UUWR_25

PR24 Draft Determination: UUW Representation

Area of representation: Real price effects and frontier shift

August 2024

This document outlines UUW's response to Ofwat's Draft Determination proposals on Real price effects and frontier shift.

Reference to draft determination documentation:
Expenditure Allowances, section 4.1.2

United Utilities

Water for the North West

1. Key points

- **Energy RPE adjustment should be neutral, or positive:** UUW continues to consider that no energy RPE adjustment is necessary, due to the difference between forward-looking energy prices and the extent to which current energy prices are not reflected in Ofwat's botex models.
- **We have some targeted concerns about CEPA's energy RPE methodology:** CEPA has not robustly justified its choice of time periods or indices used within the energy RPE adjustment. The only adjustment should be to ensure that companies that had already made prudent hedging arrangements – prior to Ofwat's announcement of its mechanism – are not made worse by Ofwat's proposal.
- **Ofwat should take a consistent approach to RPEs across the industry:** Whether an energy RPE adjustment is thought necessary or not, the same approach must be applied to all companies.
- **UUW supports the labour RPE applied to residential retail:** UUW welcomes the recognition of real price effect pressure relating to labour costs within residential retail.
- **UUW supports Ofwat's proposed ex-post plant, materials and machinery true-up:** We support Ofwat's proposal to apply an end-of-period adjustment for the plant, materials and machinery element of enhancement expenditure.
- **UUW considers that Ofwat's frontier shift assumption is overstating the scope for ongoing productivity increases in the water sector:** Ofwat's DD requires water companies to achieve a high level of frontier shift relative to other industries. We do not consider that the long-lived nature of the sector's asset base supports this level of stretch.

2. UUW's PR24 proposal

UUW did not propose any Real Price Effect (RPE) adjustments within its business plan. In the October 2023 business plan document *UUW46: Cost Assessment proposal*[1] we set out our view that an energy RPE adjustment was unnecessary because the expected fall in energy prices in AMP8 would not fully offset the under allocation of energy costs produced by the backward-looking botex models. Botex models produce an under allocation of energy costs because they are based on a historical dataset that encompasses the period FY12-FY23 (i.e. it contains a significant number of years prior to the energy cost shock). We also note that companies are often well placed to manage the risk associated with energy price shocks using hedges, which can enable companies to manage peaks and troughs in energy costs within a long-term botex allowance. Whilst this may not always be feasible, it should be considered when assessing the need to apply an RPE for energy prices.

We proposed a wholesale frontier shift of 0.55% and a residential retail frontier shift of 0.45%. This was informed by a cross-industry project, which was supported by Economic Insight.[2]

3. Draft determination position

Ofwat has proposed a series of RPE adjustments at Draft Determinations (DD).

Energy RPE

Ofwat has adopted an approach to recognising energy RPEs developed by CEPA. CEPA's methodology is formed of two key parts:

[1] UUW (2023) *UUW46: Cost Assessment Proposal, pp. 61-62.* Available here.
[2] See *UUW46* for more details.

(1) CEPA uplifts base costs to address the discrepancy between the implicit power costs funded by botex models and companies' actual power expenditure requirements based on FY23 prices.

(2) CEPA then uses Ofgem day ahead electricity baseload prices to establish the baseline power price for FY23. It then uses Bloomberg's electricity seasonal baseload forward contract price forecasts to predict how electricity prices will change up to the end of AMP8. This forecast is then combined with expected CPIH movements to estimate the RPE for energy prices, using FY23 as the baseline year.

The combination of these two steps results in an industry-wide negative adjustment. Ofwat also proposes an ex-post true-up mechanism. This adjustment will be determined by the extent to which outturn values of the chosen DESNZ index differ from CEPA's forecasts constructed using Bloomberg data and third-party cost projections.

Residential retail labour RPE

Ofwat proposes to implement a labour RPE within the residential retail price control. It notes that this recognises the macroeconomic changes since setting PR19 allowances, in particular higher levels of general inflation and nominal wage growth. Ofwat forecasts nominal wage growth of 2.5% a year.

Wholesale labour RPE

Ofwat retains the labour RPE and ex-post true-up mechanism it implemented at PR19. It uses the Office of Budget Responsibility's earnings forecast as the basis for the labour RPE adjustment.

Materials, plant and equipment RPE

Ofwat introduces an ex post true-up mechanism that will reflect the difference between CPIH and the Office for National Statistics' (ONS) construction output price index. It does not implement an ex-ante adjustment because it has not been able to identify robust forecasts of materials, plant and equipment costs.

Frontier shift

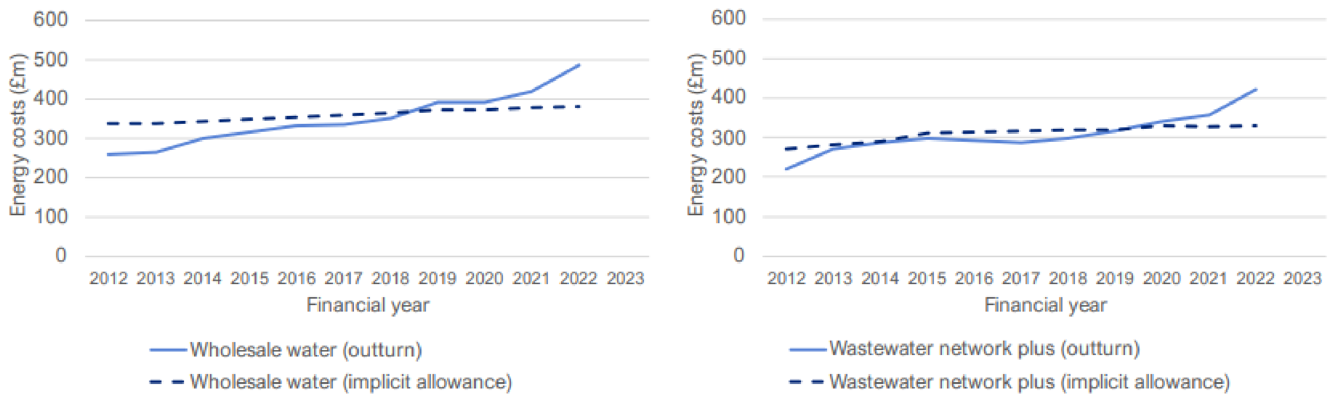
Ofwat considers that a frontier shift assumption of one percent is reasonable for wholesale and residential retail price controls.

4. Issues and implications

4.1 A negative energy RPE adjustment is wholly unjustified

CEPA's methodology results in a £204m negative adjustment for energy across the industry. A negative adjustment effectively assumes that companies' implicit allowance for power is too high, and therefore needs to be adjusted downwards. In its report, CEPA presents two graphs (Figure 1) which show the retrospectively estimated implicit power allowance compared to industry outturn power costs. This illustrates that before FY19, the implicit allowance is higher than companies' actual costs, implying that companies have been overfunded for power during that period.

