Anglian Water

PR24 CMA Redetermination

Response to the CMA's Base Costs Modelling Working Paper

January 2026

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Anglian: Response to CMA Base Cost Modelling Working Paper

1 Executive Summary

(1) Anglian accepted the outcomes of Ofwat's base models. It made a targeted and proportionate SoC submission focused on adjustments to address shortfalls between those modelled outcomes and Anglian's efficient costs for funding its specific assets and customer service outcomes at AMP8.

(2) The CMA's Working Paper instead radically reduces Anglian's modelled base allowances by £203 million compared to Ofwat's FD. This reduction results from a deeply flawed process that has produced models that prioritise historical statistical fit over the engineering and operational realities of delivering safe water and wastewater services to customers. The results are also inconsistent with wider concerns expressed (including by the Independent Water Commission) that the regulatory framework is failing to deliver a resilient sector.

(3) Based on Anglian's assessment of the Working Paper, and its failure to address the concerns expressed by Anglian and wider parties at PDs, the most robust approach to setting Anglian's modelled base costs in a manner compatible with the CMA's duties remains reverting to the Ofwat models. However, despite Anglian's profound reservations about the Working Paper model [redacted] Anglian considers it possible for the CMA to focus on the outcome on the base funding and make changes to allow a fair outcome that closes the gap between the implausible model results and operational needs. Anglian has indicated how that may be achieved at Sections 5-7 of this Response from page 24 onwards). If the models persist to FD, these changes are essential because the CMA has not presented evidence (and has not carried out any process to obtain it) to show that base funding can be reduced on this scale.

(4) The implications of the inferred botex allowances for AMP8 clearly demonstrate the materiality of the resultant underfunding from the CMA approach:

- Industry-wide, the CMA assumes an 8% reduction in modelled base costs vs. AMP7 industry outturns, compared to Ofwat's 2.9% reduction, despite the fundamental step-change in investment, combined with population growth and asset base growth at PR24 relative to PR19.
- The Working Paper implicitly concludes that the industry is systematically overfunded by 7.1% on average, despite nearly all (15/17) companies overspending PR19 modelled base funds, and the CMA identifying a downside skew in Ofwat's ODI package at AMP8.
- The c. £3bn that the Working Paper proposes to remove from the industry equates in practice to a huge proportion of the c. £3.9bn of sector-wide

CACs. Ofwat made these CACs in response to the CMA's PR19 call, in the context of capital maintenance issues, for Ofwat to develop a forward-looking element that could be triangulated with historic econometric cost modelling.[1]

- Anglian's implied PR24 efficiency challenge as a proportion of capital maintenance spend alone is increased from 7% at Ofwat's FD to 25% in the Working Paper. This arises from the disproportionate impact that base cost squeezes have on capital maintenance, given the volume of non-discretionary spend categories that must be covered by base allowances (eg. business rates, EA permit, licence fees, energy costs).
- After accounting for metering, mains renewal and the value of its Boundary Box and Leakage CACs,[2] Anglian will be left with just £153 million over 2025-2030 (21% of Water Base CAPEX excluding network reinforcement) to cover all other water capital maintenance (eg. on 380 storage points, 130 water treatment works, 433 boosters and over 450 boreholes and more).

(5) The above arises despite an FD that Ofwat implicitly recognised already risked underfunding AMP8 base needs via its Asset Health Roadmap and cost change process.

(6) The Working Paper states that the CMA's models "perform better than Ofwat's" at the basic benchmarking task "*to predict efficiency of costs so companies can fund their day-to-day activities, without customers overpaying where companies are inefficient*".[3] This is wrong:

- Analysing AMP7 costs shows that the CMA's models are worse than Ofwat's at predicting efficient costs. There is significant evidence that Ofwat underfunded base costs in AMP7 (including given the level of company penalties and base overspend). Yet, if the CMA's Working Paper methodology were deployed today to predict AMP7 costs, it would have failed to do so to a concerning extent, underfunding the sector by c. 10% in AMP7. In contrast, Ofwat's modelling framework would have left a gap of c. 3% - meaning Ofwat's models are much closer to the truth.
- The CMA has chosen to prioritise "predictive power", i.e. the ability to accurately predict historic costs, not future AMP8 costs. As a matter of modelling principle, this is not a better way of assessing efficiency (as supported by the detailed economic submission of Professor Subal Kumbhakar, attached for reference as **Annex 001** to this submission, with

[1] CMA, PR19 Final Report, para. 4.293 (March 2021) (see here).
[2] Metering and mains renewal obligations are tied to PCDs and are therefore, effectively, mandatory. Boundary Boxes and Leakage are also effectively non-discretionary activities because it is not viable to leave customers without functioning stop-taps or allow leakage to deteriorate.
[3] CMA, Base Costs Modelling Working Paper (December 2025), para. 1.7 (see here).

over 40 years of expertise in efficiency assessment in utilities). This is because it risks funding companies based on historical cost levels regardless of efficiency, locking in past inefficiency and reducing efficiency incentives (as recognised by Ofwat's PDs criticism that the CMA's models "*may embed company-specific inefficiencies*").[4] The models mechanically learn from and "predict" the past but the CMA has not demonstrated any underlying engineering rationale for the relationships they find, so it cannot rely on them to predict the future. Some of the underlying relationships will change (such as the correlation between energy prices and other costs) but the CMA's tool does not know that and so produces the wrong answer.

- Further, the decision to prioritise "predictive power" places greater emphasis on historical costs than Ofwat's modelling approach, which is not suitable to isolate the ever-growing cost pressures associated with aging assets and delivering improved performance. This is inconsistent with the CMA's PR19 call for Ofwat to adopt a more forward-looking modelling approach and, as shown in para. (4) above, the results predictably worsen the outcomes for modelled asset health funding.
- The Independent Water Commission found that Ofwat "*has relied too heavily on a data-driven econometric approach*" and the "*increasing complexity of the challenges facing water companies … require a … less desk-based approach to economic regulation*".[5] Instead of following this advice, the CMA has placed more weight on pure econometric analysis than Ofwat ever did, making the problem worse.

(7) The models arise out of an inadequate process, in which the CMA overruled models that (while insufficient to adequately fund asset health needs or regional specific factors which are the subject of the CAC process) have been collectively developed by Ofwat and the industry over many years. The CMA's resulting models produce unrealistic outcomes and are unstable, as purely technical, econometric decisions, taken over a few weeks, change industry funding by hundreds of millions of pounds. It is hard to see how the CMA can be confident in imposing such changes, especially without having had the benefit of a live counterview discussion.

(8) Further, there is no evidence that the CMA has properly considered, or asked its engineering experts to consider, whether the reduced modelled allowances require amendments to additional CAC funding, are sufficient to meet the stretching performance commitments or robustly considered their impact on the overall risk/reward balance - a glaring procedural omission.

[4] Ofwat, Response to PDs on Base and Enhancement Costs (November 2025), page 10 (see here).
[5] IWC, Final Report (July 2025), para. 417 (see here).

(9) Anglian retains its PDs position that the most robust approach is to return to the Ofwat FD models, and to deal separately with concerns of companies such as Southern and South East, whose variables were included in the models, with CACs.[6] However, [redacted] should the CMA choose to retain its new modelling framework, it is imperative to meeting its customer, efficiency, resilience and financeability duties that allowances are increased to more realistic levels. Anglian has identified specific options within the CMA's modelling framework to do so, whilst also improving the consistency or stability of the CMA's models. In particular:

- **Triangulation Across Models**: Reverting to a 50:50 weighting across bottom-up and top-down aggregation levels in water and wastewater – which is well-established regulatory best practice and would reduce volatility and uncertainty in modelled base allowances. Considered in isolation, this would restore between £124 million and £132 million of the reduction in Anglian's cost allowance imposed by the CMA's existing models.
- **Inclusion of Anglian's Topography Variables**: Including the additional water topography variables which Anglian proposed within the candidate set reduces the problems created by the CMA's decision to include variables proposed by two companies only. Considered in isolation, this would restore between £26 million and £84 million of the reduction in Anglian's cost allowance imposed by the CMA's existing models.
- **Scale variables**: The CMA's pure statistical approach, Principal Components Analysis using multiple scale drivers to capture costs across the entire value chain, departs from a decade of consultation between Ofwat and the industry, which established 'properties' and 'load' as the unique relevant scale drivers for top-down water and wastewater models, respectively. Reverting to the use of these intuitive drivers (which have clear engineering justification) would, considered in isolation, restore between £33 million and £140 million of the reduction in Anglian's cost allowance imposed by the CMA's existing models.
- **Wage Input Corrections**: The Working Paper models provide no allowance for the impact of future real wage increases on wastewater costs. The impact of this error is substantial, as wage levels are projected to increase by c. 4% over 2025–30. Constituting a cost share of 36%, this equates to around a 1% cost increase over the period. This is equivalent to a 0.3% p.a. productivity challenge to base wastewater costs. Correcting this mis-

[6] Anglian, Response to PDs (November 2025), para. 198 (see here).
[7] [redacted]

specification would increase internal consistency between the CMA's water and wastewater models and its frontier shift productivity analysis

- **Energy Costs Corrections**: Energy costs made up only a small proportion[8] of the general base cost overspend in AMP7, yet the CMA's analysis appears to attribute the entirety to energy prices, contrary to broader industry evidence. Correcting this misspecification by removing the DESNZ energy index as a variable or moderating catch-up targets helps to address the widely recognised concern by Disputing Companies, Ofwat, CEPA, and in the Report by Economic Insight (attached as **Annex 002**)[9] that the approach taken by the CMA identifies costs incorrectly (creating systematic underfunding for non-energy cost pressures). This correction would improve the model's ability to predict future efficient spend.

(10) Stepping back, Anglian emphasises that – whilst there are many technical modelling changes that could be made (and Sections 5 to 7 below identify specific changes that would improve the credibility, consistency and stability of the CMA's framework) - the most important point is that sufficient funding is provided to maintain assets, deliver services, and meet the industry's obligations to customers and the environment. There is no credible evidence base for the CMA to reasonably conclude that the cuts to base costs that its model proposes produce allowances sufficient to deliver these outcomes.

(11) The remainder of this response is structured as follows. Section 2 addresses the material procedural failures and lack of evidence for the CMA's approach. Section 3 examines the practical implications and evidence of the insufficiency of the CMA's modelled allowances. Section 4 addresses the conceptual flaw at the heart of the CMA's framework, prioritising explaining historical costs over projecting efficient future costs. Section 5 identifies the empirical consequences of this flaw – demonstrating spurious / mis-specified relationships between efficient future costs and energy and prices and how this could be addressed. Section 6 highlights the arbitrary decisions that have led to specific detriments to Anglian in the modelling and how this could be addressed, while Section 7 summarises a potential way forward.

(12) Anglian notes that, as the CMA's consultation is limited to the base models only, the delta which Anglian refers to between the Ofwat FD and the CMA's decision relates to the modelled costs only (£203 million). As set out in this response however, it is vital that the CMA take steps to address the wider implications for the overall allowances and package to ensure that the Working Paper's outcome does not render the entirety of the redetermination unsupportable.

[8] Estimates vary between 14% and 36%.
[9] See Economic Insight, The Treatment of Energy Input Price Inflation in Base Cost Econometric Modelling on page 2. (Attached as Annex 002).

(13) As is clear from the above, and per Anglian's letter to the CMA of 23 December 2025, Anglian is deeply concerned by the Working Paper's outcome. Anglian is considering all of its options, reserves all of its rights, and urges the CMA Group to closely consider Anglian's PDs Response on the consequences of the CMA's base modelling decision. No part of this response should therefore be taken as acceptance or agreement with any aspect of the CMA's Working Paper decision.

(14) Further, given the volatility between iterations of models from the CMA's framework and continued issues with the technical approach, Anglian is concerned that mis-specifications may occur in future iterations between now and FD. Where these drive material gaps in Anglian's funding relative to Ofwat's FD it is particularly important that the CMA consult on the approach ahead of the FD.

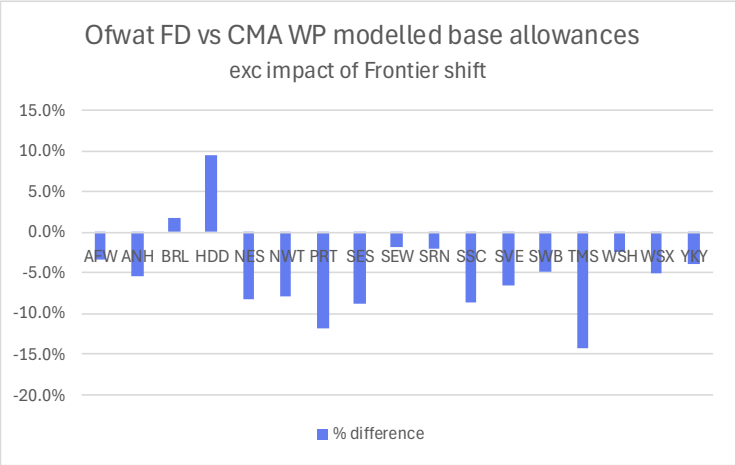
2 The Working Paper fails to remedy material procedural errors and does not substantively engage with key concerns advanced at PDs

(15) The PDs' outcome flowed from material procedural errors. These remain unremedied by the Working Paper consultation and the analysis it describes.

2.1 The CMA is overturning well-established models for a new untested econometric approach producing radical and volatile swings in allowances with insufficient consultation or cross-check

(16) The Ofwat FD models are the result of years of industry/regulator consultative development (including the CMA's model review at PR19). In contrast, there have been just three time-pressured and/or page-limited opportunities for written views (all post the Hearings) on the CMA's changing new models. The consensus of those views, from a range of stakeholders, was strongly negative. Nonetheless, the CMA now presents confidence that it has produced a single model for each service area that is more robust in explaining the future modelled base cost requirements for all companies than the models produced by Ofwat in collaboration with the sector. These new models produce radically different results from those well-established models grounded in operational and economic reasoning, indicating modelled industry base allowances c. £3bn lower than Ofwat's FD, with impacts on individual companies of up to 14% (see Figure 1 below).

Figure 1: Ofwat's FD vs. CMA WP modelled base allowances exc. Frontier Shift



(17) This £3bn reduction turns solely on highly theoretical (and sometimes arbitrary) modelling choices approved by the CMA Group. Different choices have material impacts on outcomes, and are being made by the Group without any live discussion with Disputing Companies, Ofwat and their econometric advisors as to counterviews on these substantive matters (save for [redacted] high level questions on LASSO in the Base Hearing, prior to the CMA's models being published).[10] This is despite this being by far the most significant individual decision on totex in the Redetermination for Anglian.

