied to simulate possible performance outcomes over PR24.

Analysis assumes a no cost sharing rate, reflective of Ofwat's proposals in PR24 FM.

Projected values over PR24

Values are projected for the entire AMP, and do not reflect the range of potential outcomes for a single year. The range already captures the intra-year correlations and no further adjustment is required.

Retail RoRE risk range pre Anglian proposed mitigations



Key findings

Analysis resulted in the notional firm's retail RoRE exposure of -0.60% (P10, the low case scenario) to +0.60% (P90, the high case scenario). The overall RoRE risk range is significantly wider than the illustrative range presented in Ofwat's PR24 FM. The key driver of this difference is the input data used as a proxy for AMP8 performance. Ofwat relies on AMP6 retail cost performance which significantly understates the risk, while this analysis has utilised the most recent data, e.g. AMP7 data, due to its relative similarity to AMP8 expectations.

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06

ODI risk assessment

Methodology and assumptions for ODI risk assessment

Outcomes are another material component of overall RoRE risk for water sector. Companies may be exposed to penalties and rewards based on the difference between their actual performance and their performance commitment levels (PCLs).

Ofwat considers that PR19 range for ODI performance remains appropriate at PR24. As a result, PR24 FM Ofwat assumes a high-level view of the RORE impact of performance on ODIs of +/- 2% based on ex ante analysis carried out at PR19.

Using the PR19 range for ODI RoRE risk may not account for new incentives and changes to existing incentives, such as new targets, PR24 ODI rates, removal of caps and collars.

The CMA assessed Ofwat's overall ODI package to be negatively asymmetric, as it included largely penalty-only incentives and asymmetric reward and penalty rates. This was key justification for the CMA aiming up on the allowed cost of equity.

"The overall degree of structural asymmetry in the ODIs, and otherwise in the determination, should be reflected in the choice of point estimate of the cost of capital". The CMA, PR19 re-determination, final report, 2021

The sector's overall level of performance on ODIs during the first three years of AMP7 is set out in table below. The shaded cells highlight performance at or above sector average. This indicates that ODI targets are stretching in AMP7. PR24 will likely require a further improvements in performance which exposes companies to a larger underperformance risk.

ODI risk in AMP8 is increasing as a number of the caps, collars and deadbands are being removed, performance commitment targets are likely to become more stretching, new ODIs are being introduced which are correlated with the existing ODIs, particularly on the wastewater side, and ODI rates are being recalibrated exposing greater proportion of return to risk.

Approach to assessment of ODI risk

This Report analyses water companies' actual risk exposure on ODIs, observed across the sector during PR19, as a proxy for potential risk exposure over PR24.

The analysis is based on the observed variation in actual performance for the sector in the first three years of PR19.

The risk exposure is assessed separately on each common PC and the combined exposure for all ODIs for PR24.

The sector-wide historical data is used to estimate distribution parameters (st. deviation and mean) that have been used as an input to Monte Carlo simulation analysis.

Key assumptions

To capture potential variation on performance at PR24 the analysis uses sector-wide historical data on performance (e.g., actual performance and PR19 targets) from Water Company Performance Reports (in previous years this Report was known as the Service Delivery Report) published by Ofwat.

Ofwat has not yet published PR24 performance targets. In the absence of this information, this risk assessment relies on Anglian's proposed targets in its PR24 Business Plan.

The risk assessment uses company-specific ODI rate, shared by Ofwat with Anglian.

Using this data, the distribution parameters per performance commitment are estimated, e.g. mean and the standard deviation. Using historical information as a proxy for PR24 performance represents a conservative assumption given the expected increase in risk compared to the past as a result of climate change.

For new ODIs, AMP7 data was considered where available and supplemented with AMP6 data where necessary (e.g., Bathing water quality). Due to lack of historical data, risk related to Greenhouse Gas Emissions, Biodiversity, D-Mex and BR-Mex has not been assessed. Therefore, the resulting ODI risk ranges potentially understate risk by excluding the impact of these measures if there is negative asymmetry or non-zero mean expected outcomes.

To estimate the exacted mean performance on individual PCs, we consider following scenarios:

- **Notional:** Assume past sector performance is a good proxy for future performance
- **Actual:** Assume past Anglian performance is a good proxy for future performance

A normal distribution has been applied to simulate possible performance outcomes for all PCs, besides the penalty only incentives. For penalty only incentives, we use triangular distributions.

AMP7 Sector RoRE performance ODIs. The shaded cells highlight performance at or above sector average.

	Company 1	Company 2	Company 3	Company 4	Company 5	Company 6	Company 7	Company 8	Company 9	Company 10	Company 11	Company 12	Company 13	Company 14	Company 15	Company 16	Company 17
ODI RoRE – notional equity																	
2021	**0.20%**	-1.80%	0.10%	-2.10%	**1.70%**	-0.80%	-0.60%	**0.30%**	-0.30%	**-0.10%**	0.00%	-1.10%	-0.90%	**0.10%**	-0.50%	-1.10%	-0.30%
2022	**-0.40%**	-2.30%	-1.20%	-1.70%	**1.40%**	0.10%	-0.70%	**0.40%**	-0.50%	**0.10%**	-0.60%	-0.80%	0.00%	**-0.30%**	0.30%	-0.40%	-0.50%
2023	**-0.70%**	-1.70%	-0.20%	-1.80%	**0.60%**	-0.20%	-1.50%	**0.40%**	-0.90%	**-0.10%**	-0.70%	-2.10%	-1.50%	**-0.50%**	-0.80%	-0.70%	-2.10%

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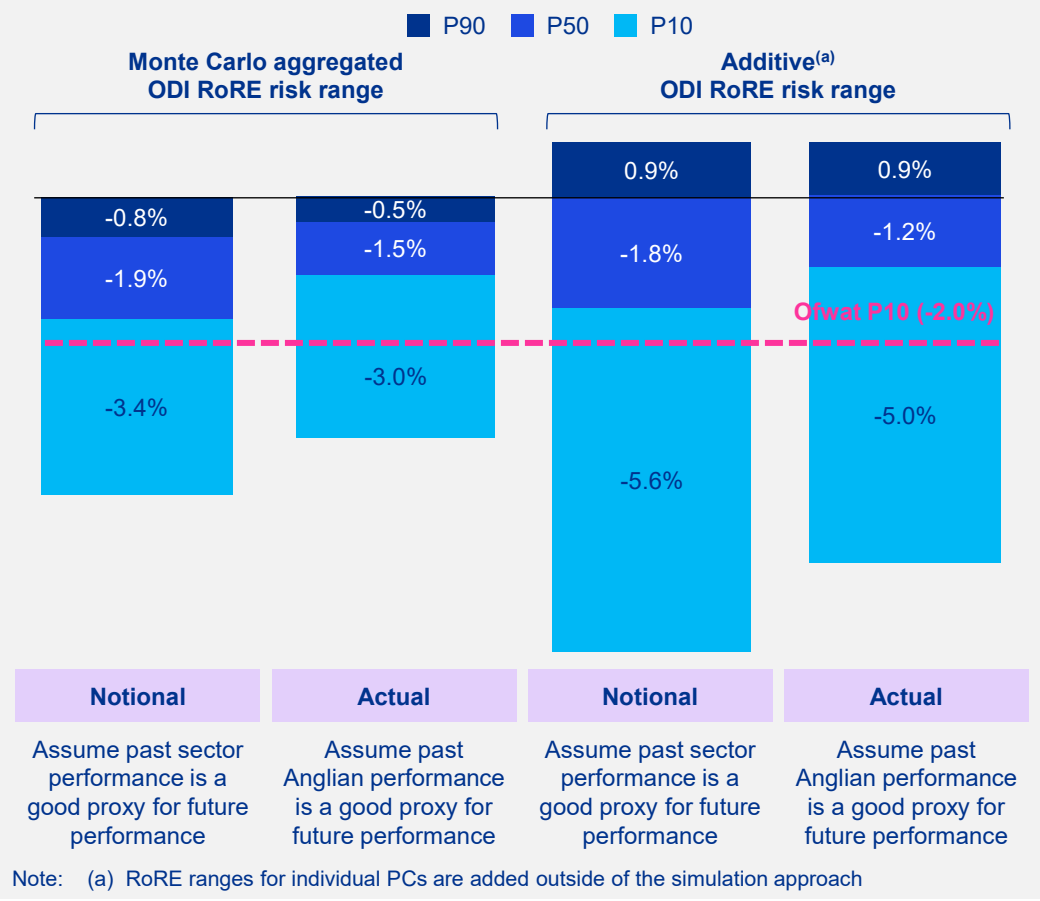
Analysis findings – ODI risk range on an unmitigated basis

ODI RoRE risk range pre Anglian proposed mitigations



Note: (a) RoRE ranges for individual PCs are added outside of the simulation approach

The Anglian unmitigated range for ODIs based on AMP7 performance implies:

1. **Higher downside risk exposure than implied by the PR24 FM estimate**

Anglian under a notional capital structure is exposed to a materially higher level of downside ODI risk (-3.4% under a notional scenario and -3.0% under actual scenario) than assumed based on Ofwat's initial analysis in its PR24 FM (-2.0%), driven by the expected stretching targets, penalty-only incentives and Ofwat's proposed ODI rates.

2. **Higher downside than upside exposure**

Downside ODI risk is significantly higher than upside opportunity – indicating that PR24 ODI package is negatively skewed.

3. **Penalties are expected in the base case**

P50 positions under notional and actual scenarios are negative.

4. **Higher risk exposure under the notional than actual scenario**

The downside ODI risk under actual scenario is lower compared to the notional P10 position, driven by expectation that Anglian will remain a better performer than industry average. Assuming future performance in line with Anglian's past performance increases downside exposure at the P10 level by up to 150bps

The combined exposure for all ODIs for PR24 is based on the aggregating risk ranges of individual PCs through Monte-Carlo simulation approach. The ODI risk range aggregated through the Monte-Carlo approach is more narrow compared to the simple additive range as Monte-carlo simulation approach enables controlling for interactions between different PC performance probabilities and provides a more robust estimate of the risk range.

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Key drivers of downside exposure on ODIs

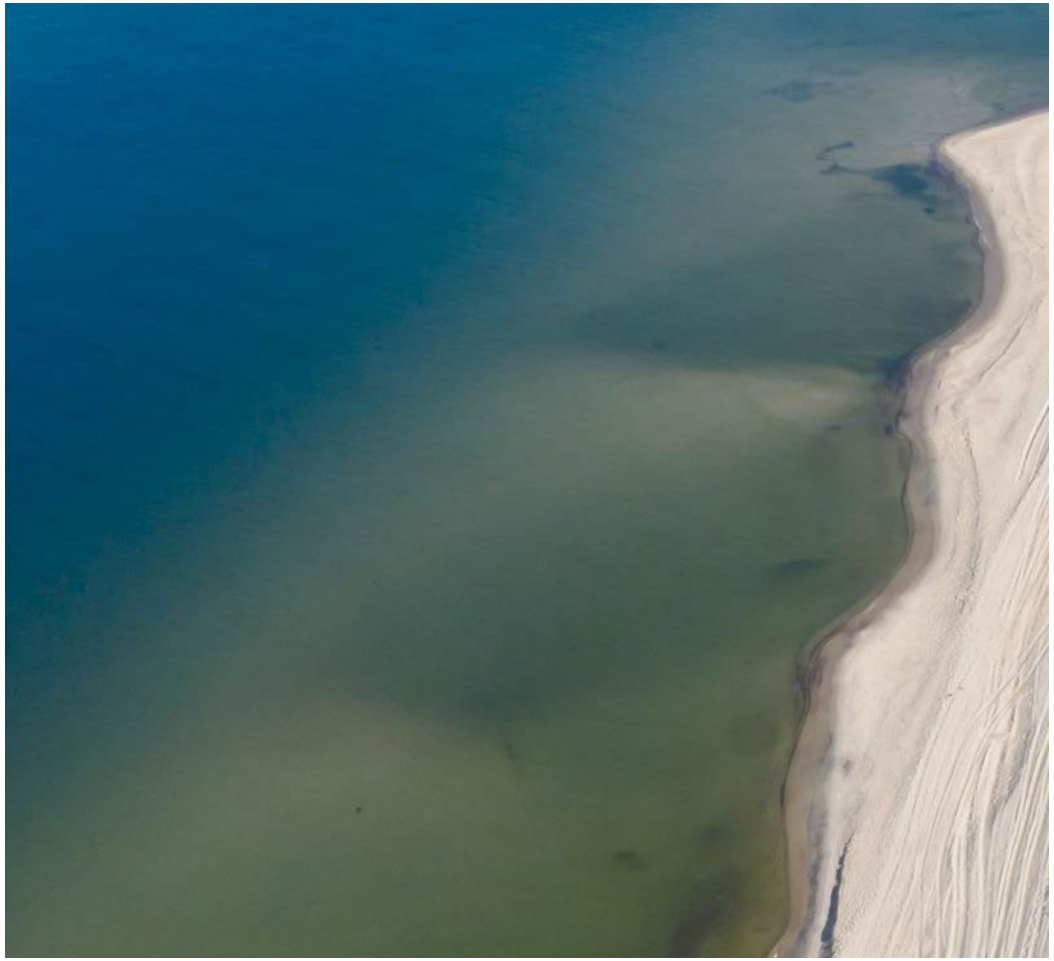
In its PR24 FM Ofwat considered the overall balance of risk on ODIs to be symmetric, however initial risk analysis based on AMP7 performance indicates that Ofwat's approach does not take into account all potential drivers of asymmetry.