Figure 1: Figure 2.7 in CEPA's report

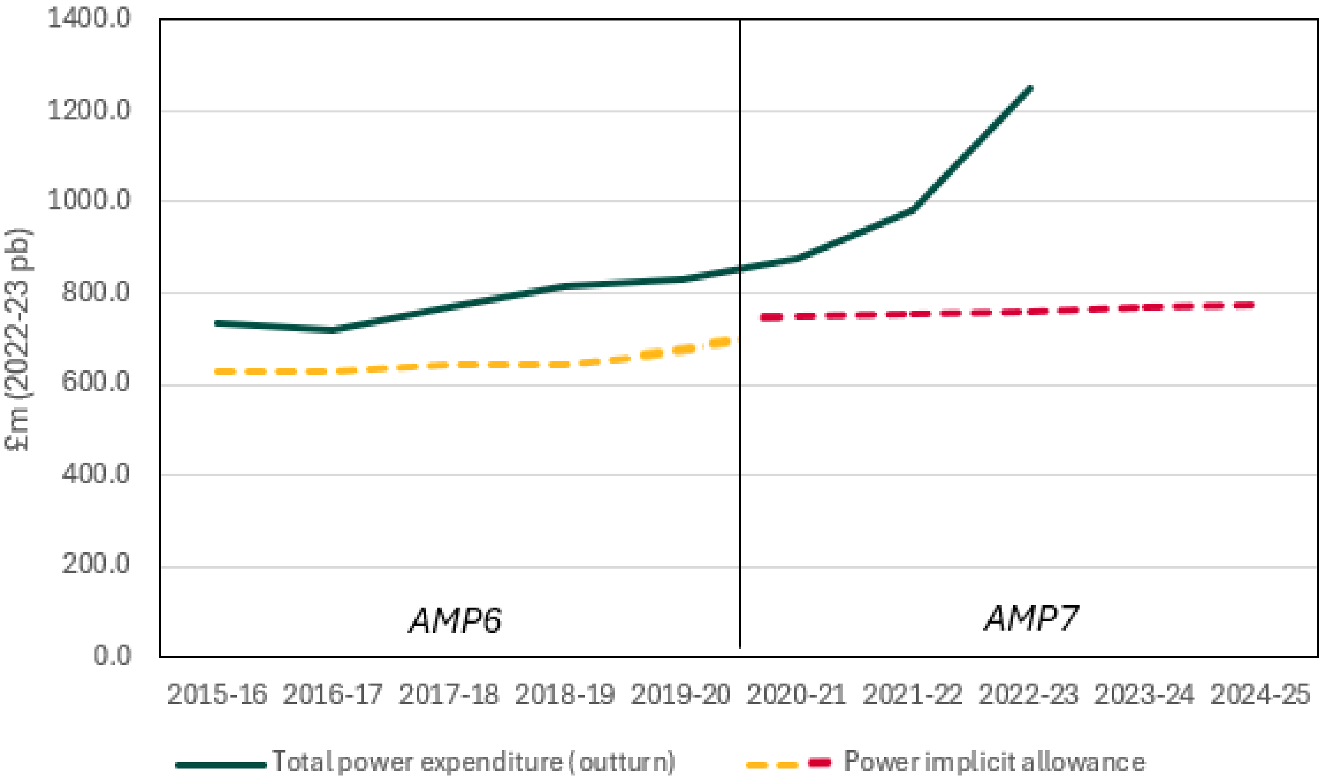


Source: CEPA (2024), Frontier Shift, Real Price Effects and the energy crisis cost adjustment mechanism, p. 22.

We consider that this is a highly misleading interpretation. We understand that CEPA calculated the model coefficients and the associated implicit allowances using the full historical dataset (FY12-23). This is at odds with how ex-ante price controls function, as Ofwat's models only use data that is available at the time of setting revenue allowances. At PR19, for instance, Ofwat used outturn cost data up to FY19 to generate modelled allowances. As there is a general upward trend in power costs (which is apparent in the graph above), CEPA's method of using the full historical dataset will tend to overestimate the implicit power allowance compared to what is actually funded by botex models.

Therefore, a more accurate approach would be to estimate the implicit power allowance by only using data that would have been available at the time of setting price control allowances.[3] The results of this approach are presented in Figure 2, which shows total industry outturn power expenditure (across water, wastewater network+ and bioresources) compared to the aggregate power implicit allowance. It can be seen that the power implicit allowance is consistently below companies' actual expenditure. This is unsurprising, given that Ofwat's models put equal weight on each year of historical data, meaning that the implicit allowance will be biased downwards by low-cost years.

Figure 2: Industry total outturn power expenditure vs power implicit allowance



Source: UUW analysis

It is therefore clear that companies have had to absorb significant power cost increases over the last few AMPs. In the next five years we expect energy prices to come down from the peaks seen in FY22-FY23, but remain elevated above historical levels, due to persisting geopolitical instability. This means that in AMP8 botex models will likely continue to underfund companies in relation to power expenditure. Accordingly, we consider that a negative adjustment for energy would be fundamentally unjustified. We recommend to Ofwat to not make any adjustment, as this avoids unnecessary regulatory complexity and maintains appropriate energy risk management incentives, as discussed below.

[3] For AMP7, we use FY12-19 data to estimate the power implicit allowance. For AMP6, we use FY12-14 data – although at PR14 Ofwat used a longer dataset, this data is not available on a consistent basis across companies. To ensure comparability, we used Ofwat's PR24 Draft Determination modelling suite to estimate implicit allowances.

4.2 UUW continues to consider that companies are often best placed to manage energy price risk

Responsible companies will seek to hedge energy costs to manage risk. In our response to Ofwat's additional information request on energy costs, we set out our approach to hedging electricity in order to balance cost efficiency and price stability. However, the proposal to use the DESNZ index to true-up costs risks negative interactions with the actions that a company may take to achieve these goals.

Firstly, water companies may consider the true-up mechanism to be a replacement for undertaking their own hedging activity. As set out in our *Cost Assessment Proposal*,[4] we are concerned that this could encourage companies to adopt more risky positions in the energy market. Companies might seek to align with Ofwat's mechanism (i.e. a regulatory hedge rather than a hedge to the market where the pricing risk resides) in order to avoid the risk of a regulatory penalty when wholesale prices do not align with hedged prices. However, due to the lag between actual cost pressures and the future true-up in AMP9, an energy crisis (such as the one seen recently) would likely create significant cash flow issues. As the DESNZ index is published regularly, the opportunity to true-up costs could instead be taken on an annual basis, although this would incur additional regulatory complexity.

Secondly, there is a timing mismatch, as companies may have already undertaken hedges prior to the publication of DD. In line with our own hedging policy, we have purchased energy for the first three years of AMP8, accounting for 39% of our forecast demand across that period. By the end of March 2025, we would expect to have purchased energy for the first four years of the AMP, accounting for 50% of the energy we forecast we will consume over that period. These purchases have been taken over time in a falling market and, as such, are at a higher rate than the single day Bloomberg price chosen by CEPA for their baselining exercise. As of July 2024, we estimate the difference between our current achieved prices and the Bloomberg prices at £36m. **We consider that it would be entirely inappropriate for Ofwat to apply an ex-post adjustment with no prior signalling that penalises responsible hedging decisions companies have already made in order to manage their costs appropriately**.

4.3 UUW has targeted concerns with CEPA's approach to the energy RPE

As set out in the previous section, UUW considers that companies are best placed to manage energy cost risk. However, if Ofwat does apply an adjustment at FD then we are clear that it should be consistent across the industry. UUW has examined CEPA's proposed approach to applying an energy RPE adjustment. While we consider that its general approach is legitimate, we have some targeted methodological concerns which we set out in this section.

