IW IRC2 (2017-2018) Look Forward Submission Assessment

Prepared for the Commission for Energy Regulation (CER)

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Executive Summary

IW proposes a large capital programme of c. €1.3bn over IRC2 and c. €3.7bn over the period 2017 to 2021

Irish Water has developed a capital investment plan totalling c. €3.6bn to deliver the objectives and outcomes set out in its Business Plan and within the long term vision of the 25 year Water Sector Strategic Plan.

IW has reduced the size of its original unconstrained plan (€4.8bn) to determine its constrained plan (€3.6bn) after considering the unconstrained plan against a number of criteria (specifically: financeability, deliverability, operability and meeting the needs of stakeholders and customers).

Alongside the main capital investment plan, IW has also identified an initial requirement of €112m over IRC2 to fund non-network capex, which supports the delivery of its operating model and both capex and opex efficiencies, making a total submission of c. €3.7bn over the period to 2021.\(^1\)

On an annual basis, this represents a large capital expenditure programme, but within the range of capital investment programmes carried out by water utilities in the UK.

Over the initial years of the five year investment plan (2017-2021), much of IW’s expenditure is within Major Projects, which include carryover projects from the Water Services Investment Plan and projects started by IW at IRC1. In the latter years of the plan there is a rebalancing towards capital maintenance, and a ramp up of expenditure under IW’s National Programmes, which are currently being developed by IW.

\(^1\) This amount excludes any estimate of non-network capital expenditure requirements for the period 2019 to 2021 and of c. €1.3bn falling in the IRC2 period.
There is a clear needs basis for IW’s Major Projects (€827m of its investment plan over IRC2)

We have reviewed a sample of projects and programmes within the Major Projects that will start during IRC2. We have also reviewed IW’s governance arrangements, and approach to prioritisation. Our review suggests that the set of IRC2 projects are justified – with the majority driven by statutory drivers.

We consider IW’s approach to prioritisation is reasonable. In developing the investment plan, IW’s plan balancing tool first includes all mandatory (already committed) projects, and solves for constraints (e.g. statutory obligations and compliance). Any residual funding is then optimised based on IW’s initial customer research which shows drinking water quality is the highest priority, followed by leakage and lead in water.

We consider that solutions are (and necessarily so for such a large portfolio of projects in the early stages of development) relatively generic, and we expect improvements in relation to both re-scoping and cost efficiency. We therefore propose that IW is required to deliver the set of projects for less as with other elements of the investment plan (as we discuss below).

A substantive element of the expenditure falls outside of the IRC2 period, given project timelines and the relatively short two-year review period. In making the determination, we recommend that expenditure limits are set for projects that commence (or ramp up) in IRC2 for the life of these projects. Our proposed approach provides IW stability with respect to funding for projects in future regulatory periods that commence in IRC2.
IW expects to ramp-up capital maintenance over five year period; its national programmes will address national disparities in service levels

In relation to capital maintenance (CM), IW intends to implement the capital maintenance common framework, a risk based approach to CM, and in line with best industry practice. IW’s focus is on the maintenance of the water rather than the wastewater assets, and initially on the infrastructure (i.e. below-ground) assets. Investment on above ground assets is prioritised on larger, critical assets where IW has improved information and greater certainty around the asset condition and performance, and likely benefits.

The full implementation of the framework will require further studies and improved understanding of its asset base, and therefore IW defers expenditure in the immediate IRC2 period to the latter part of the period. In terms of levels of expenditure, IW has identified designated capital maintenance expenditure over IRC2 of €116m over IRC2. However, our analysis of the wider plan suggests that this understates the real level of expenditure on maintaining assets, as there are also capital maintenance elements included within the Major Projects and National Programmes. We estimate actual expenditure around €310m over IRC2. Our analysis shows that using the wider definition of capital maintenance and drawing on maintenance expenditure for comparator networks, IW proposed level of expenditure ramps up to the expected enduring level towards the end of the five year period (albeit below the enduring level over IRC2).

We consider the lower level of maintenance in these early years reflects a reasonable approach to deferring investment until IW has an improved understanding of its assets, and can optimise expenditure drawing on the best practice tools that it has introduced.

IW has also proposed expenditure on National Programmes of €232m over IRC2. In broad terms, the programme is designed to address deficiencies and disparities in service levels across Ireland. Examples of the programmes designated as National Programmes include: i) the national lead programme; ii) first fix leak repair programme; iii) a treated water storage programme; and, iv) wastewater reinforcements for growth. The vast majority of this expenditure is at the early planning stage, and as a result most of the expenditure within IRC2 is focussed on improving understanding of assets, with a substantive ramp-up of expenditure post IRC2 (see Figure 1 above).

For both capital maintenance and the national programmes, we set out recommended expenditure limits for the IRC2 period (rather than the longer five-year plan) consistent with the intended two-year regulatory review period. As with Major Projects, we consider that IW should realise both scope and cost efficiencies, and therefore we expect IW to deliver the programme for reduced expenditure (as we explain below).

Non-network capex will support the transformation of IW

The non-network capex includes expenditure on facilities and fleet investment; information technology (IT) investment across a wide range of business areas; business change IT investment; and, the IW transformation programme that includes the Water Industry Operating Framework (WIOF). The WIOF will enable IW to move from its current model with service delivery at the LA level to a standard integrated service model, and is integral to IW realising substantive operating cost reductions. In general, we recommend that CER
funds the non-network capex, save some minor reductions for relatively low priority programmes, and sets an efficiency challenge as described below.

**We recommend an efficiency challenge of 5% per annum for IRC2 applied to non-committed capital expenditure**

Table 1 sets out IW’s proposed capital expenditure over the period 2017 to 2021. As discussed above, we recommend that CER makes a determination only for those projects and programmes that involve material expenditure falling before or during the IRC2 period. As a result, our proposed allowances are substantively lower for the post IRC2 period reflecting the expectation that CER will reconsider these amounts at the next review.

In relation to cost efficiency, our review of IW’s expenditure estimates suggests that the programmes are costed on the basis of pre IRC1 costs and approach and do not reflect the efficiency challenge determined by CER at IRC1 of 13.5%. One option therefore is to apply an initial starting efficiency challenge for IRC2 of 13.5% to bring the proposed costs to the level expected at the end of IRC1. However, IW has contested the findings of our review, stating that it considers its programme is costed on the basis of efficient E&W costs. If so, there would be no need to apply an initial starting efficiency challenge. For the purposes of this report, we have not included a 13.5% reduction subject to further discussion with IW.

In terms of the efficiency challenge within the IRC2 period, we recommend a 5% per annum additional challenge for 2017 and for 2018 to all expenditure that has not been committed prior to the IRC2 period. We define committed expenditure as expenditure related to projects that have substantively started over IRC1. The 5% efficiency challenge draws on evidence from the efficiency challenge set for SW and NIW at comparative stages of development.

Table 2 sets out our recommendation in relation to the IRC2 capital expenditure determination. This includes all major project expenditure which becomes committed before or during IRC2, and national programme expenditure, capital maintenance and non-network capex relating to the IRC2 period only. Overall, we propose an expenditure allowance of €1,233 for IRC2, a 4% reduction to IW’s proposed expenditure of €1,287m. Our proposed overall allowance – including expenditure that falls outside IRC2 – is equal to €1,674 – and is substantively lower than IW’s submission of €3,699 – reflecting in large part our recommendation that expenditure on projects or programmes that commence beyond IRC2 are considered at subsequent reviews.

**Table 1**

<table>
<thead>
<tr>
<th>IW Proposed Capital Expenditure (€m)</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>IRC2 Total</th>
<th>IP Total</th>
</tr>
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<tbody>
<tr>
<td>Water and Wastewater Projects</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Projects</td>
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<td>316</td>
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<td>National Programmes</td>
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<td>139</td>
<td>198</td>
<td>339</td>
<td>232</td>
<td>908</td>
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<td>Capital Maintenance</td>
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<td>63</td>
<td>118</td>
<td>133</td>
<td>180</td>
<td>116</td>
<td>547</td>
</tr>
<tr>
<td><strong>Total Capital Investment</strong></td>
<td>515</td>
<td>660</td>
<td>772</td>
<td>806</td>
<td>835</td>
<td>1,175</td>
<td>3,587</td>
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<tr>
<td>Non-Network Capex</td>
<td>59</td>
<td>54</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>112</td>
<td>112</td>
</tr>
<tr>
<td><strong>Total IRC2 Capex</strong></td>
<td>574</td>
<td>714</td>
<td>772</td>
<td>806</td>
<td>835</td>
<td>1,287</td>
<td>3,699</td>
</tr>
</tbody>
</table>

*Source: NERA analysis*
IW has proposed a series of high-level outcome targets against which progress on the delivery of its investment plan can be monitored. IW has also provided outputs associated with each of the projects included in its investment plan, including progress targets for each of these projects in 2018 and in 2021, e.g. in relation to drinking water quality improvements, environmental improvements, customer service standards, and security of supply.

We propose that IW delivers the proposed outputs and outcomes identified in its submission for the reduced expenditure allowances. Alternatively, IW could bring forward projects and programmes equivalent to our proposed reductions, and identify a corresponding set of proposed outputs and outcomes.

**IW proposes an increase in operational expenditure over IRC2 of around 6%**

As set out in Figure 2, IW proposes operational expenditure (opex) of around €750 million per annum over IRC2. Relative to IRC1, IW’s forecast costs in 2018 are around 6% higher than budgeted costs for 2016.

As was the case at IRC1, the substantive element of IW’s costs are those associated with the service level agreements (SLAs), i.e. operations and maintenance performed by the Local Authorities (LAs), which comprise around three-quarters of its proposed opex. The other major element is the target operating model costs (TOM) which comprises the centralised costs to IW of delivering water and waste water services. The remaining areas relate to Group and Shared Services, and a small portion of non-controllable costs.
IW’s proposed improvements in cost efficiency are more than offset by “growth drivers”

IW’s plan identifies cost efficiencies of €44 million over IRC2. These cost improvements are realised through a reform agenda comprising 27 separate programmes – under the umbrella of a new Water Industry Operating Framework (WIOF). The WIOF is expected to integrate the operations and maintenance functions undertaken by SLAs within IW to reflect standard industry practice.

The proposed improvement in cost performance under these transformational programmes is more than offset by the assumed increase in costs from “growth drivers” over IRC2. IW sets out expected cost increases of around €46 million relation to asset maintenance, increase in sampling activities, expansion in the capital base, etc.

Under IW’s proposals, its comparative opex cost performance deteriorates over IRC2

The outturn level of opex per population served at IRC1, and the level proposed for IRC2, is higher than Scottish Water and Northern Ireland Water today and higher than both SW and NIW at similar point in time, as shown in Figure 3.

Under IW’s business plan proposals, its comparative cost performance would deteriorate over IRC2, meaning that four years since its formation and the introduction of incentive based regulation it would have made no real progress on operating cost efficiency. While SW and NIW made substantial progress to catching up with the cost performance of English and
Welsh companies in the years following the introduction of incentive based regulation, IW’s IRC2 proposals see it moving further away from the E&W efficient benchmark.

**Figure 3**
Comparison of IW Opex per Population Served
(Water on left; Sewerage Service on right)

Source: NERA analysis of IW IRC2 submission and UK regulatory accounts

NOTES: (1) NIW data is from 2007-08 to 2012-13; SW data is from 2002-03 to 2012-13; E&W data is from 2000-01 to 2009-10
(2) Not all companies share the same cost structures. For example, Scottish Water does not bill unmetered domestic customers (who are billed by the local authorities) and NIW does not bill domestic customers.

Our comparative cost modelling shows that IW’s costs are around twice the long run efficient level

In order to assess the scope for improvements in cost performance over IRC2, we have compared IW’s costs to its peers in UK, and in particular to the mature English and Welsh water utilities. We do this to identify the costs that we would expect an efficient, mature Irish water utility to incur, and to identify the efficiency gap between Irish Water’s current cost performance levels and the efficient benchmark.

We have developed a range of statistical models drawing on the models developed by UK regulators, notably the UK’s CMA and UREG in NI. In developing our statistical models, we have been careful to control for the specific operating circumstances of IW, e.g. its greater network length and sparsity, by including such variables in our model specifications.

Figure 4 sets out a comparison of companies’ observed costs (triangles) and the efficient modelled costs (bars), as determined by our suite of models. The bars represent the modelled costs as predicted by our suite of models, while the triangles represent actual costs. The round blue markers show the results for our preferred model specification, which we consider to be the most reasonable baseline model around which the other models are presented as sensitivities.

The modelled cost ranges for IW are large compared to the other UK companies. This is because IW is currently an outlier with respect to some of the drivers included in the models, and notably with respect to mains length and water and waste water treatment works.

Across all model specifications considered, IW’s proposed expenditure is at least 60% higher than the modelled long-run efficient level, where we compare IW’s costs to the efficient level.
of costs predicted by the model most favourable to IW, and most likely closer to 80% to 100% higher (i.e. twice as high), when IW’s costs are compared to the costs predicted by the most statistically robust model.

**Figure 4**
Comparison of IW Opex per Population Served
(Water – LHS; Sewerage service – RHS)

*SOURCE: NERA analysis of Ofwat’s PR14 dataset, other UK regulatory submissions and IW’s BP submissions. NOTE: Models estimated using E&W data (2009-13). All UK modelled and observed costs presented in this chart correspond to 2013; all IW costs correspond to the 2017-18 average. All costs are in 2015 prices.*

We recommend that IW’s opex is reduced by 5% per annum in each year of IRC2

In order to inform the expected rates of improvement in cost, we have reviewed performance by Scottish Water and Northern Irish Water. As set out in Figure 5, Scottish Water delivered an annualised unit cost improvement of around 11 per cent over its first four year review. Similarly, NIW reduced costs quickly between 2008-09 and 2014-15 (incentive based regulation introduced in 2007). At PC10 in Northern Ireland covering the period 2010-13, NIAUR set a target opex improvement of 6.5 per cent per annum against which NIW outperformed.

We recommend that CER sets an operating cost efficiency target of between 5% and 10% per annum relative to 2016 outturn controllable costs. This would result in IW’s opex decreasing by between 10% and 20% by 2018 relative to 2016. The high end of the range is based on the average annual rates of improvement achieved by Scottish Water throughout its first four year price control. However, a value at or towards the lower-end is more relevant to IW given that it is constrained by an operational model which may impede the cost reductions realised by the best performers elsewhere.

The cost allowances set out in our report are based on realising cost reductions of 5% per annum over IRC2. The cost allowances also include a one-off lump sum of around €9.9 million p.a. to address required improvements in IW’s operating service capabilities, e.g.

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2 Cumulative Annual Efficiency Rates are NERA calculations, based on efficiency targets and outturn described in: WICS “Costs and performance report 2003-06”.
improvements to monitoring and enforcement of trade-effluent arrangements, improving asset data capture.

**Figure 5**

Declines in Opex by SW and NIW in Early Years (SW on left, NIW on right)


**Working with CER, IW intends to develop a set of customer and quality of service measures**

The CER has proposed a set of customer and quality of service metrics to monitor IW’s performance over IRC1. The metrics proposed by CER match closely to those developed for energy networks in Ireland in relation to customer services, and to the environmental and drinking water metrics reported by IW to EPA, as well as these published by UK water regulators.

The evidence from Scottish Water and NI Water shows strong improvements in customer and quality of service performance at a comparable stage of development while cost efficiencies were also being made, and we consider that IW should be challenged to deliver similar rates of improvement.

As well as customer and quality of service targets and incentives, we also recommend that CER considers introducing a rolling opex incentive mechanism to improve incentives for cost efficiency.

In relation to billing, we recommend that the CER considers incentives to ensure that IW has incentives to bill properties (e.g. modelled on an “efficient billing” incentive introduced by Ofwat in E&W). A first key step for implementation of such a mechanism is the establishment of a firm baseline. We also recommend that CER sets an ex ante bad debt allowance for non-households, and potentially households depending on future domestic charging arrangements, to provide incentives for IW to collect revenues.
1. **Introduction**

NERA Economic Consulting (NERA), along with CH2M, an engineering consultancy,\(^3\) was commissioned by the Commission for Energy Regulation (CER) to assist with a review of Irish Water’s (IW) submission for the second interim review of charges (IRC2) and to advise the CER on the revenues that IW should be allowed to recover for IRC2 covering 1\(^{st}\) January 2017 to 31 December 2018.

The next control follows the first interim price control (IRC1), which set allowed revenues for the period Q4 2014 to end 2016. In setting out our recommendations for the efficient level of expenditure for IRC2, we take into account IW’s performance over IRC1 and decisions made by CER at the time of IRC1.\(^4,5\)

This report is structured as follows:

- Section 2 sets out our review of IW’s proposed capital expenditure (capex) proposals, including IW’s proposed capital investment expenditure and its capital maintenance requirements;
- Section 3 sets out our review of IW’s proposed operating cost (opex) proposals;
- Section 4 sets out IW’s proposed improvements in cost efficiency over the period, and our recommendations;
- Section 5 sets out the customer and quality of service mechanisms we would expect IW to put in place, and other incentive mechanisms that may be relevant for IRC2;
- Section 6 proposes a framework for output monitoring and adjustment during the interim review; and,
- Section 7 sets out our proposals on the opening regulatory asset base (RAB) value, and depreciation policy.

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\(^3\) NERA is an economic consultancy. See: [http://www.nera.com/](http://www.nera.com/). CH2M is a global engineering consultancy. See: [https://www.ch2m.com/](https://www.ch2m.com/)

\(^4\) NERA (2016) “Review of IW’s IRC1 Cost and Output Performance”

\(^5\) NERA carried out the technical and economic review of IW’s IRC1 business plan proposals. For more information please refer to: NERA (July 2014) “IW Interim Review Assessment Prepared for the Commission for Energy Regulation (CER)”
2. Capital Expenditure

In this section we describe IW’s capital expenditure proposals as set out in its IRC2 submission, provided to the CER in March 2016.\(^6\) Unless otherwise stated, all prices are expressed in € 2015.

IW has developed its long term (25 year) vision in the Water Sector Services Plan,\(^7\) and a seven-year Business Plan to cover the period 2014 to 2021.\(^8\) To meet the objectives set out in this plan IW has developed a five-year capital investment plan, covering the period 2017 to 2021.\(^9\) IW has also submitted a non-network capex plan (which it has excluded from its “investment plan”) for IRC2 period only.

Our review is focussed on expenditure which is committed over the course of the IRC2 period, i.e. in years 2017 and 2018, consistent with the CER determining expenditure allowance for a two year price control period.

Our approach to assessing IW’s capital expenditure is to:

1. Carry out a review of all aspects of capital investment, including a detailed review of specific projects and programmes based on a sampling approach; and,
2. Compare IW’s cost efficiency proposals to UK comparators drawing on econometrics benchmarking models and efficiency trends achieved elsewhere.

These analyses inform our view of IW’s capital investment proposals and feed into our overall conclusions about the proposed investment levels, the appropriate level of capital maintenance, and the outputs that we would expect to be associated to the investment plan. We discuss the appropriate cost efficiency profile for IW over IRC2 in Section 4.

This section is structured as follows:

- Section 2.1 provides a high-level overview of IW’s proposed capital investment, and describes the broader picture of capital investment expenditure over IRC1, IRC2 and the remainder of the Investment Plan out to 2021;
- Section 2.2 reviews IW’s proposed expenditure on Major Programmes,
- Section 2.3 reviews IW’s proposed expenditure on National Programmes;
- Section 2.4 discusses IW’s proposed Capital Maintenance expenditure and provides comparisons to benchmarks for long-term capital maintenance requirements;

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6 Irish Water “Interim Revenue Control 2017 – 2018 Investment Plan 2017 – 2021” and IW response to BPQ
7 IW (October 2015) “Water Services Strategic Plan – A Plan for the Future of Water Services”
8 IW “Irish Water Business Plan – Transforming Water Services in Ireland to 2021”
9 IW (submitted to the CER in March 2016) “Interim Revenue Control 2017 – 2018 – Investment Plan 2017 – 2021”. In common with IW, we use the term “investment plan” to exclude the non-network capital expenditure.
- Section 2.5 reviews other, non-network, capital investment, and in particular assesses the capex expenditure proposed by IW to undertake transformation of the business over IRC2 and in the medium term;
- Section 2.6 provides an overview of IW’s proposed outcome and output targets for the IRC2 and IP2 periods; and,
- Section 2.7 discusses key issues in IW’s presentation of its capital investment plan and develops conclusions and recommendations from our review of proposed IRC2 capex.

2.1. IW Investment Plan 2017 to 2021 (IRC2 €1,287m, IP2 €3.7bn)

2.1.1. Summary of IW proposed investment plan

IW has proposed a capital investment plan over IRC2 and out to 2021 that starts below the level of outturn expenditure at IRC1 and increases to well in excess of the annual capital investment undertaken at IRC1 by the end of 2021. We note that IW non-network capex (which it considers apart from its investment plan) runs only for the IRC2 period.

There are substantial changes in the balance of capital investment proposed over the medium term, with a marked decrease in expenditure committed under the Water Projects and Waste Water Projects headings, a gradual increase in capital maintenance, and a more pronounced increase in National Programmes expenditure. IW has provided forecast expenditure for non-network capex only for the IRC2 period, which we understand includes its proposed expenditure to support its transformation plans. We expect such expenditure to continue beyond 2018, but as yet no information is available on the expected expenditure requirements beyond the IRC2 period.
We present the proposed capital investment expenditure (excluding non-network capex) in Figure 2.2 by QBEG classification, which allocates expenditure to four key drivers: environmental or drinking water quality improvements (Q), maintaining current or base service levels (B), enhancing existing service levels to customers (E), and meeting growth in water or wastewater services (G). Taking 2017 (the first year of the new investment plan) as the base year, there is substantial ramp up of both growth (to meet demand and improve security of supply) and base (i.e. maintaining service levels) expenditure over the period to 2021. IW expects proposed expenditure on quality and on enhancement to remain relatively more stable.

Over the course of IRC2, the largest share of expenditure (43%) is associated with quality, as we would expect given the need to address environmental and water quality statutory requirements. Of the rest, 27% is associated with maintaining base service levels, 21% growth and 10% enhancement. Figure 2.2 shows how expenditure across the QBEG categories is profiled over the course of the investment plan. This shows that both growth and capital maintenance (or base) expenditure increase over the five year plan as IW improves its understanding of its asset base and develops programmes of work and completes strategic plans to address maintenance and growth issues.

Figure 2.2
IW Proposed Capital Investment Plan to 2021 – QBEG

Source: NERA analysis of IW IRC2 submission

2.1.2. Review of IW proposed Investment Plan

IW had initially developed its investment plan (which consists of all capex, excluding non-network capex) on the basis of an unconstrained funding envelope of €4.8bn, using its Plan Balancing Tool. IW reduced its optimised plan back to a constrained 2017-2021 funding envelope of €3.6bn considered against a number of criteria (financeability; deliverability; operability; and, meeting the needs of stakeholders and customers).
Figure 2.3 shows IW’s annual proposed capex programme against UK comparators. Over the course of IRC2, IW’s capex is within the pack, albeit toward the upper end; only Severn Trent, United Utilities and Thames Water have larger capital programmes. By the end of the capital investment plan in 2021, IW’s expenditure will be in excess of Severn Trent’s annual capex, and only lower than United Utilities and Thames Water.

The comparison with the size of programmes in E&W (as per Figure 2.3), and indeed IRC1 (as per Figure 2.1), suggests that the delivery of the overall programme is achievable.

![Figure 2.3](image_url)

**Figure 2.3**
IW Proposed Annual Capex against UK Comparators (€m)


### 2.2. Capital Investment Plan – Major Projects (IRC2 €827m, IP2 €2,132m)

#### 2.2.1. Summary of IW’s proposed IRC2 major project expenditure

At IRC1, the capital investment plan was largely made up of committed projects which the LAs inherited from the Water Services Investment Programme (WSIP).

Figure 2.4 shows IW’s proposed water and waste water expenditure over IRC2 and through to 2021. Of the major project expenditure using IW’s allocation of expenditure according to the QBEG classifications, over the course of IRC2 53% is associated with quality, 22% growth, 17% base and 7% enhancement.

A substantive element of the programme reflects the portfolio of projects that IW commenced at IRC1. In terms of expenditure shares, IW considered around 94% of the Major Projects...
expenditure area as being commenced under IRC1 (i.e. expenditure is incurred within the IRC1 period). This accounts for 66% of the capex programme as a whole.

Figure 2.4
IW IRC2 Proposed Water and Waste Water Project Expenditure (IRC2 €827m)

Source: NERA analysis of IW IRC2 submission.

2.2.2. Review of IW’s proposed major project expenditure

For the set of projects due to commence in IRC2, we have reviewed a sample of projects and programmes within the Major Projects. We have also reviewed IW’s governance arrangements, and approach to prioritisation. Our review suggests that the set of IRC2 projects are justified – and a large portion of the proposed expenditure is driven by compliance drivers.

We consider IW’s approach to prioritisation is reasonable. In developing the unconstrained investment plan (based on an expenditure of €4.8bn over the period 2017 to 2021), IW’s plan balancing tool first includes all mandatory (already committed) projects, and solves for constraints (e.g. statutory obligations and compliance). Any residual funding is then optimised based on cost benefit scores, which IW has developed on the back of customer research to determine projects that deliver the greater customer benefit. For example, IW’s initial customer research shows that across business and household customers combined, drinking water quality is the highest priority, followed by leakage and lead in water. These priority rankings are then used to determine customer benefits scores to feed into an overall cost benefit score for proposed investment projects. We consider IW’s approach to optimising the plan appropriate, where a relatively small portion will be affected by CBA rankings, with the majority driven by committed projects and compliance.