Stretching performance targets. Ofwat may set targets which are not achievable in the base case. A number of common performance targets are already difficult to achieve in AMP7, which exposes companies to a higher under-performance risk on PCs in AMP8.

Penalty-only incentives: The CMA at PR19 re-determination considered that the overall ODI package was asymmetric, in part as it included significant asymmetric (largely penalty-only) incentives. PR24 ODI package still consists of penalty only ODIs such as Compliance Risk Index (CRI) and Discharge Compliance, where Discharge Compliance will no longer benefit from a deadband while the deadband for CRI will become narrower and confined to failures caused by customers' internal fittings

Removal of caps, collars and deadbands. Ofwat may set cap on out-performance reward closer to the PC level than the collar on under-performance penalty, making the total reward available lower than the potential penalty for under-performance. Ofwat may also remove caps, collars and deadbands. While the sector is benefitting from a collar on supply interruptions in AMP7, the unmitigated notional company risk analysis assumes that the collar that applies in AMP8 is much wider, exposing companies to potentially very significant downside from one-off but severe events. Similarly, the downside on pollution incidents is increasing because pollutions occurring due to named storms will no longer be excluded from the penalties. Per capita consumption is another area of asymmetry where companies have limited ability to influence customer behaviour, as was evidenced by sector-wide underperformance in AMP7 due to a shift in customer consumption patterns during and after Covid-19.

Risk of non-compliance with required environmental, water quality and related standards is a key issue for water companies but not captured in ODIs and hence in Ofwat's RORE range. EA and DWI are among water companies' most important stakeholders. The costs of addressing problems could be very high. We are considering how to pick up the fact that the scale of compliance requirements for water services is very different than for many other goods and services – this scale is a key source of risk and corresponding potential for fines or penalties.



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Addressing asymmetric ODI risk at source

Ofwat in PR24 FM stated that it aims a "*balanced package of incentives that allows efficient companies with a notional capital structure to have a reasonable prospect of achieving a return that is commensurate with the base allowed return".*

The risk analysis indicates that the ODI incentive package implies a significant downside skew. A notional firm based on the Anglian plan faces a penalty in the base case (P50 of -1.9% of RoRE). Moreover, the risk analysis suggests that both reasonable high (P90) and reasonable low (P10) scenarios are expected to result in penalties in the unmitigated scenario. This implies that a notional firm is exposed to a significant downside risk while there is limited opportunity for reward.

A balanced overall risk and return package is a necessary condition for the notional company to be able to finance its plan and attract both debt and equity capital at efficient rates and on continuous basis. In unregulated environments, businesses incorporate the consequences of asymmetric risks in cash flows, and in some cases the rate of return, required for an investment. If asymmetric risks were not adequately compensated then investments would not be undertaken.

An asymmetric ODI package was a key point of discussion at PR19 redeterminations. The CMA concluded that PR19 ODI package was asymmetric and uplifted the cost of equity point estimate to ensure the risk and return were in balance. Ofwat has indicated that if asymmetry in the PC/ODI framework creates asymmetric risk, then rather than taking this into account in the aiming up decision on the cost of capital, this would be better addressed by adjusting the ODIs package.

Addressing ODI asymmetry at source remains Ofwat's preferred approach at PR24. In PR24 FM Ofwat states:

> ***Where there is perceived asymmetry within the balance of incentives, we will seek to address this issue at source. We consider this preferable to adjusting allowed returns to address perceived asymmetry.***

The main reason behind CMA's decision for aiming up on cost of equity instead of changing ODI package was the timing of the intervention as the PR19 redetermination stage was already too late. The CMA at PR19 redetermination said:

> ***We do not agree that adjusting ODI collars or rates is appropriate at this stage to address overall asymmetric risk. PCs and their associated ODI rates are intended to incentivise service improvement. The definition of PCs and ODIs has been developed over PR19 and we consider it would not be appropriate at this stage to fundamentally change the way in which they are designed and calibrated.***

The PR24 ODI package remains under development. As a result, there is scope to change incentive package design at this stage to address risk at source.

Following Ofwat's guidance, in the process of developing its PR24 Business Plan, Anglian has considered potential risk mitigations to address ODI risk asymmetry at source.

Potential ways to address the ODI risk asymmetry at source and Anglian's proposed ODI risk mitigations in the Business Plan are set out on following slides.

It is important to note that Ofwat's RoRE range for ODI risk in PR24 FM is based on PR19 range and Ofwat considers this to be appropriate for PR24. Ofwat's similar position during PR19 was challenged by the CMA. The CMA said:

> ***We do not agree that Ofwat's historic analysis of companies' performance in AMP6 demonstrates that there is no asymmetrical risk in the AMP7 ODI framework. The PC and ODI framework in PR19 is different in scope (more financial incentives, including the introduction of new penalty-only incentives) and design (rates, caps and collars) from the PR14 framework.***

The PR24 incentive package is going to be different to the corresponding incentives at PR19, and it is important to evaluate the implications of PR24 incentive design, including application of rates, caps, collars and targets, for notional company risk exposure.

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Potential ways to address the ODI risk asymmetry at source

Use of caps and collars:

Caps and collars can serve a useful function as part of the design of effective ODIs: (a) Caps provide protection for customers from increased bills, and also mitigate the risk that a company's objectives could be distorted by the opportunity to outperform on particular ODIs. (b) Collars mitigate the risk that under-performance on one PC (which could arise for various reasons, potentially including ones outside the control of the company) could lead to extreme penalty levels for firms.

Use of deadbands:

Deadbands may be appropriate in certain circumstances. Deadbands may be appropriate where outcomes may not be fully within the control of management such as where the measure itself allows very little tolerance. In these cases, a company might 'miss' the PC without necessarily having objectively failed in management of the commitment.

> ***The common theme across caps, collars and deadbands is that they are able to make ODIs more effective in circumstances where there is difficulty in setting targets and defining a single appropriate level of penalty and rewards against those targets. We agree that some of the PCs and ODIs would be more effective if these additional mechanisms are applied in addition to standard reward and penalty rates".***
>
> – The CMA, PR19 re-determination

Use of enhanced ODI rates:

At PR19, for some PCs, companies proposed Enhanced ODI rates above and below certain performance levels. Enhanced ODI rates were a new initiative in PR19 and were in place only on request for high-performing companies. The purpose of Enhanced ODIs is to drive frontier shift and set new benchmarks for sector performance. The highest-performing companies are given additional incentives to innovate in order to further improve performance and develop new techniques for doing so which can be shared across the sector. Where enhanced rates apply, the company will earn (or pay) a standard ODI rate for out-performance and under-performance to up to the standard rate cap or collar. Additional out-performance or under-performance attracts higher rates, up to an enhanced cap or collar.

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Anglian's assumed ODI risk mitigations

Anglian has proposed a combination of potential risk mitigations outlined on the previous slide to reduce the risk exposure and asymmetry for the notional firm implied by unmitigated ranges.

Summary of mitigations proposed by Anglian Water in the PR24 business plan

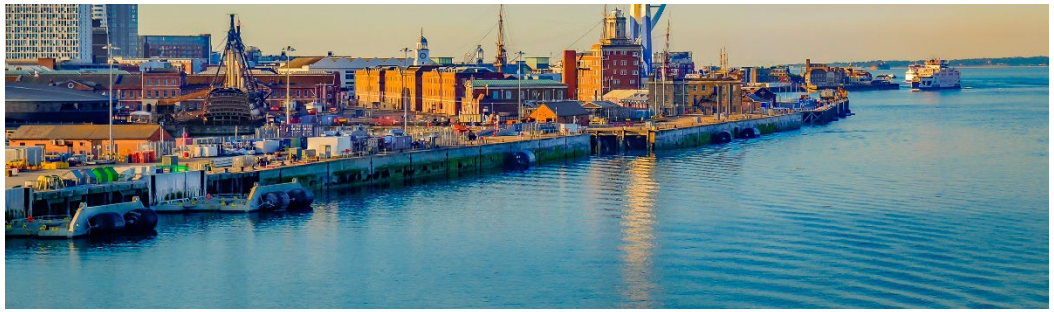
1. ODI reward/penalty rates different to Ofwat's for four PCs (set out to the right). Alternative rates aim to reduce the overall risk exposure implied by ODIs.

2. Deadbands to mitigate PR24 risk exposure for the following PCs:

- CRI
- Discharge compliance
- Mains repairs
- Customers contacts
- Bathing water quality

3. A cap on supply interruption PC. The aim of this mitigation is to limit the downside risk exposure and to reduce the asymmetry.

4. Enhanced thresholds where enhanced out-performance rates to be applied. This aims to expand the upside potential and to reduce asymmetry.



Anglian Water's rates vs Ofwat's proposed ODI rates		
PC category	**Ofwat**	**Anglian**
Total pollution incidents	1.74	0.60
Serious pollution incidents	1.14	0.16
Business demand	0.36	0.14
PCC	1.77	0.38

Anglian Water's proposed enhanced thresholds for specific PCs	
PC category	**Enhanced threshold**
Water supply interruptions	2:21
PCC	121
Leakage	154
Total pollution incidents	16.29
Internal sewer flooding	0.97
External sewer flooding	12.7

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Impact of the ODI mitigations assumed in the Anglian plan

The assumed suite of mitigations on ODIs is one of the possible combinations that is targeted to mitigate risk at source. These mitigations category improve the ODI RoRE risk range. Anglian's mitigated RoRE risk range for ODIs based on AMP7 performance implies:

1. **Anglian's proposed mitigations in BP significantly reduce downside exposure**

Anglian Water under a notional capital structure and post-mitigations is exposed to a materially less risk (-1.8% under a notional scenario and -1.3%% under actual scenario) compared to downside risk exposure for unmitigated case (3.4% under a notional scenario and -3.0% under actual scenario).

Anglian's downside risk exposure on ODIs under mitigated scenario falls within Ofwat's PR24 FM ODI downside range.