Choice of historical period for average power share calculations

To estimate the value of the energy adjustment, CEPA first calculates the 'implicit allowance' for power in the base cost models. This is achieved by multiplying Ofwat's DD post catch-up modelled botex estimate by the average proportion of power expenditure relative to base costs for each company. The proportion of power expenditure is determined by averaging annual shares of power costs relative to base costs in the period FY18 to FY23.

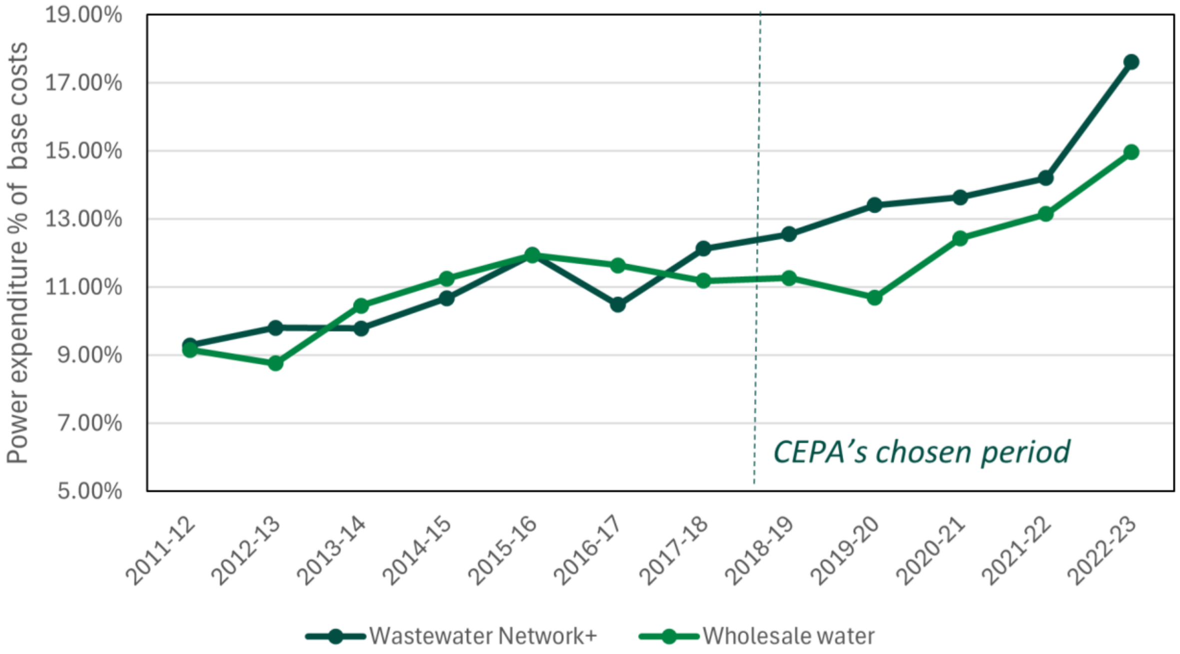
We consider the approach of estimating the implicit allowance by multiplying AMP8 base cost allowances with historical cost shares as a valid, albeit highly simplified, method for approximating the implicit funding for power within the models. However, we find the rationale for using the FY18-FY23 period unclear and have not identified a clear justification for this methodological choice in the published documentation.

As shown in Figure 3, CEPA's chosen period primarily encompasses the years of the energy price shock, during which power costs as a proportion of botex increased significantly for most companies. However, Ofwat's DD botex models are based on cost data from FY12 to FY23. Therefore, using this unrepresentative historical period will artificially inflate the implicit allowance, all other things equal. We consider that to approximate the implicit

[4] UUW (2023) *UUW46: Cost Assessment Proposal, pp. 61-62.* Available here.

allowance more accurately, it would be appropriate to use average power shares from the FY12-FY23 period, aligning with Ofwat's modelling timeframe.

Figure 3: Power expenditure as a share of base costs (industry average)



Source: UUW's analysis of "PR24-DD-Energy-cost-adjustment" model

We recognise that one potential reason for CEPA's choice of time period might be the change in the panel structure created by the formation of Hafren Dyfrdwy. However, we consider that there are relatively simple ways to address this change in the data structure. For example, the Severn Trent and Hafren Dyfrdwy entities could be merged for the purposes of the implicit allowance calculation, with the resulting power implicit allowance percentage applied to each entity separately. As such, we do not consider there is a good reason to use the time period from FY18 onwards in these calculations.

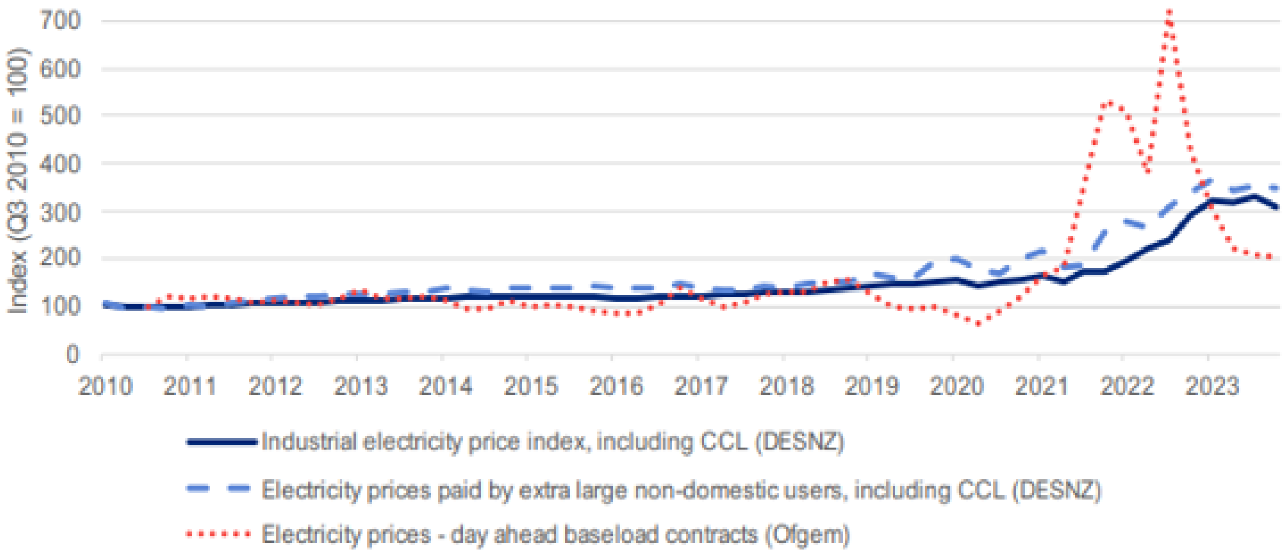
We find that expanding the period of analysis to incorporate all years from FY12 leads to a non-negligible impact on the final size of the energy adjustment. Total industry adjustment (across water and wastewater network+) increases by around £21 m (8.5% change relative to CEPA's approach).

Therefore, we consider that CEPA must align the historical period used for its implicit allowance calculations with the historical period used to set botex allowances. CEPA's approach appears to be disjointed from the panel dataset used in Ofwat's botex models with no robust methodological justification. This leads to an overstated implicit allowance.

Use of Ofgem prices to set the FY23 baseline

CEPA uses Ofgem day ahead electricity baseload prices as a proxy for the electricity prices faced by water companies in FY23. This approach helps to bridge the gap between the DESNZ index, which ends in FY23, and Bloomberg forecasts, which start in FY24. For this method to be effective, there should be a high degree of comparability between the DESNZ index and Ofgem prices, meaning they should measure similar aspects of electricity costs. If there is a significant discrepancy, the baseline for the RPE adjustment may be incorrect.

