ADVICE ON EFFICIENCY CARRYOVER MECHANISMS
INDEPENDENT PRICING AND REGULATORY TRIBUNAL (IPART)

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FINAL REPORT

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IMPORTANT NOTICE

EXECUTIVE SUMMARY

IPART is reviewing the prices charged by Sydney Water Corporation (Sydney Water) from 1 July 2016 for water, wastewater, stormwater and other services for a four year period. As part of the review process, Sydney Water has proposed amendments to the way that cost efficiencies are incentivised in the regulatory framework. In particular it proposes the introduction of mechanisms that provide for carrying forward the benefit of cost savings between regulatory periods. This report considers the way these schemes have been applied in Australia and the UK, and appropriate ways forward for the regulatory framework given IPART's statutory objectives, the existing and potential future overall regulatory framework and the particular characteristics of Sydney Water.

The current approach to setting prices does involve distortions, with differential incentives to cut costs at different times in a price control period. Modifying the regulatory framework to address this distortion makes sense. However, any new mechanism needs to have regard for the way in which prices are set in the underlying price control system that is being amended.

Context

Sydney Water is regulated by IPART using a classic CPI-X approach, with required revenues set by a building blocks approach. Estimates of operating expenditure (opex), depreciation, and a required return on a regulatory asset base (the measure of capital) are made, combined with an estimate of required capital expenditure (capex). Prices are set so that the net present value of expected revenues, costs, and the discounted value of the end of period regulatory asset value is equal to the current regulatory asset value.

The CPI-X form of regulation is widely used internationally, and one of its main benefits compared to alternative forms of regulation is the incentives provided for regulated companies to cut costs within a price control period, with benefits shared with customers at the time of the next price review. CPI-X, unamended, is already an efficiency benefit sharing scheme.

The need to modify incentives

CPI-X regulation provides incentives for companies to manage costs, and the evidence across a wide range of countries, industries, and time periods is that it has been effective. However, there are obvious defects that can be severe. One of these is that while the incentive to cut opex in the early years of a control are relatively strong (because savings will be kept by the regulated company for the rest of the period of the price control), at the end of the period incentives are weak (as any cost cuts achieved will be shared with customers very quickly). The incentive is for companies to defer opex cuts identified towards the end of the price control until after a price control has been reset. This is not to say that regulators cannot (and in practice they have) apply efficiency savings they have identified to the companies'

allowances, however due to information asymmetry the regulator's role is made more effective if the companies reveal their efficient cost levels.

There are other weaknesses that have been observed including incentives to: increase capex and to distort the decision between capex and opex; reduce quality; misreport information about operating, capital and other costs. The importance of these depends on the opex and capex needs of the industry, the structure of the industry and the maturity of the regulatory framework.

As a result of these incentive effects, regulators have introduced additional mechanisms to remove or reduce distortions in incentives. In the early years following the introduction of CPI-X regulation these were rather simple adjustments, often relying on regulatory tests of reasonableness rather than mechanical rules. The approach in some countries, most notably the UK, has now become rather complex, in particular with companies choosing the structure of incentives faced during the succeeding price control period, an approach known as menu regulation.

Regulatory experience of modifications to incentives

Schemes to modify the incentive arrangements from the classic CPI-X are now widespread, and sharing schemes have for example been developed in France, Italy, and Spain's energy network industries, relating to capex and opex. In this review, following consultation with IPART, we have restricted detailed examination of these schemes to Australia (energy networks), and the UK (energy networks and water & sewerage).

Ofgem, the regulator of UK energy networks, assesses the combination of opex and capex (totex) and use this to set revenue allowances for price control periods. Measurement of outperformance or underperformance is against totex rather than individual capex and opex budgets. This approach was put in place because of evidence that companies were making decision to invest even if the whole life costs of the investment would be higher than incurring additional opex. There was (and is) also a belief that there may be greater scope for substitution in the future through embedded generation, demand side management, etc. The totex approach is seen to have reduced this distortion. In addition, Ofgem's incentive arrangement ensures the strength is consistent across time within a price control. The price control process also involves companies selecting from alternative benefits / costs to underperform / outperform, structured in such a way to encourage companies to publish truthful business plans. The incentive effects of these broadly appear to have worked well, with substantial efficiency gains observed, although for some aspects of the incentives that have only been in place for a short period of time, it is difficult to assess fully their impact. However, the cost has been considerable complexity, and an array of incentives that are difficult for many stakeholders to understand.

The experience of Ofwat, the water & sewerage regulator for England & Wales, has been somewhat similar to that of Ofgem. In the last price control review (PR14), companies were

given totex budgets; and were offered menus with different incentive structures. As with Ofgem, the approach has been seen to give appropriate cost cutting incentives and removed previous distortions, but at a cost of lack of transparency and difficulty for stakeholders to understand the scheme.

Ofwat had a different approach in its previous price control reviews (PR04 and PR09). At that time it had separate incentive arrangements for opex and capex. Opex efficiencies were rewarded through a rolling incentive mechanism which preserved gains in the following price control period. However, opex underspends and overspends were treated differently, with no carry over for permanent overspends. The mechanism also ensured that the company bore the full benefit or cost of temporary under- or over-spending on opex. Prior to PR09, where a menu on capex was used, Ofwat used a rolling incentive mechanism for capex which was broadly similar to its opex mechanism.

In Australia, the AER has implemented opex "Efficiency Benefit Sharing Schemes" in price control determinations since 2007. It now applies schemes to both opex and capex, and these are designed to provide network operators with 30% or more of the total value of future savings. Temporary underspending or overspending is not incentivised (aside from the time value of money), with customers ultimately bearing the full benefit or cost of this. Compared to the UK more recent schemes, the Australian examples are much simpler, more predictable, and easier for stakeholders to understand (although PR04 used similar mechanisms). But the network operators benefit far more from these savings than similar companies do in the UK. It is also notable that the AER has not applied some of these incentive schemes to companies it has found to be very inefficient compared to their peers using benchmarking analysis.

Assessing incentive strength

A key component in consideration of incentive schemes is the measure of "incentive strength". In Australia, this is considered to be the value of any savings retained by the company as a proportion of the total value of those savings in perpetuity. In recent years the UK, in contrast, has considered incentive strength as the savings retained by the company as a proportion of costs saved in that year.

In our view, it is important to consider the strength of the incentive from the scheme and compare it to the counterfactual – that is what would have happened in the absence of the implementation of that incentive scheme? Productivity improvements can be anticipated, and it is reasonable for regulators to expect to set prices to reflect the implementation of these in future price control reviews. An incentive scheme, therefore, may simply be an encouragement for a company to deliver a cost saving early, rather than finding some new source of productivity that would never have been found in the absence of a scheme. So the incentive scheme is valuable, and facilitates continued cost savings, but the value of it is not the savings that are generated into perpetuity – these most likely would have occurred without the scheme. This suggests that great care needs to be taken in considering sharing ratios.