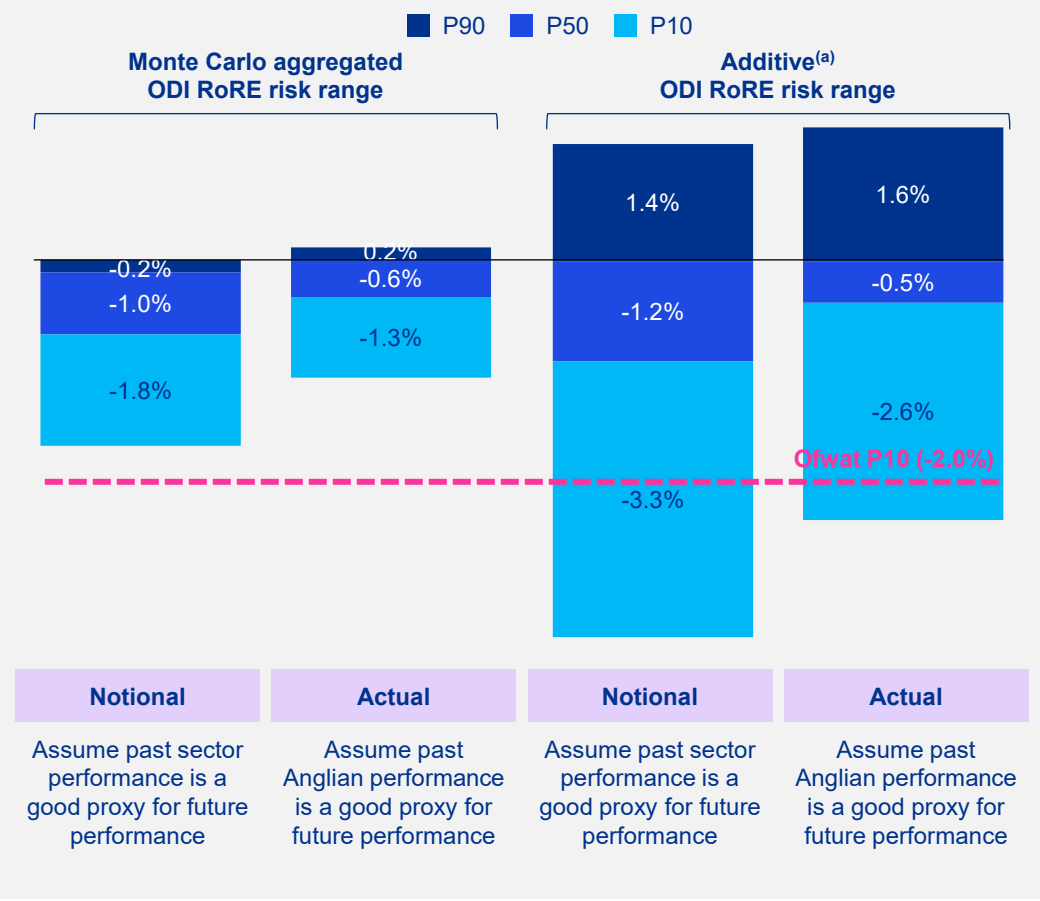
2. **Downside exposure even under the mitigated scenario is significantly higher than the upside opportunity, implying asymmetric design of PR24 incentive framework on ODIs.**

Downside exposure under all options is higher than the upside potential. The P50 position under all options, mitigated and unmitigated or notional and actual, is also negative. All else being equal, this implies that the ODI framework is inherently asymmetric and some level of aiming up on returns may be required to price in asymmetric exposure which cannot be addressed at source.

3. **Downside risk exposure for the actual company (e.g. assuming past Anglian performance is a proxy for the future performance) is relatively smaller compared to the notional company (e.g. assuming sector performance as a proxy for future performance).**

The risk assessment is based on Anglian's proposed targets as set out in the business plan. There is a risk that Ofwat introduces different targets to those assumed in the Anglian plan, which could impact on risk exposure.

ODI RoRE risk range post Anglian proposed mitigations



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Decomposition of PR24 ODI RoRE risk range

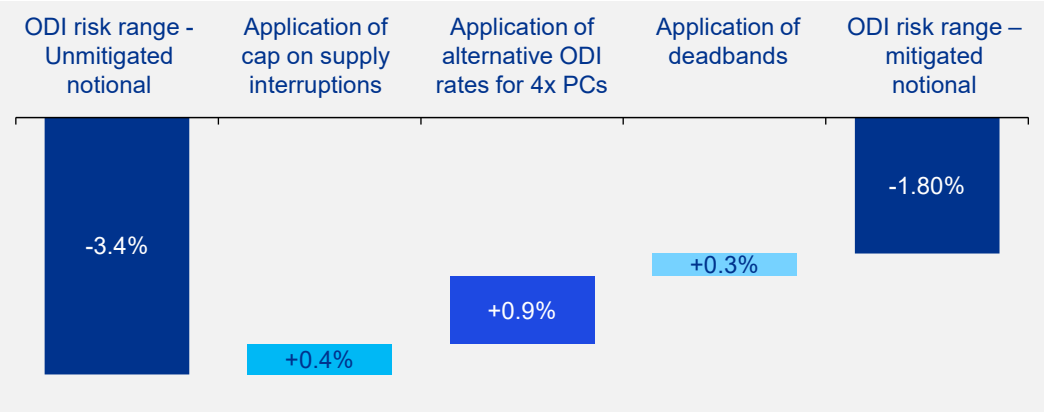
The mitigations applied on ODIs materially reduce scope for downside exposure and improve the P50 position.

The inclusion of mitigations in Anglian's plan has shifted the P10, P50 and P90 RoRE upwards, by -1.6%, -0.9% and -0.6%, respectively, with the greatest impact on the downside.

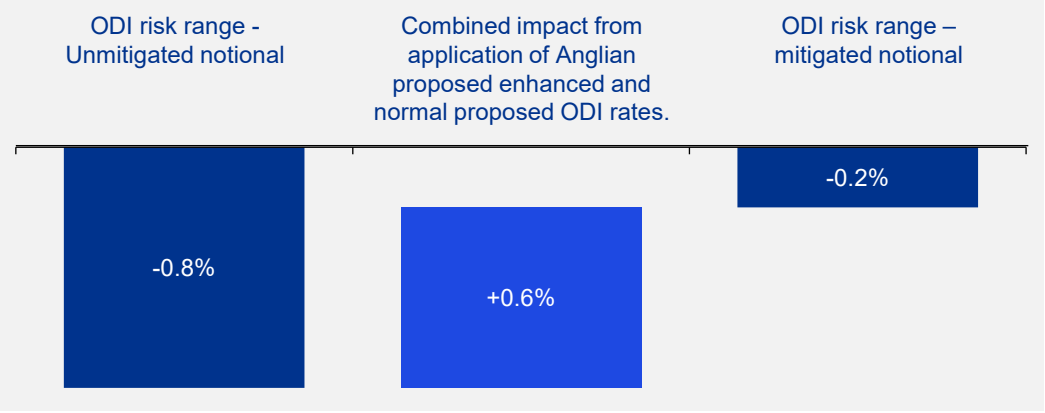
- The most material impact from proposed suite of mitigations is due to the application of Anglian's proposed ODI rates. Adopting Anglian rates decreases downside exposure by 90bps. The main driver of the difference is the exposure on Total Pollution Incidents. Without Anglian's proposed mitigation (lower ODI rate), a notional company is exposed to a material downside, with no corresponding upside opportunity, which creates a significant asymmetry in risk exposure on ODIs.
- Application of a cap on water supply interruptions reduces downside exposure by 40bps.
- Removal of Anglian's proposed deadbands reduces downside exposure by 30bps.
- Application of enhanced rates increases the upside opportunity for a notional company. The combined impact from adopting Anglian regular and enhanced rates increases the upside opportunity by 60bps.

The risk assessment is based on Anglian's proposed targets as set out in the business plan. There is a risk that Ofwat introduces more stretching targets than assumed in the Anglian plan, which could introduce additional downside exposure.

Impact of each group of notional company mitigations to the ODI RoRE downside (P10)



Impact of each group of notional company mitigations to the ODI RoRE upside (P90)



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PR24 ODI RoRE risk range for individual PCs

In the risk analysis, the combined exposure for all ODIs for PR24 is based on the aggregating risk ranges of individual PCs through Monte-Carlo simulation approach. Table below sets out P10, P50 and P90 positions of RoRE risk per individual PC under unmitigated notional, mitigated notional and mitigated actual scenarios.

The table shows that the primary drivers of ODI risk range under unmitigated scenario are **water supply interruptions** and reducing the **total pollution incidents.**

The risk exposure on these two PC is significantly reduced after considering Anglian's assumed risk mitigations. Specifically, the Anglian plan assumes a 0.5% cap on supply interruptions to reduce downside risk exposure and proposes to use a lower rate than Ofwat's ODI rate for total pollution incidents to reduce the risk implied by the incentive.

Performance Commitment	Unmitigated notional			Mitigated notional			Mitigated actual		
	P10	P50	P90	P10	P50	P90	P10	P50	P90
Total ODI	**-3.4%**	**-1.9%**	**-0.8%**	**-1.76%**	**-0.99%**	**-0.20%**	**-1.34%**	**-0.62%**	**0.21%**
Leakage	-0.20%	-0.162%	0.039%	-0.20%	-0.162%	0.068%	0.000%	0.004%	0.008%
Water quality contacts	-0.045%	0.002%	0.050%	-0.024%	0.002%	0.050%	-0.024%	-0.011%	0.036%
Water supply interruptions	-1.007%	-0.195%	0.065%	-0.500%	-0.195%	0.065%	-0.500%	-0.011%	0.065%
Compliance risk index (CRI)	-0.197%	-0.108%	-0.045%	-0.197%	-0.108%	0.000%	-0.197%	-0.108%	0.000%
Per capita consumption (PCC)	-0.448%	-0.293%	-0.139%	-0.097%	-0.064%	-0.030%	-0.083%	-0.050%	-0.016%
Mains Repairs	-0.100%	-0.010%	0.080%	-0.067%	-0.010%	0.080%	-0.067%	-0.027%	0.220%
Unplanned outage	0.007%	0.032%	0.056%	0.007%	0.032%	0.056%	0.001%	0.025%	0.050%
Total pollution incidents	-1.926%	-0.501%	0.194%	-0.660%	-0.172%	0.067%	-0.625%	-0.137%	0.067%
Sewer flooding	-0.260%	-0.075%	0.109%	-0.260%	-0.075%	0.218%	-0.177%	0.008%	0.384%
Sewer collapse	-0.186%	-0.022%	0.141%	-0.186%	-0.022%	0.141%	-0.027%	-0.004%	0.018%
Discharge compliance	-0.223%	-0.155%	-0.103%	-0.223%	-0.155%	0.000%	-0.223%	-0.155%	0.000%
Bathing water quality	-0.147%	-0.018%	0.110%	-0.147%	-0.018%	0.110%	-0.129%	0.000%	0.128%
Storm overflows	-0.371%	-0.180%	0.011%	-0.371%	-0.180%	0.011%	-0.160%	-0.057%	0.047%
External sewer flooding	-0.333%	0.017%	0.365%	-0.333%	0.017%	0.649%	-0.332%	0.018%	0.651%
serious pollution incidents	-0.241%	-0.115%	0.000%	-0.033%	-0.016%	0.000%	-0.057%	-0.039%	-0.022%

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07

Measures of experience risk assessment

Methodology, assumptions and findings

Ofwat's approach to measure of experience at PR24

Ofwat has set out its initial proposals for the **high-level design of the measures of experience** in the *consultation on the measures of experience performance commitments at PR24*. This includes the following mechanisms, which Ofwat introduced at PR19:

- **the customer measure of experience (C-MeX);**
- **the developer services measure of experience (D-MeX);**
- **the business customer experience in Wales performance commitment.**

Ofwat is also introducing a new experience measure at PR24 – **the business and retailer customer measure experience (BR-MeX).**

Ofwat's proposed changed for PR24 include:

- Calculating incentive payments based on a proportion of regulatory equity for C-Mex and D-Mex
- Removing payment gateways for C-Mex
- Making a greater use of cross-sector benchmarks for C-Mex, with water companies only able to earn out-performance payments if they perform better than the average of service providers in the **wider economy**.

In the PR24 FM, Ofwat estimated a RoRE range of between +0.50% and -0.65% for the measure of experience risk category. PR24 FM range was derived prior the publication of the consultation and does not account for the proposed changes.