In moving from the unconstrained plan to the constrained €3.6bn envelope on which IW’s submission is based, IW has rebalanced expenditure to meet constraints, while retaining a relative balance across the investment drivers. In developing the plan, IW has considered and engaged with key stakeholders.
We consider that solutions are (and necessarily so for such a large portfolio of projects in the early stages of development) relatively generic and largely based on the designs and approaches utilised prior to the formation of IW. In most part for IRC1 projects, IW has indicated the outcomes in the BPQ and what they expect to have achieved by the end of 2018 and 2021 which provides assurance around CER’s ability to define a starting point or baseline against which to measure the incremental outputs for delivery over IRC2. Similarly, for the IRC2 projects, IW has set out the outputs it intends to deliver in 2018 and 2021.

As set out above, a substantive element of the expenditure falls outside of the IRC2 period, given project timelines and the relatively short two-year review period. In making the determination, we recommend that expenditure limits are set for projects that commence or ramp up in (or prior to) IRC2 for the life of these projects. That is to say that we do not propose that the CER subject the funding for these projects to further review at subsequent price controls. Our proposed approach provides IW stability with respect to funding for projects that are already underway in future regulatory periods.

We propose to exclude a small number of projects from this principle, where there is some discontinuity in expenditure post IRC2 (which appears to relate to phased projects, and where the subsequent phases should be reconsidered at subsequent reviews), and material project expenditures which should also be revisited as subsequent reviews.

In particular, during the course of our review there have been substantial changes to elements of the Vartry Water Supply Project, Greater Dublin Drainage, Ringsend, the East and Midland Region Water Supply Project and Cork Lower harbour. We recommend that the CER monitor expenditure on these projects on an ongoing basis, and that the funding levels for subsequent phases of these projects are revisited at the next review.

In terms of cost estimates, the Major Projects are predominantly outsourced to design consultants and contractors. Our view is that the generic and generally conservative approaches to defining the scope of the solution and the use of historical project costs offer significant opportunities for more efficient solutions and delivery. New tools and regional or national approaches to design, standardisation, procurement, prioritisation etc. will allow IW to realise efficiencies. IW has demonstrated the substantive scope to improve cost efficiency during the IRC1 period, as noted in the CER’s IRC1 review.

In relation to cost efficiency, our review suggests that IW’s investment programme is costed on the basis of pre IRC1 costs and approach and exclude the efficiency challenge determined by CER at IRC1 of 13.5%. One option is therefore to apply an initial starting efficiency challenge for IRC2 of 13.5%.

However, IW has contested the findings of our review, stating that it considers its programme is costed on the basis of efficient up-to-date costs, e.g. E&W cost evidence as well as IW framework costs. If so, there would be no need to apply an initial starting efficiency challenge. For the purposes of this report, we have not included a 13.5% reduction subject to further discussion with IW.

In all cases, we propose a 5% p.a. improvement in cost efficiency for each of 2017 and 2018 based on our review of improvement in capital efficiency by a set of comparators, including by Scottish Water and Northern Ireland Water at similar stages of development, as set out in section 4.
We exclude from the efficiency challenge an estimate of expenditure that we consider committed (i.e. where IW’s ability to realise further cost efficiencies is limited). To define committed expenditure, we have analysed the capex profiles of the allowed projects and identified the year in which the expenditure rises materially, taking that as the year in which the capex becomes committed. Specifically:

- If the year in which there is a material increase in expenditure occurs prior to 2017, then we consider that such costs are not subject to an efficiency challenge.
- For all other projects, we apply an efficiency reduction to the lifetime of that project (or of that phase of project) based on the year in which we consider the capex to have been largely committed.
  - Projects committed in 2017 face an efficiency challenge of 5%.
  - Projects committed in 2018 face a challenge of 9.8%.
- Expenditure for projects that ramp up after the IRC2 period – i.e. in 2019 or later – is excluded from the efficiency challenge and should be reviewed as part of the next revenue control review. Similarly, where there appears to be a discontinuity in project spend (and a subsequent ramp-of expenditure after IRC2), or for projects with substantial expenditure falling after IRC2, we exclude any post-IRC2 expenditure and propose this is revisited at subsequent review.
- Projects with no expenditure until 2019 or later are not included in this review.

Table 2.1 summarises our recommendations for IRC2 water and waste water projects allowed expenditure.

**Table 2.1**

| NERA Proposed Water and Waste Water Projects Capex IRC2 Allowance (€m) |
|-----------------|---|---|---|---|---|---|
|                | 2017 | 2018 | 2019 | 2020 | 2021 | IRC2 Total |
| IW BP Submission | 345  | 483  | 515  | 475  | 316  | 827        | 2,133 |
| Excluding expenditure falling outside IRC2 | 345  | 483  | 283  | 135  | 55   | 827        | 1,300 |
| Efficiency Reduction | 7    | 19   | 19   | 10   | 3    | 26         | 58    |
| IRC2 Allowance | 338  | 464  | 264  | 125  | 52   | 801        | 1,243 |

Source: NERA analysis

**NOTE:** We take as a starting point the IW BP headline submission numbers, which are rounded to the nearest million euros. The efficiency reductions are calculated using: 5%; 1- (1-5%)²=9.8%.

### 2.3. Capital Investment Plan – National Programmes (IRC2 €232m, IP2 €908m)

#### 2.3.1. Summary of IW’s proposed IRC2 national programmes expenditure

IW has also proposed a substantial amount of expenditure referred to as National Programmes. No comparable category was included at IRC1, and the majority of this expenditure relates to new programmes areas as we discuss below. This is in general not
expenditure that has been committed to under the WSIP or as part of the IRC1 capital investment plan. IW identifies the rationale for the National Programmes as follows:

- Improved understanding and information of the assets handed over to IW (location, description, condition and serviceability)
- Appropriately targeted, on a quantified risk basis, investment to solve deficiencies in performance and service levels
- Rationalisation of the water sources and networks to increase resilience and efficiency of delivery of the services
- Providing a geographical spread of investments

Figure 2.5 shows the proposed profile of National Programme Expenditure using the main classifications as submitted by IW in green (as in Figure 2.1), and alternatively classified by type of investment (water above and below ground and waste water above and below ground respectively).

The vast majority of this expenditure is at the early planning stage. Figure 2.6 shows the portion of National Programmes at each Gateway of IW’s governance for each year between 2017 and 2021. The National Programmes are currently under development and the transition of each through IW’s gateway process has not been provided to us at the time of writing. We would therefore expect some of the expenditure on the National Programmes to progress further through the IW Gateway process. This is not reflected in Figure 2.6, as we do not have any information at present on when projects will transition through the Gates. The only current Gate 3 expenditure programmed falls in 2017, which we understand relates to carry-over minor programmes expenditure committed in IRC1.

The narrative of the IRC2 capital investment submission does not give a great amount of detail on the specific projects included in the National Programmes expenditure. In terms of the QBEG classification, over IRC2 about 36% is associated with maintaining base service levels, 30% quality, 26% growth and 8% enhancement. Examples of the programmes designated as National Programmes include:

- The national lead programme;
- First fix leak repair programme;
- A treated water storage programme;
- Wastewater reinforcements for growth.
Figure 2.5
IW IRC2 Proposed National Programmes Expenditure (€232m)

Source: NERA analysis of IW IRC2 submission. AG = “above ground”; BG = “below ground”
2.3.2. Review of IW’s proposed national programmes expenditure

The IP2 investment in National Programmes incorporates customer and stakeholder concerns achieved through an Investment Planning Process described in Appendix B of the Investment Plan\textsuperscript{11} and is aimed at meeting targets set in the 25 year WSSP,\textsuperscript{12} and the 7 year IW Business Plan.\textsuperscript{13} The investment is focussed on the water service as IW seeks to ensure the provision of water to the required standard reflecting customer priorities.

As with other elements of capital expenditure, the national programmes are constrained by the reduction to IW’s constrained capital investment plan of €3.6bn, which represents a 25% reduction from the unconstrained envelope of €4.8bn. The National Programmes see a relatively higher reduction in expenditure under the constrained plan than other areas, with proposed expenditure reduced by 34%. This may in part result from the relatively small share of committed expenditure (even in the immediate two-year period covered by IRC2), which is limited to a small number of minor works rolling through into 2017 (Gate 3 projects shown in Figure 2.6).

The IP2 documentation does not provide an indication of the likely total capex requirement by service to resolve all the known issues. It is therefore unclear if the proposed expenditure levels will continue at a similar level post-2021, nor whether the balance of the programme is likely to change further. For example, over the period covered by the investment plan (2017

\textsuperscript{11} Irish Water “Interim Revenue Control 2017 – 2018 Investment Plan 2017 – 2021”
\textsuperscript{12} Irish Water “Water Services Strategic Plan A Plan for the Future of Water Services”
\textsuperscript{13} Irish Water “Business Plan Transforming Water Services in Ireland to 2021”
to 2021), expenditure appears to be weighted more toward the water service than the waste water service – it is not clear if IW plans to provide a greater proportion of expenditure on the waste water service once the deficiencies and rationalisation requirement in the water service are delivered.

IW has provided best estimates of the need for and the value of individual programmes within the suite of programmes; we expect IW that will need to vire expenditures between programmes or sub-programmes as it develops the National Programmes in more detail (although principally this will be an issue for the next revenue control review, given the dominance of programmes at Gate 0). We do not consider the uncertainty over the need and expenditure level necessarily a failure of plan, but an indication of the incomplete asset information, as with other utilities at similar stages. The changes will need to be appropriately effected through the proposed capital monitoring arrangements, and change control process. (For future revenue control periods we envisage that asset information and strategies will be based on improved information, and therefore allowing monitoring of delivery against the plan with less need for change.)

We have undertaken a detailed review of IW’s lead strategy. For IRC2, we have not proposed any reductions to the lead service connections plan (where expenditure is at Gate 2). However, IW has identified possible implementation issues that may arise and may impact on the effectiveness of the strategy, such as only partial replacement of pipes (i.e. replacing lead service lines where there remain lead connections within premises). We therefore recommend that IW and the CER continue to periodically monitor these issues and review the effectiveness and efficiency of the lead strategy.

In relation to cost efficiency, as with other elements, IW does not appear to have allowed for the more efficient delivery of outputs through the implementation of the rationalisation programmes proposed, the introduction of standard designs and solutions, the employment of regional framework style delivery contracts. All of these expected improvements could be realised by the investment plans currently residing at gate 0, e.g. approximately 85% of the programme over the course of IRC2.

Table 2.2 summarises our recommended IRC2 National Programmes expenditure allowance:

- We propose a reduction of 5% p.a. for each of 2017 and 2018;
- We have applied efficiency reductions to all capex, other than the element of overhang from IRC1, namely, the minor capital programmes (of around €23 million in 2017 for water and wastewater combined);
- We do not consider capex falling outside of the IRC2 period, consistent with the two-year review period. All post-2018 expenditure should be reviewed for the next price control.
Table 2.2
NERA Proposed National Programmes Capex IRC2 Allowance (€m)

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2018</th>
<th>IRC2 Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IW BP Submission</td>
<td>117</td>
<td>115</td>
<td>232</td>
</tr>
<tr>
<td>Scope Reduction (energy efficiency programmes)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Expenditure excluded from cost efficiency reduction (IRC1 minor projects)</td>
<td>23</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Efficiency challenge</td>
<td>5%</td>
<td>9.8%</td>
<td></td>
</tr>
<tr>
<td>Efficiency Reduction</td>
<td>-5</td>
<td>-11</td>
<td>-16</td>
</tr>
<tr>
<td>IRC2 Allowance</td>
<td>113</td>
<td>104</td>
<td>216</td>
</tr>
</tbody>
</table>

Source: NERA analysis

NOTE: We take as a starting point the IW BP headline submission numbers, which are rounded to the nearest million euros. The efficiency reductions are calculated using: 5% × (1-5%)² = 9.8%.

2.4. Capital Investment Plan – Capital Maintenance (IRC2 €115m, IP2 €547m)

2.4.1. Summary of proposed IRC2 capital maintenance expenditure

At IRC1, the CER determined a capital maintenance (CM) allowance of €435m. This was based on a summation of line items which were understood to broadly correspond to capital maintenance expenditure, namely: minor capital works (reactive), minor capital projects, suppressed capital maintenance and the water conservation programme. While not all of these activities correspond exactly to capital maintenance expenditure, we considered this a reasonable approximation, noting that there was also likely to be a degree of capital maintenance included within the major programmes inherited from the WSIP.

IW’s IRC1 outturn expenditure on these expenditure lines was substantially (13%) lower than the allowance at €380m. As discussed below, this represents an underspend on an allowance that was already below the estimated level of enduring capital maintenance needs.

At IRC2, IW has identified specific projects which have been designated capital maintenance as the main expenditure driver. IW’s QBEG allocation of all of its expenditure lines provides another benchmark for the total amount of capital maintenance expenditure undertaken within the other major projects.

IW’s proposed capital maintenance expenditure is shown in Figure 2.7. The proposed CM expenditure of €53m and €62m in 2017 and 2018 respectively is substantially short of IW’s enduring estimate of the required level (c. €237m in 2015 prices) and even by 2021 the projected annual CM programme expenditure of €179m falls short of IW’s estimated enduring CM needs.

14 IW submission to the CER at IRC1: IW “Capital Investment Plan Interim Price Control Submission 2014-16”
However, we do not consider that IW’s designated CM expenditure programmes (as set out by the orange bars in Figure 2.7) constitutes all of the CM activity that IW is expecting to undertake over the period 2017 to 2021. For example, we expect that there is a substantial capital maintenance activity undertaken within the major programmes of the investment plan. There also appear to be projects in the investment plan with 100% of expenditure allocated to “Base” under IW’s QBEG allocation, but which are not classified under Capital Maintenance Programme expenditure. The grey bars of Figure 2.7 provide an alternative estimate of the extent of capital maintenance included across all of the expenditure areas in the investment plan, based on the proportion of expenditure allocated to maintaining base service levels associated with each programme (i.e. QBEG definition). This would see CM start at a relatively low base of around €150m per annum in IRC2, converging on the enduring CM benchmark of €237m by the end of the investment plan in 2021.

We consider QBEG to be a more accurate reflection of actual capital maintenance expenditure than either IW’s identification of specific capital maintenance programmes in its IRC2 submission, or an aggregation of expenditure lines similar to our approach to estimating capital maintenance at IRC1. We would expect IW’s proposed classification of capital maintenance into the programmes shown by the orange bars in Figure 2.7 to converge closer to the QBEG classification over time – as it appears to do in the latter years of the investment plan. However, over the course of IRC2 we consider that a large portion of capital maintenance will be undertaken as part of the major projects of the investment plan, and therefore for the purposes of assessing the overall level of capital maintenance in 2017 and 2018, the base expenditure from the QBEG classification provides a more accurate reflection.

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15 That is, there are some projects where IW 100% of expenditure to relate to maintaining base service levels within the National Programmes and Major Project portfolios.
2.4.2. External benchmarks of long-term capital maintenance requirements

As part of its submission to the CER at IRC1, IW estimated the enduring capital maintenance needs based on a combination of a number of techniques:

1. Unit cost comparisons with Scottish Water;
2. Estimated implied capital maintenance from LA spend, compared to SW opex;
3. MEAV based comparison with Northern Ireland Water;
4. An external study comparing IW’s capital maintenance needs to those of Southern Water, and;
5. Unit cost comparisons with Welsh Water and Wessex Water.

In light of the range of estimates provided from each of these approaches, IW estimated an enduring requirement of €237m per annum.\(^{16}\) We considered that this approach was broadly sensible noting a number of caveats.\(^{17}\) This estimate was also in line with our own modelling approach at IRC1, as described below. IW has not provided any update of this analysis in its IRC2 submission. We have conducted our own benchmarking exercise to update the estimate of the required level of expenditure drawing on the revised asset data submitted as part of its plan.

Figure 2.8 shows capital maintenance per-population-served for IW and SW and NIW, at a comparable stage (i.e. measured in years since the introduction of incentive based regulation). We show IW expenditure based on both its designated capital maintenance spend and QBEG. Based on this measure, our analysis shows that IW’s expenditure is lower than SW, NIW and UK measures, and below IW’s enduring estimate (€237m).

Figure 2.8 also shows an apparent ramp up of expenditure over the course of IRC1, and then an initial drop in maintenance expenditure in the first year of IRC2 (“year 4” below). We consider this to reflect cost allocation, rather than an actual reduction in capital maintenance expenditure in the first year of IRC2. At IRC1 capital maintenance expenditure was not directly identified, and no QBEG allocation was available. IRC1 capital maintenance expenditure was estimated as the sum of several broad expenditure areas (minor works, suppressed capital maintenance, and water conservation programme expenditure). These expenditure lines would likely not have been allocated 100% to “base” under QBEG, and capital maintenance would have been undertaken in other parts of the IRC1 capital investment plan, such as the major projects.

Given the difference in estimation of capital maintenance between IRC1 and IRC2 we do not consider the apparent reduction in the first year of IRC1 to reflect the overall trend of capital maintenance expenditure. For the IRC2 review, we consider IW’s QBEG allocation to provide a more appropriate estimate of CM activity and the kink observed between IRC1 and IRC2 likely to relate to this change in methodology.

\(^{16}\) The estimate at IRC1 was of €236m in 2013 prices, which we have updated to 2015 prices using the Irish HICP series.

\(^{17}\) For more information refer to NERA (July 2014) “IW Interim Review Assessment Prepared for the Commission for Energy Regulation (CER)”
We also undertook an econometric benchmarking exercise, in line with our approach to assessing capital maintenance at IRC1. At IRC1, the approach was limited by the availability and accuracy of the data; the drivers we included were population served, mains length, leakage rates, and the number of water/waste water treatment works.

We run the models at service level (i.e. two separate models for the water and the waste water service respectively) to generate “predicted” costs for each company, on the basis of the relationship between cost drivers and cost levels from the panel of English and Welsh companies. 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 (2001 to 2011). In any given year companies may 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.

Figure 2.9 presents the modelled cost ranges for the water and the sewerage service combined. The bars represent the modelled efficient costs as “predicted” by our models, while the triangles represent actual costs.

We have re-run the models developed at IRC1, updated for more recent data on IW’s drivers. As shown in Figure 2.9, we estimate an enduring CM requirement between €163m to €245m. IW’s designated capital maintenance shown by the red triangle programmes falls far short of our estimate of the enduring level, and of IW’s estimate of enduring benchmark requirements

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18 For more information, see Annex C of our IRC1 report, or the econometric annex to this report which provides a high-level overview of the approach taken to econometric modelling at IRC1 and at IRC2.

19 For the comparator companies, the observed costs are outturn costs from 2013. For Irish Water the “actual” cost point is the average over the two years of the IRC2 business plan submission. All values are expressed in 2015 prices.
carried out at IRC1. However, the capital maintenance activities implied by the QBEG allocation – shown by the black triangle – are at the bottom end of our modelled range.

**Figure 2.9**
IW’s Modelled CM Versus Proposed CM – Combined Service (€m)

*Source: NERA analysis of annual regulatory returns (UK companies 2001 – 2011); Information provided by Irish Water (average annual spend over IRC2 period). All prices are expressed in EUR 2015.*

### 2.4.3. Review of IW’s proposed IRC2 capital maintenance expenditure

IW has developed a sound framework to inform its capital maintenance strategy. Its intention is to fully implement the capital maintenance common framework, a risk based approach to CM, and in line with best industry practice. However, the programmes are based on very significant assumptions regarding assets inherited from the LAs, where historical information may be absent or inconsistent. There are large gaps in the data, where IW has had to make substantive assumptions extrapolated from limited sample sizes in order to develop a system wide understanding of its assets, and to identify the levels of intervention required to address deficiencies and to maintain/improve asset condition and performance to acceptable long-term levels.

IW’s focus is on the maintenance of the water rather than the wastewater assets, and initially on the infrastructure (i.e. below-ground) assets. Investment on above ground assets is prioritised on larger, critical assets where IW has improved information and greater certainty around the asset condition and performance, and likely benefits.

IW has assessed that an overall capital investment plan of €4.8bn is required to achieve the outcomes proposed in their WSSP but, for reasons of limited funding, IW proposes a constrained budget of €3.6bn. To meet the constrained funding envelope – representing a 25 per cent reduction in the capital investment plan overall – IW has substantively reduced the capital maintenance elements by approximately one third of the unconstrained expenditure plan. Overall, faced with a constrained investment plan, we consider it reasonable that IW defer maintenance expenditure until it has a better understanding of its asset base and maintenance needs, and focuses expenditure on known quality (e.g. compliance) and availability issues.
As can be seen by the expenditure profile in Figure 2.7, there is a strong ramp-up later in the 2017-2021 period, particularly in WBG in 2019. The increase in expenditure relates predominantly to the mains rehabilitation and the “find & fix” programmes.

Figure 2.7 presents IW’s proposed expenditure under the programmes identified as capital maintenance in its investment plan, alongside an alternative view of total expenditure on capital maintenance activities based on IW’s classification of expenditure under the QBEG classification. As discussed above, we consider that the QBEG allocation more accurately reflects actual maintenance activity undertaken, with a large degree of capital maintenance being undertaken in the major programmes expenditure in the early years of the plan.

We consider that the profile of expenditure is reasonable, and that the overall level over IRC2, although at the lower end of our enduring estimate (as set out in Figure 2.9), ramps up to the enduring level by 2021 based on the QBEG allocation.\(^\text{20}\)

We consider the proposed level of expenditure implied by the QBEG allocation provides acceptable risk to asset condition and performance and customer services (although by definition, there may be some degradation in serviceability metrics), given that IW’s QBEG capital maintenance expenditure ramps up to our estimate of the enduring level over the five-year plan. These are long-lived assets, and we do not expect the short period of deferral to present unacceptable risk. Indeed, the lower level of maintenance in these early years reflects a reasonable approach to deferring investment until IW has an improved understanding of its assets, and can optimise expenditure drawing on the best practice tools that it has introduced. We also note that under IW’s QBEG allocation, capital maintenance is at the bottom end of the modelled range over IRC2 (a relatively short two year period) and is expected to attain levels comparable to other utilities by 2021.

In relation to cost efficiency, IW has used cost estimating tools consistent with industry standard costs adjusted to reflect outturn costs from LA projects and activities. However, the quantity and quality of data available to IW is limited and there is a lack of confidence around the cost estimates. The estimates are based on the way in which IW and the LAs have been specifying, packaging, procuring and managing similar activities historically and do not generally take into account the efficiencies that the establishment and transformation investments over IRC1 (and continued over IRC2) are expected to yield.

In addition, most of the programmes are at an early stage of development. We expect to see improvements in information and understanding of key asset metrics and costs such that the estimates of capital maintenance will be defined over time.

As with other areas, our review of IW’s expenditure estimates suggests that the capital maintenance (with the exception of some design, project management and overhead costs, at around 30% of the programme costs) are costed on the basis of pre IRC1 costs and approach and exclude the efficiency challenge determined by CER at IRC1 of 13.5%. One option is therefore to apply an initial starting efficiency challenge for IRC2 of 13.5% (excluding the ca. 30% element which we consider is based on efficient cost estimates). However, as in other

\(^{20}\) Although expenditure designated to capital maintenance programmes is below the level
areas, we have not included this reduction but the issue will be reconsidered following further discussions with IW. IW maintains that the entirety of its costs draws on efficient costs.

Consistent with other areas, we recommend a reduction – or efficiency challenge – to IW of 5% per annum for 2017 and 2018 drawing on evidence of cost improvements for comparators, as set out in section 4.

We do not apply efficiencies to the Find and Fix Programme (totalling c. €34m over IRC2), as the cost estimates have been developed on the basis of similar programmes of work in the UK. Whilst we would expect the Find & Fix process to be more productive for IW in terms of the average leakage found per fix (due to the considerably higher leakage rates prevalent), this is offset by the more mature state and efficiency of the supply chain in the UK. In this regard, IW appropriately propose to ramp up the programme post 2018 when more efficient procurement and delivery practices should be embedded. We consider that the post 2018 expenditure should be considered in the next revenue control review, due to commence in 2019, and the 2017/18 capex to be satisfactory without further efficiency reductions imposed.

Table 2.3 summarises our recommendations for IRC2 capital maintenance programme capex.

<table>
<thead>
<tr>
<th>Table 2.3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NERA Proposed Capital Maintenance IRC2 Allowance (€m)</strong></td>
</tr>
<tr>
<td>2017</td>
</tr>
<tr>
<td>IW BP Submission</td>
</tr>
<tr>
<td>Scope Reduction</td>
</tr>
<tr>
<td>Expenditure excluded from efficiency challenge (Find and Fix)</td>
</tr>
<tr>
<td>Cost efficiency</td>
</tr>
<tr>
<td>Efficiency Reduction</td>
</tr>
<tr>
<td>IRC2 Allowance</td>
</tr>
</tbody>
</table>

Source: NERA analysis

NOTE: We take as a starting point the IW BP headline submission numbers, which are rounded to the nearest million euros. The efficiency reductions are calculated using: 5%; 1- (1-5%)^2 =9.8%.