In this context, the method of determining prices in future price control reviews also needs to be considered. If regulators rely solely on revealed costs to assess expenditure requirements, then the incentive scheme is paramount. But if there are other sources of information (e.g. engineering studies or benchmarking) that can support identification of the level of efficient expenditure, the value of the revealed expenditure to the regulator (and consumers) can be considered to be somewhat lower.

It is the regulatory framework as a whole (the method of setting efficient prices combined with any additional incentive mechanisms) that provides the incentive on companies to become efficient. The role of the add-on incentive mechanisms rather than being considered to be the driver of efficiency, is rather simply the way to preserve incentives during a price control period.

Temporary and permanent savings

In the AER schemes, temporary and permanent cost underspends or overspends are treated differently. Permanent cost differences are incentivised whereas temporary underspends or overspends are neutralised through later adjustments to customer bills (aside from the time value of money). This means that companies are not incentivised to exploit short term opportunities to cut costs or to prevent possible short term higher costs.

Of course, sometimes such temporary effects may be outside the control of companies, so passing the risk of temporarily higher or lower costs to customers may be appropriate. But in our experience it is advantageous for companies to be incentivised to manage costs in the short term: temporary opportunities to cut costs in one part of a network may be replicable in other parts of a network and thus become permanent; and companies that are strongly incentivised to manage cost over-spends can be rather innovative to ensure that such overspends don't occur. Such cost management can also provide information about long term efficient costs.

Criteria for assessing regulatory frameworks

There are a range of criteria against which any incentive-based regulatory framework should be assessed. The overarching objective is that it should be effective in delivering the right level of service to customers at the right price over the long term. To do this, we suggest that there should be:

- Equal treatment of different types of cost. From a customer perspective it is overall costs that matter, and as far as possible there should be equivalent incentives to manage all cost categories.
- Time consistency. Incentives to reduce cost should not depend on when cost savings are made.
- Continuity. Significant changes in the strength of incentives dependant on performance can distort decisions.

- Consistency with best practice regulatory principles of transparency, and proportionality.
- Practicality. It is important that proposals can be easily implemented and easily understood by the regulator, the company, shareholders, and the public.

In assessing the proposed amendments to the framework, there are a range of approaches that could meet the above principles. The choice between those options depends on the balance between incentivisation and customer benefit that is considered to be desirable. There are trade-offs between these two: greater sharing with customers will blunt incentives. Which of the two is more important is an important determinant of the choice of the incentive scheme. The appropriate choice is not scientific, but depends on the social and political context. For IPART, it is relevant that Sydney Water is owned by the state of NSW.

Recommendations

Opex

There is a distortion in the current regulatory arrangements that gives stronger incentives to cut costs in the early years of a price control, and weaker incentives at the end. An amendment to the regulatory framework that ensures the benefits of opex savings to the company are the same whenever they are introduced would remove this distortion. This makes sense and we recommend introducing a scheme that does this.

This incentive can be removed by the introduction of a relatively straightforward incentive scheme to carry-forward a proportion of the value of efficiency benefits into successive price control periods. A simple design of this mechanism is set out in the body of the report, and we recommend that a scheme of this form or similar is implemented for the following reasons:

- it would remove the distortion identified;
- it would be relatively straightforward to implement; and
- it provides a mechanism that can be extended to capex in future if warranted.

We consider that the incentives associated with this scheme should be focused on the removal of the distortion related to the timing of the cost savings, rather than on aggressive cost savings. This is partly because we have observed in other jurisdictions that the incentive strength necessary to encourage appropriate cost cutting is lower than the 24% proposed by Sydney Water, and partly because financial incentives appear to have played a limited part in facilitating efficiency savings in publicly owned Australian networks to date.

We have proposed two options. In Option 1, incentives for opex underspends and overspends are symmetric, but temporary cost differences from allowances are not incentivised. Under Option 2, the treatment of opex underspend and overspend is asymmetric, with the benefit of recurring underspends continuing into the following price period (raising prices), but with

no adjustment for overspends across price controls (i.e. no negative adjustment to prices). In Option 2, temporary cost savings or overspends are incentivised fully. In both options the retention period is four years (the year of actual savings plus three years carryover).

Our analysis indicates that both Option 1 and Option 2 are preferable to the current approach as it removes the time varying element of the current incentive with little additional cost. Between the two, our recommendation is for Option 2 because of the benefits of incentivising temporary outperformance and disincentivising underperformance. We note that Option 1 is similar to that proposed by Sydney Water while Option 2 is similar to Ofwat's PR04 opex carryover mechanism.

We note that a retention period of four years adds a level of complexity to the specific mechanisms of both options which would not exist under a retention period of five years. This is due to data for the final year of the preceding price control being unavailable when setting the next regulatory period's allowances. In practice, without and adjustment, this means that Sydney Water would be able to keep savings made in the final year and all years of the following period (i.e., five years in total). To adjust for this IPART would need to make an adjustment in the subsequent price control period for the final year's actual value. This is where complexity is added; the need for this calculation could reduce regulatory certainty and possibly impact on the incentive strength for Sydney Water to reveal cost savings for the final year in its submission for the following regulatory period. Ofwat cited this as a key reason for adding an additional year to its opex carryover mechanism in PR04.

While we believe that a four year retention period is appropriate given Sydney Water's circumstances, we acknowledge that adding an additional year would simplify the mechanism and increase the incentive strength on Sydney Water. The downside would be a delay in when consumers benefited from the savings. This is something IPART could consider, and we note that there is regulatory precedent for a longer retention period from both Ofwat and the AER.

Capex

We have also considered whether it is appropriate to extend the incentives to capex. While in theory we believe this to be sensible, the mechanisms (including the review of capex deferrals) that need to be implemented are more complex than those for opex savings. We recommend that IPART considers the nature of Sydney Water's expenditure program, and in particular the potential for opex and capex substitution to decide whether the costs associated with implementation are likely to be worth incurring for the potential benefit. A capex carryover mechanism, seeking to equalise across opex and capex, will be of greatest value if there are material opportunities for substitution between opex and capex options to address network requirements.

Overall

We recommend that IPART retains its full discretion to assess efficient expenditure or the permanence of expenditure levels for subsequent price controls. In our view, any attempt to design a mechanistic scheme that covers all possible circumstances is likely to be too complex.

We recommend that the scheme is kept as simple as possible, and that the regulator uses its discretion to avoid the impact of any perverse incentives.

Conclusion

The existing approach to CPI-X regulation used by IPART provides relatively strong incentives for Sydney Water to seek efficiency savings, but these incentives are stronger in the early years of the price control period, and more limited towards the end of the price control period. In addition to distorting the way the business is operated, the lower incentives towards the end of the regulatory period may affect whether the baseline opex used to inform setting the opex for the next price control period is as efficient as possible.