Figure 4: Figure 2.8 in CEPA's report



Source: CEPA (2024), Frontier Shift, Real Price Effects and the energy crisis cost adjustment mechanism, p. 25.

However, CEPA's own analysis appears to show that there is, in fact, a divergence between the two measures, as illustrated in the figure above. Although the DESNZ index and Ofgem market prices may reflect the same underlying price pressures, there is a noticeable temporal lag between them. Specifically, while the Ofgem price index peaks in FY23, the DESNZ index shows a slower response to this price shock. This discrepancy is problematic because, for CEPA's RPE adjustment methodology to be robust, the implied electricity prices for FY23 from both Ofgem and DESNZ data should be closely aligned. However, as shown in the above graph, the Ofgem price series appears to significantly overstate the actual costs incurred by companies in FY23. Accordingly, the price level for the base year of the RPE adjustment is set too high, which in turn implies an implausibly large reduction in real energy costs over AMP8.

We also note that for the RPE adjustment to be accurate, there must be a high degree of comparability between the Ofgem prices and the constructed Bloomberg (plus third party cost) forecast. Consistency across the two measures is crucial for ensuring that the adjustment reflects true cost conditions. However, we are unable to evaluate this comparability directly due to a lack of access to Bloomberg's historical electricity seasonal baseload forward contracts data.

Based on the above, we recommend that the Ofgem price series is not used; instead, the discrepancy could be mitigated by shifting the base year for the RPE adjustment from FY23 to FY24, and using the outturn DESNZ index values to estimate the uplift.

Third party charges

For third party costs, CEPA have taken an average of company submitted forecast costs. This simple approach appears to overlook two significant issues:

1) In our build-up of costs, we used consultants from Cornwall Insight (alongside most of the other water companies) to inform the basis of our forecast. Cornwall Insight developed a forecast which was based on the portfolio of sites which is specific to UUW. Third party charges are specific to a particular site, and depend on site location and where it connects to the electricity network. This impacts regulated network charges (DUoS + TNUoS) and the incurred losses. A portfolio of sites for a company will have very different charges dependent on the make-up of the portfolio. Therefore, a simple average of third party charges does not necessarily reflect cost for a company's sites portfolio.
2) In the work Cornwall Insight completed for UUW, wholesale charges were forecast at a higher rate than assumed in the Bloomberg forecast. This higher forecast interacts with the Contracts for Difference (CfD) scheme which supports renewable energy projects. When wholesale energy prices are high, CfD costs are lower (and in the case of our forecast, negative). Therefore, third party costs are lower than they should

be if wholesale prices are as per the Bloomberg forecast. Historically CfD costs have been close to 10 £/MWh. For UUW, this equates to a cost over AMP8 of £32.5m.[5] At a sector level, the CEPA forecast of third party prices underestimates costs by around £250m for this reason.[6]

Based on the above, we consider that taking a simple average of third party costs is not an appropriate approach. Third party cost forecast methodology should take into account issues related to company portfolio differences and CfD cost variability.

Energy adjustment instability when including FY24 DESNZ data

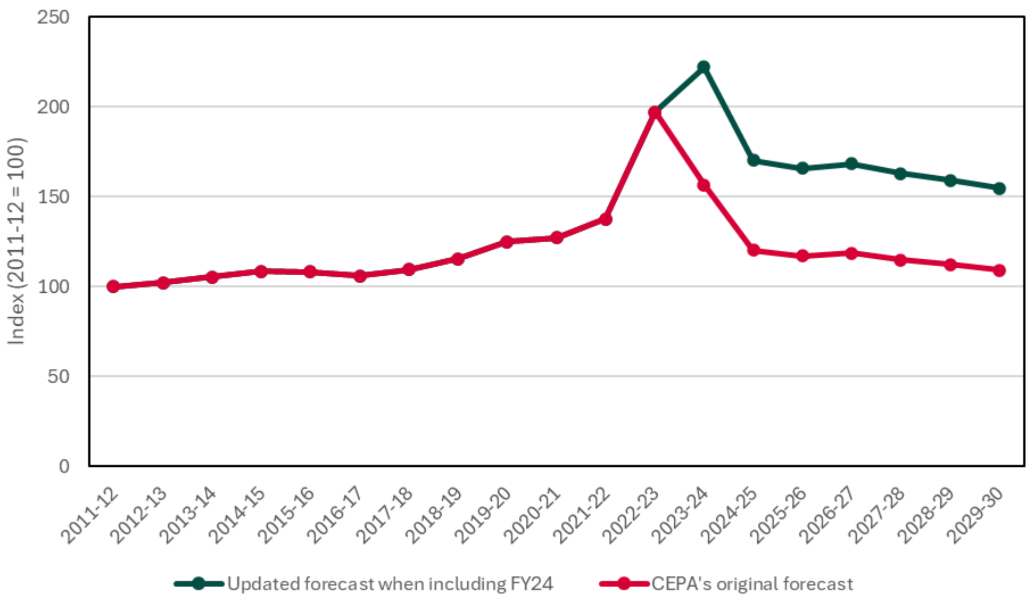
We understand that at the time of finalising the energy adjustment model, CEPA did not have access to DESNZ index values for FY24. This information is now publicly available. We have tested the change in energy adjustment when outturn data for FY24 is incorporated into the model. We did this by adjusting the uplift factor, so that it is based on the ratio of FY24 index value and FY12-24 average index. For RPE adjustment calculations, we used FY24 as the new base year. We consider that this method most closely resembles CEPA's methodology.

We find that incorporating FY24 results in very large swings: total industry energy adjustment changes from negative £204 m to positive £1,204 m. This instability suggests that the methodological approach taken to calculate the energy adjustment is not robust.

CEPA states that when calculating the adjustment *"what matters is the rate of change not the price level."*[7] However, this is also one of the main drawbacks of its methodology. CEPA's original forecast (based on Bloomberg and third party cost data) implies that in FY24 energy prices should have decreased by around 21% in real terms. However, outturn DESNZ data reveals that prices have actually increased by 13%.

As AMP8 forecasts are driven by relative price changes (across historical and forecast prices), re-basing the adjustment using DESNZ FY24 data implies that power expenditure will remain well above pre-crisis levels, as depicted in Figure 5. This counterintuitive outcome is a direct result of relying on two different indices across historical and forecast periods and assuming that there is direct comparability between them. We consider this approach to be inappropriate. Given the inherent uncertainty surrounding any electricity price forecast, we maintain that the best option would be to not make any adjustment for energy.

Figure 5: Electricity prices implied index (net of CPIH) - with and without outturn FY24 data



Source: UUW's analysis of "PR24-DD-Energy-cost-adjustment" model.

