UÉ's RC4 (2025-2029) Look Forward Submission Assessment: Revenue and Opex

Commission for Regulation of Utilities

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Contents

Executive Summary **4**

1. Introduction **11**

2. Overview of UÉ's Submission **12**
2.1. UÉ's Proposed Expenditure and Revenue 12
2.2. Implications for Customer Bills 13

3. Review of UÉ's Operating Cost Submission **17**
3.1. Overview of UÉ's Proposals 17

4. Assessment of UÉ's Operational Cost Efficiency **30**
4.1. Analysis of unit costs 30
4.2. Description of Frontier approach 33
4.3. Our Approach for Assessing UÉ's Efficiency Using Econometric Benchmarking 36
4.4. Analysis of UÉ's Additional Costs 58
4.5. Conclusions on Efficient Level of Operating Costs 63

5. Summary of Our Proposals for Capex and Overall Revenue Allowance **66**
5.1. Arcadis capex scenarios 66
5.2. Proposed RC4 revenue allowance 66

Appendix A. Opex Econometric Benchmarking **68**
A.1. Our Approach to Control for Regional Differences 68
A.2. Adding Average Pumping Head to Water Models 71
A.3. Testing Pumping Capacity per Sewer Length in Our Wastewater Models 74
A.4. Forecast Cost Drivers 76

Appendix B. Capital Maintenance Econometric Benchmarking **78**
B.1. Overview of UÉ's proposed RC4 capital maintenance expenditure 78
B.2. Benchmarking capital maintenance with E&W peers 79

Appendix C. Response to UE's Comments on our Opex Benchmarking **82**
C.1. Our Response to UÉ's Comments on Our Analysis 82
C.2. UÉ's main concern is with our use of different measures to control for density in the water model 82
C.3. UÉ is concerned with our decision to not allow for the historical time trend for E&W companies to persist into RC4 84
C.4. UÉ does not agree with our 1 per cent ongoing efficiency assumption 85

Executive Summary

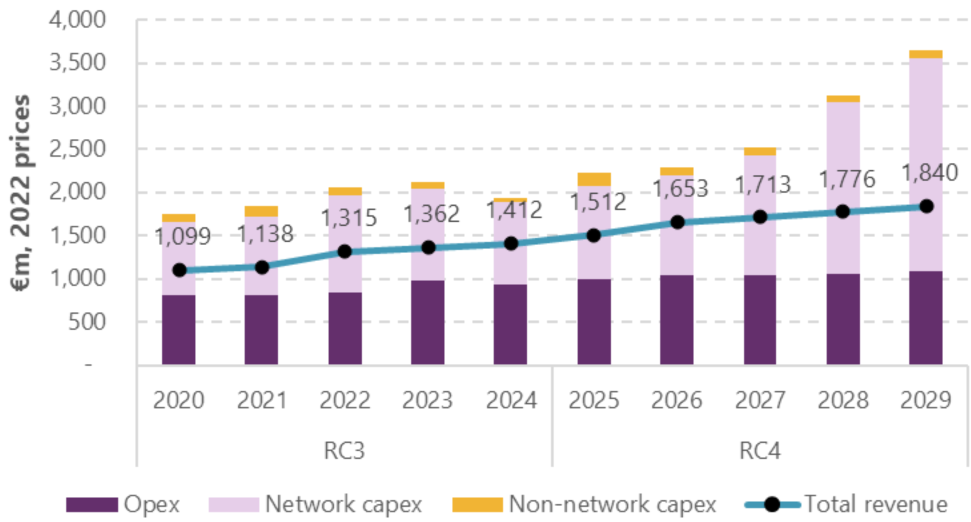
In this report, we provide an overview of UÉ's RC4 business plan revenues. We also provide an overview of its proposed operational expenditure (opex), undertake a comparative analysis of its efficiency, and set out our proposed opex funding allowances for RC4.

Drawing on a more detailed report from Arcadis, our technical consultants, we summarise our proposed capex and our proposed level of revenues.

UÉ's business plan submission includes substantive step-up in capex and proposed revenues

Figure 1 shows the annual breakdown of UÉ's opex, capex, and total revenue request for RC4, in comparison to annual RC3 allowances. As shown, UÉ's requested opex increases slightly over RC4, averaging €1.05 billion per year. Requested capex increases from €1.22 billion in 2025 to €2.56 billion in 2029, and correspondingly the total revenue request increases from €1.51 billion in 2025 to €1.84 billion in 2029.

Figure 1: Annual Breakdown of RC3 Allowances and UÉ Request for RC4 (€m 2022 prices)

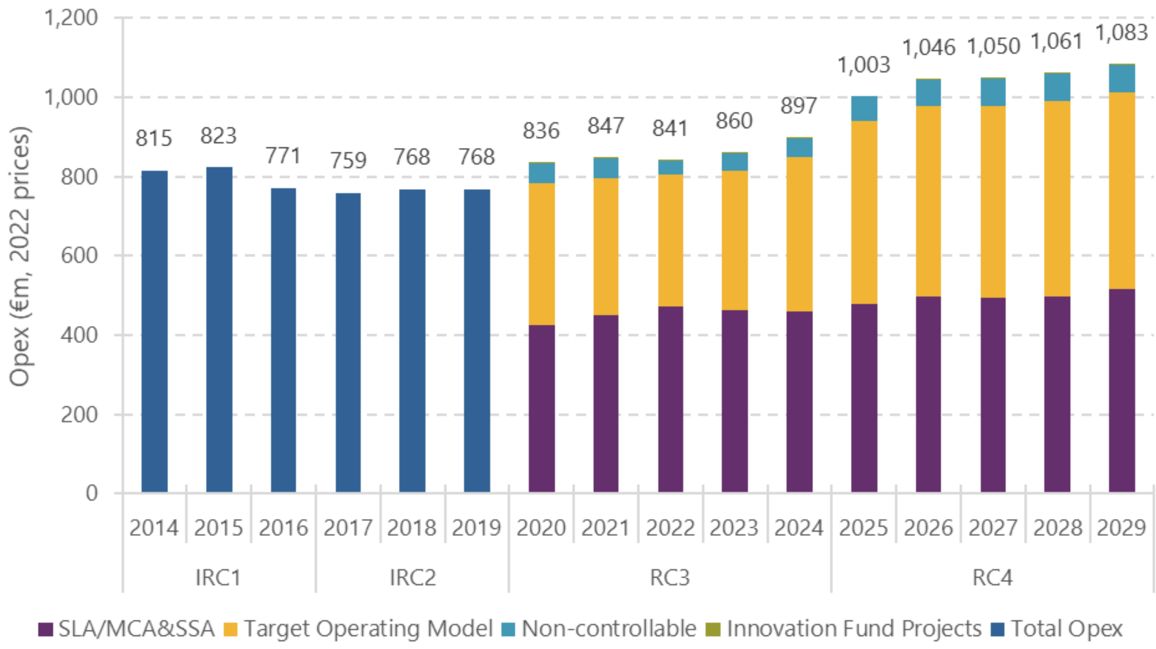


Note: RC4 values exclude UÉ k-factor requests.
Source: NERA analysis of UÉ RC4 submission.

UÉ's proposed opex is steadily increasing over RC4, reflecting new obligations as well as growth

Figure 2 presents UÉ's RC4 opex proposal. UÉ proposes to spend on aggregate €5.2 bn over the five-year RC4 period representing an increase of 21 per cent in controllable opex over RC4 relative to the RC3 on average.

Figure 2: UÉ Historical Outturn and RC4 Proposed Operating Expenditure



Source: NERA analysis of UÉ RC4 submission. Notes: 1. At RC4, through the UÉT Programme, the original Service Level Agreement (SLA) structure will be replaced by the implementation of Master Cooperation Agreements (MCA) and individual Support Service Agreements (SSA). 2. Costs in 2024 are understated as these are net of the central management charge (CMC) of €71million, which were transferred to government. The UÉ has allowed for the costs of facilities etc, covered by the CMC, from 2025. Source: UÉ (2024) UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, p.13

At RC4, through the UÉ Transformation (UÉT) Programme, the original Service Level Agreement (SLA) structure – under which UÉ procured operational services from the local authorities (LAs) – will be replaced by the Master Cooperation Agreements (MCA) and individual Support Service Agreements (SSA), as UÉ brings services within a single public utility (SPU) model. The figure demonstrates a steady increase in SLA/MCA&SSA costs, broadly direct service related costs such as design build own (DBO), energy but excluding labour in the above categorisation, across RC3 and RC4. UÉ also envisages an increase in target operating model (TOM) costs, which comprises the systems and processes required for UÉ operations, as well as labour costs.

The increase in UÉ's proposed opex for RC4 reflects upward pressure on costs from new obligations, such as compliance with the Drinking Water Directive, industry transformation costs, as well as costs related to the investment programme (opex from capex), and increasing growth in the network, e.g. with connection and load growth of around 6-8 per cent over the period.

Benchmarking analysis suggests that UÉ has substantively improved its cost performance since its formation in 2014

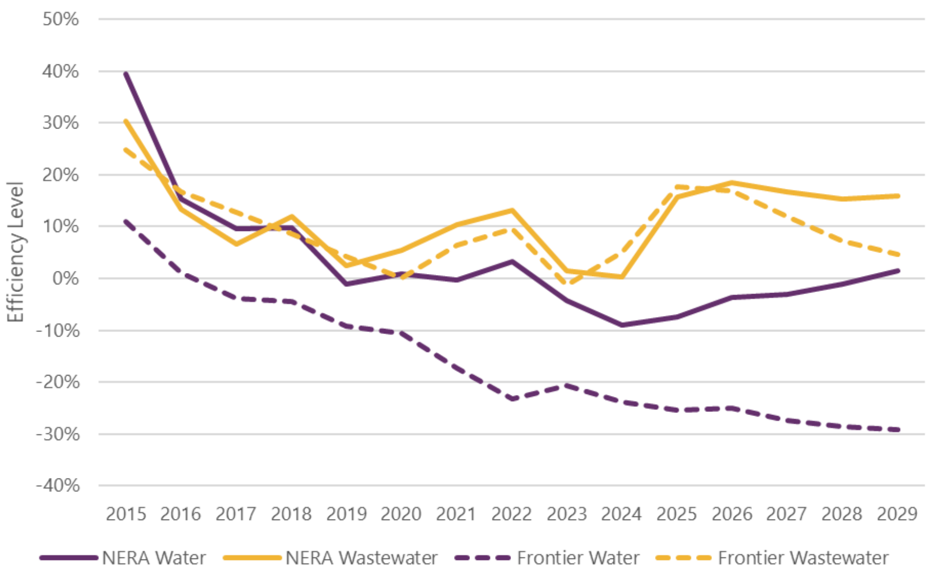
To inform our assessment of UÉ's proposed opex, we have considered the approaches developed by regulators in UK and Ireland to assess comparative efficiency, with particular reliance on the econometric models developed by Ofwat at its most recent price control (PR24). We also reviewed the models Frontier, UÉ's economic advisers, has suggested to inform UÉ's RC4 business plan submission.

Figure 3 presents the results of different benchmarking models developed by Frontier and NERA to assess UÉ's comparative efficiency, where the efficiency score is calculated as UÉ's cost minus expected costs generated by the models as a percentage of modelled costs. A negative value indicates that UÉ's costs are less than that expected by the model, given UÉ's characteristics such as network length.

Irrespective of the model, the analysis shows that UÉ has made substantive improvement in its cost performance since its formation in 2014. For example, the set of benchmarking models indicate that UÉ's costs were at time of UÉ's formation in 2014/15 up to 40 per cent higher than expected by the model, and under all model specifications are now no more than 20 per cent higher than expected cost and in the case of Frontier's water model, up to 30 per cent less than the expected cost. The analysis suggests that UÉ has performed comparatively well at containing upward cost pressures over recent control periods relative to the set of E&W water companies included in the modelling, as demonstrated by the improvement in efficiency score across all models.

Frontier's preferred benchmarking models shows that UÉ's costs for the water service are up to 30 per cent lower than predicted by the model over RC4 but that the costs for the wastewater service are around 10 per cent higher. By contrast, we show that UÉ's forecast costs are only around 3per cent lower for the water service on average while between 10 and 20 per cent higher than the efficient level for the wastewater service by the end of RC4.

Figure 3: UÉ has substantively improved its cost performance over time, but its costs remain around 10-20 per cent higher than the efficient level at the end of RC4



Source: NERA analysis of UÉ and Ofwat data.

We believe that Frontier's models overstate UÉ's comparative efficiency because of the way it forecasts costs over RC4, and its reliance on a single definition for service area density

There are two substantive reasons that explain the differences in our comparative efficiency analysis relative to Frontier. First, Frontier's models incorporate a 3-5 per cent real increase in costs p.a. – i.e. the models assume that an efficient company's costs will increase over RC4 by up to 20 per cent in real terms. We do not believe that this reflects the likely cost projection for an efficient company, and instead our starting point is that costs are constant in real terms over RC4, other than for expected changes in energy, DBO and labour costs (or collectively, real price effects, RPEs) net of on-going improvements in efficiency. Our approach is consistent with Ofwat and other UK regulators' approaches to forecasting cost changes.

Second, Frontier's models draw on a single definition of density, measured as number of connections per length of main, in its modelling of water sector costs. By contrast, we develop a wider set of models drawing on two additional definitions of density used by Ofwat at PR24, which rely on measures of population per electoral division (ED) and local electoral area (LEA). Drawing on a wider set of models shows UÉ in a less favourable position on cost performance and explains a substantive element of the difference between our and Frontier's conclusions on UÉ's water service comparative efficiency.

UÉ forecasts a reduction in real input prices over RC4 of 5 per cent. We also consider ongoing efficiency of 5 per cent by end of period

As mentioned above, Frontier's model assumes that the efficient company costs increase by ca 3-5 per cent p.a. over RC4. Instead, and consistent with regulatory practice, we assume that costs evolve over RC4 by the real price effect (RPE) net of any on-going efficiencies.

For RPEs, we have adopted UÉ's own forecasts for the reduction in energy and DBO costs over the RC4 period offset by a slight real increase in labour costs, which comprise around a 5 per cent reduction in RPEs by the end of the RC4 period. However, we note that under our proposed uncertainty mechanisms any variation in RPEs relative to these forecasts included in allowances will be trued-up, e.g. if energy costs fall further than expected at review, the cost allowance will be reduced correspondingly.

UÉ has not included any improvements in on-going efficiency or productivity improvements. In recent regulatory decisions, UK regulators have set an on-going efficiency challenge of around 1 per cent. For example, Ofwat applied a 1 per cent p.a. efficiency challenge to ex-ante totex ("frontier shift efficiency") based on productivity growth in comparable industries. Similarly, the Utility Regulator (UR) in Northern Ireland has most recently set an annual efficiency challenge of 0.8 per cent p.a. in its PR21 decision for water and sewerage.

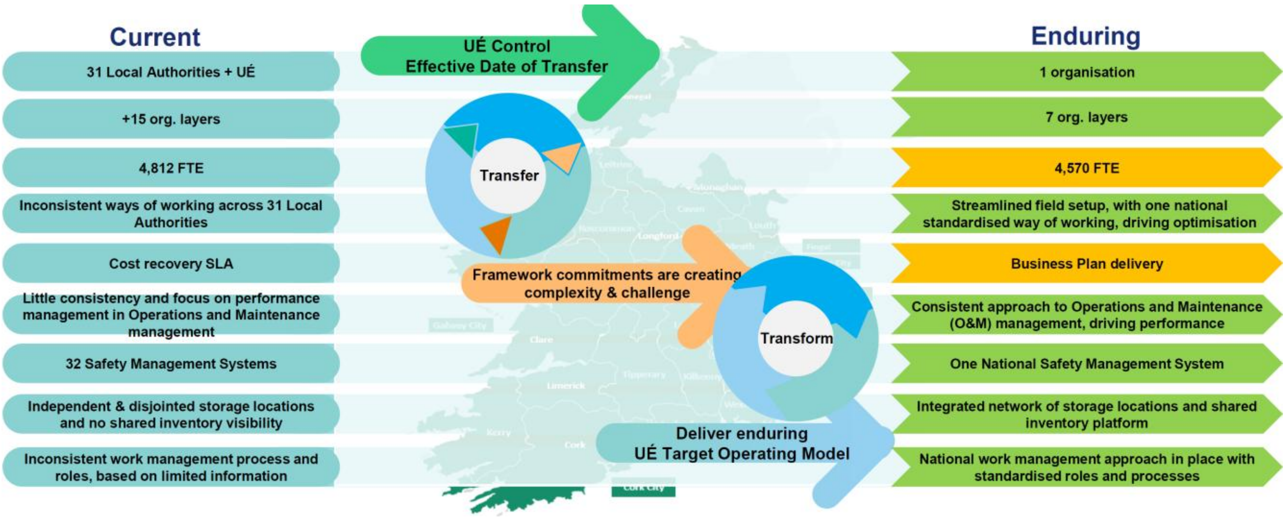
Taking the expected change in RPEs and ongoing efficiency together supports a further reduction of 10 per cent in UÉ's costs by the end of the RC4 period – in addition to the 6 per cent or more identified in our comparative efficiency modelling.

UÉ's plan omits ambitious efficiency improvements in relation to UÉT and other elements

UÉ notes that the UÉT programme will deliver transformational change over RC4 and beyond, delivering efficiencies and service improvements resulting from the delivery of services through 31 LAs to a single organisation, a reduction in organisation layers from 15 to 7, a reduction in full time equivalents of up to 10 per cent, standardised ways of working etc. (See Figure 4.) UÉ identifies a number of levers for delivering improved cost performance such as improvements in efficiency from improved scheduling and work optimisation, improved organisational design, streamlining and crew sizing, transformation of store and inventories, fleet transformation etc.

In terms of the quantification of costs, UÉ has set out cost efficiencies associated with UÉT of less than €40 million cumulatively by the end of RC4 or around 4 per cent of the requested opex of around €1 billion per annum. On the face of it, these cost efficiencies seem modest in the context of the transformational nature of the UÉT.

Figure 4: The UÉT project will transfer and transform water service provision



Source: UÉT Efficiencies (January 2025) UÉT presentation, slide 11

We set out two scenarios for reductions in costs towards the end of the RC4 period

We set out two scenarios for the reduction in UÉ's costs. Both scenarios recognise that UÉ is undergoing a transitional period during 2025 and 2026 with the implementation of the UÉT and therefore we do not impose any cost reductions for this period. Rather, we assume UÉ can realise improvements in cost efficiency post 2026, and therefore we profile a reduction in costs for the final three years of the control periods as follows:

- **Scenario 1 ("benchmarking scenario")**: A 16 per cent reduction relative to UÉ's submission in 2029. The reduction is based on a reasonable interpretation of our comparative efficiency modelling, including adjustments for RPEs and on-going efficiency, as described above. We profile the reduction as a step reduction of 8 per cent in 2027, 12 per cent in 2028 and 16 per cent in 2029.
- **Scenario 2 ("UET Stretch")**: UÉ includes relatively minimal cost efficiencies in its plan given the transformational nature of the UET. Also, the plan does not include any improvements for on-going efficiency. Taking these factors together, we assume it can achieve a 10 per cent reduction relative to UÉ's submission in 2029 We profile this reduction as an improvement of 5 per cent in 2027, 7.5 per cent in 2028 and 10 per cent in 2029.

Table 1 shows RC4 operating costs under both scenarios. As shown, we calculate a total RC4 operating cost allowance (i.e., including non-controllable and innovation funded opex) of €4,883m under Scenario 1 and €5,018m under Scenario 2, which is 7 per cent and 4 per cent lower than UÉ's request, respectively.

Table 1: NERA Proposal for Efficient RC4 Operating Costs under Scenario 1 and Scenario 2 (€m 2022 prices)

		2025	2026	2027	2028	2029	Total
A	Non-controllable opex	62	67	68	69	70	337
B	Innovation funded opex	0	1	2	2	1	5
C	Controllable opex - UÉ submission	941	977	979	990	1013	4,900
D	Controllable opex - Scenario 1	941	977	901	871	851	4,541
E	Controllable opex - Scenario 2	941	977	930	916	911	4,675
A + B + C	Total opex - UÉ submission	1,003	1,046	1,050	1,061	1,083	5,242
A + B + D	**Total opex - Scenario 1**	**1,003**	**1,046**	**971**	**942**	**921**	**4,883**
A + B + E	**Total opex - Scenario 2**	**1,003**	**1,046**	**1,001**	**986**	**982**	**5,018**

Source: NERA-analysis of UÉ BPQ

Combining our two operating cost scenarios with Arcadis' capex scenarios, we set out two allowed revenue scenarios for RC4

Table 2 shows Arcadis' view on efficient RC4 capex, as set out in its separate report. Arcadis identified two capex profiles based on different cost challenge scenarios; "Scenario 1" includes a 10 per cent cost challenge relative to UÉ's submission and "Scenario 2" a lower, 5 per cent cost challenge. Both scenarios also include additional adjustments for an ongoing efficiency (OE) challenge and expected real-price effects (RPEs) over RC4.

Table 2: Arcadis Proposal for Efficient RC4 Capital Expenditure under Scenario 1 and Scenario 2 (€m 2022 prices)

	2025	2026	2027	2028	2029	Total
Scenario 1 (10% cost challenge)						
UÉ Submission	1,220	1,249	1,467	2,067	2,558	8,561
After 10% Cost Challenge	1,175	1,202	1,413	1,990	2,463	8,243
Post OE & RPE Adjustment	1,159	1,171	1,359	1,890	2,309	7,888
Scenario 2 (5% cost challenge)						
UÉ Submission	1,220	1,249	1,467	2,067	2,558	8,561
After 5% Cost Challenge	1,197	1,225	1,440	2,029	2,510	8,402
Post OE & RPE Adjustment	1,181	1,194	1,385	1,927	2,354	8,040

Source: Received from Arcadis, 19 May 2025
Note: Figures are total capex - i.e., network and non-network capex

Table 3 shows total allowed revenues over RC4 based on two scenarios which combine our opex scenarios with Arcadis' capex scenarios. The first scenario ("Scenario 1") is based on the more ambitious cost scenarios, i.e., i) controllable opex as per our Scenario 1 ("benchmarking scenario"), ii) capex as per Arcadis' Scenario 1 (i.e., a 10% cost challenge), and iii) our "Option 2" k-factor adjustment, which we describe in our separate look-back report. The second allowed revenue scenario ("Scenario 2") is based on the less ambitious cost challenges, i.e., i) controllable opex as per our Scenario 2 ("UET Stretch"), ii) capex as per Arcadis' Scenario 2 (i.e., a 5 per cent cost challenge), and our "Option 1" k-factor adjustment, which returns more monies to UÉ.

As shown, total allowed revenues are €8,250m over RC4 under Scenario 1 (i.e., the higher cost reduction scenario) which is a €569m reduction relative to UÉ's submission m (i.e., a 6 per cent reduction). Under Scenario 2 scenario, allowed revenues are €292m lower compared to UÉ's submission (i.e., a 3 per cent reduction).

Table 3: RC4 Allowed Revenues under "Scenario 1" and "Scenario 2" of Efficient Costs (€m 2022 prices)

	2025	2026	2027	2028	2029	Total
UÉ Submission	1,516	1,728	1,791	1,858	1,926	**8,819**
Arcadis/NERA Scenario 1 (greater cost reduction)	1,514	1,593	1,652	1,713	1,777	**8,250**
Arcadis/NERA Scenario 2 (lower cost reduction)	1,515	1,659	1,720	1,784	1,850	**8,527**

Source: NERA-analysis of UÉ's March 2023 funding model (240913 RC4 Revenue Model - UÉ calcs received on 19 March 2025.xlsx), using UÉ's BPQ submission cost inputs
Note: To illustrate revenue impact of cost reductions only i) all figures use 3.69% WACC as per estimate in NERA WACC report and ii) Arcadis/NERA scenario figures do not include CRU's minded-to proposal on revenue reprofiling and may therefore differ slightly from revenue figures in CRU documents

1. Introduction

NERA was commissioned by the Commission for the Regulation of Utilities (CRU) to assist with a review of Uisce Éireann's (UÉ) submission for the fourth review of charges (RC4) and to advise the CRU on the revenues that UÉ should be allowed to recover for RC4 for the period 2025 to 2029.

The report is structured as follows:

- Section 2 sets out our review of UÉ's proposed revenue requirement for RC4
- Section 3 summarises UÉ's operating expenditure proposals, identifying main changes in cost categories over RC4 and relative to historical periods
- Section 4 sets out our approach to determining UÉ's efficient level of opex
- Section 5 summarises Arcadis' view of capex, and combined with our view of opex, the overall revenue allowance.

2. Overview of UÉ's Submission

In this section, we provide an overview of UÉ's business plan submission in terms of the overall opex and capex and implications for revenues and customer bills.

2.1. UÉ's Proposed Expenditure and Revenue

As shown in Table 2.1, UÉ has requested a total of €13.80bn in operating expenditure (opex) and capital expenditure (capex) for RC4 (2022 prices), reflecting a 42 per cent real increase over RC3 values. This results in a total revenue request of €8.49 billion for RC4 (2022 prices, excluding RC3 k-factor), which is a 34% real increase compared to the total allowed revenue in RC3.

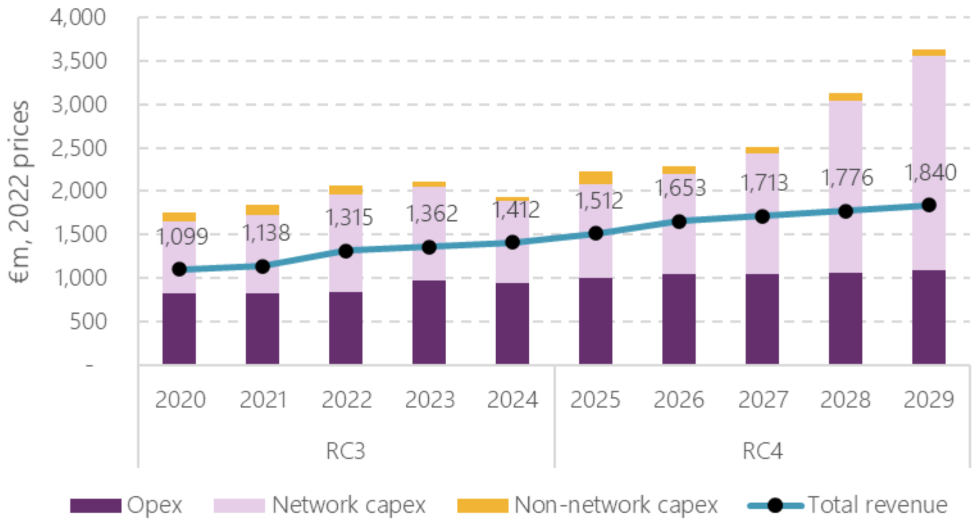
Table 2.1: RC3 Expenditure and Revenue Allowance and UÉ Request for RC4 (€bn 2022 prices)

	RC3 (allowance)	RC4	Change
Opex	4.39	5.24	19%
Network capex	4.90	8.07	65%
Non-network capex	0.42	0.49	16%
Opex + capex	9.71	13.80	42%
Total revenue	6.33	8.49	34%

Note: RC4 values exclude UÉ k-factor requests for comparability with RC3 allowance.
Source: NERA analysis of UÉ RC4 submission.

Figure 2.1 shows the annual breakdown of UÉ's opex, capex, and total revenue request for RC4, in comparison to annual RC3 allowances. As shown, UÉ's requested opex remains relatively stable throughout RC4, averaging €1.05 billion per year (2022 prices). Requested capex increases from €1.22 billion in 2025 to €2.56 billion in 2029, and the total revenue request increase from €1.51 billion in 2025 to €1.84 billion in 2029 as a result (2022 prices).

Figure 2.1: Annual Breakdown of RC3 Allowances and UÉ Request for RC4 (€m 2022 prices)



Note: RC4 values exclude UÉ k-factor requests for comparability with RC3 allowance.
Source: NERA analysis of UÉ RC4 submission.

2.2. Implications for Customer Bills

In Figure 2.2 and Figure 2.3, we summarise the impact of the UÉ revenue request on implied domestic bills and non-domestic bills (i.e., average revenues per connection). To calculate average bills separately for water and wastewater, we use data on historical and forecast connections for water and wastewater provided by UÉ, and assume revenues are split 50:50 between the two segments.