The removal of this distortion by equalising the incentives has been adopted by a number of regulators. We have developed two options for IPART to remove this distortion. These options are similar, but they differ primarily by how they treat overspends. While there are benefits of both options, on balance we recommend the second option, and note that its asymmetric treatment of opex overspends preserves an aspect of the current arrangements, while reducing the distortion within period for making efficiency savings. IPART will need to consider the options and our recommendation in the context of the overall regulatory framework for Sydney Water, including how it intends to set the baseline opex in the future.

We support in principle adopting a similar mechanism for capex, which would remove the timing distortion for capex savings, and potentially allow the incentives to make efficiency savings to be equalised between opex and capex. Sydney Water proposed that an EBSS be introduced for about 9.5% of capex. Although we support a capex carryover mechanism in principle, we are recommending that IPART consider the benefits of its introduction and how it could be implemented in the subsequent price control period. A capex carryover mechanism will be of greatest value if there are material opportunities for substitution between opex and capex options to address network requirements.

We have also suggested that IPART should consider further some of the approaches adopted by Ofwat and Ofgem, including assessing expenditure on a totex basis, and rewarding high quality business plans. But we recognise that the particular characteristics of Sydney Water (and the water sector in NSW), and IPART's current regulatory approach, mean that careful consideration of introducing some of these approaches needs to be undertaken.

1. INTRODUCTION

Cambridge Economic Policy Associates (CEPA) has been commissioned by IPART to advise on the design and implementation of an efficiency benefit sharing scheme (EBSS) for Sydney Water. This report is intended to inform IPART's review of prices for Sydney Water Corporation from 1 July 2016 and we understand that this report will be published alongside IPART's documentation. This is a periodic review that will set the maximum price that Sydney Water can charge for the provision of water, wastewater, stormwater and other services for a four-year regulatory period.

The report considers the role of cost efficiency incentives in the regulatory framework, addressing proposals from Sydney Water for the introduction of efficiency carry-over schemes (or EBSSs) for both opex and capex components. Specifically IPART has asked us to:

- research on the experience of other regulators on efficiency incentives;
- evaluated the different approaches, based on costs, benefits and risks;
- assess and comment on Sydney Water's EBSS proposal; and
- advise on implementing an EBSS for opex and/ or capex, including outlining the methodology and any issues.

We use our assessment of the proposed EBSS's and mechanisms in other jurisdictions to develop implementable options for IPART in regards to the Sydney Water review.

1.1. Background

In late June 2015, Sydney Water provided its pricing proposal to IPART and proposed changes to the form of regulation.[1] This included the introduction of efficiency benefit sharing schemes (EBSS) for opex and part of Sydney Water's capex program. This would allow the benefit (loss) to be held as an efficiency gain (loss) for a fixed period of time regardless of when the gain (loss) was incurred.

IPART responded to the pricing proposal on 7 September 2015 with an Issues Paper.[2] This outlined its views and sought comments from stakeholders on these proposals. This included a modified version of Sydney Water's EBSS for opex, whilst its preliminary view on capex was that an EBSS should not be introduced.

In addition to the Sydney Water decision, IPART is concurrently reviewing prices for Hunter Water, WaterNSW (Greater Sydney) and DPI Water. IPART has asked stakeholders whether it would be appropriate to introduce an EBSS to Hunter Water and WaterNSW. This work will

[1] Details on the price review can be found at:
http://www.ipart.nsw.gov.au/Home/Industries/Water/Reviews/Metro_Pricing/Review_of_prices_for_Sydney_Water_Corporation_from_1_July_2016

[2] IPART, *Review of prices for Sydney Water Corporation – Issues Paper,* September 2015.

also have relevance for next year's price reviews of Sydney Desalination Plant, Gosford City Council, Wyong Water and WaterNSW (Rural).

1.2. Purpose of the report

This report provides an assessment of different options for incentives related to both opex and capex to inform IPART's decisions on current and future price controls. This includes advice on the design and implementation of incentives.

The appropriate decision for IPART depends on the circumstances of the decision. In the case of the maximum charges for Sydney Water from 1 July 2016, certain options will be unavailable for the upcoming control due to time restrictions and an absence of facilitating measures to support new regimes. In this report, we focus on practical and implementable solutions for the next review, although with an eye on how the incentive regime may develop in the medium and long run. This includes the conditions that we consider would need to be in place to introduce and/ or extend the incentive mechanisms.

We also undertake an explicit assessment of Sydney Water's proposal and IPART's modified EBSS.

1.3. Report structure

The report is structured as follows:

- Section 2 looks at the context behind the incentive framework;
- Section 3 sets out criteria for assessment of incentive packages;
- Section 4 provides a summary review of expenditure efficiency incentives;
- Section 5 assesses the options for incentives; and
- Section 6 sets out our conclusions.

Annex A provides additional detail on the review of efficiency incentives, while Annexes B and C provides further details of the proposed mechanisms functions and examples.

2. CPI-X INCENTIVISATION IN CONTEXT

2.1. Introduction

An incentive aims to encourage an individual or group to perform an action or adopt a behaviour. The success of the incentive depends on not only the design of the incentive, but also the decision making framework used by the individual or group. The efficiency incentives under a CPI-X framework work best when they are aligned with/ work in conjunction with the incentives placed on management by the owner.

Different actors can respond differently to the same incentive. We must therefore consider Sydney Water specifically to understand if there are any characteristics that will influence their decision making, for example their ownership structure.

The best outcomes for consumers are likely to occur when the incentives provided by the regulatory regime work effectively with the incentives provided through the corporate governance of the business, e.g., the incentives the shareholders place on the management. While obvious, the best outcome for consumers include their sharing in the benefits from companies increasing their efficiency.

This section deals with the rationale behind setting an EBSS type mechanism and the context for Sydney Water given its characteristics, and those of the current regulatory regime.

2.2. Rationale behind EBSS type mechanisms

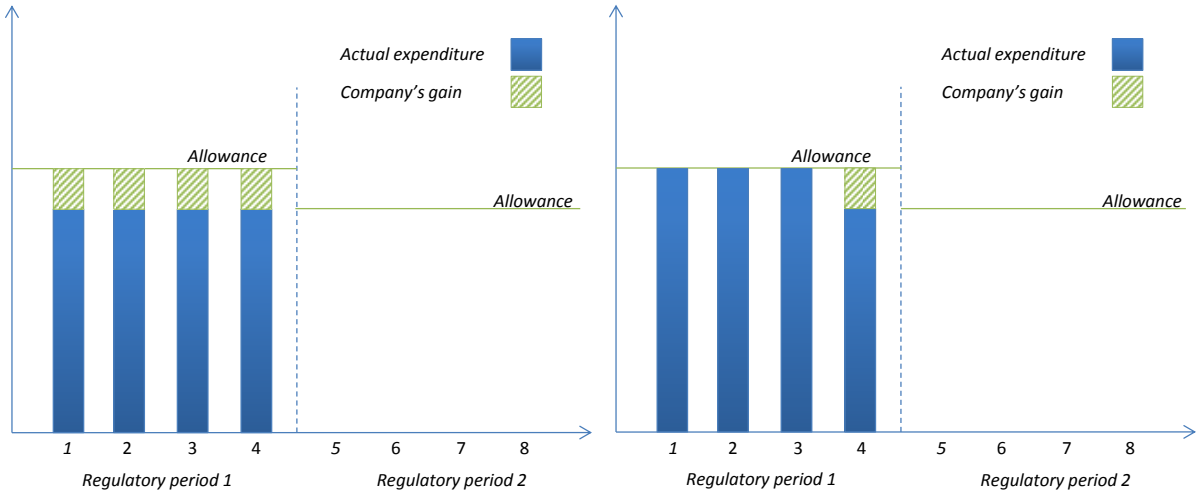
Solving issues with the incentive strength

EBSS mechanisms like the type proposed by Sydney Water have been used by regulators in different jurisdictions across a range of sectors. Schemes similar to Sydney Water's proposal are also referred to as carry-over or rolling incentive mechanisms – as they are generally only changing the profile of the benefit sharing.