(18) This provisional decision is also being made despite the huge volatility in the CMA's modelled results and the overwhelming rejection of the CMA's modelling choices in responses to PDs. There is a remarkable c. £1billion of changes in the Working Paper vs. the modelled allowances the Group deemed appropriate in the PDs (with changes of up to 12% for some individual companies). These substantial changes are not based on transparent and reasonable sense-checks of the adequacy of funding for customer services on the ground, but on highly technical and automated modelling decisions that produce a now (radically different) econometric black-box to that which the CMA Group advanced at PDs.

(19) There is, respectfully, no reasonable basis upon which the CMA can be comfortable that the process it has followed and the materially diverging outcomes it has produced (both as against its own PDs and Ofwat's FDs) are more robust than those which it proposes to overturn, or that they are the right outcome based on proper engagement with the evidence and arguments put forward by Anglian.

[10] CMA, [redacted]

2.2 The Working Paper continues to amount to disproportionate action that has failed to engage with Anglian's concerns and case appropriately and meet its duties

(20) The CMA has a duty to make an individual redetermination for each Disputing Company. Anglian is materially concerned that the CMA's prioritisation of a new modelling approach to address other Disputing Companies' claims has materially compromised its own redetermination.

(21) The Working Paper frames its decision to change the models as a "*targeted and proportionate … response to the concerns raised by Disputing Companies at the outset of this process*" that "*largely focused on matters such as the selection of cost drivers, the accuracy of predicted costs, the appropriateness of the upper quartile (UQ) 'catch-up' efficiency challenge and abnormalities in efficiency challenges set by Ofwat models*".[11] Anglian's SoC raised none of these matters.

(22) As explained in its SoC, Anglian "*applied the lessons learnt in PR19, aligning with Ofwat's econometric benchmarking models in full and rising to the efficiency challenge of basing its plan on the efficient costs determined by these models*". This resulted in Anglian imposing upon itself "*a significant efficiency challenge for AMP8 verses its bottom-up assessment of its base AMP8 needs*".[12] Anglian's Business Plan and SoC were therefore submitted on the basis of the overturned models, with a core pillar of its SoC being the need for its individual CACs due to the insufficiency of its base funding by hundreds of millions of pounds to meet its evidenced needs[13] as well as the critical need for action to improve asset health.

(23) The CMA's Working Paper instead proposes reducing Anglian's modelled base allowances by £203 million. Its decision is seemingly the result of attempting to address arguments advanced on base models by two other Disputing Companies, via an unprecedented modelling approach on purported simplicity and efficiency grounds, and which continues, selectively, to only consider the variables those companies proposed as additions to the Ofwat FD models.[14]

(24) In contrast to its modelling prioritisation, the CMA's approach to assessing Anglian's actual base case has been limited. For example, its PDs wrongly dismissed Anglian's boundary box CAC based on just one limb of the CAC test. It further reversed its PR19 decision (which had been supported by the CMA's expert engineering advisors) to grant Anglian additional funding for frontier leakage performance (a crucial resilience and service matter in Anglian's climate

[11] CMA, Base Costs Modelling Working Paper (December 2025), para. 1.5 (see here).
[12] Anglian, SoC (March 2025), page 52 (see here).
[13] Anglian, SoC (March 2025), paras. 199-205 (see here).
[14] Per the PDs, the Working Paper continues to only consider the variables in Ofwat's FD models rather than the long-list submitted by the industry - all of which were deemed to have engineering rationale and were only excluded by Ofwat's FD models (which the CMA has overturned), and only those advanced by two companies, Southern and South East Water (per. Anglian's PDs Response paras. 180-183).

vulnerable region) without any evidence of WRC input, critical data analysis, or consistency with the CMA's PDs position that base funds only average performance levels.[15] Further, at no point does the CMA explain why – counterintuitively to all evidence presented by Anglian in its SoC - Anglian can in fact properly fund the assets and services that are the subject of these CACs, its mains renewal and (alternative) gravity sewers and storage points claims, with *less* funding than it was granted in Ofwat's FDs. It remains essential that Anglian's base CACs are considered in full in light of the original evidence / new post-PDs evidence before the CMA (particularly in view of the substantial reduction the Working Paper proposes to Anglian's funding).

2.3 The CMA continues to make major procedural omissions by failing to address the disconnect between its modelling outcomes and sector needs and to transparently follow the procedural safeguard steps required to ensure its allowances are correct for Anglian in the round.

(25) The Working Paper does not address the disconnect between the outcomes of the CMA's new modelling framework and sector needs, in terms of higher service quality, higher capital maintenance/resilience and improved environmental performance (see section 3 below). Procedurally, there was no evidence at PDs that the proper steps to so radically overhaul Ofwat's FD models have been taken, where those modelled allowances form just one part of Ofwat's approach to setting allowances and obligations (and despite the warnings given by the Independent Water Commission against too heavy a reliance on a data-driven econometric approach for the increasing complexity of the challenges facing the sector).[16] The Working Paper likewise makes no reference to the CMA having made wider enquiries to ensure an overall balance of risk and return in the round.

(26) First, Ofwat's FD states: "*We have set PR24 performance expectations in the context of the expenditure allowances we have made. Where our allowances have changed from draft determinations, we have assessed the impacts on expected performance*."[17] While the CMA has radically decreased allowances, it has not demonstrated that it has carried out a similar assessment of the implications for Anglian's stretching performance targets and associated ODIs.

[15] CMA, PR24 PDs (October 2025) (see here). See para. 6.227 "*If a company provides a level of performance above the industry average, it is likely to incur higher costs that are not directly covered by its base allowances, all else equal*" and 6.169: "*The regime for base costs effectively sets allowances reflecting the average level of performance in the sector. If a company seeks to exceed that level of performance, and if this generates additional costs, then these additional costs are not directly funded through base allowances*" and (in the context of what base buys: "*The conceptual benchmark we use is therefore what is a reasonable level of activity funded by base allowances for an efficient company facing 'average' conditions (where the average is taken over the different companies)*" and para. 4.278 "*Ofwat's base allowances … are intended to provide an allowance based on long-term average requirements*".
[16] IWC, Final Report (July 2025), para. 417 (see here).
[17] Ofwat, FDs Delivering outcomes for customers and the environment (July 2025), page 22 (see here).

(27) Ofwat's assessment of the adequacy of those funds to meet the performance commitments was validated with sector experts: *"We worked with engineering specialists and our cost assessment team to validate our approach, including that companies have enough funding to deliver performance improvements*."[18] Relying on econometrics only, would be an objectively less robust process. If the CMA has sought WRC's engineering expertise on the impact of modelled base reductions on deliverability of performance commitments, it has not done so transparently, thus giving no opportunity for Disputing Companies (or Ofwat) to opine on the engineering evidence (if any) on which these vital conclusions rely. The Working Paper makes no reference to it conducting / having conducted such checks.

(28) Second, the Ofwat PR24 process allowed companies to individually apply for CACs in recognition that "*statistical models cannot account for all relevant factors that affect costs*" and also granted six sector-wide base CACs "*to reflect that historical costs are not always a good reflection of the future*".[19]

(29) At PDs no Anglian CACs (which Anglian made on the basis of modelled base costs £203m higher than those in the Working Paper) were granted. Meanwhile the PDs amendments to the sector-wide CACs are nowhere near sufficient to close the funding delta vs. Ofwat's FD (producing a net uplift of less than 24% of the gap).[20] There is no evidence or reference in the Working Paper to the CMA having considered, or having asked its engineering experts to consider, the implications of its base modelling decision for overall base funding, including sector or individual base CACs, to ensure that companies can meet base customer service requirements in light of the totality of the evidence provided by companies in the Hearings, SoCs, PDs responses, and previous and ongoing RFIs.

(30) Third, Ofwat's FD states that "*In coming to an overall view of the balance of risk we consider the sum of the risk ranges for total expenditure (totex) that includes wholesale costs and retail costs, outcomes and finance*".[21] The CMA PDs recognise the challenges facing the sector (from "*ageing infrastructure, climate change, population growth and environmental concerns*") and that "*investment is needed to meet these challenges and support economic growth*".[22]

(31) However, the CMA has failed to reflect the increased risk in the package arising from its base cost cuts, which have important implications for financial resilience and the ability for companies to address these challenges. Its claims at PDs that "*our revised totex allowances represent a reasonable level of costs for each of the Disputing Companies. We have also reduced some of the downside risks in the outcomes package relative to the Ofwat's PR24 FD. Each of these factors*

[18] Ofwat, FDs Delivering outcomes and the environment (July 2025), page 4 (here).
[19] Ofwat, FD Expenditure Allowances (February 2025), pages 27 and 29 (see here).
[20] Table 4.7 of the CMA's PDs amounts on aggregate to a £46.9m uplift to Anglian's sector CACs.
[21] Ofwat, FDs Aligning risk and return - appendix (December 2024), page 5 (see here).
[22] CMA, PR24 PDs (October 2025), para. 2.3 (see here).

improves financeability"[23] were not credible given the radical reductions in Anglian's funding. The Working Paper, which now further worsens these outcomes, is silent on the CMA's intention to assess its finance impact.

(32) There is, in short, no evidence of robust sanity-checking of results and no sound basis to conclude that modelled costs can be reduced to this extent without adjustments to other price control elements. It is essential that the CMA's remaining process provides transparent consideration of the sufficiency of base allowances outside the models to ensure outcomes and resilience are sufficiently funded and that the risk and return balance is appropriate, with opportunities to comment on this critical analysis.

2.4 The Working Paper proposal is incompatible with the CMA's duties

(33) The CMA has statutory duties to consumers, resilience, the environment and financeability, and duties under the Strategic Priority Statement to the environment and resilience. However the radical reductions in base allowances proposed by the working paper pose risks to performance and resilience and push costs onto future customers. Those future customers already risk facing undue cost pressures due to the continuing delay to adequately address asset health concerns that, as detailed in Anglian's SoC, Anglian has consistently advocated for, even prior to PR19.

(34) The CMA must uphold principles of good regulation and fundamental principles of law, as must any regulatory body. These require (*inter alia*) that its actions are proportionate, targeted and consistent. A now £203 million reduction in Anglian's modelled allowances due of changes to a modelling framework previously approved by the CMA at PR19, does not meet these standards absent a robust body of evidence supporting this, particularly since this change was not necessary to address the claims before the CMA in Anglian's submissions. Nor is the CMA's approach consistent with the predictability, process and proportionality limbs of its own "4Ps" that the CMA intends to roll out across all functions.[24]

(35) Accordingly, Anglian is concerned that the proposed cuts to its base funding and the denial of its CACs is incompatible with the consumer interest and with a fair, consistent and proportionate approach to fulfilling the CMA's duties.

[23] CMA, PR24 PDs (October 2025), para. 8.8 (see here).
[24] CMA Annual Report and Accounts 2024 to 2025: "*That's what our '4Ps' framework is designed for. Pace, predictability, proportionality and process: common sense principles that can make a real difference to how we operate. We're now rolling out tangible actions under these 4Ps across all our functions*" (see here). See also Anglian's response to PDs paras. 191-194 (see here).

2.5 Even in its focus on technical econometrics, the CMA has not responded to the concerns raised by companies or has dismissed them without adequate justification

(36) As well as ignoring vital objections to the outcomes of the models at PDs, the Working Paper ignores stakeholder representations on major issues in the PDs methodology. Although the CMA addresses selected secondary technical issues, it continues the same flawed approach without justifying or rebutting stakeholder arguments that LASSO and the overall statistical methodology employed are fundamentally inappropriate[25] for setting efficient base cost allowances in the water sector (see Section 4 below).[26]

(37) Well-evidenced concerns in these responses are dismissed with little or no justification. Examples include: the use of OLS instead of random effects (no justification); the decision not to consider the statistical significance of individual coefficients (no justification); inconsistent protection for labour input price pressures in wastewater (no justification); and rejection of standard sensitivity tests like company removal to assess the stability of the models (inadequate justification, para 2.29).

(38) The CMA's claims that it has addressed the following core economic issues are also incorrect:[27]

- **economic framework and cost driver selection:** the modelling framework used by the CMA remains fundamentally **inappropriate** for assessing cost efficiency (see Section 4), further compounded by the fact that the candidate set of variables tested through LASSO remains arbitrary and not justified (see Sections 6.1 and 6.3)
- **multicollinearity:** the CMA failed to recognise the conceptual inappropriateness of applying PCA prior to LASSO (see Section 1 and Appendix 1 of the second expert report of Professor Subal Kumbhakar), and unjustifiably assigned an arbitrary 50% weighting to scale drivers with limited operational relevance (see Section 6.3)
- **stability:** extending the CMA's own bootstrapping analysis demonstrates that arbitrarily forcing the modelling to select a single level of cost aggregation simply increases the uncertainty around individual AMP8 cost allowances (see Section 6.2 below, as well as Tables 1 and 2 of the second expert report of Professor Subal Kumbhakar)

[25] As it prioritises explaining historical costs (efficient and inefficient), rather than forecasting future efficient costs.
[26] i.e. reliance on statistical modelling at the expense of interpretability and credibility.
[27] CMA, Base Costs Modelling Working Paper (December 2025), paras. 2.6 and 2.7 (see here).

- **sensitivity analysis and statistical testing:** the sensitivity analysis presented by the CMA is partial, deliberately ignores more fundamental robustness checks such as dropping companies prior to or after LASSO (see Tables 4 and 5 of the second expert report of Professor Subal Kumbhakar), and disregards the implications of highly statistically insignificant variables in its models (see Table 3 of the second expert report of Professor Subal Kumbhakar).