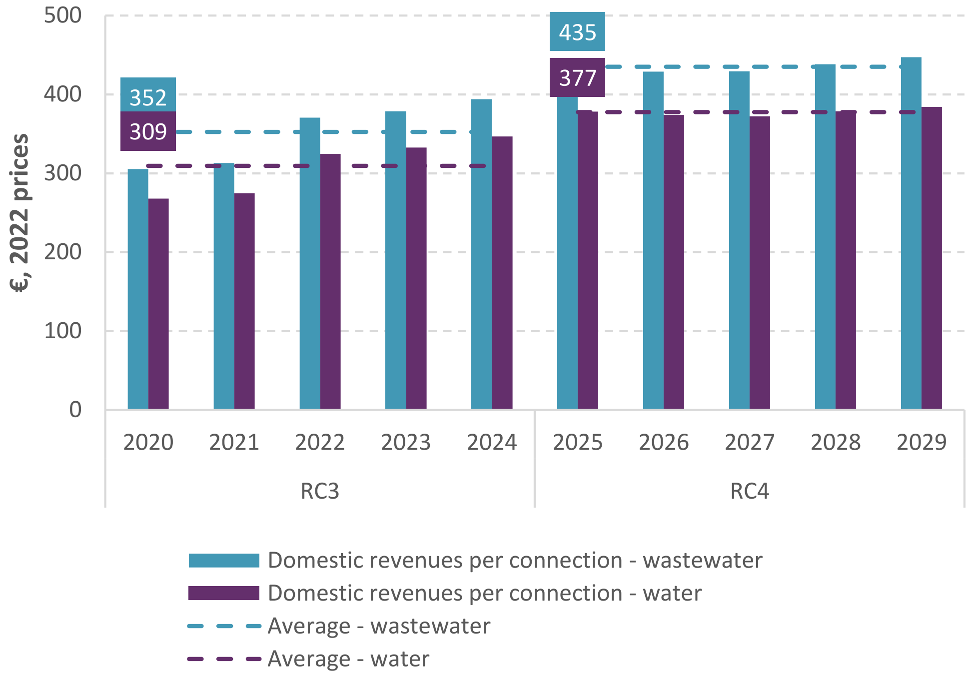
We calculate the following changes in average bills based on comparing RC3 allowances[1] to UÉ's revenue request for RC4 (all figures are expressed in 2022 prices):

- Domestic water: Increase in the implied average bill from €309 in RC3 to €377 in RC4 (i.e., a 22 per cent increase);
- Domestic wastewater: Increase in the implied average bill from €352 in RC3 to €435 in RC4 (i.e., a 24 per cent increase);
- Non-domestic water: Increase in the average bill from €707 in RC3 to €1,025 in RC4 (i.e., a 45 per cent increase);
- Non-domestic wastewater: Increase in the average bill from €1,359 in RC3 to €1,996 in RC4 (i.e., a 47 per cent increase).[2]

1 We understand that RC3 actual domestic subvention amounts were higher than allowances, so that the bill impact would be lower than stated below if outturn amounts were used. On the non-domestic side, we understand that RC3 billed amounts were lower than allowances, so that the bill impact would be greater than stated below if billed amounts were used.

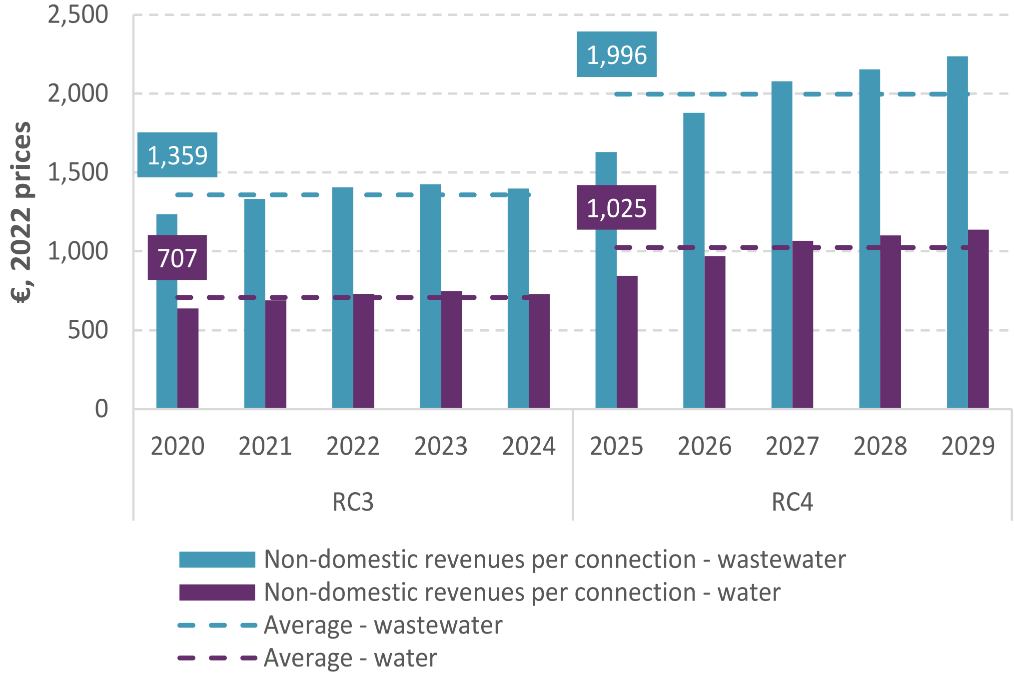
2 The comparison is based on the allowances for RC3. We understand that RC3 non-domestic billed amounts were lower than allowances, so that the bill impact would be greater using billed amounts.

Figure 2.2: Average domestic water and wastewater bills - RC3 historical allowance and implied by UÉ RC4 proposal



Note: 1) To derive revenues per connection separately for water and wastewater, we assume 50:50 allocation of total non-domestic revenues to the two segments. 2) Figures are based on historical and forecast total water and wastewater connections as provided by UÉ. To derive domestic connection numbers, we use the average historical percentage of domestic connections over RC3, as provided by UÉ, and apply it to the total forecast connection figures over RC4.
Source: NERA analysis of UÉ RC4 submission.

Figure 2.3: Average non-domestic water and wastewater bills - RC3 historical allowance and implied by UÉ RC4 proposal



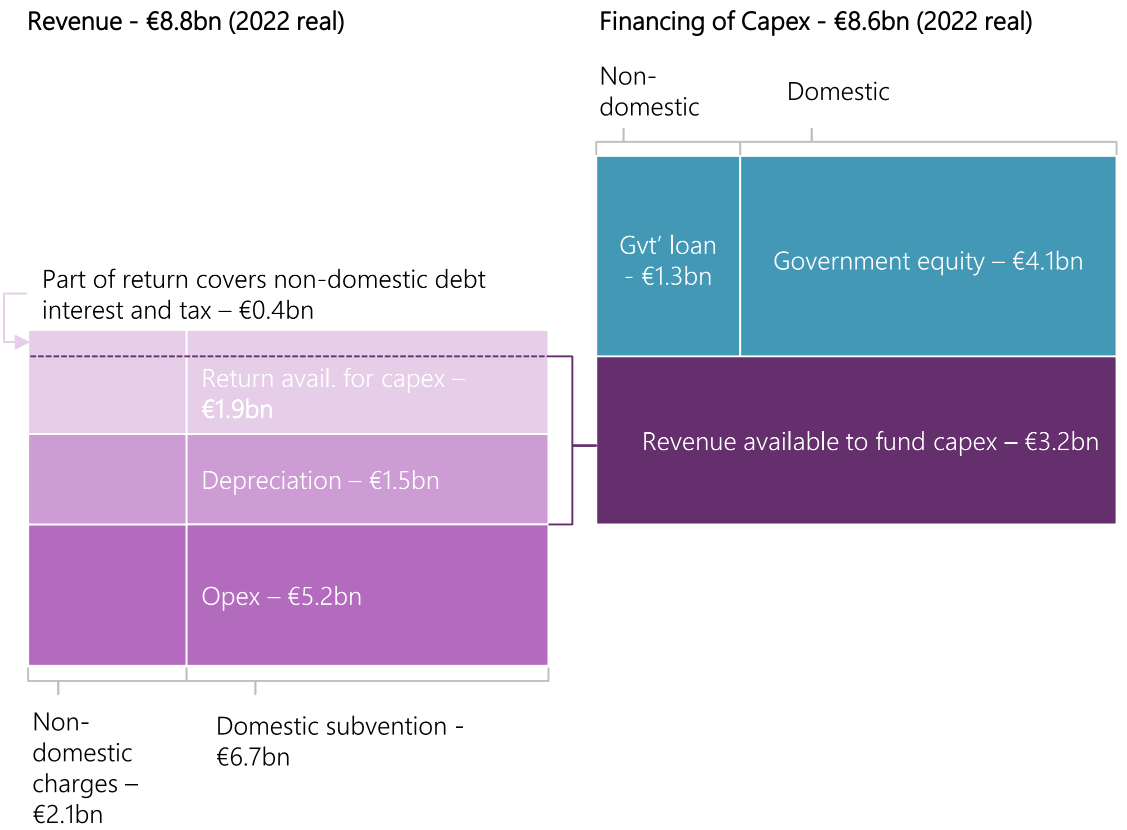
Note: 1) To derive revenues per connection separately for water and wastewater, we assume 50:50 allocation of total non-domestic revenues to the two segments. 2) Figures are based on historical and forecast total water and wastewater connections as provided by UÉ. To derive non-domestic connection numbers for RC4, we use the average historical percentage of non-domestic connections over RC3, as provided by UÉ, and apply UÉ's forecast for total connections over RC4.
Source: NERA analysis of UÉ RC4 submission.

In Figure 2.4, we illustrate the funding for UÉ's expenditure request, assuming the funding model remains unchanged from RC3. As shown, we calculate that of the €8.8bn revenue request, €3.2bn remain available to fund capex. This is based on deducting UÉ's total opex request (€5.2bn), taxes (€0.3bn) plus interest on non-domestic debt (€0.1bn), which we calculate based on notional modelling.[3] Our modelling therefore indicates that €5.4bn of UÉ's capex request (€8.6bn) need to be covered either through government debt or equity. Assuming that the non-domestic segment accounts for 24 per cent of this financing requirement based on CRU's expected non-domestic revenue share, we calculate a government loan requirement of €1.3bn and a government equity requirement of €4.1bn associated with UÉ's expenditure request.[4]

3 We calculate notional tax based on applying the 12.5% statutory corporate tax rate to notional profit calculated as allowed revenue net of allowed opex and depreciation and interest. Interest is based on expected actual interest payments of €19m (nominal) based on estimates provided by NEWera.

4 This assumes that the non-domestic funding requirement will continue to be met through government debt, and the domestic funding requirement through government equity contributions.

Figure 2.4: Funding of UÉ revenue request based on notional modelling



Source: NERA analysis of UÉ RC4 submission.

3. Review of UÉ's Operating Cost Submission

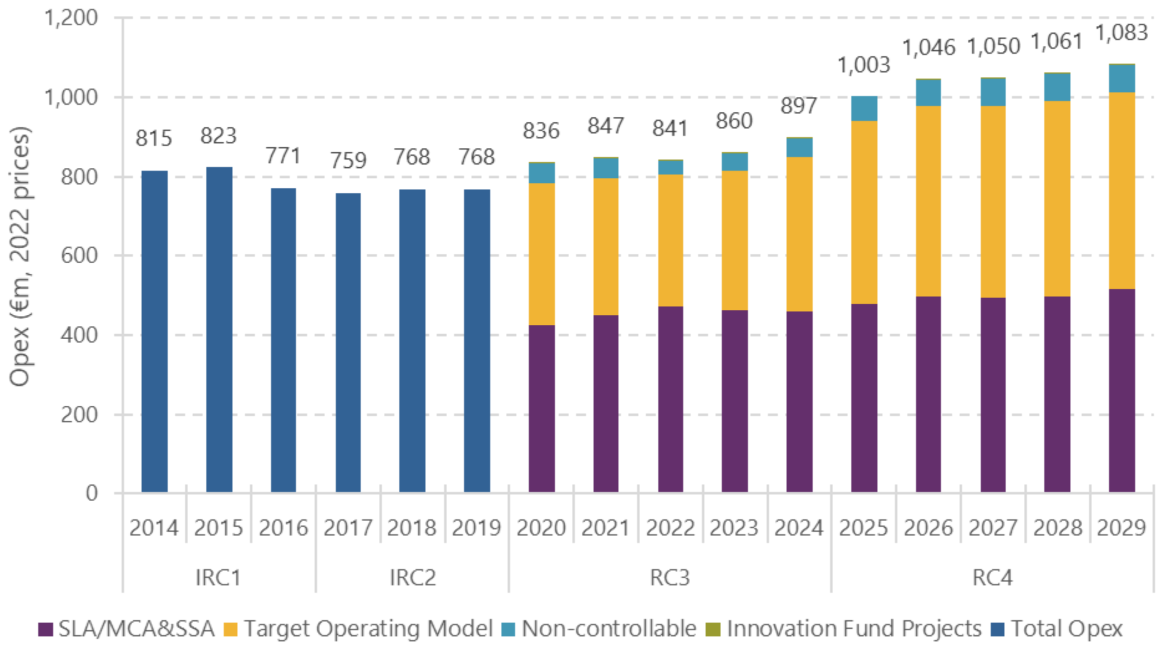
In this section we set out our review of UÉ's operating expenditure proposals, identifying UÉ's expenditure proposals in specific areas and changes relative to historical periods.

Unless otherwise specified, all figures are expressed in € 2022 real prices.

3.1. Overview of UÉ's Proposals

In Figure 3.1 below, we present UÉ's RC4 opex proposal submitted to CRU. UÉ proposes to spend on aggregate €5,242m over the five-year RC4 period. This expenditure figure represents an increase of 21 per cent in controllable opex over RC4 relative to RC3 on average, and a 22 per cent increase in total opex.

Figure 3.1: UÉ Historical Outturn and RC4 Proposed Operating Expenditure



Note: 2014-2023 data reflect outturn costs to date, while 2024 data reflect UÉ's forecasts for the last year of RC3. We present IRC1 and IRC2 opex in total due to the difference in cost categorisation across the periods. At RC4, Master Cooperation Agreements (MCA) and Support Service Agreements (SSA) replace the original Service Level Agreement (SLA) structure through the UÉ Transformation process. According to UÉ, costs of "Shared Services" and "Group Centre", which were previously analysed separately, are now included in the "Target Operating Model" category.[5] We have regrouped SLA payroll costs in IRC1, IRC2, and RC3 into Target Operating Model to align with classification at RC4.
Source: NERA analysis of UÉ RC4 submission.
Costs in 2024 are understated as these are net of the central management charge (CMC) of €71million, which were transferred to government. The UÉ has allowed for the costs of facilities etc, covered by the CMC, from 2025. Source: UÉ (2024) UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, p.13

5 UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, p.13.

In terms of high level trends, Figure 3.1 shows that UÉ's controllable opex for RC4 is steadily increasing, compared to RC3 controllable opex. We understand that at RC4, through the UÉT Programme, the original Service Level Agreement (SLA) structure will be replaced by the implementation of Master Cooperation Agreements (MCA) and individual Support Service Agreements (SSA). The figure above also demonstrates a steady increase in SLA/MCA&SSA costs (excluding payrolls) across RC3 and RC4, accompanied with an increase in target operating model costs.

3.1.1. Summary of UÉ proposed opex

At RC4, UÉ categorises its opex falling under various categories as summarised below:

- **Design, Build and Operation (DBO) costs**: costs paid to external suppliers for the Design, Build and Operation of plants on behalf of UÉ.
- **Energy costs**: energy costs associated with energy purchased from the ongoing operating of the network.
- **Operations and Maintenance costs**: costs related to drinking water and wastewater operations and maintenance activities currently delivered in partnership with the LAs through Master Cooperation Agreements and individual Support Service Agreements as agreed during the UÉT Programme.
- **UÉ Target Operating Model (TOM)**: costs related to the organisational structure, processes and systems to operate UÉ in line with the UÉT Business Case and UÉ Strategic Funding Plan (SFP).
- **Uncontrollable Costs**: pass-through cost items not under UÉ's direct control, including Local Authority rates, regulatory levies and license fees.
- **Innovation Funded Projects**: costs which historically have been separately funded by the CRU, which enable UÉ to invest in new approaches and technologies which provide customer and environmental benefits.

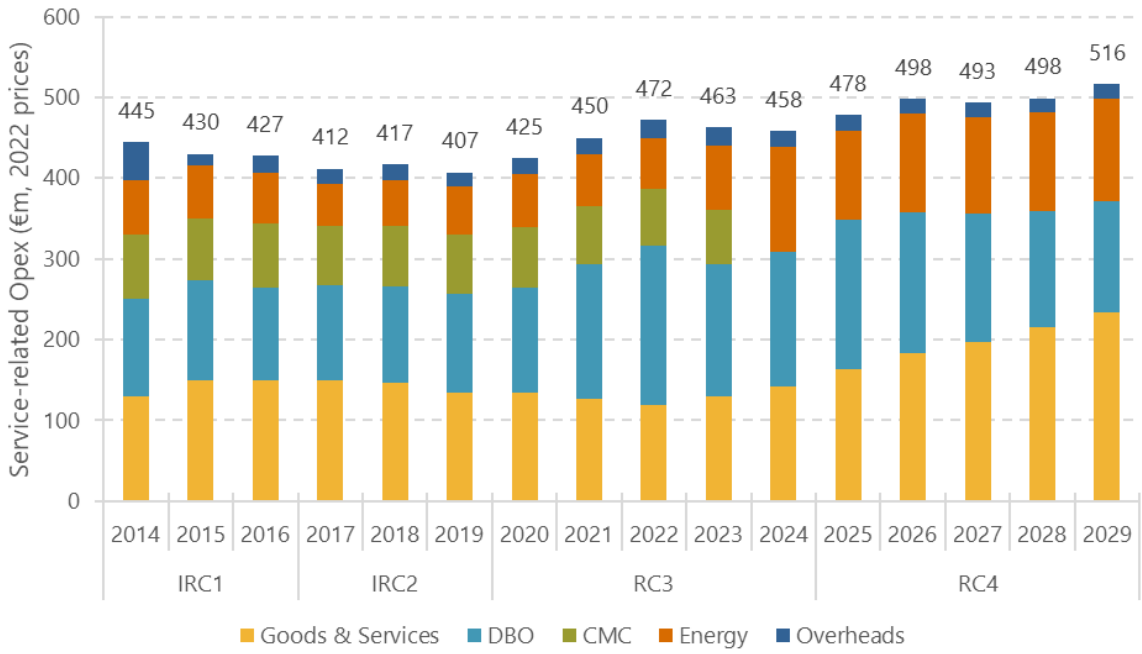
3.1.1.1. MCA & SSA expenditures

Consistent with UÉ's presentation of costs, in Figure 3.2 below, we show UÉ's SLA/MCA&SSA expenditure without historical payroll costs.[6] UÉ forecasts a slight increase in service-related opex, from an average of €454m over RC3 to €497m over RC4. The figure also reflects the removal of Central Management Charge (CMC) in 2024. As part of the MCA agreements between UÉ and LAs, the Government is now funding CMC directly from 2024 and UÉ expects to incur some subsequent costs (but now categorised within TOM).[7]

6 We classify payrolls costs under SLA in the earlier control periods to TOM for consistency with the treatment of these costs at RC4.

7 UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, p.25.

Figure 3.2: UÉ Outturn and Proposed Service-related Opex



Note: 2014-2023 data reflect outturn costs to date, while 2024 data reflect UÉ's forecasts for the last year of RC3. We have regrouped SLA payroll costs in IRC1, IRC2, and RC3 into Target Operating Model to align with classification at RC4.
Source: NERA analysis of UÉ RC4 submission.

The Figure shows a general increase in goods and services costs over time such that the cost is approximately double in real terms by the end of RC4. The time-series also reveals an increase in DBO and energy costs over RC3 reflecting increases in energy costs but an expected decline in DBO over RC4 to reflect the maturing of DBO contracts and taking in-house.

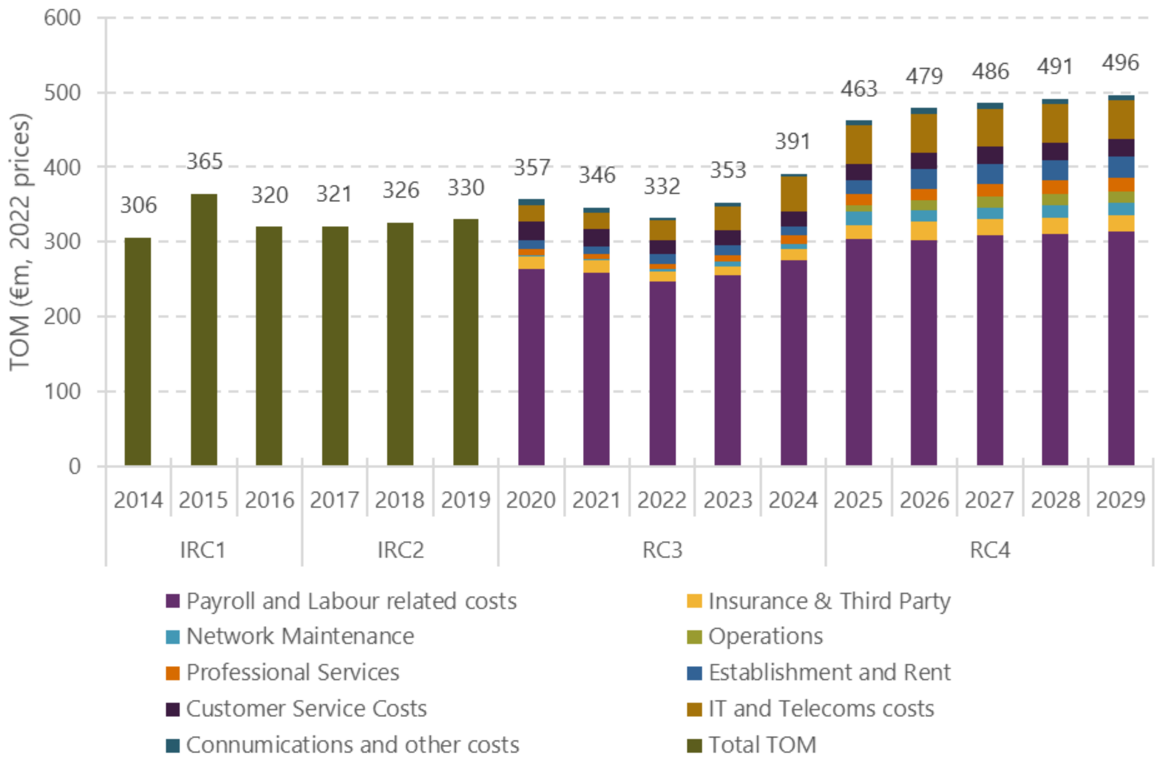
3.1.1.2. TOM

Figure 3.3 shows UÉ's expenditure under its centralised TOM over the historical (2014-2023 outturn) and future years (2024-2029 forecast). TOM supports the organisational structure, processes and systems required for UÉ operations. TOM costs consist of Payrolls costs, which account for labour related costs such as staff resources and training, and Non-Payroll costs, which refers to other costs incurred by each TOM function in delivering their activities.[8]

UÉ forecasts that TOM will rise from an RC3 average of €356m to an RC4 average of €483m.

8 UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, p.16.

Figure 3.3: UÉ Outturn and Proposed TOM Opex



In general, the increase in costs over RC4 is explained by a step up in labour related costs at RC4, as well as an increase in costs across a wide range of other categories including professional services, establishment and rent which includes costs that relate to the termination of the CMC, and IT and telecoms.

Note: 2014-2023 data reflect outturn costs to date, while 2024 data reflect UÉ's forecasts for the last year of RC3. We present IRC1 and IRC2 opex in total due to the difference in cost categorisation across the periods. According to UÉ, costs of "Shared Services" and "Group Centre", which were previously analysed separately, are now included in the "Target Operating Model" category. We have regrouped SLA payroll costs in IRC1, IRC2, and RC3 into Target Operating Model to align with classification at RC4.
Source: NERA analysis of UÉ RC4 submission.

3.1.2. Summary of UÉ proposed controllable opex

In its submission, UÉ differentiates controllable opex between base costs, as well as the additional "real price effects" (RPEs), "compliance, growth, and external costs", and "efficiencies. As set out in Table 3.1: UÉ RC4 Controllable Opex Forecast

below, UÉ identifies a controllable opex in aggregate of €4,900m over the period, consisting of base costs of €4,746m and an additional €214m opex to cover greater compliance related costs, offsetting by inflation effects of €52m and anticipated efficiency savings of €7m.

Table 3.1: UÉ RC4 Controllable Opex Forecast

€m	2025	2026	2027	2028	2029	RC4 Total
Base Controllable Costs	859	941	977	979	990	4,746
Real Price Effects	-27	1	-18	-10	2	-52
Compliance, Growth & External Costs	113	37	20	22	22	214
Efficiencies	-4	-1	-1	-1	0	-7
Controllable Opex Total	**941**	**977**	**979**	**990**	**1,013**	**4,900**

Source: UÉ (December 2024), Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, Table 3.1. Note: UÉ also estimates "Costs Avoided" of €23m in total, which are "suppressed costs of LA vacancies which have been managed to date by UÉ in anticipation of future changes to the operating model". UÉ comments that these are not included in the opening Base Controllable Costs and are therefore not included in the calculation of RC4 Controllable Opex needs. See Section 3.1.2.4.

In the following sections, we describe in detail the drivers of the cost growth and efficiencies and the expected evolution of each UÉ cost category over the RC4 period.

3.1.2.1. Opex RPEs

UÉ's revenue allowance is determined in real terms at review and indexed annually by HICP for determining actual revenues recovered from customers and government subvention. To the extent that UÉ's input prices grow at a rate that is higher or lower than HICP, the annual indexation by HICP may under or over-compensate the company for the changes in costs relative to the baseline allowance determined at review. At review, regulators usually include an allowance for input prices less expected HICP, or a real price effect.

In its RC4 submission, UÉ proposes its RPEs to account for the difference between projected inflation of a particular cost category and HICP. UÉ proposes to apply RPEs to three cost categories:[9]

- **Energy Costs**: UÉ bases energy input inflation on energy market forward pricing as at Q2 2024.[10]
- **DBO Costs**: High value contracts are linked to the WPI index, and UÉ applies the RPE to reflect a forecast of the impact relative to HICP.
- **Payroll Costs**: UÉ assumes higher real wages relative to HICP of 1.7 per cent in 2025 and 1 per cent in 2026 to reflect a tight employment market. According to UÉ, it bases this RPE on its assessment of affordability, and the RPE is below the pay RPEs estimated by the Central Bank of Ireland (2.5 per cent in 2025 and 2.6 per cent in 2026).

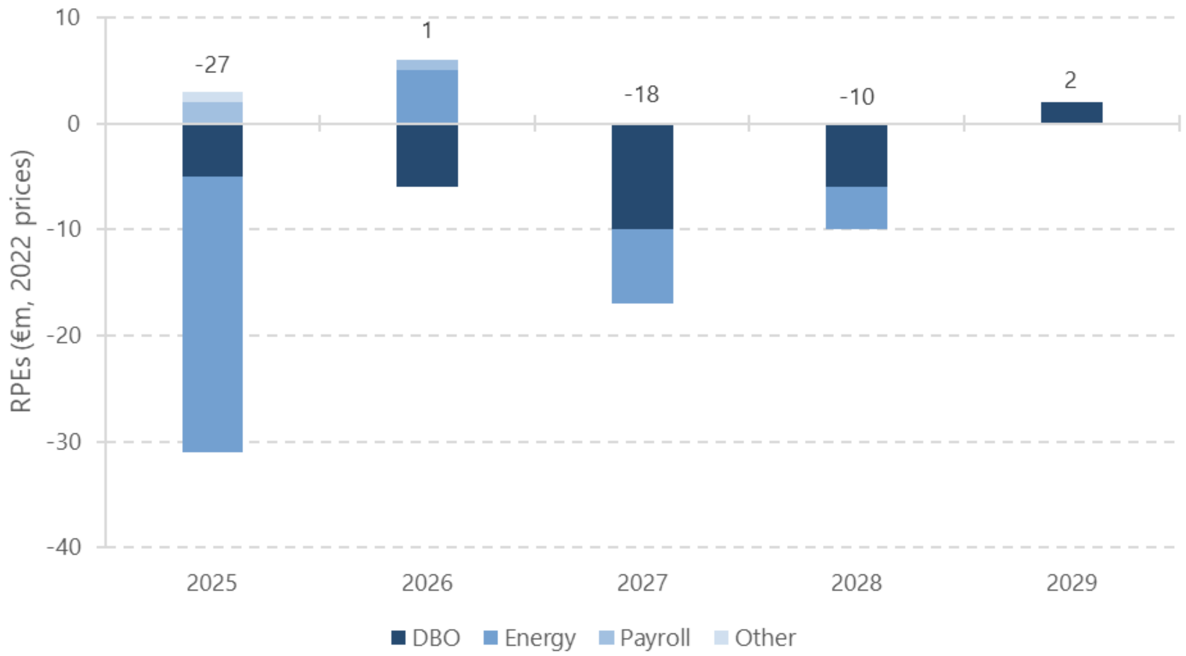
9 UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, p.19.

10 UE response to Q11 of Q&A: "This reflects the forward pricing at the time of the SFP completion related to energy costs (i.e. forward curves suggesting a fall in prices)

For other categories, UÉ assumes the costs increases in line with HICP.

Figure 3.4 below illustrates UÉ's estimate of the monetary impact of the RPEs over the RC4 period. UÉ projects a total cost reduction of €52m due to RPEs, mainly driven by the lower input prices for Energy and DBO costs.

Figure 3.4: UÉ RC4 RPEs Forecast



Source: UÉ (December 2024), Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, Table 3.2.

UÉ argues that at RC3 energy and general inflation spiked as a result of the onset of the Covid-19 pandemic and the Russia/Ukraine conflict, which had led to multiple opex reopener submissions related to energy and DBO pricing. In its RC4 submission, UÉ proposes to avoid repeated opener submissions, which involves an ex-ante approach, allowing for a resetting of Energy and DBO allowances ahead of the year based on latest forecasts, and an ex-post approach, reconciling costs through the k-factor process to reflect actual outturn energy cost and the actual WPI index levels.[11]

We discuss our proposed approach with dealing with real price effects in our separate report on uncertainty mechanisms. In short, we propose to true-up for any variations in energy and DBO input prices relative to those assumed at review, and therefore removing risk for UÉ and customers from uncertain input prices.