2.5. Non-Network Capital Expenditure (IRC2 €112m, IP2 €112m)

2.5.1. Summary of IW’s proposed non-network capital expenditure

At IRC1, IW requested non-network capex associated with facilities, business change, shared and group centre capex. IW also had some capital expenditure from the IWP establishment programme falling into IRC1.21

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21 The establishment programme included IT and systems expenditure, facilities, project management office, work and asset management etc. For more information see CH2M Hill (May 2014) “Irish Water Establishment Costs Stage 2 - Prepared for NERA Economic Consulting (and then Commission for Energy Regulation)”
Figure 2.10 shows IW’s proposed non-network capital expenditure over IRC2. Overall, IW proposes an increase in non-network capex compared to the outturn over IRC1. In terms of the main elements, we summarise the plan as follows:

- **Fleet investment**: IW proposes to increase expenditure on facilities and fleet investment during IRC2. According to the plan, this is required as a result of further asset transfers from the LAs and continuing rollout of the national transformation work in order to enhance IW’s regional presence. IW has also identified further capex relating to buildings to meet building and energy management standards and the continuing organisational distribution of staff and operational activities. Further capex is identified on the National Operations Management Centre and operational vehicles.

- **Information Technology (IT)**: IT investment is proposed to continue across a wide range of business areas from environmental and regulatory requirements coming from the EPA and the CER to consolidation and development of SCADA capability, further IW transformation requirements, IT infrastructure optimisation and customer service enhancements. IW also identifies further IT capex to enable major projects and HR systems resulting from the Water Industry Operating Framework (WIOF).

- **Business change IT**: This investment relates to the management of all non-construction change in IW and the transformation programme through the dedicated support function by providing change management and project management expertise. IW anticipates that demands on the support function will increase during IRC2 as many of the twenty seven projects in the transformation programme are implemented.

- **The Water Industry Operating Framework (WIOF)**: WIOF is a key element within the IW transformation programme. This comprises the full integration of LA operational functions into the IW business to align with standard integrated service delivery models.
  - IW proposes WIOF transformation at €30m for IRC1. In January 2017 when the final Business Case will be delivered (Gate 3 full investment approval), IW will update and provide more certainty to the timeline, the savings and the overall investment requirement. IW has identified considerable opex savings resulting from WIOF, although there are also risks to the timeline.

IW has not provided an estimate of proposed non-network capex requirements beyond the end of IRC2.
2.5.2. Review of IW’s proposed non-network capital expenditure

In general, we consider that IW has articulated the need case for these investments, and the costs are reasonable. Specifically, we note the following:

- **Facilities and Fleet:** In general, we consider that the costs of building and office works are reasonable, although we expect that scope exists to make some scope definition savings. The costs associated with the capital project offices and regional offices in support of the establishment of the Regional Capital Management Structure (for delivery of major capital projects and minor programmes) have drawn on the 2015 national construction costs database (Bruce Shaw Ireland handbook 2015) which we consider reasonable.

  In relation to need, there is uncertainty on the exact space requirements and again we consider some scope savings may be realised relative to the proposed plan.

  We note that IW may inherit ageing vehicles from the LAs, although there remains uncertainty around when and the number of vehicles they might transfer to IW, their condition, and thus their usefulness. We consider that most of the fleet is in need of replacement to meet IW’s operational needs. IW estimates the numbers and types of new vehicles (128 plus equipment) are required for IRC2. Further vehicles will be needed to complete the IW fleet requirements (some 300-400 in total) and expenditure is thus going to be required beyond the end of IRC2 into the following control period.

- **Business Change and IT:** Business Change investment is required for the external change management, business process (analysis, design and implementation) and project management to meet the extensive one off workload on these set up investments.

*Source: NERA analysis of IW IRC2 submission*  
*NOTE: IW has not provided a breakdown of IRC1 outturn non-network capex according to the subcategories used in the IRC1 submission (i.e. facilities, IT, business change, shared and group centre capex). We have taken the total outturn IRC1 non-network capex and allocated to subcategories following the proportional expenditure requested in the IRC1 submission.*
IT and BC functions work in parallel to deliver the business changes required. The IT investments are either for pure technology or business enabling purposes, the latter where IT and BC work in parallel.

In order to assess the cost efficiency of these areas (both business change and IT), we selected a sample of projects to review. We consider that the person rates reflect current framework agreements and compare very favourably with earlier cost estimates set out in an independent review of WIOF costs.

- **WIOF Transformation**: As described above, WIOF is key to the success of IW. It is a large and significant programme with other key capex investment dependencies. The WIOF requires substantive personnel resources which, due to the scale and expertise required, require significant numbers of external resource. As per the other elements of NNC, our review of the overall costs (principally personnel costs) suggests that these are reasonable.

Table 2.4 summarises our recommendations for non-network capex at IRC2.

We propose minor scope reductions for projects identified by IW as “on hold” or “low priority”, with these projects reconsidered at the next review. This leads to a reduced allowance of €4 million.

We have also applied an efficiency reduction of 5% p.a. for 2017 and 2018 consistent with our approach to the rest of the investment programme, except for those projects which are committed, and for the WIOF. As set out above, our review of the costs suggests that these are reasonable. Given the importance of WIOF to transforming IW’s operational model and in the delivery of the challenging opex efficiency assumptions, we consider that there is a reasonable case to exempt the WIOF programme from the efficiency challenge, at least during the IRC2 control period.

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2018</th>
<th>IRC2 Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IW BP Submission</td>
<td>59</td>
<td>53</td>
<td>112</td>
</tr>
<tr>
<td>Scope/efficiency reduction</td>
<td>-4</td>
<td>-4</td>
<td>-8</td>
</tr>
<tr>
<td>IRC2 Allowance</td>
<td>55</td>
<td>50</td>
<td>105</td>
</tr>
</tbody>
</table>

*Source: NERA analysis*

*NOTE: We take as a starting point the IW BP headline submission numbers, which are rounded to the nearest million euros*

### 2.6. IW’s Proposed Outputs and Outcomes

In its business plan and in the investment plan included in its IRC2 submission, IW has developed a series of outcomes which the overall envelope of capital expenditure is expected to deliver and against which the plan the overall implementation of the business plan can be assessed. Figure 2.11 replicates these targets.

In addition to the high-level outcome targets set out in Figure 2.11, IW has also associated outcomes with the majority of the projects and programmes included in its investment plan,
and the expected progress of each project to meeting the associated output/outcomes by 2018 and by 2021.

We consider the outputs associated to specific projects and the high-level objectives/outcomes associated with the plan to be appropriate level performance commitments against which the overall plan can be monitored. We discuss outputs monitoring in Section 6 and provide examples of the kind of indicators used for monitoring overall progress of capital investment plans from other jurisdictions in Appendix E.

Figure 2.11
Investment Output Targets for IRC2 and IP2 Period

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Investment Plan (2017 – 2021) Targets</th>
<th>Expected Outcomes by end of 2018</th>
<th>Expected Outcomes by end of 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of boil water notices in place for greater than 200 days</td>
<td>Reduce from c. 4,057 to Zero</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>No. of schemes on EPA’s Remedial Action List</td>
<td>75% to Zero (a)</td>
<td>44</td>
<td>9 (b)</td>
</tr>
<tr>
<td>Compliance with the parameters for Lead in Drinking Water</td>
<td>Increase from estimated 85–95% to 98% compliant</td>
<td>Plans and treatment for 200 WTWs (c)</td>
<td>98% compliant (d)</td>
</tr>
<tr>
<td>No. of common lead shared service pipes in the network</td>
<td>Reduce from c. 40,000 to Zero</td>
<td>32,500</td>
<td>25,000</td>
</tr>
<tr>
<td>No. of individual lead pipes in the network</td>
<td>Reduce from c. 140,000 to 50,000</td>
<td>132,000</td>
<td>120,000</td>
</tr>
<tr>
<td>Leakage</td>
<td>Reduce from 47% to &lt; 38%</td>
<td>44%</td>
<td>38%</td>
</tr>
<tr>
<td>WTWs rationalisation</td>
<td>Reduce from 856 to 780 WTWs</td>
<td>&lt;780 WTWs</td>
<td></td>
</tr>
<tr>
<td>WWTW – compliance with the UWWTD</td>
<td>Increase PE served by compliant WTWs from 45% to 90%</td>
<td>46%</td>
<td>90%</td>
</tr>
<tr>
<td>Overloaded wastewater treatment</td>
<td>(1) Reduce overloaded &gt;2000 PE plants from 25 to Zero (2) Reduce overloaded &lt; 2000 PE plants from 92 to &lt;80 plants</td>
<td>(1) 31 (2) 81</td>
<td>(3) &lt;15 (4) &lt;65</td>
</tr>
<tr>
<td>No. of wastewater agglomerations</td>
<td>Reduce from 40 to Zero</td>
<td>20</td>
<td>1 (e)</td>
</tr>
<tr>
<td>WWTWs – compliance with Emission Limit Values</td>
<td>Increase WWTWs serving &gt;500 PE compliance from 35% to 60%</td>
<td>39% to 45%</td>
<td>45% to 60%</td>
</tr>
<tr>
<td>Sewer flooding</td>
<td>Flood register established High priority flooding sites addressed</td>
<td>Flood register + One 2016 project start</td>
<td>11 Projects in progress + 1 completed</td>
</tr>
<tr>
<td>Energy efficiency</td>
<td>33% reduction by 2020</td>
<td>7%</td>
<td>20%</td>
</tr>
<tr>
<td>Headroom – Water (f)</td>
<td>(1) Headroom targets for urban/regional/other plants (2) GDA and Mid East (3) Plants with &lt;15% Headroom</td>
<td>(1) 54% (2) &gt;9% (3) 38%</td>
<td>(1) &gt;60% (2) &gt;7% (3) 30%</td>
</tr>
<tr>
<td>Headroom – Wastewater (g)</td>
<td>Headroom targets for urban/regional/other plants</td>
<td>55%</td>
<td>&gt;60%</td>
</tr>
<tr>
<td>Network capacity</td>
<td>Models and plans for urban and gateway towns (h)</td>
<td>WW: 2</td>
<td>WS: 9 WW: 9</td>
</tr>
</tbody>
</table>

Table 4.7 – Investment output targets for IRC2 and IP2 period.

Source: IW Investment Plan 2017 - 2021
2.7. Conclusions on Capital Expenditure and Output Delivery

Table 2.5 to Table 2.9 set out IW’s proposed expenditure in its investment plan, the sums we consider as part of this IRC2 review, ex ante scope reductions, the IRC2 capital efficiency challenge and finally the expenditure allowance that we propose should be accepted for IRC2, including allowances for projects committed at IRC2 where expenditure falls in subsequent review periods.

- Table 2.5 summarises IW’s submission, which includes €1,176m of capital investment over IRC2, and a further 112m of non-network capex, to a total of €1,288m for 2017 and 2018 combined;
- Table 2.6 sets out the expenditures associated with projects that we consider as part of the IRC2 review, excluding project expenditure which we propose should be revisited at the next price control review.
- Table 2.7 sets out proposed adjustments to IW’s ex ante allowance. We apply a €4m scope reduction in non-network capex, which includes projects identified by IW as “on hold” or “low priority”. These projects will be reconsidered at the next review.
- Table 2.8 sets out the efficiency challenge for each of the main expenditure categories, drawing on our analysis of capital efficiencies achieved by utilities at a similar stage of development in Section 4. Our review suggests that IW has costed the programme drawing on cost data and approaches prior to the formation of IW, and the cost estimates do not reflect any of the expected efficiencies over the IRC1 period. In this case, we recommend that a starting efficiency challenge of 13.5% applies to IW’s investment programme. However, IW has contested our findings, stating the costs are based on efficient E&W costs. For the purposes of this report, we have not included a reduction of 13.5% subject to further discussion with IW.

We apply an efficiency reduction of 5% per annum for 2017 and 2018. The 5% is based on our review of the improvements in cost performance for SW and NIW at a similar stage of development. For more information on the determination of the efficiency challenge see Section 4.

This implies an efficiency reduction of 5% to capex falling in 2017 and of 9.8% to capex falling in 2018. We apply the efficiency reduction to any non-committed capex.

- From our efficiency challenge, we exclude expenditure that we consider is (contractually) committed:
  - Major Programmes: We exclude expenditure committed to projects prior to 2017 – totalling €459m over the course of IRC2.
  - National Programmes: 21% of expenditure is excluded in 2017 only, which relates to carry over minor programmes from IRC1.
  - Capital maintenance: Around 29% of expenditure is exempt from the efficiency challenge – the Find and Fix programme.
  - Non-network capex: In general, we have applied our efficiency challenge of 5% p.a., with the exception of WIOF which is of strategic importance to IW and integral to realising cost efficiencies across the wider business.
Table 2.9 sets out the final allowance, net of the reductions proposed in Table 2.7 and Table 2.8. Overall we propose an IRC2 capital expenditure funding envelope of €1,233m, which represents a 4% (€55m) reduction in the expenditure allowance.

Depending on the available funding envelope, we propose that CER considers offsetting the proposed reduction in capital expenditure by bringing-forward other programmes to ensure continued improvement in water services in Ireland. That is, rather than implementing a cost reduction, CER implements the efficiency reduction through a required increase in outputs delivered over IRC2. A revised baseline set of projects and additional outcomes should therefore be agreed and closely monitored, as set out in Section 6.

<table>
<thead>
<tr>
<th>IW Proposed Capital Expenditure (€m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>2017 2018 2019 2020 2021 IRC2 Total IP Total</td>
</tr>
<tr>
<td>Water and Wastewater Projects 345 483 515 475 316 827 2,133</td>
</tr>
<tr>
<td>National Programmes 117 115 139 198 339 232 908</td>
</tr>
<tr>
<td>Capital Maintenance 53 63 118 133 180 116 547</td>
</tr>
<tr>
<td>Total Capital Investment 515 660 772 806 835 1,175 3,587</td>
</tr>
<tr>
<td>Non-Network Capex 59 54 - - - 112 112</td>
</tr>
<tr>
<td>Total IRC2 Capex 574 714 772 806 835 1,287 3,699</td>
</tr>
</tbody>
</table>

Source: NERA analysis

NOTE: We take as a starting point the IW BP headline submission numbers, which are rounded to the nearest million euros

<table>
<thead>
<tr>
<th>Capital Expenditure Considered in this Review (€m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017 2018 2019 2020 2021 IRC2 Total IP Total</td>
</tr>
<tr>
<td>Water and Wastewater Projects 345 483 283 135 55 827 1,300</td>
</tr>
<tr>
<td>National Programmes 117 115 135 135 232 232</td>
</tr>
<tr>
<td>Capital Maintenance 53 62 115 115</td>
</tr>
<tr>
<td>Total Capital Investment 515 660 283 135 55 1,175 1,647</td>
</tr>
<tr>
<td>Non-Network Capex 59 54 112 112</td>
</tr>
<tr>
<td>Total IRC2 Capex 575 714 283 135 55 1,287 1,762</td>
</tr>
</tbody>
</table>

Source: NERA analysis

NOTE: We take as a starting point the IW BP headline submission numbers, which are rounded to the nearest million euros
### Table 2.7
**Proposed Ex Ante Scope Reductions (€m)**

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>IRC2 Total</th>
<th>IP Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water and Wastewater Projects</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>National Programmes</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Capital Maintenance</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Capital Investment</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Non-Network Capex</td>
<td>-2</td>
<td>-2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-4</td>
<td>-4</td>
</tr>
</tbody>
</table>

**Source:** NERA analysis

**NOTE:** We take as a starting point the IW BP headline submission numbers, which are rounded to the nearest million euros

### Table 2.8
**Proposed Efficiency Challenge (€m)**

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>IRC2 Total</th>
<th>IP Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water and Wastewater Projects</td>
<td>7</td>
<td>19</td>
<td>19</td>
<td>10</td>
<td>3</td>
<td>26</td>
<td>58</td>
</tr>
<tr>
<td>National Programmes</td>
<td>5</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Capital Maintenance</td>
<td>2</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Total Capital Investment</td>
<td>13</td>
<td>35</td>
<td>19</td>
<td>10</td>
<td>3</td>
<td>48</td>
<td>80</td>
</tr>
<tr>
<td>Non-Network Capex</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Total IRC2 Efficiency Challenge</td>
<td>15</td>
<td>36</td>
<td>19</td>
<td>10</td>
<td>3</td>
<td>51</td>
<td>83</td>
</tr>
</tbody>
</table>

**Source:** NERA analysis

**NOTE:** We take as a starting point the IW BP headline submission numbers, which are rounded to the nearest million euros

### Table 2.9
**Proposed Final Allowance (€m)**

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>IRC2 Total</th>
<th>IP Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water and Wastewater Projects</td>
<td>338</td>
<td>464</td>
<td>264</td>
<td>125</td>
<td>52</td>
<td>801</td>
<td>1,243</td>
</tr>
<tr>
<td>National Programmes</td>
<td>113</td>
<td>104</td>
<td></td>
<td></td>
<td></td>
<td>216</td>
<td>216</td>
</tr>
<tr>
<td>Capital Maintenance</td>
<td>51</td>
<td>58</td>
<td></td>
<td></td>
<td></td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>Total Capital Investment</td>
<td>502</td>
<td>625</td>
<td>264</td>
<td>125</td>
<td>52</td>
<td>1,127</td>
<td>1,569</td>
</tr>
<tr>
<td>Non-Network Capex</td>
<td>55</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td>Total IRC2 Allowance</td>
<td>557</td>
<td>676</td>
<td>264</td>
<td>125</td>
<td>52</td>
<td>1,233</td>
<td>1,674</td>
</tr>
</tbody>
</table>

**Source:** NERA analysis

**NOTE:** We take as a starting point the IW BP headline submission numbers, which are rounded to the nearest million euros
3. Operating Costs

In this section we set out IW’s operating expenditure proposals. Unless otherwise stated, all prices are expressed in € 2015.

Our approach to assessing IW’s operating expenditure is to:

(i) Review IW’s expenditure proposals in specific functional areas and comment on the business case presented, including any supporting evidence (such as customer research, economic studies etc.);

(ii) Compare IW’s expenditure proposals to UK comparators drawing on unit cost comparisons, as well as econometric benchmarking to assess the comparative cost performance of IW and UK water and sewerage companies.

These analyses inform our view of IW’s current cost performance levels, which feed into our assessment of the appropriate cost efficiency profile for IW over IRC2, described in Section 4.

This section is structured as follows:

- Section 3.1 summarises IW’s proposals and describes the broader trend in opex expenditure over both IRC1 and now IRC2;
- Section 3.2 sets out aggregate level and unit cost comparisons between IW and comparable UK water utilities;
- Section 3.3 presents evidence from comparative benchmarking analysis. Further details are provided in a separate econometric benchmark annex to this report;\(^{22}\)
- Section 3.4 discusses the current evidence on bad debt levels and proposes options for how this could be treated at IRC2;
- Section 3.5 discusses key issues in IW’s presentation of its opex proposals; and,
- Section 3.6 summarises our conclusions and recommendations from our review of IW’s IRC2 proposed opex expenditure.

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\(^{22}\) NERA (June 2016) “IW IRC2 (2017-18) Assessment – ANNEX Econometric Benchmarking”
3.1. Overview of IW’s Proposals

In Figure 3.1, we present IW’s opex proposal as submitted to the CER. IW has proposed a total spend over IRC2 of €1,552.9m. As shown, IW proposes an increase in opex over IRC2 relative to IRC1, increasing by €28.6m (3.9%) from 2016 to 2017 and another €4.9m (0.6%) from 2017 to 2018.

As was observed at IRC1, a large share of IW’s proposed expenditure falls under the Service Level Agreements (SLAs) contracted with the local authorities, although IW expects the share of SLA expenditure to fall from 78% of total opex in 2014, to 72% by 2018 (noting that by 2015 it had already fallen to 74%).

IW has identified nine key deliverables which its operational model and associated expenditure are designed to support over the period of its business plan to 2021. The overarching theme across these nine deliverables is the “dual requirement to improve performance while reducing costs”:

Source: NERA analysis of IW IRC2 submission

23 We note that these proposals do not conform to the format requested in the business plan questionnaires which the CER provided to IW both at IRC1 and again at IRC2, and need reallocation to allow for comparison with water utilities across the UK, who are required to submit their data in a consistent format by their respective regulators, Ofwat, the WICs and UREGNI. IW has also included line items in “Non-controllable opex” which were classified as controllable by the CER at IRC1, consistent with its treatment of non-controllable opex in its regulation of the energy sector in Ireland.
(i) Establish the highest health and safety standards;
(ii) Implement a €5.5bn capital investment plan (over the period 2014 to 2021)
(iii) Deliver capital efficiency savings of €500m
(iv) Evolve IW into a high performing utility;
(v) Transform the water services operating model;
(vi) Deliver operating cost savings of €1.1bn;
(vii) Achieve best practice customer service;
(viii) Put IW on a solid commercial footing; and
(ix) Support economic growth in line with economic and spatial planning policy.

While we acknowledge IW’s long-term ambitions to become a leading water utility, it has not articulated in its business plan what it means by some of the broad statements made in its deliverables. For example, “the highest health and safety standards” do not appear to have been linked to any measurable performance target, nor is it clear what IW’s interpretation of “best practice customer service”, or the performance level targeted by its “high performance utility model” means in terms of service performance levels.

IW has not provided details of the capex and opex efficiency savings referenced in deliverable (iii) and deliverable (vi), nor the phased timing over which these efficiencies will be achieved. We discuss the question of efficiency profiles further in Section 4. It has also not provided supporting evidence as to why the service levels it is targeting are appropriate, nor how the cost savings compare to the cost levels and trends observed in comparable utilities elsewhere.

In the absence of a detailed set of longer-term projections (i.e. at IRC2 and beyond) for costs and improvements in customer and quality of service, it is difficult to assess whether IW’s IRC2 submission and transformational model represents good value for money for Irish customers.

In subsequent chapters, we provide evidence on its overall cost performance relative to comparators, and our expectations of the cost reductions that need to be realised to ensure it provides value-for-money for Irish water consumers and taxpayers (chapters 3 and 4). We also provide evidence on the expected rates of improvement in customer and quality of service drawing on improvements for water utilities at comparable stages of development to IW (chapter 5).

In the following sections, we review IW’s proposals for each functional area.
3.1.1. SLA expenditure

3.1.1.1. Summary of IW SLA proposed expenditure

Upon the establishment of Irish Water in 2014, IW entered into Service Level Agreements (SLAs) with the 34 (now 31) local authorities. The SLAs were signed for a period of 12 years, with review points at year two and year seven.\(^{24}\) IW substantially reduced SLA costs over the course of IRC1, achieving reductions in headcount and associated savings of €21m in relation to labour costs.\(^ {25}\)

IW does not propose any improvement in SLA cost performance over the course of IRC2 with expenditure across all categories remaining broadly constant, but with total costs slightly higher than the forecast outturn for 2016.

We understand from IW’s IRC2 narrative submission and from presentations from IW to the CER and to NERA that it intends to undertake a wide-scale reform of its operating model, to bring operations under the SLAs and under the TOM together into a single operating model. IW is proposing a transformation programme of €50m over IRC2 (this represents only the initial phases of expenditure), covering 27 programmes of activity. The most important of these is the Water Industry Operating Framework (WIOF). We have not been provided a detailed breakdown or profile of IW’s expected €1.1bn of opex efficiency savings by 2021.

\(^{24}\) As defined in the Water Services Act (No.2) 2013

\(^{25}\) NERA (2016) “Review of IW’s IRC1 Cost and Output Performance”
IW has re-categorised expenditure under the SLAs as “Operations and Maintenance” for IRC2. We understand this corresponds to the activities undertaken under the SLA contracts at IRC1, and for comparability we have labelled the expenditure below as “SLA”.

IW categorises its O&M expenditure falling under various categories as summarised in the bullets below and the expenditure profiles shown in Figure 3.2:

- Payroll (associated with LA staff);
- Goods and services (including materials and services, e.g. chemicals plant hire and contractor costs)
- Design build and operate (DBO) contracts;
- Energy costs (excluding energy purchased under DBO)
- Overhead costs (costs not attributable to an individual plant)
- Central management costs (incurred by LAs in managing and supporting the SLAs).

IW has identified a number of areas which it expects to drive growth in base O&M costs over IRC2. Overall, IW identifies an increase in so-called “growth expenditure” totalling €46m over IRC2, the majority of which affects the “goods and services” expenditure category. The drivers IW expects to drive this increase in costs are set out in Figure 3.3.

A core component of IW’s operating expenditure proposal is the transformation of the operating model, with a particular focus on the costs currently incurred under the O&M heading. IW has identified 27 such transformation projects, with preliminary costs savings expected in 2017 and 2018. IW proposes €44m O&M efficiencies over IRC2, of which €28m is associated with transformation activities. However, the expected improvement in cost efficiency of €44m is entirely off-set by up the “growth O&M opex” of €46m.

![Figure 3.3](image_url)

**Figure 3.3**
IW Growth O&M Opex (€46m)

*Source: NERA analysis of IW IRC2 submission*

3.1.1.2. Review of IW SLA proposed expenditure

The proposed O&M costs are broadly flat over IRC2 and no details are provided of longer term cost trends. By contrast, IW realised an improvement in SLA cost performance at IRC1
of around 7% p.a., in line with the CER’s IRC1 efficiency challenge, as noted in our review of IW’s historic expenditure.\textsuperscript{26} The Water Services Act (No 2) 2013 includes provision for a review of the operation of the agreements not later than two years and again not later than seven years after the making of the original agreements.\textsuperscript{27}

IW has presented evidence of a number of areas that are expected to drive increased O&M expenditure over the course of IRC2. These areas are expected to increase costs by more than the O&M efficiencies that IW anticipates over the same period. IW proposes a transformation programme consisting of 27 programmes to drive deeper benefits over the medium term, as we discuss in section 2.5.