3 The CMA has failed to consider whether allowances are sufficient, in particular in light of the current industry context and its broader duties

(39) As above, the Working Paper is silent on the CMA's approach to wider elements of base allowances, restricting Anglian's ability to comment. However, urgent CMA action is required on this front: The radical reduction of funds for day-to-day services in the Working Paper is inconsistent with the CMA's recognition of the challenges the industry currently faces, including asset health, climate change, population growth and environmental targets.[28]

(40) Sense-checking modelled outcomes against the evidence illustrates the concern:

- The Working Paper's conclusions are unrealistic when considered against AMP7 outturns. The CMA's outcome assumes an 8% reduction in modelled base allowances in AMP8 vs. AMP7 outturns despite the fundamental step-change in investment, combined with population growth and asset base growth relative to PR19. (See para. (44) below for more detail).
- The Working Paper implausibly claims that the industry is systematically overfunded by 7.1%, despite nearly all (15/17) companies overspending PR19 modelled base funds, and the CMA identifying that Ofwat's AMP8 outcomes package (which was underpinned by £3bn more in modelled industry base funding) had a downside skew.[29]
- The Working Paper allowances impose a huge practical squeeze on asset health funding (see para. (50) below). This is despite the PDs recognition of a "*pressing need*" for action on the "*crucial*" asset health issue, and the concerns that have been expressed by the sector, NIC and Defra,[30] as well as by the IWC who recently found that the regulatory regime "*is not delivering a sufficiently resilient system to tackle both short-term shocks and long-term pressures*".[31]
- The c. £3bn reduction in industry allowances removes a significant proportion of the c. £3.9bn of sector-wide CACs that Ofwat made in

[28] CMA, PR24 PDs (October 2025), para. 2.3 (see here).
[29] CMA, PR24 PDs (October 2025), para. 8.4 (see here).
[30] Anglian, SoC (March 2025), para. 326 (see here).
[31] IWC, Final Report (July 2025), para. 877 (see here).

response to the CMA's PR-19 call for a forward-looking element that could be triangulated with historic econometric cost modelling.[32]

(41) Considering certain datapoints in more detail, among the various potential sense-checks on the sufficiency of the proposed AMP8 funding set out in the Working Paper, one readily available insight to the CMA is the comparison with AMP7 outturns, using data summarised by Ofwat in its Water Company Performance Report (WCPR) 2024-25.[33]

(42) Ofwat summarises the AMP7 sector performance for wholesale base expenditure that was within the scope of the econometric benchmarking models (i.e. modelled base costs), excluding unmodelled base costs. This enables a comparison of companies' AMP7 outturns with the outcomes of Ofwat's or the CMA's econometric approach at PR24, to sense check the appropriateness of the proposed modelled funding / base cost modelling framework in AMP8.

(43) Table 1 below compares Ofwat's and the CMA's proposed PR24 modelled wholesale base cost allowances (including bioresources) with AMP7 outturns,[34] including the sector-wide cost adjustment for energy but excluding the other five sector-wide adjustments granted by Ofwat and the CMA. This is because the purpose of such adjustments is to account for a step change in base activities, involving additional costs not reflected in AMP7 expenditure.[35]

(44) While Ofwat's proposed modelled AMP8 base cost allowance is only 2.9% lower than equivalent AMP7 outturn for the industry, the CMA's Working Paper assumes a reduction of 8%, which is entirely incompatible with operational realities and the broader industry context.

Table 1: Comparison between AMP7 outturn and AMP8 modelled base cost allowances (after the application of frontier shift)

Company	AMP7 outturn (£m)	Ofwat's FD modelled AMP8 base allowances (£m)	CMA's WP modelled AMP8 base allowances (£m)	AMP7 outturn vs AMP8 Ofwat (£m)	AMP7 outturn vs AMP8 CMA (£m)	AMP7 outturn vs AMP8 Ofwat (%)	AMP7 outturn vs AMP8 CMA (%)
ANH	4246	4080	3934	-166	-313	-3.9%	-7.4%

[32] CMA, PR19 Final Report, para. 4.293 (March 2021) (see here).
[33] Ofwat, Water company performance report 2024-25 (October 2025), page 43 (see here) and Ofwat, Data for the water company performance 2024-25 (October 2025) (see here).
[34] As the CMA will be aware, the definition of wastewater-bioresources BOTEX has been slightly amended between PR19 and PR24, so AMP7 wastewater and bioresources outturn data from Ofwat's 2025 WCPR have been adjusted to ensure full comparability with the AMP8 modelled base cost allowances. Accordingly, the following adjustments have been made to ensure a like-for-like comparison: exclusion of STW growth (TOTEX), exclusion of EA water quality permit costs, inclusion of sludge quality enhancement expenditure (CAPEX), inclusion of sludge growth enhancement expenditure (TOTEX), inclusion of enhancement OPEX for nitrogen removal, phosphorus removal, reduction of sanitary parameters, UV disinfection and chemical removal schemes.
[35] Ofwat, FDs Expenditure Allowances (February 2025), page 29 (see here).

WSH	2824	2687	2662	-138	-162	-4.9%	-5.7%
HDD	144	160	177	16	33	11.1%	22.9%
NES	2606	2425	2270	-181	-336	-7.0%	-12.9%
SVE	5307	5968	5698	660	390	12.4%	7.4%
SWB	2071	1699	1642	-373	-429	-18.0%	-20.7%
SRN	4021	2929	2916	-1,093	-1105	-27.2%	-27.5%
TMS	9121	9243	8136	122	-985	1.3%	-10.8%
UUW	5161	5330	5028	169	-134	3.3%	-2.6%
WSX	1713	1624	1570	-89	-143	-5.2%	-8.4%
YKY	3959	3875	3793	-84	-166	-2.1%	-4.2%
AFW	1320	1253	1226	-66	-93	-5.0%	-7.1%
BRL	443	400	412	-43	-30	-9.6%	-6.9%
PRT	165	191	171	27	6	16.1%	3.8%
SEW	845	807	802	-38	-43	-4.5%	-5.1%
SSC	479	554	512	75	34	15.7%	7.0%
SES	268	195	180	-74	-89	-27.5%	-33.1%
Industry	**44694**	**43418**	**41127**	**-1276**	**-3567**	**-2.9%**	**-8.0%**

Source: Oxera analysis
Note: A 1% frontier shift target is applied under Ofwat's scenario, compared with 0.7% under the CMA's scenario.

(45) The analysis above only compares the CMA's Working Paper modelled AMP8 base allowances to AMP7 outcomes. Table 2 below further seeks to assess how well Ofwat's FD and the CMA's Working Paper models would have predicted AMP7 outturns, using AMP7 input prices (for energy and wages) as well as AMP7 outturn values for the other modelling variables, so as to bring out the effect of both modelling approaches as clearly as possible. In a sense, this can be considered to be a 'what if' analysis—given the data now available, how would the two different modelling approaches project efficient costs over AMP7?

(46) If the CMA's Working Paper methodology were deployed today to predict AMP7 costs using actual AMP7 values, it would have failed to do so to a concerning extent, underfunding the sector by c. 10%, as shown in Table 2 below. In contrast, when updated for the additional information available to it at PR24, Ofwat's modelling framework is significantly closer to reality, leaving a more plausible gap of c. 3%.

Table 2: Comparison between AMP7 outturn and adjusted-AMP7 modelled base cost allowances (after the application of frontier shift)

Company	AMP7 outturn (£m)	Ofwat's FD modelled AMP7 base allowances (adjusted) (£m)	CMA's WP modelled AMP7 base allowances (adjusted) (£m)	AMP7 outturn vs adjusted-AMP7 Ofwat (£m)	AMP7 outturn vs adjusted-AMP7 CMA (£m)	AMP7 outturn vs adjusted-AMP7 Ofwat (%)	AMP7 outturn vs adjusted-AMP7 CMA (%)
ANH	4246	4116	3883	-131	-364	-3.1%	-8.6%
WSH	2824	2737	2645	-87	-179	-3.1%	-6.3%
HDD	144	164	175	20	31	14.0%	21.9%
NES	2606	2446	2227	-160	-379	-6.1%	-14.6%

SVE	5307	5923	5557	615	249	11.6%	4.7%
SWB	2071	1710	1612	-362	-460	-17.5%	-22.2%
SRN	4021	2961	2876	-1060	-1145	-26.4%	-28.5%
TMS	9121	9068	7894	-53	-1227	-0.6%	-13.5%
UUW	5161	5329	4935	168	-227	3.3%	-4.4%
WSX	1713	1655	1560	-58	-153	-3.4%	-8.9%
YKY	3959	3918	3729	-41	-230	-1.0%	-5.8%
AFW	1320	1232	1173	-87	-147	-6.6%	-11.1%
BRL	443	410	406	-32	-37	-7.3%	-8.4%
PRT	165	190	165	26	1	15.7%	0.5%
SEW	845	794	756	-51	-89	-6.1%	-10.5%
SSC	479	562	487	83	8	17.4%	1.7%
SES	268	198	174	-70	-95	-26.2%	-35.2%
Industry	**44694**	**43414**	**40252**	**-1280**	**-4442**	**-2.9%**	**-9.9%**

Source: Oxera analysis
Note: A 1% frontier shift target is applied under Ofwat's scenario, compared with 0.7% under the CMA's scenario.

(47) Anglian already submitted similar quantitative analysis in its PDs response, demonstrating the incoherence and insufficiency of the modelled base cost allowance given operational realities. Anglian urges the CMA to engage with the highly concerning conclusions of such comparisons, and sense-check its revised modelled base cost allowances and wider proposed base package in light of these findings.

(48) Another cross-check available to the CMA for its outputs is the impacts on asset health.[36] It is widely agreed that a change in approach to asset health is needed, but the CMA's modelling approach is deliberately calibrated to reproduce past outcomes. The Working Paper states "*our primary consideration is predictive power*", where "predictive power" means the model's ability to accurately predict *historic* 2011/12-2023/24 costs, not *future* AMP8 costs. Anglian's SoC detailed the dangers for asset health of prioritising backward looking models, which can perpetuate underfunding. The CMA itself recognised this problem in PR19 by calling on Ofwat to develop a forward-looking approach "*to enable it to enhance its analysis with a forward-looking element that will assist in triangulating results from its econometric modelling of historic costs*".[37] The IWC likewise emphasised in its independent recommendations to Government on the future of the water-sector the need for "*funding for asset assessment, replacement and renewal*" to be "*assessed through a longer-term lens*".[38]

(49) The CMA's approach makes this long-standing problem worse, with the choice to place even greater priority on a historical econometric lens as opposed to considering whether the outcome makes economic and engineering sense for AMP8, certain to harm asset health. As above, in its response to the IWC's

[36] See, for example, DCs joint reply to Ofwat's response to the DCs' SoC (May 2025) (see here).
[37] CMA, PR19 Final Report (March 2021), para. 4.293 (see here).
[38] IWC, Final Report (July 2025), para. 889 (see here).

Consultation, Ofwat stated that it sought to address the CMA's PR19 call to adopt a forward-looking approach "*via cost driver forecast and several sector-wide base cost adjustments totalling £3.9 billion*".[39] The impact of the CMA's modelled allowances is therefore to remove a substantial portion of this additional funding.

(50) For Anglian the Working Paper means the following (assuming the CMA's wider PDs remain static):

- The PR24 efficiency challenge for Anglian, taken as a proportion of capital maintenance alone, moves from 7% at Ofwat's FD to 25%,[40] given – as explained in both Anglian's SoC (para. 200), and PDs Response (para. 297) the majority of base funding must go to opex costs, such as energy, chemicals and labour, where options for reductions are highly constrained. Base cost squeezes therefore have a disproportionate impact on capital maintenance spend.
- Looking at wastewater, the Working Paper removes a further £63m of modelled base cost allowances vs. the PDs, and £100m of modelled base funding vs. the Ofwat FD. To illustrate the significance of even the £63m number, on current run-rates this would account for nearly 3 years of proactive sewer maintenance work or 9 years of sewer CCTV inspections work that has been performed by Anglian.
- Looking at water, as shown by Table 3 below the Working Paper allowances mean that after accounting for activities where spend is hypothecated (metering and mains renewal) and those that are not funded by the Ofwat base models (boundary box replacement and delivering frontier leakage), Anglian will be left with just £153m over the five year AMP from 2025 to 2030 (i.e. 21% of its Water Base CAPEX excluding network reinforcement) to cover all other water capital maintenance spend on all other assets, e.g. 380 storage points, 130 water treatment works, 433 booster and over 450 boreholes and more. This is not reasonable or attainable. For example. Anglian's SoC explained it spent on *average c. £40 million per year on Gravity Sewers alone in AMP7 alone* and has identified a significant need to increase renewal rates vs. AMP7 levels.[41]

Table 3: Asset maintenance as a % of Water Base CM (excluding network reinforcement)

Base CM Item	PDs expenditure allowance 2025-2030	% of Water Base CM (excluding network

[39] Ofwat, Independent commission on the water sector regulatory system call for evidence, Annex – Ofwat Additional Evidence (April 2025), page 32 (see here).
[40] This is calculated via reflecting the impact of the delta between the Working Paper and Ofwat FD as a percentage of base capex (which mostly consists of capital maintenance).
[41] Anglian, SoC, para. 303.

		reinforcement)
Total Water Capital Maintenance (Base capex excluding network reinforcement CAC & Implicit Allowance)	£751m	100%
Metering, mains and Boundary Box Implicit Allowances & industry CACs	£392m	52%
Boundary Box and leakage CACs	£206m	27%
Remaining Water Capital Maintenance for all other assets (e.g. storage points, water treatment works, boosters, boreholes and more)	**£153m**	**21%**

(51) These results fail to pass a basic sense-check and are incompatible with the CMA's duties (including to consumers, resilience, the environment and financeability).

(52) Anglian notes that Ofwat stated in its PDs response that the CMA's (then £2bn) reduction in allowances at PDs were "*broadly aligned*" with its FD and that "*no evidence that all companies are currently underspending*" means that the PDs allowances "*are sufficient for an efficient company to maintain long-term asset health while delivering against performance commitment levels*".[42]

(53) As Anglian explained, these statements are divorced from the reality of working in the water sector (with, for example, a £200m+ reduction in modelled allowances being equivalent to twice Anglian's maintenance budget for all drinking water supply assets). It is hard to understand how Ofwat can be comfortable that an econometric model that it does not support should force these huge changes to its own in-the-round assessment of individual companies' allowances (with reductions for individual companies of up to 14%). Ofwat's own Asset Health Roadmap and newly installed cost change process inherently acknowledge that industry modelled allowances, set at more than £7bn greater than those in the Working Paper, risk being insufficient to maintain acceptable asset health maintenance in AMP8. Ofwat's views expressed in its PDs response are therefore unfounded, inconsistent with its wider policy and cannot form a reasonable basis of support for the CMA's radical changes.[43]

[42] Ofwat, Response to PDs on Base and Enhancement Costs (November 2025), para. 2.2 (see here).
[43] Anglian, Response to PDs on Base Cost Modelling, pages 2-3 (see here).