When these mechanisms are applied to opex and/ or capex separately they are trying to solve an issue with the implicit efficiency incentive under a CPI-X regime – that ***the incentive strength reduces over time***. If the regulated company identifies possible recurring efficiency savings towards the end of the period then it has an incentive to not realise these savings until the start of the next period in order to retain them for longer. One-off savings (costs) are typically retained in full by the company.

The effect on opex is illustrated very simply in Figure 2.1 below. If recurring savings are made in the first year then the company benefits from four years of outperformance until the next price reset, however if the gains are made in the last year the company only gets one year of benefit.

Figure 2.1: Company gains more from a recurring saving made in year 1 (LHS) compared to year 4 (RHS)



The time varying incentive is similar for capex (although the allowance is not typically set based on historical revealed costs), in that companies receive a greater return on the capital differential if they make savings earlier in the period rather than later as the RAB will not be adjusted until the next price reset. In other words, if they make a saving in the first year of a price control they benefit from this until the RAB is reset, while if they make a saving in the last year of the price control they only benefit from one year of saving. The gains the company makes from delaying savings depend on whether the regulator is able to set an efficient allowance without the company revealing efficient expenditure. If the company considers that regulator is able to set efficient costs without the revealed cost information then it has an incentive to make these efficiency gains or risk losing them without benefiting from them. This is discussed further in this report.

Therefore ***the primary purpose of a carryover mechanism is to make the incentive continuous (or time independent)***. This is typically done by either allowing the company to keep the savings for a fixed length of time or a fixed percentage of the underspend (overspend) regardless of when it occurs.[3]

Sometimes, for example in the case of the AER and Ofwat (PR09), ***the 'incentive strength' is also increased*** to provide the companies with additional rewards/ penalties to make savings. This was done by allowing the regulated companies to retain (bear) the under- (over-) spend for an additional year longer than the price control (e.g., six years instead of five in the case of Ofwat).[4]

[3] This is explained further in IPART, *Incentives for cost savings in CPI-X regimes,* 2011.
[4] We discuss Ofwat's use of multipliers in PR09 later in this report.

Implications of different approaches to setting expenditure allowances to an EBSS

The above example relies on revealed expenditure being used to set the baseline allowance for the next price control period. The AER, which applies a similar EBSS to Sydney Water's proposal, refer to this approach as a 'revealed cost base-step-trend'.[5] Typically this means that a 'base' year is selected, usually the last year for which actual expenditure data is available, and then rolled forward with adjustments for factors such as input price inflation, ongoing productivity changes, output growth, etc. The EBSS works in combination with this type of revealed cost allowance setting in order to ***avoid increases in opex in the base year*** and to make the incentive strength time independent. It is also worth noting that revealed expenditure is more useful for setting opex allowances as operating activities are reasonably constant over time. However, capex is much more lumpy and based on specific requirement at any given time, therefore recent historical capex may be less of an indicator of short-term future capex requirements.

There are of course different approaches to setting a company's allowance for subsequent regulatory periods. For instance the regulator could use benchmarking or an independent review of the company's expenditure to determine what an efficient expenditure allowance should be. This would mean that consumers would benefit from lower prices during the next price control regardless of whether the company made the efficiency savings during the previous period or not.

Ofwat and Ofgem no longer use a base-step-trend approach – both Ofwat and Ofgem make extensive use of benchmarking to set allowances – and set an ex ante incentive rate (see Section 4.2) this is not seen as an issue.[6] The rationale being that if the companies do not make efficiency savings available to them, they may lose these through the benchmarking process at the next regulatory reset. Companies are rewarded for outperformance as their historical data is used in the benchmarking process and they may appear as being efficient relative to other companies which would mean a smaller (or no) efficiency adjustment for the following period. The incentive strength applies evenly over time as companies maximise profits if they make efficiency gains as and when they are available to them. The *carrot* for companies is the sharing factor and the *stick* is the risk that they will lose any efficiency savings that they try to delay.[7]

We note that the incentive *stick* of the company losing efficiency gains it chose not to make applies across all regulatory approaches where the regulator has discretion for setting the price control allowance – this is the case for IPART's current regime. However, it is widely

[5] AER, *Explanatory Statement – Efficiency Benefit Sharing Scheme for Electricity Network Service Providers*, November 2013, page 5.

[6] This means that the Ofwat and Ofgem approaches no longer ensures consistent incentive strength over time in the same way as the carryover mechanisms did.

[7] The mechanisms used by Ofgem and Ofwat are complex, but we have simplified the discussion here.

considered that benchmarking provides a better view of efficient costs (and therefore a stronger *stick*).

What this means is that the approach a regulator takes to setting price levels (revenue allowances) affects the effectiveness of a carryover mechanism and how consumers benefit from it.

2.3. IPART's duties in relation to Sydney Water

As part of their duties, the Tribunal must consider what is in the long-term best interests of water users in determining the price reviews through its requirement to have regard to a number of matters. This is set out in section 15(1) of the IPART Act 1992[8].

In meeting this objective, costs should be efficient, infrastructure should be maintained and improved, and outputs to meet the needs of consumers met. The efficiency incentive has a clear role to play in meeting this overall objective.

2.4. Characteristics of Sydney Water

There are features of Sydney Water that may impact on how incentives are designed. These include:

- **State ownership** – While Sydney Water's principal objectives are not dissimilar to those of privately owned companies – protect public health, protect the environment and be a successful business – as Sydney Water is wholly government owned management may have objectives that differ to management of privately owned utilities; for example, a lesser focus on achieving profits under the incentive framework with other considerations taking a greater role. For instance, the NSW Government has directed Sydney Water to provide a number of non-commercial social programmes.[9] In addition, a number of Australian commentators, including the AER, have noted that government owned corporations do not appear to have achieved the same level of efficiency as privately owned companies which profit from the incentives under a CPI-X regulatory design.[10]
- **Large size** – In providing drinking water to over 4.8m people[11], Sydney Water is a very large water company compared to others in NSW and Australia. In setting costs, the size of the company may influence the ability to conduct comparative cost assessment if there are a limited number of suitable comparators.