[5] £10/MWh * 650,000 MWh * 5 years

[6] £10/MWh * 5,000,000 MWh * 5 years

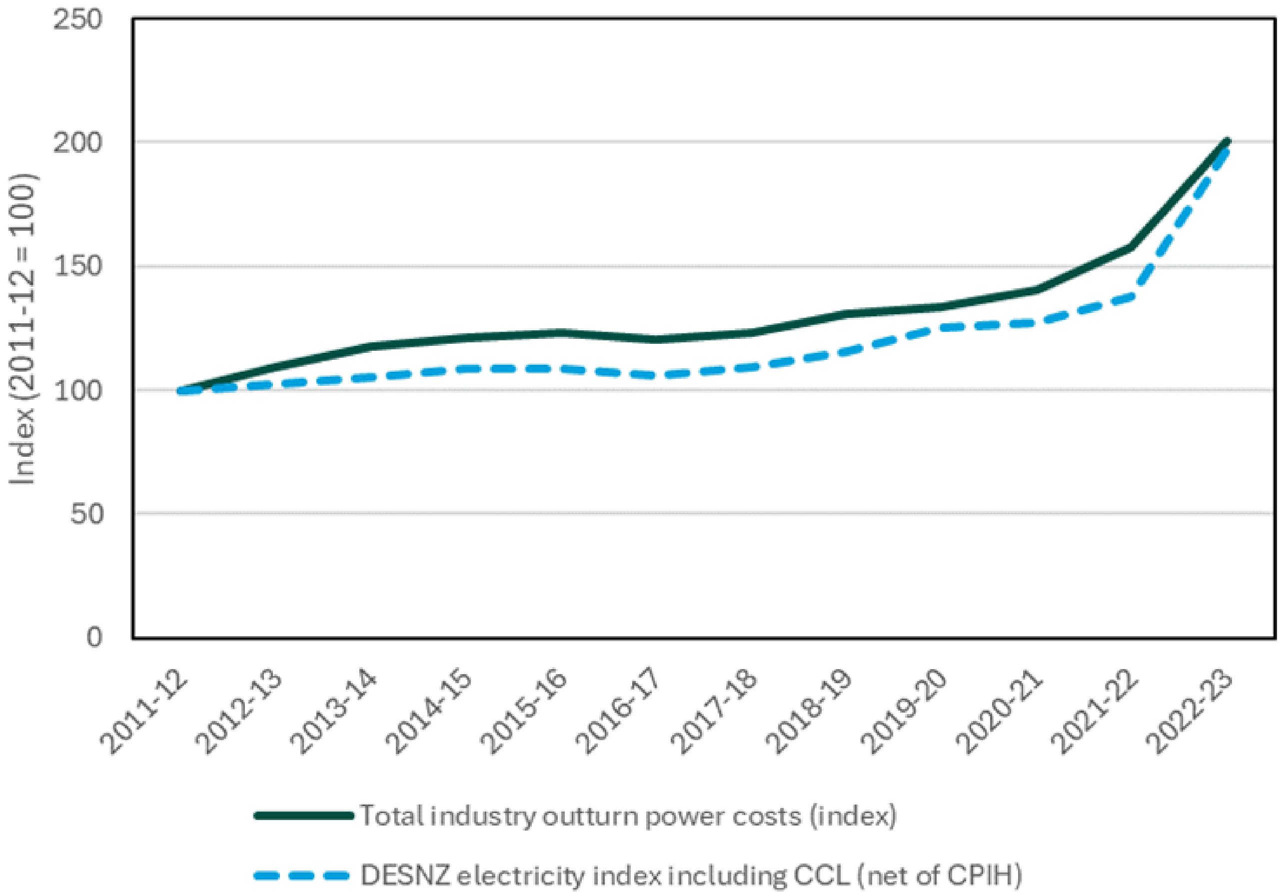
[7] CEPA (2024), *Frontier Shift, Real Price Effects and the energy crisis cost adjustment mechanism*, p. 38.

Is there a risk that the uplift factor is too high?

We understand that Ofwat has some concerns that CEPA's estimated uplift factor might be too large and will therefore over-renumerate companies. We find little evidence of this being the case.

CEPA's uplift factor is estimated on the basis of the DESNZ seasonally adjusted electricity price index for industrial users (including CCL). In theory, there might be a risk that the uplift factor is too large (or too low) if this index is not a good proxy for power costs actually incurred by water companies (e.g. due to hedging). However, we find that the DESNZ index closely tracks water companies actual power expenditure, as shown in Figure 6. Indeed, there is very strong correlation (0.98) between the DESNZ index and an index of total industry power expenditure. It can be observed that total industry power expenditure (green line) is slightly above the DESNZ index; however, this is to be expected given that total costs are determined not only by power prices, but also by consumption volumes, which have been gradually increasing (e.g. due to population growth and additional environmental requirements).

Figure 6: Total industry power costs index vs DESNZ index



Source: UUW's analysis of "PR24-DD-Energy-cost-adjustment" model and APR data.

Another method to test whether the uplift factor is accurate is by deflating actual power cost by the DENSZ index (using FY23 as the base year for the deflator) and comparing this with non-deflated costs. The results of this exercise are presented in Table 1 below.

Table 1: Non-deflated and deflated total industry power costs

FY12-23 average industry power costs (FY23 price base)	FY12-23 average industry power costs (deflated by DESNZ index, FY23 price base)	Ratio of average costs (deflated and non-deflated)	CEPA's uplift factor
£820.24 m	£1350.02 m	1.646	1.641

Source: UUW analysis of "PR24-DD-Energy-cost-adjustment" model

We find that the ratio of deflated and non-deflated power costs is very close to CEPA's calculated uplift factor (1.646 vs 1.641). Mathematically, if the DESNZ index was not an accurate proxy for actual power costs, then we should expect these two numbers to diverge (we present an illustrative example in the appendix). The fact that this is not the case provides strong evidence that the estimated uplift factor is appropriate.

We acknowledge that the chosen DESNZ index may be flawed in certain ways, meaning that it is not a perfect proxy for energy costs faced by water companies. In particular, the index measures 'industrial' users' costs. These are more likely to be large, single-site businesses, which would typically incur lower fixed energy costs than water companies. Furthermore, industrial users often have exemptions from certain policy costs (e.g. renewables obligation) which do not apply to water companies. For both of these reasons, it is possible that a true-up against this index could underrepresent the costs which an efficient water company faces. However, there exist limited options for a publicly available price index. Therefore, if Ofwat decides to implement a true-up mechanism at FD, UUW considers that it would be prudent to continue using the DESNZ seasonally adjusted electricity price index for industrial users.

Summary

While we consider that the general approach of estimating an energy adjustment uplift and combining it with an RPE adjustment is appropriate, we have concerns over the way this methodology has been implemented by CEPA. For instance, CEPA's method of estimating historical power shares appears to overstate companies' power implicit allowance, while the reliance on the Ofgem index implies an implausibly large reduction in real energy costs over AMP8.

UUW continues to consider that an adjustment for energy RPEs is unnecessary. This is reflected in our DD submission numbers, where we have removed the negative adjustment implied by the energy RPE. We are clear, however, that should Ofwat consider an adjustment to be necessary, then we expect it will be applied consistently across all companies. There exist several potential methodologies on how the adjustment could be implemented. Addressing some of the issues identified in the previous sections would be a major step towards arriving at a more accurate energy adjustment estimate.

4.4 UUW supports Ofwat's recognition of a labour RPE in residential retail

UUW strongly supports Ofwat's recognition of a labour RPE in residential retail. Labour is a material element of the residential retail cost base, and Ofwat's approach will ensure that residential retail cost allowances are reflective of the cost pressures companies will be under in AMP8.

4.5 UUW supports Ofwat's materials, plant and equipment ex-post true-up

Ofwat is proposing to introduce an ex-post true-up adjustment for materials, plant and equipment costs. The true-up will reflect the difference between CPIH and the ONS's construction output price indices. Ofwat is not proposing to apply a related ex-ante adjustment at PR24.