4 The modelling framework set out in the Working Paper prioritises the ability to explain historical costs over isolating and projecting efficient costs

(54) The CMA set out in the PDs that the "*setting of base expenditure involves two key aspects. First, customers should receive value for money and not pay for inefficiency. Second companies should have sufficient funding to maintain their assets, provide a good level of service and deliver improvements for customers and* the environment."[44]

(55) Section 3 showed that the models do not achieve the effect of providing sufficient funding. This Section 4 shows how the approach adopted at the PDs and continued in the Working Paper is inconsistent with achieving the effect of the first aspect—that cost allowances should be set on the basis of efficient costs.

(56) Identifying the efficient level of costs is consistent with the CMA's duty to promote efficiency and is generally the central objective of cost assessment across different regulatory applications. However, by design, the CMA's approach instead seeks to explain and rationalise all historical costs, regardless of whether these costs were incurred efficiently.

(57) This is explicitly stated by the CMA in its modelling consultation: *"our [the CMA's] primary consideration is predictive power"*.[45] It is important to note that, as above, in a statistical setting, 'predictive power' means the extent to which the model is able to precisely fit *historical* (efficient and inefficient) costs. The CMA implements this approach by assessing the goodness of fit of its models over the historical data, as measured by the Root Mean Square Error (RMSE).

(58) The impact of its primary consideration to optimise 'predictive power' appears across numerous decisions through the CMA's framework, including:

- the stark approach taken by the CMA to apply a 0% weighting to bottom-up models, implying a single model or equation based solely on historical data can effectively predict the forward-looking efficient costs for a sector facing material new challenges and cost pressures (para 3.15);
- alongside the resulting stability in efficiency scores over time, it underpins the CMA's decision to include input price variables in its models (energy for both service areas, wages for water services only), and is the basis on which LASSO selects all variables in the PD models (para. 4.19); and
- the exclusion of wages from its top-down model of wastewater costs, on the basis that its historical correlation with other variables renders its contribution to lowering RMSE insufficient for inclusion (para 4.17).

[44] CMA, PR24 PDs (October 2025), para. 4.2 (see here).
[45] Working Paper, para. 3.15.

(59) This section summarises, in turn, a number of concerns with a modelling framework for assessing future efficient costs that relies upon goodness of fit as its primary criterion.

- First, it captures spurious correlations that mis-specify cost and cost driver relationships, weakening the ability of the model to accurately forecast costs.
- Second, it risks forecasting higher costs for companies that have been inefficient historically.
- Third, the approach to sensitivity testing carried out in the Working Paper, contrary to the CMA's claims, does not mitigate against the risks of the CMA's model 'learning company fixed effects', such as inefficiency.
- Fourth, the low priority it places on assessing the alignment of model coefficients with operational and economic rationale heightens the above risks.

4.1 Mis-specified cost and cost driver relationships

(60) The CMA's focus on explaining the greatest proportion of historical costs (whether they are efficient or inefficient) leads it to identify mis-specified (i.e. spurious) relationships between future efficient costs and cost drivers. The CMA's approach has led it to the following errors, that make its models ineffective at predicting future efficient costs.

- A negative relationship between costs and wages for the bottom-up water resources plus model, and a finding that increases in wage levels do not affect wastewater costs. The misspecification of the relationship between costs and wage levels is addressed in more detail within section 5.1, below.
- Inclusion of an energy trend that captures other (persistent) cost pressures, in particular those associated with meeting more stringent performance targets. The misspecification of the relationship between costs and energy prices is addressed in more detail within section 5.2, below.
- The models spuriously include number of booster pumping stations, a variable with limited operational rationale to explain treated water distribution costs, as set out in Anglian's response to Disputing Companies' SoCs,[46] on the basis of model fit. This is compounded by the failure to test the inclusion of alternative topography measures (booster pumping capacity, average pumping head for water resources plus activities) that have a superior operational rationale.

[46] Anglian, Response to DCs' SoCs (April 2025), section 2 (see here).

(61) This risk was highlighted by Ofwat in its response to the PDs in the context of input price variables and remains unaddressed, in general and with respect to input price variables in particular, within the CMA's Working Paper: "*Input Price Variables: the inclusion of an energy price index may capture unrelated cost variation and act as a time trend. CEPA advised against its use due to risk of spurious correlation.*" [47]

4.2 Risk of conflating efficient and inefficient costs

(62) The CMA's focus on historical goodness of fit risks capturing company-specific inefficiency effects within its equation of future efficient costs. Taking historical goodness of fit to its logical conclusion would suggest that the most desirable model would be one with an RMSE of 0. However, such a model would simply fund companies based on their historical cost levels, regardless of how efficient or otherwise these costs were. This moves away from the intention of regulation and benchmarking. It is also inconsistent with the execution of the efficiency duty, as it 'locks in' historical levels of inefficiency to future allowances, thereby reducing companies' incentive to promote economy and efficiency.

(63) This risk was highlighted by Ofwat in its response to the PDs, and remains unaddressed for the Working Paper's models: **"***the CMA's LASSO implementation prioritises in-sample fit over out-of-sample robustness, leading to over-specified models that may embed company-specific inefficiencies*." [48]

4.3 Insufficiency of the approach to sensitivity testing

(64) The Working Paper claims that its sensitivity tests address the concerns above.[49] However, the Working Paper's approach to sensitivities does not provide an adequate basis for assessing either mis-specified relationships or conflation of efficiency with inefficiency. Critically, the move from a ten-fold cross validation approach to the consultation bootstrapping tests still fundamentally assesses the stability of models to dropping individual company-year observations, rather than entire companies.

(65) This is a concern because of the structure of the dataset available for water sector cost assessment. The risk of capturing company-specific inefficiency effects is heightened because the majority of variance in the sample of costs is between companies rather than within a given company over time. Combined with the small number of cross-sectional observations (17 in water, 10 in wastewater), company-

[47] Ofwat, Response to PDs on Base and Enhancement Costs (November 2025), page 10 (see here).
[48] Ofwat, Response to PDs on Base and Enhancement Costs (November 2025), page 10 (see here).
[49] "*We have also conducted additional robustness checks, as described below, to ensure that the resulting cost allowances are not unduly influenced by the distribution of the data or by model specification."* CMA, Base Costs Modelling Working Paper (December 2025), para 2.25 (see here).

specific fixed effects, such as inefficiency, have a high risk of affecting the relationship estimated by an econometric model.

(66) The issue with sensitivity tests that are based on assessing the stability of models to dropping individual company-year observations, rather than entire companies, was also highlighted by Ofwat in its response to the PDs: "*ten-fold cross-validation is poorly suited to the dataset structure. Limited within company variation means models may learn fixed company effects, reducing generalisability.*"[50]

(67) In its Working Paper, the CMA critiques the use of sensitivities based on dropping whole companies, on the following basis: "*Some responses to our PR24 PD pointed to tests in which an entire company had been removed from the sample. We do not think that this test is useful for checking the appropriateness of a benchmarking model. Indeed, the special water regime may in fact prohibit an equivalent loss of company data from that available for benchmarking in the event of a merger.*"[51] This is accompanied by the following footnote: "*A test cannot be selective in which parts of the data are held out of the sample. Any tests in our view should be systematic in its approach to holding out data. For example, in our implementation of cross-validation and bootstrap we take a systematic approach.*"

(68) Neither of these critiques represent a valid basis for rejecting sensitivity testing based on entire companies. With respect to the CMA's comments on the relevance of the merger regime, the purpose of testing the sensitivity of the model to dropping companies is not because Anglian anticipate data for a given company becoming unavailable in the future. Nor is the implication that the resulting models be used to set cost allowances. The objective is to ensure that no individual company is driving the results of the model—i.e. to assess the sensitivity of the modelling to company-specific fixed effects, such as inefficiency.

(69) With respect to the claim that this test is 'selective', rather than 'systematic', it is not clear why the CMA considers this to be the case. Examining the robustness/stability of the model to dropping each individual set of company-specific observations is no more or less systematic than doing so for individual company-year observations. For Anglian's response, the sensitivity of the Working Paper models have been assessed to the same test: systematically dropping each set of company-specific observations, and assessing the stability of the resulting cost predictions. These tests find the Working Paper models are as unstable as the PDs models. For example, the allowance for Thames Water halves when it is dropped from the modelling of one of the service areas— wastewater in the PDs models, water in the Working Paper models. This indicates the influence it has on the (single) equation the CMA estimates to predict future efficient costs.

[50] Ofwat, Response to PDs on Base and Enhancement Costs (November 2025), page 10 (see here).
[51] CMA, Working Paper, para. 2.29.

4.4 Importance of assessing the alignment of econometric models with economic, operational and engineering rationale

(70) Variables used in econometrics should reflect the underlying economic/engineering/operational rationale. Alongside sensitivity testing, assessing the alignment of an econometric model to economic/engineering/operational rationale is a key mitigant of the risks set out above: mis-specifying cost relationships and conflating efficient costs with inefficiency. For example, if a variable exhibits an unintuitive relationship with costs (such as the negative relationship estimated between cost and wage levels in the Working Paper's bottom-up WRP model)[52] it suggests the model is overfitted or capturing a spurious relationship related to company inefficiency. Such a check appears to have been incorrectly relegated to a 'nice to have' within the CMA's framework (contrary to the question of whether the explanatory variable has strong engineering rationale which was central to Ofwat's approach to determine its models with the sector over the period of development).[53]

(71) By contrast, this is a central check within Ofwat's framework. There are several examples within the PR24 process of Ofwat performing such cross-checks, and not using variables on this basis, irrespective of the statistical significance of the coefficients or model fit.[54] The link between intuitive coefficients and overfitting is highlighted by Ofwat's comments on the use of a LASSO framework (which prioritises goodness of fit) at the PD stage: it "*[r]esults in complex models that reduce transparency, risk overfitting and include coefficients that lack economic intuition*".[55]

4.5 Anglian's approach to the remainder of the Working Paper

(72) While, for all the reasons above, Anglian retains its PDs position that the most robust approach is to return to the Ofwat FD models, given both time constraints and [redacted] n the remainder of the paper Anglian focuses on a subset of the most key concerns

[52] Caveat—although this model is not used, it is presented.
[53] For example "*we also emphasise that, while interpretability can provide a useful sense check, we consider that it is not the primary objective of benchmarking*" and "*however, as explained in paragraph 2.22, estimated coefficients may not always provide a clear or unique economic interpretation and are also not the goal of the modelling*". CMA, Working Paper, paras. 2.15 and 3.17.
[54] For example, in its FD, Ofwat rejected the inclusion of a variable capturing the share of population living in coastal areas on the basis that "*percentage of the population served that live in coastal areas does not have a clear engineering rationale*" and "*the inclusion of Southern Water's coastal variable in the sewage treatment base cost models leads to counterintuitive outcomes*." Ofwat, FDs Expenditure Allowances - Base cost modelling decision appendix (December 2024), page 40 (see here)
[55] Ofwat, Response to PDs on Base and Enhancement Costs (November 2025), page 10 (see here).
[56] [redacted]

arising from the application of the Working Paper's modelling framework that could be adjusted:

- Material empirical issues remain with the CMA's modelling approach as a result of its framework that could be adjusted, most significantly with respect to wages and energy prices (see Section 5 below).
- Arbitrary decisions within the Working Paper framework specifically underfund Anglian and need to be adjusted if the CMA modelling framework. is retained. These relate to the list of water topography variables (which exclude Anglian's proposals), the weight placed on bottom-up models, and the equal weighting of scale drivers in top-down models irrespective of their operational relevance (see Section 6 below).
- Section 7 summarises these potential amendments. However, regardless of the many hypothetical technical modelling amendments that could be made, what remains essential is that the outcome does not underfund Anglian's asset health, customer service, performance commitment and investment demands on the ground (see Section 3 above).

5 The CMA's Working Paper models mis-specify the relationship between costs and input prices

(73) Section 4 explained the fundamental conceptual flaw in the CMA's approach: prioritising "predictive power" (the ability to fit historical data) over the identification of efficient costs. This section demonstrates how this conceptual flaw manifests in practice through two specific empirical relationships that are either mis-specified or spurious. One or several solutions is identified in each case that the CMA should implement if retaining its framework for its final determination.

(74) In each case, the CMA's mechanical application of LASSO produces relationships that either violate economic and engineering principles or make material and arbitrary spurious adjustments to the data. These are not minor technical issues: they are direct consequences of prioritising "predictive power" (RMSE minimisation) over economic coherence.

(75) This Section identifies two empirical errors that flow directly from this prioritisation:

- **Wages:** The CMA's treatment of wage costs is internally inconsistent (providing allowances for water but not wastewater) and economically incoherent (producing negative coefficients in some models). This stems from conflating regional wage differences with wage growth over time in a single variable, then mechanically applying LASSO results without assessing whether the outcomes make economic sense.
- **Energy:** The CMA's energy variable captures far more than energy cost changes, acting as a general time trend that attributes to energy prices cost

increases actually driven by higher performance standards and asset health investment. Analysis shows energy explains only 25-36% of AMP7 cost increases, yet the CMA's model attributes substantially more, creating systematic underfunding for non-energy cost pressures.

(76) Because of these errors, the CMA's model may explain the past well, but will not predict the future accurately.

(77) For each of these two errors, Sections 5.1-5.2: (i) explain the economic rationale for the relationship between costs and the input price; (ii) identify how the CMA's model mis-specifies this relationship; (iii) quantify the impact on company allowances; and (iv) propose specific remedies that should be implemented to resolve these within the CMA's framework for its final determination.

(78) However, it is important to emphasise that addressing these two specific errors, while necessary, is not sufficient to remedy the fundamental conceptual flaw identified in Section 4. The errors in wages and energy are not isolated technical issues but manifestations of a systematic problem: prioritising "predictive power" in the statistical sense leads LASSO to select variables that minimise RMSE (fit historical data well) while mis-identifying the causal drivers of future costs. Unless the CMA reconsiders its foundational approach to model selection, similar mis-specifications will continue to emerge wherever historical data patterns diverge from future cost drivers.