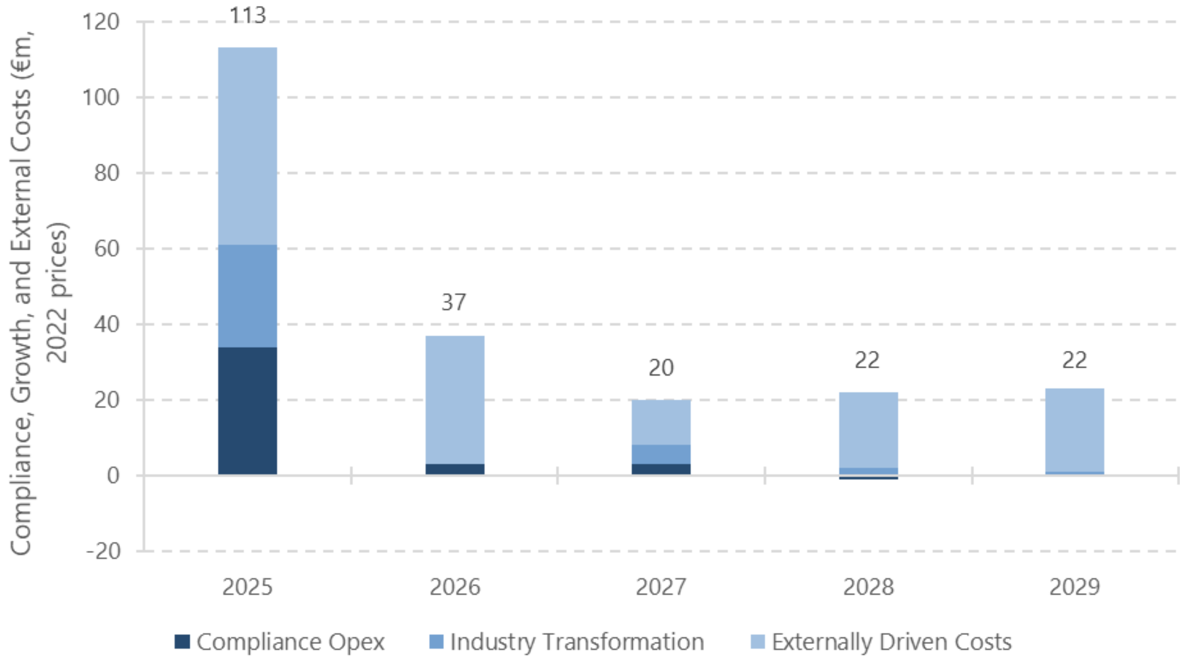
11 UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, p.20.

3.1.2.2. Compliance, Growth & External Cost

UÉ anticipates that there will be additional operating expenditure of €214m over RC4. As per Figure 3.5 shown below, UÉ identifies compliance, industry transformation and externally driven costs as the three sources of these cost pressures:[12]

- **Compliance**: Opex growth related to meet compliance with statutory, licensing, policy or regulatory requirements.
- **Industry Transformation**: Additional opex needs arising from the critical transformational change under the UÉT programme, including the operation of depots, stores, and offices which will become the responsibility of UÉ as the national water services authority.
- **Externally Driven Costs**: Additional investment driven opex required to operate and maintain new assets, as well as costs arising from economic and population growth which drives increased domestic and non-domestic service demand.

Figure 3.5: UÉ RC4 Compliance, Growth, and External Costs Forecast



Source: UÉ (December 2024), Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, Table 3.3.

We provide some more detail of UÉ's cost changes in the following sections, and we discuss our assessment of these costs in section 4.4.

12 UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, p.21.

3.1.2.2.1. Compliance driven opex growth

The cost pressure in compliance account for 18 per cent of the total opex growth costs. Table 3.2 below summarises the proposed components of the opex growth driven by compliance requirements.

Table 3.2: UÉ RC4 Compliance Driven Opex Growth

Category	Costs (€m, 2022 prices)
Road Opening Licenses	9
National Scientific and Technical Services	15
Disused Assets	3
Statutory and Dam Inspections	6
Delivery and Communications of UÉ's Strategy	4
Other	3
Total Compliance Driven Opex Growth	**40**

Source: UÉ (December 2024), Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, p.21-24.

UÉ provides further detail of these cost requests in its look-forward opex report:[13]

- **Road Opening Licenses**:[14] Due to the transfer of water service responsibilities to UÉ, the company faces additional statutory obligation including Road Opening Licenses and road reinstatement. According to UÉ, it is required to complete c.50,000 road openings per annum for both planned and emergency reasons. The costs associated with these works were previously absorbed by the LAs.
- **National Scientific and Technical Services**:[15] UÉ has a statutory obligation to undertake sampling and testing of drinking water supplies as well as wastewater discharges and their receiving waters. For the RC4 period, UÉ identifies significant growth in this area, with an overall strategy to develop two laboratories, with a national sampling service supplemented by commercial laboratory services where required.
- **Disused Assets**:[16] UÉ set up this programme to undertake works to address asset condition issues with reference to Health and Safety requirements such as fencing/access etc.
- **Statutory and Dam Inspections**:[17] The growth in opex arises from an increase in the number of asses being maintained, together with the transfer of responsibility form LAs to UÉ under the UÉT programme.

13 UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, p.21-25.

14 UÉ (January 2025), Revenue Control 4 Opex – New Costs, p.9.

15 UÉ (January 2025), Revenue Control 4 Opex – New Costs, p.4-5.

16 UÉ (January 2025), Revenue Control 4 Opex – New Costs, p.10.

17 UÉ (January 2025), Revenue Control 4 Opex – New Costs, p.11.

- **Delivery and Communication of UÉ Strategy**:[18] UÉ anticipates additional needs to engage with customers on key policy, regulatory and business requirements, including public health, water conservation, wastewater behavioural change, and infrastructure delivery progress.
- **Other**: This category includes other cost items such as HSQE compliance in relation to occupational health and safety programmes, operational inspections, initial assessments of costs associated with sustainability reporting and Cyber Resilience initiatives.

3.1.2.2.2. Industry transformation

UÉ estimates additional opex associated with industry transformation of €35m, accounting for 16 per cent of the total opex growth costs. According to UÉ, it will need to establish support services across IT, Facilities and HR. This will involve an incremental cost to the opening operating expenditures for the RC4 period, consisting of costs related to Buildings and the UÉT programme:[19]

- **Buildings** (€12m):
  - New Operational Centre (Depots) and Stores: UÉ expects seven Regional Operations Centres and five Local Operational Centres to be onboarded by 2025.
  - New Offices: UÉ expects sixteen additional Offices to be onboarded during 2025 and 2026.
- **UÉT Programme** (€23m): UÉ states that moving into RC4, the UÉT transformation phase will involve the streamlining and standardising of all water services activities into dedicated water and wastewater streams, and the establishment of dedicated Centres of Excellence in Operations Support, Control and Leakage. As examples, core activities include:
  - Continued investment in technology and equipment such as hand held units;
  - Linked SCADA alarms and telemetry on sites;
  - Standardising the process used across all plants

3.1.2.2.3. Externally driven opex growth

The largest cost pressure UÉ identified are external factors, which UÉ forecasted to increase opex by €140m at RC4, or 65 per cent of the total additional opex growth costs. In its RC4 submission, the company identifies three key external factors:[20]

- **Investment Driven Growth** (€77m): UÉ recognises that capital investment will drive an increase in opex through additional needs to operate and maintain new and upgraded assets from the increasing population growth and increased level of compliance.[21]
  - To estimate the opex growth associated with capex at RC4, UÉ states that it has analysed its capex by project and split into those which generate additional opex needs (e.g. treatment

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18 UÉ (January 2025), Revenue Control 4 Opex – New Costs, p.7.

19 UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, p.25-27.

20 UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, p.27-29.

21 UÉ (January 2025), Revenue Control 4 Opex – New Costs, p.12.

plant upgrades) and those which do not (e.g. leakage reduction programmes, energy efficiency, sewer rehabilitation).

- UÉ then applies an assumed annual 1.5 per cent opex rate to those projects which are deemed to generate an incremental opex requirement, i.e. the investment driven opex growth is calculated as Relevant Projects Costs (€m) × 1.5 per cent p.a. According to UÉ, the 1.5 per cent opex rate can be supported by the internal source of review of historical businesses since 2020 and average incremental opex, as well as by the external source of submission data from Ofwat PR24 process.[22]
- The overall estimate of investment driven opex at RC4 is €77m, derived from applying the 1.5 per cent assumption to €4.6bn of nominal capex spend, plus incremental insurance costs of €8m.[23]

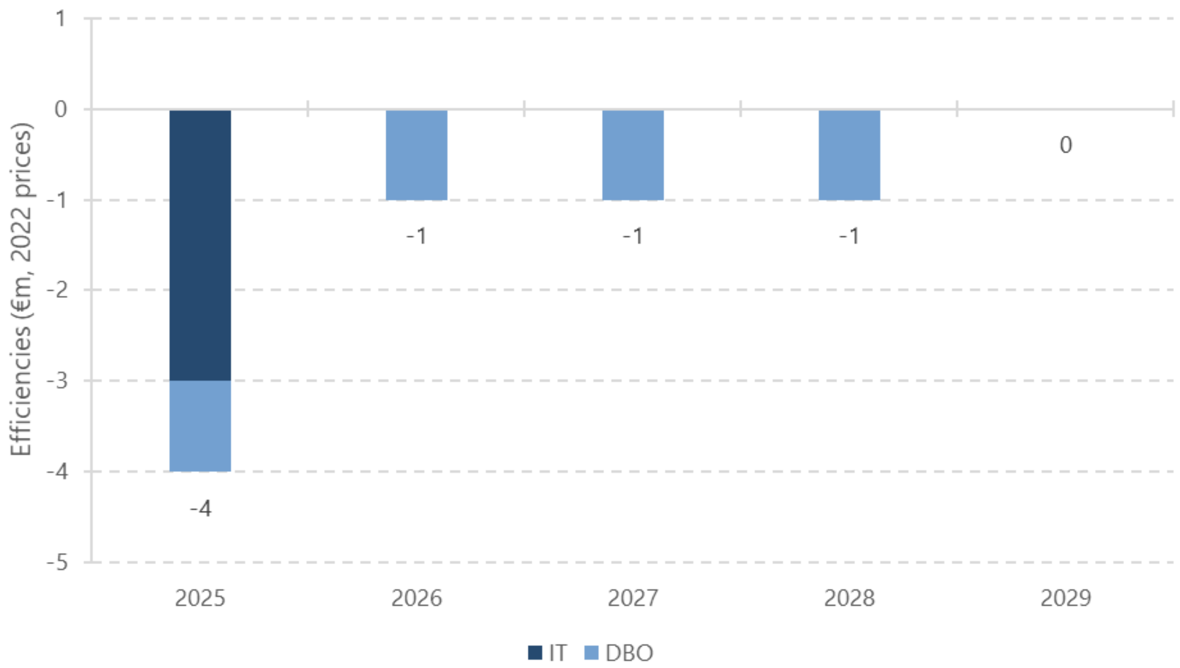
- **Population and Economic Growth** (€14m): UÉ argues that the economic and population growth in Ireland is leading to increasing pressure on water production and wastewater treatment. UÉ estimates the growth will lead to impact on all areas of business (e.g. customer billing and service, IT & Telecoms opex at new sites, and other overheads) and drive up the opex by €14m (or 1.4 per cent of 2029 controllable opex).[24]
- **DBO Growth** (€48m): UÉ identifies two categories of DBO growth at RC4 as below:[25]
  - Ringsend wastewater treatment plants (c.€33m), including population and economic growth driven volume pressure which results in 3 per cent year-on-year growth, upgraded infrastructure charges, and upgrade projects with increased costs relating to Urban Waste Water Treatment Directive (UWWTD) compliance, sludge treatment and phosphorus recovery.
  - Other DBO sites (c.€15m), including volume pressure due to increasing population, contract extensions, maintenance on legacy assets, and Contract license review.

3.1.2.3. Efficiencies

UÉ estimates that over RC4 it will realise €7m efficiency savings, i.e. a reduction in opex, contributed by two key sources. Figure 3.6 below presents the split of the efficiency savings.

[22] UÉ (January 2025), Revenue Control 4 Opex – New Costs, p.12.
[23] UÉ (January 2025), Revenue Control 4 Opex – New Costs, p.12.
[24] UÉ (January 2025), Revenue Control 4 Opex – New Costs, p.13.
[25] UÉ (January 2025), Revenue Control 4 Opex – New Costs, p.8.

Figure 3.6: UÉ RC4 Efficiency Savings Forecast



Source: UÉ (December 2024), Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, Table 3.4.

- **IT Efficiencies** (€3m):[26] UÉ's IT department is currently restructuring its framework to implement a single supplier managed service to ensure maximum economies of scale. The new framework has been executed and UÉ expects to deliver savings of €3.4m in 2025.
- **DBO Efficiencies** (€4m): We understand UÉ is preparing a business case for a programme to consider full "in house" operation of the transferred sites from LAs to UÉ, focusing on potential operational and procurement efficiencies as the UÉ's portfolio of sites expands. UÉ has assumed an indicative efficiency estimate of €4m for the 77 sites due to transfer over the RC4 period.

3.1.2.4. Cost avoided[27]

In addition to in-year efficiencies, UÉ forecasts that, through the UÉ transformation, it will also save the suppressed costs of LA vacancies which have been managed to date by UÉ in anticipation of future changes to the operating model. UÉ projects that the starting sectoral FTE count would reduce from 4,812 to 4,570, resulting in total payroll costs avoided of €23m over the RC4 period.[28]

26 UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, p.29-30.

27 According to UÉ, Costs Avoided are not included in opening Base Controllable Costs and are therefore not included in the calculation of RC4 Controllable Opex needs. Source: UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, p.18.

28 UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) Operational Expenditure Look forward 2025-2029, p.30-31.

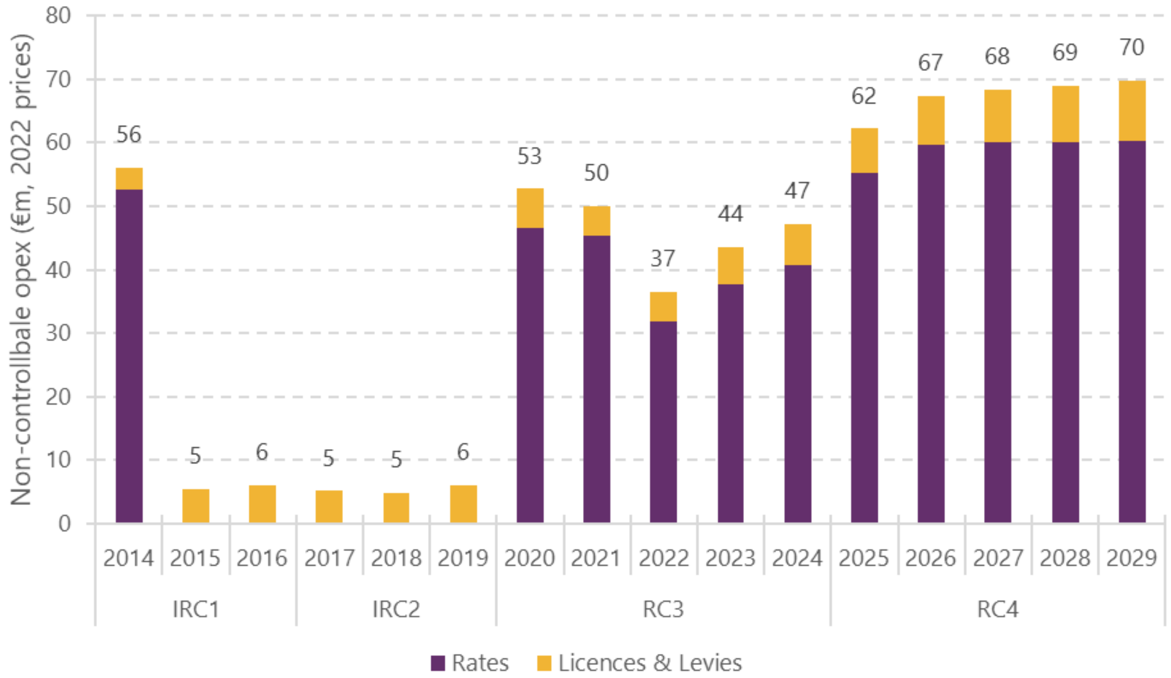
3.1.3. Non-controllable costs

Non-controllable costs represent the costs set by external entities and are beyond management control. For UÉ, non-controllable costs covers:

- **Regulatory levies and licences**: the CRU levy and EPA licences for which UÉ has limited control; and
- **Commercial rates**: fees that UÉ must pay to the LAs. UÉ was not required to pay these fees during IRC2.

Figure 3.7 summarises the non-controllable costs from 2014 to 2029, reflecting a 46 per cent increase in non-controllable costs from RC3 to RC4.

Figure 3.7: UÉ Outturn and Forecast Non-Controllable Costs

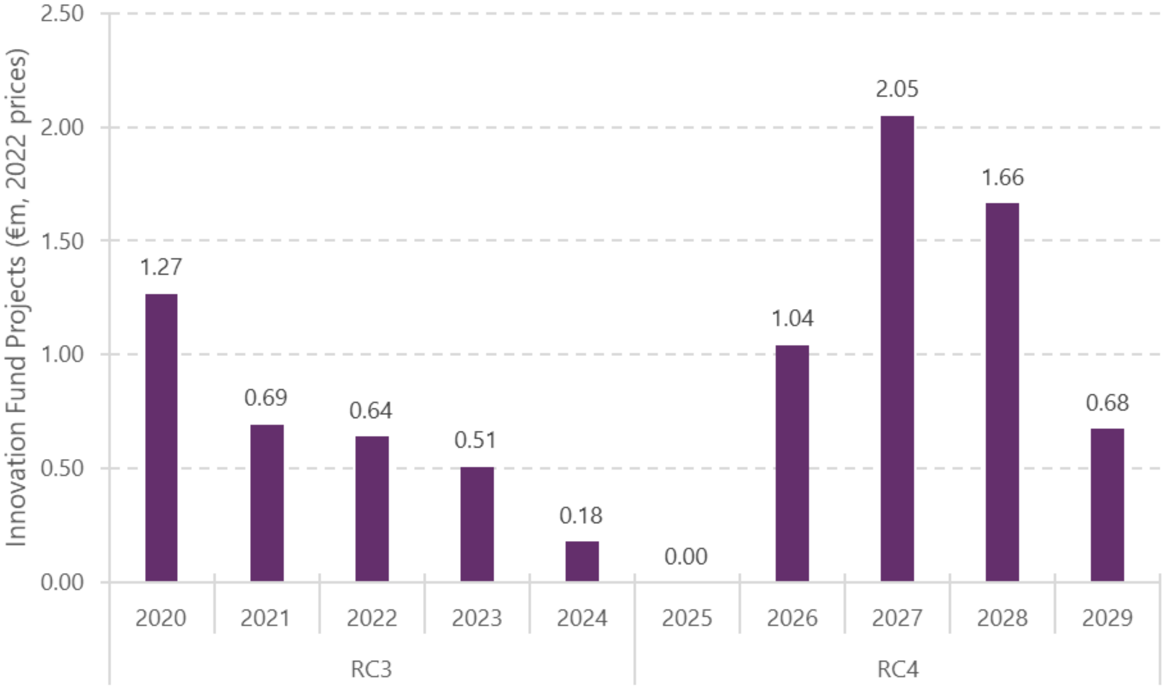


Note: 2014-2023 data reflect outturn costs to date, while 2024 data reflect UÉ's forecasts for the last year of RC3.
Source: NERA analysis of UÉ RC4 submission.

3.1.4. Innovation funded opex

Figure 3.8 below illustrates the outturn innovative projects funding at RC3, as well as a forecast of €5.43m at RC4.

Figure 3.8: UÉ Outturn and Forecast Innovation Funded Opex



Note: 2014-2023 data reflect outturn costs to date, while 2024 data reflect UÉ's forecasts for the last year of RC3.
Source: NERA analysis of UÉ RC4 submission.

4. Assessment of UÉ's Operational Cost Efficiency

In this section, we compare UÉ's expenditure proposals to English and Welsh (E&W) comparators drawing on unit cost comparisons as well as regression analysis. Using datasets of information on the costs and drivers of cost of several regulated companies performing a similar activity these techniques can be used to inform about the "efficient" level of expenditure.

Along with its business plan submission, UÉ has also provided a supporting document from Frontier Economics (henceforth Frontier), its economic consultants, on its comparative efficiency. We address this report in this section, setting out modifications to Frontier's analysis, and draw conclusions on UÉ's efficiency relative to E&W peers.

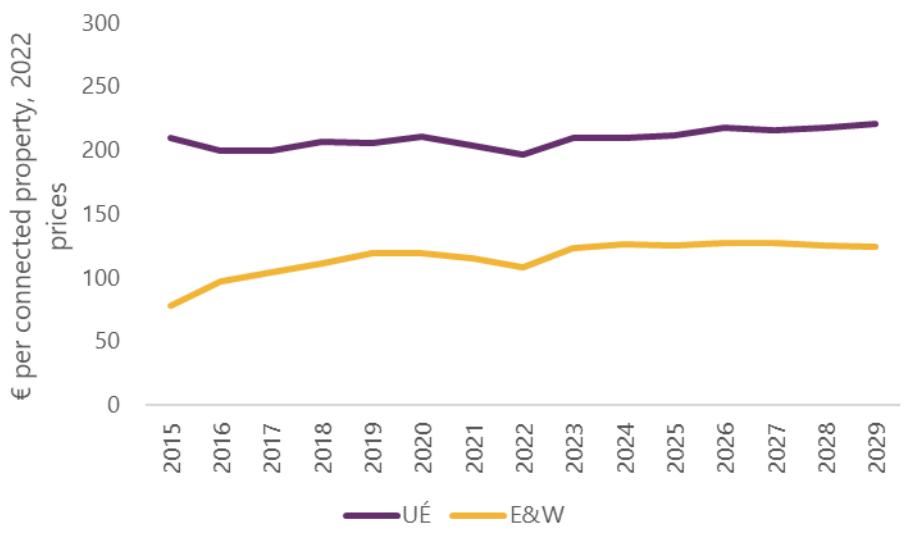
4.1. Analysis of unit costs

Benchmarking is a technique that economic regulators use to identify the efficient level of costs of regulated companies. Comparative benchmarking works by comparing data for companies performing similar regulated activities using statistical analysis. These comparisons control (insofar as possible) for differences between firms that affect their costs for reasons besides inefficiency, such as their operating environment, the size of the business and/or the level of output they produce.

A simple form of comparative benchmarking is unit cost analysis, an approach that compares firms' average cost per unit of output. For example, Figure 4.1 shows that UÉ's water opex per connected property is larger than for its E&W. While in 2016 cost per property in Ireland was more than double the one in E&W, because of an increase in costs in E&W, in 2023 UÉ are 71 per cent larger than its peers. However, using a different cost driver, UÉ may look more efficient than other companies. Indeed, as shown in Figure 4.2, using length of mains as a scale variable, UÉ costs have remained generally constant over time, while E&W opex has increased by around 70 per cent between 2015 and 2023. By 2023 UÉ water costs per length of mains are around 40 per cent lower than its E&W peers.

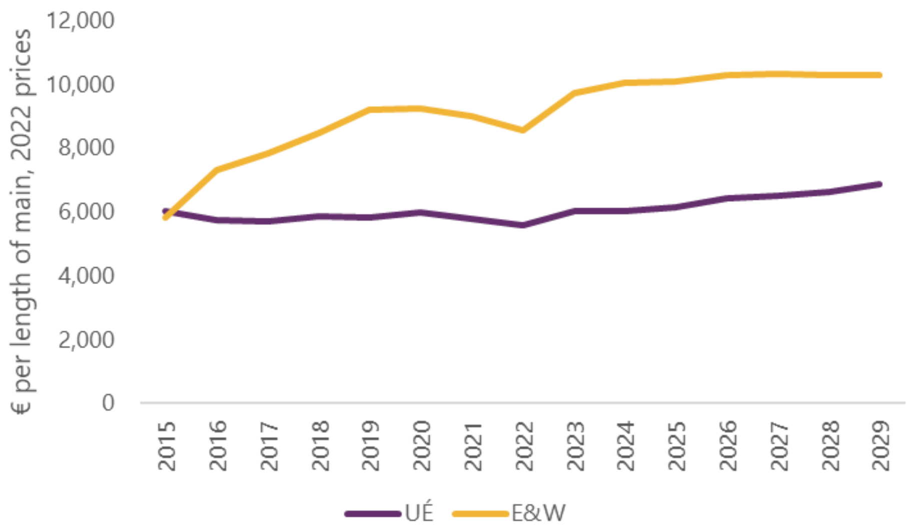
While both measures show that UÉ has been better at absorbing upward cost pressure than E&W costs, we cannot draw any firm conclusions on UÉ's level of cost efficiency given the crudeness of these unit cost comparisons. The comparison is very dependent on the selection of the cost driver, e.g. the use of length of main would show UÉ in a better light.

Figure 4.1: Water opex per connected property, in 2022 €



Note: For E&W, we rely on outturn costs up to 2024 and business plan forecasts for the period 2025-29.
Source: NERA analysis of UÉ and Ofwat data.

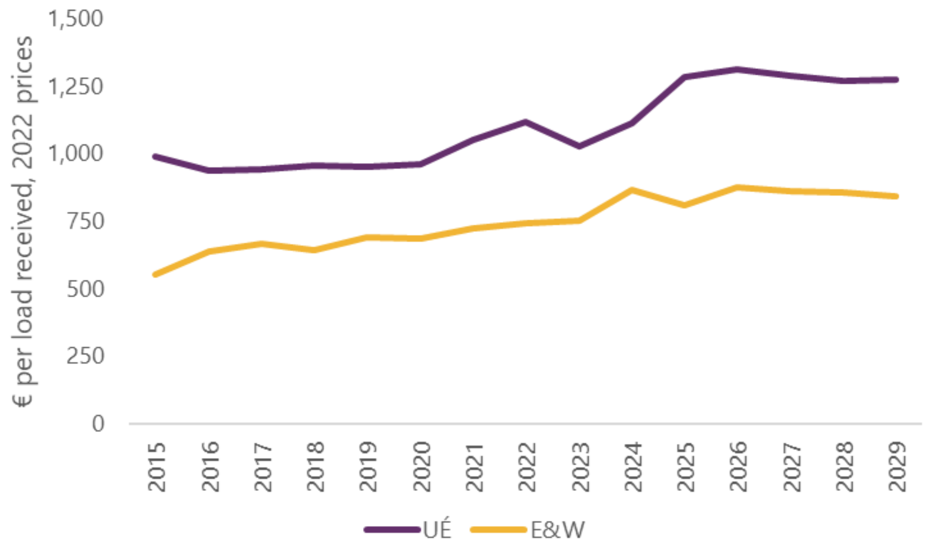
Figure 4.2: Water opex per km of mains, in 2022 €



Source: NERA analysis of UÉ and Ofwat data.

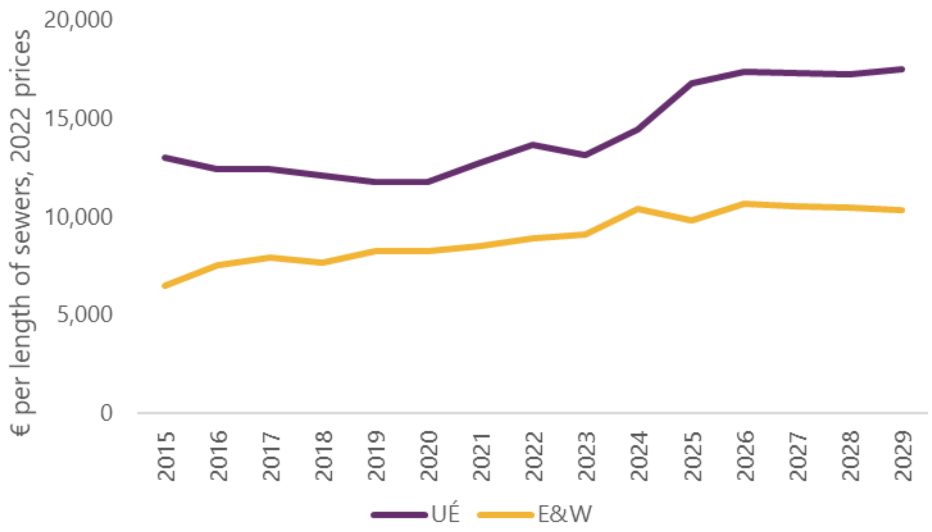
Figure 4.3 and Figure 4.4 below show instead unit costs for wastewater, using load and connected property as scale driver, respectively. When using these drivers, UÉ looks less efficient than its peers (+37 per cent in 2023 for opex per load, +45 per cent for opex per length of sewers), with UÉ forecasting large increases in average costs at RC4 (+24 per cent between 2023 and 2029 for opex per load, +33 per cent for opex per length of sewers).

Figure 4.3: Wastewater opex per unit of load, in 2022 €



Source: NERA analysis of UÉ and Ofwat data.

Figure 4.4: Wastewater opex per km of sewers, in 2022 €



Source: NERA analysis of UÉ and Ofwat data.

Because different companies operate in different conditions, their average unit costs may differ even if they are equally efficient. For instance, a large company may have lower unit costs than a smaller company because it achieves economies of scale. This difference does not mean the small company is operating inefficiently, but may simply reflect that it serves a less populated area and therefore incurs greater average costs for reasons beyond its control. To prevent such differences between companies from distorting comparisons of their costs, it is common for regulators to control for differences in operating conditions when estimating the efficient level of costs using regression analysis, that allows to control for multiple factors affecting. We discuss such approach below.

4.2. Description of Frontier approach

UÉ commissioned Frontier to assess the efficiency of UÉ's opex by benchmarking UÉ's costs relative to the opex of comparator water companies in E&W.[29] As per the CRU's approach at IRC1, IRC2, and RC3, Frontier employs econometric analysis to construct a model of water companies' costs, drawing on operating cost data published by Ofwat from E&W companies. We briefly summarise Frontier's approach and overall results, before discussing key differences in our respective approaches.