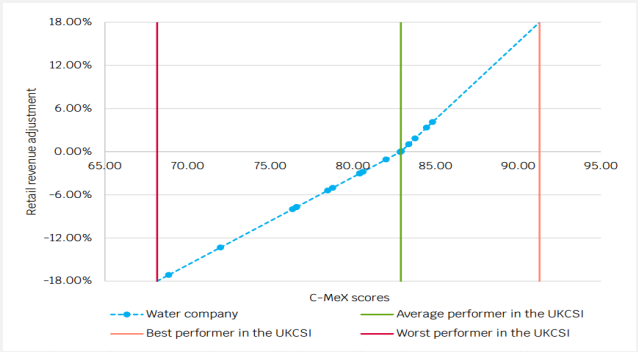
Approach to assessment of measure of experience risk

C-Mex

Moving to comparative assessment of performance based on the wider economy, introduces an asymmetry in the approach as water companies will have less scope for out-performance than for under-performance.

In 2022 only 5 water companies (out of 17) have outperformed wider-economy average score. This implies that **the scope for under-performance is more than two times higher than the scope for out-performance for C-Mex incentive at PR24**.

C-Mex scores in 2022



D-Mex

Historical performance on D-Mex implies a downside asymmetric risk exposure. In 2020-21 the maximum range of D-MeX payments as a proportion of notional regulatory equity was around +0.07% to -0.14% RoRE on a weighted average basis.

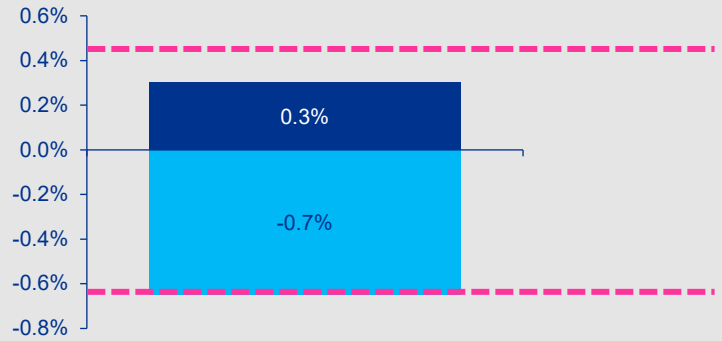
Ofwat has not yet published details of the approach to measure of experience incentives, including (1) proportions of regulatory equity for the purpose of calculating incentive payments (2) definition of to the wider economy for a comparative assessment (3) approach to setting higher payments for the best service provider in the wider economy.

In the absence of this information it is implausible to estimate the precise risk range for measures of experience.

We consider it is conservative assumption to retain Ofwat's proposed downside, P10 position as set out in PR24 FM.

Observed historical performance and an additional downside asymmetry introduced by Ofwat's proposed changes at PR24 implies that the potential for upside, P90 position, for performance on experience measures is expected to be significantly limited, compared plies out-performance risk range to be half of the under-performance.

Measure of experience RoRE risk range



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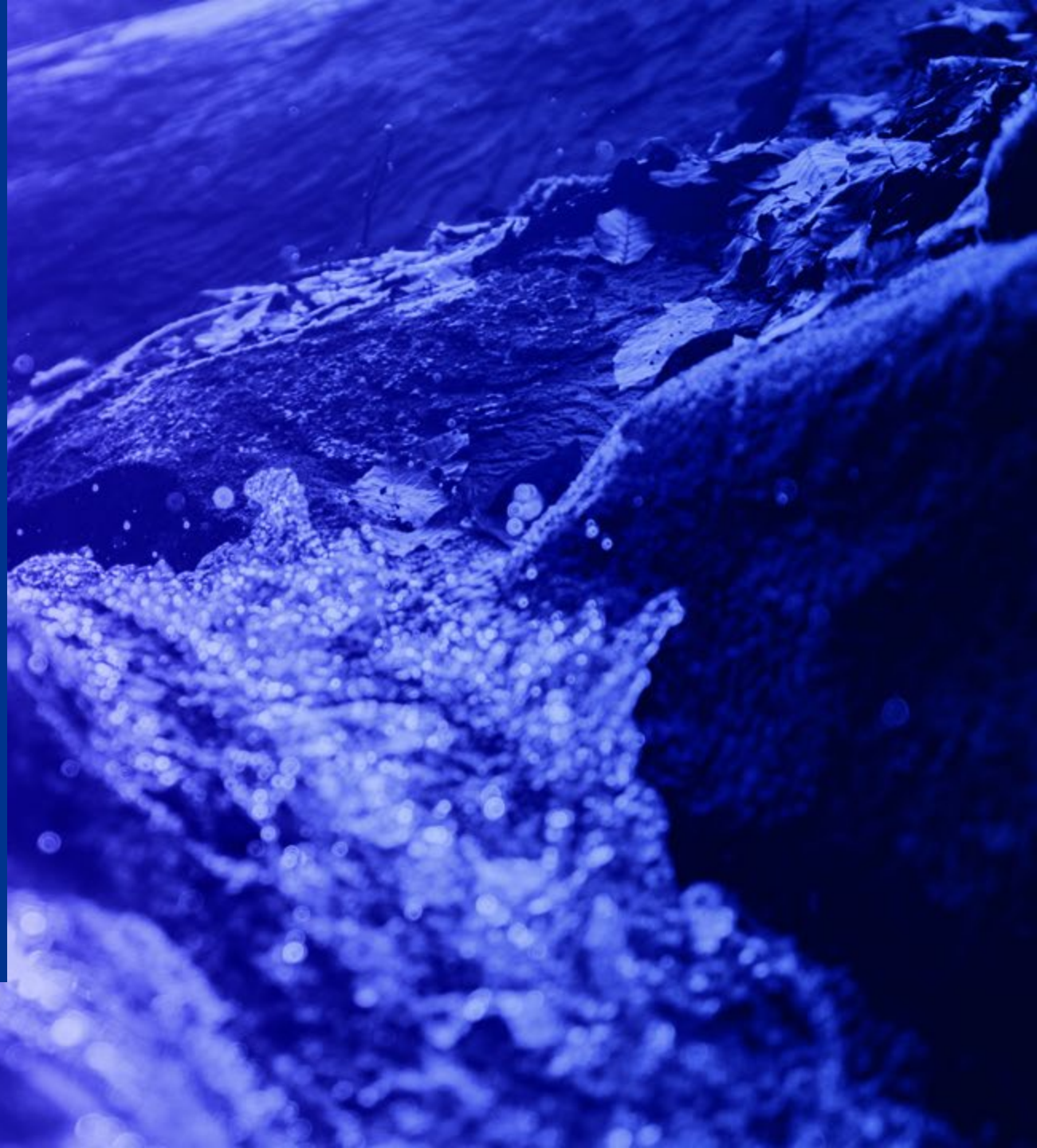
08

Financing risk assessment



Methodology and assumptions for financing risk assessment

Ofwat's approach to development of financing risk RoRE ranges for PR24

In the PR24 FM, Ofwat provides an indicative RoRE risk range for financing of 0.7% upside and -0.65% downside. Ofwat decomposes the financing risks into the following drivers:

1) Inflation risks: the impact of CPIH inflation being 1% higher or lower than its long-term inflation assumption. This gives a RoRE impact of -0.60% and 0.60% for the notional firm, which is assumed to have 33% index linked debt.
2) Cost of new debt risks: the risk that water sector new debt may be issued at a yield above or below the iBoxx benchmark indices, drawing on water sector bond data from 2015 to March 2022. This implies scope for up to 0.1% out-performance on RoRE and -0.05% under-performance.
3) Cost of embedded debt risks: Ofwat considers that risks relating to the cost of debt should not be included in RoRE as these costs are not governed by PR24 regulatory incentives.

This approach omits key drivers of financing risk in the sector, in particular risks associated with embedded debt, and does not appear to capture current macroeconomic volatility.

01 Inflation drivers omitted by Ofwat's PR24 FM approach

There are risk drivers which are not captured by the PR24 FM RoRE range calibration:

1) **Inflation risks**: outturn RPI-CPIH wedge variance to long-term inflation assumption.
2) **Inflation risks**: outturn CPI-CPIH wedge variance to long-term inflation assumption.

02 Omission of cost of embedded debt risk

Ofwat implicitly assumes that at the P50 level the notional company will neither outperform nor underperform. However, the notional firm might not issue its debt in line with the sector P50 due to different timing of issuance, debt strategy relative to the median company. In addition median costs could not have been forecast ex ante. As a result there is a risk that the notional company might not have incurred debt costs in line with sector P50 across AMP8.

03 Assumptions on inflation volatility

The PR24 FM risk range assumes an inflation variation of +/- 1% relative to long-term inflation assumptions. However, recent market conditions indicate that inflation can be more volatile. Based on historical inflation series from April 2000, the P10-P90 range for CPIH is 0.9%-4.0% on an annual basis. This suggests that a higher level of inflation variation.

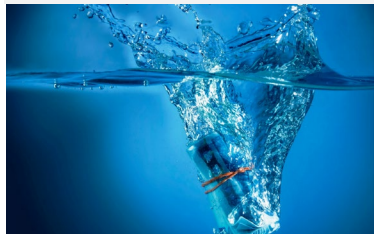
04 Assumptions on interest rate risk

1) The PR24 FM range omits long term financing risks for the notional firm on embedded debt, including risks associated with different timing of issuance and debt composition relative to sector average
2) More recent data on the issuance yield of water sector (FY2022 to FY2023) needs to be taken into account when assessing cost of new debt performance against the iBoxx benchmark indices.

Financing risk for the notional company

This section will examine the following risk areas:

- **Inflation risks:** 1) outturn CPIH variation compared to long-term CPIH inflation assumption; and 2) outturn RPI-CPIH wedge variance compared to assumed wedge; and 3) outturn CPI-CPIH wedge variance compared to assumed wedge
- **Interest rate risks:** 1) cost of new debt performance against iBoxx benchmark indices; 2) cost of embedded debt performance relative to the sector P50.



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Financing risk – CPIH variation – embedded and new fixed rate debt

Inflation risks: Outturn CPIH variation compared to long-term CPIH inflation assumption

The variation of outturn CPIH gives rise to risk of out- or under-performance on fixed rate debt against the cost of debt allowance in real terms.

The PR24 FM assumes +/- 1% CPIH variation relative to the long-term 2% CPIH assumption, which is lower than the variation suggested by historical data and in particular recent data. Based on the historical inflation series from April 2000, the P10-P90 range for CPIH is 0.9%-4.0% on an annual basis.

Forward looking estimation of inflation variation

To refine the assumptions on inflation variation for AMP8, forward looking inflation is simulated based on historical data. Outturn inflation rates from April 2015 to July 2023 are used to simulate exposure to inflation across AMP8. Based on a structural break test[(a)] conducted in Stata, outturn inflation rates are delineated into periods of low inflation volatility (March 2015 to November 2021) and high inflation volatility (from November 2022 to July 2023). The historical inflation rates from the low inflation volatility period underpins scenario 1mwhich assumes a low level of inflation variation, while the inflation rates from the period of high volatility is used to underpin scenario 2 which assumes a high level of inflation variation.

The inflation rate downside is defined as the P10 less P50 of the simulated paths, and the inflation upside as the P90 less P50 of the simulated paths. In practice, the inflation downside means that the actual real cost of fixed rate debt will be higher than the allowance, which implies under-performance. The average of the inflation variation across the two scenarios over AMP8 is **-1.90%** downside and **1.88%** upside.

Impact on inflation risks on the financing risk RoRE range

Ranges are calculated based on Ofwat's approach to convert inflation variation into RoRE terms: Inflation variation x (1 – proportion of non-ILD debt) x (Notional Gearing / 1 – Notional Gearing) x (1 – Tax rate). 33% notional company ILD debt, 55% notional gearing and 25% tax rate is used.

This implies -1.17% under-performance vs allowance, and +1.15% out-performance vs allowance.