5.1 Wages

(79) Exogenous changes to wage levels represent a significant cost for water companies, directly affecting around 33% of wholesale water base costs and 36% of wholesale wastewater base costs.[57] Wage levels can differ between companies operating in different regions. For example, prevailing wages tend to be higher in London and, to a lesser extent, the South and East. Over the 2012–24 period used by the CMA, the difference between the lowest and highest level of prevailing construction wages (the measure used by Ofwat and the CMA), is c. 30%, with the lowest level of wages prevailing in Wales and the highest in London. This implies that the wage bill of 10 FTEs for a company operating in Wales would only fund c. 7.5 FTEs for a company operating in London.

(80) Wage levels also increased over time across all regions. Between 2012 and 2024, the compound annual growth rate in real wages has averaged 0.78%, a total increase of 10% over the period modelled by the CMA. This implies that, for a given company, the wage bill for 10 FTEs in 2012 would only fund 9 FTEs in 2024,

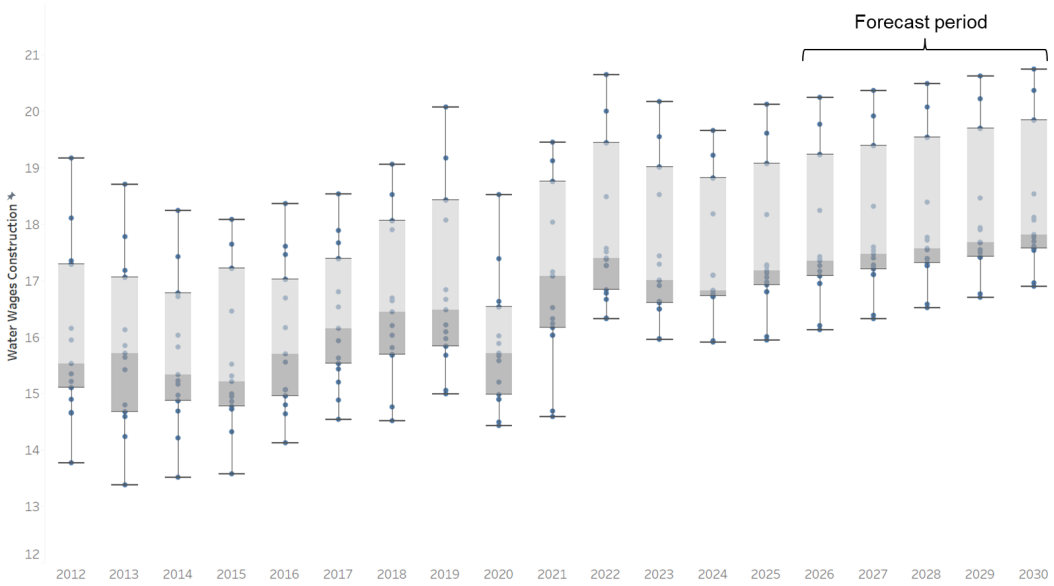
[57] Ofwat, FDs Expenditure Allowances (February 2025), page 273 (see here). Note there is a typo in table 33, rows 5 and 6 in column 1 should read '*labour cost share – wastewater network plus – base*' and '*labour cost share – wastewater network plus – enhancement*' respectively.

in real terms. This growth rate is forecast to remain at 0.78% over the 2026–30 period, implying a total increase of 15% relative to 2012.

(81) Within the historical dataset available for modelling water costs, about 75% of the variation in wage data is attributable to between-company variation, while only about 25% of the variation in wage data is attributable to within-company variation (based on the sum of least squares decomposition). Thus, the between- company variation will have a greater influence on regression analysis - particularly a regression that does not account for the underlying panel structure of the data, like the CMA's model.

(82) Figure 2 below shows this variation in the construction wage variable. From this visual representation, both sources of variation can be seen. The greater between-company variation is shown by the spread of values within a given year, while the smaller within-company variation can be seen by the way in which the height of the bars increases over time.

Figure 2: Variation in the regional hourly construction wages (ONS ASHE) between companies and over time (water service area)



Source: Oxera analysis of modelling files provided by the CMA.

(83) Over successive price controls, Ofwat has chosen not to provide an additional allowance for companies that face relatively higher wages, nor included a cost driver for regional wage differences in its cost assessment models. As Ofwat summarised in its response to Southern's claim for a wage adjustment: "*regional wage differentials are already sufficiently captured by the inclusion of population density in the base cost econometric models*."[58]

[58] Ofwat, Base cost adjustment claim feeder model – Southern Water (December 2024), table 'SRN_CAC2' (see here).

(84) Instead, at PR24 (as at previous price reviews) Ofwat made an *industry-wide ex-ante adjustment* for higher real wage costs, reflecting projections of national increases in real wages. Ofwat also provided for an ex-post true-up for differences between forecast and outturn wage increases. This is consistent with other regulators, such as Ofgem, that make similar provisions for real price effects associated with wages.

(85) However, in its Working Paper, as at PDs, the CMA discards any ex-ante allowance for real wage effects, instead relying on the (potential) inclusion of a wage variable in its model. The wage variable used by the CMA is the same as that presented above, combining regional wage variation (75% variation) and real wage increases over time (25% of the variation) within the same variable.

(86) However, under the CMA's framework, the variable is not retained in all models, as LASSO only selects the variable if it considers that it explains sufficient variation in the dataset in addition to other variables. Where the wage variable is retained, the ex-ante allowance for wages depends on the coefficient estimated by a single econometric model for each cost area. The CMA itself notes that the estimated coefficient may not provide a clear or unique interpretation, as a result of multicollinearity with other cost drivers.[59] This contrasts with Ofwat's framework, where the ex-ante allowance for real wage effects is based on the share of company costs affected by changes in wage costs.

(87) Table 4 below, summarises the wage relationships identified in the CMA's models. The colour-coding indicates the severity of issues: red highlights relationships inconsistent with economic principles and yellow indicates overstated effects or correct signs but questionable magnitudes. It shows the results of both the Working Paper models at a top-down and bottom-up level of cost aggregation, on the basis that the CMA could use either level of aggregation at its FD. Note, the CMA used the wholesale water bottom-up models at the PDs stage, and Anglian consider that (should the CMA retain its modelling framework at FD) the CMA should triangulate across models at both the top-down and bottom-up levels of aggregation in its FD (see Section 6.3 below).

Table 4: CMA Working Paper results of modelling costs and wages

Service area	Coefficient and implied relationship between costs and wages	Consistent with economic relationship?	Statistically significant?	Model currently used by the CMA?
Wholesale water (top-down)	0.303, i.e. a 10% increase in wage levels would increase costs by around 3%	Yes—broadly consistent with wage share of cost base (33%)	No	Yes
Wholesale water (bottom-up,	-0.217, i.e. a 10% increase in wage levels	No, implies negative relationship	No	No

[59] CMA Working Paper, para. 2.22.

water resources plus)	would *decrease* costs by around 2%	between costs and wages		
Wholesale water (bottom-up, treated water distribution)	0.556, i.e. a 10% increase in wage levels would increase costs by around 5.5%	Correct sign, but overstates wage share of cost base (33%)	Yes	No
Wholesale wastewater (top-down)	No relationship identified	No, implies costs are unaffected by wages	N/a	Yes
Wholesale wastewater (bottom-up, sewage collection)	No relationship identified	No, implies costs are unaffected by wages	N/a	No
Wholesale wastewater (bottom-up, sewage treatment)	0.094, i.e. a 10% increase in wage levels would increase costs by around 1%	Correct sign, but understates wage share of cost base (36%)	No	No

Source: Oxera analysis

(88) The CMA's results largely confirm Ofwat's previous findings: regional wage differences do not significantly affect relative company costs, as these effects are captured by other factors, such as population density. The top-down wholesale water model appears to be an exception, but this finding is contradicted by two bottom-up models of the same cost base, raising questions about the top-down model's robustness.

(89) As noted above, on this and similar evidence, Ofwat has rejected company submissions for CACs related to high regional wages, while still making a provision for the increase in national real wages. However, the CMA draws a completely different conclusion from the same information. The CMA applies the outcome from its inclusion of wage levels in the cost models mechanistically, without applying an ex-post adjustment. This leads it to make two clear errors, that are not justified in the Working Paper.

(90) First, the Working Paper models provide no allowance for the impact of future real wage increases on wastewater costs. The only rationale provided for excluding the impact of higher future wage levels on wastewater costs is the following: "*We note that in our top-down model regional hourly wages is not selected by the LASSO. This is likely caused by the correlation between it and other variables. For the reasons set out in paragraph 2.13 above, we do not, however, consider that this invalidates the model, nor does it reduce its predictive power for the purpose of benchmarking.*"[60]

[60] CMA, Working Paper, para. 4.17.

(91) It is particularly odd that the CMA excludes future real wage increases from its wastewater model, while including them in its water model, despite wages directly impacting an even greater share of wastewater base costs (36%) than the corresponding share of water costs (33%).

(92) The impact of this error is substantial, as wage levels are projected to increase by c. 4% over 2025–30. Constituting a cost share of 36%, this equates to around a 1.5% cost increase over the period. This is equivalent to a 0.3% p.a. productivity challenge to base wastewater costs over AMP8.

(93) The consequence of combining this error with a frontier shift challenge of 0.7% p.a. equates to an effective frontier shift challenge of 1.0%, which entirely contradicts the CMA's own analysis of productivity at the PDs which shows this level of challenge to be inappropriate.

(94) Second, the bottom-up model for water resources plus implies a negative relationship between costs and wage levels. This directly contradicts the underlying economic relationship between costs and input prices. Moreover, if applied, it amounts to an even greater unjustified additional productivity challenge within this area of the cost base.

(95) Given the expected increase in labour costs over the 2025–30 period of c. 4%, the coefficient estimated by the CMA implies that companies would receive a cumulative *reduction* in cost allowances equivalent to 0.87% of the water resources plus cost base. This negative adjustment is equivalent to a per annum additional productivity target of 0.175%. This is compounded by the increase in costs companies expect to face across the water service area due to rising real wages and prices. Calculated on a similar basis to the wastewater cost pressure identified above, this implies a further additional productivity challenge of 0.26%, based on a 0.81% p.a. cost pressure applied to 33% of company costs. Combined with the negative adjustment, this implies a total additional productivity challenge to companies' water resources plus costs of 0.44% (0.18% + 0.27%). The resulting total frontier shift challenge of 1.14% is inconsistent between cost areas and far out of line with the CMA's own analysis of potential productivity improvements.

(96) While the model is not presented in the Working Paper as one the CMA intends to use, Anglian believes the CMA has erred in placing no weight on its bottom-up models and *should* make some use of such models, as set out in Section 6 below. Therefore, it is a material concern that the model currently available to the CMA is so flawed.

(97) Two errors are set out above. First, the Working Paper models make no provision for the impact of wage cost pressures on wastewater activities. Second, the Working Paper models imply a negative relationship between wage cost pressures and water resources plus activities. Not only are both of these errors untenable

with respect to the underlying intuition between costs and input prices, they are also inadequately justified. The only analysis that underpins these decisions is a purely statistical analysis of costs, cost drivers and input prices over the 2012-24 period. This is not sufficient, in the absence of engineering and common-sense cross-checks, for the CMA to have confidence that it can use these models to overturn decades of regulatory precedent across multiple regulated sectors.

(98) Not only is the CMA's approach to wage modelling wrong, the way it treats these variables causes it to miss the effect of other important variables and trends. This is a common problem in an overly statistical approach to assessing cost drivers: the model will naturally combine variables that move together. However, in future these variables may well diverge, so the ability of the model to 'predict'' past trends does not help it predict future efficient costs, which is what it should do.

(99) The variables with which wages are most correlated within the top-down models (sewer length, load, ammonia consents)[61] are mostly time invariant.[62] Over the 2025–30 period, ammonia consents are forecast to remain flat and sewer length is forecast to grow by c 0.9%. Only load is forecast to grow significantly over 2025–30, by 3.2% - still considerably below the 4.2% forecast growth in wages over the same period.

(100) This creates a fundamental problem for predicting future costs outside of the sample used by the CMA. If historical wage cost variation is misattributed to lower growth or time-invariant variables, the model cannot predict the impact of future wage increases. The mechanism operates as follows:

- a company operates in a high-wage region, as a result of which it faces higher costs;
- LASSO observes that this company has both higher costs and (for example) greater ammonia consents (which happen to correlate geographically with high wages, although unrelated);
- LASSO attributes some of the higher wage costs faced by the company to ammonia consents rather than wages;
- as a result, LASSO does not select regional wages;
- for the purpose of assessing historical relative efficiency, this may not create problems - the model still predicts the company requires higher allowances (albeit attributed to ammonia consents rather than wages);

[61] CMA, Working Paper, figure C.1.
[62] While the CMA's analysis shows that wage levels are correlated with density, no density drivers are included within the CMA's top-down modelling.

- however, the same misattributed relationship is used to set AMP8 forecasts - but on the basis of ammonia consents that are time invariant rather than a 4% growth in wages; and
- the model therefore provides no allowance across the industry for the 4% wage increase all companies will face.

(101) This illustrates why prioritising historical predictive power, as the CMA does, does not ensure the identification of future efficient costs, which is what the CMA should be pursuing as an efficiency objective. The model can explain why historical costs were high whilst entirely missing the future driver that will increase them further.

(102) The instability of the treatment of wages in the Working Paper models is demonstrated by the accompanying bootstrap analysis presented by the CMA. Table 4.6 of the Working Paper shows that construction wages are selected in 59% of bootstrap runs for the wastewater model. This means that the CMA's decision to remove any allowances for a price input underpinning 36% of the wastewater cost base is contradicted by over half of the model sensitivities it has run. This instability is likely to be related to the high degree of multicollinearity that the CMA acknowledges with respect to its wastewater modelling.[63]

(103) The CMA dismisses this multicollinearity's implications, and the resulting instability in model specifications, stating "*where cost drivers are correlated, it is well known that there can be instability in model selection under LASSO"* and that this *"has a limited impact on predicted allowances as the instability is between cost drivers all capturing similar variation in the data"*[64]. As shown above, while this may be true for assessing historical costs, the fundamental purpose of the cost models is to predict future (efficient) costs. It cannot be assumed that variables that moved together in the past will continue to in the future. By assuming this, with no engineering or operational reality check, the CMA makes a significant error of judgement.