[8] http://www5.austlii.edu.au/au/legis/nsw/consol_act/iparta1992426/s15.html
[9] The corporation can seek full reimbursement for costs associated with these type of programmes.
[10] This view is supported by the relatively large increases in electricity network prices of government owned utilities compared to privately owned ones (see https://www.nsw.gov.au/sites/default/files/miscellaneous/electricity_network_services.pdf).
[11] Sydney Water Annual Report 2014/15.

- **Network of assets** – Sydney Water operates a network of water and wastewater assets. In regulating this entity, this may influence how it is regulated; for example, a number of projects may diversify risk, but be more challenging to assess costs.

2.5. Regulatory framework

IPART is currently undertaking price reviews for Sydney Water and Hunter Water, with price reviews of bulk water and water management services for WaterNSW and DPI Water. However, Sydney Water is regulated on an individual basis, rather than being considered as part of a NSW wide regulatory regime.

Operational requirements on Sydney Water

Sydney Water operates under a licence that enables and requires it to supply water, wastewater, recycled water and stormwater services. IPART conducts an annual operational audit of Sydney Water to ensure that they are compliant with the terms of the licence, awarded under Part 5, Section 12 of the Sydney Water Act 1994. As part of the licence, there are obligations relating to:

- water quality;
- asset performance, including system performance standards;
- water conservation;
- environmental indicators and management; and
- customer and consumer rights.

This informs the outputs required under the price control reviews, with IPART keeping track of how Sydney Water meets its objectives.

Assessment of costs

IPART sets separate allowances for opex and capex (rather than setting a totex allowance) for Sydney Water. Capitalisation into the RAB is therefore based on whether Sydney Water classifies the expenditure as capex.

IPART sets ex ante allowances for expenditure, with ex post reviews conducted to assess capex over the period to better understand whether there was additional prudent and efficient expenditure incurred or whether certain expenditure had been deferred.

The baseline for opex cost allowances utilises expenditure in the year preceding the price control decision, with step changes and normalisation used where IPART deem it is appropriate following a review. Capex is considered to be less recurrent than opex and therefore is based less closely on a revealed cost approach. To date, IPART has not used benchmarking, though has indicated that it intends to use productivity benchmarking in future.

Current incentives for opex and capex

Under the current regime, Sydney Water retains (bears) the entire difference – in terms of opex, depreciation and return on capital – between the actual and allowed opex and capex (subject to the ex post review of capex) until the price review reset, where new allowances are set. Historical expenditure inform the new allowances. This approach leads to relatively stronger incentives for efficiency savings at the start of the regulatory period and relatively diluted incentives at the end of the period. We illustrated this previously in Figure 2.1. As we discuss later, the ex post review on capex – where IPART may determine that an overspend is prudent and efficient and adjust Sydney Water's Regulatory Asset Base (RAB) accordingly – has the potential to distort the incentives on Sydney Water.

2.6. What issues are faced under the current regime

As discussed above IPART currently relies on the implicit incentives under a CPI-X framework. As we will see in the report, regulators in other jurisdictions moved away from this approach due to concerns that such an approach may lead to some distortions in the incentives faced by regulated companies. The two key concerns with the implicit incentive approach are:

- Varying incentive strength depending on the timing of savings.
- Capex-opex trade-off (often referred to as capex bias as it is believed to generally be an asymmetric trade-off in favour of capex).

Varying incentive strength

We have discussed the first of these concerns in Section 2.2 above. However, the high level evidence from Sydney Water's actual expenditure does not indicate this is a significant issue. This in itself is not strong evidence that the varying incentive strength has not affected Sydney Water's decision-making, as other reasons may have accounted for the expenditure pattern. However, it may indicate that Sydney Water's characteristics do result in a lower drive to profit maximise.

Table 2.1: Allowed versus actual expenditure

Category	Regulatory period 1				Regulatory period 2			
	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16*
Opex	Above	Below	Above	Above	Below	Below	Below	Below
Capex	Above	Above	Below	Below	Below	Below	Above	Above

**2015-16 is a forecast.*

'Above' indicates actual expenditure was higher than the allowance.

Source: Sydney Water Annual Information Return, June 2015; IPART.

Capex-opex trade-off

In relation to the capex-opex trade-off there are two primary issues. One is that there is a perceived capex bias for companies. The bias is believed to exist for several reasons:

- there are different levels of overall financial incentives for capex and opex based on the approach to setting each of the allowances and their associated delivery incentives;
- if the allowed cost of capital is higher than the actual cost of capital and companies profit when receiving a return equal to the allowed cost of capital; and
- there is a corporate culture for growing the RAB.

The focus of this report is only on the first of these reasons. Under a CPI-X regime, without any equalising mechanism, opex is effectively incentivised at 100%, ignoring the time varying element, as the company retains (bears) any under- (over-) spend against its allowance. While for capex, the company would only traditionally retain the return of and on capital for the regulatory period (as the RAB would be based on actual expenditure at the next price control), although in Sydney Water's case it does not benefit from the return of capital as IPART roll forward the RAB with forecast depreciation. Therefore a $1 underspend of opex against allowance has more value for the company than a $1 underspend of capex.[12] If a company could reasonably undertake capex instead of opex (or at least account for the opex as capex) it would have an incentive to do so as it would retain the entire difference between its allowance and its actual opex for a period of time. Rather than it retaining the return of and on the capex underspend for a limited time period. In Text box 2.1 we set out a simple case study which demonstrates the issues that can arise from differential incentive rates being set across capex and opex.

Text box 2.1: NIE rolling opex incentive

NIAUR, the multi-sector regulator for water, gas and electricity in Northern Ireland, for controllable opex in the electricity transmission and distribution determination from 2007/8 to 2011/12. It was proposed by the regulated company, which also referred to it as a rolling mechanism. It worked by setting year "t" opex allowance using actual opex in year "t-5" (adjusted for inflation). In this situation, opex had a 100% incentive rate while NIAUR has left the incentive rate on capex at around 30% (the approach to capex adopted during this control period was based on allowing actual investment into the RAB). While a significant reduction in opex was apparently achieved during the price control period is also clear is that the opportunity for regulatory gaming under this type of mechanism is significant.[13] NIAUR noted in its April 2012 draft determination that it appears that a change in capitalisation policy may have taken place which helped reduce opex and boost capex

The fact that a base year capex is not typically used by regulators means that there is unlikely to be the same issue around the time varying incentive rate. However, Sydney Water has proposed that some of its capex is recurrent in nature. If actual expenditure for this category

[12] The actual capex savings value depends on the discount rate and the useful life of the asset.

[13] See Figure 6.1, Northern Ireland Electricity Transmission and Distribution Price Controls 2012-2017, Draft Determination, NIAUR, April 2012

is used to set allowance in the next regulatory period, and the company can delay capex in this category for a year or so, then the time varying incentive strength may influence decisions.