Inflation variation – Scenario 1: Low level of inflation variation

Scenario 1	FY2026	FY2027	FY2028	FY2029	FY2030	Average
P10 less P50	-1.3%	-1.4%	-1.5%	-1.6%	-1.7%	**-1.51`%**
P90 less P50	1.3%	1.4%	1.5%	1.6%	1.6%	**1.47%**

Inflation variation – Scenario 2: High level of inflation variation

Scenario 2	FY2026	FY2027	FY2028	FY2029	FY2030	Average
P10 less P50	-2.28%	-2.30%	-2.31%	-2.24%	-2.26%	**-2.28%**
P90 less P50	2.29%	2.26%	2.31%	2.28%	2.31%	**2.29%**

Inflation variation – Simple average of the two scenarios

	FY2026	FY2027	FY2028	FY2029	FY2030	Average
P10 less P50	-1.79%	-1.85%	-1.91%	-1.92%	-1.98%	**-1.90%**
P90 less P50	1.80%	1.83%	1.91%	1.94%	1.96%	**1.88%**

Note (a) A structural break test is a statistical test that helps to determine any step changes in the data throughout the period. The step change is identified by any significant change in the mean and standard deviation of the data.

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Financing risk – RPI–CPIH wedge variation – embedded RPI-linked debt

Inflation risks: outturn RPI-CPIH wedge variance compared to ex ante wedge

The notional capital structure assumes all index-linked debt to be linked to the CPIH index. In practice the notional company has raised a substantial proportion of debt linked to the RPI index, since all price controls prior to AMP7 were indexed by RPI. It is possible that the sector could swap all of its embedded RPI-linked exposure into CPI or CPIH, however this has not been priced and hence at this stage it is assumed that the notional company maintains a material exposure to the RPI-CPIH wedge in AMP8.

RPI-linked debt assumed to be held by the notional company will face the risk exposure from the outturn variation of RPI-CPIH wedge against the assumption of 0.9% used in setting the cost of embedded debt allowance.

Based on the historical inflation series since 2000, the P10-P90 range for the RPI-CPIH wedge is 0.1%-2.1% on an annual basis, with P50 of 0.9%. This gives a wedge variation of -0.9% to +1.2% to the central case (i.e. P50). A variation of +1.2% at the P10 level means that wedge is 1.2% higher than forecast, which leads to higher accretion on the cost of debt and higher costs. This translates into under-performance relative as the allowance does not capture changes in the wedge.

Impact on financing risk RoRE range

Applying the RPI-CPIH wedge variation to the cash interest and the accretion of notional embedded RPI-linked debt gives RoRE range of -0.25% to 0.18%. This is mainly due to the asymmetry in RPI-CPIH variation, which has a higher positive variation (1.2%) than negative variation (-0.9%). This translates into a slightly higher scope for under-performance relative to the allowance.

Detailed calibration of the RoRE risk range is illustrated in the table to the right.

Parameter		P10	P50	P90
RPI-linked debt as a % of total ILD	A		94%	
% Proportion of embedded debt	B		74%	
% Notional debt	C		55%	
% Index-linked debt	D		33%	
% Notional debt – embedded, RPI-linked [(A × B × C × D)]	E		13%	
% Cost of debt allowance (CPIH, real)	F		2.5%	
Tax rate	G		25%	
RPI-CPIH wedge	H	2.08%	0.91%	0.05%
RPI-CPIH wedge variation	I	1.20%	0.0%	(0.90%)
Cost of debt (RPI, real)	J	1.58%	1.58%	1.58%
Outturn CPIH	K	2.00%	2.00%	2.00%
Accretion (%) [(1+H) × (1+K) -1]	L	4.12%	2.93%	2.05%
Cost of debt (nominal) [((1+J) × (1+ L)-1]	M	5.77%	4.56%	3.66%
Cost of debt (CPIH, real) [(1+M)/(1+K)-1]	N	3.69%	2.51%	1.63%
Cost of debt out- (under-)performance vs allowance (post tax) [(N – F) × (1 – G)]	O	(0.90%)	(0.01)%	0.65%
%RoRE out- (under-)performance vs allowance (post tax) [O × E / (1-C)]	**P**	**(0.25)%**	**(0.00)%**	**0.18%**

Note (a) The outturn CPIH is kept constant across P10, P50, and P90, as the calculation here is to examine the %RoRE variation due to the variation in RPI-CPIH wedge, not the variation in outturn CPIH.

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Financing risk – CPI – CPIH wedge variation – embedded and new debt

Inflation risks: outturn CPI-CPIH wedge variance compared to assumed wedge

The notional capital structure assumes all index-linked debt to be linked to the CPIH index. In reality, due to the lack of liquidity in CPIH debt markets, all embedded debt that is not linked to RPI index on issuance is linked to CPI not CPIH.

Absent any significant market development in CPIH markets for new debt, the variation of CPI-CPIH wedge will affect both embedded and new debt.

As a result, the notional company will have financing risk exposure related to the CPI-CPIH wedge at PR24.

Based on the historical inflation series since 2000, the P10-P90 range for the CPI-CPIH wedge is -0.3% to 0.7% on an annual basis, with P50 of 0%. This gives a wedge variation of -0.3% to +0.7% against the central estimate of 0%. The variation of +0.7% means that CPI is higher than CPIH, which leads to higher accretion on the cost of debt and hence higher costs. This translates into under-performance relative to the allowance.

For WaSCs and the largest WoC, 6.0% of embedded index-linked debt is linked to CPI based on Ofwat's PR24 Balance Sheet Cost of Debt model. For new index-linked debt issued during AMP8, it is assumed that 100% of the ILD is CPI-linked.

Impact on financing risk RoRE range

Applying the CPI-CPIH wedge variation to embedded and new CPI-linked debt gives RoRE range of -0.06% under-performance and 0.02% out-performance (i.e. the sum of R and S in the table to the right). This is mainly due to the asymmetry in CPI-CPIH variation, which has a higher positive variation (0.68%) than negative variation (-0.30%), meaning a higher accretion amount on the cost of debt. This translates into a larger scope for under-performance relative to the allowance.

Detailed calibration of the RoRE risk range is set out in the table to the right.

Parameter		P10	P50	P90
CPI-linked debt as a % of total embedded ILD	A		6.02%	
CPI-linked debt as a % of total newly issued ILD	B		100%	
% Proportion of embedded debt	C		74%	
% Notional debt	D		55%	
% Index-linked debt	E		33%	
% Notional debt – embedded, CPI-linked [(A × C × D × E)]	F		0.81%	
% Notional debt – new, CPI-linked[(B × (1 – C) × D × E)]	G		4.72%	
% Cost of debt allowance (CPI, real)	H		3.27%	
Tax rate	I		25%	
CPI-CPIH wedge	J		0%	
CPI-CPIH wedge variation	K	0.68%	0.04%	(0.30%)
Cost of debt (CPI, real)	L	3.27%	3.27%	3.27%
Outturn CPIH	M	2.00%	2.00%	2.00%
Accretion (%) [(1+M) × (1+K) -1]	N	2.69%	2.04%	1.70%
Cost of debt (nominal) [(1+L) × (1+N) -1]	O	6.05%	5.38%	5.03%
Cost of debt (CPIH, real) [(1+O)/(1+M)-1]	P	3.97%	3.31%	2.97%
Cost of debt out- (under-)performance vs allowance (post tax) [(H – P) × (1 – G)]	Q	(0.52%)	(0.03)%	0.23%
%RoRE out- (under-) performance vs allowance (post tax): embedded debt [Q × A / (1-D)]	**R**	(0.01%)	(0.00)%	0.00%
%RoRE out- (under-) performance vs allowance (post tax): new debt [Q × B / (1-D)]	**S**	**(0.05)%**	**(0.00)%**	**0.02%**

Note (a) The outturn CPIH is kept constant across P10, P50, and P90, as the calculation is to examine the %RoRE variation brought by the variation in CPI-CPIH wedge, not the variation in outturn CPIH.

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Financing risk – Cost of new debt performance

Interest rate risk: cost of new debt performance against the iBoxx benchmarks

The cost of new debt allowance is equal to the average iBoxx A/BBB non-financial 10 year+ index deducted by 15 bps out-performance wedge. There is however scope for the notional company could out- or under-perform against the allowance when issuing new debt.

Based on water sector issuance yield data from 2015 to March 2022, Ofwat estimates 0.7% outperformance and -0.3% underperformance, which is upward asymmetric.

This analysis has been updated based on the issuance yield of the more recent period up to August 2023. The figure on the right shows that, compared to the earlier period (2015-2021) where the majority of water sector bonds are issued at below the iBoxx A/BBB index, the more recent period indicates yield at issue close to, and in several cases above, the benchmark index.

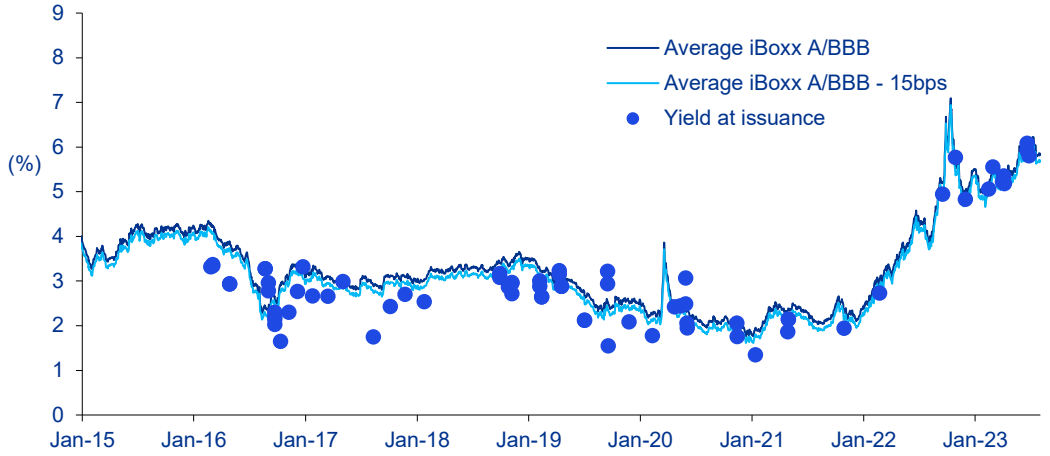
Based on all the issuance post CMA PR19 decision (from Jan 2021 to July 2023), the cost of new debt indicates a higher scope for under-performance than out-performance, even before controlling for tenor and credit ratings. The P50 position against the benchmark index after 15bps adjustment is -0.01% under-performance. Cost of new debt under-performance (i.e. P10) is -0.30%, while out-performance (P90) is 0.26%. All else equal this would suggest that the risk is slightly downward asymmetric.

This also indicates that a key mitigation of risk on cost of new debt would be removal of the outperformance wedge assumed in the PR24 FM.

Impact on financing risk RoRE range

Applying the notional capital structure assumptions, this translates to a post-tax RoRE range of -0.07% downside and 0.06% upside.

Observed water sector bond issue yields compared with iBoxx benchmark



Source: KPMG analysis based on Bloomberg and Refinitiv Eikon.

Cost of new debt performance – Measured by iBoxx benchmark yield -15bps less issue yield

Percentile	Nominal	CPIH-real
Min	(0.40%)	(0.39%)
P10	(0.30%)	(0.30%)
P20	(0.21%)	(0.21%)
P50	(0.01%)	(0.01%)
P80	0.16%	0.16%
P90	0.27%	0.26%
Max	0.46%	0.45%

Note: based on the period between Jan 2021 and July 2023.

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Financing risk – Cost of embedded debt performance

Interest rate risk: cost of embedded debt

Ofwat sets the cost of embedded debt allowance based on the median of the sector's forecast average cost of debt (in real) across AMP8. The sector here is defined as WaSCs and large WoCs.

Ofwat implicitly assumes that at the P50 level of the notional company will neither out-perform nor under-perform. That is, the notional company will raise debt in line with the sector P50 (in this case Yorkshire Water) over the last 30 years.

However, the notional firm might not have issued its debt in line with the sector P50 due to factors such as timing and frequency of issuance, treasury policies. This suggests the notional company might not have issued debt in line with the sector P50 at the beginning and across AMP8.

The variation on cost of embedded debt performance at P10 to P90 represents the fact that the notional company might not have issued its debt in line with the sector median, which results in the cost of embedded debt risks against the allowance over AMP8.