4.2.1. Adjusting costs for differences across regions

UÉ provided Frontier with its outturn opex data, covering calendar years 2015 to 2023. For E&W companies, Frontier collects the dataset published by Ofwat as part of its PR24 final determinations (PR24 FD), including 13 years of outturn data from 2012 to 2024 of the 17 water companies and 10 wastewater companies.[30]

Since there are differences between companies that cannot be fully captured within the econometric model, it is common to make adjustments to the data used to estimate the regression in an attempt to make the data more comparable across companies. In this instance, Frontier adjusts the controllable opex from E&W companies to ensure a like-for-like comparison with the UÉ data. For E&W companies' costs, Frontier includes costs associated with power and bulk supply, while excludes costs associated with statutory water softening and the Traffic Management Act and Industrial Emissions Directive. The benchmarking exercise focuses on wholesale opex and does not include retail costs.[31]

Frontier also applies the following pre-modelling adjustments, in line with the RC3 modelling:[32]

- **VAT adjustment**: In the UK, water companies' VAT costs are recoverable, and for this reason, reported costs exclude VAT. Unlike E&W companies, UÉ's VAT costs are irrecoverable. Frontier therefore adjusts UÉ cost down by 8.7 per cent for water and 10.1 per cent for wastewater, with the rates provided by UÉ based on the share of expenses with irrecoverable VAT.
- **Exchange rate adjustment**: UÉ reports costs in euro, while E&W companies present costs in GBP. Frontier adjusts E&W costs using the annual OECD PPP exchange rate between the two jurisdictions.
- **Inflation adjustment**: Costs collected were in nominal terms. Frontier then converts the cost data into 2022 real prices using Eurostat data on the Harmonised Index of Consumer Prices (HICP).
- **Financial year adjustment**: UÉ financial year covers from January 2022 to December 2022, while E&W financial year runs from April 2021 to March 2022. Frontier therefore inflates E&W costs to align costs in the two jurisdictions, relying on the ratio between the average monthly

[29] Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report.

[30] Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report, p.10.

[31] Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report, p.11.

[32] Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report, p.11-12.

HICP index between April 2021 and March 2022 and the average monthly HICP index between January and December 2022.

- **Regional wage adjustment**: Frontier applies a regional wage adjustment to normalise the wage levels in Ireland and the UK. Frontier uses construction and professional wage indices published by CSO and ONS for Ireland and E&W respectively. It then makes an adjustment to allow for higher real wages in Ireland, which are estimated to be around 29 per cent larger then in E&W in 2023 (see Appendix A.1 for a review of Frontier's approach to wages).

4.2.2. Frontier relies on econometric modelling to assess UÉ's opex efficiency

In CRU's RC3 cost benchmarking exercise, the dataset used to run the econometric models excluded UÉ. CRU then generated predicted costs for UÉ, on the basis of the relationship between cost drivers and cost levels from the panel of E&W companies, to inform the company's efficiency.

At RC4, Frontier proposes to include UÉ in the sample when running econometric models, which differs from CRU's RC3 approach. Frontier points out that this approach would allow the models to better capture the relationship between costs and cost drivers of all the companies benchmarked. It also comments that including UÉ in the sample led to a more conservative estimation of UÉ's efficiency.[33]

Frontier develops two models for water service and two models for wastewater service, respectively. Table 4.1 below summarises the cost drivers included in Frontier's models.

33 Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report, p.11.

Table 4.1: Frontier RC4 Models Cost Drivers

Frontier water models	**Model 1**	**Model 2**
Scale	• Total connected properties	• Total connected properties
Density	• Connected properties per mains length • (Connected properties per mains length)^2	• Connected properties per mains length • (Connected properties per mains length)^2
Topography	• Booster pumping stations per km of mains	• Booster pumping stations per km of mains
Treatment complexity		• Weighted-average complexity of treatment (WAC)
Time effects	• Time trend	• Time trend
Frontier wastewater models	**Model 1**	**Model 2**
Scale	• Sewer length • Total load	• Sewer length • Total load
Treatment economies of scale	• Weighted-average treatment size (WATS)	• WATS
Treatment complexity	• % load treated at ammonia ELV 3mg/l	• % load treated at ammonia ELV 3mg/l
Topography	• Pumping stations per km sewer	• Pumping stations per km sewer
Weather effects		• Urban rainfall per km sewer
Time effects	• Time trend	• Time trend

Source: Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report, Table 5 & Table 6.

For each year, Frontier estimates UÉ's efficiency gap as the distance between UÉ's actual opex and UÉ's predicted opex derived from the models. A positive efficiency gap implies that the company's costs are inefficient relative to the estimated average level, while a negative efficiency gap suggests the company's expenditure is less than what the model would predict.

Based on the modelled results, Frontier concludes that UÉ's opex has improved significantly since 2015, and is overall efficient during the RC3 period up to 2023 where outturn data are available, with water service being efficient (by 16 to 20 per cent below the average efficient opex predicted by the models) and wastewater service being marginally inefficient (by 3 per cent above the average efficient opex predicted by the models).[34] This conclusion of an overall efficient cost performance extends to UÉ's cost forecast at RC4, where Frontier applies the estimated coefficients from the models to UÉ's forecasted cost drivers to inform the company's opex efficiency for the RC4 period. Table 4.2 below replicates the range of Frontier's estimate of modelled efficiency gap for RC3 and RC4.

[34] Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report, p.26&30.

Table 4.2: Frontier Modelled Opex Efficiency Gap, RC3 and RC4

	Water	Wastewater	Total
RC3 (2020-2023, outturn)	-16% to -20%	+3% to +3%	-8% to -10%
RC3 (2020-2024, outturn with one year forecast)	-17% to -21%	+3% to +4%	-8% to -11%
RC4 (2025-2029, forecast)	-24% to -30%	+8% to +15%	-8% to -14%

Source: Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report, Table 7. Negative values indicate that UÉ's costs are below the expected or modelled cost and therefore relatively efficient; positive values indicate relative inefficiency.

4.3. Our Approach for Assessing UÉ's Efficiency Using Econometric Benchmarking

We have reviewed Frontier's comparative efficiency analysis and identified a few limitations in the proposed models. In this section, we summarise areas for improvement and develop alternative models to assess UÉ's cost efficiency.

4.3.1. We rely on manufacturing wages to control for regional differences

We have reviewed and substantively adopted Frontier's approach to pre-modelling adjustments, as discussed in Section 4.2 We have adopted a slightly different approach to adjust for higher real wages in Ireland relative to E&W peers, but which has limited impact on UÉ's relative efficiency.

As described in Section 4.2 above, Frontier applies pre-modelling regional wage adjustment to account for the difference between wages across Ireland and E&W regions.

We find that Frontier's approach gives the highest real wage adjustment relative to other reasonable measures. Consistent with our wider approach (see Section 4.3 below for our approach to benchmarking), we draw on the measure adopted by Ofwat in the context of ex-post real wage adjustment, i.e. manufacturing wages. We note that our use of Ofwat's index does not have a material impact on our assessment of relative efficiency, as shown in Table 4.3.

We discuss our changes to Frontier's approach in Appendix A.1.

Table 4.3: Using our preferred wage index to control for labour costs does not materially impact UÉ's efficiency when using Frontier's models

	Frontier Water Models		Frontier Wastewater Models	
	Frontier Labour Adjustment	*NERA Labour Adjustment*	*Frontier Labour Adjustment*	*NERA Labour Adjustment*
RC3 (2020-2023, outturn)	-16% to -20%	-16% to -20%	+3% to +3%	+3% to +4%
RC3 (2020-2024, outturn with one year forecast)	-17% to -21%	-17% to -22%	+3% to +4%	+3% to +4%
RC4 (2025-2029, forecast)	-24% to -30%	-24% to -30%	+8% to +15%	+10% to +13%

Source: Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report, Table 7. NERA analysis of UÉ and Ofwat data. Negative values indicate that UÉ's costs are below the expected or modelled cost and therefore relatively efficient; positive values indicate relative inefficiency.

4.3.2. We have developed models for water and wastewater that better fit the data than Frontier's

To inform our own assessment of UÉ's costs, we have considered the approaches developed by regulators in Great Britain to assess comparative efficiency, including the econometric models developed by Ofwat at its most recent price control (PR24). We also reviewed the models we developed at RC3, and the models Frontier has suggested to inform UÉ's RC4 business plan submission.

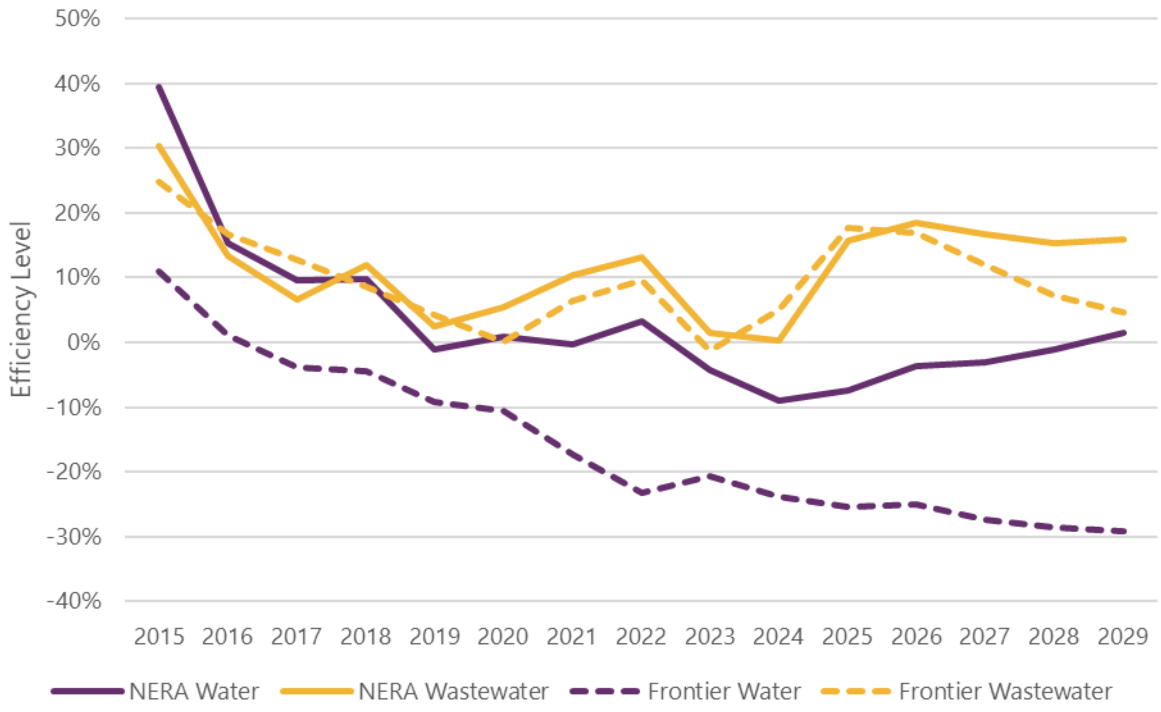
For both water and wastewater, we rely on a set of models that are closely aligned with the set developed by Ofwat for PR24. These models have undergone a consultation process that has allowed E&W companies to provide input and feedback on the proposed methodologies and assumptions used in the models. Our approach is different from RC3, where we departed from Ofwat models as a starting point for our assessment because of a lack of compatible drivers between UÉ and E&W companies. Given improved data, we can now include further relevant drivers as adopted by Ofwat.

Consistent with Frontier, we find that UÉ has substantively improved its cost efficiency since its formation in 2014 – this is the case irrespective of the choice of model. However, unlike Frontier, we conclude that UÉ's total costs are still higher than expected over RC4.

Overall, we find that that at RC4 UÉ's costs are around 13-21 per cent higher than efficient on wastewater (weighted average 16 per cent), while we find wider variation across different models for water, estimating UE's water costs are 18 per cent lower to 17 per cent higher than efficient level across models depending on definition of density (weighted average -3 per cent).

We discuss below how we have developed our preferred models for water (Section 4.3.2.1) and wastewater (Section 4.3.2.2), describing the changes made relative to Frontier's models.

Figure 4.5: UÉ has substantively improved its cost performance over time, but remains relatively inefficient over RC4



Source: NERA analysis of UÉ and Ofwat data.

4.3.2.1. Water: Our improved models show UÉ's cost efficiency varies between -18 per cent to 17 per cent over RC4 and between -19 per cent to 21 per cent by the end of RC3, depending on the choice of econometric model used

We have tested a wide range of models, starting from the specifications we developed at RC3 and Frontier's latest models to approaches that are consistent with Ofwat's latest wholesale water models. We have tested different time specifications (i.e. time trend, time dummies and no time variables) and measures of density. Table 4.4 below shows the coefficients of our preferred six models to assess UÉ's efficiency at RC4, using data from 2012 to 2024.[35] These models are equivalent in terms of selected cost drivers, but for the use of time dummies, to Ofwat's wholesale water models WW1-WW6 used at PR24.[36]

By contrast to Frontier, we include additional definitions of population density that are consistent with Ofwat's variables used in its models, and which rely on Census data from the Central Statistics Office (CSO) (see Section 4.3.2.1.1). In addition, our models rely on time dummies rather than a time trend to capture changes in costs over time not explained by a change in drivers (see Section 4.3.2.1.2). Finally, we also capture complexity of treatment not only using weighted average, as

[35] Note, as Frontier, we only use outturn data for UÉ from 2015 to 2023, and outturn data from 2012 to 2024 for E&W.

[36] Ofwat (December 2024), PR24 final determinations, Expenditure allowances – base cost modelling decision appendix, Table 14.

Frontier does in one of its two models, but also relying on treatment complexity the proportion of water treated at complexity levels from 3 to 6.

Note, to control for pumping requirements, Ofwat also considers average pumping head (APH) as a driver for six of its twelve wholesale water models (WW7-WW12).[37] We understand UÉ does not collect comparable data to E&W companies, and therefore we do not include APH in our preferred models to assess UÉ's efficiency at RC4. We show in Appendix A.2 the results of including APH as an independent variable as a sensitivity.

37 Ofwat (December 2024), PR24 final determinations, Expenditure allowances – base cost modelling decision appendix, Table 16.

Table 4.4: We rely on six models to assess UÉ's water opex efficiency

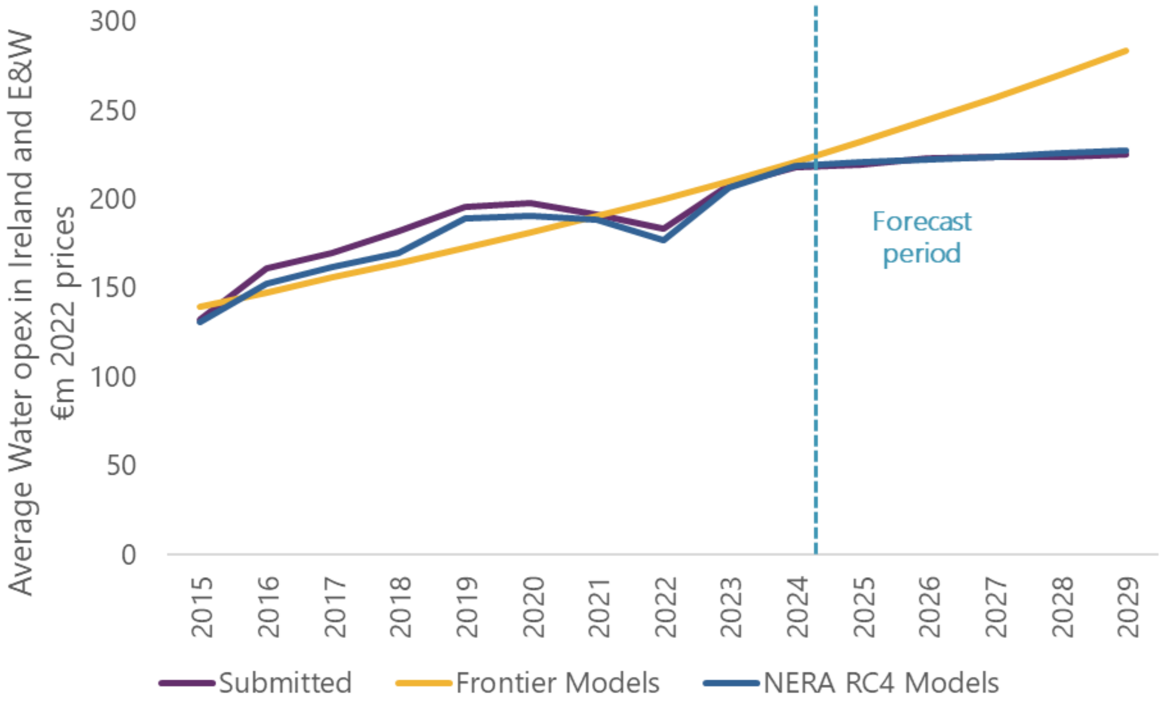
	NERA Model 1	NERA Model 2	NERA Model 3	NERA Model 4	NERA Model 5	NERA Model 6
Log Connected properties	1.037***	1.041***	1.043***	1.050***	1.001***	0.996***
Log Boosters per length of mains	0.656***	0.654***	0.549***	0.533***	0.429***	0.416***
Log of Weighted average treatment complexity		0.072		0.004		0.377***
% of Water treated at complexity levels 3 to 6	0.003***		0.001*		0.003***	
Log of Density 1 (Properties per length)					-5.157***	-6.001***
Log of Density 1 squared (Properties per length)					0.597***	0.689***
Log of Density 2 (LAD from MSOA)	-1.155***	-1.084***				
Log of Density 2 squared (LAD from MSOA)	0.083***	0.078***				
Log of Density 3 (MSOA)			-3.885***	-4.041***		
Log of Density 3 squared (MSOA)			0.241***	0.250***		
2013	0.005	0.005	0.006	0.006	0.005	0.007
2014	0.02	0.022	0.022	0.024	0.02	0.021
2015	0.08	0.082	0.082	0.083	0.058	0.058
2016	0.224***	0.228***	0.229***	0.233***	0.203***	0.197***
2017	0.273***	0.281***	0.281***	0.288***	0.252***	0.244***
2018	0.312***	0.321***	0.322***	0.329***	0.291***	0.280***
2019	0.412***	0.423***	0.426***	0.436***	0.386***	0.373***
2020	0.419***	0.428***	0.432***	0.441***	0.393***	0.378***
2021	0.398***	0.407***	0.412***	0.421***	0.372***	0.357***
2022	0.331***	0.341***	0.345***	0.355***	0.304***	0.288***
2023	0.481***	0.490***	0.494***	0.503***	0.453***	0.434***
2024	0.520***	0.532***	0.534***	0.546***	0.514***	0.497***
Constant	10.345***	10.140***	21.531***	22.163***	17.003***	18.597***
N	230	230	230	230	230	230
R squared	0.963	0.961	0.964	0.964	0.968	0.97

Source: NERA analysis of UÉ and Ofwat data.
Note: *** p < 0.01; ** p < 0.05; * p < 0.1.

We use the model results to generate predicted costs for each company, on the basis of the relationship between outturn cost drivers and cost levels from the panel that includes both UÉ and E&W companies. Using forecasts of the cost drivers and the model coefficients shown above, we can calculate modelled costs post-2024. In doing so, we have taken into account forecasts provided by UÉ, thus allowing for growth on the system in terms of properties connected (which UÉ forecasts to increase by 8.7 per cent between 2023 and 2029) and load collected (increasing by 7 per cent between 2023 and 2029 according to UÉ).[38]

Figure 4.6 below shows the evolution of average outturn and forecast opex for the industry in Ireland and E&W. Overall, operative costs post-2024 are expected to increase at a lower rate than in previous years, while, using modelled costs derived using Frontier's model costs, average costs are predicted to increase as in the past. On the other hand, our preferred models track more accurately both outturn costs and the trend in industry costs predicted by E&W companies' business plans, suggesting they fit the data better than Frontier's two water models.

Figure 4.6: Our Preferred Water Models Fit the Data Better Than Frontier's Models



Source: NERA analysis of UÉ and Ofwat data.

We measure UÉ's efficiency relative to modelled or expected costs that reflect efficiency of the average company. Some companies therefore exhibit cost performance which is superior to the predicted range, while some companies exhibit cost performance above (i.e. inferior to) to the predicted range. In GB water and energy sectors, both Ofwat and Ofgem compare companies to the upper-quartile performer, as opposed to predicted costs (which is the average company). In this respect, our approach shows UÉ in a more favourable light.

Table 4.5 below shows UÉ's efficiency for each of our preferred models. Because of the different drivers used in each model, there is a large variation in UÉ's efficiency (e.g. UÉ's costs are 22 per cent higher than the average company according to Model 2, while 19 per cent lower when using Model 5 at RC3). We discuss in Section 4.3.2.1.1 that most of these differences are explained by

38 See Frontier Economics, UE RC4 - refreshed data input - 2025-01-15.xlsx, sheets "UÉ Water Drivers" and "UÉ Waster Drivers".

alternative definitions of the density variable. Given the large differences in modelled costs across the different modelling specification, we triangulate across the models with different drivers "to mitigate the risk of error and bias in any one model".[39] Our triangulation assigns a 50 per cent weight to models with the weighted average density measures (Model 1 to Model 4) and a 50 per cent weight to models with the property per length of mains density measure (Model 5 to Model 6), aligning with Ofwat's triangulation approach across models with different density variables at RC4.We calculate an overall efficiency across models by dividing submitted costs over the weighted average modelled costs. Our analysis shows that UÉ's water business is broadly in line with the efficient level across the outturn years of RC3 (2020-2023), and it is predicted to be 2 per cent lower than the average company across the whole control period (2020-2024). As UÉ's is improving over time, it is predicted to be 3 per cent efficient than the benchmark at RC4.

Table 4.5: Our models find UÉ to be relatively inefficient both at RC3 and RC4

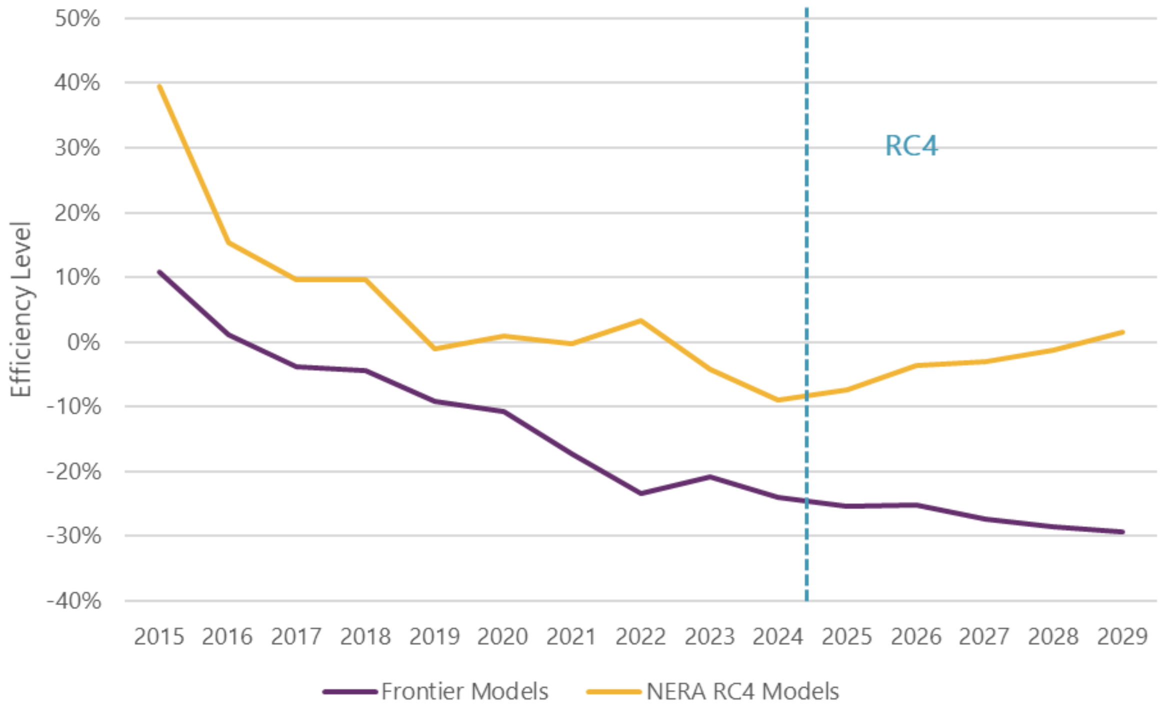
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Average
RC3 (2020-2023, outturn)	23%	24%	21%	20%	-17%	-14%	-0.2%
RC3 (2020-2024, outturn with one year forecast)	21%	22%	19%	18%	-19%	-16%	-2%
RC4 (2025-2029, forecast)	17%	17%	16%	15%	-18%	-14%	-3%

Source: NERA analysis of UÉ and Ofwat data.

Overall, as shown in Figure 4.7 below, we find that while we estimate UÉ is efficient relative to the average company, it is not as efficient as Frontier concludes. Frontier models overestimate UÉ's efficiency because 1) they rely on a single definition of density (connected properties per length of mains) and 2) they estimate RC4 modelled costs using a time trend. We discuss both issues in the following sections.

39 Ofwat (December 2024), PR24 final determinations, Expenditure allowances – base cost modelling decision appendix, p.8.

Figure 4.7: While improving over time, UÉ's efficiency is materially lower than predicted by Frontier



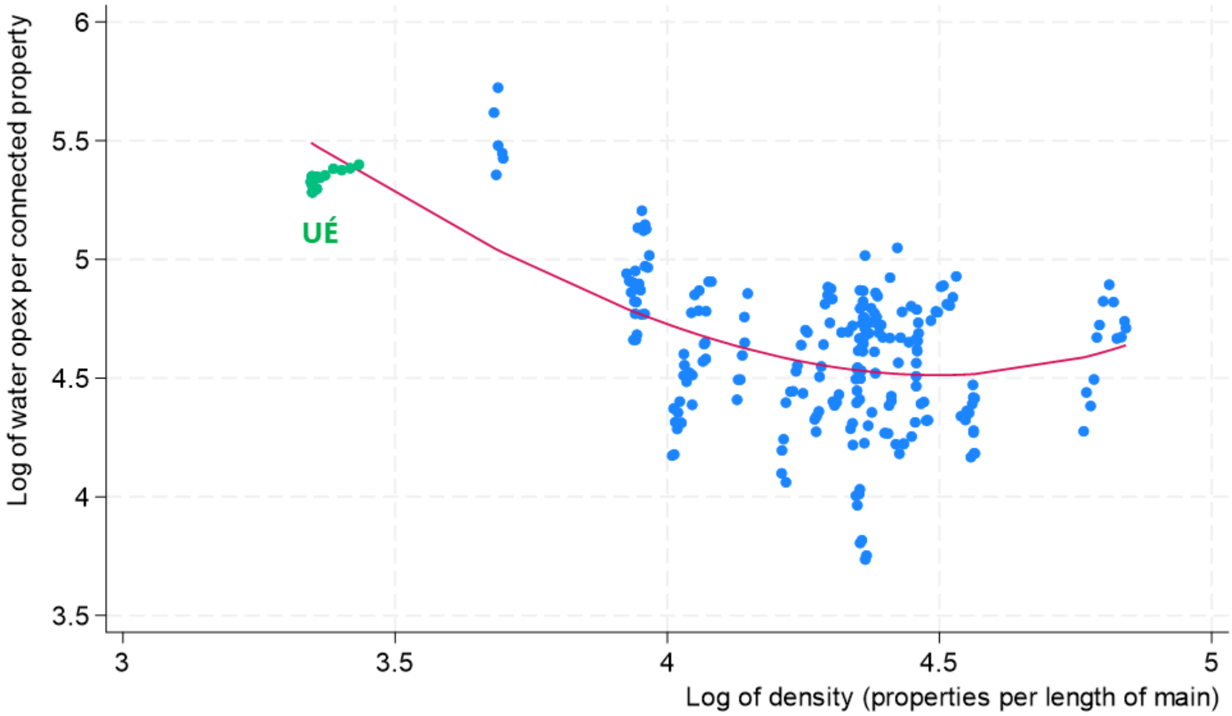
Source: NERA analysis of UÉ and Ofwat data.

4.3.2.1.1. Relying solely on the density variable of properties per length of mains overstates UÉ's efficiency in water

Density is an important driver of costs for water companies, and it needs to be considered in an econometric model when assessing UÉ's water opex efficiency. On one hand, companies operating in densely populated areas may benefit from sourcing and treating water at fewer, larger facilities, leading to economies of scale. They can also enhance resource efficiency by minimising travel distances for maintenance and decreasing the necessity for multiple depots and spare parts to maintain service quality. On the other hand, firms operating in these densely populated regions may face higher expenses associated with property, rentals, labour, and access, while also dealing with a more complex operational environment.

In its two benchmarking models, Frontier relies on the number of connected properties per length of mains as a measure of density, a measure also used by Ofwat at PR24. As shown in Figure 4.8, there is U-shaped relationship between density and cost per property, suggesting the use of a quadratic density term is appropriate. UÉ has the lowest density and second highest cost-per property.

Figure 4.8: UÉ has the lowest number of connected properties per length of mains in the sample



Source: NERA analysis of UÉ and Ofwat data.