Based on our simple high level assessment (see Table 2.1 above) there is no strong evidence that Sydney Water exhibits a capex bias (at least in regulatory period 1), as it has not substituted capex for opex in order to remain below its allowance. However, in principle, it is appropriate to set incentive mechanisms which minimise the risk of creating (or enhancing) a capex bias. We note that this capex bias has been explicitly recognised in the UK with the current Ofwat and Ofgem price controls focusing on totex to avoid this issue. However, even during their transition to totex Ofwat and Ofgem tried to put in place equalising mechanisms and detailed reporting guidelines. The latter was to prevent regulated companies simply reclassifying some opex as capex.[14]

[14] Ofgem, *Electricity distribution price control review – Final proposals,* November 2004, para 7.83, page 89.

3. OUR ASSESSMENT CRITERIA

3.1. Objectives of an efficiency incentive

In Section 2.2 we set out the standard rationale behind EBSS type mechanisms and in Section 2.6 we identified potential issues with the current regime. Given the interlinkages between the approach used to set allowances and the carryover mechanisms the objectives and design of the mechanism will vary. In the context of how IPART currently approaches price controls and Sydney Water's characteristics we consider that, alongside the overarching long-term consumer benefit objective, the high level objectives for carryover mechanisms are:

- To ensure that the incentive strength is time independent. This includes removing any perverse incentive to incur higher costs in the base year and 'save' efficiency gains until the final year to the regulatory period.
- To reduce, or at least not increase, any capex bias the company may experience.

We discuss the assessment criteria for the efficiency incentives below.

3.2. Assessment criteria for efficiency incentives

In Section 4 we present our review of existing efficiency incentive mechanisms, looking at regulatory precedent in both Australia and Great Britain. This can inform our design of efficiency incentives, but first we must set out the assessment criteria for the incentives for IPART.

The overarching criterion is that any incentive mechanism needs to be consistent with long-term interests of consumers (cost and quality). This includes determining whether introducing an EBSS is appropriate given other aspects of IPART's approach to setting Sydney Water's price determination.

IPART framework

In its Issues Paper, IPART note benefits, costs and risks from incentive design:[15]

- **The potential benefits of the proposals** – how they can promote outcomes that are more consistent with competitive market outcomes, including allocative, productive and dynamic efficiency; efficient allocation of risk between the business and customers; and responsiveness to customer preferences.
- **The potential limitations and risks of the proposals** – how they could result in limited and/or unintended consequences due to the level of competition in the sector; the governance framework; and asymmetric information.

[15] IPART, *Issues Paper*, September 2015, page 80.

- **The potential costs of the proposals** – how they could lead to a more complex and administratively burdensome regulatory environment.

Sydney Water criteria

In its response to the IPART Issues Paper, Sydney Water sets out principles that IPART should follow in its determination and ensuring consistency with section 15 of the IPART Act 1992.[16] This includes aspects such as transparency, accountability, proportionality, consistency and targeting.

Chosen assessment criteria

In order to aid comparison, we have composed criteria specific to the design of an efficiency incentive mechanism, while also capturing principles of best practice regulation. We use a framework of assessing benefits, costs and risks in structuring our assessment.

The criteria are guided by the experiences of other jurisdictions in designing efficiency incentives and seeking to avoid the pitfalls that other regulators have faced.

Our criteria are:

- **Effective** – leads to consumer benefits in the long-run. Inherent in effectiveness is an ability for the business to respond to the incentives.
- **Equal treatment of category of cost** – avoid as far as possible incentivising one solution type (e.g. opex or capex) over one another.
- **Time independence** – incentives should be equivalent depending on the timing of savings/losses within the regulatory period.
- **Continuity of incentives in strength** – incentives should not have significant step changes in strength depending on the company's level of performance that may distort the company's decision making.
- **Transparent, consistent, replicable (simple) and proportionate (i.e., better regulation objectives).**
- **Practical and implementable** – it is important that the proposed solution can be understood by key stakeholders and implementable.

In relation to the last point above, we note that there may be a good case for trialling incentives with limited financial impact before a full implementation. For example, the Australian energy rules allow the AER to trial incentives before their full introduction. This allows the adaption of incentives over time as lessons are learnt, providing the way it is done is transparent. An example of this is Ofgem's approach to incentives on consumer satisfaction.

[16] Sydney Water, *Response to IPART's Issues Paper*, October 2015, pages 4-6.

Ofgem started with a relatively weak incentive on this during its fifth price control for electricity distribution networks and increased this in its recently completed sixth control.[17]

There may be some overlap between these criteria and trade-offs between individual criteria. In the next section, we use these to help our assessment of incentive mechanisms.

3.3. Rationale behind selection of criteria

What may be the issues if the criteria are not met?

- Effective – this may be difficult to observe in the absence of a counterfactual that demonstrates the foregone efficiency benefits, but may cover gaming in a general sense. We also note that introducing a sharing scheme where consumers are not likely to benefit is a consideration – we understand that AER's decision not to apply the EBSS to some of the NSW distribution network service providers (DNSPs) was a recognition that they were unlikely to underspend the opex allowance.
- Equal treatment of category of cost – the idea of a 'capex bias', where the incentive strength on opex savings being stronger than for capex, stems from a different treatment of cost.
- Time independence – where there is a different incentive strength over time, this can lead to sub-optimal decision making from a social perspective.
- Consistency with best practice regulatory principles – a key concern is to prevent gaming; the risk of additional complexity is additional unintended consequences.
- Practical and implementable – if the proposed solution is not possible, then there is no value reviewing this at this stage.

The table below presents examples of our criteria.

Table3.1: Examples of where criteria have not been met

Criteria	Example
Effective	In the Phoenix Natural Gas Ltd (PNGL) 2013 determination by the Competition Commission (CC) in response to an appeal over the Northern Ireland Authority for Utility Regulation's (NIAUR's) final decision, the CC largely rejected the argument put forward by the regulator for clawback in light of rewards earned by PNGL for historic outperformance (seeking to limit to five years ex post) and deferrals. This was an example of generous rewards in light of incentives not being clearly defined.
Equal treatment of cost category	Following its PR09 pricing determination, Ofwat sought to address concerns over a perceived capex bias in the sector. This was seen to be through different incentive strengths covering

[17] Ofgem, *Strategy decision for the RIIO-ED1 electricity distribution price control: Outputs, incentives and innovation,* March 2013, page 62.