To measure the financing risks on the cost of embedded debt performance, the projected AMP8 cost of debt variation (in real terms) for WaSCs and large WoCs is used. The P50 position, measured by the 2.5% PR24 FM allowance (in real terms) relative to the projected cost of debt of median company is equal to -0.07% (see row J in the right table), which represents slight under-performance at P50 level. The cost of debt underperformance (P10) is -0.38%, while the outperformance (P90) is 0.30%. This suggests that the cost of embedded debt is downside asymmetric, with a higher scope for underperformance than outperformance

Impact on financing risk RoRE range

Applying the assumption of notional capital structure, this translates to a post-tax RoRE range of -0.34% downside and 0.27 % upside.

Parameter		P10	P50	P90
CPIH assumption	A		2%	
Allowance: cost of embedded debt (nominal)	B		4.55%	
Allowance: cost of embedded debt (CPIH real)	C		2.50%	
Tax rate	D		25%	
% Proportion of embedded debt	E		74%	
% Notional debt	F		55%	
% Notional debt: embedded	G		41%	
Actual cost of debt (Nominal)	H	5.06%	4.64%	4.14%
Actual cost of debt (CPIH, real)	I	3.00%	2.58%	2.09%
Out/(under)-performance vs allowance (post tax, CPIH, real)	J	(0.38)%	(0.07)%	0.30%
%RoRE out- (under-) performance vs allowance (post tax, CPIH real): embedded debt	**K**	**(0.34)%**	**(0.06)%**	**0.27%**

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Financing risk – Summary – Notional company

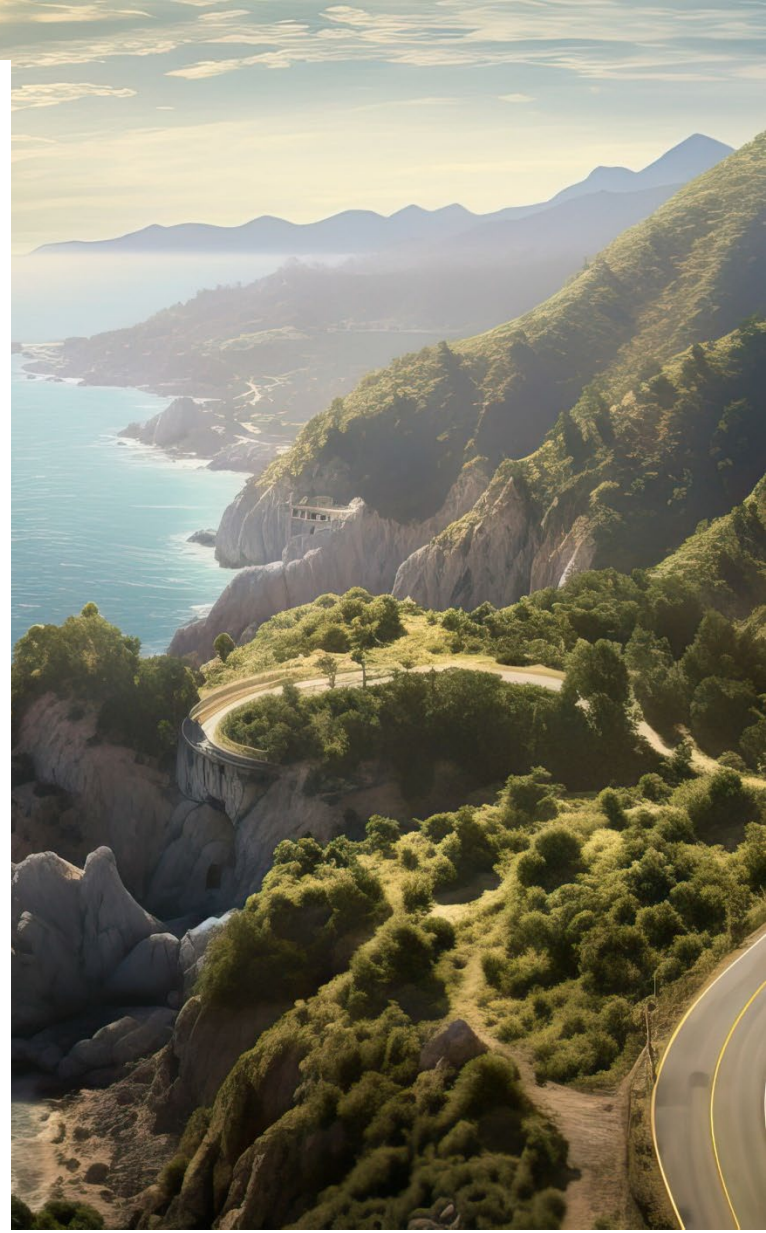
The table below summarises the total impact of financing risks in RoRE terms. The post-tax RoRE range is -1.90% to +1.70%, with a central case P50 of -0.07%.

Cost of new debt performance – Measured by water sector issuance yield minus adjusted benchmark yield

Riskn	Impact on	Post-tax RoRE impact (%)		
		Downside (P10)	Central (P50)	Upside (P90)
Inflationary risk				
CPIH variance	Embedded and new fixed rate debt	(1.17%)	-	1.15%
RPI-CPIH wedge variance	Embedded RPI-linked debt	(0.25)%	(0.00)%	0.18%
CPI-CPIH wedge variance	Embedded and new CPI-linked debt	(0.06)%	(0.00)%	0.02%
Non-inflationary risk				
New debt performance	New debt, all	(0.07)%	(0.00)%	0.06%
Embedded debt performance	Embedded debt, all	(0.34)%	(0.06)%	0.27%
Total		**(1.90)%**	**(0.07)%**	**1.70%**

Overall, the analysis shows that financing risk as set out in the PR24 FM substantially under-estimates the notional company financing RoRE risk range for PR24:

- Based on the historical data and forward-looking simulations, the inflation variation across AMP9 is likely to be higher than Ofwat's estimated variation of +/- 1%.
- Based on the sector's more recent fixed rate debt issuance yield vs iBoxx benchmark, Ofwat underestimates the under-performance on cost of new debt in the prevailing high interest rate environment.
- There are inflation risks related to RPI-CPIH wedge and CPI-CPIH wedge that are not captured by Ofwat's analysis.



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Financing risk – Summary: Actual company

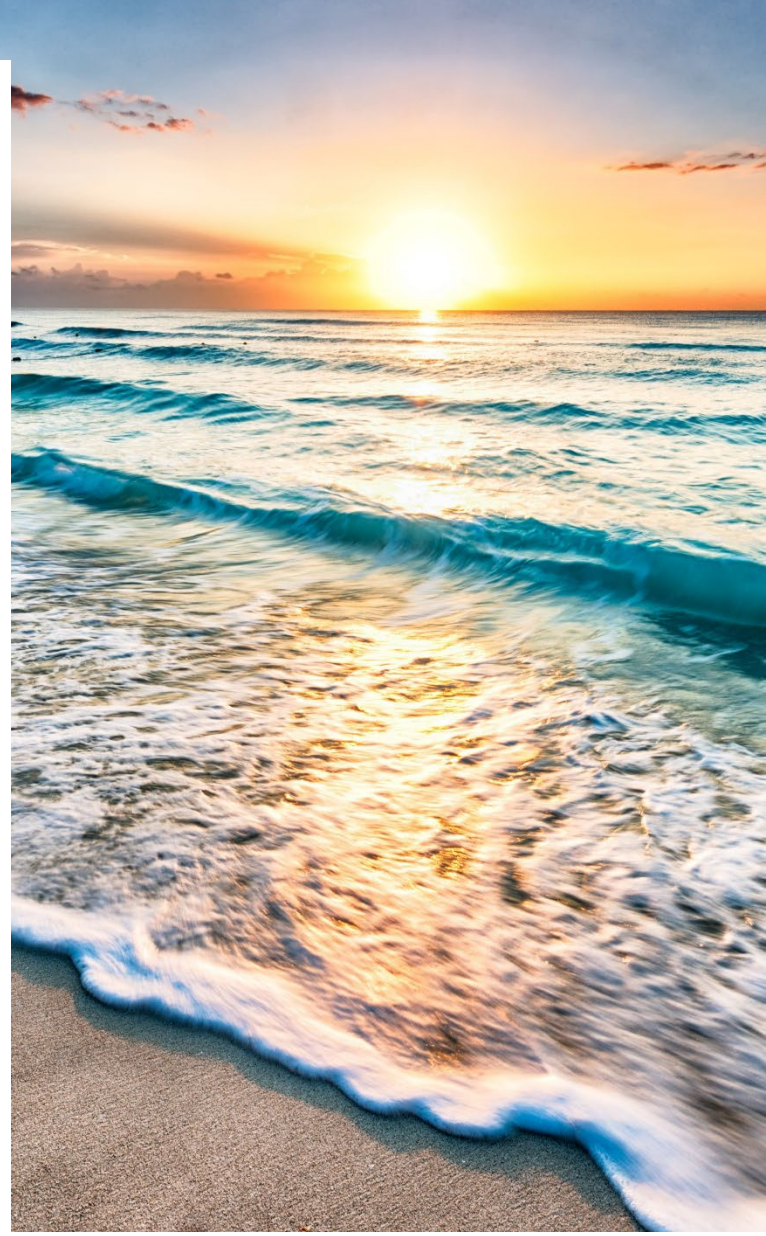
Financing risks on the actual company is based on Anglian's proportion of index-linked debt, proportion of RPI vs CPI-linked debt, and the actual company's cost of embedded debt and new debt performance.

Assumption	Actual	Notional
Proportion of index-linked debt	65.6%	33.3%
RPI-linked debt as proportion of index-linked debt	72.2%	93.4%
P10-P90 range: cost of new debt performance	-0.30% (P10 underperform) / 0.26% (P90 outperform)	-0.30% (P10 underperform) / 0.26% (P90 outperform)

Anglian's actual cost of embedded debt is projected to be 5.08% in nominal terms, or 3.02% in real (CPIH) terms, which is higher than the 2.50% embedded debt allowance used in PR24 FM. It is expected that there would be under-performance on cost of embedded debt across P10 to P90.

All risks combined, the post-tax RoRE range on an actual basis is -1.59% downside and 0.67% upside, with a central view P50 of -0.37%, as shown in the table below.

Risk	Impact on	Post-tax RoRE impact (%)		
		Downside (P10)	Central (P50)	Upside (P90)
Inflationary risk				
CPIH variance	Embedded and new fixed rate debt	(0.60)%	-	0.59%
RPI-CPIH wedge variance	Embedded RPI-linked debt	(0.37)%	0.00%	0.28%
CPI-CPIH wedge variance	Embedded and new CPI-linked debt	(0.19)%	(0.01)%	0.09%
Non-inflationary risk				
New debt performance	New debt, all	(0.07)%	(0.00)%	0.06%
Embedded debt performance	Embedded debt, all	(0.35)%	(0.35)%	(0.35)%
Total		**(1.59)%**	**(0.37)%**	**0.67%**



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Overall RoRE risk range and implications