When using properties per length of main as the definition of density, because UÉ is an outlier in the sample, i.e. lowest density with high cost per property, the regression line will go through the UÉ data points (referred to as over-fitting).[40]

In addition, while Ofwat argues that properties per length of mains is an intuitive measure of population density, it is less exogenous than other measures that rely on external sources and "may not capture the differences in population density within a company's operating region as well measure of population density".[41] Indeed, Ofwat uses two alternative definitions of density in addition to properties per length of mains calculated using data from the Office of National Statistics (ONS):[42]

A. Population weighted average density – Middle Super Output Area (MSOA); and

40 When reviewing Cadent's appeal at RIIO-2 on regional factors, the CMA made a similar remark when it argued that because London was an outlier with respect to density, the OLS estimation procedure might 'force the line to go through the London observation' without supporting a clear assessment of the cost of operating at that level of density". CMA (28 October 2021), Cadent Gas Limited, National Grid Electricity Transmission plc, National Grid Gas plc, Northern Gas Networks Limited, Scottish Hydro Electric Transmission plc, Southern Gas Networks plc and Scotland Gas Networks plc, SP Transmission plc, Wales & West Utilities Limited vs the Gas and Electricity Markets Authority, Final determination Volume 3: Individual Grounds, para. 10.268.

41 Ofwat (December 2024), PR24 final determinations, Expenditure allowances – base cost modelling decision appendix, p.26.

42 Ofwat (December 2024), PR24 final determinations, Expenditure allowances – base cost modelling decision appendix, p.26.

B. Population weighted average density – Local Authority District (LADs).

Under A, the density of a given company for a given year is calculated as follows:[43]

$$Density\ (MSOA) = \frac{\sum_{i=1}^{n}(Population_i * \ Density_i)}{\sum_{i=1}^{n} Population_i}$$

Where i is a MSOA, which is the most granular statistical geographic unit in E&W, with c.7,000 MSOA areas.[44] Hence, under A, Ofwat calculates density as the population weighted average of densities for the individual MSOAs in a company's area.

The formula for calculating measure B is equivalent, but i in this instance represents a LAD instead of a MSOA. A LAD is a coarser geographical unit – Ofwat's companies cover c.450 LADs.

Using Definition A results in higher density estimates across all companies than when using B, since the LAD-based calculation effectively averages out higher density of urban. The relative ranking of companies by density is also different depending on which measure is used. A company serving dense urban areas as well as sparsely populated rural areas will rank relatively lower using LADs compared to MSOAs as the rural parts dilute higher density urban areas.[45]

To obtain comparable density measures for UÉ, we use data from the 2016 and 2022 censuses from the Irish Central Statistics Office. We understand that a comparable geographical unit to MSOA in Ireland is an electoral division (ED), which is the smallest published census unit. Ireland consists of 3,420 of these, which are consistent with 7,000 MSOAs for E&W, considering that E&W is approximately twice the size of Ireland. We also understand that the closest comparable unit to a LAD in Ireland is instead a Local Electoral Area (LEA), of which there are 166 in Ireland.

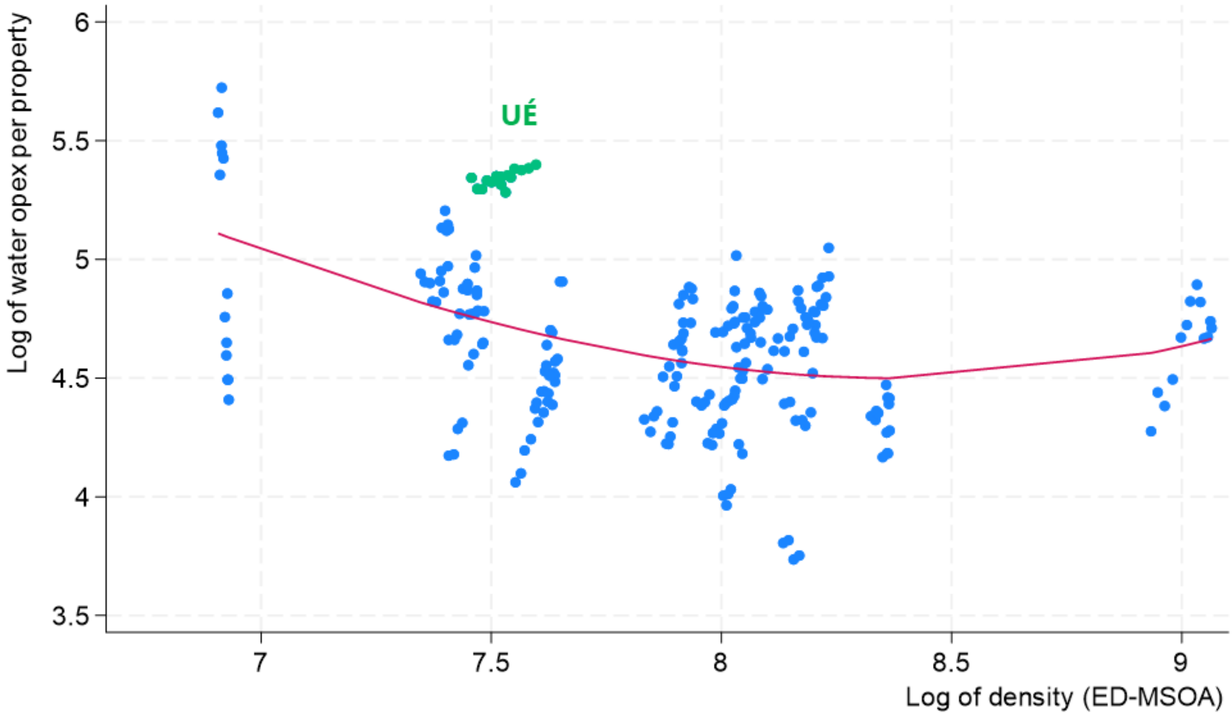
Using the MSOA-ED definition of density, which is consistent with Ofwat, Figure 4.9 shows that UÉ is not an outlier, and it is relative high cost given its density.

43 See MSOA_area_density_derivation_v2.0.xlsx, Population density estimates using Middle Super Output Area population estimates v2, available at https://www.ofwat.gov.uk/regulated-companies/price-review/2024-price-review/framework-and-methodology/approach-to-assessing-base-expenditure/.

44 Ofwat (December 2024), PR24 final determinations, Expenditure allowances – base cost modelling decision appendix, p.26.

45 For example, Southern Water, which serves densely populated cities such as Brighton and Portsmouth but also sparsely populated areas, ranks 4th in Ofwat's calculation under MSOA (A) but 9th under LAD (B). The choice of density measure may therefore have an impact on regression results. See MSOA_area_density_derivation_v2.0.xlsx, Population density estimates using Middle Super Output Area population estimates v2, available at https://www.ofwat.gov.uk/regulated-companies/price-review/2024-price-review/framework-and-methodology/approach-to-assessing-base-expenditure/.

Figure 4.9: Using a different definition of density shows UÉ to have density levels comparable to other E&W companies



Source: NERA analysis of UÉ and Ofwat data.

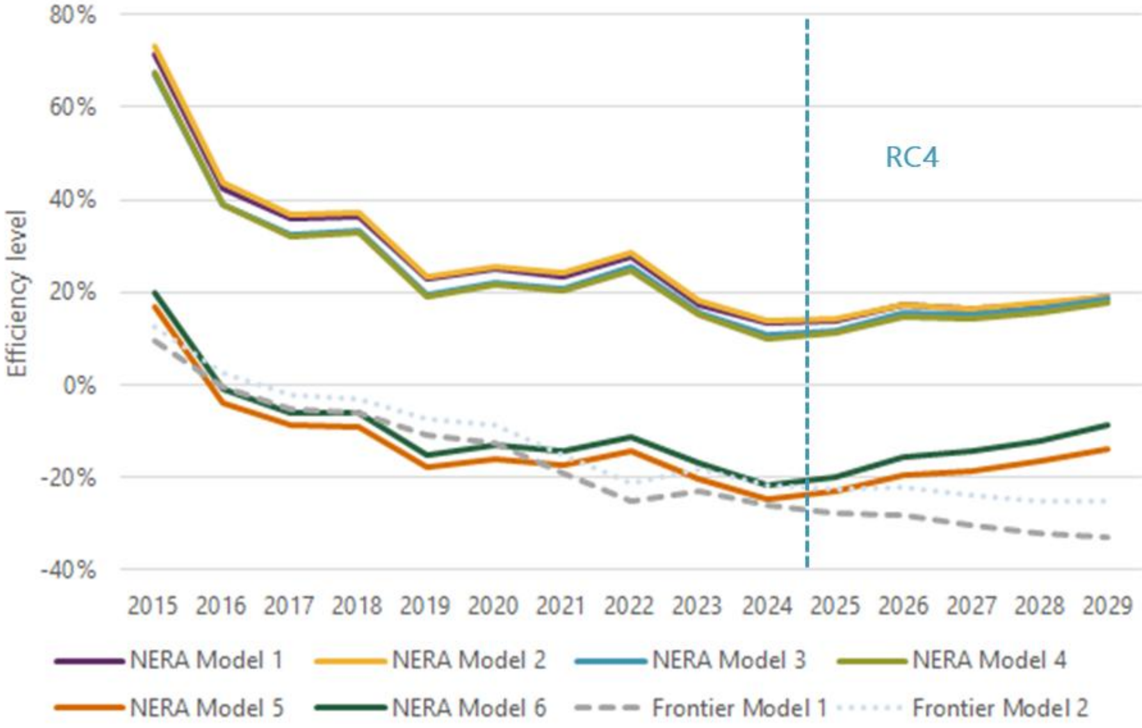
Figure 4.10 below shows how the different definitions of density affect the efficiency assessment:

- Using Frontier's definition of density (i.e. property per length of mains), both NERA Model 5 and Model 6 show UÉ to be relatively efficient compared to the average company, with modelled costs that are larger than outturn and forecast costs. These models show efficiency levels for the historical period which are consistent with Frontier's models. However, models using this definition of density may be over-fitted (see Figure 4.8 and Figure 4.9 above);
- Relying on population per electoral division/ local electoral area shows UÉ in a less favourable light, as UÉ is c.20 per cent more expensive than the average company at RC3 and around 16 per cent at RC4 (Model 1-Model 4).

These results illustrate the importance of triangulating the results across different models. When presented with a range of methodological choices where there is no clear preferred approach, the most reasonable approach would be to triangulate between the options, e.g. through selecting a midpoint or a weighted average of multiple estimates. Therefore, consistent with Ofwat, we triangulate across models that include three different density measures, applying a 50 per cent weight to models using weighted average density measure and a 50 per cent weight to models using properties per length of mains:

- Weighted average density – ED/MSOA;
- Weighted average density – LEA/LAD; and
- Properties per length of mains.

Figure 4.10: There is wide variation in UÉ's efficiency when using different definitions of density



Source: NERA analysis of UÉ and Ofwat data.

4.3.2.1.2. Frontier's choice of relying on a time trend overcompensates UÉ at RC4

To control for changes in water companies' costs over time, which are not explained by changes in other drivers, Frontier relies on a time trend in its two econometric models for water. Using outturn data for both UÉ and E&W companies, Frontier finds that, holding other factors constant, water companies' efficient cost increase by around 4-5 per cent each year, as shown in Table 4.6.

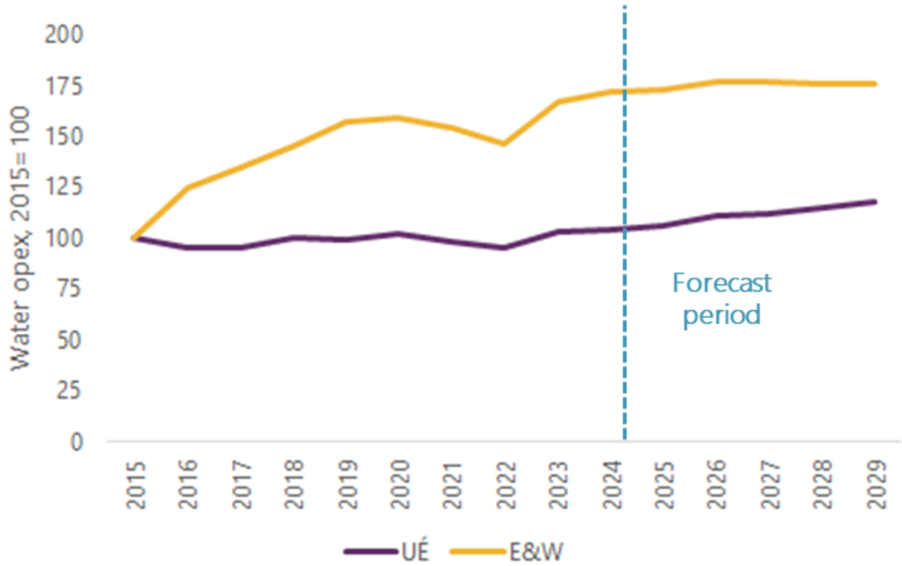
Table 4.6: Holding everything else constant, Frontier's time trend assumes companies costs increase by 4-5 per cent each year

	Frontier Model 1	Frontier Model 2
Coefficient for time trend	0.05***	0.04***

Source: Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report, Table 5.
Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

As shown in Figure 4.11, E&W companies water costs in 2023 are on average around 70 per cent higher than in 2015, while UÉ costs have remained almost constant. As costs have materially increased for E&W companies while the main drivers used in the regressions have remained relatively stable, this increase in costs is captured by the coefficient for the time trend.

Figure 4.11: Frontier's forecast of efficient costs includes ca 4% p.a. real increase reflecting historical increase in E&W companies' costs



Source: NERA analysis of UÉ and Ofwat data.

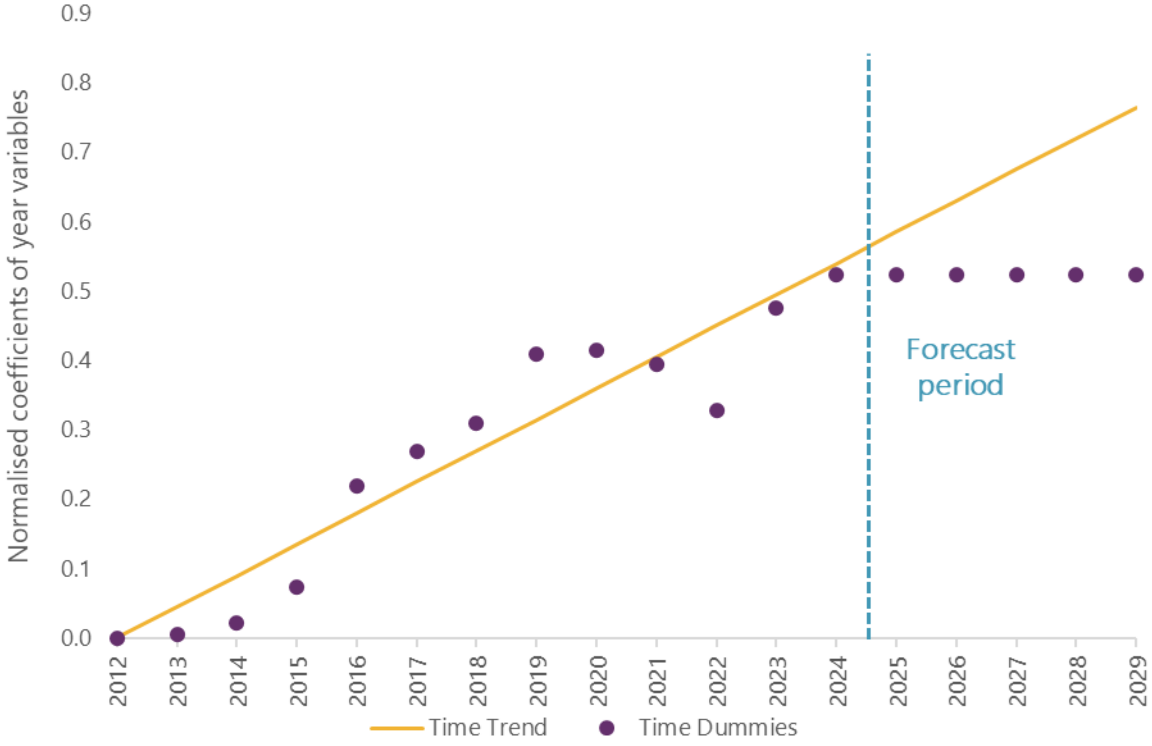
Frontier argues that the "difference in aggregate efficiency score is very minor" when using time dummies instead of a time trend.[46] While this may be true for the historical period, the use of the time trend rather than time dummies to estimate modelled costs at RC4 leads to difference in efficiency scores which are instead material.

Indeed, Frontier assumes that the increase in wholesale expenditure observed for E&W in the last years would continue in the forecast period too. Frontier multiplies the forecast drivers by the model coefficients estimated using outturn costs to obtain modelled costs through the end of RC4, and as a consequence UÉ's forecast of efficient costs includes around 4 per cent per annum real increase in costs over RC4 (i.e. 20 per cent increase in efficient cost over forecast period). When using time dummies, we assume that the coefficient for the year 2024, the last year of outturn data in the sample, is kept constant for the RC4 period.[47] Thus, as also shown in Figure 4.12 below for , while the normalised coefficients of the trend and dummies are somewhat similar pre-RC4, Frontier's approach of rolling forward the trend over-compensates water companies in the forecast period.

46 Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report, p.49.

47 Note, we use only outturn data to estimate the econometric models, using data for UÉ up to 2023 and for E&W up to 2024.

Figure 4.12: Using a time trend instead of time dummies allows for an assumed increase in costs over RC4



Source: NERA analysis of UÉ and Ofwat data. For the time trend, we take the average between the coefficients for the time variable for Frontier Model 1 and Frontier Model 2. For the time dummies, we take the average of the coefficients in each year across our six models.

In contrast to Frontier, Ofwat does not control for time effects in its models as it argues there is a risk that a time trend captures factors that are under management control. In addition, Ofwat also claims there is a risk that the increase in wholesale water base expenditure observed in recent years is not permanent or will continue at the same rate.[48]

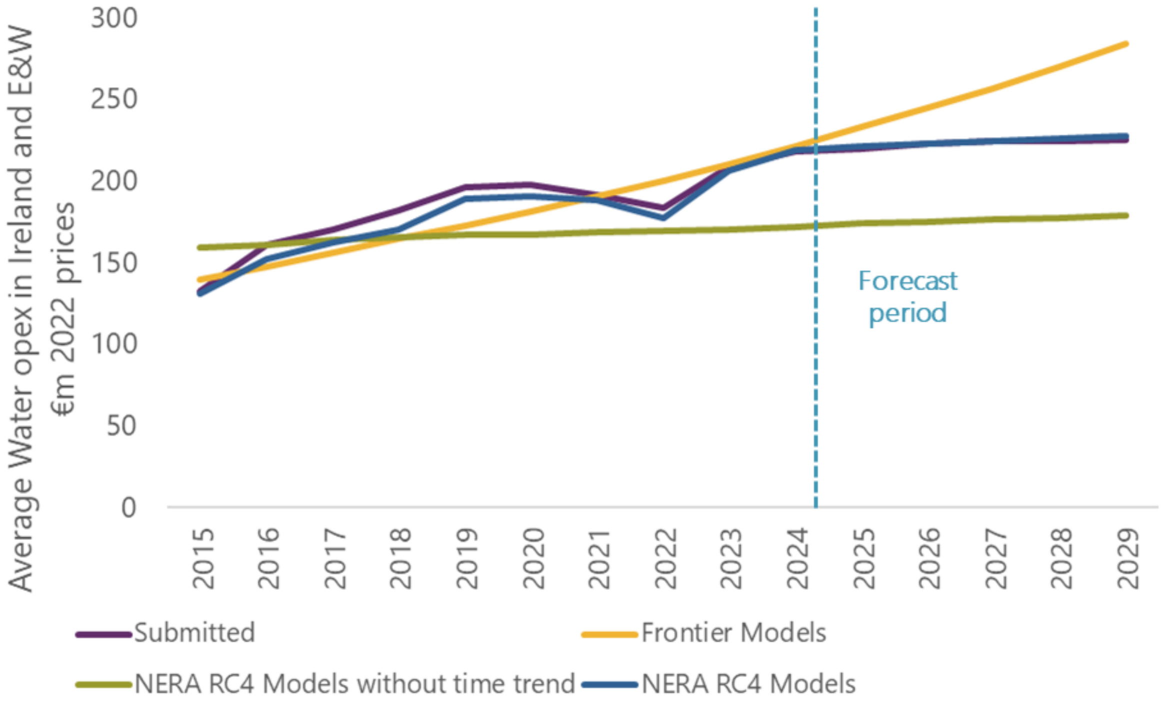
While we agree with Frontier that it is important to control for time effects within the econometric model, we test different approaches to check which model specification fits the data better and can explain better water companies' costs over time. Specifically, we tested (1) a model with a time trend as Frontier; (2) a model with time dummies as we did at RC3; (3) a model with no time effects as Ofwat at PR24.

As depicted in Figure 4.13, a model that does not control for time effects shows the average company more efficient in the early part of the modelled period, and less efficient in more recent years. On the other hand, a model with a time trend, like Frontier's, would instead allow companies larger modelled costs in future years.

Our preferred approach, that relies on time dummies, is able to match companies' submitted costs in the historical period. By assuming that the coefficient for the year 2024 is used for all the years in the forecast period, the model also perfectly matches the average company's forecast costs.

48 Ofwat (April 2023), Econometric base cost models for PR24, p.31.

Figure 4.13: A model with time dummies fits the data better than models with and without a time trend



Source: NERA analysis of UÉ and Ofwat data.

4.3.2.2. Wastewater: We find that UÉ's costs are 13-21 per cent higher than modelled costs over RC4

As with water, we have considered different model specifications for our wastewater models, using an approach that is consistent Ofwat's latest wholesale wastewater models. Table 4.7 shows the regression coefficients of our two preferred models we use to assess UÉ's efficiency. These two models are analogous to Ofwat's wastewater network plus models WWNP1 and WWNP2.[49] In contrast to Ofwat, we do not control for topography as we understand UÉ pumping capacity per sewer length is not comparable to E&W companies. In addition, as we have done for water, we incorporate time dummies in our modelling.

In contrast to Frontier, we rely on time dummies rather than a time trend to capture changes in costs over time not explained by a change in drivers (see Section 4.3.2.2.1). We also made changes to the definition of weighted-average treatment size (WATS) to make it consistent with Ofwat's calculation. (see Section 4.3.2.2.2). Finally, we exclude one of the two scale drivers used in its regressions (i.e. sewer length), modifying the definition of urban rainfall per sewer length to be consistent with E&W costs (see Section 4.3.2.2.1).

We do not consider pumping stations per sewer length in our models, while Frontier uses it as a proxy for pumping capacity. Frontier states that it has "tested the number of pumping stations as

49 Ofwat (December 2024), PR24 final determinations, Expenditure allowances – base cost modelling decision appendix, Table 21.

a proxy for this in both our water and wastewater models, however this is an imperfect proxy as the average capacity of pumping stations in Ireland vs E&W could be different, meaning energy costs per pumping station may not be directly comparable".[50] Thus, for comparability reasons between UÉ and E&W, we have decided to not include pumping stations per sewer length in our regression. This approach is also consistent with our choice of not including APH in the water models (see Appendix A.3 for a sensitivity where we test the impact of adding pumping capacity per length as a driver in our wastewater models).

Finally, we consider load treated with ammonia consent ≤ 3mg/l. as an additional variable, other than WATS, to control for economies of scale in sewage treatment consistent with Ofwat's PR24 models.

Table 4.7: We rely on two models to assess UÉ's wastewater opex efficiency

	NERA Model 1	NERA Model 2
Log Total Load	0.874***	0.687***
Load treated with ammonia consent ≤ 3mg/l	0.002***	0.005***
Log Urban rainfall per sewer length	0.069***	0.108***
% of Load treated in size bands 1 to 3	0.058***	
Log Weighted average treatment size		-0.106***
2013	0.031	0.009
2014	0.076	0.056
2015	0.091*	0.066
2016	0.202***	0.172**
2017	0.261***	0.236***
2018	0.224***	0.190***
2019	0.302***	0.273***
2020	0.281***	0.237***
2021	0.340***	0.293***
2022	0.374***	0.338***
2023	0.391***	0.354***
2024	0.504***	0.454***
Constant	7.863***	11.563***
N	140	140
R_squared	0.94	0.91

Source: NERA analysis of UÉ and Ofwat data.
*Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.*

Table 4.8 below shows UÉ's efficiency for our two preferred models. In contrast to water, for wastewater we do not observe large variations in efficiency between the alternative models. Our analysis shows that UÉ's wastewater business is 8 per cent inefficient across the outturn years of

50 Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report, p.34.

RC3 (2020-2023), while it is predicted to be 6 per cent more expensive than the average company across the whole control period (2020-2024). While improving in the past years, our modelling predicts a worsening in UÉ's efficiency at RC4 (average of 16 per cent higher costs than the average company).

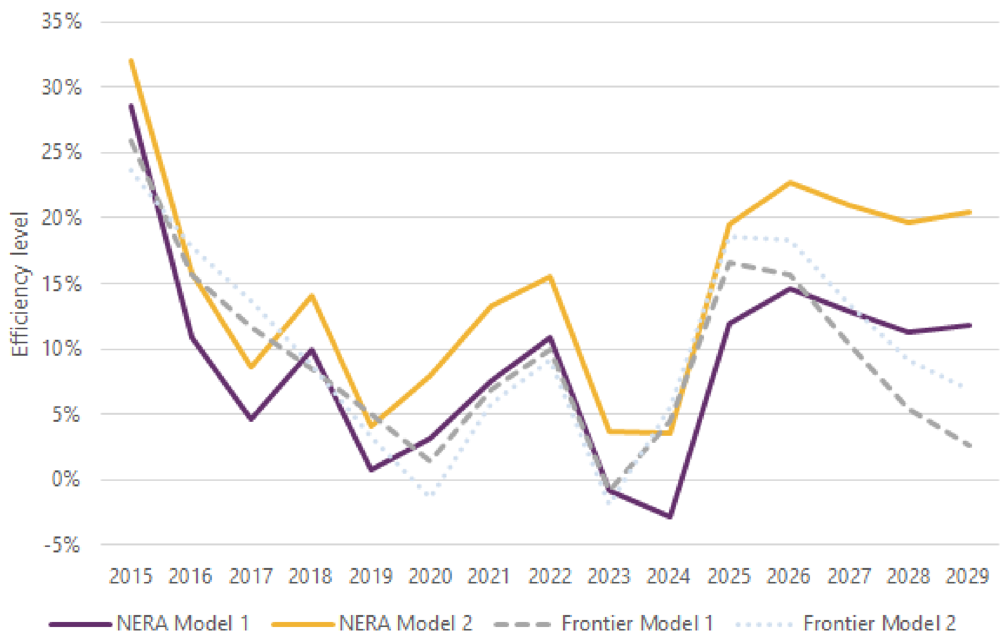
As shown in Figure 4.7 below, we find that while our results do not materially differ from Frontier during the historical period, Frontier's use of a time trend leads to an assumed improvement in UÉ's efficiency at RC4.

Table 4.8: Our models find UÉ's to be relatively inefficient both at RC3 and RC4

	Model 1	Model 2	Average
RC3 (2020-2023, outturn)	5%	10%	8%
RC3 (2020-2024, outturn with one year forecast)	3%	9%	6%
RC4 (2025-2029, forecast)	13%	21%	16%

Source: NERA analysis of UÉ and Ofwat data.

Figure 4.14: At RC4, our models show that UÉ's forecast costs are on average 13-21 per cent higher than efficient costs, while Frontier concludes 12-15 per cent



Source: NERA analysis of UÉ and Ofwat data.

4.3.2.2.1. We use time dummies to fit the data better

Using a time trend, Frontier finds that water companies' wastewater cost should increase around 3-5 per cent each year, as shown in Table 4.9. This coefficient is mainly driven by the increase in

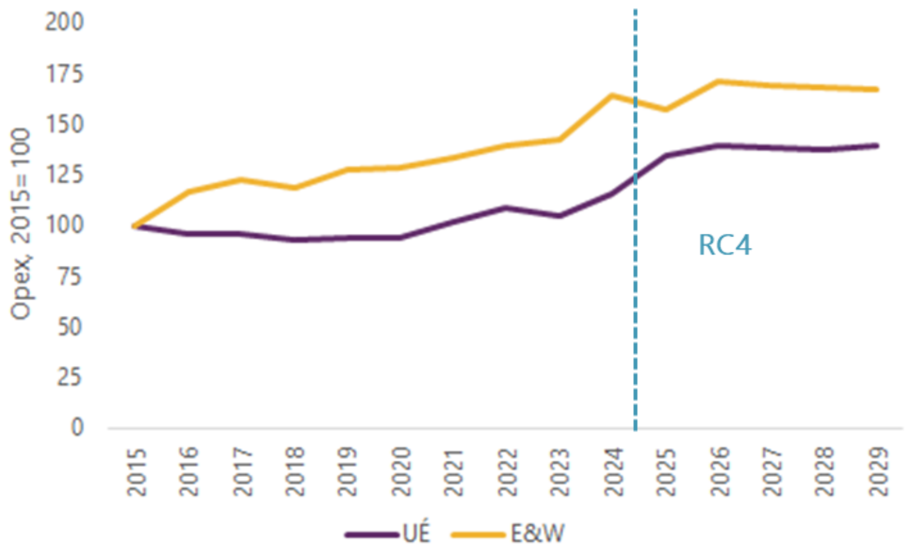
E&W costs observed in the past, while UÉ's costs have remained generally constant up to 2023 (see Figure 4.15). In order to forecast modelled costs in the future, Frontier assumes that costs will continue to grow at the same rate as they have done in the past.