In section 3.2, we compare IW’s unit costs with UK comparators, including for employment and material costs – of which SLA’s comprise the larger element. Our analysis shows that IW’s employment and material costs are substantively higher than the benchmark level which suggests that there is scope to continue to improve SLA cost performance in contrast to IW’s proposed increase in costs.

### 3.1.2. Target operating model

#### 3.1.2.1. Summary of IW TOM proposed expenditure

![Figure 3.4](image)

**Figure 3.4**
IW IRC1 Outturn and IRC2 Proposed TOM Expenditure (€305m)

*Source: NERA analysis of IW IRC2 submission*

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\textsuperscript{26} NERA (July 2014) “IW Interim Review Assessment Prepared for the Commission for Energy Regulation (CER)”

\textsuperscript{27} Irish Statute Book, Water Services (No. 2) Act 2013, Section 31
Figure 3.4 shows IW’s expenditure under its centralised Target Operating Model (TOM) over the course of IRC1 (outturn) and IRC2 (proposed). The TOM was introduced gradually over IRC1, which is why we see a relatively low level of expenditure in 2014, when IW came into creation and started to develop its operational models.

The TOM was phased in over the course of IRC1 to deliver a “High Performance Utility Model” (HPUM), following benchmarking with the aim of meeting “best in class” utility standards. At IRC1, the TOM model targeted the build-up of IW staff levels to an enduring level of 747 full-time equivalent by the end of 2016.

We understand from IW that it does not consider the TOM implemented at IRC1, which was reduced in terms of permanent headcount and activity levels, is sufficient to deliver the services required through IRC2. IW envisages a requirement to convert a portion of temporary staffing at IRC1 to permanent headcount at IRC2. IW has not provided a submission on the long-term requirements of the TOM model, but we understand from discussions that IW considers the FTE headcount at the end of IRC1 of just short of 700 to be below its enduring requirements. The IRC1 submission regarding TOM was based on a FTE count of 747, although we understand that this is below the level that IW considers it needs.

The observed cost increase in IRC2 is principally driven by resourcing of the permanent enduring TOM model including requirements identified to support capacity and capability gaps in WAM and support functions.

A large portion of the TOM costs is associated with customer operations, including operating a billings contact centre and a 24/7 operations centre.

IW provided evidence that its pay structures and headcount are efficient. The evidence broadly concludes that the Ervia pay model is appropriate for a “start-up” utility (although it also suggests that having a different pay model for IW within Ervia would be counterproductive). It notes that IW employees’ salaries are more likely to fall within the defined pay-bands than other parts of the business, because IW’s employees have largely been recently recruited onto “2012 Ervia pay ranges, rather than having been transitioned from more generous legacy pay arrangements”. The evidence provided by IW concludes that Ervia’s pay structures are broadly reflective of best industry practice in Ireland, and the report states that the pay ranges have been externally benchmarked.

We summarise the pay bands implemented for Irish Water, and the original headcount projections for the full TOM model in Figure 3.5. The orange bars show the pay scale ranges on the left hand axis, while the black line with yellow marker points represents the target operating model full headcount complement at IRC1 – as yet we have not received any information on the operating model envisaged over IRC2, or over the longer term as the WIOF programme is rolled out.

28 LA, group centre, shared service centre and major projects office staff are additional to this complement.
3.1.2.2. Review of IW TOM proposed expenditure

IW has faced the challenge of creating a new utility and has needed to recruit rapidly. In our review of IW’s historic expenditure and performance, we broadly concluded that IW has performed well against the IRC1 efficiency challenge set by the CER and has deferred implementation of the TOM where appropriate.\(^{29}\)

We do not necessarily agree with IW’s evidence that it claims shows “efficient” pay structures and headcount; the evidence provided by IW appears to be primarily concerned with the pay structure at different grades, and does not comment directly on headcount, nor on the appropriate staffing complement under different bands.

It is not straightforward to measure the headcount across the various functional areas of Irish Water’s structure, which includes multiple layers, from the group centre, shared service and major project functions shared at Ervia level, through to IW’s centrally managed TOM and on to the structure of the LA operations which IW has inherited and currently operates under 31 Service Level Agreements with DBO elements as well.

As with SLA costs, our comparison of total costs (and for employment, materials, and other areas) set out in Section 3.2 and Section 3.3 suggests that IW’s employments costs are high in aggregate, although we cannot definitely conclude where the balance of inefficiency lies between TOM and other functional areas.

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\(^{29}\) NERA (2016) “Review of IW’s IRC1 Cost and Output Performance”
3.1.3. **Group, shared service centre and major projects office**

3.1.3.1. **Summary of IW GC SSC and MP proposed expenditure**

**Figure 3.6**

IW IRC1 Outturn and IRC2 Proposed Shared Service, Group Centre and Major Projects (€72.8m)

IW has proposed an increase in shared service centre and group centre costs relative to expenditure incurred in IRC1, as shown in Figure 3.6.

In its forecast submission for IRC2, IW has set out the proposed expenditure on services shared at group level, namely the shared service centre, the group centre and the major projects office. IW has set out the division of activity between each of these units and the activities undertaken under the central TOM model.

The Group Centre is responsible for setting the strategic direction of IW and providing corporate governance and oversight. The major projects support function is responsible for managing the development and delivery of large scale gas and water infrastructure projects. Expenditure in these areas is projected to increase slightly over IRC2, although they comprise only a small share of IW’s total opex (about 2%) and the major projects opex comprises just 1% of the major capital expenditure it will support.

IW draws high-level comparisons with its expenditure on the Group Centre alone, which represents 2% of IW’s total opex requirement (based on a 65% allocation of the total costs of the Group Centre to IW). IW states that this expenditure is favourable in comparison to the allowance made by the CER for ESB networks at PR4 of 3.6% of opex for the distribution system operator and of 4.4% of opex for the transmission asset owner.

The shared service centre provides transactional support services to IW and GNI and the other shared services at Ervia level. In particular, the SSC covers transactional activities relating to:
IW IRC2 Expenditure Review Operating Costs

- Enterprise Application delivery and support;
- IT Service Delivery;
- IT Infrastructure Service;
- IT Project Management Office (PMO) support, and;
- IT vendor and contract management.

Both the shared service centre and the group centre have identified a set of targets to deliver over IRC2. However, few these targets map to KPIs which could be objectively monitored and are more aspirational in terms of the organisation of the business. For example, while one of the key deliverables for the shared services facilities service to provide is a reduction in facilities energy usage of 33% by 2020 compared to 2009 levels, most targets are higher level and not tied to verifiable targets, such as “increase automation in the delivery of facility services”, or “extract benefit of moving from multi-supplier model to strategic partnership with a single supplier partner to reduce costs and increase efficiency”, or “Deliver ‘Economies of Scale’ Procurement Savings”.

*Figure 3.7
IW Benchmarking of Business Support Functions*

IW provided evidence of the relative efficiency of its business support functions, as set out in Figure 3.7. The evidence focusses on the business support functions undertaken at Ervia group level and does not provide an assessment of the full range of services undertaken by IW as a whole. The high-level messages are that the adoption of a shared service model for the delivery of support functions is in line with international leading best practice.

Source: IW IRC2 Group Centre, Shared Services and Major Projects submission
As summarised in Figure 3.8, the evidence provided by IW intends to show that Ervia’s support functions performance generally compare favourably to benchmarks and that its service provision can be considered efficient.

**Figure 3.8**

**Benchmarking of Ervia Support Services**

<table>
<thead>
<tr>
<th>Cost/Efficiency Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Number of Finance function FTEs per €1bn revenue</td>
</tr>
<tr>
<td>2. Total cost to perform the Finance function per €1000 revenue</td>
</tr>
<tr>
<td>3. Total cost to perform the process group payroll per €1,000...</td>
</tr>
<tr>
<td>4. Total IT Spend per User</td>
</tr>
<tr>
<td>5. IT Operational Spending as Percentage of Revenue</td>
</tr>
<tr>
<td>6. IT Operational Spending per User</td>
</tr>
<tr>
<td>7. Number of FTEs that perform the HR function per €1 billion revenue</td>
</tr>
<tr>
<td>8. Total cost to perform the HR function per €1000 revenue</td>
</tr>
<tr>
<td>9. Number of FTEs for the Procurement process group per €1 billion...</td>
</tr>
<tr>
<td>10. Total cost to perform the procurement process as a % of purchase...</td>
</tr>
<tr>
<td>11. Total cost of Facilities function as percentage of revenue</td>
</tr>
<tr>
<td>12. Total Facilities cost per workstation</td>
</tr>
<tr>
<td>13. Total Facilities cost per FTE</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Process Metrics</th>
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<tbody>
<tr>
<td>14. Number of invoices processed per “process accounts payable” FTE</td>
</tr>
<tr>
<td>15. Percentage of invoice line items matched with a purchase order</td>
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<tr>
<td>16. Cycle time from job requisition to acceptance of offer</td>
</tr>
<tr>
<td>17. Number of learning days per employee</td>
</tr>
</tbody>
</table>

Source: NERA analysis of IW submission

3.1.3.2. Review of IW GC SSC and MP proposed expenditure

IW has clearly undertaken substantial work in determining an operating model which is fit-for-purpose to deliver water and waste water services to Irish customers, and the activities undertaken at Ervia level appear reasonable.

The evidence provided by IW presents useful evidence of the general structure of the IW and Ervia shared service model. In general we recognise that it supports the delivery of Ervia’s support services to IW, although note the following caveats:

- It does not provide a comprehensive review of the transition of IW and its support functions over time, and does not appear to provide a deep understanding of the objectives of the SSC – nor what should be expected of such a service in the context of Irish Water.
- Some of the metrics presented by IW may also reflect the nascent stage of Irish Water’s operations. For example, Ervia support functions in terms of headcount compare favourably against the comparator database used. However, it is not clear if this is reflective of the enduring framework for IW’s staffing model, nor whether the current number of FTE with access to systems is an accurate reflection of actual usage requiring support services.
The evidence includes benchmarks of Ervia’s support services as a whole and does not assess the requirements or specific context facing Irish Water. It provides only a partial assessment of the business as a whole and does not take into account any activities which may also be undertaken in parts of the business which were not considered.

IW claims that its group centre costs at around 2% of total opex is around half that of Irish energy networks. However, it is difficult to infer much from such analysis: the organisations may have different organisational structures and functions (are the “group centres” alike in terms of functions) and how different are the overall level of costs (the denominator in the benchmark). In terms of organisational structure, in addition to the group centre, IW proposes a separate shared service centre, a major projects management function and a TOM model, on top of the pre-existing LA structure. Given this, we do not consider the percentage allocation of opex cited above by IW to be easily comparable to the group level expenditure undertaken by ESB Networks. We also note that IW’s expenditure on group as a proportion of total opex will be low, in part driven by the high level of base opex relative to comparators (as discussed in Section 3.2 and Section 3.3).

### 3.1.4. Non-controllable opex

#### 3.1.4.1. Summary of non-controllable proposed expenditure

**Figure 3.9**

**IW IRC1 Outturn and IRC2 Proposed Non-Controllable Opex (€52.3m)**

IW has classified the following expenditure items as non-controllable opex:

- LA commercial rates (€0m). IW has been exempt from paying the LA rates since 2015, and has no expenditure falling under this category in IRC2. There was a relatively large expense on LA rates in Q4 2014 of €47.1m, which explains the spike in the 2014 column of Figure 3.9;
• Licences and levies (€18.0m), which consist of EPA licence fees and the CER levy;
• Irrecoverable VAT (€8.0m), which comprises VAT on expenditure on shared Ervia services, which are costed exclusive of VAT, as these entities have VAT recoverability;
• Pension costs (€0m). IW did not incur any expense under this category in IRC1 and does not forecast any expenditure for IRC2;
• Insurance (€26.3m).

3.1.4.2. Review of non-controllable proposed expenditure

As at the IRC1 Decision, and in the CER’s assessment of IW’s IRC1 expenditure over the IRC period, only licences and levies and commercial rates were deemed uncontrollable and therefore cost pass-through items.

As per the most recent CER decisions in the energy sector and IRC1, and consistent with GB regulators, we do not consider that insurance costs are outside of the management control, although we recognise that IW has inherited its current insurance liability position from the arrangements already in place by the regional LAs (as with other SLA costs).

We recommend that CER maintain the framework introduced at IRC1 and treat only licences and levies and commercial rates as cost pass-through items. Insurance and irrecoverable VAT should be assessed according to the general principles of this review as set out in the introduction to Section 3 of this report, i.e. considered controllable for the purposes of the efficiency challenges discussed in Section 4.

3.2. Operating Expenditure Comparisons

In this section, we consider IW’s opex costs at an aggregate and unit cost level compared to UK water companies.

3.2.1. Total expenditure level comparison

Figure 3.10 compares IW’s combined service average annual operating expenditure over the IRC2 period (2017-18) to the annual operating expenditure of the UK water and sewerage companies.  

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30 CER (October 2014) “Water Charges Plan Irish Water’s Interim Revenue Review - Response to Comments and Decision Paper” CER/14/454
31 See NERA (2016) “Review of IW’s IRC1 Cost and Output Performance”
32 The last available year of published data for the UK comparators is 2013-14, which we have inflated to 2015 prices using the UK ONS RPI CHAW series
IW’s expenditure in absolute terms is high – only Thames Water has a (marginally) higher level of annual operating expenditure, and then only slightly while it is a much bigger company. While this is a crude measure of cost performance, given the differing scale of operations of these companies, it suggests that IW has a low degree of cost performance relative to peers. We control for the different scale of the companies below, with unit cost comparisons using population served as the denominator.

### 3.2.2. Unit cost comparisons

To help identify areas where IW’s current performance shows particular variation to the performance of the mature E&W utilities and from SW and NIW at a similar stage of development, we asked IW to complete a breakdown of operating expenditure by functional area as part of its BPQ response. IW has not provided such a breakdown, so we have allocated expenditure into functional expenditure categories, as set out in Table 3.1. We undertook a similar classification in our analysis to support the CER’s IRC1 Decision. However, IW’s classification of expenditure has changed since the IRC1 submission, notable with respect to expenditure under the SLAs. The following analysis should therefore be interpreted with caution and considered indicative only.

Within the Operations and Maintenance (formerly SLAs) category, IW has substantially changed the categories used to present its IRC2 submission. At IRC1 IW categorised expenditure according to: labour, materials, plant hire, maintenance, contractor costs (including DBOs) energy and overheads. For IRC2 IW has used the following allocation:

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NERA (July 2014) “IW Interim Review Assessment Prepared for the Commission for Energy Regulation (CER)”, Table 5.1
- **Payroll**, which we take to be equivalent to the previous IRC1 allocation to “labour”;
- **Goods & Services**, which is made up of the IRC1 categories “materials”, “plant hire”, “maintenance” and the contractor costs portion of “contractor costs”, excluding DBOs costs;
- **DBO**, separates out the DBO costs from the IRC1 “contractor costs”;
- **CMC**, are central management costs incurred by the LAs in managing and supporting the Service Level Agreements, including pension costs to dormer LA staff, LA management costs, finance, HR and IT;
- **Energy**, is the same “energy” IRC1 category and includes energy purchased wither directly or indirectly through LAs. It does not include energy procured under the DBOs;
- **Overheads.** Includes costs related to the operation of plants but not attributable to a single plant, such as transport, training and telecommunications. The IRC1 category “overheads” costs also included the equivalent of CMC.

Table 3.2 shows the proportion of expenditure falling under each functional area for IW and for UK comparators. As shown, given the current allocation to expenditure lines, IW’s employment costs are substantially higher than comparators both at IRC1 and at IRC2.

For power costs, IW is lower than all comparators, although note that this does not include any power costs purchased under the DBOs. While at IRC1 IW’s spend on materials and consumables appeared in line with comparators, at IRC2 we find a large change in expenditure under this functional area. This is almost certainly as a result of the allocation technique we have undertaken, and underlines the need for IW to provide information in a format consistent with that provided by UK water utilities, to facilitate comparative analysis.
### Table 3.1
IW Opex Classification Matching to UK Comparators

<table>
<thead>
<tr>
<th>UK Classification</th>
<th>IW IRC1 Classification</th>
<th>IW IRC2 Classification</th>
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</thead>
<tbody>
<tr>
<td>Employment Costs</td>
<td><strong>Labour</strong>&lt;br&gt;Sum across SLA and IW activities</td>
<td><strong>Labour</strong>&lt;br&gt;Sum of “payroll” expenditure lines across SLA and IW activities</td>
</tr>
<tr>
<td>Hired &amp; contracted services</td>
<td><strong>Hired and Contracted Services</strong>&lt;br&gt;- TOM professional services&lt;br&gt;- SLA contractor costs</td>
<td><strong>Hired and Contracted Services</strong>&lt;br&gt;- TOM professional services&lt;br&gt;- DBOs</td>
</tr>
<tr>
<td>Power</td>
<td><strong>Energy</strong>&lt;br&gt;Within SLA expenditure</td>
<td><strong>Energy</strong>&lt;br&gt;Within O&amp;M (formerly SLA) expenditure</td>
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<tr>
<td>Materials &amp; consumables</td>
<td><strong>Materials</strong>&lt;br&gt;Within SLA expenditure</td>
<td><strong>Materials</strong>&lt;br&gt;Goods and services within O&amp;M</td>
</tr>
<tr>
<td>Other</td>
<td><strong>Other</strong>&lt;br&gt;- Agencies&lt;br&gt;- Associated companies&lt;br&gt;- Other Direct Costs&lt;br&gt;- Bulk Supply Imports&lt;br&gt;- General and support expenditure&lt;br&gt;- Customer Services&lt;br&gt;- Scientific Services&lt;br&gt;- Other business activities&lt;br&gt;- Doubtful Debts</td>
<td><strong>Other</strong>&lt;br&gt;- All TOM costs that are not related to labour or professional services&lt;br&gt;- Plant hire (within SLA costs)&lt;br&gt;- Maintenance (within SLA costs)&lt;br&gt;- Overheads (within SLA costs)</td>
</tr>
<tr>
<td>Uncontrollable costs:</td>
<td><strong>Uncontrollable Costs:</strong>&lt;br&gt;- Service charges&lt;br&gt;- Local Authority Rates&lt;br&gt;- Exceptional Items&lt;br&gt;- Third Party Services</td>
<td><strong>Uncontrollable Costs:</strong>&lt;br&gt;- Licences&lt;br&gt;- Rates&lt;br&gt;- Irrecoverable VAT&lt;br&gt;- Insurance</td>
</tr>
</tbody>
</table>

NERA analysis of UK regulatory returns and Information provided by Irish Water

Figure 3.12 shows controllable opex broken down into functional expenditure areas as described above. IW’s water costs appear to be particularly high in relation to employment costs and materials, although some of the observed variation may result from cost allocation issues. It is worth noting that the bulk of IW’s employment costs fall under the O&M budget which at present is largely inherited from the SLA agreements with the LAs (70% in 2018 compared to 84% in 2014).

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34 IW has not provided the CER with this functional area breakdown of expenditure. In the absence of a formal submission from IW we have categorised the expenditure as best as we could but there may be differences in the way UK comparators categorise their expenditure and how this has been mapped to equivalent expenditure lines for Irish Water.
Table 3.2
Proportion of Opex by Functional Expenditure area (% total opex)

<table>
<thead>
<tr>
<th></th>
<th>E&amp;W Min</th>
<th>E&amp;W Max</th>
<th>E&amp;W Ave</th>
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<th>NIW</th>
<th>IW (IRC1)</th>
<th>IW (IRC2)</th>
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<td>Employment Costs</td>
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<td></td>
<td></td>
<td>16.2</td>
</tr>
<tr>
<td>Total Opex</td>
<td>n/a</td>
<td>n/a</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: NERA analysis of regulatory returns, (for E&W, SW and NIW, last full year of available data is taken from 2009-10); Information provided by Irish Water average over IRC1 and IRC2 periods.

3.2.2.1. Water service

Figure 3.11 shows IW and UK comparator operating unit cost performance for the water service.\(^{35}\)

IW’s unit costs in terms of population served are higher than all UK comparators. This is also true for controllable opex. It is notable that IW forecasts its operating unit cost performance to deteriorate over IRC2, that is, four years since the creation of IW as a national utility subject to incentive based regulation, IW proposes no improvement in its operating cost levels, with a widening gap to the opex levels achieved in the UK.\(^{36}\)

By contrast, since the introduction of incentive based regulation in 2002-03, Scottish Water has converged on the average unit opex performance of E&W comparators.\(^{37}\) Northern Ireland Water (NIW) has undergone a similar trend of unit costs converging to the E&W average since the introduction of incentive based regulation in 2007-08 – as for SW its opex is now also broadly comparable to the E&W average.

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\(^{35}\) Note: we have only been provided with data at combined service level in the BPQ response. For analytical purposes, we allocate 50% of IW’s opex to the water service and 50% to the sewerage service.

\(^{36}\) All figures are presented in € 2015

\(^{37}\) In Figure 3.11 this is shown by the decrease in the size of the black bars over time to a level comparable with the blue line representing the E&W average, which has been relatively constant in real terms over the period 2000-01 to 2009-10.
3.2.2.2. Sewerage service

Figure 3.13 shows IW’s operating unit cost performance for the sewerage service. As with the water service, IW’s unit costs are higher than all UK comparators in terms of population served, and this is also true for controllable opex. Figure 3.14 breaks the controllable opex down into functional expenditure areas, to allow comparison between different types of...
expenditure at service level.\textsuperscript{38} As with the water service, this shows relatively high sewerage opex costs for employment and material and consumables.\textsuperscript{39} By contrast, IW’s cost performance for power is more in line with its peers, although this may be explained by the lower extent in Ireland of energy intensive secondary and tertiary sewage treatment.

\textsuperscript{38} As noted above, IW has not provided this data, so should be interpreted with caution and as indicative only.

\textsuperscript{39} As noted above, the apparent high expenditure on materials and consumables is likely driven by simple cost allocation rules. This allocation should be developed by IW, as has been requested in IRC1 and IRC2 business plan questionnaires.
3.3. Econometric Modelling of Operating Costs

3.3.1. Approach

In this section we summarise our approach to econometric benchmarking of IW’s proposed operating expenditure. We present only a high-level summary of the methodology and
results here, with full details of the modelling undertaken in a separate econometric benchmarking annex to this report.\footnote{NERA (June 2016) “IW IRC2 (2017-18) Assessment – ANNEX Econometric Benchmarking”}

The purpose of undertaking comparative benchmarking is to provide statistical evidence to support our assessment of the efficiency of IW’s proposed IRC2 operating expenditure.

We have considered the approaches developed by UK regulators to assess comparative efficiency in our own assessment of IW. We have considered the econometric models developed by Ofwat at its most recent price control (PR14), as well as the UK’s Competition and Markets Authority (CMA) in its consideration of the appeal of Bristol Water’s decision of Ofwat’s PR14 price control decision. We have also reviewed the models developed by the UREG in Northern Ireland in its assessment of NIW’s cost efficiency at PC15.

Based on our review of regulatory precedent, we have developed a range of potential models to assess IW’s cost performance. By setting out IW’s comparative performance based on a range of model specifications, our approach acknowledges that it is difficult to identify a definitive statistical model that fully explains water companies’ costs. In particular, we have been careful to investigate the impact of IW’s specific characteristics, such as its greater length of water network per connections on its comparative cost efficiency, namely, by including network length in certain model specifications. We do this even though in general, models developed by Ofwat, CMA and UREG show that connections rather than network length is the principal cost driver.

We use the model results to generate “predicted” costs for each company, on the basis of the relationship between cost drivers and cost levels from the panel of English and Welsh companies. 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 (2001 to 2011). Some companies therefore exhibit cost performance which is superior to the predicted range, while some companies exhibit cost performance above (i.e. inferior to) the predicted range.

### 3.3.2. Results

Our overall conclusion from the modelling exercise is that IW’s proposed IRC2 operating expenditure is very high compared to a benchmark level of efficient expenditure formed based on UK water and sewerage companies. We consider that a reasonable interpretation of the evidence is that IW’s opex costs are at least 70% higher, and more likely to be closer to 100% higher (i.e. twice) the long-run efficient level for IW.

Figure 3.15 and Figure 3.16 present the modelled cost ranges for the water and the sewerage service respectively. In both cases, the bars represent the modelled efficient costs as “predicted” by our models, while the triangles represent actual costs.\footnote{For the comparator companies, the observed costs are outturn costs from 2013. For Irish Water the “actual” cost point is the average over the two years of the IRC2 business plan submission. All values are expressed in 2015 prices.} The round blue markers present the modelled efficient cost levels from our preferred model (“Model 1”),
which we consider to be the most reasonable baseline model around which the other models are presented as sensitivities.\footnote{We consider Model 1 to be our preferred specification, as it uses an “optimal” weighting for the composite scale variable, and does not include the treatment works variable, which is questionable partly because it takes different signs in the water and waste water models. Refer to econometric benchmarking annex for further details on model specifications}

The modelled cost ranges for IW are large compared to most UK companies. This is because IW is an outlier with respect to some of the drivers included in the models, notably with respect to mains length and numbers of water and waste water treatment works.

For the water service, our best estimate of efficient controllable costs for IW is €190m, and our top end estimate is €221m per year compared to proposed controllable opex (net of VAT) of €350m. The highest predicted costs results from a model specification where we place an equal weighting on the three cost drivers: mains length, connections and distribution input. By contrast, our preferred model specification places less weight on mains length as a cost driver (indicated by a black marker). Our preferred model is also in line with model specifications developed by CMA in the recent Bristol Water appeal and UREG for NIW.