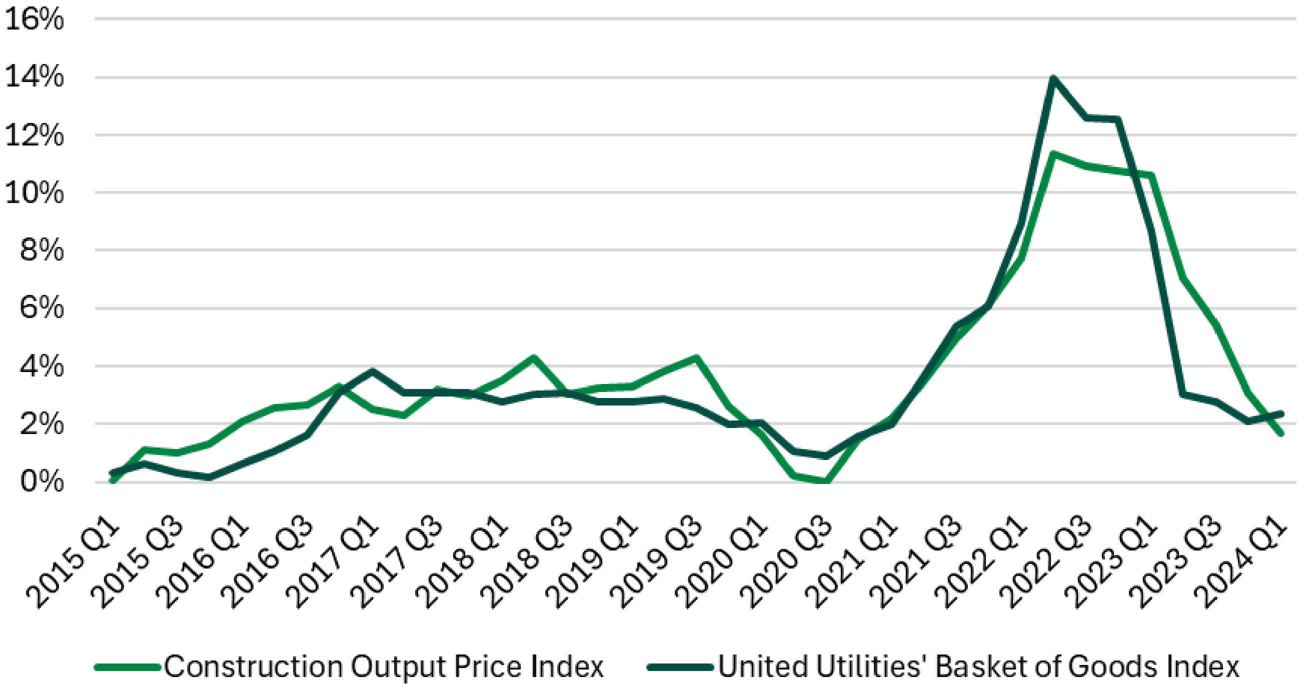
We agree with Ofwat's DD proposal and consider it will support the deliverability of the PR24 enhancement programme. AMP7 revealed that companies are subject to global supply chain shocks, which they have limited control over.

We note that Ofwat is concerned that:

"[…] the new infrastructure construction output price index is not a perfect index as it [is] based on road and bridge construction rather than wider infrastructure projects."[8]

However, we note that the chosen construction index aligns well with UUW's internal 'basket of goods' index, which tracks the change in the input prices used in our capital delivery programme. This is illustrated in Figure 7. As such, we consider it should appropriately reflect the changes in input prices used for our AMP8 enhancement programme.

Figure 7: Ofwat's proposed indices aligns with UUW's construction costs



Source: UUW analysis

Ofwat is also seeking views on whether a deadband is appropriate. However, Ofwat does not set out the criteria by which a deadband might be seen as necessary. We note that it does not propose a deadband for other ex-post true-ups so we are not clear on what basis a deadband is thought required in this case. We note there is a risk that an overly wide deadband could render an ex-post true-up redundant - we would not support this outcome. We do not consider that the true-up will significantly increase regulatory complexity relative to the current approach to cost reconciliation. Therefore, we do not consider a deadband is needed or appropriate.

4.6 Frontier shift methodology

Frontier shift refers to the ability of the most efficient companies to identify opportunities to improve their productivity and become more efficient. UUW was part of a group of companies that appointed Economic Insight to explore estimates of frontier shift that would be suitable for use at PR24. Following this work, UUW identified a frontier shift of 0.55 percent for wholesale and 0.45 percent for residential retail.

CEPA is advising Ofwat on frontier shift at PR24. Its report[9], published alongside Ofwat's DD, suggests a frontier shift estimate in the range of 0.8% to 1.2% to be appropriate, and critiques Economic Insight's report. Europe Economics also published a critique[10] of Economic Insight's report.

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[8] Ofwat (2024) *Draft Determinations: Expenditure Allowances*, p. 141.

[9] CEPA (2024) *Frontier shift, real price effects and the energy crisis cost adjustment.*

[10] Europe Economics (2024) *Critique of Economic Insight Reports on PR24 frontier shift.*

Frontier shift is difficult to quantify empirically. There are several different, but equally legitimate, methods to explore the issue but as far as we're aware, there are none that can settle on an undisputable number. Ultimately, the question of frontier shift is a question of judgement. Our view is that CEPA's estimate provides an overly optimistic view on the scope for productivity improvements in the water sector that appears to be more informed by regulatory convention than pragmatic judgement.

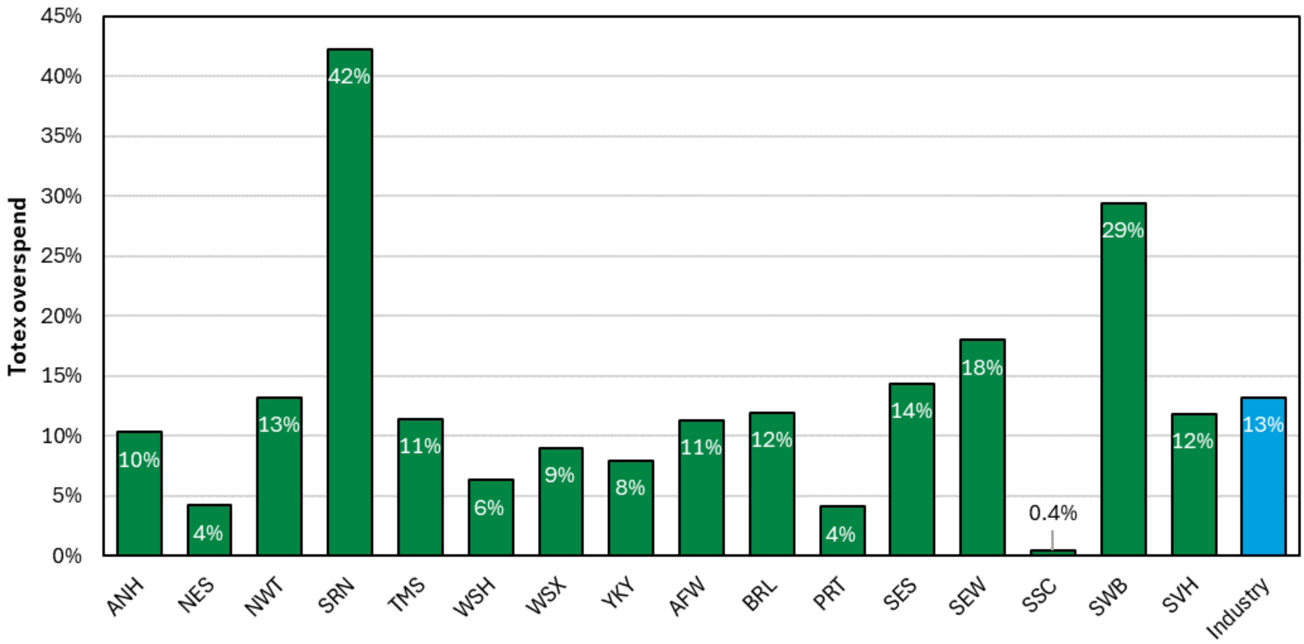
In this context, we provide some targeted comments about the DD publications concerning frontier shift.