Table 4.9: Holding everything else constant, using a time trend increase wastewater opex by 3-4 per cent each year

	Frontier Model 1	Frontier Model 2
Coefficient for time trend	0.04***	0.03***

Source: Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report, Table 6.
Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

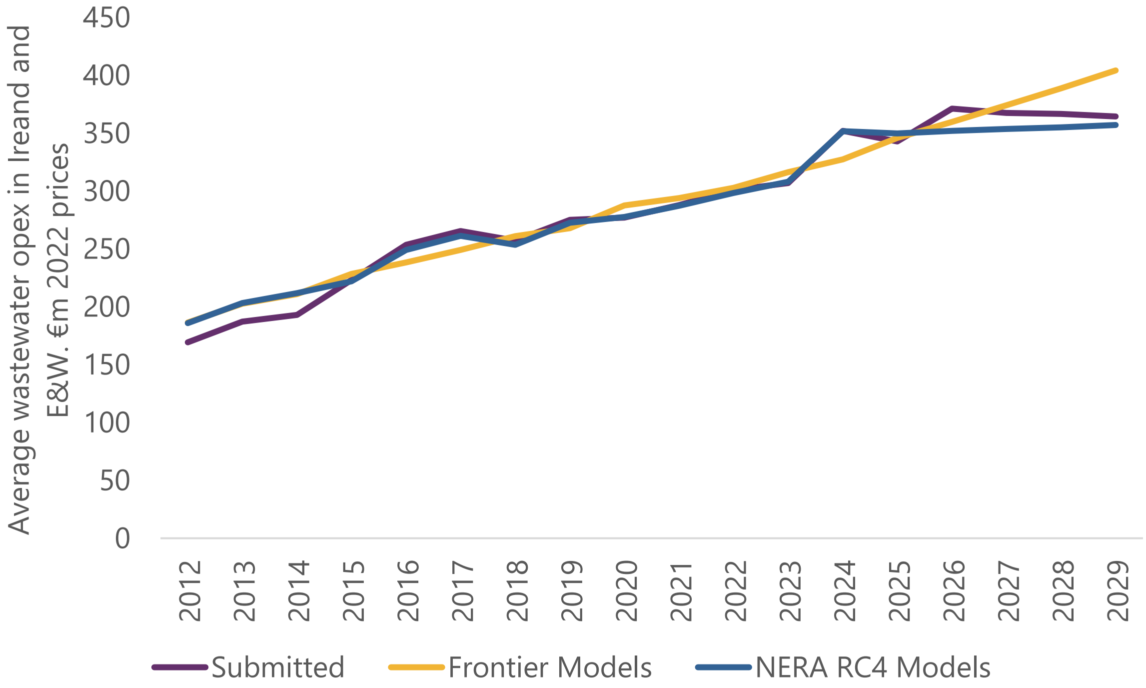
Figure 4.15: The coefficient for the time trend is driven by the historical increase in costs for E&W companies



Source: NERA analysis of UÉ and Ofwat data.

As shown in Table 4.7 above, we use instead time dummies to estimate our models. As for water, we assume that the coefficient for the year 2024, the last year of outturn data in the sample, is kept constant for the RC4 period (see Section 4.3.2.1.2). Our assumption provides a better fit of the data in both in the historical period and during RC4. Indeed, by relying on a time trend, Frontier's models forecast allowances which are high relative to E&W companies' business plans (see Figure 4.16).

Figure 4.16: The use of a time trend provides companies with greater allowances than requested in the business plans, on average



Source: NERA analysis of UÉ and Ofwat data.

4.3.2.2.2. We adopt Ofwat's definition of weighted-average treatment size (WATS)

Weighted-average treatment size (WATS) is one of the variables Ofwat uses at PR24 to control for treatment economies of scale in its wastewater models. As shown in Table 4.1 above, both Frontier RC4 wastewater models include WATS in the cost drivers. However, Frontier's method of constructing WATS differs from Ofwat's approach as it assigns less weight on companies' sewage treatment works (STWs) with larger size:

- At PR24, Ofwat adopts a different calculation of WATS for small STWs (i.e. size from band 1 to 5) and large STWs (i.e. size band 5+). For small STWs (band 1-5), Ofwat constructs WATS by taking the average load treated at the STWs within each band, multiplied by the proportion of total load in that band. For large STWs, Ofwat calculates WATS for each STW individually.
- Frontier calculates WATS for load treated for small and large STWs in the same way, thus also taking the average of the load treated in large STWs, instead of accounting for the contribution of each large STW separately as in Ofwat's method.

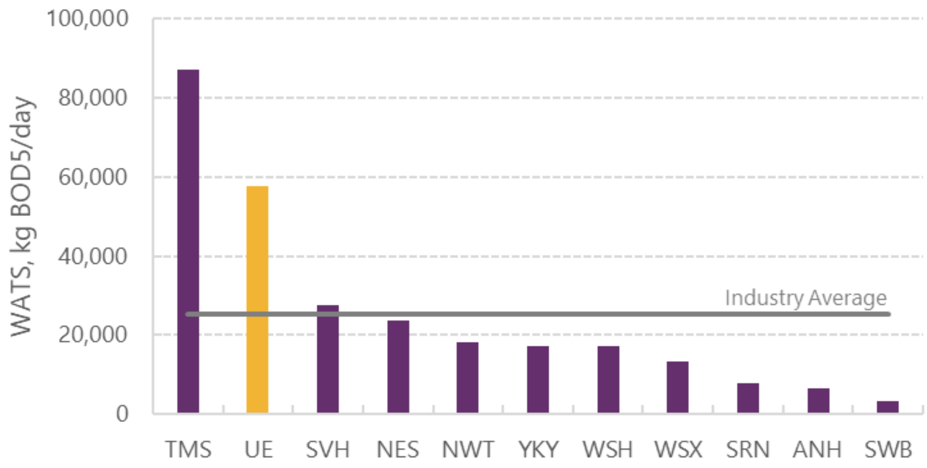
Figure 4.17 and Figure 4.18 below present the WATS calculated using Ofwat's approach and Frontier's approach, respectively. Frontier's method leads to significantly lower WATS figures compared with Ofwat's approach as its approach gives less weight to the impact of Ringsend in weighting economies of scale in UÉ's wastewater business.[51]

We retain Ofwat's WATS calculation in our wastewater Model 2. Indeed, this approach allows to better capture economies of scale at large sites and it was supported by all E&W companies at PR24.[52]

51 Q&A Spreadsheet for look-forward opex, UÉ response to Q38.

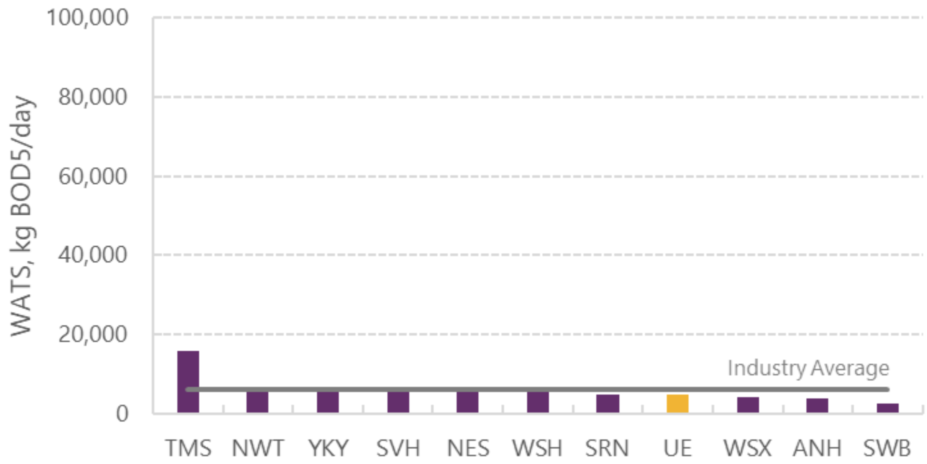
52 Ofwat (December 2024), PR24 final determinations: Expenditure allowances – Base cost modelling decision appendix, p. 34.

Figure 4.17: WATS using Ofwat's approach, outturn average for each company



Source: NERA analysis of UÉ and Ofwat data.

Figure 4.18: WATS using Frontier's approach, outturn average for each company



Source: NERA analysis of UÉ and Ofwat data.

4.3.2.2.3. We propose changes to the definition of a number of variables used by Frontier to be consistent with Ofwat

We also propose a number of changes to the definition of variables to align more closely with Ofwat. However, in general, the proposed changes do not materially affect our results relative to Frontier – the main changes relate to the use of time-specific dummies and WATS, as described above.

As listed in Table 4.1 above, both Frontier wastewater models include two scale drivers, total load and sewer length. Frontier argues that each variable can be understood to drive different elements of wastewater network costs, with load driving sewage treatment costs while sewer length driving sewage collection costs.[53]

We find that total load and the sewer length variables are highly correlated (i.e. correlation coefficient is equal to 0.98). Including two correlated variable introduces the risk of multicollinearity to the models, which can lead to instability in model coefficients. The estimated coefficient of total load is statistically significant in Frontier Model 1, while we fail to reject the null hypothesis that the coefficient of sewer length is statistically different from zero. The opposite is true for Model 2.[54]

At PR24, Ofwat employs the sewer length driver in its sewage collection models, and the load driver in its sewage treatment models. However, in its two wholesale wastewater models, Ofwat only uses load as the scale driver.[55] Therefore, to avoid the risk of multicollinearity described above, and to align with Ofwat's approach, we do not include sewer length as a scale driver in the wastewater models.

However, sewer length also enters into Frontier's models through two additional explanatory variables as it used to derive two measures of topography (pumping stations per sewer length) and weather effects (urban rainfall per sewer length).

Frontier adopts a definition of sewer length that is different from Ofwat's definition used at PR24 for E&W companies. Ofwat defines E&W companies' sewer length as the sum of total length of legacy public sewers and length of formerly private sewers and lateral drains, while Frontier defines sewer length of total length of legacy public sewers only.[56] We understand from Frontier that, because UÉ is not responsible for lateral drains while E&W companies are, it is more appropriate to use a narrower definition of sewer length for E&W companies in the models.

We do not agree with Frontier's approach as it is important to ensure that costs and cost drivers are on a like-for-like basis. Changes in the drivers will lead to changes in the relevant costs, and if such costs are not included in the modelling, the relationship between drivers and costs captured by the benchmarking model is likely to be biased, and vice versa. For example, when assessing distribution network operators' costs at RIIO-ED1, Ofgem argued that the cost assessment needs to ensure that "*costs we [Ofgem] are assessing and the associated cost drivers are on a like-for-like basis*".[57]

Given the difference in the service scope between the two jurisdictions, we consider two options below to adjust E&W companies' data:

- **Option 1**: Adopting the narrower definition of sewer length as Frontier has done, but removing costs related to formerly private sewers and lateral drains from total opex for E&W companies;

53 Q&A Spreadsheet for look-forward opex, UÉ response to Q33.

54 See Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report, Table 6.

55 Ofwat (December 2024), PR24 final determinations: Expenditure allowances – Base cost modelling decision appendix, Table 6.

56 In Ofwat PR24 FD dataset, sewer length is defined as Total length of legacy public sewer (variable code: BN13535_21) plus Length of formerly private sewers and lateral drains (variable code: BN13528). Source: Ofwat (December 2024), Wastewater network plus base cost (Stata do file).

57 Ofgem (28 November 2014), RIIO-ED1: Final determinations for the slow-track electricity distribution companies, para. 3.4.

- **Option 2**: Adopting the full definition of sewer length, thus aligning with Ofwat.

Ofwat's dataset does not provide granular information which would allow us to differentiate between costs related to private sewers and lateral drains. In fact, Frontier has also pointed out in its response to our query that costs "cannot be properly adjusted", which makes its narrower definition of sewer length "imperfect".[58] Therefore, we consider that it is appropriate to adopt Option 2, i.e. retaining Ofwat's full definition of sewer length for E&W companies. Adopting a narrower definition of sewer length for E&W companies while considering the costs to maintain such sewers in the definition of opex would not be appropriate.

We also find that Ofwat measures E&W companies' urban rainfall excluding soil permeability, while Frontier model uses the urban rainfall variable that is not adjusted for soil permeability.[59] In response to our query, Frontier comments that it did not find publicly available information on soil permeability for Ireland and hence could not adjust this driver for UÉ. To align with Ofwat's models at PR24, we use Ofwat's definition of urban rainfall for E&W companies in our RC4 wastewater models.

4.4. Analysis of UÉ's Additional Costs

As well as considering the efficiency of UÉ's costs in aggregate drawing on comparative efficiency analysis, we have also examined its proposals for increases in costs over RC4. As explained in Section 3.1.2, UÉ has identified an increase in costs of €214 million over RC4. These include:[60]

- Compliance driven opex of €40 million, with the substantive elements including road opening licences (ROL, €9 million) and national and scientific and technical services (€15 million).
- UÉT costs of €35 million, mostly relating to the provision of assets and services previously provide by LAs through the central management charge (CMC).
- Externally driven costs of €139million, related to the opex required to operate and maintain new assets.

In relation to compliance driven opex, UÉ has provided evidence for the increase in ROA, with an increase in costs by €9million to €27 million in 2025 based on 50,000 road opening per annum as per historical data.[61] For the national scientific and technical services, UÉ has provided further evidence that the cost increase is a net €8million, allowing for €7million in existing costs and that these costs are net of efficiencies related to out-sourced option of around €3 million.[62]

We discuss UÉ's approach to UÉT costs and externally driven costs below.

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58 Q&A Spreadsheet for look-forward opex, UÉ response to Q34.

59 Ofwat uses Urban rainfall excl. soil permeability – wastewater – MSOA (variable code: BN4507) in the PR24 dataset, while Frontier uses Urban MOSA rainfall (variable code: BN4507B). Source: Ofwat (December 2024), Wastewater network plus base cost (Stata do file).

60 Uisce Éireann Revenue Control 4 (2025-2029) Operating Expenditure Look Forward, Table 3.3., p.

61 UÉ response to Q&A, question 15 & 41

62 UÉ response to Q&A, question 39

4.4.1. Externally driven costs

For Ringsend, following discussions with UÉ, we understand the expected increase in cost is €22 million rather than the submitted €33 million but UÉ states that the reduction is approximately offset by increases in network charges of around €13million.[63] Rather than reducing the allowance, we propose to allow for the additional network charge cost increasing but note that under our proposed true-up mechanism UÉ would not bear cost risk in relation to energy network charges and other energy costs.[64]

For economic growth, UÉT forecasts an increase in population of around 6 to 9 per cent over RC4, based on CSO projections or a 2.8 per cent increases in €14 million or 2.8 per cent of indirect opex, assuming an elasticity of 33 per cent (i.e. 1 per cent increase in population leads to 0.33 per cent increase in indirect opex).[65] Our review of the evidence suggests a slightly lower range of 5-7 per cent, as set out below, where the scenarios reflect different assumptions on net migration.[66] However, in rolling-forward modelled costs, we have accepted UÉ's projections which assume 8 per cent growth and therefore we mitigate risk in relation to growth projections, as we show in Appendix A.4 .

UÉT also forecasts incremental opex of 1.5 per cent of capex. The 1.5 per cent supported by its own review of historical business cases since 2020 and average increment opex, as well as data from Ofwat PR24 process.[67] We have reviewed E&W data; we note that although only a few companies submit data and the variation in terms of opex from capex is wide-ranging, the data broadly supports UÉ's assumption.

4.4.2. UÉT and cost efficiencies

UÉ notes that the UÉT programme will deliver transformational change over RC4 and beyond, delivering efficiencies and service improvements.

In terms of efficiencies, UÉ has included:

63 UE response to Q&A question 40.

64 We will ensure that the additional €13 million network cost allowance is incorporated within the assumed ex ante network charge and therefore incorporated within true-up mechanism.

65 Opex – New costs (January 20-25) UE presentation, slide 12

66 Our review of CSO data supports growth projections of around 5 to 7 per cent over RC4 (with scenarios M1, M2 and M3 based on different assumptions of net migration.

	2024	2030	Change
M1	5370388	5758831	7.2%
M2	5355388	5674843	6.0%
M3	5350384	5596747	4.6%

https://www.cso.ie/en/releasesandpublications/ep/p-plfp/populationandlabourforceprojections2023-2057/populationprojectionsresults/

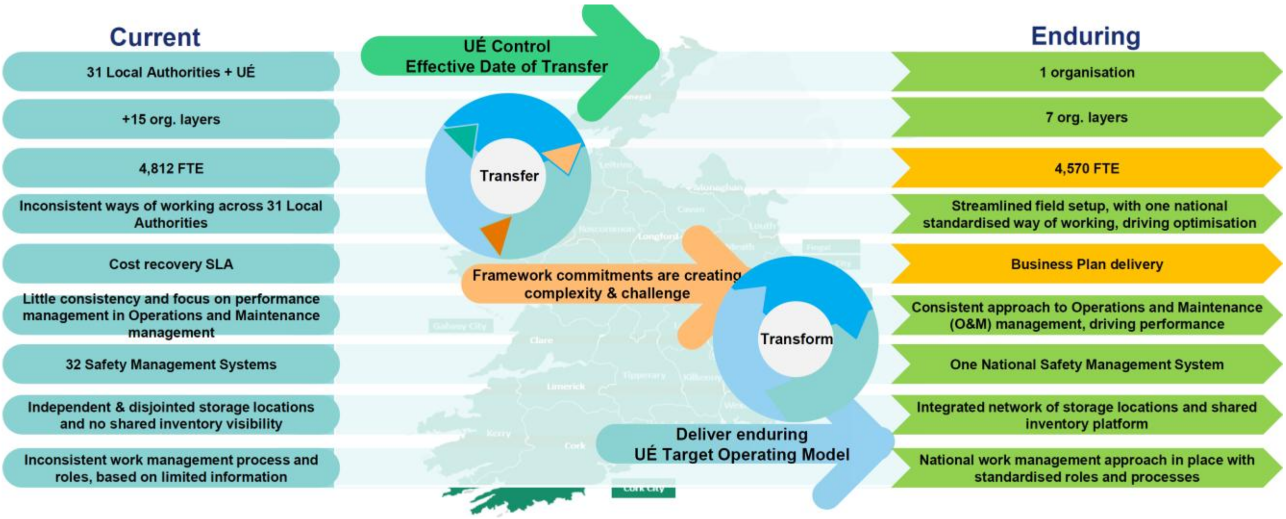
67 Opex – New costs (January 20-25) UE presentation, slide 12

- €16m of cost efficiencies related to the discontinuation of the central management charge (CMC) payment to the LAs. As part of RC3, UÉ discontinued payments of €71million, related to the provision of IT, facilities and HR, previously provided by the LAs.[68] UÉ has identified new enduring costs of €35 million from the UÉT, namely, for new depots and stores, new offices and standardising new ways of working, e.g. telemetry roll-out.[69,70]
- €23m of cost avoidance through a lower headcount, avoiding the necessity to fill vacancies to an original sectoral headcount of 4,812. UÉ has the intention to reduce headcount to 4,570 in the enduring model.[71]

The cost efficiencies associated with the implementation of the UÉT of less than €40 million cumulatively or around 4 per cent of the requested opex of around €1 billion per annum. On the face of it, these cost efficiencies seem modest in the context of the transformational nature of the UÉT and the qualitative assessment of cost improvements set out by UÉT, as summarised in Figure 4.19 and Figure 4.20.

UÉ itself observes that it will introduce a new asset operations structure at the completion of the programme in 2026 and it will then identify new synergies.[72] That is, there is an expectation of further cost savings than those included in the business plan.

Figure 4.19: The UÉT project will transfer and transform water service provision



Source: UÉT Efficiencies (January 2025) UÉT presentation, slide 11

68 Uisce Éireann Revenue Control 4 (2025-2029) Operating Expenditure Look Forward, Section 2.2 p.25

69 Uisce Éireann Revenue Control 4 (2025-2029) Operating Expenditure Look Forward, Section 2.2 p.27

70 The improved efficiency of €16million is calculated as CMC reduction (€71million) less pension transfer (€20 million) less UÉT integration and support costs (€35 million). UE response to Q&A, question 24

71 Uisce Éireann Revenue Control 4 (2025-2029) Operating Expenditure Look Forward, p. 30

72 UE response to Q&A, question 28

Figure 4.20: UÉT includes 6 levers to improve cost performance and quality of service

Efficiency levers*	What's going to change?		What are the benefits?
LEVER 1: ENHANCED SCHEDULING ACTIVITY & INCREASED WORK OPTIMISATION	**Work schedules created** based on most efficient deployment of staff	WM	**Reduced non-productive time travelling**, creating capacity for more work to be completed by fewer people
	Visibility of field force location in Scheduling and Management	WM	Allows more effective deployment of staff to work on-day based on location, **reducing unnecessary travel time**, creating capacity for more work to be completed by fewer people
	Visibility of field force skills, training and equipment in Scheduling and Management	WM	Allows the right resource to fix the issue to be deployed first time, **reducing unnecessary repeat visits**
	Work available to field force on devices, with full schedule visible by start of day	WM	**Reduces wasted time in the field waiting for work**, creating capacity for more work to be completed by fewer people
LEVER 2: TARGETTED PLANNED MAINTENANCE	**Routine tasks & planned maintenance schedules** created	FF	Clarifies the routine work required on sites and assets, **reducing the amount of time** spent carrying out **unnecessary tasks**
	Standard operating procedures produced for asset operation	FF	Standardises the way that assets should be operated & maintained, reducing failure rates of assets linked to incorrect operation/maintenance, **reducing unnecessary work**
LEVER 3: ORGANISATION DESIGN, STREAMING & CREW SIZING	**Standardised crew sizes and required roles** in field force	FF	**Reduces unnecessary time on site**, through people/skills not attending where they are not needed
	Revision of **operational areas & boundaries**	FF	Ensures the most effective boundaries are in place based on site location and travel, as well as enabling more effective deployment of resource, **reducing *unnecessary* travel time**
	Start & finish from home	FF	Reduces wasted travel time to site/depot at start of day, creating capacity for more work to be completed by fewer people
LEVER 4: FULFILMENT OF THE O&M MANAGEMENT STRUCTURE	**Dedicated, streamed and streamlined roles** across O&M management and specialised teams	OM	Time taken to complete tasks is reduced, due to a reduction in the number of repeated touchpoints, handoffs, and work. A flatter management structure is created, by standardising spans of control.
LEVER 5: TRANSFORMATION OF STORES, INVENTORY & LOGISTICS	Central team managing **procurement of spares/materials**	SIL	**Reduces the amount of admin time** for field force manging their own ordering of required spares & materials
	Inventory & stores physical network stood up	SIL	Improves availability of spares and materials and their locality, **reducing unnecessary repeat visits and travel time** to obtain spares & materials
LEVER 6: FLEET TRANSFORMATION	**Vehicles stocked** with standardised critical spares & equipment	SIL FF	Increases the percentage of work that can be completed first time, **reducing unnecessary repeat visits**

KEY:
- WORK MANAGEMENT (WM)
- O&M FIELD FORCE (FF)
- O&M MANAGEMENT (OM)
- STORES, INVENTORY & LOGISTICS (SIL)

'Levers of efficiency' taken from the 'Analysis of efficiencies in the transformation v1.3' document

Source: UÉT Efficiencies (January 2025) UÉT presentation, slide 23

In term of further capex, UÉ has requested €16.3 million to support the UÉT in 2025, which if incurred will bring total funding to around €90 million (2017 prices), with no further funding in RC4.[73]

4.4.3. Wider efficiencies

Aside from UÉT related efficiencies, the business plan includes efficiencies of only €7million outside of the UÉT, in relation to IT and DBO costs.[74] In some key areas, the plan does not appear to contain improvements for cost performance.

For example, UÉ has ambitions to decrease energy costs by 25GWh over RC4 from around 400GWh p.a., i.e. by around 6 per cent.[75] This will be achieved by the upgrading and replacement of assets (e.g. pump replacement) as well as installation of PV. This reduction will also be achieved in the context of a growing asset base and therefore demand for energy. As a public body, UÉ is also bound by specific climate action targets, namely 50 per cent improvement in energy efficiency; 51 per cent reduction in greenhouse gases by 2030.[76] We understand that the plan does not include the expected cost reductions from the reduction in energy demand.[77]

For goods and services, which reflect the direct costs of operations, excluding energy and labour and which are materially increasing over RC4, as shown in Figure 3.3, UÉ does not expect UÉT to secure further efficiencies. UÉ notes that a national approach has been taken to water services

73 UÉT Efficiencies (January 2025) UÉT presentation, slide 26

74 Uisce Éireann Revenue Control 4 (2025-2029) Operating Expenditure Look Forward, p.29, Table 3.4

75 UE response to Q&A, question 23

76 Uisce Éireann Revenue Control 4 (2025-2029) Operating Expenditure Look Forward, section 2.2 p.15

77 UE response to Q&A, question 23

since 2013 which has delivered significant savings related to national procurement frameworks, optimisation of goods and services through improved processes and overheads/contract review.[78]

Finally, we note that UÉ has not included any improvements in on-going efficiency or productivity improvements. In recent regulatory decisions, regulators in Great Britain have set an on-going efficiency challenge of around 1 per cent. For example, Ofwat applied a 1 per cent p.a. efficiency challenge to ex-ante totex ("frontier shift efficiency") based on productivity growth in comparable industries. Similarly, the Utility Regulator (UR) in Northern Ireland has most recently set an annual efficiency challenge of 0.8 per cent p.a. in its PR21 decision for water and sewerage. We summarise recent regulatory precedent on on-going efficiency in Table 4.10.

Table 4.10: Recent Regulatory Precedent on On-going Efficiency Challenge

Regulator	Price review	On-going efficiency challenge, % p.a.
CAA (GB)	Heathrow H7 (Airport), 2022-26	1% (opex)
CMA (GB)	Water & Sewerage PR19, 2020-24	1% (totex)
Ofwat (GB)	Water & Sewerage PR19, 2020-24	1.1% (totex)
Ofwat (GB)	Water & Sewerage PR24, 2025-29	1% (totex)
Ofgem (GB)	Electricity distribution RIIO-ED1, 2016-23	0.8%-1.1% (totex)
Ofgem (GB)	Electricity distribution RIIO-ED2, 2023-28	1.0% (totex)
Ofgem (GB)	Electricity transmission RIIO-T2, 2021-26	1.25% (opex)
UR (NI)	Water & Sewerage PC15, 2015-21	0.9% (opex)
UR (NI)	Water & Sewerage PC21, 2021-25	0.8% (opex)

Source: CEPA (28 June 2024), PR24 Draft Determinations, Frontier Shift, Real Price Effects and the energy crisis cost adjustment mechanism, p.82, Table 4.8. Ofwat (20 December 2024), PR24 final determinations: Expenditure allowances, p.13.

4.4.4. Real Price Effects

UÉ has included some reductions in expected real prices over the RC4 period of €52 million mainly in relation to an expected reduction in energy costs following a fall in wholesale energy market prices in Ireland, offset by a modest increase in labour RPEs of €4 million.[79]

The reduction in the energy costs reflects expected forward curves at the time of the business plan submission; however, UÉ's energy costs will not directly follow wholesale markets given that UÉ hedges future positions.[80] For DBOs, around 50 per cent of the base cost is linked to the wholesale price index (WPI) with the CSO electricity index reflecting 40 per cent weighting within the WPI – the other elements comprising labour, chemicals etc.[81]

[78] UE response to Q&A, question 24

[79] Uisce Éireann Revenue Control 4 (2025-2029) Operating Expenditure Look Forward, p. 19

[80] For example, UE hedges 100 per cent of energy at least 9 months and up to 12 months ahead. UÉ response to Q&A, question 21

[81] Uisce Éireann Revenue Control 4 (2025-2029) Operating Expenditure Look Forward, p. 17

4.5. Conclusions on Efficient Level of Operating Costs

UÉ has made substantive improvements in cost performance but we estimate costs remain ca 6 per higher than modelled cost

To date, UÉ has made substantive progress in reducing its operating costs in the face of upward cost pressure. However, our analysis suggests that UÉ's business plan opex is still higher than predicted by econometric modelling that compares the company's costs with those of its E&W peers.

Specifically, we do not find UÉ as efficient as Frontier concludes in its analysis. Frontier estimates UÉ's water opex is on average 27per cent lower than the benchmark, while wastewater costs are on average 11 per cent higher than its models predicted costs. As discussed above, we have improved Frontier's models by considering additional drivers (e.g. different measures of density) and the use of the time dummies. We find that, over RC4, UÉ's opex is on average 3 per cent efficient in water (see Table 4.5), while wastewater costs are on average 16 per cent higher than the costs faced by the benchmark (see Table 4.8) or approximately 6 per cent less efficient than the average company overall.

There are reasons to believe that our comparative efficiency analysis is indeed conservative and shows UÉ in a relatively favourable light. For example:

- While other regulators calculate efficiency as relative to the upper-quartile efficient company, we measure efficiency relative to average modelled costs;
- UÉ is likely to incur lower costs than E&W peers as it catches up in terms of levels of service quality, and levels of water and wastewater compliance, with higher energy and chemical costs;
- Any process of asset rationalisation and consolidation over the period to 2050 is likely to reduce costs. For example, rationalisation of wastewater treatment works would result in fewer sites, but of larger size, in Ireland that will benefit from economies of scale.[82]

Our modelled cost does not incorporate expected reduction in input prices or on-going efficiency. Including these effects suggests costs could be up to 16 per cent lower by end of regulatory period

UÉ projects a total cost reduction over RC4 equivalent to around 5 per cent of total opex due to RPEs at the end of the control period (i.e. €52m, see Figure 3.4), while our model considers opex pre-2025 and therefore does not take into account the RPE forecasts. This suggests that UÉ efficient costs should reduce by a further 5 per cent by the end of RC4 than predicted by our model to take into account RPEs. That is, if we adjust our modelled costs by the expected reduction in RPE's, the overall efficiency gap relative to the adjusted modelled costs would be 11 per cent on average across both services.

Thus, combined with UÉ's RPE forecast, we estimate that UÉ's business plan is on average 11 per cent inefficient across the two services by the end of the period. We note that if the reduction in

[82] The negative coefficient for WATS in one of our wastewater models, wastewater efficient costs are expected to reduce as the size of the treatment sites increase, holding everything else fixed.

input prices does not materialise, then UÉ's expenditure allowances will be adjusted under our proposed true-up mechanism for energy and DBO costs.