Across all model specifications considered, IW’s proposed controllable operating expenditure (net of VAT for comparability) of €350m per year is about 60 per cent higher than the predicted efficient costs from any of our models, and 80 per cent higher than our best estimate of its efficient costs.

For the sewerage service the picture is similar. In this case, IW’s proposed controllable operating expenditure (net of VAT for comparability) of c. €350m is more than 80 per cent higher than even the top end of the modelling range (which predicts costs of €193m), and 90 per cent higher than our best estimate (with predicted costs of €183m).
Figure 3.15
IRC2 Opex Model - Water Modelled Ranges

SOURCE: NERA analysis of Ofwat’s PR14 dataset, UK regulatory submissions and IW’s BP submissions.
NOTE: Models estimated using E&W data (2009-13). All UK modelled and observed costs presented in this chart correspond to 2013; all IW costs correspond to the 2017-18 average. All costs are in 2015 prices.

Figure 3.16
IRC2 Opex Model - Sewerage Modelled Ranges

SOURCE: NERA analysis of Ofwat’s PR14 dataset, UK regulatory submissions and IW’s BP submissions.
NOTE: Models estimated using E&W data (2009-13). All UK modelled and observed costs presented in this chart correspond to 2013; all IW costs correspond to the 2017-18 average. All costs are in 2015 prices.
3.4.  Bad Debt

In this section, we draw on evidence from E&W to identify an efficient level of bad debt costs. At future reviews, CER may need to make an allowance for bad debt depending on the decision on domestic charging arrangements.

3.4.1.  Domestic bad debt

We set out the doubtful debt and bad debt write downs for UK water and sewerage companies.43

Figure 3.17 shows the doubtful debt cost and debt written-off as a percentage of revenue for domestic customers in 2015. On average, 3.7% of domestic water revenues are deemed doubtful in 2015 and therefore included as operating costs on companies’ P&L. Actual written off debts in 2015 averaged 2.7% of water company domestic revenues. The worst performing companies are United Utilities and Thames Water with around 4% and 5% bad debt levels respectively as a proportion of total revenue for 2015.

Scottish Water and Northern Ireland Water are not relevant comparators for bad debt levels, as in the case of SW, domestic charges for unmetered customers have been collected by the local authorities,44 while in Northern Ireland domestic charges have not been introduced.

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43 Doubtful debt refers to the outstanding revenue that companies expect that they may not be able to recover from customers. Doubtful debts are written off when all available methods for collecting the revenue have been exhausted and the revenue is deemed uncollectable.

44 See for example, Scottish Water “Your Charges Explained – Scheme of Charges 2015/16. Charges for household customers and other non-licensed activities”
3.4.2. Non-domestic bad debt

Figure 3.18 shows the doubtful debt cost and debt written-off for non-domestic customers in England and Wales, which are lower than that for domestic customers in percentage terms; 1.7% of non-domestic water revenues are deemed doubtful, with just 1.3% written off.

IW has provided a high-level estimate of bad debt (27 month average) of 9.39% for IRC1. We expect IW’s performance to be initially worse than E&W company performance given the transition of billing functions from LAs to IW. Given the UK evidence, and IW’s initial expectation of attaining a bad debt level of around 8% for domestic customers, we consider a value of around 3% to 5% reasonable for IW.

Source: NERA analysis of water company 2015 annual reports
Note: averages are calculated as industry total doubt debt divided by industry total revenue
3.5. Key Issues in Presentation of IW’s Proposed IRC2 Opex

From our review of IW’s IRC2 submission, and our own cost efficiency analysis, we draw the following conclusions:

- **IW proposes a net increase in opex over IRC2.** The modest efficiency reductions are lower than the assumed growth opex drivers over the period. The result is a net increase in operating expenditure relative to IRC1. In several areas increased expenditure is cited with reference to driving efficiencies elsewhere in the business (for example the IRC2 spending on group and shared services and the TOM model are expected to drive deeper efficiencies in O&M). However, there are cost increases across all expenditure categories projected over IRC2 and no detailed profile of efficiencies to 2021.

- **IW’s long term efficiency targets have not been explained.** IW states it will have achieved €1.1bn in opex efficiency savings by 2021. However, over the IRC2 period, it identifies just €22m of savings in each year. We have not been provided with details of the €1.1bn target.

- **IW continues to classify Insurance and Irrecoverable VAT as uncontrollable,** despite clarity in the IRC1 Decision and in the CER’s review of IW’s historic IRC1 expenditure. We do not agree with IW’s classification and recommend the treatment of cost pass-through items (i.e. commercial rates and licences and levies) be consistent with the IRC1 Decision.

- **IW has not proposed a comprehensive set of customer and quality of service targets over the IRC2 period and beyond.** However, we understand that IW has engaged with the CER on the development of a set of customer and quality of service measures, which
should provide a transparent way to monitor service performance over time and a degree of comparability to utilities in Ireland and the UK.

- **IW’s proposed operating expenditure is high in absolute terms and remains very high in unit terms on all comparative benchmarks**, as set out in Section 3.2. We have developed a range of statistical models drawing on the approaches and models developed by UK regulators, notably the UK’s CMA and UREG in NI. Based on such models, and controlling for IW specific factors, we conclude that IW’s costs are at least 60% higher than the long-run efficient level, and potentially around 100% (i.e. twice) as high.

### 3.6. Conclusions on IW IRC2 Opex Proposals

We have reviewed the operating expenditure proposed by Irish Water and compared this to the cost performance observed in the UK by mature utilities and by utilities at a similar stage of development to IW. We do not propose to determine the level of expenditure that IW should incur at sub-category level, as IW should make optimal business decisions with its funding allowance.

We have set out a number of reasons why IW’s opex may currently be higher than peers, including that it has largely inherited its cost base from the local authorities and that there may be constraints on IW’s ability to immediately drive some efficiencies. There are also reasons why IWS’s opex may be low relative to comparators. For example, we would expect it to have lower energy costs than peers to the extent that it undertakes less secondary and tertiary treatment, and we would expect lower opex given lower service performance.

In Section 4.1 below we set out the efficiency reductions made by utilities at a comparable stage of development which supports a range of 5%-10% p.a. SW achieved a value towards the higher-end although we note that this is a single observation, and that there may be differences between SW and IW which may mean that a value towards the lower-end is more reasonable for IW at the current review, e.g. the constraints imposed by IW’s operating model.

Our proposed opex allowances are based on a 5% p.a. efficiency challenge, i.e. around a 10% cumulative reduction by the end of the IRC2 period. If realised by IW, the overall improvement in opex performance at the end of IRC2 relative to the start of IRC1 (in Q4 2014) would be around 20%.45

- Table 3.3 summarises IW’s operating expenditure proposal as submitted to the CER, for a total of €1,522.9m over the course of IRC2.
- Table 3.4 sets out our proposed reallocation of expenditure between controllable and uncontrollable opex. As at IRC1, we recommend that “irrecoverable VAT” and “insurance” be classified as controllable. We exclude IW’s DBO contracts (design build operate) from the efficiency challenge, as we assume that these costs are largely outside of IW’s control within the course of IRC2. This is a similar approach to that adopted by

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45 This is calculated as 1-((1-14.9%)*(1-5%)^2) which is equal to a 23% reduction by the end of IRC2.
the regulator in Scotland, which excluded the equivalent contracts for SW from the main efficiency challenge.46

- Table 3.5 explains the efficiency calculations for base controllable opex, taking expected 2016 outturn expenditure as the starting point for the proposed cost reductions.
- Table 3.6 presents the final recommended IRC2 opex allowance, which represents a 12% reduction in controllable opex (excluding DBO contracts) against IW’s IRC2 submission (a reduction of €147.6m).

Our proposed cost allowances also include an additional one-off allowance for IW of ca. €9.9 p.a. million to improve current deficiencies in service levels to consumers. The improvements that these amounts will provide for are: a) rolling out a comprehensive approach to trade effluent licensing and monitoring; b) the formation of a single asset delivery function within IW; and c) improving asset data capture; and d) improving plant monitoring and performance.

<table>
<thead>
<tr>
<th>Table 3.3</th>
<th>IW Proposed Operating Expenditure (€m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controllable Opex</td>
<td>2017</td>
</tr>
<tr>
<td>Operations and Maintenance</td>
<td>546.2</td>
</tr>
<tr>
<td>Target Operating Model</td>
<td>152.9</td>
</tr>
<tr>
<td>Group, Shared and Major Projects</td>
<td>59.8</td>
</tr>
<tr>
<td><strong>Total IRC2 Submitted Opex</strong></td>
<td>759.0</td>
</tr>
</tbody>
</table>

Source: NERA analysis

<table>
<thead>
<tr>
<th>Table 3.4</th>
<th>Proposed Reallocation of IRC2 Operating Expenditure (€m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reallocation of insurance and irrecoverable VAT</td>
<td>16.4</td>
</tr>
<tr>
<td>Uncontrollable Opex</td>
<td>7.4</td>
</tr>
<tr>
<td>Controllable Opex</td>
<td>751.6</td>
</tr>
<tr>
<td><strong>Total IRC2 Submitted Opex</strong></td>
<td>759.0</td>
</tr>
</tbody>
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Source: NERA analysis

46 See section 4.1.1.
### Table 3.5
Proposed Efficiency Challenge (€m)

<table>
<thead>
<tr>
<th></th>
<th>2016 (baseline)</th>
<th>2017</th>
<th>2018</th>
<th>IRC2 Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controllable opex baseline (outturn)</td>
<td>723.8</td>
<td>723.8</td>
<td>723.8</td>
<td>1447.7</td>
</tr>
<tr>
<td>Controllable opex baseline (excluding DBO expenditure)</td>
<td>612.8</td>
<td>612.8</td>
<td>612.8</td>
<td>1225.7</td>
</tr>
<tr>
<td>Efficiency challenge (p.a.)</td>
<td>-5%</td>
<td>-5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency challenge (cum.) over IRC2</td>
<td>-5%</td>
<td>-9.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency reduction</td>
<td>-30.6</td>
<td>-59.8</td>
<td>-90.4</td>
<td></td>
</tr>
<tr>
<td><strong>Recommended IRC2 Controllable Opex Post-Efficiency (excl. DBOs)</strong></td>
<td><strong>582.2</strong></td>
<td><strong>553.1</strong></td>
<td><strong>1135.3</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Source: NERA analysis*

### Table 3.6
Proposed Final Allowance (€m)

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2018</th>
<th>IRC2 Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IW submitted opex</strong></td>
<td>759.0</td>
<td>763.9</td>
<td>1522.9</td>
</tr>
<tr>
<td>IW submitted controllable opex (reclassified, excluding DBOs)</td>
<td>640.6</td>
<td>642.3</td>
<td>1282.9</td>
</tr>
<tr>
<td>IW submitted DBO expenditure</td>
<td>111.0</td>
<td>111.0</td>
<td>222.0</td>
</tr>
<tr>
<td>IW submitted non-controllable opex (reclassified)</td>
<td>7.4</td>
<td>10.6</td>
<td>18.0</td>
</tr>
<tr>
<td>Proposed allowed controllable opex (excl. DBOs)</td>
<td>582.2</td>
<td>553.1</td>
<td>1135.2</td>
</tr>
<tr>
<td>• Reduction in allowed controllable opex, excl. DBOs (€m)</td>
<td>-58.4</td>
<td>-89.2</td>
<td>-147.6</td>
</tr>
<tr>
<td>• Reduction in allowed controllable opex, excl. DBOs (%)</td>
<td>-9%</td>
<td>-14%</td>
<td>-12%</td>
</tr>
<tr>
<td>Proposed allowed DBO expenditure</td>
<td>111.0</td>
<td>111.0</td>
<td>222.0</td>
</tr>
<tr>
<td>Proposed allowed non-controllable opex</td>
<td>7.4</td>
<td>10.6</td>
<td>18.0</td>
</tr>
<tr>
<td>Capabilities allowance</td>
<td>9.9</td>
<td>9.9</td>
<td>19.8</td>
</tr>
<tr>
<td><strong>IRC2 Proposed Opex Allowance</strong></td>
<td><strong>710.5</strong></td>
<td><strong>684.6</strong></td>
<td><strong>1395.1</strong></td>
</tr>
</tbody>
</table>

*Source: NERA analysis*
4. Rates of Improvement in IW’s Cost Efficiency

IW broadly met the efficiency challenges set by the CER at IRC1. IW has stated that in order to meet the IRC1 expenditure allowance, it had to defer some activities, such as roll out of standard operating procedures and water sampling activities. These items were not expected to be major expenditure areas at IRC1 and IW continued to deliver the water services model and performance levels that it had targeted over the course of IRC1.

IW views many of the savings made in IRC1 as one-off, which could not be repeated at IRC2, through initiatives such as headcount reduction, rationalisation of cost base etc. While recognising that a “deeper, sustainable level of operating efficiency is possible”, IW believes this requires a full transformation of the operating model through an ‘invest-to-save’ type programme. Irish Water has also developed a better understanding of its asset base, and its requirements for operating expenditure. It has revised its view of opex needs upward, citing a number of reasons:

- Higher than expected network leakage (revised from 41% to 49%) and a larger than expected water mains network (revised up from 58,000km to 63,000km).
- Rising compliance standards, with more than 200 additional licences issued over 2014 – 2015;
- Roll out of the capital investment plan, with an increasingly complex asset base, including maintenance of the new stock of meters;
- Additional capabilities needed within IW’s TOM model;
- Population and Economic growth, which increases requirements for key inputs such as energy and chemicals;
- Activity deferral at IRC1, which if deferred any longer would result in deterioration of asset performance, customer service levels and ability to drive further operational efficiencies. The activities deferred by IW include rollout of standard operating procedures, water sampling and testing and upskilling of LA staff. We do not consider these “deferrals” to have affected service provision at IRC1 and discuss these activities in detail in our historic review of IRC1 operating expenditure;
- IW also intends to improve customer service levels, reducing planned and unplanned interruptions and improving out-of-hour services for drinking water and wastewater services. It also cites improving drinking water quality, leakage and lead as reasons for requiring additional operating expenditure above the current baseline.

IW does not propose substantial opex efficiencies over the IRC2 period, citing a total of €44m efficiencies in O&M over 2017 and 2018 combined, on a controllable opex spend of c. €1,460m over two years. Set against IW’s expectations for growth opex (set out above) costs are projected to rise relative to the opex performance achieved at IRC1. IW has provided high-level objectives in its IRC2 submission and in its business plan, to achieve €500m in

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47 NERA (2016) “Review of IW’s IRC1 Cost and Output Performance”
48 NERA (2016) “Review of IW’s IRC1 Cost and Output Performance”
capex efficiencies and €1.1bn in opex efficiencies by the end of 2021. We review the IW proposals below in Section 4.2 below.

4.1. UK Evidence on Cost Efficiencies

4.1.1. Comparator evidence on opex efficiencies

At IRC1, we reviewed the profile of opex efficiency savings made by UK water utilities. This analysis supported a potential for cost efficiencies to be achieved by IW of the order of 4 – 11 per cent per annum over the IRC2 period and out to 2021. Noting the challenges facing Irish Water, the CER’s IRC1 Decision set IW a challenge to achieve 7 per cent efficiencies per annum.

For the mature utilities in England and Wales which have been subject to incentive based regulation since the early 1990s, the efficiency targets set by Ofwat have tended to decline over time, from a range of 1.4 to 3.9 per cent between 2000 and 2005 and of 0.4 to 2.3 per cent between 2005 and 2010.

E&W companies achieved marked cost reductions in the early periods following the introduction of incentive-based regulation, and ownership change in 1989. We would expect the target efficiency gains to diminish over time, as companies converge towards an efficient level of operating costs, given modelled differences in the operating environment of each specific company. As such, we consider the latest evidence presented from E&W to represent a reasonable lower bound for what could be achieved in the medium-term in Ireland, where the regulatory framework is nascent and there is apparent considerable scope for cost savings over the short term.

Scottish Water began operations in 2002, taking over the functions of three regional operators who in turn replaced the functions of the Scottish Regional Councils (nine mainland regions and three island areas) in 1996. In the first strategic review period, running from 2002 to 2006, the Water Industry Commissioner set SW a challenge to reduce operating expenditure by £158m below the baseline level of costs by the end of the period, equivalent to an annualised reduction of around 10 per cent. The WICS considered but ultimately decided not to apply an efficiency reduction in relation to SW’s private finance initiative (PFI) contracts, which are analogous to IW’s DBO contracts.

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51 CER (October 2014) “Water Charges Plan Irish Water’s Interim Revenue Review - Response to Comments and Decision Paper” CER/14/454
53 The WICS reports the baseline spend as £423m, from which SW was set an opex efficiency target of £158m. The implied cumulative annual rate of reduction over the SRC2002-2006 period is 11.0 per cent. 
54 The WICS stated that “[In the 2006-10 Strategic Review of Charges], we presented analysis that suggested that customer’s bills were financing substantial and possibly excessive returns by equity holders in the PPP schemes. We therefore considered setting an efficiency target for the payments to PPP contractors. We considered that this would provide an incentive for Scottish Water to pursue opportunities with the PPP contractors to share the benefits of refinancing. A number of respondents to our methodology consultation in October 2004, including Scottish Water and Water UK along with the PPP contractors, did not consider that this was appropriate. [...]We considered that these
Evidence from WICS suggests that Scottish Water delivered reductions around €165m below the baseline, at an annualised unit cost improvement of around 11 per cent.\textsuperscript{55}

The WICS has updated analysis of Scottish Water’s performance to include performance in the most recent strategic review of charges (SRC09 covering 2010 to 2015).\textsuperscript{56} After the rapid cost reductions made in the early years post-introduction of incentive based regulation in the early 2000s, Scottish Water’s operating costs have remained relatively flat, at £296m in 2014-15 compared to £292m in 2009-10. Scottish Water’s operating cost performance has helped Scottish Water deliver a high level of service to Scottish customers with an average bill more than 40 per cent lower than the UK average in recent years.\textsuperscript{57} As shown in Figure 4.1, SW succeeded in substantially reducing opex in the years following the introduction of regulation following the establishment of Scottish Water as a single national utility.

![Figure 4.1](source: WICS (2008) Cost and performance report)

A similar picture is observed in Northern Ireland Water’s operating cost performance to that observed for Scottish Water. After an initial increase in operating expenditure between 2003-04 and 2008-09, NIW achieved substantial cost reductions over the course of the first regulatory periods, PC10 and PC13. At PC10 in Northern Ireland covering the period 2010-11 to 2012-13, NIAUR set a target opex improvement of 6.5 per cent per annum against which NIW outperformed, as shown in Figure 4.2.\textsuperscript{58,59} In its PC15 determination, NIAUR

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\textsuperscript{55} Cumulative Annual Efficiency Rates are NERA calculations, based on efficiency targets and outturn described in: WICS “Costs and performance report 2003-06”.

\textsuperscript{56} WICS (October 2015) “PERFORMANCE REPORT 2010-15”.

\textsuperscript{57} In each of 2012-13, 2013-14 and 2014-15, Scottish Water’s annual bill was £52, £54 and £54 lower than the UK average according to SW’s annual reports.

\textsuperscript{58} UREGNI (Feb 2010), “Water and Sewerage Service Price Control 2010-2013”, p.20

\textsuperscript{59} The 6.5% efficiency challenge excluded the capital charge element of the private-public partnerships (PPPs). Source: UREGNI (Feb 2010), “Water and Sewerage Service Price Control 2010-2013”, p.20 footnote 3: “Efficiencies calculated on a percentage of prior year post efficiency opex (excluding PPP capital charges)”.

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allowed for a slight initial increase in costs early in the period, offset by a decline in the latter years to 2021.\footnote{UREGNI (December 2014) “Key point briefing – Final Determination: Summary”}

The initial increase in operating expenditure was also accompanied by verifiable improvements in NIW’s performance levels across a range of water, sewerage, environmental and customer service indicators, as set out in Section 5.

**Figure 4.2**
**Substantial Decline in NIW Opex in Early Years of Incentive Based Regulation**

![Figure 4.2](image)

*Source: UREGNI (2015) PC15 Final Determination*

### 4.1.2. Comparator evidence on capex efficiencies

At IRC1, we reviewed the profile of capex efficiency savings made by UK water utilities. This analysis supported a potential for cost efficiencies to be achieved by IW of the order of 4 – 9 per cent per annum over the IRC2 period and out to 2021.\footnote{NERA (July 2014) “IW Interim Review Assessment Prepared for the Commission for Energy Regulation (CER)”} In its decision, the CER’s IRC1 Decision set IW a challenge to achieve capital investment cost efficiencies of 7 per cent efficiencies per annum.\footnote{CER (October 2014) “Water Charges Plan Irish Water’s Interim Revenue Review - Response to Comments and Decision Paper” CER/14/454} This challenge excluded capital investments that had already been committed to under the WSIP, and capital maintenance, which we considered to be below the enduring levels and therefore not appropriate to make further reductions.

The IRC1 capital efficiency range was formed based on the performance during the first full price controls for SW and NIW:

- The target set by the WICS in SRC02 (2002/03 – 2005/06) of 8.4 per cent per annum, which SW beat by the end of the period, achieving a reduction of 9.1 per cent per annum;\footnote{This period (2002-06) corresponds to the first full price control for SW. Cumulative annual efficiency rates are NERA calculations, based on efficiency targets and outturn described in: WICS “Costs and performance report 2003-06”.”}
The target set by the UREGNI, in PC10 (2010/11 – 2012/13) of 3.4 per cent per annum.\(^\text{64}\) We also reviewed evidence from recent reviews in E&W, although considered that these examples were less relevant to IW given that the companies and sectors were relatively mature (subject to incentive based regulation since 1989).

- Targets set by Ofwat for English and Welsh companies for the regulatory periods PR99 and PR04 (2000/01 – 2004/05 and 2005/06 – 2009/10 respectively),
  - In PR99, Ofwat set a challenge for each company ranging from 1.7 per cent to 4.4 per cent,
  - In PR04, Ofwat set a target range of 1.8 per cent to 4.3 per cent;

Since the IRC1 Decision, there have been a number of regulatory determinations that we have reviewed to update the capital efficiencies achieved in other jurisdictions. In particular, we have reviewed the UREG’s determination for PC15 in Northern Ireland and the WICS determination for SRC 2016-2020 in Scotland.

**UREG PC15 Capital Efficiency Challenge**

The utility regulator set a more modest target for PC15 than had been set at PC10 (described above). Over the period 2015 to 2021, the UREG challenged NIW to meet a capital enhancement efficiency challenge of 8.9 per cent (i.e. a cumulative annual reduction rate of c. 1.5%).\(^\text{65}\)

The proposed reduction relates to improvements in cost efficiency, as opposed to reductions to scope for outputs that UREG considered were not well-justified.

The UREG made its efficiency challenge on the basis of a rate of catch up to cost performance based on unit cost analysis from NIW’s cost base proposals, against comparable cost base data from England and Wales (from PR09). As an appropriate rate of catch-up, the UREG asked NIW to make 75% catch up to the upper quartile efficiency benchmark in year one of the six-year price control.

The UREG showed that the capital efficiency challenge set for NIW was at the upper end of efficiency challenges set around the same time, as shown in Figure 4.3. These total efficiency savings translate to per annum rates of between 1% for Network Rail to just over 2% for Scottish Water. SW’s business plan included a total capex efficiency challenge of 16% (almost 3% per annum).

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\(^{64}\) This corresponds to the first full price control for NIW. UREGNI (Feb 2010), “Water and Sewerage Service Price Control 2010-2013”, p.12 give capex spending proposals from NIW and the UREGNI final determination. From baseline expenditure of £385m, UREGNI set a challenge to reduce capex to 527 over the three year review, implying a cumulative annual reduction of 3.4 per cent

Figure 4.3
UREG Comparison of Average Capital Efficiencies

Source: UREG PC15 Final Determination Annex L

WICS SRC 2016-2020 and SW Historic (SRC 2010-2015)

The WICS published a consultation note prior to its Final Determination for the 2009 Strategic Review of Charges, which summarised Scottish Water’s business plan proposed efficiencies.66 These amounted to 12% on capital enhancement (2.1% per year) and 16% average efficiency target across all capex (2.9% per year).

For the period 2010 to 2015, the WICS set a 13% efficiency target for capital enhancement (2.7%), which Scottish Water is on course to beat.67,68

4.2. Conclusions on Cost Efficiency Profiles for IW

The CER set a challenging but achievable efficiency target at IRC1 of 7% p.a. for both operating and capital expenditure, based on high-level cost comparisons, comparative benchmarking and in light of the rates of cost improvements observed elsewhere, notably by Scottish Water and Northern Ireland Water in the years immediately following the introduction of incentive based regulation.

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4.2.1. Opex efficiency conclusions

Irish Water largely met the IRC1 opex efficiency challenge while continuing to deliver water and waste water services in Ireland and continuing to deliver a large and complex capital investment plan. However, as set out in Section 3, Irish Water remains an outlier in terms of cost performance against both the mature utilities in England and Wales, and against Northern Ireland Water and Scottish Water at similarly early stages of development. Our comparative cost analysis shows that IW’s proposed increasing operating cost level is at least 70% higher than the long-run efficient level, and more likely 100% higher.

Over IRC2, IW has not proposed any net reductions in opex. Given that IW’s costs are around twice the long run efficient level, the large initial investment in IW predicated on its intention to be a high performing utility in the medium term, we do not consider that IW’s IRC2 operating cost projections are reasonable.