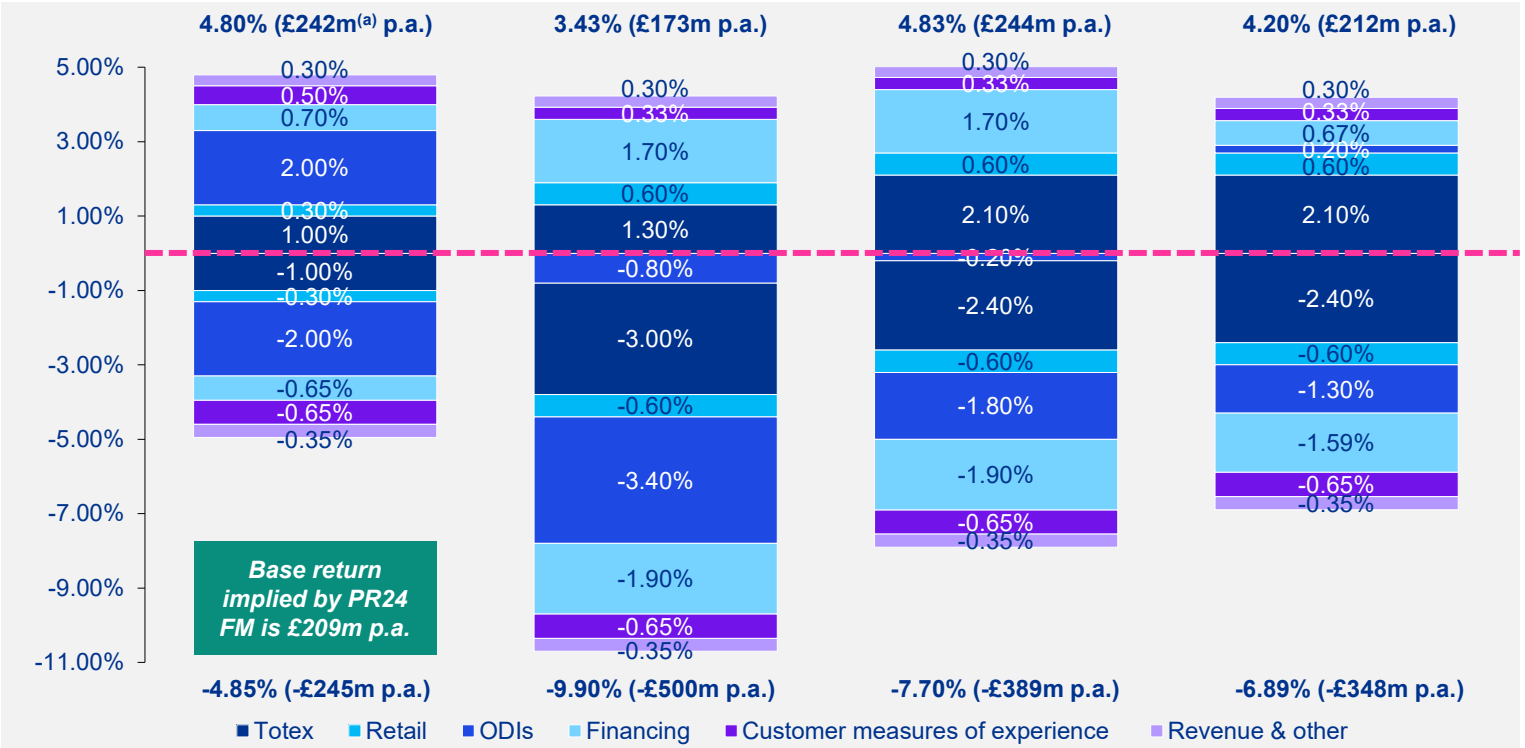
Summary of PR24 RoRE risk ranges under mitigated and unmitigated scenarios

The RoRE risk range estimated for Anglian Water at PR24 implies higher downside than Ofwat's assumed risk range set out in its PR24 FM, even after taking into account proposed mitigations.

The figure to the right first sets out the RoRE range from the PR24 FM and then RoRE risk ranges based on analysis in this Report on (1) an unmitigated basis, i.e. before taking into account risk mitigations; and (2) on a mitigated basis, taking into account mitigations included in the Anglian plan.

- Key drivers of higher downside exposure than assumed by Ofwat are totex (driven predominantly by higher potential for cost variation on enhancement relative to base, combined with the step change in the scale of the enhancement capital programme) and financing risk (as a result of the inclusion of risks relating to embedded debt as well as new debt).
- The high degree of asymmetry imply by the unmitigated range is driven by negatively skewed ODI risk package and the introduction of PCDs, which are assumed to limit scope for out-performance on totex and increase scope for under-performance as specified in the FM.
- Inclusion of mitigations significantly reduces the scale of downside exposure and negative skew for the notional firm through reducing risk at source. The risk range implies higher downside exposure and negative skew even on a post mitigation basis.
- The range for the actual company implies lower risk exposure, however calibration cannot assume company specific levels of performance which observed for Anglian in the past.

	Ofwat PR24 FM	Assessment for Anglian – unmitigated notional	Assessment for Anglian – mitigated notional	Assessment for Anglian – mitigated actual
Mean	0.0%	-3.24%	-1.44%	-1.35%
P50[b]	0.0%	-2.3%	-1.1%	-0.7%



Note: (a) £m impacts are stated in FYA CPIH 2022/23 real terms
(b) Asymmetry of P50 position is estimated based on the ODI and totex RoRE range. It does not include asymmetry from financing risk exposure.

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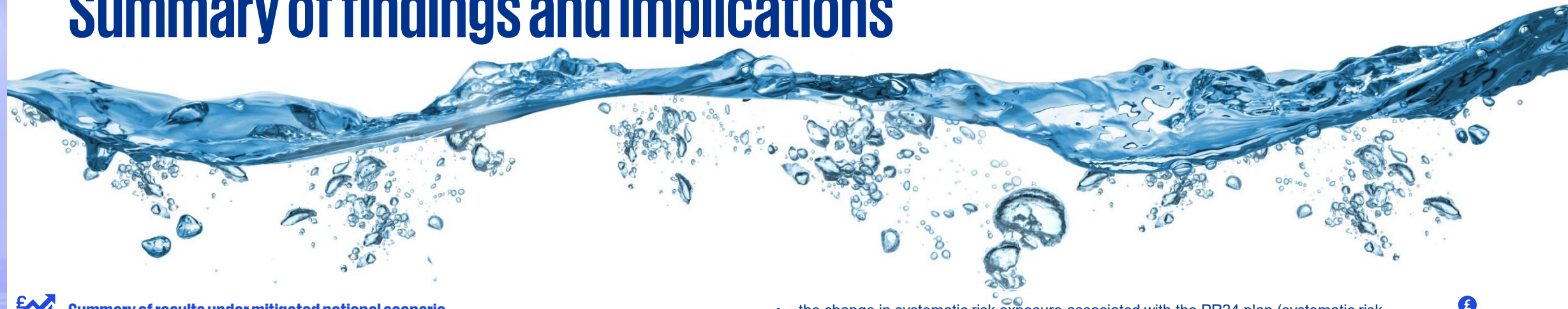
Summary of findings and implications



Summary of results under mitigated notional scenario

The analysis in this Report indicates that the initial RoRE ranges presented in the PR24 FM understate risks faced by the notional company.

Anglian under a notional capital structure is exposed to a materially higher level of downside risk than assumed based in Ofwat's initial analysis in its PR24 FM. This is driven primarily by the scale of delivery risk associated with the step change in capital programme, heightened performance risks on ODIs as well as risks on financing which are omitted from the range set out in the PR24 FM.

Downside risk exposure for the notional firm is likely to be significantly higher (7.7% RoRE) post mitigations than the allowed cost of equity (4.1%) set out in the PR24 FM, all else equal. This indicates that (1) the equity buffer implied by PR24 FM allowed returns on equity is not aligned with risk exposure for the notional firm; and (2) the notional firm is not financially resilient on this basis.

The notional RoRE range is also negatively skewed with a negative P50 which reduces the likelihood of the notional company earning the base allowed return.

All else equal, this suggests that the risk premium in allowed returns would need to be adjusted to reflect:

- required compensation for expected loss in the base case (mean expected return).
- an additional risk premium investors may require due to higher value at risk (value at risk)
- the change in systematic risk exposure associated with the PR24 plan (systematic risk exposure).

The analysis in this Report suggests that the required equity premium for risk asymmetry is at least 1.1% and that the required equity risk premium for increased systematic risk exposure is 0.8%.

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Implications of RoRE risk analysis for returns

Ofwat has indicated that it is concerned about financial distress in the sector. In this context it is important regulatory decisions for PR24 reflect and capture the scale of risk exposure, and test whether the notional company has sufficient equity buffer to manage projected risks.

To estimate cost of equity Ofwat uses the Capital Asset Pricing Model (CAPM). Under this framework, an asset is priced according to the risk it contributes to a well-diversified market portfolio, assumed to be held by the investor pricing the asset.

The CAPM prices the systematic component of equity risk on the assumption that investors hold a diversified portfolio and do not require compensation for idiosyncratic (or specific) risk. The primary means of capturing equity risk, when applying the CAPM, is therefore identifying appropriate comparators to estimate beta.

The level of risk in the sector is captured by the CAPM's beta parameter, which is typically estimated using historical data based on listed pure play water companies. These estimates may not fully take into account forward-looking changes to the regulatory methodology, for example Ofwat's incentive arrangements.

The usual implicit assumption in the regulatory model is that investors have a mean expectation of earning the CAPM-derived CoE. However, certain situations may expose a business to downside risk without an equivalent upside, resulting in what is known as asymmetric risk.

To incentivise investment, investors must have a reasonable expectation of earning the required return. This would not be the case in the presence of asymmetric risk as the expected return of the investment (i.e., the probability-weighted return) would differ from the median (or P50) return, resulting in an expected loss.

If the assumed cashflows resulting from allowed revenues are not adjusted for such downside events, the allowed CoE will be insufficient, necessitating appropriate adjustments to account for downside risk. Additional compensation will be required to ensure these investments are considered a 'fair bet'.

There are potential flaws in capturing the risk exposure where returns are set based on CAPM. In particular, the risk premium under CAPM:

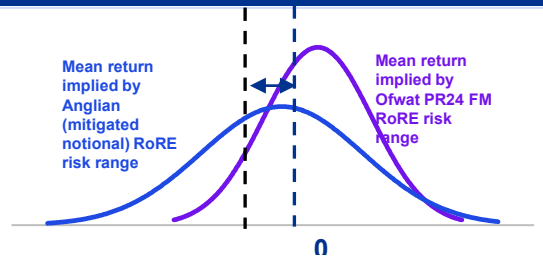
- does not reflect any required compensation for downside risk (**mean expected return**). This is measured as the difference between the expected returns set out in the PR24 FM (no out- or under- performance in the base case) and the expected returns implied by analysis of Anglian risk;
- does not reflect additional risk premia lenders may require due to higher value at risk (**value at risk)** when bad outcomes materialise. To illustrate this, lenders to wind farms usually make lending decisions based on P(10) wind output. In other words, the level of output than would be exceed 90% of the time. For this analysis, value at risk is also measured at P(10); and
- is unlikely to reflect the change in systematic risk exposure associated with the PR24 plan (**systematic risk exposure**). This is measured as the difference in the variance in returns (measured as the difference between P10 and P90 outcomes).

The charts on the right illustrate the exposure to risk asymmetry and value at risk. This exposure is not captured by CAPM, and as such is in addition to systematic risk captured via CAPM. The increase in systematic risk exposure is measured as the change in the variance of returns, which in turns affects the asset beta.

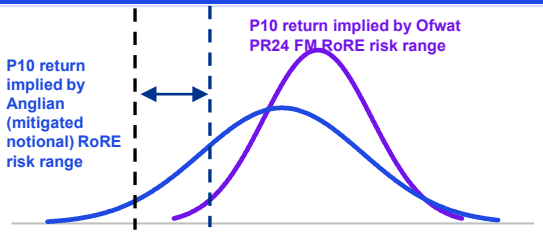
Risk analysis for the notional company, post risk mitigations included in the Anglian PR24 business plan, implies an asymmetric range with a negative P50 position and significantly higher downside risk than the upside potential. All else equal, this suggests that allowed return based on CAPM will be insufficient and that it is necessary to apply adjustment to account for downside risk.

If there is not sufficient equity buffer to manage risk exposure across AMP8 then this implies that forward-looking risk exposure has not been priced in correctly into allowed returns and/or appropriately mitigated at source. Additionally, if the overall amplitude of return at risk, difference between P10 and P50 in RoRE terms, exceeds the cost of equity allowance, that could lead to unexpected consequences, such as an erosion of companies' financial resilience over time in case of sustained downside scenarios or deterring new capital from the sector.

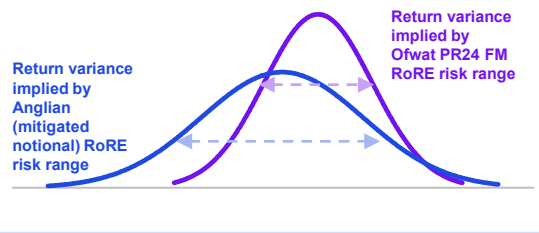
Mean expected return



Value at risk



Systematic risk exposure



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Quantifying the impact of PR24 risk exposure on returns: potential impact of asymmetric risk exposure

Approach

This risk analysis resulted in a significant downside asymmetric risk exposure for a notional company after mitigations.