UÉ has not included any improvements in on-going efficiency or productivity improvements. For example, Ofwat applied a 1 per cent p.a. efficiency challenge to ex-ante totex ("frontier shift efficiency") based on productivity growth in comparable industries.[83] Including an improvement in ongoing efficiency suggests that UÉ's costs are approximately 16 per cent higher than the efficient level by the end of RC4.

We set out two scenarios for reductions in costs towards the end of the RC4 period,

We propose two scenarios for the reduction in UÉ's costs. Both scenarios recognise that UÉ is undergoing a transitional period during 2025 and 2026 with the implementation of the UÉT and therefore we do not impose any cost reductions for the first two years. Rather, we assume UÉ can realise further substantive improvements in cost efficiency post 2026, and therefore we profile a reduction in costs for the final three years of the control periods as follows:

- **Scenario 1 ("benchmarking scenario")**: A 16 per cent reduction relative to UÉ's submission in 2029. The reduction is based on a reasonable interpretation of our comparative efficiency modelling, including adjustments for RPEs and on-going efficiency, as described above. We profile the reduction as a step reduction of 8 per cent in 2027, 12 per cent in 2028 and 16 per cent in 2029.
- **Scenario 2 ("UET Stretch")**: .As we explained above, UE includes relatively minimal cost efficiencies in its plan given the transformational nature of the UET. Also, the plan does not include any improvements for on-going efficiency. Taking these factors together, we assume it can achieve a 10 per cent reduction relative to UÉ's submission in 2029. We profile this reduction as an improvement of 5 per cent in 2027, 7.5 per cent in 2028 and 10 per cent in 2029.

Table 4.11 shows RC4 operating costs under both scenarios. As shown, we calculate a total RC4 operating cost allowance (i.e., including non-controllable and innovation funded opex) of €4,883m under Scenario 1 and €5,018m under Scenario 2, which is 7 per cent and 4 per cent lower than UÉ's request, respectively.

[83] Ofwat, PR24 final determinations: Expenditure allowances, dated February 2025, p.261

Table 4.11: NERA Proposal for Efficient RC4 Operating Costs under Scenario 1 and Scenario 2 (€m 2022 prices)

		2025	**2026**	**2027**	**2028**	**2029**	**Total**
A	Non-controllable opex	62	67	68	69	70	337
B	Innovation funded opex	0	1	2	2	1	5
C	Controllable opex - UÉ submission	941	977	979	990	1013	4,900
D	Controllable opex - Scenario 1	941	977	901	871	851	4,541
E	Controllable opex - Scenario 2	941	977	930	916	911	4,675
A + B + C	Total opex - UÉ submission	1,003	1,046	1,050	1,061	1,083	5,242
A + B + D	**Total opex - Scenario 1**	**1,003**	**1,046**	**971**	**942**	**921**	**4,883**
A + B + E	**Total opex - Scenario 2**	**1,003**	**1,046**	**1,001**	**986**	**982**	**5,018**

Note: figures may not add due to rounding
Source: NERA-analysis of UÉ BPQ

5. Summary of Our Proposals for Capex and Overall Revenue Allowance

5.1. Arcadis capex scenarios

In a separate report, Arcadis assessed efficient capex over RC4. Table 5.1 sets out Arcadis' view of efficient RC4 capex levels based on its cost assessment. As shown, Arcadis identified two capex profiles based on different cost challenge scenarios; "Scenario 1" includes a 10 per cent cost challenge and "Scenario 2" a lower, 5 per cent challenge. Both scenarios include an additional adjustment for an ongoing efficiency (OE) challenge and expected real-price effects (RPEs) over RC4.

Table 5.1: Arcadis Proposal for Efficient RC4 Capital Expenditure under Scenario 1 and Scenario 2 (€m 2022 prices)

	2025	2026	2027	2028	2029	Total
Scenario 1 (10% cost challenge)						
UÉ Submission	1,220	1,249	1,467	2,067	2,558	8,561
After 10% Cost Challenge	1,175	1,202	1,413	1,990	2,463	8,243
Post OE & RPE Adjustment	1,159	1,171	1,359	1,890	2,309	7,888
Scenario 2 (5% cost challenge)						
UÉ Submission	1,220	1,249	1,467	2,067	2,558	8,561
After 5% Cost Challenge	1,197	1,225	1,440	2,029	2,510	8,402
Post OE & RPE Adjustment	1,181	1,194	1,385	1,927	2,354	8,040

Source: Received from Arcadis, 19 May 2025
Note: Figures are total capex - i.e., network and non-network capex

5.2. Proposed RC4 revenue allowance

Table 5.2 shows total allowed revenues over RC4 based on two scenarios which combine our opex scenarios with Arcadis' capex scenarios. The first scenario ("Scenario 1") is based on the more ambitious cost reduction scenarios, i.e., i) controllable opex as per our Scenario 1 ("benchmarking scenario"), ii) capex as per Arcadis' Scenario 1 (i.e., a 10% cost challenge), and iii) our "Option 2" k-factor adjustment, which we describe in our separate look-back report.[84] The second allowed revenue scenario ("Scenario 2") is based on the less ambitious cost reduction challenges, i.e., i) controllable opex as per our Scenario 2 ("UET Stretch"), ii) capex as per Arcadis' Scenario 2 (i.e., a 5 per cent cost challenge), and our "Option 1" k-factor adjustment, which returns more monies to UÉ.

[84] See NERA (17 September 2025), Review of UÉ's RC3 Operating Cost Performance and K-factor Adjustments. As set out in the look-back report, our Option 2 k-factor does not fund UÉ for additional energy costs in 2021 and 2022, resulting in a total upward adjustment to allowed revenues of €119.7m (2017 prices, PV 2025 terms). Under Option 1, UÉ is funded for the additional energy costs while outperformance on controllable opex is returned to customers, resulting in a higher k-factor of €222.3m (2017 prices, PV 2025 terms).

As shown, total allowed revenues are €8,250m over RC4 under Scenario 1 which is a €569m reduction relative to UÉ's submission (i.e., a 6 per cent reduction). Under Scenario 2 scenario, allowed revenues are €292m lower compared to UÉ's submission (i.e., a 3 per cent reduction).

Table 5.2: RC4 Allowed Revenues under Efficient Cost Scenarios 1 and 2 (€m 2022 prices)

	2025	2026	2027	2028	2029	Total
UÉ Submission	1,516	1,728	1,791	1,858	1,926	**8,819**
Arcadis/NERA Scenario 1 (greater cost reduction)	1,514	1,593	1,652	1,713	1,777	**8,250**
Arcadis/NERA Scenario 2 (lower cost reduction)	1,515	1,659	1,720	1,784	1,850	**8,527**

Source: NERA-analysis of UÉ populated funding model (240913 RC4 Revenue Model - UÉ calcs received on 19 March 2025.xlsx)
Note: To illustrate revenue impact of cost reductions only i) all figures use 3.69% WACC as per estimate in NERA WACC report and ii) Arcadis/NERA scenario figures do not include CRU's minded-to proposal on revenue reprofiling and may therefore differ slightly from revenue figures in CRU documents

Appendix A. Opex Econometric Benchmarking

This Appendix will set out more details of our opex econometric benchmark modelling in relation to controlling for regional wage differences, and pumping head for both water and wastewater.

We also include the forecast for cost drivers.

A.1. Our Approach to Control for Regional Differences

We describe Frontier's approach to adjust E&W companies' labour costs to make them comparable to UÉ, and we summarise our proposed changes.

Frontier applies a regional wage adjustment to normalise the wage levels in Ireland and the UK. We summarise Frontier's approach in four steps:[85]

- **Step 1: Collecting regional wages**. Frontier constructs regional wages by computing an average wage from relevant industries in Ireland and in the UK. For UÉ, Frontier calculates a weighted-average wage based on a 60 per cent weighting on construction (CSO hourly earnings, NACE sector C) and a 40 per cent weighting on professional, scientific, and technical activities (CSO hourly earnings, NACE sector M).[86,87] For E&W companies, Frontier uses the ONS earnings data, with a 60 per cent weighting on "skilled construction and building trades" and a 40 per cent weighting on "science, research, engineering and technology professionals".[88] The available E&W wage dataset covers 2016 to 2023. Frontier then normalised the wages into real 2022 euros.
- **Step 2: Mapping regional wages to the companies**. For the E&W companies, Frontier calculates the average wages for each company based on Ofwat's mapping of water and wastewater companies at the regional level.[89]
- **Step 3: Calculating regional wage adjustment factor**. For each year and company, Frontier takes the ratio between the regional wage in UÉ and the regional wage in that company. This implies that the factor for UÉ is 1 (i.e. no adjustment), and the factor for an E&W company whose regional wage equals 84 per cent of UÉ, the company's factor is 1.19 (1.0/0.84) (i.e. upward adjustment). Frontier then calculates a single regional wage adjustment factor for each company by taking the average of the ratios for that company from 2016 to 2023.
- **Step 4: Applying the regional wage adjustment to companies' labour proportion of opex**. In the last step, Frontier applies the regional wage adjustment factors to the share of opex that

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85 Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report, p.38.

86 In its report, Frontier states that it applies a 60 per cent weighting on professionals and a 40 per cent weighting on construction. This is inconsistent with the actual weightings used in the modelling (i.e. 40 per cent on professionals and 60 per cent on construction). Here we align with the weightings in Frontier's modelling.

87 CSO (2024) Data on average hourly earnings by sector. URL: https://data.cso.ie/table/EHQ03.

88 ONS (2024) Data on average hourly earnings by sector. URL: https://www.ons.gov.uk/datasets/ashe-tables-3/editions/time-series/versions/4.

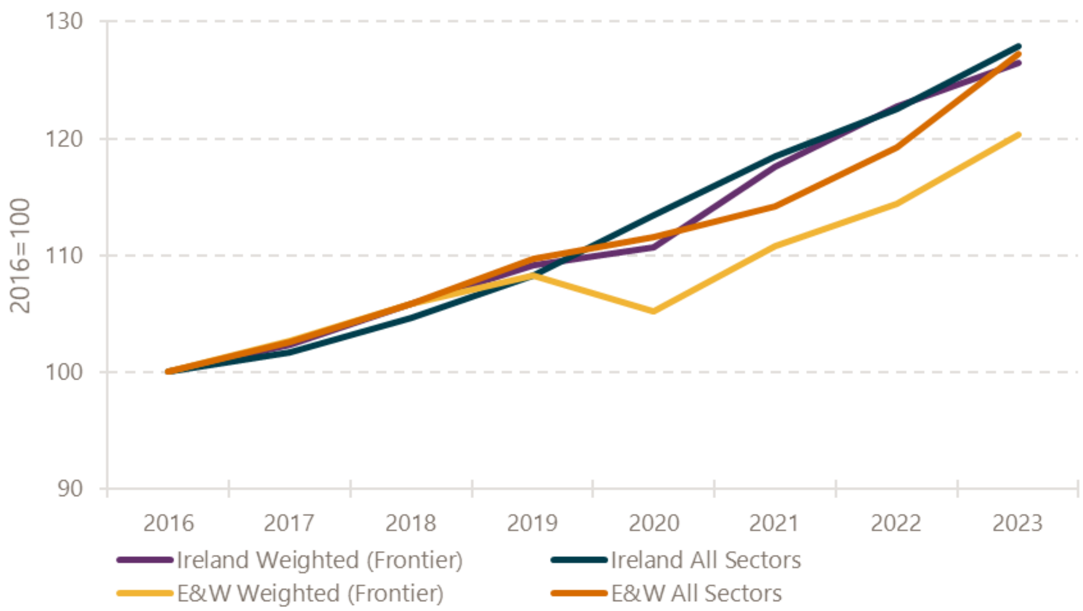
89 Ofwat (2022) Publication density estimates by MSOA. URL: https://www.ofwat.gov.uk/publication/population-density-estimates-using-middle-super-output-area-population-estimates/.

corresponds to labour costs. At RC4, Frontier assumes that the share of labour costs in the water service is 30 per cent, and 40 per cent in wastewater service.

Frontier's method is broadly in line with the CRU's RC3 approach, with a weighted-average wage for each region and deriving a regional wage adjustment factor for each company. In addition, we understand that Frontier's choice of wage data series and the corresponding weightings (i.e. 60 per cent on construction and 40 per cent on professionals) inherits from previous price controls, where CRU aligned with Ofwat to calculate regional wages.[90]

Figure A.1 below compares the regional average wage calculated using Frontier's weighted measure with all-sector general wages. At the general level, since 2016, E&W wages have increased at a significantly lower rate than Irish wages as suggested by the weighted measure. Thus, if general wages were to be used instead of Frontier's measure, the gap between Irish and E&W wages would not be as wide.

Figure A.1: Comparison of Regional Average Wages between Ireland and E&W Regions, Weighted Index (Frontier approach) vs All-Sector Index, 2016=100



Note: The comparison is net of any impact from exchange rate.
Source: NERA analysis of wage indices in Ireland and in England and Wales.

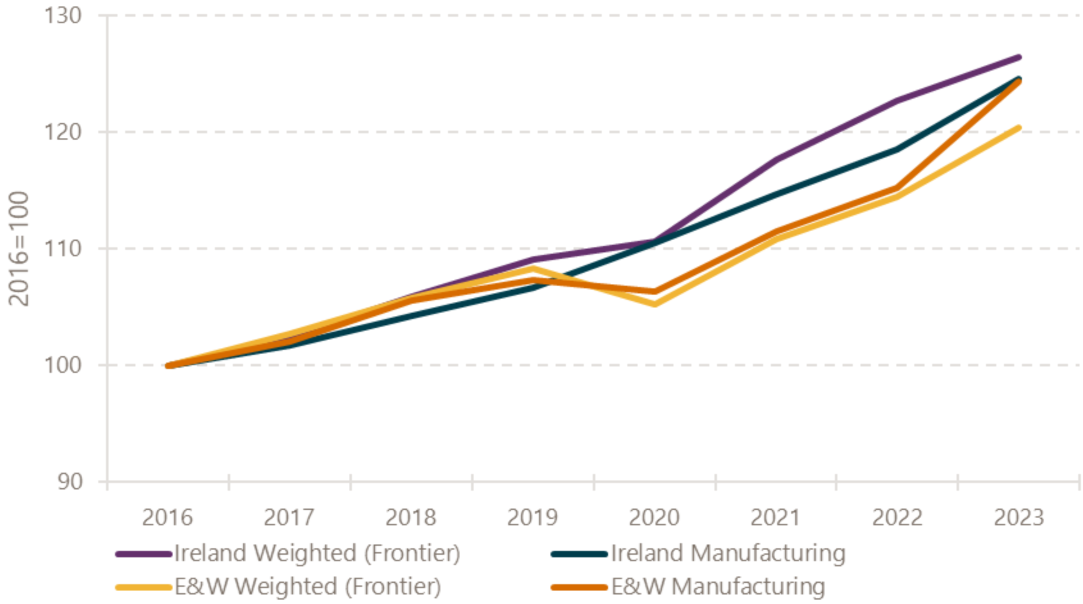
At PR24, as it did at PR19, Ofwat does not apply a regional wage adjustment to E&W companies when assessing their cost efficiency. However, when applying an ex-post true-up between forecast

[90] At PR14, Ofwat calculated regional wage indices drawing on ONS ASHE "average regional hourly earnings by occupation category (2-digit SOC level)" data, weighting 60 per cent on "Skilled: 53 – Skilled Construction and Building Trades" and 40 per cent on "Specialist: 21 – Science, Research, Engineering and Technology Professionals". At IRC2, NERA calculated the regional wage for UÉ following the procedure adopted by Ofwat, based on CSO's "Earnings and Labour Costs" data. At the time, NERA placed a 60 weighting on "F – Construction" and a 40 per cent weighting on "M – Professional, scientific and technical activities". We understand that Frontier's selection of indices and weightings is consistent with the IRC2 calculation described above. Source: NERA (May 2016), IW IRC2 (2017-18) Assessment – Annex Econometric Benchmarking, p.26.

and outturn wage growth as part of the real price effects for wholesale base labour costs, Ofwat uses the ONS ASHE manufacturing wage index to track wholesale labour costs for the industry.[91]

Figure A.2 below illustrates a comparison of how Irish and E&W regional wages have changed since 2016 using the weighted average of construction and professionals indices and using the manufacturing index. While both measures show that the wage level in Ireland has grown at a significant higher rate than in England and Wales, the gap in wage levels has grown less when using manufacturing wages.

Figure A.2: Comparison of Regional Average Wages between Ireland and E&W Regions, Weighted Index (Frontier approach) vs Manufacturing Index, 2016=100



Note: The comparison is net of any impact from exchange rate.
Source: NERA analysis of wage indices in Ireland and in England and Wales.

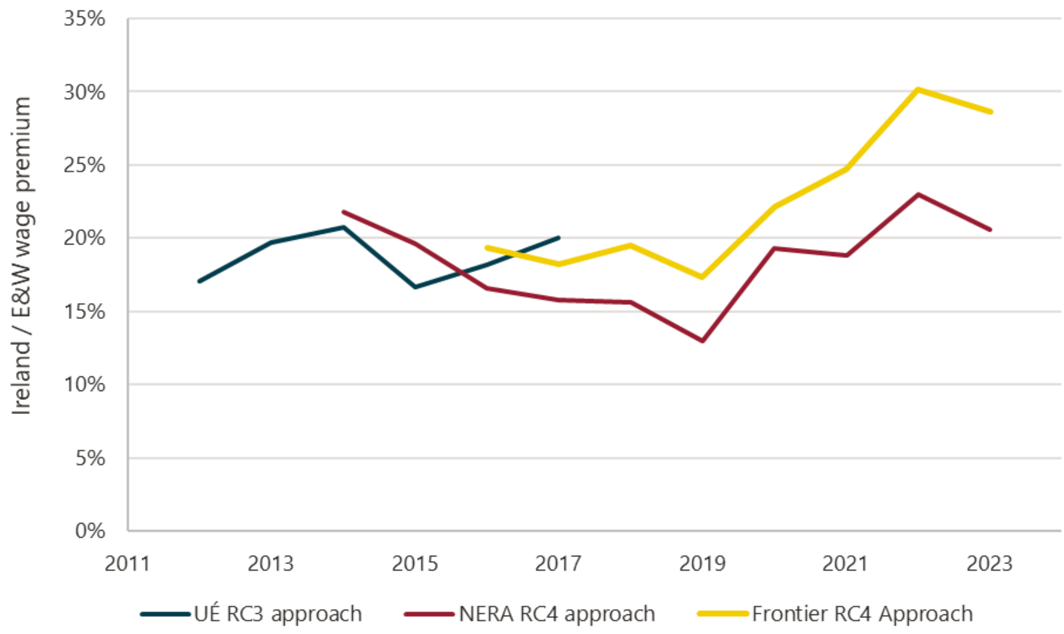
Thus, as shown in Figure A.3, using our preferred index, the gap between wages in Ireland and E&W is reduced compared to Frontier's approach. Specifically, using Frontier's weighted index, the wage premium between Ireland and E&W has increased from 19 per cent in 2016 to 29 per cent in 2023. Using instead the manufacturing series, we find that wages in Ireland are 17 per cent higher than in E&W in 2016, while 21 per cent in 2023.

Because Frontier adjusts upward E&W labour costs to make them comparable to its Irish counterpart, using a series that overstates the wage difference between the two jurisdictions shows UÉ in a better light in terms of efficiency. Consistent with our wider approach, we draw on the measure adopted by Ofwat (in the context of ex-post real wage adjustment), using instead the manufacturing index. Thus, for E&W companies, we collect the equivalent earnings and hours

91 Ofwat uses ONS ASHE Manufacturing mean hourly earnings, gross pay including overtime ("Earnings and hours worked, industry by four-digit SIC: ASHE Table 16.5a"). Source: Ofwat (December 2024), PR24 final determinations: Expenditure allowances, p.273-274.

worked index for manufacturing from ONS as used by Ofwat, but with further differentiation across UK regions.[92] For UÉ, we use the CSO average hourly earnings for the manufacturing industry.[93,94]

Figure A.3: Regional wage adjustment: NERA approach compared to Frontier one



Source: NERA analysis of wage indices in Ireland, and in England and Wales.

A.2. Adding Average Pumping Head to Water Models

In its PR24 Final Determination, Ofwat considered two alternative measures to capture companies' network topography for its wholesale models: (1) booster pumping stations per length of mains, and (2) average pumping head (APH).[95] Ofwat argues there are merits and drawbacks associated with each measure. Explaining its introduction of the APH into the PR24 models, Ofwat notes that "APH has a better engineering rationale as it is a more direct measure of pumping requirements [than boosters per length of main]. But APH data quality remains lower than booster pumping stations despite improvements made since PR19" as not all APH data is measured but part of it is estimated by companies.[96]

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92 ONS ASHE Earnings and Hours Worked, UK Region by Industry by Two-Digit SIC: ASHE Table 5, C: Manufacturing, Hourly pay – Excluding overtime. URL: Earnings and hours worked, UK region by industry by two-digit SIC: ASHE Table 5 - Office for National Statistics. Accessed on 5th February 2025.

93 CSO Average Earnings, Hours Worked, Employment and Labour Costs, Manufacturing (C). Provided in Frontier's modelling suite.

94 Both data series are available back to 2014, and hence we calculate the regional wage adjustment factor for each company by taking the average of factors from 2014 to 2023. On other aspects of the regional wage adjustment, we keep the same method as in Frontier's calculation.

95 Ofwat (December 2024), PR24 final determinations, Expenditure allowances – base cost modelling decision appendix, p. 23.

96 Ofwat (July 2024), PR24 Draft Determinations Expenditure Allowances – Base Cost Modelling Decision Appendix, p. 21.

The number of booster pumping stations per length of mains is the measure Ofwat used previously at PR19. Ofwat considers that "Booster pumping stations has better data quality than APH [...] But it has weaker engineering rationale than APH as it only counts the number of boosters" and it "is used as an imperfect proxy for pumping requirements".[97]

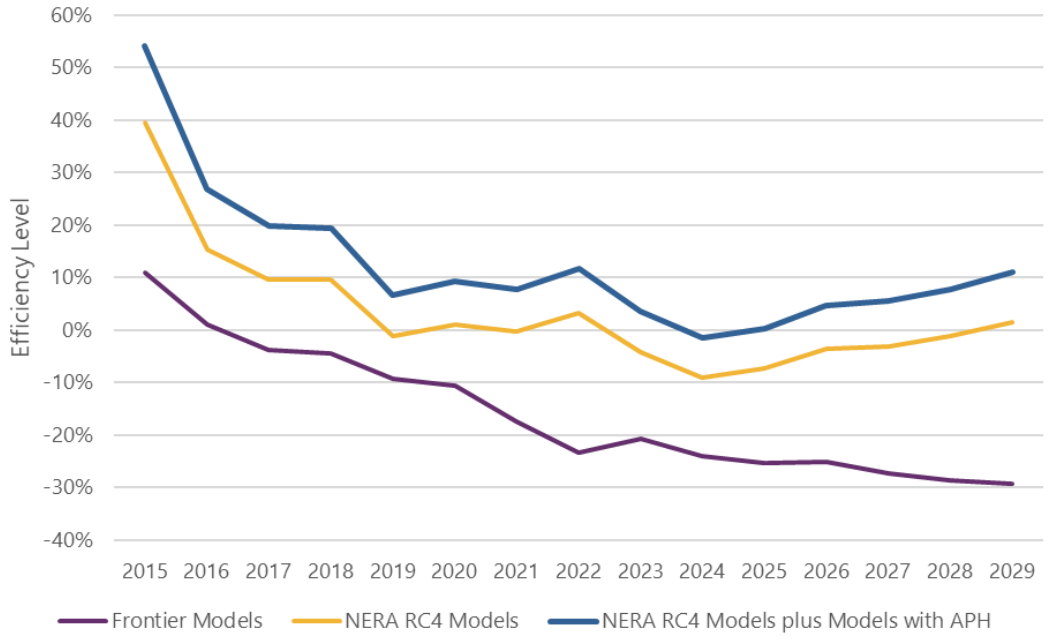
Based on these considerations, Ofwat includes each measure in a subset of its proposed wholesale models, and triangulates the modelling results from the respective models to form a view on companies' efficient costs, placing a 50 per cent weight on models using each measure to control for pumping costs.

In our econometric models used to assess UÉ's efficiency, we have only relied on booster pumping stations per length of mains, thus ignoring the effect of APH on companies' costs. This is because we understand data for UÉ is not available on APH. However, as a sensitivity, and to allow us to use all twelve wholesale water models used by Ofwat at PR24, we test the effect of introducing an additional important driver of water companies' costs. To do so, we make assumptions on UÉ's APH: we assume that UÉ's APH is equivalent to the E&W's average APH in each year. Figure A.4 shows that, by using the full suite of Ofwat's models, UÉ's efficiency reduces by approximately 5 per cent compared to our RC4 models that rely instead only on number of boosters (see Table 4.4).

However, because we need to make assumptions on UÉ's APH, we do not use these models to inform our efficiency assessment. In addition, as shown on Table A.3, once APH is included in the regression, the coefficient for weighted average treatment complexity become counterintuitively negative in two models.

97 Ofwat (July 2024), PR24 Draft Determinations Expenditure Allowances – Base Cost Modelling Decision Appendix, p. 21-22.

Figure A.4: Using APH as a driver in the model reduces UÉ's efficiency



Source: NERA analysis of UÉ and Ofwat data.

Table A.3: Average pumping head sensitivity: regression results

	NERA Model 7	NERA Model 8	NERA Model 9	NERA Model 10	NERA Model 11	NERA Model 12
Log Connected properties	1.041***	1.058***	1.056***	1.064***	0.984***	0.978***
Log APH	0.181***	0.258***	0.186***	0.247***	0.100**	0.072*
Log of Weighted average treatment complexity		-0.322**		-0.353***		0.328***
% of Water treated at complexity levels 3 to 6	0.001		-0.001		0.002**	
Log of Density 1 (Properties per length)					-5.998***	-6.717***
Log of Density 1 squared (Properties per length)					0.662***	0.741***
Log of Density 2 (LAD from MSOA)	-1.455***	-1.667***				
Log of Density 2 squared (LAD from MSOA)	0.094***	0.109***				
Log of Density 3 (MSOA)			-5.821***	-6.420***		
Log of Density 3 squared (MSOA)			0.349***	0.389***		
2013	0.008	0.008	0.01	0.009	0.007	0.008
2014	0.019	0.02	0.024	0.023	0.02	0.021
2015	0.104	0.1	0.099	0.094	0.058	0.058
2016	0.254***	0.261***	0.255***	0.258***	0.207***	0.200***
2017	0.312***	0.328***	0.318***	0.328***	0.260***	0.250***
2018	0.349***	0.368***	0.357***	0.368***	0.300***	0.287***
2019	0.461***	0.477***	0.471***	0.480***	0.396***	0.382***
2020	0.466***	0.484***	0.476***	0.486***	0.402***	0.387***
2021	0.446***	0.465***	0.457***	0.468***	0.383***	0.367***
2022	0.526***	0.550***	0.538***	0.554***	0.463***	0.444***
2023	0.550***	0.584***	0.573***	0.597***	0.531***	0.512***
2024	0.550***	0.584***	0.573***	0.597***	0.531***	0.512***
Constant	8.474***	9.168***	26.940***	29.271***	17.471***	18.958***
N	230	230	230	230	230	230
R squared	0.938	0.941	0.948	0.952	0.96	0.962

Source: NERA analysis of UÉ and Ofwat data.
Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

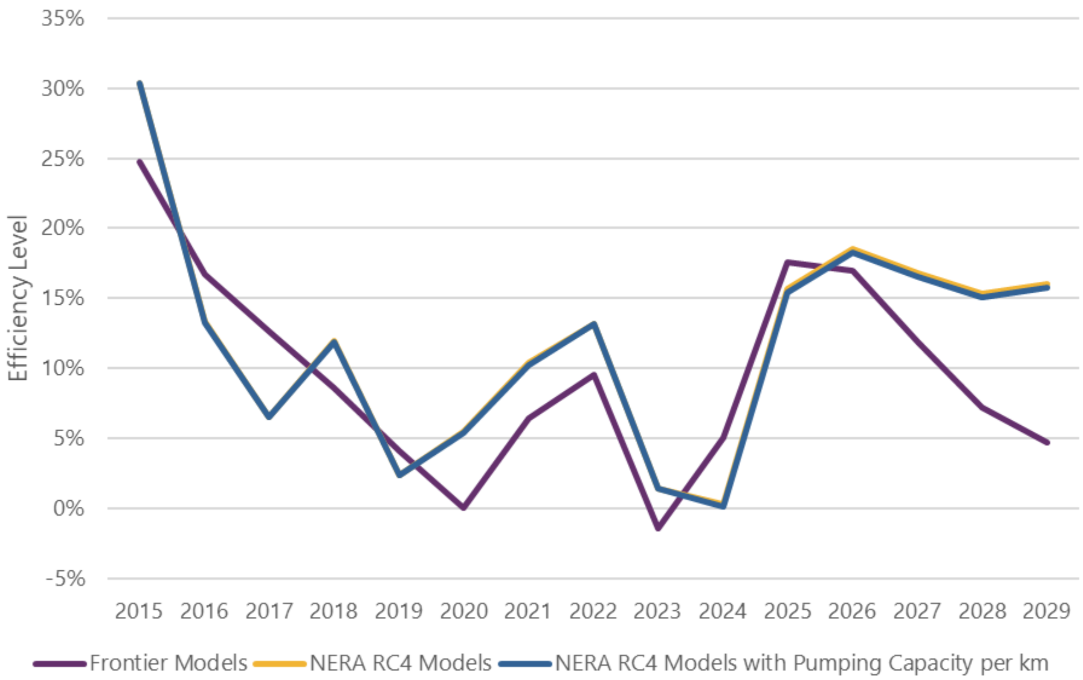
A.3. Testing Pumping Capacity per Sewer Length in Our Wastewater Models

In its PR24 wastewater network plus models, Ofwat relies on pumping capacity per sewer length to capture network topography, recognising its "strong engineering, operational and economic rationale".[98] Because of data availability, Frontier uses pumping stations per sewer length in its models as a proxy for pumping capacity, arguing that "this is an imperfect proxy as the average capacity of pumping stations in Ireland vs E&W could be different, meaning energy costs per pumping station may not be directly comparable".[99]

As we have done for water (see Appendix A.2), we also test the effect on wastewater companies' costs of adding an important driver of costs as pumping capacity. However, as for APH, we need to make assumptions about UÉ's pumping capacity: we assume its pumping capacity is equivalent to the average of the capacity observed in E&W in each year.