Evidence suggests that companies have not been able to achieve stretching productivity targets

It is important to set an efficiency challenge that is sufficiently stretching, but achievable. However, existing evidence suggests that the frontier shift challenge set at PR19 (1.1% per year) might have been too ambitious. This is apparent from the fact that companies have significantly overspent their totex allowances in AMP7. This is demonstrated in Figure 8, which shows totex overspend due to 'inefficiency' (i.e. after accounting for timing effects) up to FY24. At an industry level, totex allowances have been overspent by around 13%. It is also striking that not a single company has spent less than their PR19 allowance. We find that the picture is broadly the same for base expenditure.

We acknowledge that companies' total expenditure has been impacted by a number of factors, including input price shocks, extreme weather events and other operational challenges. However, this evidence still suggests that maintaining a largely unchanged frontier efficiency target of 1% for AMP8 is likely to be unachievable for most companies.

Figure 8: Totex overspend (%) due to 'inefficiency', relative to PR19 allowance (cumulative up to FY24)



Source: UUW analysis of APR data

Approach to selecting comparator industries

Table 4.6 in CEPA's report sets out estimates of annual average growth in productivity that inform its frontier shift estimates, split across the different comparator industries used by CEPA.

Table 2: Table 4.6 in CEPA's report

Industry	1996 - 2008	2009 - 2019	1996 - 2019
Chemicals and chemical products	1.8%	2.5%	**2.1%**
Construction	-1.0%	-0.2%	**-0.4%**
Machinery and equipment n.e.c	1.9%	-0.8%	**0.9%**
Manufacture of furniture; jewellery, musical instruments, toys; repair and installation of machinery and equipment	1.4%	-0.2%	**0.9%**
Professional, Scientific, Technical, Administrative and Support Service Activities	-0.5%	-0.3%	**-0.3%**
Total manufacturing	1.6%	0.4%	**1.1%**
Transportation and storage	-0.2%	-0.8%	**-0.3%**
Unweighted average	**0.7%**	**0.1%**	**0.6%**
Unweighted average of 4 highest performing industries	**1.7%**	**0.5%**	**1.3%**

Source: CEPA analysis of EU KLEMS data (2023 release).

CEPA's assessment effectively assumes that there is equal comparability between water companies and the selected EU KLEMS industries. In reality, however, water companies operate across a complex value chain involving various activities, ranging from complex asset management to maintenance and customer-facing operations. Due to the diversity of these activities, different segments within the value chain will experience varying levels of productivity improvements. For example, in AMP8, companies are planning to significantly increase investment, leading to a substantial rise in construction-related expenditure. This means that water companies' ability to achieve efficiency gains will be closely linked to productivity growth in the construction sector. CEPA's analysis from the table above indicates that there is likely to be little to no growth in construction sector productivity. However, this fact is largely overlooked when setting the frontier shift challenge: the 'construction' industry comparator is given equal weight to other industry comparators, despite construction expenditure being a significantly more material category of expenditure for water companies than other comparators.

Meanwhile, the chemical industry comparator is also given equal weight, despite CEPA's own analysis indicating that chemical costs are an immaterial cost category for water companies.[11] CEPA also retains the use of 'manufacture of furniture; jewellery, musical instruments, toys; repair and installation of machinery and equipment' as an industry comparator. CEPA justified its inclusion by saying: *"[t]his category captures activities which will be similar in nature to those undertaken in the water sector, such as the repair and installation of machinery and equipment."*[12] We do not share the judgement that the types of machinery and equipment that make jewellery, musical instruments and toys are likely to be similar to those used in water and wastewater service provision.[13]

Therefore, the approach of selecting comparator industries and setting the frontier challenge is largely divorced from water companies' actual ability to achieve productivity gains across different categories of operational activities. We accept, for example, that developments in artificial intelligence and other digital technologies could provide a boost to productivity in the coming years. However, these advances are only likely to be applicable to small portion of the value chain; it would be entirely unrealistic to suggest this can result in productivity improvements across a companies' entire cost base. All this serves to highlight the importance of taking a holistic approach and exercising pragmatic judgement when setting the frontier shift.

[11] CEPA (2024) *Frontier shift, real price effects and the energy crisis cost adjustment,* p. 51.

[12] Ibid., p. 75.

[13] We note that Economic Insight justified the inclusion of the same industry with an entirely different (and, we consider, more legitimate) methodology.

The water sector is not equivalent to high productivity sectors

It is reasonable to judge whether CEPA's estimate of frontier shift is realistic by comparing it to the relative productivity growth of different industries and considering whether these industries have common characteristics with the water sector. If they do, then we consider it is reasonable to ask the water sector to achieve the same level of productivity growth. However, if the industries are entirely different, then it seems inappropriate to seek similar productivity improvements from the water sector.

One such key difference is the fact that the water sector is characterised by long-lived assets. All else equal, this is likely to reduce the scope for ongoing productivity improvements. This is especially relevant in the context of assessing embodied technical change. As noted by CEPA, embodied technical change is the process by which technological advancements are incorporated into physical assets, such as machinery and infrastructure, leading to enhanced performance and productivity.[14] However, due to the prevalence of long-lived assets, there is often limited scope for water companies to rapidly adapt and change these inputs. For instance, UUW operates many reservoirs built during the Victorian era, which relied on what would now be considered outdated construction techniques and materials. While more effective reservoir technologies are now available, implementing these improvements would require completely overhauling our current reservoir fleet. The potential productivity gains often do not justify the significant investment and operational disruption implied by such a transformation. Therefore, although embodied technological change might be a material driver of productivity in industries with easily interchangeable primary inputs, this is unlikely to be the applicable to the water sector.

However, CEPA does not carry out comparisons to other industries. It appears to be primarily focused upon regulatory precedent when considering the legitimacy of its position. Relying on what other regulators have done in effect undermines the whole notion of basing the frontier shift challenge on economy-wide productivity trends.

'Aiming up' when setting frontier shift is largely unjustified

CEPA provides a number of reasons why the EU KLEMS analysis may underestimate actual productivity growth, thereby implying that Ofwat could aim upwards when setting the frontier shift adjustment.

For instance, CEPA notes that the expected increase in investment in AMP8 will open new opportunities to achieve productivity improvements from *"learning by doing"*[15]. However, CEPA does not acknowledge that the significant ramp-up in capital expenditure could also have negative effects on productivity. The increase in investment activity is expected to put significant strain on water companies' supply chains. Such 'congestion' has the potential to cause operational delays and cost overruns. We also note that in AMP8, a significant portion of enhancement expenditure will be subject to Price Control Deliverables (PCD). UUW considers that the PCD framework, as currently proposed to be implemented by Ofwat, will significantly reduce companies' flexibility in managing their capital delivery programmes, dampening the potential to achieve efficiency gains. Accordingly, it is improper to suggest that the increase in investment in AMP8 should be seen as a source of productivity improvements.