(104) Anglian therefore makes the following recommendations (assuming the CMA retains its modelling framework) for the CMA's approach in its final determination:

- to remove wage costs as a variable within the selection set available to LASSO and reinstate the ex-ante wage adjustment;

[63] In particular, the CMA comments with respect to the wastewater model that: "*[…] due to the higher maximum VIF score in our model (of around 5, shown in Table 4.5) we do not consider that there is a clear interpretation of some cost drivers in our model where they are highly correlated across cost driver groups.*" CMA, Base Costs Modelling Working Paper (December 2025), para. 4.16 (see here).
[64] CMA, Base Costs Modelling Working Paper (December 2025), para. 4.32 (see here).

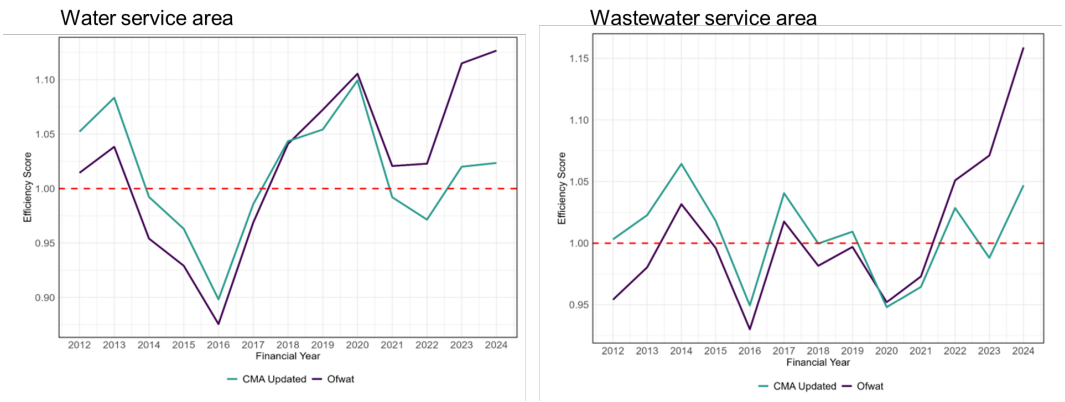
- if it is to test the legitimacy of regional cost adjustment claims, to do so separately from the ex-ante wage adjustment, as proposed by Ofwat;[65]
- at a minimum, if it continues using a real wage variable in the selection process for LASSO, to remove it from models where it has a counterintuitive (negative) sign and to reinstate the ex-ante wage adjustment where there is no price protection from real wages in the model; and
- regarding the approach to the true-up for wages, the CMA should apply a true-up for wages at its FD but, as for the ex-ante allowance, this should apply to both water and wastewater costs.

5.2 Energy

(105) The CMA's Working Paper largely retains the approach taken to energy prices at its PDs, with the principal change being the removal of interactive scale variables from input price variables (energy and wages). However, the problem of spurious correlation remains. The CMA attributes all of the cost increase over AMP7 to energy prices. However, other factors – especially a stronger ODI regime and the resulting investment to improve performance – also drove increased expenditure. The CMA's energy price variables spuriously include these other cost pressures. In practical terms, this might not matter if the two drivers were to continue to move together, and they are not expected to. As energy prices (and the DESNZ index that controls for them) are expected to fall, while quality expenditure drivers are increasing, the CMA's models are not reliable in assessing future efficient costs.

(106) The CMA presents a comparison of modelled efficiency scores between its Working Paper and Ofwat's FD models over 2012–24 for the water and wastewater service areas. The CMA's comparison is shown in Figure 3 below.

Figure 3 CMA Working Paper's comparison of efficiency scores over time between its Working Paper models (green) and Ofwat's FD models (black), 2012-24



[65] Ofwat's response to DCs' SoCs said a more appropriate approach to testing relative wages' model impact would be adjusting the wage variable to strip out sector-wide changes (or real price effects). This would effectively isolate 'between company' variation, allowing the CMA to reinstate the sector-wide ex-ante wage allowance while also testing if between company wage differences discernibly impacts relative costs. Ofwat, Expenditure Allowance – Cost adjustment claims (April 2025), para. 7.11 (see here).

(107) The Working Paper puts forward the argument that:

- input prices (principally energy) led to an increase in industry costs over the first four years of AMP7 (2021–24)
- the CMA's Working Paper models in both water (para. 3.18) and wastewater (para. 4.17) result in average efficiency scores near 1.00 over this period, because they control for energy and wage input prices;
- Ofwat's FD models produce efficiency scores reaching over 1.10 in water and wastewater respectively over the same period, because they do not control for energy and wage input prices, and therefore misattribute increased expenditure over this period; and
- the CMA "*does not currently view the [resulting] UQ challenge produced by [its] model to be necessarily overly stringent*"[66]—and by implication views the Ofwat FD UQ challenge as insufficiently stringent.

(108) By including these variables, the CMA's model explains historical costs. Following its stated criterion of "predictive power", the CMA therefore asserts that such a model represents a superior basis for industry cost assessment. However, as set out previously, this only holds as an appropriate basis for predicting future efficient costs if the implied relationship (and level of efficiency challenge) can be validly extrapolated into AMP8. Section 5.2 shows it cannot for energy costs.

(109) Company reports cited higher costs associated with quality of service as the driver of many cost categories, some of which are in Table 5 below, Some companies also cited higher maintenance programmes as part of the driver of overspend.

Table 5: Company references to overspend attributable to meeting higher quality of service targets

Firm	Period	Quote	Source
SVE	21/22	*"In Water Network Plus, we have taken the decision to invest above the FD in customer driven programme …. We have also reduced the number of low-pressure property days by 10% year on year, tackling one of our customers' most commonly experienced service failures. We have sustained our increased level of mains flushing, delivering our fifth consecutive year on year reduction in drinking water quality complaints. Additionally we are [seeing] increased pressure on operational expenditure such as energy and chemicals costs which are factoring in to the price control expenditure."*	Annual performance report, commentary to table 4C

[66] CMA, Base Costs Modelling Working Paper (December 2025), para. 3.24 (see here).

SVE	24/25	"*We are reporting £53.7 million overspend to allowed expenditure across the environmental programmes driven by our commitment to deliver our WFD ODI and fulfil our regulatory commitments*."	Annual performance report, page 123
SVE	22/23	"*An increase of job volumes in leakage detection activities has led to a rise in like for like renewal expenditure as part of our programme to reduce leakage by 15% across the AMP. Additionally, there has been an increase of operational expenditure with pressure on energy and chemicals cost which factor into the price control overspend compared to the FD.*"	Annual performance report, page 139
SVE	AMP7	"*Higher totex spend compared to the FD is due to the higher costs incurred on energy and chemicals and investment in customer driven programmes above the FD allowance plus our ongoing borehole maintenance programme*"	PR24 data table commentary, page 25
UU	21/22	*"Our investment strategy delivers long-term efficiency and sustainable performance improvements, and the additional £765 million investment we are making beyond the scope of our FD will drive further enhancements for customer and environmental performance. £265 million of this investment we expect to be fully recovered through regulatory mechanisms, including Green Recovery and projects that form part of our Water Industry National Environment Programme (WINEP). £250 million of this investment is improving environmental outcomes, funded through investment of outperformance, and subject to regulatory sharing mechanisms. The final £250 million of this investment will drive improved performance against customer outcomes and is supported on a business case basis, delivering improved customer ODI performance."*	Annual Report 2022, page 69
SRN	AMP7	*"[In Water Network Plus] the underspend in our enhancement expenditure was more than offset by the significant levels of base expenditure incurred, largely driven by:* • *the base allowance in our final determination being significantly lower than the base run-rate that we were operating at as we entered AMP7* • *overall asset maintenance capital expenditure in excess of the allowance in the final determination to help improve operational performance and compliance of … £508 million cumulatively,*	Annual performance report, commentary to table 4C

		• *compliance related costs at Testwood Water Supply Works as reported in the prior two year added £22.4 million cumulatively,* • *power variances, mainly relating to inflation, over the final two years of the AMP, following the ends of our fixed price agreement, … £14.2 million cumulatively,* • *the impact of inflation in excess of the average rate applied to the final determination, across the entire cost base* [i.e. SRN reports total AMP7 base variance to FD for water network plus of £675m. Of this, asset health and operational performance (bullet 2) account for 75% while energy accounts for 2%.] *In Wastewater Network Plus our base totex variance [to FD] has been driven by:* • *the base allowance in our final determination being significantly lower than the base run-rate that we were operating at as we entered AMP7* • *overall asset maintenance capital expenditure in excess of the allowance in the final determination to help improve operational performance and compliance of … £668 million cumulatively* • *the response to incidents and adverse weather across the AMP period, most notably in 2023– 24 when we incurred an additional £27.9 million tankering costs due to the very high levels of ground water during that year.* • *power variances, mainly relating to inflation, over the final two years of the AMP, following the ends of our fixed price agreement, … £61.3 million cumulatively,* • *the impact of inflation in excess of the average rate applied to the final determination, across the entire cost base."* [i.e. SRN reports total AMP7 base variance to FD for wastewater network plus of £831m. Of this, asset health and operational performance (bullet 2) account for 80% while energy accounts for 7%.]	
YKY	23/24	*"Gross base capital expenditure of £377m … is above the Final Determination of £309m with this investment supporting service improvements required to meet our performance commitment targets."*	Annual performance report,

			commentary to table 2B
YKY	24/25	*"Gross base capital expenditure of £339.4m … is above the Final Determination of £252.6m with this investment supporting service improvements required to meet our performance commitment targets."*	Annual performance report, commentary to table 2B

(110) Ofwat, likewise, has identified that capital maintenance and performance obligations are among the primary factors that companies have found to drive their overspend, with energy costs only accounting for some of AMP8 overspend.

Table 6 Examples of Ofwat quotes on AMP7 cost increase drivers

Quote	Source
"The largest proportion [of AMP7 water TOTEX overspend] is due to base expenditure, which makes up the majority of the total PR19 allowances. Companies have attributed the overspend across the PR19 period primarily to increased capital investment aimed at improving asset health, and higher expenditure required to meet performance commitments, such as reducing leakage. Some companies citied the challenge of meeting PR19 performance commitment levels. Companies have quoted inflationary pressures for energy and materials costs. We note that companies were somewhat protected from wholesale energy price increases over the 202-25 [sic] period through their hedging strategies."	Ofwat water company performance report (2024/25), page 40
"A large proportion (~50%) of the overspend across the 2020-25 period is driven by base expenditure, which makes up the majority of total PR19 allowances. The key reasons driving this overspend across the PR19 period as quoted by companies are: increased capital maintenance expenditure to improve performance, increased expenditure for one-off weather-related events and unexpected inflationary pressures for energy and materials costs. We note that companies were somewhat protected from wholesale energy price increases over the 202-25 [sic] period through their hedging strategies."	Ofwat water company performance report (2024/25), page 41
"We estimate the [industry AMP7] overspend reduces at an industry level from 14% to 12% when [the unexpected energy price increase] is accounted for."	Ofwat, 'Expenditure allowances – addressing asset health', page 17

(111) However, the CMA's analysis appears to attribute the entirety of the rise in costs over AMP7 to energy prices. This is shown by the CMA analysis presented above: Ofwat's analysis of costs excluding energy prices shows that costs exceeded the

level predicted by its model by over 10% over AMP7 (i.e. an average efficiency score of over 110%), whereas the CMA's model 'explains' the entirety of the AMP7 cost increase (i.e. an average efficiency score of 100%).

(112) Several different analyses have been undertaken for Anglian's response to assess the proportion of the AMP7 cost increase that can be attributed to energy cost increases. These are set out in Table 7 below, and consistently identify that energy costs made up around a quarter of the general base cost overspend. This finding is also supported by the analysis of Economic Insight, attached as Annex 002.[67]

Table 7: Expenditure overspend attributable to energy prices

Method to calculate share of expenditure overspend attributable to energy prices	Base water expenditure	Base wastewater network+ expenditure	Combined impact
Proportion of the industry base overspend above PR19 allowance attributable to increases in energy base costs over AMP7	29%	24%	26%
Proportion of the increase in total OPEX (a subset of base costs) between AMP7 and AMP6 that is attributable to the increase in energy costs	36%	37%	36%
CEPA's analysis of the level of energy overspend captured within Ofwat's implicit allowance (based on the first three years of AMP7, 2020/21 to 2022/23)[68]	5%	43%	'roughly' 25%
Update of CEPA's analysis of the level of energy overspend captured within Ofwat's implicit allowance (updated for the fourth year of AMP7, 2020/21 to 2023/24)	20%	44%	28%

(113) The consultancy CEPA, that supported Ofwat to develop its own energy adjustment, concluded on the basis of a subset of this evidence that: "*These values [estimates of the impact of energy costs on implicit allowances] are not immaterial and demonstrate that there is some conceptual double-counting [if an uplift factor is combined with models that do not control for energy costs]. But* ***it also shows that non-energy costs drive most of the increase in modelled expenditure****. Therefore, we think that in practice the double-counting effect is likely to be small and that any adjustment to the initial 64% uplift factor justified on this basis should also be small."*[69]

(114) Relative to Ofwat's FD model, the CMA's analysis includes a variable corresponding to around 25% of the cost increase, yet by doing so it entirely closes

[67] Annex 002, page 5.
[68] CEPA, DDs Frontier shift, real price effects and the energy crisis cost adjustment mechanism (June 2024), page 37 (see here).
[69] CEPA, DDs Frontier shift, real price effects and the energy crisis cost adjustment mechanism (June 2024), page 37 (see here).

the gap in efficient costs explained by its model. This indicates that it is misattributing the impact of other factors, i.e. service quality and asset health expenditure, to the relationship between cost and energy prices.

(115) Ofwat and the CMA predict energy costs to decline. However, quality of service and asset health pressures are increasing over AMP8. Performance targets are more stretching than at AMP7, the number of common performance commitments has increased and regulatory penalties have increased. Maintenance and asset health expenditure are also expected to increase over AMP8 as assets age. The Independent Water Commission's review of the water sector highlighted the "*pressing need*" for asset health action. This review concluded that the "*current regulatory approach to infrastructure resilience is not delivering a sufficiently resilient system to tackle both short-term shocks and long-term pressures*".[70]

(116) As set out in Anglian's response to the PDs,[71] the risk of spuriously misattributing the impact of other cost pressures to energy prices is a natural consequence of introducing a time-varying regressor that happens to coincide with recent cost increases. This was a risk identified by CEPA in a report commissioned for Ofwat: "*including the energy price index seems to capture spurious correlation (rather than causal effects) and unintentionally serves as a time trend variable, capturing other cost increases over time unrelated to energy. Therefore, we do not recommend including an energy index driver in the base cost models*."[72] This was reaffirmed by Ofwat in its response to the PDs, in which it stated: "*the inclusion of an energy price index may capture unrelated cost variation and act as a time trend. CEPA advised against its use due to risk of spurious correlation.*"[73]

(117) Ofwat's response to the Disputing Companies PDs responses effectively makes largely the same point. Ofwat states that: "*It also seems that the respondents have simply replaced one autoregressive variable with another. That they were able to find another autoregressive process that LASSO would select should not be a surprise.*"[74] Anglian understand this to be in response to evidence in its PDs response showing that unrelated series, such as a coffee, tea and cocoa price index, performed similarly to the energy price index in explaining costs. Anglian agree with Ofwat that the outcome of this analysis was unsurprising - and with its characterisation of the energy price variable as an autoregressive trend proxy rather than capturing a genuine causal relationship.