Figure A.5 below shows that adding pumping capacity per km to our two wastewater models only marginally improves UÉ's efficiency by around 1 per cent when compared to our preferred RC4 models that exclude the pumping capacity driver.

Figure A.5: Adding pumping capacity per km to wastewater models does not have a significant impact on UÉ's efficiency when compared to our preferred RC4 models



Source: NERA analysis of UÉ and Ofwat data.

However, because we need to make assumptions on UÉ's pumping capacity, and the estimated coefficient for pumping capacity per sewer length is not statistically significant (see Table A.4), we do not use these models to inform our efficiency assessment.

98 Ofwat (December 2024), PR24 final determinations, Expenditure allowances – base cost modelling decision appendix, p. 35.

99 Frontier Economics (January 2025), Benchmarking UISCE ÉIREANN's Opex for RC4, Final report, p.34.

Table A.4: Pumping capacity per sewer length sensitivity: regression results

	NERA Model 3	NERA Model 4
Log Total Load	0.887***	0.684***
Load treated with ammonia consent ≤ 3mg/l	0.002***	0.005***
Log Urban rainfall per sewer length	0.049**	0.119***
% of Load treated in size bands 1 to 3	0.059***	
Log Weighted average treatment size		-0.114***
Log Pumping capacity per sewer length	0.098	-0.049
2013	0.041	0.003
2014	0.081	0.052
2015	0.092*	0.065
2016	0.203***	0.169**
2017	0.256***	0.238***
2018	0.222***	0.190***
2019	0.298***	0.274***
2020	0.283***	0.234***
2021	0.339***	0.292***
2022	0.367***	0.340***
2023	0.385***	0.355***
2024	0.504***	0.452***
Constant	7.589***	11.723***
N	140	140
R_squared	0.942	0.909

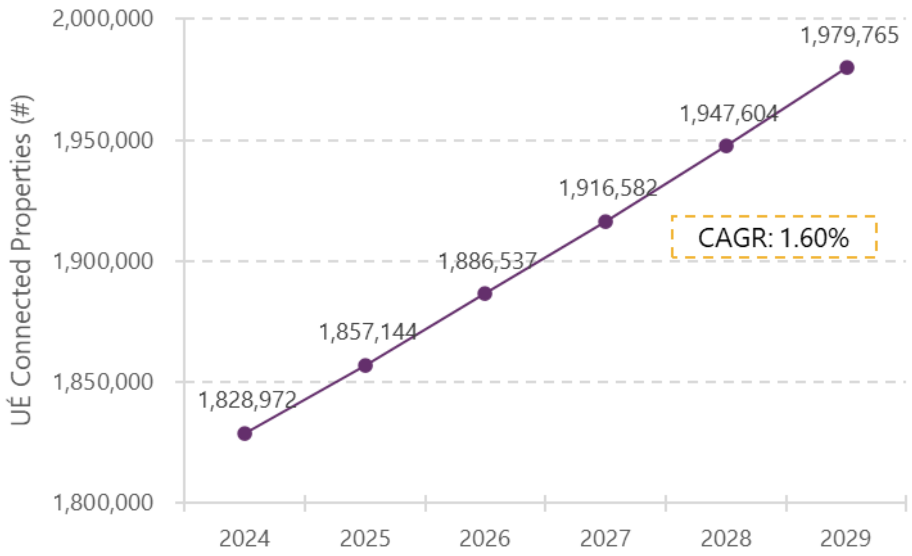
Source: NERA analysis of UÉ and Ofwat data.
*Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.*

A.4. Forecast Cost Drivers

In determining modelled costs and our proposed cost allowances for UÉ, we have adopted UÉ's forecasts for connection growth and other cost drivers which explain UÉ's costs, as per the Tables below.

Figure A.6 below illustrates UÉ's forecasted number of water connected properties, reflecting an total growth of 8.24 per cent from 2024 to 2029, or a CAGR of 1.60 per cent.

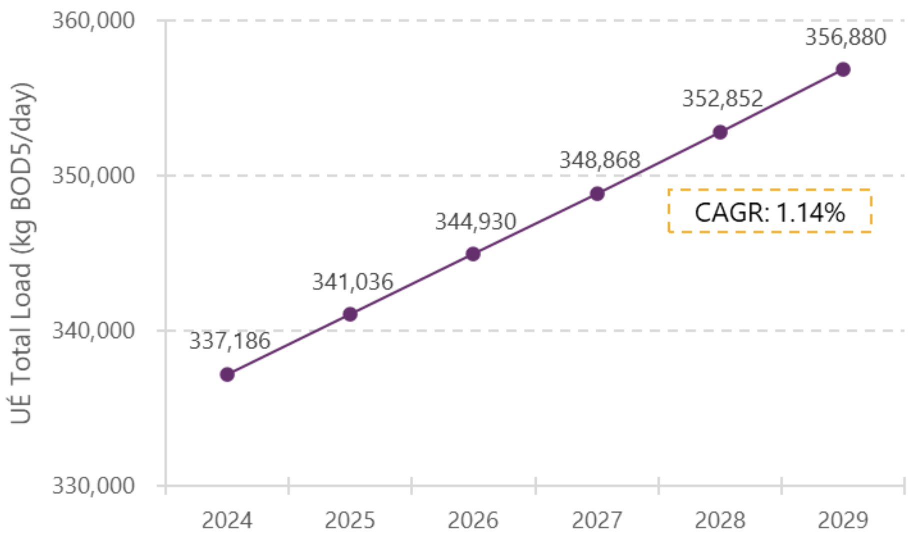
Figure A.6: UÉ water connected properties forecasts 2024-2029



Source: NERA analysis of UÉ data.

Figure A.7 below shows UÉ's forecasted total load (used as the scale driver in wastewater models) from 2024 to 2029. Total load is expected to increase by 5.84 per cent, or a CAGR of 1.14 per cent, over the forecast period.

Figure A.7: UÉ total load forecast 2024-2029



Source: NERA analysis of UÉ data.

Appendix B. Capital Maintenance Econometric Benchmarking

B.1. Overview of UÉ's proposed RC4 capital maintenance expenditure

UÉ's proposed designated capital maintenance programmes have a total proposed investment of €739m over RC4, with €273m invested in water and €466m invested in wastewater.

Table B.1 below shows the list of designated capital maintenance programmes at RC4. Most of the proposed programmes has an estimated completion time during RC4, except for "Drogheda WWTP Capital Maintenance" programme which is expected to finish post-RC4.

Table B.1: UÉ proposes €739m of designated capital maintenance over RC4

Programme	2025	2026	2027	2028	2029	Total RC4
Capital Maintenance Programme - Wastewater Above Ground Assets	46.79	45.57	59.21	68.5	69.89	289.96
Capital Maintenance Programme - Wastewater Below Ground Assets	12.41	13.86	7.63	10.96	11.39	56.25
Capital Maintenance Programme - Water Above Ground Assets	44.88	43.86	56.99	58.99	67.82	272.54
Wastewater Pumping Station Programme (Capital Maintenance)	6.69	10.48	16.22	14.33	16.17	63.89
Drogheda WWTP Capital Maintenance	0	3.14	8.07	10.56	12.49	34.26
Dundalk WWTP Capital Maintenance	0.83	7.93	5.47	5.37	2.1	21.7
Ringsend WWTP Capital Maintenance	0.09	0	0	0	0	0.09
Total	**111.69**	**124.84**	**153.59**	**168.71**	**179.86**	**738.69**

Source: UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) BPQ FINAL.xlsx.

However, the designated capital maintenance programmes are not UÉ's total investment in capital investment, as the programmes do not cover the effective capital maintenance included across UÉ's entire capital programme, such as the capital maintenance delivered as an element in UÉ's quality programmes/projects. UÉ's proposed expenditure in capital maintenance can better be identified from base maintenance cost allocation provided in the BPQ I&O worksheet, where UÉ has allocated its project costs by regulatory purpose (i.e. the QBEG allocation, which stands for quality, base maintenance, enhancement and growth). Table B.2 below summarises UÉ's base capital projects/programmes grouped by asset type.

Table B.2: UÉ proposes €1,511m expenditure for base maintenance

Programme	2025	2026	2027	2028	2029	Total RC4
Water	77.99	81.47	91.37	98.75	107.36	456.94
Wastewater	94.94	112.92	150.37	166.97	168.89	694.09
Non-Asset	53.28	74.98	76.75	77.19	77.82	360.02
Total	**226.21**	**269.37**	**318.49**	**342.91**	**354.07**	**1,511.05**

Source: UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) BPQ FINAL.xlsx.

We identify base maintenance investment totalling €1,511m, with 30 per cent allocated to water assets, 46 per cent allocated to wastewater assets, and the rest (24 per cent) grouped into non-asset investment. Among the €1,151m capital maintenance associated with water or wastewater assets, around 85 per cent is expected to be invested in above ground non-infrastructure assets, 12 per cent is expected to be invested in underground infrastructure assets, and the remaining 3 per cent serves multiple purposes.

B.2. Benchmarking capital maintenance with E&W peers

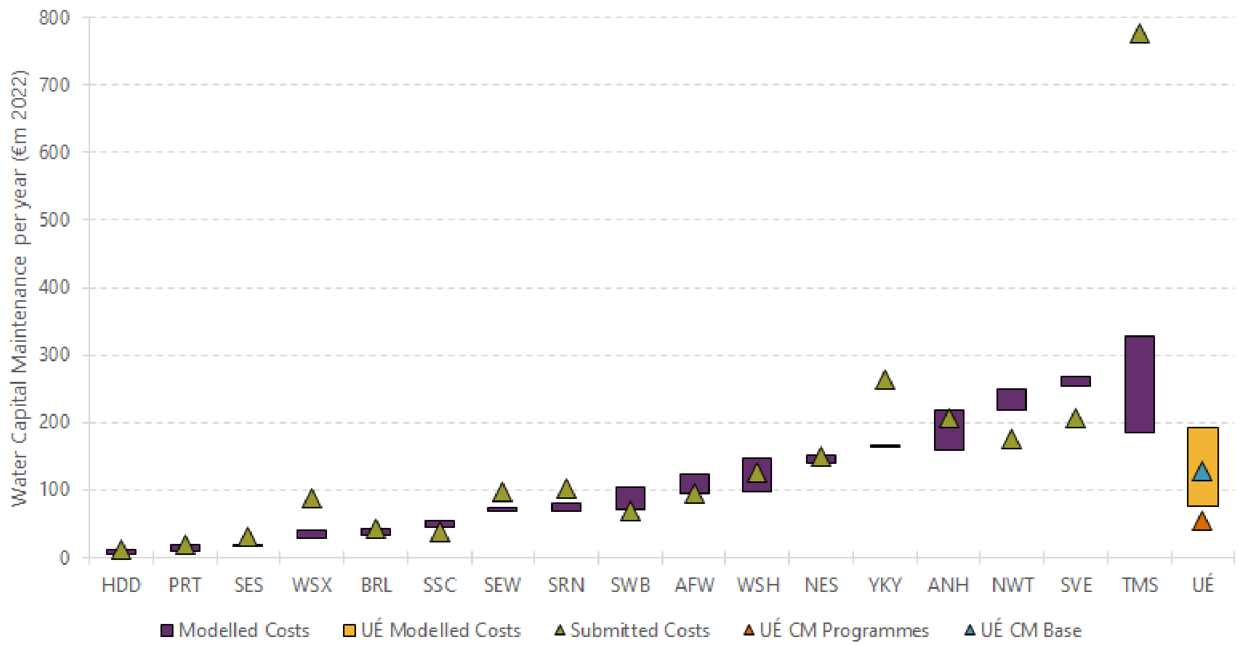
We have also undertaken an econometric benchmarking exercise to assess whether UÉ's proposed level of capital maintenance of RC4 is reasonable to maintain the integrity of the network.

We run econometric models at service level (i.e. separate models for the water and the wastewater services respectively) to calculate "predicted" costs for each company, on the basis of the relationship between cost drivers and cost levels developed from the panel of E&W companies. The drivers we include are number of connected properties, weighted average complexity of treatment, length of mains, and total load. These modelled ranges do not represent an efficiency frontier, but represent expected cost levels based on the average performance of the E&W companies over the period included in the panel (2012-2024 outturn).

We include three models for water and two models for wastewater to develop the relationship between costs and cost drivers. We then apply the estimated coefficients of each model to the cost driver forecasts of E&W companies and UÉ to get the predicted capital maintenance costs over AMP8 and RC4.

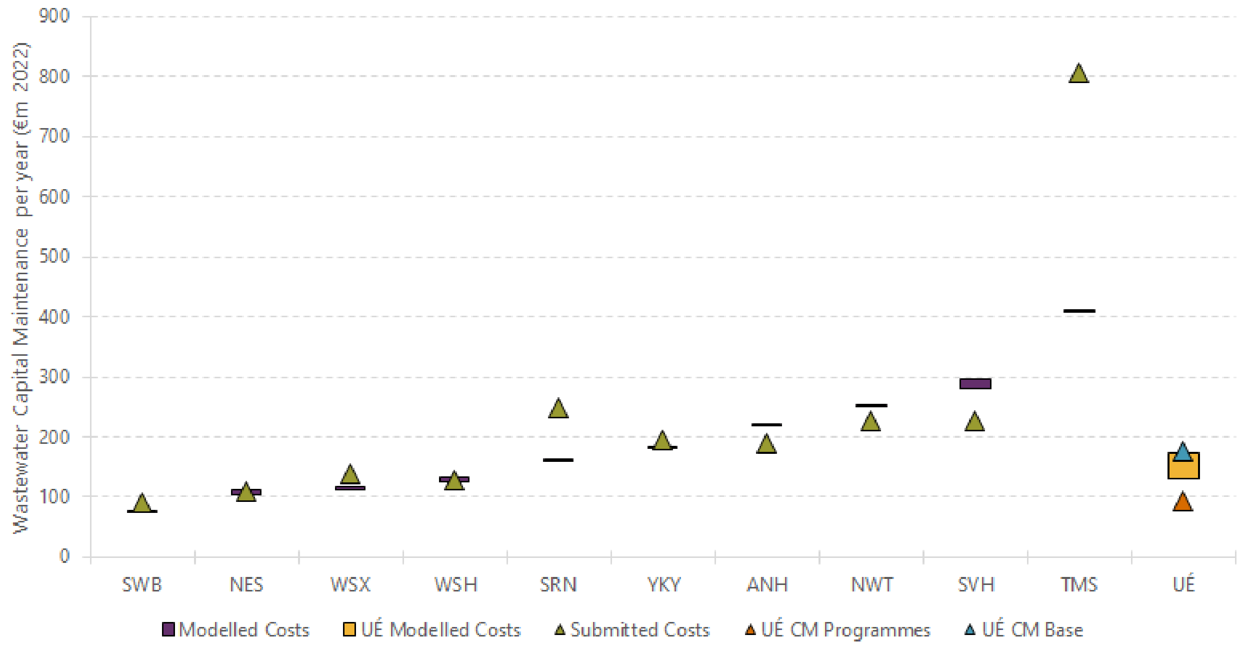
Figure B.1 and Figure B.2 below present the per annum modelled cost ranges compared to submitted cost forecasts for water and wastewater separately, taking average across the years of AMP8 (2025-2030) for E&W companies and of RC4 for UÉ. The bars represent the modelled efficient costs as "predicted" by our models, while the triangles indicate the submitted costs forecasts. At discussed above, UÉ's RC4 proposed capital maintenance include non-asset investment; we reallocate the non-asset investment amount into water and wastewater by 50:50 for the purpose of comparison.

Figure B.1: Water capital maintenance modelled ranges, annual average



Source: NERA analysis of E&W 2012 to 2024 outturn capital maintenance costs and UÉ provided RC4 BPQ.

Figure B.2: Wastewater capital maintenance modelled ranges, annual average

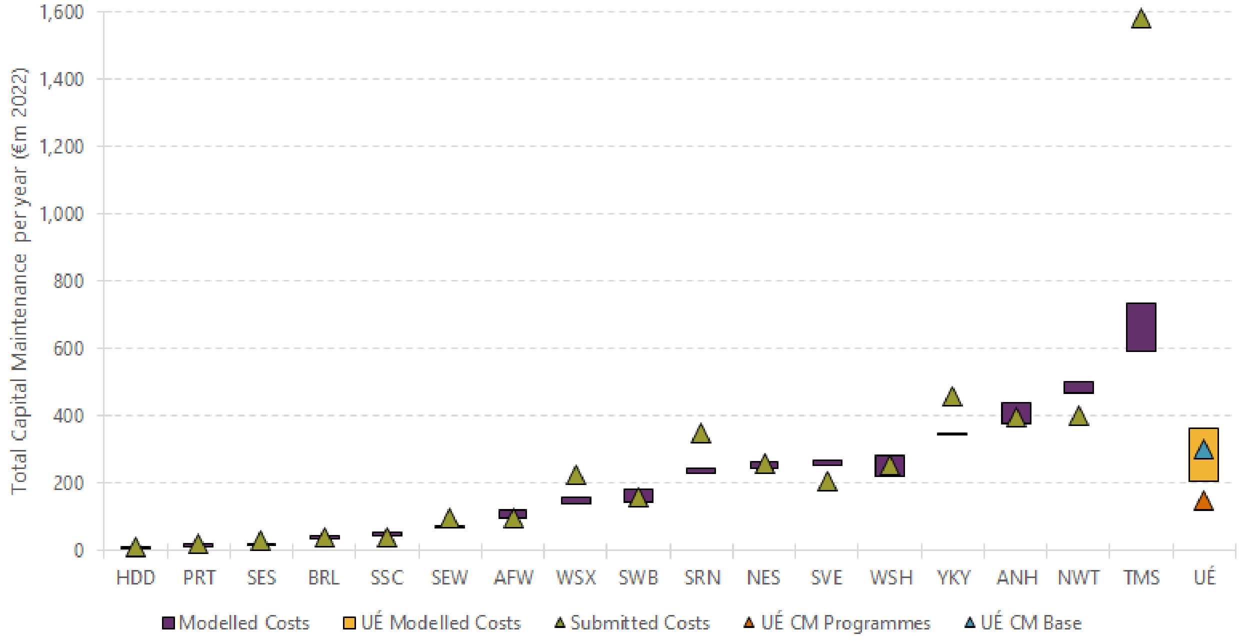


Source: NERA analysis of E&W 2012 to 2024 outturn capital maintenance costs and UÉ provided RC4 BPQ.

Based on the models, we estimate an enduring capital maintenance requirement between €75m and €192m per annum for water and between €130m to €173m per annum for wastewater. UÉ's designated capital maintenance falls short of the RC4 enduring level for both water and wastewater. However, the water capital maintenance activities implied by the QBEG allocation are within our modelled range for water, while the wastewater capital maintenance activities implied by the QBEG allocation are at the higher end of our modelled range for wastewater.

Figure B.3 below illustrates the modelled range and submitted costs for the water and wastewater services combined. Our estimated total RC4 capital maintenance requirement ranges between €205m and €365m. Again, UÉ's total designated capital maintenance programmes fall short of the estimated level, while the capex allocated to base maintenance is within the modelled range.

Figure B.3: Water and wastewater combined capital maintenance modelled ranges, annual average



Source: NERA analysis of E&W 2012 to 2024 outturn capital maintenance costs and UÉ provided RC4 BPQ.

Appendix C. Response to UE's Comments on our Opex Benchmarking

C.1. Our Response to UÉ's Comments on Our Analysis

UÉ has provided specific comments relating to accuracy and errors identified in our draft report, which we address below.

C.2. UÉ's main concern is with our use of different measures to control for density in the water model

Frontier's models draw on a single definition of density, measured as number of connections per length of main, in its modelling of water sector costs. By contrast, we develop a wider set of models drawing on two additional definitions of density used by Ofwat at PR24, which rely on measures of population per electoral division (ED) and local electoral area (LEA). Drawing on a wider set of models shows UÉ in a less favourable position on cost performance and explains a substantive element of the difference between our and Frontier's conclusions on UÉ's water service comparative efficiency.

UÉ and Frontier have criticised our water models because "NERA's assessment of UÉ's opex efficiency contains a material inaccuracy relating to how density is captured in its models". Specifically, they argue that Ireland's ED and LEA units are different to E&W's Middle Super Output Area (MSOA) and local authority district (LAD) units. Because the geographic unit definitions used in Ireland and the UK are materially different, UÉ and Frontier argue that it cannot be used to calculate comparable population density variables.

We do not agree with the statement that our approach is inaccurate, as we describe below:

- We acknowledge that the basis for MSOA is different to the ED in Ireland (namely MSOA defined by population of around 8,000). However, as we have explained in our previous responses to UÉ, because MSOAs do not align with E&W boundaries, the MSOAs as used by Ofwat are divided into smaller units, and the population distribution per adjusted MSOA for certain E&W companies (and particularly small companies) is not uniform (see Figure.4 which shows for example that HDD and SSC have different population distributions to the E&W population distribution).
- We do not agree that there are comparability issues with LEAs and LADs, as the distribution of the size of the LEAs is similar to E&W, while the lower population per LEA for UÉ relative to E&W reflects UE's lower density. Also, using either density measure (ED or LEA) results in similar efficiency scores for UÉ. Therefore, if we were to discard MSOA/ED (which we do not propose to do) and place weight on LEA/LAD, our results would not change.
- UÉ and Frontier also believe that the large swings in efficiency are the results of "comparing statistical geographic units (from the CSO in Ireland and ONS in the UK) which are not like-for-like". However, they do not recognise that UÉ is an outlier on network length thus appearing extremely efficient when density is defined as property per length is used.

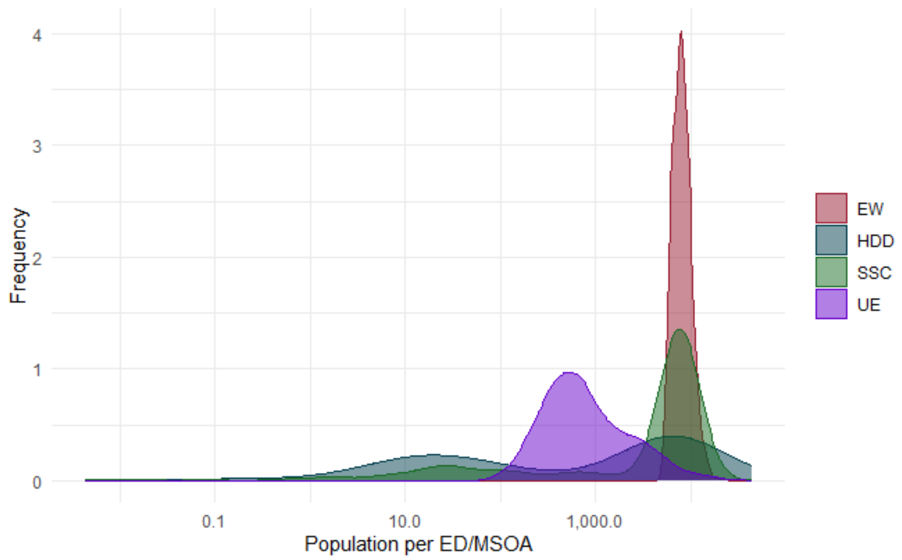
- UÉ and Frontier argue that "this erroneous comparison results in unintuitive density rankings" because, while the population of Wales is more than twice as dense as Ireland, the weighted average density measures we use show Ireland to have a larger density than Wales. The two are very different measures: the weighted average density measures also capture sparsity by assigning higher weightings to more populated areas, like Dublin. It is therefore not surprising that UÉ has a higher weighted average density than the Welsh water companies. This variation in sparsity means that moving from the simple property per length density measure to the weighted average density measure would change the relative relationship of densities among companies. Indeed, also Ofwat argues that that properties per length of mains variable "may not capture the differences in population density within a company's operating region as well measure of population density".[100]

As also Ofwat recognises, there are pros and cons with both the density defined as customer per length (favoured by Frontier) and the one based on weighted average density WAD. Both measures are potentially reasonable to use to explain companies' costs and, consistent with Ofwat, we take into account the results of both density measures, rather than relying solely on the simple property per length measure as UÉ proposes. Therefore, our approach is more balanced, whereas UÉ focuses on the density measure that shows it in the best light.

Overall, we are not proposing a reduction to UÉ's allowance on water (before ongoing efficiency and real price effects adjustments). On wastewater, for which there is little dispute from both Frontier and UÉ, UÉ is demonstrably inefficient. By contrast, UÉ and Frontier claim that the evidence suggests that UÉ is extremely efficient on water, which should offset the inefficiency observed on wastewater, and overall there should be no overall reduction to the plan. Even if we were to accept that UÉ was extremely efficient on water, which we categorically do not, then there is no ground to offset uncontested inefficient levels of costs on wastewater. Therefore, we find UÉ's approach is manifestly bias and flawed.

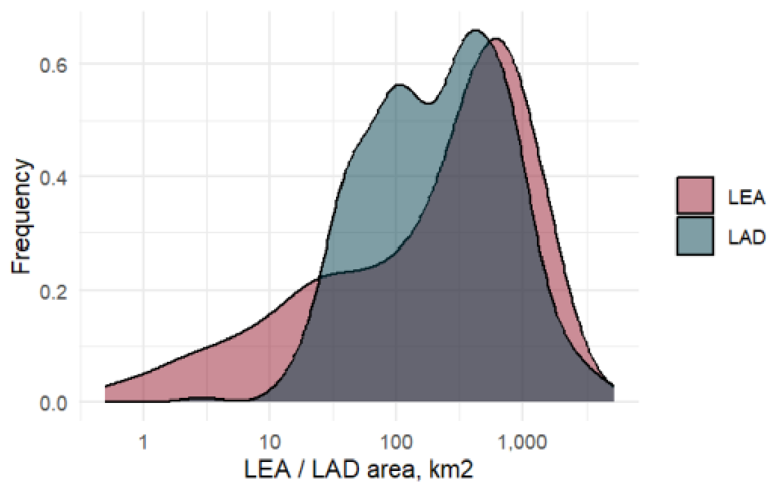
100 Ofwat (December 2024), PR24 final determinations, Expenditure allowances – base cost modelling decision appendix, p.26.

Figure.4: There is large variation in population density across the E&W companies as measured by MSOA



Source: NERA's analysis of UÉ and Ofwat's data.

Figure.5: There are no comparability issues with LEAs and LADs as their sizes are similar



Source: Frontier Economics (April 2025), Assessment of two key issues in NERA's Opex Look Forward paper, p. 11.

C.3. UÉ is concerned with our decision to not allow for the historical time trend for E&W companies to persist into RC4

Frontier's models incorporate a 3-5 per cent real increase in costs p.a. – i.e. the models assume that an efficient company's costs will increase over RC4 by up to 20 per cent in real terms. We do not believe that this reflects the likely cost projection for an efficient company, and instead our starting point is that costs are constant in real terms over RC4, other than for expected changes in energy, DBO and labour costs (or collectively, real price effects, RPEs) net of on-going improvements in efficiency.

UÉ and Frontier have criticised our approach, arguing "the assumption about the persistence of the observed historical time trend is the key to whether UÉ is forecast to be efficient at RC4 or not".

There is no basis for assuming the trend will continue to hold. The trend picks up real price effects for E&W companies. Assuming that costs for water are going to increase by 3-5 per cent each year at RC4 after controlling for other drivers is not plausible.

Ofwat does not consider a trend in its modelling as it argues there is a risk that a time trend captures factors that are under management control. In addition, Ofwat also claims there is a risk that the increase in wholesale water base expenditure observed in recent years is not permanent or will continue at the same rate. Therefore, we are being more generous to UÉ than Ofwat has been to E&W companies as we recognise that time effects are instead important. We are also generous in our modelling as we assume that energy prices at RC4 will be kept at the same level as 2024, the last year of outturn data in the sample, which represents a year with high energy prices.

C.4. UÉ does not agree with our 1 per cent ongoing efficiency assumption

UÉ argues that we have used a 1 per ongoing efficiency (OE) figure "which is based on precedent from UK regulators rather than any analysis of Irish productivity trends, as is typically done".

While we agree that precedent from UK regulators has been considered for our decision, proposal is also consistent with Irish regulatory precedent. For example, at PC5, the CRU also set a 1 per cent OE challenge on GNI's opex. [101] This is based on GNI's proposal and CEPA's evidence from the 2011 EU KLEMS database, "which provides evidence of the historic productivity changes across different sectors of the Irish economy from 1988-2007, broadly supports the long-term 1% assumption that has been used by the CRU in its recent price control decisions for opex".[102] In addition, our assumption of 1 per cent is consistent with CEPA's approach at PR6.

[101] CRU (20 December 2023), Decision on October 2022 to September 2027 Distribution Revenue for Gas Networks Ireland, p.22

[102] CEPA (30 June 2023), PC5 Frontier Shift, p.34.

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