CEPA also argues that the EU KLEMS frontier shift estimate will not fully capture embodied technical change, meaning that the frontier shift should be adjusted *upwards*. We accept the notion that it is difficult to quantify embodied technological improvements. However, this also implies that we should not make speculative assumptions about the direction of embodied technological change (i.e. whether it is positive or negative). Empirically, it is not possible to demonstrate the impact of embodied technological change over the last few decades, nor how this will have manifested over time This means that EU KLEMS TFP measure could potentially overstate actual efficiency gains. Accordingly, we see no logical basis for CEPA to suggest that there should be an exclusively upwards adjustment to the efficiency challenge to account for embodied technical change.

Finally, we note that Ofwat's totex-outcomes regime requires companies to make performance improvements without commensurate increases in botex allowances. In other words, companies need to achieve productivity improvements 'from base'. Within our business plan submission, we estimated this implicit productivity challenge to be around £130 m. CEPA suggests that accounting for qualitative (i.e. performance-related) improvements

[14] CEPA (2024) *Frontier shift, real price effects and the energy crisis cost adjustment,* p. 68.

[15] Ibid., p. 83.

would likely lead to an increase of the TFP estimate.[16] We accept this position – indeed, much of the performance-related productivity improvements that have been achieved by water companies over the last few decades will not be represented through quantitative TFP measures. As the existing regulatory framework already contains a number of implicit sources of stretch, adjusting the frontier shift upwards would effectively impose a double-count.

4.7 Application of frontier shift

Residential retail frontier shift

Ofwat's approach to retail now incorporates the effect of inflation. Our business plan proposed that retail did not need frontier shift because inflation acts as an implicit efficiency challenge. However, Ofwat's updated approach now means that it is appropriate to apply frontier shift to the retail price control. As such, we have adopted the retail frontier shift of 0.45 percent (which we considered appropriate in our business plan) within our residential retail cost forecasts.

Traffic Management Act and lane rental costs

We do not agree that Traffic Management Act costs and lane rental costs should be subject to frontier shift. This implies that companies are able to make productivity improvements across this cost category, when in fact these costs are determined by external third parties. As such, Ofwat risks setting an unobtainable cost challenge.

5. Approach for final determination

We consider that Ofwat should adopt the following approach for its Final Determination:

- Remove the proposed RPE adjustment for energy along with the end-of-period reconciliation. This aligns with the principle that companies are best placed to manage energy cost risk within a long-term botex allowance. Whether an energy RPE is thought necessary or not, Ofwat must take a consistent approach across the industry.
- The only exception that should be made applies to companies that had already entered into hedging arrangements prior to the publication of Ofwat's draft determination. These companies were acting prudently to avoid energy price volatility and were doing so without knowledge of the mechanism Ofwat was about to introduce, and which did not feature in Ofwat's final methodology. The mechanism should ensure that these companies are not left worse off as a result of taking the prudent action than they would have been had they not entered into the hedging arrangements.
- Ofwat should maintain its approach to a labour RPE in residential retail.
- Ofwat should maintain its approach to the ex-post true-up for materials, plant and equipment costs. We do not consider a deadband is necessary or justified.
- We continue to consider that 0.55 percent and 0.45 percent remains an appropriate frontier shift estimate for wholesale and residential retail, respectively. Ofwat's current approach to frontier shift assessment fails to take a holistic approach to water companies' actual ability to achieve productivity gains. The methodology relies on a number of speculative assumptions and inappropriate inferences. Existing evidence on totex overspend also suggests that companies have been largely unable to align with Ofwat's frontier efficiency assumptions.

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[16] Ibid., p. 68.

Appendix A

In this appendix we present two illustrative examples to help demonstrate the relationship between energy price index accuracy and uplift adjustment.

Assume that there exists a power price index that perfectly captures changes in actual power costs. Assume also that actual power costs are only determined by changes in price (rather than volume). This is set out in Table 3. In this scenario, the annual change of the power cost index (column 3) is directly proportional to the change of actual power costs (column 2). Suppose that actual power costs are then deflated using the power cost index. As expected, deflated power costs (column 5) are constant, since the power index perfectly captures any year-on-year variability in power prices. Based on CEPA's methodology, this power index implies an uplift factor of 1.31. Importantly, the ratio of average deflated and non-deflated costs is also 1.31. This result indicates that the power cost index is an accurate proxy for actual power costs.

Table 3: Scenario where power index is an accurate representation of actual costs

Column 1 Year	Column 2 Actual power costs (£m)	Column 3 Power cost index (FY12 base year)	Column 4 Deflator (FY23 base year)	Column 5 Deflated power costs (£m)
FY12	1,000	100	2.00	2000
FY13	1,200	120	1.67	2000
FY14	1,500	150	1.33	2000
FY15	1,300	130	1.54	2000
FY16	1,400	140	1.43	2000
FY17	1,600	160	1.25	2000
FY18	1,650	165	1.21	2000
FY19	1,700	170	1.18	2000
FY20	1,700	170	1.18	2000
FY21	1,500	150	1.33	2000
FY22	1,800	180	1.11	2000
FY23	2,000	200	1.00	2000
Average costs (FY12-23)	1,529			2000
Uplift factor (calculated using CEPA's approach)	1.31			
Ratio of average deflated and average non-deflated costs	1.31			

Source: UUW analysis

Assume an alternative scenario where the price index is not well correlated with actual power costs, as set out in Table 4. In this case, the movement of the power cost index (column 3) resembles a random walk, rather than capturing the true change in power prices. Deflated power costs (column 5) are no longer constant as in the previous scenario. Furthermore, there is now a divergence between the uplift factor and the ratio of deflated and non-deflated costs (1.45 vs 1.52). This divergence only occurs when the chosen power cost index is not an accurate proxy for actual power costs.

Table 4: Scenario where power index is an accurate representation of actual costs

Column 1	*Column 2*	*Column 3*	*Column 4*	*Column 5*
Year	**Actual power costs (£m)**	**Power cost index (FY12 base year)**	**Deflator (FY23 base year)**	**Deflated power costs (£m)**
FY12	1,000	100	1.90	1,900
FY13	1,200	150	1.27	1,520
FY14	1,500	150	1.27	1,900
FY15	1,300	110	1.73	2,245
FY16	1,400	120	1.58	2,217
FY17	1,600	80	2.38	3,800
FY18	1,650	120	1.58	2,613
FY19	1,700	120	1.58	2,692
FY20	1,700	110	1.73	2,936
FY21	1,500	120	1.58	2,375
FY22	1,800	200	0.95	1,710
FY23	2,000	190	1.00	2,000
Average costs (FY12-23)	**1,529**			**2,326**
Uplift factor (calculated using CEPA's approach)	**1.45**			
Ratio of average deflated and average non-deflated costs	**1.52**			

Source: UUW analysis

As discussed in Section 4.2, we find that there is only a small divergence (1.646 vs 1.641) between CEPA’s calculated uplift factor and the ratio of deflated and non-deflated costs. Based on the above analysis, this should be taken as evidence that the DESNZ index is a generally accurate proxy of power costs incurred by water companies.