Criteria	Example
	opex and capex categories. A totex regime was introduced for the subsequent price control period, PR14.
Time independence	The New Zealand Commerce Commission (NZCC) introduced the Incremental Rolling Incentive Mechanism (IRIS) in 2014 to remove the different incentive strength that regulated companies faced within determination periods. The NZCC noted that the IRIS meant that suppliers were no longer able to boost profits by concentrating costs in a base year.[18]
Continuity of incentive	Continuity has similarities to time independence, but over a different dimension i.e. cost level rather than time. An example of a non-continuous incentive would be an asymmetric incentive mechanism. Unless well-defined and transparent, asymmetric incentives can lead to unintended consequences i.e., if a company faces a greater incentive to avoid costs then service performance may suffer.
Transparent, consistent, replicable (simple) and proportionate	Achieving a strong theoretical model may come at the cost of complexity. In 2010, Ofgem Chairman Alistair Buchanan said that 'While undoubtedly very clever, some schemes in our price controls, such as the IQI .. are virtually unfathomable to those outside the cognoscenti.'[19]

[18] NZCC (2014) IRIS Final Reasons Paper, pX2.
[19] Ofgem (2010) RPI-X@20 project.

4. REVIEW OF EXPENDITURE EFFICIENCY INCENTIVES

4.1. Selection of incentive mechanisms

In considering potential options for Sydney Water, we focus on options that are implementable and practical at this stage of the pricing review. For example, the current Ofgem and Ofwat approaches in the UK use menu regulation on a totex basis with cost benchmarking used across the different networks. This approach implemented in full is not feasible for Sydney Water in the short-term, but we look at the evolution of incentives to identify whether parts of the current approach could be implemented, and try to understand how developments in the short-term could facilitate consideration of future changes to the incentive regime in the longer term.

It is important to consider any changes to the regulatory approach in the context of the overall regulatory approach, and the particular circumstances of the regulated business. Considering changes without regard to other aspects of the regulatory framework may lead to unintended consequences.

There are three case studies that we review in detail. Full information can be found in Annex A. The three regulators we consider are:

- Ofgem, GB energy regulator.
- Ofwat, England and Wales water regulator.
- The AER, Australian national energy regulator.
- After assessing these case studies and considering IPART's current approach, we then assess Sydney Water's proposals and IPART's initial response to the proposal.

We had considered using the Essential Services Commission of Victoria's (ESC) approach as a case study, but it appears to be similar to some of the approaches used by the AER. However, of interest from its last price control for the Victorian DNSPs was the removal of a capex EBSS. We summarise the reasons for this in Text box 4.1 below.

Text box 4.1: ESC's reasons for removing the capex carryover mechanism[20]

In its 2006-2010 pricing decision for Victorian DNSPs ESC withdrew a rolling capex incentive it had in place for the 2001-2005 price control. ESC noted a number of factors that lead to the withdrawal of the capex carryover mechanism. These included:

- Concerns that 'efficiencies' where actually inefficient deferrals. The ESC was not convinced the capex 'efficiencies' were sustainable.
- The transfer of capex efficiency benefits to customers has been less transparent than for opex.
- It could not determine whether the capex carryover mechanism provided any greater incentive than that already provided within the five year regulatory framework.
- Benefits to customers were not readily realisable; while a customers' benefit from a reduced RAB in one period (through lower capex), they may pay the carryover cost plus increased RAB in the subsequent period.

ESC did note concerns that the removal of the capex carryover mechanism might create bias, however it considered its reporting requirement would help alleviate this risk.

Quantitative analysis may inform the review of these cases, but it is difficult to distinguish the cause of changes in expenditure and outcomes. An increase in expenditure does not necessarily imply inefficiency (and vice-versa). Equally, outperforming the expenditure allowance also does not necessarily point to efficiency savings being made. There will be a number of factors that determine what the level of expenditure will be, so isolating the impact of the incentive may not be practical. Understanding cause and effect is also often complicated because the regulators have made regular incremental changes to their approaches, so there is not a time series of information to use to assess outcomes.

It is also important to note that we would expect that the regulators would have regard to the regulatory framework, and the sharing of risks between consumers and the businesses when setting the rate of return for the business. Therefore, an incentive regime that leaves more risk with consumers may result in a lower rate of return for the business (compared to the counter-factual). We have not reviewed in these case studies how the regulators have reflected their different approaches to setting incentives in how they approached setting the rate of return.

4.2. Incentive strength

Before we set out the case studies below we consider it worthwhile to discuss the different interpretations on incentive strength across the regulators. This is important as Sydney Water stated, in relation to the EBSS, that UK regulators have "strengthened, rather than reduced, the incentives over time."[21] We do not consider that this is as clear cut as Sydney Water propose, and it also depends on the approach to cost assessment taken by the regulators –

[20] Essential Service of Commission of Victoria, *Electricity Distribution Price Review 2006-10 - October 2005 Price Determination as amended in accordance with a decision of the Appeal Panel dated 17 February 2006 Final Decision Volume 1 - Statement of Purpose and Reasons*, October 2006.
[21] Sydney Water, *Response to IPART Issues Paper*, October 2015, page 18.

since the allowance and implication of a cost overspend or underspend needs to be seen in aggregate. If the headline 'sharing factor' is looked at, it would appear that UK regulators (Ofgem and Ofwat) have decreased the incentive strength (although as discussed in Section 2.2 this is the carrot rather than the stick).

The AER and Sydney Water have relied on a savings in perpetuity calculation to determine their definition of the sharing rate. For example, the AER's opex sharing rate is based on companies retaining the efficiency savings for six years with a discount rate of 6%. This means that if a company makes a recurring $10 saving it retains that benefit for six years. After discounting that is equal to $52. The total 'savings' in perpetuity are $167,[22] therefore the consumers share is $115 (or approximately 69%). The headline sharing factor for the Australian electricity businesses is therefore approximately 30% (or 31%).

As we discussed in Section 2.2, this estimate is dependent on the regulator placing 100% weight on the revealed costs in setting allowances during the next period and into the foreseeable future. If the regulator uses benchmarking or makes an independent assessment to set allowance for the next regulatory period, i.e., placing less weight on the revealed costs, then if could be argued that consumers would benefit from efficiency gains without additionally rewarding the company.[23]