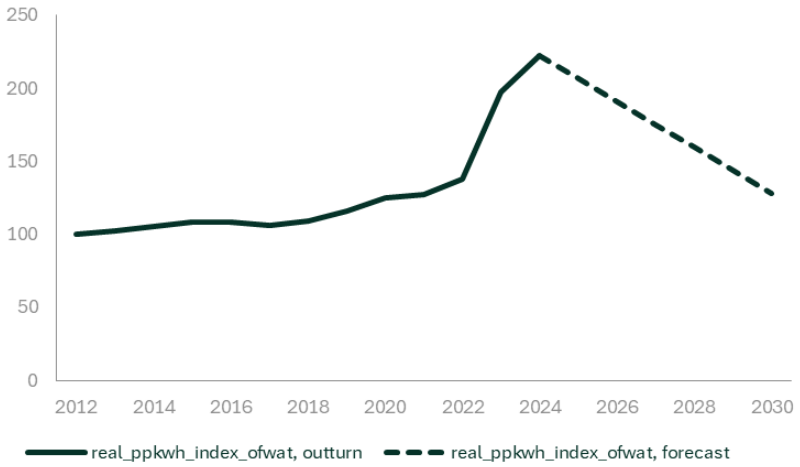
(118) Ofwat is right: there are many trends that could be identified that would spuriously correlate with costs just as well as do energy prices. However, if Ofwat is

[70] IWC, Final Report (July 2025), para. 877 (see here).
[71] Anglian, Response to PDs (November 2025), section 4.2.2 (see here).
[72] CEPA, DDs Frontier shift, real price effects and the energy crisis cost adjustment mechanism (June 2024), page 30 (see here).
[73] Ofwat, Response to PDs on Base and Enhancement Costs (November 2025), page 10 (see here).
[74] Ofwat, Response to Base Cost Modelling (December 2025), para. 1.10 (see here).

suggesting that means these are equally good, it is wrong. They are equally bad. To be clear: if energy prices (or the price of coffee, tea or cocoa) could reliably be assumed to continue to move in line with general costs, this spurious correlation would not in practical terms be a problem (although it would always be risky and unsatisfactory, with unreliable foundations). However, the CMA's own analysis shows this is not true of energy, so it cannot rely on its existing approach.

(119) Over the AMP8 period, the CMA uses an energy price index that projects that energy prices will return to pre-crisis 2020/21 levels (see Figure 4 below). However, over the same period, the omitted cost drivers that are being misattributed to energy prices (the cost of more stretching performance targets and targeted asset health improvements) are set to increase rather than decrease.

Figure 4: Ofwat FD energy index forecast used in CMA Working Paper models



Source: Oxera analysis

(120) Indeed, in its FD Ofwat was content to set the 'less stretching' catch-up target implied by its analysis of AMP7 costs precisely in order to provide companies with sufficient headroom to meet the higher performance standards they face at AMP8. As characterised by the CMA in its PDs: "*Ofwat recognised that an implication of its modelling approach in its PR24 FD was a small catch-up efficiency challenge on companies, but decided that it was appropriate to provide companies with the additional financial headroom to enable them to deliver performance improvements with base expenditure allowances over AMP8.*"[75] In other words, Ofwat explicitly linked the specific level of its cost allowances with the need to set allowances sufficient for higher AMP8 performance improvements.

(121) In making this assessment, Ofwat considered estimating catch-up efficiency over a longer time period (over the full sample period), in part as a consequence of the same energy cost overlap issue the CMA uses to motivate its Working Paper models. Ofwat stated that: "*There is some risk that the catch-up efficiency challenge overlaps with the energy cost adjustment (discussed below). But we*

[75] CMA, PR24 PDs (October 2025), para. 4.67 (see here).

consider calculating the catch-up efficiency challenge over the full sample period would overcompensate the overlap. It would address the energy cost overlap but also mean that base expenditure allowances do not reflect other cost pressures incurred by water companies in recent years (e.g. higher labour costs)."[76]

(122) In summary:

- energy price pressures explain a minority of the cost increases over the AMP7 period - around 25% across water and wastewater costs;
- the evidence presented above shows that it is likely that the CMA's energy price index misattributes other cost pressures to the energy price variable;
- while the energy price index is projected to fall in AMP8, the factors that gave rise to significant base cost overspends in AMP8 will persist.
- as a result, the CMA's model cannot be relied upon to forecast AMP8 costs efficiently; and
- the resulting allowances do not provide funding for the cost of meeting higher performance standards or addressing asset health needs, both of which will increase in AMP8.

(123) In principle, the most complete approach would be to include drivers that capture the cost of meeting higher performance standards and growing asset health needs in the model alongside energy prices. However, this is not realistic in the time available to the CMA ahead of its FD. Should the CMA continue with its modelling framework, Anglian therefore makes the following recommendations for the CMA's approach to modelling base costs in its final determination.

- The CMA should remove energy costs as a variable within the selection set available to LASSO, and reinstate the ex-ante energy price adjustment—if necessary consulting on any relevant changes to the adjustment.
- At a minimum, if the CMA continues using a model that uses energy prices as a cost driver, it should reflect the misattribution of future cost pressures to energy prices and moderate the stringency of its catch-up target accordingly. This could take the form of:
    - a triangulation between models that include and don't include energy prices;
    - a moderation of the catch-up target applied to the cost allowances resulting from the CMA's modelling;
    - introduction of a glidepath (effectively another form of catch-up efficiency moderation), as considered by the CMA at the PDs stage,

[76] Ofwat, FDs Expenditure Allowances (February 2025), page 27 (see here).

and applied by Ofwat at several price controls (at PR99[77] and PR04[78] for OPEX and capital maintenance; PR09 for OPEX[79] and PR14[80] for retail costs).

- The CMA should continue to allow for a true-up, but recognise its limitations: it only adjusts for energy cost variances, and it provides no mechanism for companies to recover the costs of meeting higher performance standards that the model has misattributed to energy.
- In defining the approach to the energy true-up for the FD, the confirmation of which Anglian welcomes, the CMA should align to Ofwat's FD approach of using power-cost shares from the last five years of the modelling period. This is necessary to reflect the evolution of power costs, as a share of total base costs, in recent years (relative to AMP5 and AMP6).

5.3 Conclusion

(124) The errors in the CMA's treatment of energy and wage costs are not isolated technical issues but manifestations of the fundamental conceptual problem with its modelling described in Section 4 above: its prioritisation of "predictive power" (RMSE minimisation) leads to the selection of variables that fit historical data well but will not track future cost drivers. Time-invariant variables cannot predict wage growth; energy costs that fall over AMP8 will not predict increasing performance standard costs.

(125) Anglian has proposed remedies that address these specific errors, while working within the CMA's framework. However, although necessary to address the unrealistic overall allowances the CMA would impose from using its models without a reality check, the broader modelling framework remains inappropriate. While some technical refinements in the Working Paper, such as specifying a true-up mechanism or extending the set of model stability tests, may marginally improve implementation, they do not resolve this fundamental limitation.

(126) Given the relatively high degree of instability between iterations of models from the CMA's framework (for example between the PDs and the Working Paper), Anglian is concerned that similar mis-specifications may occur in future iterations of the CMA's analysis between now and the FD stage. Particularly where these drive material gaps in Anglian's funding, Anglian believes the CMA must consult on the resulting models ahead of the FD.

[77] Ofwat (1999), 'Future water and sewerage charges 2000–05: final determinations', p. 94.
[78] Ofwat (2004), 'Future water and sewerage charges 2005-10: final determinations', pp. 144 and 263.
[79] Ofwat (2009), 'Future water and sewerage charges 20010-15: final determinations', p. 107.
[80] Ofwat (2014), 'Final price control determination notice: policy chapter A5 – household retail costs and revenues', pp. 36–37.

(127) The next section turns to three additional aspects of the Working Paper models. Unlike the issues in this section, these relate to arbitrary decisions made by the CMA as part of its modelling process rather than fundamental misspecification. However, the collective outcome of these arbitrary decisions are significant and unjustified reductions in the funds available to Anglian.

6 Decisions in the CMA's modelling process lead to specific, arbitrary detriments to Anglian which should be changed in its Final Determination

(128) Notwithstanding Anglian's broader concerns with the CMA's process, framework and approach to treating input price pressures, Anglian has also identified three Working Paper decisions that are (i) the result of arbitrary decisions; and (ii) result in specific detriment for Anglian. This Section summarises these issues and demonstrates that they collectively reduce Anglian's modelled funds by over £200m: more than the entire gap between the Working Paper and Ofwat's FD.

6.1 Arbitrary exclusion of proposed topography variables

(129) In its PDs, the CMA set out the rationale for adopting a LASSO-based approach as enabling it to assess multiple claims on variable selection within unified framework. Within this paper and within Anglian's previous response to the PDs it has outlined its concerns with this approach, which are not restated here.

(130) Nonetheless, having determined a framework to assess all claims made on algorithmic cost driver selection, the CMA has then taken a partial view across Disputing Companies with respect to the cost drivers used. While variables proposed by Southern and South East have been included, variables proposed by Anglian as part of the process have not been. The CMA has provided no justification for the partial and incomplete application of its unified framework.

(131) Per Anglian's PDs Response (but not addressed in the CMA's Working Paper), Anglian detailed the use of booster pumping capacity per length of mains, average pumping head (WRP) and average pumping head (total) as alternative/additional drivers to capture topography in water.[81] Anglian notified the CMA of these variables in its response to Disputing Companies' SoCs in April 2025,[82] ahead of the CMA's Approach and Prioritisation document that first raised the potential use of LASSO in exploring the approach to variable selection. In its submission, Anglian provided operational, engineering and economic rationale for the variables proposed, including their greater correlation with power usage than the number of booster pumping stations used by Ofwat and the CMA.[83]

[81] Anglian, Response to PDs (November 2025), section 4.3.3 (see here).
[82] Anglian, Response to DC's SoC (April 2025), pages 5-7 (see here).
[83] Anglian, Response to DC's SoC (April 2025), pages 5-7 (see here).

(132) The Working Paper analysis, including the variables Anglian proposed for the relevant cost categories, has been replicated for Anglian's response to this Working Paper. This replication finds that, within the top-down model presented by the CMA, if the additional topography variables Anglian proposed are included in the candidate set, a number of these variables are selected by LASSO as relevant cost drivers. The resulting top-down model increases Anglian's allowance by £84m when average pumping head (WRP), average pumping head (total) and booster pumping capacity per length of mains are added to the variable-selection process, or by £26m when all are included except total average pumping head (if the CMA considers it appropriate to apply a pre-modelling restriction and limit average pumping head to its two disaggregated components, WRP and TWD).

(133) Both average pumping head (WRP) and booster pumping capacity per length of mains are also selected when included in the corresponding candidate lists for the bottom-up wholesale water models (the former in the WRP model, the latter in the TWD model). While allowances from these models are not presented in the Working Paper, Section 6.3 explains that it would be clearly more appropriate to triangulate between the top-down and bottom-up models. If the below proposed triangulation over the top-down and bottom-up models presented in the Working Paper is adopted, the inclusion of Anglian's proposed topography variables in the candidate list would restore between £84 million to £114 million of the reduction in Anglian's cost allowance imposed by the CMA's existing models.

(134) Therefore, Anglian finds that the CMA's decision to exclude topography variables proposed by Anglian from the candidate list, inconsistent with its treatment of variables proposed by Southern and South East, reduces Anglian's allowance for water by up to £114m. The CMA does not explain why it has excluded Anglian's proposed variables from the candidate list, while including variables proposed by Southern and South East, and how this is consistent with its regulatory duties.

6.2 Arbitrary weighting of 100% on one level of aggregation

(135) In its PDs, the CMA set out its approach to using models at a bottom-up or top-down level of aggregation as follows: "*In general, the top-down approach is likely to perform better where the constituent activities share significant common costs, or if there are dependencies between their production processes (in the sense that operational decisions and conditions in one activity also impact costs in the other). The bottom-up approach is likely to perform better if the sets of cost drivers are different between activities. Since there is [in the CMA's view]* ***no obvious theoretical rationale for using one level of aggregation over the other*** *in our context, we have used the level of aggregation that performs better empirically […]*

[w]e have used the approach – top-down or bottom-up – that delivers the lowest RMSE in each business (wholesale water and wastewater). [emphasis added]."[84]

(136) With respect to Ofwat's approach to triangulation across models at and within different levels of aggregation, the CMA characterises this as follows: "*It is not clear to us how the PR24 FD approach, which essentially involves applying arbitrary weights on different models estimated with different cost drivers, is a more effective way of dealing with these issues [raised by Thames with respect to the suitability of LASSO].*"[85]

(137) This overall framework is unchanged in the CMA's Working Paper, and for modelling wastewater costs it selects the same (top-down) level of aggregation. However, changes to the CMA's modelling of wholesale water costs lead it to select a different level of aggregation from its PDs, selecting a top-down wholesale water model instead of the two bottom-up wholesale water models used at PDs.

(138) The Working Paper rests on an irrational assumption: that the underlying drivers of costs for companies operating in different parts of England and Wales can be captured by a single mathematical equation for each service area.

(139) Water companies operate under markedly different conditions, including variations in geography, asset age, network configuration, environmental constraints, and historical investment patterns. These structural differences affect both the nature and the intensity of cost drivers in ways that cannot be adequately captured by a single functional relationship. Imposing a common equation conflates fundamentally different cost structures, obscuring genuine efficiency differences, and producing results that reflect arbitrary model specification choices rather than underlying economic reality.