At IRC1 IW was funded to deliver a high-performance-utility model, capable of driving future efficiencies. The additional layer of the TOM, the group centre and the shared service centre, and the establishment programme all contained elements that can be compared to a “spend to save”.

While IW has not provided a detailed profile of targeted efficiency savings in its IRC2 submission, it did so at IRC1 and was targeting a total of c. €600m efficiency savings to 2021, with a total of €149m falling in 2017 and 2018. While IW has not provided a detailed profile of targeted efficiency savings in its IRC2 submission, it did so at IRC1 and was targeting a total of c. €600m efficiency savings to 2021, with a total of €149m falling in 2017 and 2018. The current submission appears to target savings of just €44m in 2017 and 2018, but targets a larger cumulative opex efficiency reduction of €1.1bn by 2021 while giving no details.

We recommend that CER sets a target for improving operating cost performance of between 5% and 10% per annum relative to the 2016 budgeted costs, i.e. such that IW costs are between 10% and 20% lower in 2018 relative to 2016. The very high end of the range is based on the rates of improvement achieved by SW at a similar stage of development. However, we recognise that there may be differences between SW and IW circumstances which limit IW’s ability to achieve such rates, note least IW may be constrained by an operational model which impedes the cost reductions realised by the best performers elsewhere.

Our opex cost efficiencies are therefore based on a 5% p.a. efficiency reduction which recognises the differences in circumstances at IRC2. The reduction is also applied to expenditure excluding IW’s DBO contracts, consistent with regulatory approaches elsewhere (namely WICS) to exclude such contracts from the efficiency challenge.

4.2.2. Capex efficiency conclusions

SW achieved improvements in capex efficiencies of around 9% per annum over the first full regulatory cycle. At PC10, UREG set a target of 3.4% p.a. These comparators informed our

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recommendation of a 4-9% p.a. improvement in capital efficiency for IW at IRC1. CER required an overall improvement of around 7% p.a., i.e. the middle of the range.

We consider that the range of 4-9% is still relevant, given the short period to which the efficiency challenge applied. We also note that the required and realised improvements in capital efficiency for our principal comparators – SW and NIW – have been more modest at subsequent and recent reviews, e.g. around 2-3% p.a.

Following the immediate step changes in the early years over IRC1, we expect some diminution in the improvement in cost performance. We consider the evidence supports an improvement in efficiency towards the lower to middle end of the IRC1 range, e.g. around 4-6%.

We recommend an improvement in capital efficiency of 5% p.a. over IRC2. The requirement improvement should be in addition to the expected improvement over IRC1, which IW considers it has largely met.

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**Box 4.1 Conclusions – Cost Performance**

**Capex**

- We recommend an improvement in capital efficiency of 5% p.a. over IRC2. The requirement improvement should be in addition to any reduction for the “starting position” efficiency challenge of 13.5%, depending on further discussion with IW as to whether such a reduction is merited.

**Opex**

- We recommend that CER sets a target for improving operating cost performance of between 5% and 10% per annum relative to the 2016 outturn costs, i.e. such that IW costs are between 10% and 20% lower in 2018 relative to 2016. Our cost allowances are based on 5% p.a. efficiency challenge which recognises potential constraints on IW’s ability to reduce costs from its operational model. The challenge is applied to controllable costs, excluding IW’s DBO contracts, consistent with the approach taken for SW.
5. Incentives and Improving Customer Service Levels

In this section we describe additional incentive mechanisms for potential introduction at IRC2.

We have identified a set of candidate incentive measures based on a brief review of existing mechanisms in Irish energy sectors, and UK water sectors, as well as taking into account the particular context of Irish Water and data availability. Specifically, CER has introduced customer and quality of service mechanisms, rolling cost incentive mechanisms, and efficient deferral incentives in the Irish energy sector, and we consider their potential application to IW. In addition, we also consider incentive mechanisms around efficient billing and data quality provision, to address specific issues related to IW.

This chapter is structured as follows:

- Section 5.1 sets out CER’s intended approach to incentivising customer and quality of service metrics. We focus on the expected improvement of IRC2 and subsequent reviews, drawing on data from comparable water companies.
- Section 5.2 discusses rolling opex and capex incentive mechanisms, as present in the Irish energy sector
- Section 5.3 discusses the potential role of incentives around efficient deferral, along the lines of GNI.
- Section 5.4 discusses mechanisms to incentivise IW to identify and bill all eligible properties and to identify and rectify any historic under-collection;
- Section 5.5 discusses how regulators have incentivised data quality provision
- Section 5.7 draws conclusions.

5.1. Customer and Quality of Service (or “Overall Performance Assessment”)

The CER intends to introduce a customer and quality of service mechanism, and has set out the measures that it intends to focus in detail in its own consultation document. In this chapter, we briefly compare CER’s proposed metrics with those in E&W, and describe the level of improvement by comparator companies to provide a potential benchmark for IW.

5.1.1. CER Proposals and comparison with E&W

The CER has proposed that IW reports on the following customer and quality of service metrics. The rationale for the overall approach and individual metrics is explained in more detail in CER’s report. In brief, the customer service metrics are broadly similar to performance measures CER collects for Irish energy networks and to metrics applied to UK

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70 CER (July 2016) “Consultation paper on metrics to monitor the performance of Irish Water”
71 CER (July 2016) “Consultation paper on metrics to monitor the performance of Irish Water”
water companies, and the environmental and water supply measures correspond to data report to the EPA.

Figure 5.1
CER's Proposed Customer and Quality of Service Metrics

<table>
<thead>
<tr>
<th>Metrics to be monitored:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Service</td>
</tr>
<tr>
<td>▪ Response to billing contacts</td>
</tr>
<tr>
<td>▪ Response to complaints</td>
</tr>
<tr>
<td>▪ Billing of metered customers</td>
</tr>
<tr>
<td>▪ Ease of telephone contact: the call abandonment rate</td>
</tr>
<tr>
<td>▪ Ease of telephone contact: a customer call-back survey</td>
</tr>
<tr>
<td>▪ Ease of telephone contact: speed of telephone response</td>
</tr>
<tr>
<td>▪ Ease of telephone contact: first contact referral</td>
</tr>
<tr>
<td>Environmental Performance</td>
</tr>
<tr>
<td>▪ Pollution incidents relating to waste water</td>
</tr>
<tr>
<td>▪ Sludge Disposal</td>
</tr>
<tr>
<td>▪ Waste water treatment works meeting requirements</td>
</tr>
<tr>
<td>▪ Pollution incidents relating to water</td>
</tr>
<tr>
<td>Water Supply Quality of Service</td>
</tr>
<tr>
<td>▪ Properties subject to unplanned interruptions</td>
</tr>
<tr>
<td>▪ Water quality</td>
</tr>
<tr>
<td>▪ Water supplies on boil water notices and/or water restrictions</td>
</tr>
<tr>
<td>Water Supply Security</td>
</tr>
<tr>
<td>▪ Leakage</td>
</tr>
<tr>
<td>▪ Security of Supply – Absolute performance</td>
</tr>
<tr>
<td>▪ Security of Supply – Performance against target</td>
</tr>
<tr>
<td>Sewerage Service</td>
</tr>
<tr>
<td>▪ Sewer incidents (overload)</td>
</tr>
<tr>
<td>▪ Sewer incidents (other causes)</td>
</tr>
<tr>
<td>▪ Sewer incidents (at risk)</td>
</tr>
</tbody>
</table>

The measures proposed by CER correspond to many of the metrics included in Ofwat’s overall performance assessment (OPA). The OPA was introduced by Ofwat for E&W companies as part of the PR99 price review process, to provide a defined set of measurable, observable output measures against which to measure customer service levels over time. It developed to include 17 measures of customer service, spanning the water service, waste water service, environmental quality and customer service measures, and has subsequently been implemented in both Scotland and Northern Ireland, as shown in Table 5.1.

To reflect missing or unreliable data, both the WICS and NIAUR have adopted a subset of the full OPA. The WICS initially omitted pollution incident categories and one of the customer service measures, although these have now been added. NIAUR does not have reliable data on sewer flooding incidents, and also omitted one customer service measure and the two security of supply measures. In the PC15 final determination NIAUR proposes to maintain the OPA in its current form, in the absence of improved data on these missing measures.

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72 CER (April 2016) “Information paper on metrics to monitor the performance of Irish Water”
73 Ofwat two security of supply measures in 2007, in addition to the original 15 OPA measures.
74 Ofwat no longer runs the OPA per se but has instead introduced an “outcomes delivery incentive” (ODIs). In principle, the ODIs work in a similar way to the OPA: companies receive financial penalties/rewards according to actual versus relative performance level over the review. The ODIs contain many of the same elements of the OPA. For example, Ofwat has identified six measures: supply interruptions; water quality; water quality compliance; pollution; sewer flooding; and, leakage.
The following Table also shows how the CER’s proposed measures map to those in the OPA, although in a number of cases the precise definition of the measure is not identical. Broadly, it shows that the CER intends to collect all but one of the measures (or similar measures) to those that are included in Ofwat’s OPA. The exception is DG4 – which relates to water restrictions applied following droughts in generally water stressed zones in E&W, and which may clearly have less relevance to Ireland.

Table 5.1

Comparison of Measures Collected by WICS, and UREGNI, and CER’s Targeted Measures

<table>
<thead>
<tr>
<th>Currently collected by:</th>
<th>Targeted by CER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ofwat OPA Composition</td>
<td>WICS</td>
</tr>
<tr>
<td></td>
<td>(indicates whether broadly equivalent)¹</td>
</tr>
<tr>
<td><strong>Water Service</strong></td>
<td></td>
</tr>
<tr>
<td>1 DG2 – Risk of low pressure</td>
<td>✓</td>
</tr>
<tr>
<td>2 DG3 – Unplanned interruption to supply</td>
<td>✓</td>
</tr>
<tr>
<td>3 Drinking water quality</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Sewerage Service</strong></td>
<td></td>
</tr>
<tr>
<td>4 Sewer flooding incidents (capacity)</td>
<td>✓</td>
</tr>
<tr>
<td>5 Sewer flooding incidents (other causes)</td>
<td>✓</td>
</tr>
<tr>
<td>6 Properties at risk of sewer flooding more than once in 10 years</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Customer Service</strong></td>
<td></td>
</tr>
<tr>
<td>7 Customer contact</td>
<td>✓</td>
</tr>
<tr>
<td>8 Other customer service</td>
<td>X</td>
</tr>
<tr>
<td><strong>Environmental Performance</strong></td>
<td></td>
</tr>
<tr>
<td>9 Category 1 and 2 pollution incidents per million equivalent resident population (sewage)</td>
<td>X</td>
</tr>
<tr>
<td>10 Category 3 pollution incidents per million equivalent resident population (sewage)</td>
<td>X</td>
</tr>
<tr>
<td>11 Sludge disposal</td>
<td>✓</td>
</tr>
<tr>
<td>12 Percentage equivalent population served by WWTW in breach of their consent</td>
<td>✓</td>
</tr>
<tr>
<td>13 Category 1 and 2 pollution incidents (water)</td>
<td>X</td>
</tr>
<tr>
<td><strong>Security of Supply</strong></td>
<td></td>
</tr>
<tr>
<td>14 DG4 – Water restrictions</td>
<td>✓</td>
</tr>
<tr>
<td>15 Leakage</td>
<td>✓</td>
</tr>
<tr>
<td>16 Security of supply – performance against target</td>
<td>X</td>
</tr>
<tr>
<td>17 Security of supply – absolute performance</td>
<td>X</td>
</tr>
</tbody>
</table>

Source: Ofwat: “Updating the overall performance assessment (OPA) – Conclusions and methodology for 2004-05 onwards”

Ofwat (Dec 2006): “Reflecting security of supply in the overall performance assessment (OPA) – summary of consultation responses and our conclusions”
5.1.2. Expected rate of improvement

We recommend that CER draws on expected rates of improvement in the OPA metrics both in aggregate and at an individual level, to assess IW’s proposed and outturn performance over IRC2 and beyond. In this section, we set out evidence on expected rates of improvement based on evidence from E&W, Scottish Water and NIW. We provide full details of how the different service metrics comprising the OPA are formed in Appendix C. The basic methodology is to normalise each of the composite metrics to a score between 5 and 50, and the overall OPA is then the sum of each of the metrics included. In this way a partial OPA can be constructed, based on data availability on each of the constituent 17 individual metrics.

5.1.2.1. Overall performance level improvements in England and Wales have been modest since 2000

England and Wales OPA scores remained relatively constant over the period 2001 – 2010, as much of the improvement in service levels will have occurred in the period immediately following the introduction of incentive based regulation. The average OPA score increased from 352 in 2001-02 to 403 in 2009/10 – equivalent to an annual percentage improvement of just 0.8 per cent per annum. The largest improvement by a single company was achieved by South West Water, who achieved an annual improvement rate of 2.8 per cent year-on-year.

Ofwat replaced the OPA by the Service Incentive Mechanism in 2011, which incorporates a qualitative customer satisfaction survey component.

Figure 5.2

England and Wales OPA Performance 2001 - 2010

Source: NERA analysis of Ofwat Level of Service reports and revised OPA scores available from http://www.ofwat.gov.uk/pricereview/pr09phase3/ltpr0935_2009opa
5.1.2.2. Scottish Water has achieved a rapid improvement in service levels and has caught up with E&W service levels

The WICS introduced an OPA equivalent as early as the first Strategic Review of Charges in 2002, initially based on a subset of 11 measures, to reflect Scottish Water’s data limitations. Over this initial period, the WICS benchmarked performance to adjusted OPA scores from E&W, comprising the subset of measures made available by SW.

Figure 5.3 shows the improvement on this subset of OPA scores achieved by SW against the range of comparable OPA scores achieved by E&W companies. The WICS challenged SW to attain as score of 241 by 2009/10, which SW exceeded. SW improved its score from 161 in 2003/04 to 291 in 2009/10, improving its relative standing from just 54 per cent of the E&W average score to 98 per cent over the same period. The implied average annual improvement in SW’s OPA score is 10.4 per cent – substantially in excess of that achieved by any E&W company over the period 2001 – 2010, as discussed above.

The left panel of Figure 5.3 shows how Scottish Water’s initial improvement over was achieved across a subset of OPA categories between the years 2005-06 and 2009-10. The majority of SW’s catch up over this period came from improvements in waste water compliance, reductions in sewer flooding, improvements in pressure levels and reduced leakage.

The WICS has subsequently added the remaining measures in April 2010 such that SW’s performance can be benchmarked against the full Ofwat OPA. As shown in the central and right panels of Figure 5.3, SW’s performance on the OPA has progressed such that it is among the top performers on the E&W OPA, achieving a score of 400 in 2014-15.

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76 This score has subsequently been updated to 306, as shown in the central panel of Figure 5.3
In recognition of SW’s improvement to catch up with the OPA frontier performance set by E&W companies, the WICS intends to introduce a qualitative based measure – along similar lines to the SIM used by Ofwat – over the course of the current review period.

5.1.3. Northern Ireland Water has seen rapid improvements in service levels, albeit from a low baseline

NIAUR also introduced the OPA from the beginning of the Price Control 2010, including a historical OPA baseline score from the creation of NIW in 2007. Over the price control period, NIW was set a challenge to improve its OPA score to 181, which it exceeded.

As shown in Figure 5.4, NIW’s OPA score improved from 121 in 2009/10, to 216 by 2013/14. This is still some way short of the E&W average over a comparable subset of OPA measures, which UREGNI estimate to be 290 in 2009/10. Nevertheless, NIW’s average annual improvement of 15.6 per cent over this period is exceeds both improvements made by SW and greatly exceeds improvements made by E&W companies as discussed above. This results in part from a lower baseline score, but underlines the importance of developing a comparable score against which to demonstrate service level improvements.

Figure 5.4
Northern Ireland Water’s OPA Improvements 2007 - 2013


While NIW has improved data collection over the period, NIAUR has continued to set targets associated with the original 11 measures included in the partial OPA for consistency.77 NIW is not being asked to fully converge to E&W average performance levels by 2020-21, with a more gradual improvement on the OPA score expected compared to the rapid improvements between 2007-08 and 2013-14.

5.1.4. Conclusions on Customer Service Levels

Monitoring and incentivising improvements in customer and quality of service metrics is an established element of incentive based regulation. Demonstrating improving levels of service quality will contribute to a greater level of customer satisfaction.

Service quality can incentivised through reputational or financial incentives. We do not recommend that CER puts in place financial incentives before there is a firm baseline data for the proposed metrics. Instead, we recommend that CER requires IW to develop and publish a set of service level performance indicators comprising those agreed with CER (as set out in Figure 5.1). We consider that some of these metrics, notably the customer service and environmental metrics should be available from the outset of IRC2; others (around security of supply) may take longer to put in place as they require further data collection and modelling.

We recommend that CER assesses IW’s performance over IRC2 in light of the service improvements made by other utilities at comparable stages. The comparison can be at an aggregate level; that is, comparing an IW OPA with a comparable score for SW/NIW at similar stages, as well as comparisons at the individual metric level. Given the differences in definitions, it may not always be possible to compare levels: however, we can draw on the comparators to assess trends in IW’s performance, i.e. its rate of improvement. Over the longer term, we would expect to see IW customer service levels converge to performance achieved in England and Wales, and by Scottish Water.

5.2. Rolling Opex and Capex Incentive Mechanisms

In many jurisdictions, companies are subject to rolling incentive mechanism which allow retention of benefits/bear the costs of any cost under/overspend for a fixed period (often, 5 years) irrespective of when the under or overspend is realised during the regulatory control period. The CER has proposed in its advice to Ministers that it will implement rolling incentive mechanisms. The CER has adopted such mechanisms in the energy sector.

The objective of rolling incentive mechanisms is to provide incentives to minimise expenditure towards the end of the control period, when such incentives could otherwise be blunted because of the regulatory reset.

Below, we describe how the opex and capex rolling incentive could work, based on a review of how other regulators have implemented such mechanisms.

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78 CER (2014) Advice to the Minister on the Economic Regulatory Framework for the public water services sector in Ireland, p. 34. Link: http://www.cer.ie/docs/000832/CER14076%20Advice%20to%20the%20Minister%20on%20the%20Economic%20Regulatory%20Framework%20for%20the%20Public%20Water%20Services%20Sector%20in%20Ireland.PDF

5.2.1. Operating cost

We have reviewed Ofwat’s approach to the opex rolling incentive – referred to as the opex incentive allowance (OIA) – introduced at PR04. Ofwat allows regulated water companies to keep incremental outperformance (that is outperformance achieved in a given year minus the outperformance achieved in the previous year) for a fixed period of five years. This provides an incentive for the companies to seek operational efficiencies on an ongoing basis, since the five year benefit of any additional outperformance is guaranteed, irrespective of in which year of the price control period the efficiency is realised.

The WICS stated its intention to introduce a similar rolling opex incentive mechanism for its Strategic Review of Charges 2010-2015. However, the WICS ultimately decided not to introduce the opex rolling incentive citing:

- Difficulties in establishing the detailed accounting rules required to compare outturn expenditure against the regulatory contract (i.e. the ability to assess truly incremental outperformance);
- Implementing Ofwat’s approach may reduce the transparency of the WICS’ approach to setting prices;

The WICS instead favoured linking the opex rolling incentive to additions to the gilts buffer (i.e. representing cash outperformance), and to link bonuses to SW staff in part to the growth of the buffer, and partly to other performance indicators, such as the OPA.

In Northern Ireland, the Utility Regulator (UREG) consulted on a common approach to incentives, based on the rolling incentive scheme used by Ofwat. For opex, the UREG has historically allowed companies to retain the benefit from opex under-spends for the duration of the price control.

This type of rolling incentive “tends to act as an incentive to discourage companies from identifying efficiency savings in the latter half of the price control period”. The UREG proposed to adopt a rolling opex incentive allowing companies to retain savings for a fixed time period across all price controls with savings typically retained for five years.

Table 5.2 below shows an example of how a five-year opex rolling incentive as applied by Ofwat works in practice if applied to IRC2.

In this example, we assume that the regulatory allowance is equal to 100, but actual opex is 98 in 2017 and 96 in 2018, that is, 4 units less by end 2018. The company receives five years of incremental outperformance for both years, totalling a reward of 20 (including retention of outperformance in period, and the rewards/penalties triggered in subsequent reviews) in total.

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81 WICS SRC2010-2015 “Methodology supporting material: Volume 1. Information Paper 8: Rolling Incentive”
82 UREG (September 2011) “Network price controls: Proposals for a Cross-Utility approach”
In general, the opex rolling incentive is only applied to the controllable proportion of the regulated companies’ opex. For IW, this would imply that CER excludes rates and license fees and levies.

In undertaking a review of companies’ performance, Ofwat restates the opex allowance for the opex consequences of logging-up/down or shortfalling on the capital programme, as well as less any atypical or exceptional opex items. Ofwat also undertakes the adjustment at a service level, i.e. for water and wastewater separately.

The incentive could work symmetrically such that any underperformance incurs similar penalties as the rewards for out-performance. Alternatively, Ofwat’s incentive mechanism rewards outperformance only on a rolling basis, and any underperformance is capped to the underperformance within the period.

In the past, Ofwat has also increased the level of retained outperformance by applying a “multiplier” to the reward earned by the most efficient companies (as measured by its comparative efficiency analysis) of between 1.25 and 1.5 times the level of outperformance.

In terms of overall performance, the combination of a five year review and five year rolling incentive implies that E&W companies receive a reward equal to 200 per cent (or 300 per cent if subject the highest multiplier) of the value of outperformance within period, but underperformance is capped at 100% of the value within period.

In more recent reviews, Ofwat has moved to a totex incentive regime which has the effect of reducing the overall retention on opex, but increase in the outperformance on capex. It also

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Table 5.2
Illustration of the opex rolling incentive

<table>
<thead>
<tr>
<th>IRC2</th>
<th>IRC3/ subsequent review periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulatory opex determination</td>
<td>100</td>
</tr>
<tr>
<td>Actual opex expenditure</td>
<td>98</td>
</tr>
<tr>
<td><strong>Outperformance</strong></td>
<td></td>
</tr>
<tr>
<td>Incremental outperformance in 2017</td>
<td>2</td>
</tr>
<tr>
<td>Incremental outperformance in 2018</td>
<td>2</td>
</tr>
<tr>
<td><strong>Opex rolling incentive allowance IRC2</strong></td>
<td>4</td>
</tr>
<tr>
<td>Total reward/ penalty</td>
<td></td>
</tr>
</tbody>
</table>

*Source: NERA analysis.*
has the objective of aligning capex and opex incentives. Figure 5.6 shows the evolution of the rolling incentive mechanisms over time in E&W.

5.2.2. Capex rolling incentive mechanism

As past reviews (prior to the menu of contracts or “totex” approach) in E&W, companies retained 5 years’ financing return on any capex outperformance but incurred 100% cost of any underperformance.

The WICS excluded incentives for outperformance on capital expenditure, as “a rolling incentive allowance for capital expenditure could increase the risk of overscoping or overpricing of capital projects in Scottish Water’s business plans”.

The UREG in Northern Ireland places a rolling incentive on replacement capex. For more lumpy/discrete capex projects it proposed to limit out-performance benefits to the price control period.

In undertaking its assessment of the rewards under the rolling incentive, Ofwat adjusts realised capital expenditure for logging-up, logging-down, and shortfalling, as per opex, to identify cost outperformance per se (separate from output variations). The WICS also logs up or down SW’s revenue allowance at the end of the regulatory control period to reflect differences in cost from the original determination (which has an impact on prices only in the next regulatory period).

The rolling incentive mechanism has not applied to maintenance expenditure on network assets (defined as infrastructure renewals expenditure, IRE). Instead, IRE was compared

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85 Ofgem (and subsequently Ofwat) introduced the “totex framework” to address the supposed capital bias in GB networks, i.e. propensity for GB networks to pursue “RCV growth” as opposed to least cost solution. The totex approach has three main elements: I) Setting a fixed ex-ante capitalisation rate, i.e. the percentage of total expenditure capitalised in RCV is determined at the price control and is fixed, irrespective of actual opex:capex spend during the control period. The use of a fixed ex ante capitalisation rule means RCV growth is independent of a company’s decision on opex or capex solutions; II) Applying a single incentive rate to both opex and capex (i.e. totex), general around 50%. This means that companies retain around 50% of any out (or under) performance, irrespective of whether outperformance is in relation to opex or capex; III) Implementing totex benchmarking at review, where model includes, opex, base capex, and enhancement. The use of a totex benchmarking approach incentivises companies to seek least cost provision.

Both Ofgem and Ofwat have also adopted the menu of contracts (referred to the Information Quality Incentive or IQI by Ofgem), although not an integral part of the “totex approach” (i.e. not necessary to address issues around capital bias). It is designed to incentivise companies to reveal efficient costs. For a discussion of menu of contracts see recent CMA decision on ED1 price control. Source: CMA (2015) British Gas Trading Limited v The Gas and Electricity Markets Authority. https://assets.digital.cabinet-office.gov.uk/media/5609588440f0b6036a00001f/BGT_final_determination.pdf


87 WICS SRC2010-2015 “Methodology supporting material: Volume 1. Information Paper 8: Rolling Incentives”

88 UREG (September 2011) “Network price controls: Proposals for a Cross-Utility approach”

89 Logging-down relates to outputs that are funded at review but which are no longer required. Shortfalling relates to the failure to deliver outputs funded at review which are required. Ofwat (2004) Final Determinations 2005-10, p. 142.