The significant asymmetric downside risk is likely to require adjustment to either cashflows or allowed returns to ensure that the PR24 price control represents a fair bet.

The risk asymmetry can be assessed through by considering:

1. Mean expected return
2. Most likely (P50) position
3. Value at risk

The mean expected return and P50 position are considered for each risk category in the Report. The approach to measuring value at risk is set out below.

Measuring value at risk

The value at risk is measured as the difference between this analysis and Ofwat's assumed downside risk, e.g., differential in P10 positions)

$$\Delta CoE = (P10_{RoRE_{Ofwat}} - P10_{RoRE_{Anglian}})$$

An adjustment for value at risk is necessary to ensure that Anglian under a notional capital structure can manage risks across AMP8 and attract and retain equity capital.

Summary of asymmetric risk implied by RoRE ranges

Premium for	Results		Equity premium
Mean expected-return	(P50) Ofwat's PR24 FM	0.0%	1.1%
	(P50) This risk analysis	-1.1%	
Most likely (P50 position)	(Mean) Ofwat's PR24 FM	0.05%	1.4%
	(Mean) This risk analysis	-1.4%	
Value at risk	P(10) Ofwat's PR24 FM	-4.85%	2.5%
	P(10) This risk analysis	-7.35%	

The analysis in this Report suggests that the required equity premium for risk asymmetry is at least 1.1%.

Key drivers of the required equity premium for asymmetry are:

- More extensive use of Price Control Deliverables (PCDs), regulatory mechanism that is asymmetric in nature.
- Stretching performance targets, removal of most ODI caps and collars and penalty-only ODIs, implying a significantly higher downside risk than the upside opportunity.

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Quantifying the impact of PR24 risk exposure on returns: impact of increased variance in returns

Approach

In addition to the increased exposure to asymmetric risk and value at risk, Anglian is likely exposed to **additional systematic risk** associated with the increase in variance and volatility of equity returns.

The risk analysis implies a significantly different variance of RoRE range compared to Ofwat's PR24 FM (see the table below). In the absence of underlying distributions of the Ofwat's RoRE range, it is assumed that the RoRE risk is normally distributed.

	PR24 FM	This analysis
P10 of the overall RoRE risk range	-4.85%	-7.83%
P90 of the overall RoRE risk range	4.80%	4.70%
Standard deviation	3.76%	4.89%

Increase in volatility can be measured by translating the difference between the standard deviations of the modelled RoRE risk and Ofwat's proposed RoRE range into an impact on equity beta.

$$\Delta\sigma_{Anglian} = \sigma_{RoRE\_OFwat} - \sigma_{RoRE\_Anglian}$$

$$\Delta CoE = \Delta\beta_E * ERP = (\beta_E * \frac{\Delta\sigma_{Anglian}}{\sigma_{Sector}}) * \mathrm{ERP}$$

The change in equity beta is measured by the impact on the regulated company's volatility, as a percentage of the volatility of the water sector comparator used in the equity beta estimation.

Impact of increased systematic risk exposure

Premium for	Results		Equity premium
Systematic risk	St. deviation: Ofwat PR24 FM risk range	3.76%	0.78%
	St. deviation: Anglian RoRE risk range	4.91%	

This analysis suggests that the required equity premium for increased systematic risk exposure is 0.8%.

Key drivers of the required equity premium for increased systematic risk are:

- A larger and more complex AMP8 enhancement programme driven by statutory requirements, and a corresponding increase in delivery risk
- Increase in the level of interest rates and heightened macroeconomic volatility affecting financing risk.

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Translating RoRE risk ranges into downside scenarios financial resilience testing

Translating RoRE ranges into downside scenarios for financial resilience testing

01

Specification of risk-reflective downside scenarios is a mandatory requirement to underpin board assurance of actual company financial resilience.

02

The RoRE risk range for the actual mitigated RoRE range—which reflects assumptions in the Anglian business plan for PR24—is translated into downside scenarios in line with the requirement.

03

The RoRE ranges reflect whole-AMP estimates of downside exposure.

The RoRE ranges for each risk are translated into per annum impact in nominal amounts (in £m) during AMP8, and are split into relevant input categories (e.g. totex is split into opex/capex).

04

In addition, combination scenarios are developed for downside scenarios to test the impact when multiple possible risks crystallise at the same time.

These scenarios are developed based on assumptions about covariance and correlations across different risk categories.

Key findings: RoRE ranges in downside scenarios—baseline estimates

- Cost/ODI performance ranges and corresponding financial exposure in £m are presented for **an average year in the overall price control period.**
- Downside scenarios are estimated for **the entire AMP**, and do not reflect the range of potential outcomes for a single year. Thus, the ranges should not require any scaling adjustment and already **capture intra-year correlations**
- Ranges are based on the **actual mitigated** scenario.

Anglian Water is required to provide board assurance that the actual company is financially resilient over AMP8 and beyond based on its business plan. In this context, it is important to test the business plan with a set of downside scenarios. Following tables set out downside scenarios (P5, P10, P20, P30, P40) for totex, retails costs and ODIs. Downside scenarios are established based on the risk analysis carried out in this Report. Financial exposure (£m) is set out for an average year in the overall price control period, in 2022-23 prices.

Wholesale totex	P40	P30	P20	P10	P5
Overspend, pre-cost sharing, £m	-60	-112	-158	-238	-307
Overspend, post cost-sharing, £m	-30	-56	-79	-119	-154
% overspend (pre-cost sharing)	-3.51%	-6.52%	-9.21%	-13.90%	-17.95%
RoRE %	-0.59%	-1.10%	-1.56%	-2.35%	-3.03%

Retail costs	P40	P30	P20	P10	P5
Overspend, pre-cost sharing, £m	-	-	-	-	-
Overspend, post cost-sharing, £m	-5.7	-11.2	-18.0	-27.5	-35.3
% overspend (pre-cost sharing)	-5.50%	-10.88%	-17.46%	-26.61%	-34.21%
RoRE %	-0.11%	-0.23%	-0.37%	-0.56%	-0.72%

ODIs	P40	P30	P20	P10	P5
Penalty, £m	-35.4	-45.5	-55.7	-65.8	-75.9
RoRE %	-0.70%	-0.90%	-1.10%	-1.30%	-1.50%

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Key findings: RoRE ranges in downside scenarios— Capex and opex split

Tables below set out downside scenarios for opex and capex. Financial exposure (£m) is given for an average year in the overall price control period, 2022-23 prices.

Opex	P40	P30	P20	P10	P5
Overspend, pre-cost sharing, £m	-20.4	-47.5	-74.7	-135.8	-142.6
Overspend, post cost-sharing, £m	-10.4	-24.3	-38.1	-69.3	-72.8
% overspend (pre-cost sharing)	-2.26%	-4.63%	-7.52%	-11.54%	-14.98%
RoRE %	-0.21%	-0.48%	-0.75%	-1.37%	-1.44%

Capex	P40	P30	P20	P10	P5
Overspend, pre-cost sharing, £m	-28.1	-56.1	-89.8	-196.4	-179.6
Overspend, post cost-sharing, £m	-14.3	-28.6	-45.8	-100.2	-91.6
% overspend (pre-cost sharing)	-3.68%	-7.52%	-12.22%	-18.75%	-24.35%
RoRE %	-0.28%	-0.57%	-0.91%	-1.98%	-1.81%

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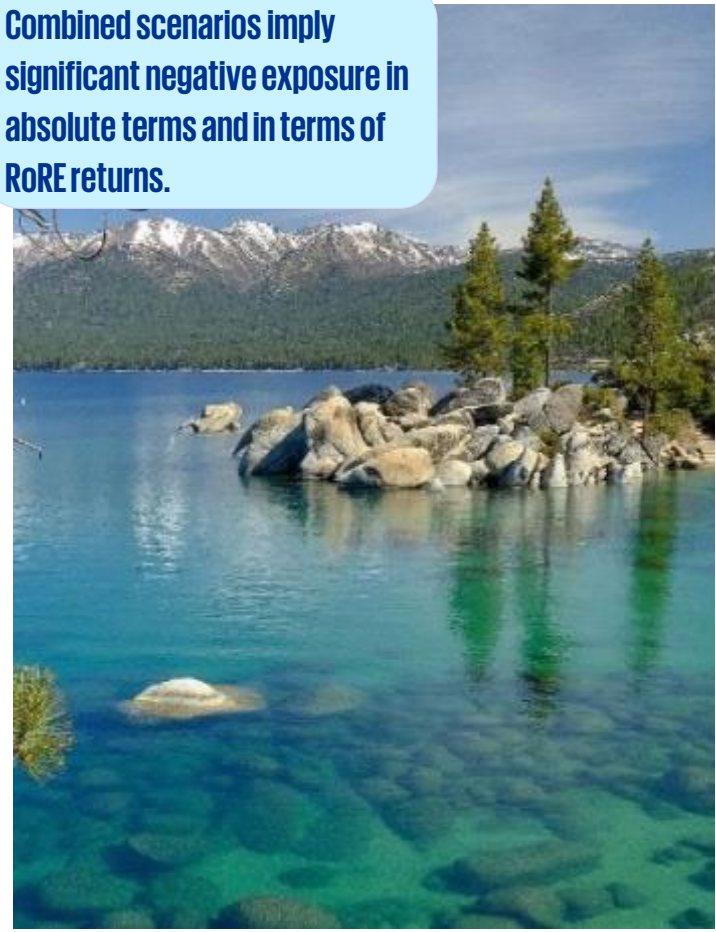
Key findings: RoRE ranges in downside scenarios—combined

Following combined downside scenarios consolidate performance on wholesale totex, retail costs and ODIs and set out the overall risk exposure for all areas together. Financial exposure (£m) is given for an average year in the overall price control period, 2022-23 prices.

Combined: Totex, ODI and retail	P40	P30	P20	P10	P5
Totex overspend, £m – pre cost sharing	-66.48	-93.22	-121.73	-168.41	-205.27
Totex overspend, £m – post cost sharing	-33.91	-47.55	-62.09	-85.90	-104.70
Totex overspend, (%) – pre cost sharing	-3.9%	-5.4%	-7.1%	-9.8%	-12.0%
ODI penalty, £m	-18.4	-25.8	-33.6	-46.5	-56.7
ODI, RoRE %	-0.36%	-0.51%	-0.66%	-0.92%	-1.12%
Retail overspend, £m	-8.48	-11.89	-15.52	-21.47	-26.18
Retail overspend, (%)	-8.2%	-11.5%	-15.0%	-20.8%	-25.4%
Total, £m	**-60.8**	**-85.2**	**-111.2**	**-153.9**	**-187.6**
RoRE %	-1.201%	-1.684%	-2.199%	-3.042%	-3.708%

Combined: Capex, opex, ODI and retail	P40	P30	P20	P10	P5
Opex overspend, £m – pre cost sharing	-29.43	-41.26	-53.88	-74.54	-83.91
Opex overspend, £m – post cost sharing	-15.01	-21.05	-27.49	-38.03	-42.82
Opex overspend, (%) – pre cost sharing	-6.5%	-9.1%	-11.8%	-16.4%	-18.4%
Capex overspend, £m – pre cost sharing	-37.05	-51.95	-67.84	-93.85	-121.34
Capex overspend, £m – post cost sharing	-18.90	-26.50	-34.60	-47.86	-61.88
Capex overspend, (%) – pre cost sharing	-3.6%	-5.0%	-6.6%	-9.1%	-11.7%
ODI penalty, £m	-18.4	-25.8	-33.6	-46.5	-56.7
ODI, RoRE %	-0.36%	-0.51%	-0.66%	-0.92%	-1.12%
Retail overspend, £m	-8.48	-11.89	-15.52	-21.47	-26.18
Retail overspend, (%)	-8.2%	-11.5%	-15.0%	-20.8%	-25.4%
Total, £m	-60.8	-85.2	-111.2	-153.9	-187.6
RoRE %	-1.201%	-1.684%	-2.199%	-3.042%	-3.708%

Combined scenarios imply significant negative exposure in absolute terms and in terms of RoRE returns.



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