(140) Ofwat's CACs framework (endorsed by the CMA in its three most recent redeterminations, including PR24 PD, both at the sector-wide and company-specific levels)[86] was created to address econometric modelling limitations. Per Ofwat's framework rationale: "*Econometric cost modelling is the main benchmarking tool we use to set an efficient cost allowance for each company. But we recognise that statistical models are imperfect and cannot account for all relevant factors that affect costs. There may be instances where an adjustment is required to correct these imperfections*".[87]

[84] CMA, PR24 PDs (October 2025), para. 4.49 (see here).
[85] CMA, PR24 PDs (October 2025), para. 4.40 (see here).
[86] Although Anglian regrets that, to date, the CMA has not engaged in sufficient depth with a number of company-specific CACs, including Anglian's relating to boundary boxes, leakage, and (its alternative) gravity sewers/storage points.
[87] Ofwat, PR24 Final methodology - appendix 9 setting expenditure allowances (December 2022), page 27 (see here).

(141) As the CMA sets out, there are benefits to modelling at each level of aggregation. On this basis, established economic regulatory precedent is to triangulate across multiple levels of aggregation. As South Staffs Water noted in its third-party submission to the CMA's PDs, both Ofgem and Ofwat consider triangulation to reduce the risk of error and bias in any one model.[88] The CMA does not address this argument in its Working Paper.

(142) Despite developing econometric top-down models to determine efficient cost allowances in the electricity distribution sector (where overall model fit is significantly better than for bottom-up models) Ofgem nevertheless applies a 50% weighting to bottom-up models.[89] Where Ofgem has relied solely on top-down models, such as in the case of gas distribution networks, it has provided a clear rationale for doing so, including cost allocation issues, the failure of bottom-up models to pass key statistical tests, and the high degree of similarity in activities undertaken by gas distribution networks.[90]

(143) Indeed, given the lack of a theoretical rationale for any particular level of aggregation, it cannot be reasonably argued that selecting a single level of aggregation is superior compared with Ofwat's triangulation, which places a 50% weighting on top-down models and a 50% weighting on bottom-up models. The CMA's approach to picking only the level with the lowest RMSE is equivalent to placing a 100% weight on the model that explains a greater proportion of *historical* costs. Rather than providing greater certainty or precision, this choice only serves to increase uncertainty around individual companies' AMP8 base cost allowances, as outlined in Tables 1 and 2 of the second expert report of Professor Subal Kumbhakar for both water and wastewater.

(144) Anglian has raised a number of concerns above on relying solely upon a model's ability to explain total historical costs to judge its suitability to forecast future efficient cost levels. Notwithstanding these concerns, even if RMSE represented an appropriate criterion, using it to select a single level of aggregation casts away useful information from other models on future efficient costs.

(145) The instability this creates in the CMA's modelling framework is particularly clear in wholesale water. The decision to change level of aggregation from the PDs is based on a marginal difference in RMSE (33.1 for bottom-up models compared to 33.0 for top-down models). However, when extending the bootstrap tests conducted by the CMA to assess the stability of its arbitrary modelling selection process, analysis conducted for Anglian's response finds that in nearly half (42%) of the 5,000 bootstrap runs the bottom-up models exhibit a lower RMSE than the

[88] South Staffs Water, CMA Submission (November 2025) (see here).
[89] Ofgem, RIIO-ED2 Final Determinations Core Methodology Document (November 2022), para.7.15 (see here).
[90] Ofgem, RIIO-3 Final Determinations – Gas Distribution (December 2025), paras.5.47-5.49 (see here).

top-down model alone. This demonstrates the evident fragility of the CMA's decision to use only the model with the lowest level of aggregation. Finally, it is noted that the CMA did not even follow its RMSE-minimisation logic through to its conclusion, given that the 50:50 triangulated outcome delivers a lower RMSE (32.8) than either the top-down or bottom-up model taken in isolation.

(146) For both water and wastewater, moving away from an arbitrary 100% weighting on one level of aggregation would be more aligned with regulatory precedent and represent a more stable basis for making cost predictions.

(147) Based only on the Working Paper models presented by the CMA, moving to a standard 50:50 weighting across bottom-up and top-down aggregation levels in water and wastewater would restore between £124 million and £132 million of the reduction in Anglian's cost allowance imposed by the CMA's existing models. The range is driven by whether a wage variable with a (counterintuitive) negative sign is retained in WRP models or removed, as discussed in Section 5.1. Combining the impact of moving to a standard 50:50 weighting across aggregation levels with the inclusion of the topography variables proposed by Anglian would broadly restore the £203 million reduction in Anglian's cost allowance imposed by the CMA's existing models, with an increase between £186 million and £215 million.

(148) If the CMA still decides to move away from the well-established and sound 50:50 weighting, a more robust approach than the CMA's 100:0 weighting would be to weight levels of aggregation based on the mean square error (MSE) of each model. This would apply the following weightings for top-down and bottom-up models in each service area:[91]

- water top-down model: 50.18% weighting
- water bottom-up models: 49.82% weighting
- wastewater top-down models: 54.87% weighting
- wastewater bottom-up models: 45.13% weighting

(149) Therefore, the CMA's decision to place 100% weight on a single level of aggregation (which discards valuable information, is inconsistent with regulatory precedent and, for wholesale water, fails the CMA's own stated criterion to minimise RMSE) leads to a reduction in Anglian's allowance of between £186m to £215m (depending on the treatment of Anglian's proposed topography variables). The upper end of this range would more than close the £203m gap between the CMA's Working Paper assessment of Anglian's efficient modelled cost level and the Ofwat FD. These changes would thus reconcile the CMA's chosen approach

[91] This is based on the CMA's Working Paper models, but any alternative modelling approach (such as considering the topography variables proposed by Anglian) would lead to a slightly different RMSE, and hence a slightly different weighting based on MSEs.

to cost modelling with Ofwat's view, developed with greater time and consultation than that of the CMA, of the base allowance Anglian needs to address its customers' needs efficiently in AMP8.

6.3 Arbitrary weighting of scale variables

(150) In its Working Paper, the CMA has introduced a new approach to controlling for 'highly correlated' cost drivers, including scale. Whereas in the PDs, it allowed its LASSO model to select between two scale variables, it has updated this approach to apply principal components analysis (PCA) to the scale variable.

(151) As the CMA summarises, PCA transforms a set of potentially correlated variables into a smaller number of uncorrelated components, known as principal components. The CMA uses this to reduce the six density variables into a single principal component that captures 93.5% of the variance. By including this variable, and its squared term, in its analysis the CMA is able to model the expected 'U-shaped' relationship between density and wholesale water costs. Notwithstanding the theoretical issues with PCA in this context (see Section 1 and Appendix 1 of the second expert report from Professor Subal Kumbhakar at Annex 001) this responds to and resolves a critique made by Anglian and other Disputing Companies in response to the PDs.

(152) However, the CMA also applies this PCA approach to scale variables in its Working Paper models, departing from its PDs approach for scale without any adequate justification. Unlike for density, where the PCA approach addresses a specific critique of the absence of a U-shaped relationship between density and costs, it is not clear why the CMA has introduced this change to modelling scale, where no such issue was identified. Further, it is unclear why the CMA has not then applied a similar and consistent approach to other correlated variables which remain unchanged from the PD, such as water treatment complexity drivers, particularly given that doing so would in any case imply the same arbitrary 50:50 weighting applied to the scale variables regardless of how these variables are constructed.

(153) Two highly correlated scale variables are included in the scale PCA for water (properties and mains length) and wastewater (load and sewer length). This produces a standard PCA result, whereby both variables received precisely the same loading of ± 0.707—or $\pm 1/\sqrt{2}$. The outcome is that the two scale variables receive an equal loading of 50:50 in the resulting PCA—a result that is guaranteed when only two highly correlated variables are included.

(154) The CMA does not explain why it has departed from a decade of consultation between Ofwat and the industry, including the extensive consultation process for PR24, which resulted in using properties and load as the scale drivers for top-down water and wastewater models respectively. It is noted that none of the DCs

nor Ofwat has argued that length of mains is an intuitive scale variable for wholesale water costs, or that sewer length is an intuitive driver of wholesale wastewater costs.

(155) In addition to the lack of justification for their inclusion, Anglian has concerns with the operational basis for considering length of mains and sewer length in models of aggregate water and wastewater costs, whether as standalone drivers or as part of an arbitrarily constructed composite index determined through PCA (per the CMA's Working Paper models). Around half of the water cost base corresponds to water resources plus activities (abstracting, transporting and treating raw water). These activities are functionally unrelated to the length of the treated water distribution network. The number of properties already captures the relevant scale relationship; mains length provides no additional operational insight for WRP costs. Including mains length through PCA therefore dilutes the properties variable with a driver that is operationally irrelevant to half of the costs being modelled.

(156) Equivalently, around half of the wastewater network plus cost base corresponds to sewage treatment activities, which are functionally unrelated to sewer length. This is particularly relevant for companies like Anglian, which operate in rural regions with a larger number of small sewage treatment works, and operate smaller sewer networks relative to their overall scale. The PCA approach penalises this operational configuration by unjustifiably underweighting load (which drives treatment costs) and overweighting sewer length (which is of marginal relevance for treatment).

(157) Using the most intuitive and operationally relevant scale driver in each top-down model (which no DCs challenged in this Redetermination) would restore £33 million of the reduction in Anglian's cost allowance imposed by the CMA's existing models, based on the top-down models presented in the Working Paper. However, as changing the approach to scale also leads to different RMSEs, were the CMA to remove PCA from its analysis of scale and continue its current methodology of selecting the level of aggregation based on the lowest RMSE, it would also switch to using bottom-up models for wholesale water. This would restore £140 million of the reduction in Anglian's cost allowance imposed by the CMA's existing models.

(158) Therefore, the CMA's decision to move to a PCA-based approach to controlling for company scale, without a rationale or clear explanation, and inconsistent with its treatment of other variables such as water treatment complexity drivers, leads to a reduction in Anglian's allowance of between £33m and £140m alone.

6.4 Conclusion

(159) These three arbitrary decisions (excluding Anglian's topography variables, placing 100% weight on a single aggregation level, and introducing PCA for scale

variables) share a common pattern. Each represents a departure from established practice (Ofwat's FD, the CMA's own PD, or regulatory precedent) with minimal or no justification. The CMA has not explained why it excluded variables proposed by Anglian whilst including those proposed by Southern and South East. It has not justified why 100% weighting on one aggregation level is superior compared with Ofwat's 50:50 triangulation, particularly when its own bootstrap analysis shows that a triangulated outcome would reduce uncertainty around the level of modelled efficient cost allowances. And it has not explained why PCA is necessary for scale variables, given that one scale driver has clearly higher operational relevance than the other in each service area, as recognised by Ofwat and the five DCs.

(160) Collectively, these three decisions reduce Anglian's modelled base allowance by between £205m to £253m— more than the entire £203m gap between the CMA's Working Paper outcome and Ofwat's FD. This is not a marginal adjustment or technical refinement. These are material detriments to Anglian arising from decisions that lack clear justification or contradict the CMA's own stated methodology. The scale of the impact demonstrates that the CMA's determination is highly sensitive to arbitrary implementation choices, not just to the fundamental framework issues identified in Sections 4 and 5.

(161) The pattern of arbitrariness is particularly concerning when combined with the systematic mis-specifications documented in Sections 4 and 5. Even if the CMA's fundamental approach to prioritising predictive power were appropriate (which Anglian has shown it is not), the arbitrary implementation of that approach creates additional, unjustified detriments to Anglian. A regulatory determination should not be this fragile to unexplained modelling choices. The CMA has a duty to come to a full redetermination for Anglian that is justified and consistent.

(162) Anglian therefore recommends that (should the CMA retain its modelling framework) the CMA: (i) includes Anglian's proposed topography variables in the candidate set, consistent with its treatment of other Disputing Companies' proposals; (ii) triangulates across aggregation levels, consistent with regulatory precedent and the CMA's own evidence of model instability; and (iii) uses properties and load as the scale drivers for top-down water and wastewater models respectively, consistent with a decade of consultation between Ofwat and the industry. Implementing these changes would increase Anglian's modelled allowance from £205m to £253m, bringing the CMA's assessment materially closer to Ofwat's FD whilst removing arbitrary detriments that lack justification.

7 A way forward

(163) As above, Anglian strongly contends that the most robust approach is to return to the Ofwat FD models to determine Anglian’s base allowances and to deal

separately with concerns of companies such as Southern and South East whose variables were included in the models with CACs.[92]

(164) If the CMA retains its new modelling framework, it is imperative to meet its customer, efficiency, financeability and resilience duties that allowances are revised to allow sector outcomes to be achieved. If the CMA retain its framework, Anglian therefore suggests the CMA take the following actions as explained above:

- **Triangulation Across Model Aggregation Levels**: Reverting to a 50:50 weighting across bottom-up and top-down aggregation levels in water and wastewater, which is well-established regulatory best practice and would reduce volatility and uncertainty in modelled base allowances.
- **Inclusion of Anglian's Topography Variables**: Including the additional topography variables Anglian proposed within the candidate set would reduce the selectivity created by the CMA's decision to include variables proposed by two companies only.
- **Scale variables**: Reverting to applying the intuitive properties and load as the unique relevant scale drivers (which have clear engineering justification) rather than the introduction of the PCA using multiple scale drivers to capture costs across the entire value chain (which departed from a decade of consultation between Ofwat and the industry).
- **Wage Input Corrections**: Correcting this mis-specification of wage cost-sharing (whereby the Working Paper models provide no allowance for the impact of future real wage increases on wastewater costs) would increase internal consistency between the CMA's water and wastewater models and its frontier shift productivity analysis.
- **Energy Costs Corrections:** Correcting the misattribution of historic cost increases to energy price rises (where the CMA appears to attribute AMP7 base overspend entirely to energy costs, contrary to broader industry evidence) by removing the energy index from LASSO or moderating catch-up targets. This would help address the widely recognised concern by DCs, Ofwat and CEPA that the CMA's approach identifies costs incorrectly, and improve the model's ability to predict future efficient spend.

(165) Stepping back, however, whilst there are many technical modelling changes that could be made, the most important point is that sufficient funding is provided to maintain assets, deliver services, and meet the industry's obligations to customers and the environment. There is no credible evidence base for the CMA to reasonably conclude that cuts to base costs delivers these outcomes.

[92] Anglian, Response to PDs (November 2025), para. 198 (see here).