90 The WICS SRC 2006-2010 “Our work in regulating the Scottish water industry: The calculation of prices”
with the infrastructure renewals charge (IRC), and the balance, the infrastructure renewals accrual or prepayment, was added to or deducted from the RCV each year.\textsuperscript{91} The reason for excluding such expenditure is not explained by Ofwat: however, one possible explanation is that it is difficult to distinguish efficiency savings from simply deferred expenditure for network maintenance.

The reward is implemented by reducing the RCV at the subsequent period by the value of the out-performance on a smoothed basis such that the company enjoys five years of financing benefit. We set out a worked example for calculating the rolling incentive allowance as published by Ofwat below.

\textsuperscript{91} Ofwat, RD010 – Regulatory Capital Values 201-15. Link: \url{http://www.ofwat.gov.uk/publications/rd-0410-regulatory-capital-values-2010-15/}
5.2.2.1. More recent developments

At the 2009 price review, Ofwat introduced the capital expenditure incentive scheme (CIS). Under the CIS, each company receives a weighted average of its “bid” amount included in its

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plan, and the benchmark determination (determined by Ofwat at review), where the weights are 25:75.\textsuperscript{93}

As part of the CIS, companies receive an income penalty or reward which incentivises companies to bid the efficient level (i.e. Ofwat’s view of the efficient level of costs). The CIS allows for symmetric treatment of capital expenditure over- and under-spends against the assumptions in Ofwat’s determinations.

As with opex, from PR14, capital expenditure is subject to the totex menu of contracts, which imposes symmetrical and identical efficiency factors on expenditure, irrespective of whether the spend is defined in accounting terms as opex or capex.

As shown in Figure 5.6, opex rolling incentive allows companies to retain up to 300% of outperformance (defined as retained outperformance/outperformance within period, pre-tax). The capex rolling incentive has provided more modest rewards, estimated at around 25% (pre-tax), but has included potential for a penalty, up to 100%.

Figure 5.6
Rolling Incentive Mechanisms Rewarded (Penalised) Companies by up to 300% (100%) of Out- (Under-) Performance

5.2.3. Conclusions and recommendations – rolling incentives

In summary, rolling efficiency incentive schemes are useful in: (a) reducing the periodicity of incentives to realise efficiency savings; and, (b) enhancing overall rewards/penalties, and therefore providing greater incentive to cost efficiency.

In considering the use of rolling incentives, a key issue is the reliability of underlying data used to measure expenditure, as this forms the basis of actual over (or under) performance.

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\textsuperscript{93} This means that the overall capital expenditure allowance is made up of 0.25 times the capital expenditure proposed by the company and 0.75 times the benchmark determined by Ofwat.
In relation to operating costs, we consider that there is a firm basis to measure IW’s performance over IRC2. However, on the capex side, any rolling incentive should be restricted to capital investment areas where IW can provide firm costs and the associated outputs. The most likely area for an incentive mechanism would appear to be Major Projects over IRC2, although even here, given the outputs roll into subsequent years identifying output performance, it may be difficult).

For the opex rolling incentive, there are additional considerations:

- whether outperformance and underperformance should be treated symmetrically;
- the inclusion/exclusion of opex categories; and,
- the retention period.

We recommend: a) to apply the rolling incentive for outperformance only in order to mitigate downside risk; b) to exclude uncontrollable costs and atypical/exceptional expenditures; and, c) to normalise expenditure for logging-up/down of outputs.

In relation to the retention period, the standard approach is to match the retention period with the length of review, i.e. in this case two-years. However, given that the short period may not change IW incentives to realise cost efficiencies (an objective of the mechanism), we recommend a retention period of 3 or 4 years.

### 5.3. Efficient Deferral

For GNI (then BGN), CER has allowed it to retain outperformance where GNI has efficiently deferred expenditure, i.e. where it could demonstrate that the project outputs were no longer required. One of the reasons CER introduced “efficient deferral” in gas is to mitigate the tendency/risk for companies to otherwise spend, irrespective of need to grow the RCV. Ofgem also rewards GB gas distribution networks (GDNs) for deferring expenditure that is no longer required. As per GNI, the intent is to incentivise GDNs to defer capacity enhancements funded at review, where ex post the demand does not justify expenditure. In such cases, the GDN has to clearly demonstrate that is has met the capacity output (i.e. asset utilisation metrics) despite the deferral. In absence of incentive, GDN has incentive to spend funded investment to grow its regulated capital base. The rules are relatively complicated in relation to when an efficient deferral is recognised; GDNs’ are also penalised for not inefficient deferral. Figure 5.7 provides a brief overview of the mechanism.

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Figure 5.7
GB GDN’s receive a reward for deferring expenditure, but only where it can demonstrate the output has been delivered⁹⁵

In relation to UK water regulation, we are not aware of an identical mechanism. UK water companies face incentives to re-scope schemes in order to meet outputs at least cost; however, there is no recognition for deferral of outputs per se. Instead, Ofwat reduces capital expenditure allowances as set at review by logging-down expenditures that were funded yet no longer required.

In the case of IW, we do not consider that arrangements to incentivise efficient deferral (ie. where you defer an investment that is no longer required to meet the output specified at review) are useful at the present time for the following reasons:

- IW faces an investment need which is greater than the funding envelope for IRC2. During the control period, we expect IW to re-optimise the set of projects/outputs it delivers subject to any change control protocol, e.g. it may decide to defer some outputs/projects given greater priorities. The deferral of any such outputs is likely to reflect the requirement to fund more immediate/higher ranking needs as opposed to deferring outputs that are no longer required. Differentiating deferral of projects that are lesser priorities from those that are genuinely no longer required is problematic.

- Any recognition of deferred expenditure requires a clear understanding of the current and expected performance against a set of outputs, e.g. capacity/asset utilisation, in order to assess whether the project/expenditure has been efficiently deferred. This is the case for

GDNs. By contrast, IW has less clarity on key output metrics to assess the efficiency of any deferral.

- If IW receives a reward for the deferral of projects, it will be important that the regulator does not provide funding for the same output at subsequent reviews to avoid double-funding (or where it does provide such funding, ensure it is net of any reward). In theory, the period for which IW will need to demonstrate that the expenditure is no longer required relates to the life of the asset, e.g. the regulator needs to ensure it does not fund the same incremental improvement in output over many price controls. This seems impractical to monitor, particular given the absence of clear performance levels by IW.

- More generally, the approach also provides an incentive for companies to overstate capital investment requirements.

For these reasons, we do not recommend the adoption of rewards/penalties for efficient deferral for IW at IRC2.

5.4. Billing and Collection

5.4.1. Efficient billing incentives

Under a revenue cap, IW does not face strong incentives to maximise the number of properties billed. This is because IW does not receive higher revenues from billing a higher number of properties relative to those assumed in the tariff model.

All properties connected to the IW network for either water or waste water services (or both) should be considered eligible for billing, excluding void properties (i.e. properties that are vacant and where there is no prospect for charging). Ofwat’s guidance on what properties should be considered “void” is unoccupied and unfurnished properties; furnished properties face the standard charges, unless they request to be disconnected.

An incentive to bill all eligible properties (those connected to the system and which are not genuinely void properties) may have particular relevance in Ireland given the uncertainty around the number of void properties. At IRC1, the CER assumed void properties in Ireland would represent 6.1% of total connected properties. The implied rate of void properties is near the upper end of the range observed in England and Wales (where the equivalent void properties are on average around 4% of total households, with a maximum of around 7% (see Figure 5.8). By contrast, IW contests the CER’s assumption around void properties, although it has not explicitly stated its estimate.

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96 Ofwat defines a void property as the “average total number of household properties, within the supply area, which are connected for either a water service only, a wastewater service only or both services but do not receive a charge, as there are no occupants. This should not include properties that do not receive a bill because it would be uneconomical to do so” Ofwat (October 2015) “RAG 4.05 Guideline for the table definitions in the annual performance report”, para 4A.5

97 http://www.ofwat.gov.uk/regulating/charges/ltr_rd0206_chngvacpropconc

98 That is: 91,220 divided by 1,490,748.
The regulatory framework should provide IW with a strong incentive to recover revenues from vacant properties where it is able to do so. This is important from an efficiency perspective (properties that are connected to the network continue to impose costs on Irish Water) and from an equity perspective (one subset of customers should not be expected to subsidise another, if the properties are not truly vacant). The efficient billing incentive should provide clarity over the level of void properties given that IW would face an incentive to bill all such properties that are eligible.

As part of the Revenue Correction Mechanism (RCM), Ofwat included a financial incentive scheme to encourage companies to bill all eligible properties. In short, the company shared any rewards /penalty) from billing more /less) properties than expected. This was calculated by multiplying:

- The difference between expected billing and actual billing levels
- An “efficient billing factor” of 42% of the average bill.

A similar incentive mechanism could be envisaged for Ireland in order to provide IW the incentive to maximise the number of “void properties” and other properties billed. Such a mechanism requires IW to have a firm baseline of the number of properties in the charging base which we understand is not the case for domestic customers. However, CER may want to consider such a mechanism for non-domestic customers, assuming there is greater certainty around the number of customers billed.

 Source: NERA analysis of Ofwat June Returns

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100 Properties with a bill less than 42% of the average bill were initially excluded from this mechanism, although the mechanism was subsequently simplified to include all properties.
5.4.2. Collecting under-recovery: “back-billing”

The RCM also included an incentive for back-billing, to incentivise companies to identify and correct instances where properties had been (and were potentially continuing to be) charged less than they should have been, where the inaccuracy of the charging is not the company’s fault.

Ofwat considered two mechanisms to incentivise back-billing, by increasing the billing incentive (described above) by either:

- the future extra revenue billed up to March 2015 as a result of correcting historical under-billing;
- the associated back-billing.

Ofwat’s proposed approach was to apply whichever of the two approaches resulted in a lesser amount.

Considering application to Ireland, each of the approaches has some merit. Under the first option, IW would retain (a portion of) any additional revenues recovered as a result of identifying errors which had resulted in historic under-recovery, for a limited period of time. By linking the incentive to the future extra revenue means, IW would be rewarded for identifying any problems as early as possible.\(^\text{101}\)

The second approach would allow the company to retain any additional revenues relating to historic under-recovery.\(^\text{102}\) This limits the rewards that IW would receive to be no greater than the size of the historic problems identified. However, it does not provide as strong incentives to proactively seek to identify all issues as early as possible.

5.4.3. Conclusions on billing and collection incentives for IRC2

We recommend that CER considers using the Ofwat incentive rate of 42% as the basis for the efficient billing incentive rate.

With respect to back-billing, there is a large degree of uncertainty particularly around non-domestic collection rates under the charging schemes inherited from the LAs. There may be merit in providing an incentive for IW to seek to identify and address any issues as early as possible so as to increase revenues collected from non-domestic customers (if appropriate). Given that the size of the back-billing problem is unknown, allowing IW to retain a portion of extra-recovery from non-domestic customers as a result of the back-billing incentive might be most practicable, and provides strong incentives to identify problems early, which is particularly relevant to the context in Ireland. An important first step would be to agree on a clear baseline for current collection levels, and what types of problems identified should qualify for the back-billing incentive.

\(^{101}\) IW would not keep the historic revenues back-billed, which would be passed on to customers.

\(^{102}\) Conversely, any resulting increase in future revenues would be passed on to customers.
For domestic customers, where charges have only recently been introduced by Irish Water (and are currently suspended), the benefits of the back-billing may be weaker. Such an incentive scheme may still be useful, but is less of a priority than incentivising non-domestic back-billing.

5.5. **Incentivising Improved Data Provision**

5.5.1. **“Fast-tracking” business plans**

In England and Wales where the regulatory framework is at a more advanced stage than in Ireland, the regulator (Ofwat) encourages high-quality business plans through a fast-track process. This consists of nominating a subset of the regulated companies’ first draft or interim business plans as “enhanced”, at which point they benefit from an earlier decision, subject to less scrutiny than under the full regulatory review cycle. Ofwat’s approach is also akin to Ofgem’s fast-track process in the GB energy sector.

It is difficult to see how such an approach could be implemented in the context of Irish Water, where the CER is only responsible for regulating one utility. Irish Water is also at a very early stage of development, where it may not yet be appropriate to move towards a light-touch regulatory regime as a reward for a high quality business plan.

5.5.2. **Disallowing expenditures**

One approach to incentivising data quality, as touched on in the WICS Decision for SRC01, is to only allow essential expenditure until a greater understanding of the asset base has been developed by the company and the regulators. This logic has applied in particular to elements of capital maintenance, and to non-essential (non-compliance) capital enhancement in other jurisdictions. For example, in the Strategic Review of Charges covering expenditure between 2002 to 2006, the WICS approved a gradual ramp up of capital maintenance, citing:

> “The back-loading of the investment should also be in the customer’s benefit, as investment will be more efficiently prioritised as better quality data becomes available”

5.6. **Specific funding of data projects**

An additional approach to improving data provision is for the regulatory to directly fund projects to improve data. For example, in the lead up to the 2001 Strategic Review of charges, the WICS sanctioned an information project, intended to improve information to support Scottish Water’s expenditure plans. Comparability with other UK water utilities was highlighted as the single most important factor by the Commissioner.

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103 Ofwat (July 2013) “Setting price controls for 2015-20 – final methodology and expectations for companies’ business plans”


105 WICS
“The single most important output of the Information Project is the annual return. I wanted to be sure that I could benchmark costs with the privatised companies in England and Wales”.

5.7. Conclusions

<table>
<thead>
<tr>
<th>Box 5.1 Conclusions - Incentives</th>
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<tbody>
<tr>
<td><strong>Customer and quality of service (or overall performance assessment)</strong></td>
</tr>
<tr>
<td>▪ We recommend CER requires IW to report on the agreed set of customer and quality of service metrics.</td>
</tr>
<tr>
<td>▪ IW should report on trend increases in individual metrics and in aggregate over IRC2, comparing its performance with SW/NIW at comparable times (as described in this chapter).</td>
</tr>
<tr>
<td>▪ IW should be subject to reputational incentives at IRC2, given the absence of firm baselines. At future reviews, CER should consider introducing financial incentives, where the baseline can be set drawing on comparator company improvements over time.</td>
</tr>
<tr>
<td><strong>Rolling incentive mechanism</strong></td>
</tr>
<tr>
<td>▪ We recommend that: a) CER introduces a rolling opex incentive mechanism where IW retains outperformance for a 3 or 4 year period; b) any underperformance is not subject to the mechanism, but is capped at the underperformance within period; c) opex is defined net of controllable costs and any atypical/extraordinary expenditures.</td>
</tr>
<tr>
<td>▪ We do not recommend the adoption of a capex rolling incentive unless IW can provide firm cost and output measures. The most likely area would appear Major Projects, but even here the outputs are delivered over successive reviews which may make it difficult to measure performance at end of IRC2.</td>
</tr>
<tr>
<td><strong>Efficient deferral</strong></td>
</tr>
<tr>
<td>▪ We do not recommend that IW is rewarded for deferring projects/outputs that are funded at review but no longer required. Instead, such projects/outputs should be logged-down (removed from RCV).</td>
</tr>
<tr>
<td><strong>Efficient billing</strong></td>
</tr>
<tr>
<td>▪ CER may want to consider the introduction of an efficient billing incentive for non-domestic customers if there is greater certainty around the current level of customers billed.</td>
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6. Output Monitoring and Adjustment

6.1. Progress made in IRC1 and recommendations for IRC2

In the review of IW’s IRC1 submission, we recommended that an outputs monitoring framework be put in place to monitor delivery of the plan and to agree changes in expenditure profiles and/or outcomes.\(^{106}\)

The review concluded that it was critically important to establish an outputs monitoring framework (with associated change protocol) because of limited availability and robustness of performance data. In particular, there was very little information available on baseline levels of service, target outcomes, and a high degree of uncertainty on the exact final number and scope of projects in the investment plan.

Over the course of IRC1, Irish Water has improved its understanding of its business, and has identified both outcomes and specific projects that CER can monitor over the course of IRC2 and beyond in order to hold IW to account. Subject to CER decision on the monitoring arrangements, the main elements of monitoring IW’s performance could comprise:

- IW has published a set of outcome measures, and has included targets for these in its Business Plan, as we describe in Section 2.6.\(^{107}\)
- IW has also developed its Investment Plan (2017-2021), which has an associated list of projects and outcomes. Our determination makes it clear which projects we expect IW to complete over IRC2 period and beyond, and the allowed expenditures. IW should be held to account for delivery of these projects within the overall funding envelope, subject to any changes agreed during the IRC2 period and at subsequent reviews.
- Similarly, IW has provided programme level outputs for a number of the constituent elements of the NP. There is also a number of programmes where IW needs to undertake studies to inform the optimal design of the programme (understandably given the recent formation of IW), and the corresponding outputs will therefore be identified following the completion of such studies.
- For the capital maintenance programme, the expected outputs and outcomes are least developed, as per other utilities at a similar stage of development. As we describe in section 2.4.3, IW will adopt a fully developed risk-based approach to managing its asset base which requires the development of a comprehensive set of asset condition measures. We recommend that CER requires IW to report on these measures once the data becomes available, and that at future reviews these measures are used to inform both IW’s performance on capital maintenance, and the requirement for expenditure at future reviews. (In UK water regulation, the set of asset condition measures are referred to as “serviceability” measures, and we include the set at Appendix E. CER also requires IW to submit these measures as part of its BPQ.)

\(^{106}\) NERA (July 2014) “IW Interim Review Assessment Prepared for the Commission for Energy Regulation (CER)”, Section 8

\(^{107}\) Irish Water “Interim Revenue Control 2017 – 2018 Investment Plan 2017 – 2021”, Table 4.7
In addition, CER has developed a set of output performance assessment (or OPA), as we describe in section 5. As set out, we recommend that CER requires IW to publish its performance against these measures, and that CER draws on the *rate of improvement* (acknowledging that the current level of performance is likely to be poorer) achieved by NIW and SW to assess IW’s performance. Once IW has established a firm baseline for these measures, CER could consider introducing financial rewards/penalties associated with the OPA measures as per other jurisdictions. We expect IW to have a firm baseline for most of the measures during the course of IRC2.\(^\text{108}\)

We recommend that for these early reviews periods CER requires IW to report on the delivery of its capital investment programme on a frequent basis, e.g. on a quarterly basis. Such a process will provide CER with an early warning of any delay in delivering the capital investment programme. It would also provide a forum for reporting on and monitoring changes to projects or programmes that will arise during the IRC2 period, as IW re-optimises the programme. The CER will need to ensure that a appropriate process is in place to monitor and assess significant changes to the capex programme, e.g. along the lines of “change protocol” in UK water regulation. Ofwat has set out guidance on how it approaches such changes in E&W, and the implications for company’s capital expenditure allowances.\(^\text{109}\)

In Appendix E, we also set out how the WICS in Scotland approaches output monitoring which also includes both Government and the quality regulators within the monitoring group.

### 6.2. Correcting the IRC2 Allowance for Outturn Outputs

We recommend that the CER adopt the same principles to correcting the revenue allowance for variance in outturn expenditure / outcomes as were set out at IRC1. We provide a summary below.

The value of the RAB should reduce/increase by the amount of the expected costs associated with any undelivered/additional agreed outputs (or projects) during IRC2, and taking into account the financing benefit/cost incurred by IW at the allowed rate of return. This process is commonly referred to as logging-down or logging-up in UK water regulation. Specifically, the CER proposes the following figure be added or subtracted from the closing RAB at the end of the price control (defined in base year prices):

\[
\Delta \text{CAPEX} \times (1 + WACC)^{13.5} \\
\]

Where \(\Delta \text{CAPEX}\) is the change in capex associated with undelivered or additional agreed outputs in base year prices, and WACC is the allowed rate of return over the IR period. The formula explicitly assumes that any under- or over-delivery of capital investment occurs

\(^{108}\) IW reports on most of the OPA measures to the EPA. There are some measures, such as security of supply indices (SoSI) that are not currently reported on, and will require further detailed studies to construct (and therefore may not be available for the next revenue control period. For example, NIW does not currently report SoSI.

approximately uniformly over the interim review period, and therefore the formulae provides for a financing adjustment equivalent to half of the review period of 27 months.

**Box 6.1 Conclusions – Output Monitoring**

- IW be held to the performance commitments made in its IRC2 submission and supported by the Investment Plan.
- In relation to the OPA, IW should set out a timetable for data collection and development of OPA indicators, to be agreed with the CER.
- IW should develop a series of asset serviceability indicators to be developed to monitor capital maintenance performance.
- For this interim review, CER should establish a capital investment monitoring process to provide an early indicator of whether the capital investment plan is on track, and the delivery against projects outputs and outcomes. The process could also incorporate a mechanism for reporting and monitoring changes to projects and programmes, and associated outputs/outcomes, as IW re-optimises its approach over IRC2.
7. Updating the Regulatory Asset Base and Depreciation

Once the opening RAB is determined, it will be rolled forward over the price control period with allowed capital expenditure and allowed regulatory depreciation using the following formula:

\[ RAB_{\text{closing, } t} = RAB_{\text{opening, } t} + Allowed \text{ capex}_t - Allowed \text{ depreciation}_t \]

In this sub-section, we discuss the issues related to setting regulatory depreciation allowances. We recommend that the CER maintain the core principles that it put in place at IRC1, consistent with its approach in the energy sector:

- Calculate depreciation using a straight line methodology;\(^{110}\)
- The first year of depreciation for new capital expenditure be set equal to half the total annual amount to reflect the assumption that capex is assumed to occur mid-period (on average);
- Capital expenditure be depreciated using asset life categories based on the expected economic life of the assets to be depreciated.
- We propose that capex is recognised in the RAB in the year in which the expenditure is incurred.\(^{111}\)
- New capital expenditure be allocated to asset life categories to reflect the actual nature of the capex spent (based on IW’s proposed allocations). In the absence of IW data on capex allocations into the different categories, we propose to allocate IW’s total capital expenditure into using data from benchmarks (based on Northern Ireland Water and Scottish Water data).

Table 7.1 summarises our recommendations in relation to asset categories for depreciation and the corresponding depreciation asset lives. We set out the proposed allocation of any new capex which is not directly allocated across asset categories in Table 7.2.\(^{112}\)

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\(^{111}\) Capex recognition upon expenditure corresponds to the approach adopted by Ofwat for the PR14 price control review. An alternative assumption would be to recognise capital expenditure in full only once the asset is completed. This would require detailed modelling of work-in-progress assets, including recognition of financing cost incurred up until the asset is activated. Such information is not available for the interim review period.

\(^{112}\) We provide more details on the derivation of the benchmarks in Appendix D
Table 7.1
Recommended Asset categories and Respective Asset lives

<table>
<thead>
<tr>
<th>Category</th>
<th>Asset life range</th>
<th>Depreciation asset life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Short</td>
<td>0-5 years</td>
<td>5 years</td>
</tr>
<tr>
<td>Short</td>
<td>6-15 years</td>
<td>10 years</td>
</tr>
<tr>
<td>Medium</td>
<td>16-30 years</td>
<td>20 years</td>
</tr>
<tr>
<td>Medium-long</td>
<td>31-50 years</td>
<td>40 years</td>
</tr>
<tr>
<td>Long</td>
<td>50+ years</td>
<td>60 years</td>
</tr>
<tr>
<td>Land</td>
<td>infinite</td>
<td>Not depreciated</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>100+ years</td>
<td>100 years</td>
</tr>
</tbody>
</table>

Source: NERA

Table 7.2
Benchmark Total Capex Allocations for IW

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Short</td>
<td>2%</td>
<td>7%</td>
<td>5%</td>
</tr>
<tr>
<td>Short</td>
<td>9%</td>
<td>5%</td>
<td>7%</td>
</tr>
<tr>
<td>Medium</td>
<td>21%</td>
<td>24%</td>
<td>23%</td>
</tr>
<tr>
<td>Medium Long</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Long</td>
<td>20%</td>
<td>18%</td>
<td>19%</td>
</tr>
<tr>
<td>Infinite (land)</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>47%</td>
<td>44%</td>
<td>46%</td>
</tr>
</tbody>
</table>

Source: NERA calculations based on NIAUR PC13 financial model and WICS PC10 financial model.

Given neither the NIW nor SW investment plans include any substantive metering expenditure, we recommend that the metering programme is subject to the specific rule that the asset life assumption is a weighted average of “long” and “short/medium” lives, with weights of 45:55 respectively, as per IRC1 recommendation. ¹¹³

Box 7.1 Conclusions – RAB and Depreciation

- We recommend that CER uses the depreciation asset classes adopted for NIW and SW.
- In the absence of expenditure by depreciation asset class, we also recommend it assumes the same proportionate expenditure across these asset classes as per NIW and SW.
- We recommend a bespoke rule for the remaining metering programme, as per IRC1.

¹¹³ NERA (July 2014) “IW Interim Review Assessment Prepared for the Commission for Energy Regulation (CER)”
Appendix A.  Unit Costs by Network Length

In this appendix we present unit cost comparisons, using network length as the driver (we use population served in the main body of the report). We do not consider network length to be the appropriate cost driver. However, given IW’s unique network characteristics, we present this data in Figure A.1 and Figure A.2 for the water service and in Figure A.3 and Figure A.4 for the sewerage service.

As shown, IW’s proposed IRC2 water service opex is high relative to UK comparators, but not to the same extent as when we use population served as the unit cost driver. This is not surprising, as IW is a large outlier in terms of mains length, with its c. 63,000km network being more than 30% longer than the closest comparator (Scottish Water).

For the sewerage service, where IW’s estimated sewer pipes network length of 25,000km falls within the pack of UK comparators, the picture is similar to that presented in the main body of this report where we use population served as the driver.
Figure A.1
IW Total Opex per km of mains - water

Source: NERA analysis of IW IRC2 submission and UK regulatory accounts
NOTE: NIW data is from 2007-08 to 2012-13; SW data is from 2002-03 to 2012-13; E&W data is from 2000-01 to 2009-10

Figure A.2
IW Opex per km of mains – water (functional area)

Source: NERA analysis of IW IRC2 submission and UK regulatory accounts
NOTE: NIW data is from 2007-08 to 2012-13; SW data is from 2002-03 to 2012-13; E&W data is from 2000-01 to 2009-10
Figure A.3
IW Total Opex per km of sewer pipes -sewerage

Source: NERA analysis of IW IRC2 submission and UK regulatory accounts

NOTE: NIW data is from 2007-08 to 2012-13; SW data is from 2002-03 to 2012-13; E&W data is from 2000-01 to 2009-10

Figure A.4
IW Opex per km of sewer pipes -sewerage (functional area)

Source: NERA analysis of IW IRC2 submission and UK regulatory accounts

NOTE: NIW data is from 2007-08 to 2012-13; SW data is from 2002-03 to 2012-13; E&W data is from 2000-01 to 2009-10
Appendix B. Summary of Scottish Water Spend to Save

Irish Water has highlighted the need for expenditure on a transformation of the water and waste water services operational model in order to drive future cost efficiencies and performance improvements. In this appendix we provide a brief summary of similar programmes undertaken by Scottish Water and by Northern Ireland Water at similar stages of development. High level examples of other spend to save style programmes were provided in the CH2M Hill technical annex on IW’s establishment programme as part of the NERA consortium’s support to the CER at IRC1.114

B.1. Scottish Water Spend to Save

In this section we provide a summary of the costs allowed by the WICS for a transformational Spend to Save in each of the three regional authorities that eventually became Scottish Water in 2002, drawing largely on the WICS determination for the Strategic Review of Charges 2002-2006 (SRC02).115

At SRC02 the WICS approved a transformation programme termed Spend to Save of £200m over a three year period. This expenditure was classified as an atypical (or exceptional) item and therefore is not included in the figures presented in the main body of this report that show a reduction in controllable opex in the years following the introduction of incentive based regulation. Figure B.1 shows the Spend to Save programme alongside the agreed operating and capital expenditure budgets allowed by the WICS at SRC02.116

Figure B.1
Scottish Water Spend to Save and Allowed SRC02 Expenditure

114 CH2M Hill (May 2014) “Irish Water Establishment Costs Stage 2. Prepared for NERA Economic Consulting (and then Commission for Energy Regulation)”


116 The WICS applied efficiencies to bring down base operating expenditure costs to maintain current service levels, and allowed a separate budget for agreed and targeted improvement of service levels above the baseline
The objectives of the Spend to Save were two-fold:\(^{117}\)

- Achieving an efficient capital programme; and
- Making the organisational and business process changes that will ensure that the operational cost efficiency targets are achieved.

The efficiencies projected through the Spend to Save initiative were independent of the savings that would become available as a result of the Scottish Water merger. Similarly to the Irish context, the Spend to Save transformation followed a period of efforts to control rising costs in the local authorities.

The expenditure under this item was closely monitored by the WICS and was additional to any ongoing spending within the authorities to achieve efficiency. The WICS expected the pay-back to occur within a maximum of two to three years; i.e. the allowance should directly facilitate savings of between £70m and £100m per annum within three years. This figure represented over half the targeted operating cost efficiencies expected by the end of SRC02.

The Spend to Save was also expected to largely help SW narrow the efficiency gap to the English and Wales benchmark cost level by 80% compared to SW’s 1998-99 cost levels but the end of SRC02. Put into context, the costs of Spend to Save were relatively modest (5% of total spending in the water industry in Scotland over SRC02) and supported the WICS in setting a more challenging efficiency target over the short to medium term (resulting in savings that exceed its costs by the end of the third year with ongoing benefits to customers).

The WICS considered many of the items to be relatively easy to achieve without large one-off expenditure, such as procurement and management of the local authorities. Others would include upfront costs, but would also unlock immediate benefits (e.g. exiting a lease).

### B.2. Northern Ireland Water Transformation Programme

In the first review period conducted by the Utility Regulator in Northern Ireland (UREG) for Northern Ireland Water (between 2007 and 10), NIW included a programme of transformation to transition to a single national water utility.

The CH2M review of IW’s establishment costs found that the One Programme contained similar sub projects to that undertaken in the IWP. For example NI Water’s One Programme comprised a number of projects across the business including development of an asset management model and processes, mobile work management system, development of a Human Resources capability together with various other initiatives to help improve performance and efficiency.

---

By 2009/10, NIW reported the programme had delivered benefits in direct savings and avoided costs, of c. £127m for an investment of £60m over the initial regulatory period.\textsuperscript{118}

At PC10, the UREG allowed for a small amount of expenditure under Exceptional items, following the precedent set by the WICS in Scotland. The amounts were small in absolute and in relative terms, with two exceptional items accepted relating to the transformation of the business: £8.1m for the “Business improvement programme”, which consisted of elements of the NIW “One Programme” described above and £4.56m for “Voluntary Early Retirement” programmes.\textsuperscript{119}

\textsuperscript{118} Northern Ireland Water (June 2010) “Annual Report 2009/2010”, p21

Appendix C. Constructing the OPA in England and Wales

The Overall Performance Assessment is used to incentivise enhanced service level provision, and is comprised of 17 service indicators covering the water service, sewerage service, customer service, environmental performance and security of supply. Companies are then incentivised through adjustments to their price limits of +0.5 per cent or -1.0 per cent for the best and worst performers respectively.

We define how the OPA is calculated and definitions of each of these indicators below.

The OPA is a sum of scores from individual output measures. Each of the individual scores is normalised to a range between 5 and 50 by applying the formula below:

$$\left( \frac{\text{(Company score - Range_min)}}{\text{Range_max - Range_min}} \right) \times 45 + 5$$

The formula calculates the OPA in three steps:

1. Company scores are converted to a range of 0-1: this is done by dividing the difference between the company’s actual score and the minimum possible score in the range, by the total range of possible scores, as shown in the denominator above;
2. This score is then increased to a range of 0-45, by multiplying (1) through by 45;
3. The final score is then adjusted to lie between 5 and 50, by adding 5 to each score.

The following sections describe each composite measure of the full OPA. Indicative min/max ranges are provided; these ranges need to be updated in line with company performance.

C.1. Water service KPIs

1. **Inadequate pressure (DG2):** No. of properties served at risk of receiving pressure below the reference level, as a percentage of the total connected properties.\(^{120}\) [Min 0; Max 0.5]

2. **Supply interruptions (DG3):** Properties experiencing unplanned supply interruptions (where the customer has not been warned) in excess of 6, 12 and 24 hours, as a percentage of the number of properties served.\(^ {121}\) [Min 0.13; Max 3.00]

3. **Drinking water quality:** Assessment of drinking water quality based on the Drinking Water Inspectorate’s operational performance index (OPI), which assesses the presence of iron, manganese, aluminium, turbidity, faecal coliforms and trihalomethanes.\(^ {122}\) [Min 98.4; Max 100]

---

\(^ {120}\) E.g. reference level: 10 metre head at a flow of 9 litres per minute.

\(^ {121}\) Weighting is: \((%>6\text{hours} \times 1) + (%>12\text{hours} \times 1) + (%>24\text{hours} \times 2)\)

\(^ {122}\) Details of companies’ OPI performance can be found in the DWI’s annual report at [http://dwi.defra.gov.uk/about/annual-report/](http://dwi.defra.gov.uk/about/annual-report/)
C.2. Waste water service KPIs

(4) **Sewer flooding – overload**: No. of properties affected by an incident of internal sewage flooding caused by overload of a sewer (also termed hydraulic incapacity), as a percentage of connected properties. [Min 0.0015 ; Max 0.036]

(5) **Sewer flooding – other causes**: No. of properties affected by an incident of internal sewage flooding from “other” causes (equipment failure in/blockage or collapse of, a sewer), as a percentage of connected properties. [Min 0.0047 ; Max 0.029]

(6) **Sewer flooding – at risk**: No. of properties considered to be at risk of flooding by sewage, caused by overload, more frequently than once in ten years, as a percentage of connected properties. This is normalised to include properties removed from the at-risk register in that year due to enhanced service level funding. [Min 0.012 ; Max 0.1]

C.3. Customer service level KPIs

(7) **Customer contact**: An equally weighted measure of:

- \[
\frac{\text{Billing contacts dealt within 5 days}}{\text{Total billing contacts}} \times 100; \text{ [Min 90 ; Max 100]}
\]

- \[
\frac{\text{Written complaints answered within 10 days}}{\text{Total written contacts}} \times 100; \text{ [Min 95 ; Max 100]}
\]

- \[
\frac{\text{Bills based on meter reading}}{\text{Total no. of bills}} \times 100; \text{ [Min 98 ; Max 1.0]}
\]

- \[
\frac{\text{Calls answered within 30 seconds}}{\text{Total calls received}} \times 100; \text{ [Min 83.13 ; Max 98]}
\]

The combined score is between 81 and 180 – which does not require a full score of 50 on each individual measure.

(8) **Assessed customer service**: Based on seven equally weighted measures, which are: (i) revenue and debt collection; (ii) complaint handling; (iii) information to customers; (iv) telephone contact hours; (v) compensation policy; (vi) supply pipe repair policy; and (vii) service for disabled and elderly customers.\(^{123}\) [Min 10 ; Max 18]

C.4. Environmental KPIs

(9) **Sewage treatment works consent compliance**: Population equivalent served by WWTWs that do not comply with the conditions of their discharge consents, as a percentage of total PE served. [Min 0 ; Max 4.93]

(10) **Sewage sludge disposal**: Sewage sludge disposed of in an unsatisfactory manner, as a percentage of total sewage sludge disposed of. [Min 0 ; Max 4]

(11) **Category 1 and 2 pollution incidents (sewage):** Category 1 and 2 pollution incidents per million resident population equivalent served [Min 1.06 ; Max 6.17]

(12) **Category 3 pollution incidents (sewage):** Category 3 pollution incidents per million resident population equivalent served [Min 9.44 ; Max 145.07]

(13) **Category 1 and 2 pollution incidents (water):** Category 1 and 2 pollution incidents per million resident population equivalent served [Min 0 ; Max 1.7]

### C.5. Security of Supply KPIs

(14) **Hosepipe restrictions (DG4):** Average number of person weeks of hosepipe restrictions over a rolling five-year period. Each year is weighted to discount the effect of historic years’ performance. [Min 0 ; Max 1025]

(15) **Leakage:** Leakage scores are set as a percentage of the target leakage level met:

<table>
<thead>
<tr>
<th>% of target not met</th>
<th>&lt;= 0%</th>
<th>0.1% to 5.0%</th>
<th>5.1% to 10%</th>
<th>10.1% to 15.0%</th>
<th>15.1% to 20.0%</th>
<th>20.1% to 25.0%</th>
<th>&gt;25%</th>
<th>No set target</th>
<th>Target not robust</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPA Score</td>
<td>50</td>
<td>45</td>
<td>40</td>
<td>35</td>
<td>30</td>
<td>25</td>
<td>20</td>
<td>20</td>
<td>Reduce score by 5</td>
</tr>
</tbody>
</table>


(16) **Security of supply – absolute performance:** The OPA scale is non-linear to reflect the non-linear scale used for the SoSI bands, as set out in Table C.2. The rationale for this is that a company that does not have adequate security of supply should not score as highly in the OPA as one that does.

<table>
<thead>
<tr>
<th>SoSI Index</th>
<th>100</th>
<th>90-99</th>
<th>50-89</th>
<th>&lt;50</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPA Score</td>
<td>50</td>
<td>45</td>
<td>30</td>
<td>5</td>
</tr>
</tbody>
</table>


**Security of supply – performance against target:** The OPA score is based on performance against the target security of supply index level (as for leakage, and set out in Table C.1).
Appendix D. Derivation of IW Benchmark Capex Allocations across Asset Categories

In this appendix, we set out the derivation of the benchmark capex allocations reported in Table 7.2 in the main report.

We have derived the benchmark capex allocations using latest available data from Northern Irish Water (NIW) and Scottish Water (SW) on allocation of their total capital expenditure across different depreciation asset categories.

Table D.1 shows the individual years’ allocation percentages and the average over the 2011-12 to 2014-15 period for NIW, derived from NIAUR’s PC13 financial model.

<table>
<thead>
<tr>
<th></th>
<th>2011/12</th>
<th>2012/13</th>
<th>2013/14</th>
<th>2014/15</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Short</td>
<td>7%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
</tr>
<tr>
<td>Short</td>
<td>12%</td>
<td>9%</td>
<td>8%</td>
<td>7%</td>
<td>9%</td>
</tr>
<tr>
<td>Medium</td>
<td>15%</td>
<td>24%</td>
<td>24%</td>
<td>22%</td>
<td>21%</td>
</tr>
<tr>
<td>Medium Long</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Long</td>
<td>21%</td>
<td>19%</td>
<td>22%</td>
<td>19%</td>
<td>20%</td>
</tr>
<tr>
<td>Infinite (Land)</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>45%</td>
<td>48%</td>
<td>45%</td>
<td>51%</td>
<td>47%</td>
</tr>
</tbody>
</table>


Table D.1 shows the individual years’ allocation percentages and the average over the 2008-09 to 2014-15 period for SW, derived from WICS’ PC10 financial model.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Short</td>
<td>7%</td>
<td>7%</td>
<td>8%</td>
<td>6%</td>
<td>7%</td>
<td>9%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Short</td>
<td>5%</td>
<td>5%</td>
<td>6%</td>
<td>6%</td>
<td>4%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Medium</td>
<td>39%</td>
<td>24%</td>
<td>19%</td>
<td>22%</td>
<td>24%</td>
<td>20%</td>
<td>21%</td>
<td>24%</td>
</tr>
<tr>
<td>Medium Long</td>
<td>1%</td>
<td>2%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Long</td>
<td>23%</td>
<td>22%</td>
<td>14%</td>
<td>17%</td>
<td>17%</td>
<td>16%</td>
<td>16%</td>
<td>18%</td>
</tr>
<tr>
<td>Infinite (Land)</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>25%</td>
<td>40%</td>
<td>51%</td>
<td>48%</td>
<td>46%</td>
<td>49%</td>
<td>49%</td>
<td>44%</td>
</tr>
</tbody>
</table>

We derive benchmark capex allocations across different depreciation asset categories for IW as the average of the NIW and SW average allocation percentages, as set out in Table D.3.

Table D.3
Benchmark Total Capex Allocations for IW

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Short</td>
<td>2%</td>
<td>7%</td>
<td>5%</td>
</tr>
<tr>
<td>Short</td>
<td>9%</td>
<td>5%</td>
<td>7%</td>
</tr>
<tr>
<td>Medium</td>
<td>21%</td>
<td>24%</td>
<td>23%</td>
</tr>
<tr>
<td>Medium Long</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Long</td>
<td>20%</td>
<td>18%</td>
<td>19%</td>
</tr>
<tr>
<td>Infinite (land)</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>47%</td>
<td>44%</td>
<td>46%</td>
</tr>
</tbody>
</table>

Source: NERA calculations based on NIAUR PC13 financial model and WICS PC10 financial model.
Appendix E. Outputs Monitoring – UK Examples

E.1. Outputs monitoring – precedent from the WICS in in Scotland

In Scotland, Ministerial Direction is provided to the state-owned utility Scottish Water, including a full list of required outcomes, defined in the Quality and Standards requirements. The Q&S programme defines the outcomes that SW is expected to achieve during the regulatory cycle – the company’s business submission should refer to this to justify expenditure. These requirements include drinking water and environmental objectives, which Scottish Water must provide within the revenues determined by WICS and the financing envelope agreed by the government.\(^{124}\)

The Minister (as advised by WICS) also established the Output Monitoring Group (OMG), to ensure that Ministers’ objectives are delivered. The OMG membership comprises the Scottish Government, Scottish Water, WICS, quality regulators, and Waterwatch (now Consumer Focus Scotland). This group is chaired by the Scottish Government.

The principal objective of the group is to monitor progress of output delivery against Ministerial objectives.\(^{125}\) However, the remit of the group also includes a process for establishing a change in outputs, and indeed a change in Ministerial objectives. The duties of the group include:\(^{126}\)

- Ensure that a well-defined and agreed change mechanism is established to allow changes to outputs while ensuring that Ministerial Objectives are still met and that a linkage is maintained at all times between the Objectives and outputs.
- Advise on any issue that may give rise to a need for a change to the Ministers’ Objectives and associated Directions on Scottish Water.

The OMG operates at a strategic level, and the outputs are reported at a fairly high-level of aggregation.\(^{127}\) As well as IW reports to the OMG, the CER will develop a more detailed output/input reporting requirement for IW as part of the regulatory returns, as also adopted by WICS. The CER included a template table as part of the draft business questionnaire as shared with IW some months ago.\(^{128}\)

SW has used, and will continue to use, an “Overall Measure of Delivery”,\(^{129}\) which tracks progress of the planned delivery of outcomes associated with enhancement capex and consolidates a range of measures into a single score. The OMD provides a “high-level


\(^{125}\) [http://www.scotland.gov.uk/Topics/Business-Industry/waterindustry/scot/q3](http://www.scotland.gov.uk/Topics/Business-Industry/waterindustry/scot/q3)


\(^{127}\) The OMG produces quarterly reports which summarise the progress made by Scottish Water in each quarter of the financial year. The report uses the targets and milestones shown in Scottish Water’s Delivery Plan and information reports produced by Scottish Water for its regulators.

\(^{128}\) See NERA draft business plan templates, Table 1, Investment and Outputs.

\(^{129}\) WICS (July 2010) “The Overall Measure of Delivery (OMD) A guide to its calculation and interpretation”
measure monitoring the delivery of the Ministers' objectives”, which is monitored by the Outputs Monitoring Group. It presents a snapshot that takes into account the balance of progress across the investment plan, taking account of outputs that are ahead of schedule, on schedule, or behind target at each stage of delivery.

The OMG monitors delivery of SW’s investment plan against SW’s Delivery Plan. Performance is considered to be ‘on target’ if it is within 2.5% of the agreed OMD score. An example of the template used to monitor progress across a range of output programme areas is shown in Figure E.1.

### Figure E.1
Scottish Water OMD output programme delivery

<table>
<thead>
<tr>
<th>OMG Grouping</th>
<th>Quarterly monitored programme areas</th>
<th>Q4 Target</th>
<th>Q4 Actual</th>
<th>Year end position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinking Water Quality</td>
<td>Raw water sampling and treatment</td>
<td>235</td>
<td>235</td>
<td>Complete</td>
</tr>
<tr>
<td></td>
<td>Measures to protect Water Quality</td>
<td>268</td>
<td>269</td>
<td>Complete</td>
</tr>
<tr>
<td></td>
<td>Number of lead communication pipes removed</td>
<td>0</td>
<td>594</td>
<td>Complete</td>
</tr>
<tr>
<td></td>
<td>Number of OMs subject to investigations</td>
<td>143</td>
<td>143</td>
<td>Complete</td>
</tr>
<tr>
<td></td>
<td>Number of sites covered by drinking water safety plans</td>
<td>174</td>
<td>196</td>
<td>Complete</td>
</tr>
<tr>
<td></td>
<td>Security of Supply Improvements</td>
<td>13</td>
<td>13</td>
<td>On target</td>
</tr>
<tr>
<td></td>
<td>Mains rehabilitation</td>
<td>2,827</td>
<td>2,922</td>
<td>On target</td>
</tr>
<tr>
<td></td>
<td>Number of water treatment works improved</td>
<td>76</td>
<td>58</td>
<td>Behind target</td>
</tr>
<tr>
<td></td>
<td>Number of zones with reduced lead levels</td>
<td>64</td>
<td>62</td>
<td>Behind target</td>
</tr>
<tr>
<td></td>
<td>Security and Emergency Measures Direction (SEMD)</td>
<td>735</td>
<td>699</td>
<td>Behind target</td>
</tr>
<tr>
<td>Environmental Protection</td>
<td>Non-strategic UROs and dual manholes addressed</td>
<td>35</td>
<td>35</td>
<td>Complete</td>
</tr>
<tr>
<td></td>
<td>Improvements to the wastewater network (properties)</td>
<td>15</td>
<td>15</td>
<td>Complete</td>
</tr>
<tr>
<td></td>
<td>Works associated with the Commonwealth Games</td>
<td>68</td>
<td>68</td>
<td>Complete</td>
</tr>
<tr>
<td></td>
<td>Surface Water outfalls improved</td>
<td>6</td>
<td>6</td>
<td>Complete</td>
</tr>
<tr>
<td></td>
<td>Number of UROs improved (under 7 stages)</td>
<td>114</td>
<td>126</td>
<td>On target</td>
</tr>
<tr>
<td></td>
<td>Number of environmental studies undertaken</td>
<td>113</td>
<td>113</td>
<td>On target</td>
</tr>
<tr>
<td></td>
<td>Number of improved wastewater discharges</td>
<td>92</td>
<td>81</td>
<td>Behind target</td>
</tr>
<tr>
<td></td>
<td>Compliance with wastewater licences</td>
<td>326</td>
<td>326</td>
<td>Behind target</td>
</tr>
<tr>
<td>Malodour</td>
<td>Number of sites where malodour is reduced</td>
<td>4</td>
<td>4</td>
<td>Complete</td>
</tr>
<tr>
<td>Flood Management</td>
<td>Duties under the Flood Risk Management Act</td>
<td>282</td>
<td>289</td>
<td>Behind target</td>
</tr>
<tr>
<td>Customer Service</td>
<td>Number of properties removed from low pressure register</td>
<td>2,437</td>
<td>3,086</td>
<td>Complete</td>
</tr>
<tr>
<td>Completion of past investment</td>
<td>Projects completed in the QLSR2 (2002-06) programme</td>
<td>62</td>
<td>62</td>
<td>Complete</td>
</tr>
<tr>
<td></td>
<td>Projects completed in the QLSR3a (2006-10) programme</td>
<td>251</td>
<td>250</td>
<td>Behind target</td>
</tr>
</tbody>
</table>

**Summary**

<table>
<thead>
<tr>
<th>Programme areas completed</th>
<th>On or ahead of target</th>
<th>Behind target</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>

*Source: Scottish Government OMG Report (Q4 2014-15)*

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131 WICS (Revised October 2014) “Information Note 10: The overall measure of delivery”


133 Progress with the unfinished projects from previous investment periods and growth schemes are not included in OMD and are reported separately
E.2. **Ofwat Serviceability Indicators**

At periodic reviews, Ofwat has set targets for serviceability indicators to *“maintain the flow of services to customers in the short and long term”*.\(^\text{134}\) In general, serviceability indicators provide high-level measures of capital maintenance activity and the ability to hold (or improve) stable service levels.

At PR09, Ofwat required companies to maintain all indicators at a stable position otherwise they would be at risk of shortfalling. Figure E.2 sets out the serviceability indicators for each of: (i) water infrastructure, (ii) water non-infrastructure, (iii) sewerage infrastructure, and (iv) sewerage non-infrastructure.

**Figure E.2**

**Ofwat Serviceability Indicators - Capital Maintenance Expenditure by Driver**

<table>
<thead>
<tr>
<th>Water infrastructure indicators</th>
<th>%age of total sub-service</th>
<th>Water non-infrastructure indicators</th>
<th>%age of total sub-service</th>
<th>Sewerage infrastructure indicators</th>
<th>%age of total sub-service</th>
<th>Sewerage non-infrastructure indicators</th>
<th>%age of total sub-service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bursts</td>
<td>28.2%</td>
<td>WTW Coliforms*</td>
<td>16.4%</td>
<td>Sewer collapses</td>
<td>40.7%</td>
<td>STW Non-Compliance</td>
<td>18.6%</td>
</tr>
<tr>
<td>Interruptions &gt;12h</td>
<td>12.6%</td>
<td>SR Coliforms</td>
<td>6.2%</td>
<td>Pollution Incidents (Cat 1, 2 &amp; 3)</td>
<td>11.7%</td>
<td>STW PE Non-Compliance</td>
<td>17.7%</td>
</tr>
<tr>
<td>Iron MZC</td>
<td>4.3%</td>
<td>Turbidity</td>
<td>6.5%</td>
<td>Flooding Other Causes</td>
<td>11.9%</td>
<td>Unplanned Maintenance</td>
<td>13.5%</td>
</tr>
<tr>
<td>Low pressure</td>
<td>1.9%</td>
<td>Enforcement Actions</td>
<td>4.8%</td>
<td>Flooding Overloaded Sewers</td>
<td>5.3%</td>
<td>SNI – Other</td>
<td>50.1%</td>
</tr>
<tr>
<td>Discolouration</td>
<td>8.2%</td>
<td>Unplanned Maintenance</td>
<td>10.6%</td>
<td>Sewer blockages</td>
<td>15.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distribution index TIM</td>
<td>4.2%</td>
<td>WNI – Other</td>
<td>6.3%</td>
<td>Equipment failures</td>
<td>3.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W – Other</td>
<td>40.7%</td>
<td></td>
<td></td>
<td>S – Other</td>
<td>11.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W- Total</td>
<td>100%</td>
<td>WNI – Total</td>
<td>100%</td>
<td>SI – Total</td>
<td>100%</td>
<td>SNI – Total</td>
<td>100%</td>
</tr>
</tbody>
</table>


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