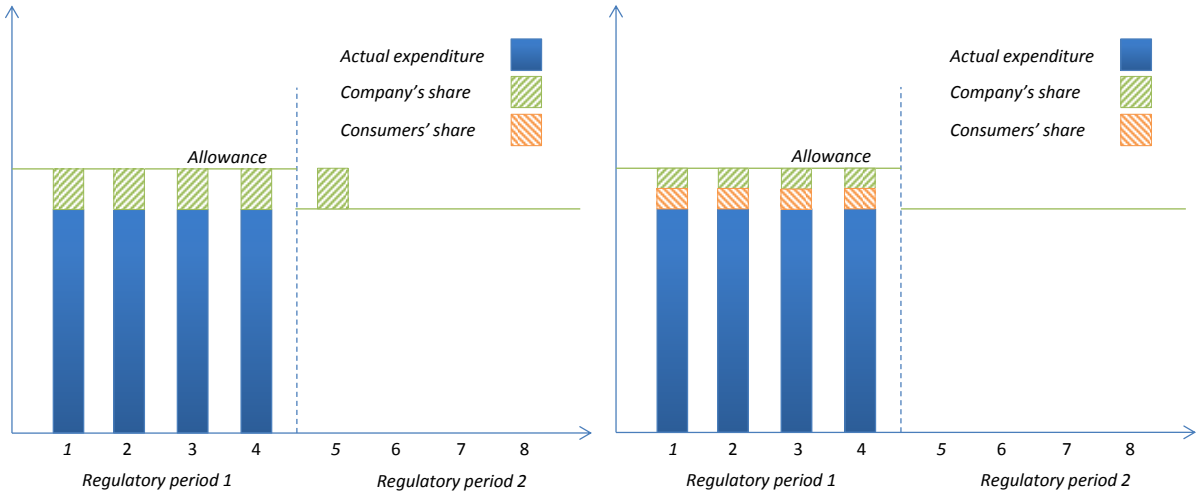
Ofwat and Ofgem use sharing rates based on the premise that companies can retain (bear) in any given year (their mechanisms are much more complex in practice).[24] Therefore, if the ex ante sharing rate was set at 50% and a company made an efficiency saving in any given year, regardless of whether it is recurring or not, the company would retain 50%. If it made the saving in the first year of the price control and it was recurring the company would only retain 50% of the difference between actual and allowed expenditure for each year of the price control. Putting Sydney Water's proposal in similar terms, Sydney Water would retain 100% each year (and for one additional year). Therefore, its sharing rate, in Ofwat/Ofgem terms would be greater than 100%. We have provided a simple illustration of this in Figure 4.1 below.

[22] $167 = $10/6%

[23] The AER illustrate this in Annex B ("How the EBSS interacts with an exogenous forecasting approach") of, *Explanatory Statement – Efficiency Benefit Sharing Scheme for Electricity Network Service Providers,* November 2013.

[24] We note that the Competition and Markets Authority in the UK, in its recent decision on Bristol Water's price control, did apply a menu and simply set a sharing factor of 50% for under (over) spends. CMA, *Bristol Water plc – A reference under section 12(3)(a) of the Water Industry Act 1991,* October 2015, page 52.

Figure 4.1: Comparison of Sydney Water's sharing rate (LHS) to Ofgem/ Ofwat's sharing rate (RHS)



The above discussion also means that incentives across capex and opex will not necessarily be equalised if one uses an ex ante sharing factor while the other relies on an in perpetuity calculation, even if they are set to the same 'rate'.

4.3. Incentive mechanisms reviewed

The incentive mechanisms are described in detail in Annex A. We provide an overview of the characteristics of the relevant mechanisms used by regulators and those proposed by Sydney Water and IPART in Table 4.1.

We have focused on older price control decisions for Ofwat and Ofgem. This is because their most recent price controls, Ofgem's RIIO price controls and Ofwat's PR14, do not use carryover mechanism as such.[25] Rather, as discussed previously, they use menu regulation which sets an ex ante sharing factors. We do not consider that this type of approach is feasible for IPART at this time, therefore we have not included them in our assessment. We note however, that Ofgem's DPCR5 approach (its fifth price control for electricity distribution networks) and Ofwat's PR09 capex mechanism did use a form of menu regulation. We have included this in our analysis for comparative purposes as Ofgem had not previously used a carryover mechanism for opex (but it had used one for capex).

[25] In Annex A, we include details about the evolution of Ofgem's and Ofwat's approaches.

Table 4.1: Review of incentive mechanisms

	Ofwat - PR04	Ofwat - PR09	Ofgem - DPCR5	AER - from Nov 13	Sydney Water - revised EBSSs	IPART modified EBSS
Opex						
Carry-over mechanism used?	Yes	Yes	Yes	Yes	Proposed	Proposed
Symmetric?	No - overruns borne in full	No - overruns borne in full	Yes	Yes	Yes	No
Same treatment of temporary and permanent over/under spend.	No – fully retain temporary over/ under spends	No – fully retain temporary over/ under spends	Yes	Yes (sharing factor constant, on a time value of money basis)	Yes (sharing factor constant, on a time value of money basis)	Yes – for underspend (sharing factor constant, on a time value of money basis)
Incentive strength - assuming benefit sharing in perpetuity (i.e. as per AER opex EBSS) using 5% discount factor	30% (six year holding period)	30% (six year holding period)	~8% to 13%	30% (six year holding period)	23% (five year holding period)	19% (four year holding period)
Incentive strength - assuming current Ofwat/ Ofgem style analysis (note we ignore time value of money for comparative purposes).	100% for temporary. 120% for recurring.* Plus multipliers.	100% for temporary. 120% for recurring.* Plus multipliers.	30-50% (totex)	0% for temporary. 120% for permanent.*	0% for temporary. 125% for permanent.*	0% for temporary. 100% for permanent.*
Capex						
Carry-over mechanism used?	Yes	Yes - menu form	Yes	Yes	Proposed	Not proposed
Symmetric?	No - overruns borne in full	Yes	Yes	Yes - subject to review	Yes	n/a

	Ofwat - PR04	Ofwat - PR09	Ofgem - DPCR5	AER - from Nov 13	Sydney Water - revised EBSSs	IPART modified EBSS
Same treatment of temporary and permanent over/under spend	No - retain temporary over/ under spends	Yes	Yes	Yes	Yes	n/a
Incentive strength - assuming benefit sharing from second period (i.e. as per AER opex EBSS)	~30%	~4%-10%	~8% to 13%	~30%	~23%	n/a
Incentive strength - assuming current Ofwat/ Ofgem style analysis	~100-120%	15-40% (based on menu)	30-50% (totex)	~100-120%	~100-125%	n/a
Combined incentives						
Equalised incentives?	Yes (approximately)	Yes (approximately)	Yes	Yes (approximately)	Yes (approximately)	No

** Based on retaining the savings for one year longer than the price control. Therefore, six years rather than five in Ofwat and the AER's case, and five rather than four for Sydney Water.*

What can be observed from Table 4.1 is that the other regulators did decide that it was appropriate to try and make the incentive strength time independent by introducing a carryover (or menu) mechanism. The exact strength varies on how you measure it, but both Ofwat and the AER decided that increasing the retention period to be one year longer than the price control was appropriate. We note that Ofwat increased the opex retention period for two reasons:

- to make the mechanism simpler as no final year adjustment would be required;[26] and
- to match the incentive strength with that set for the capex mechanism.[27]

Ofgem's menu approach for DPCR5, meant that the incentive strength was much lower on the companies, but consumers bore a share of any overspend. The menu approach makes no distinction between temporary and permanent overspends, they effectively net out over the price control period.

A key difference across the approaches is how temporary over-/ under-spends were dealt with. The AER's and Sydney water's approach results in any temporary over-/ under-spend being borne by consumers, while Ofwat's (PR04 and PR09) approach resulted in the company bearing any temporary over-/ under-spend. As noted above, Ofgem's menu approach meant that consumers shared in any gains/ losses regardless of whether they were temporary or not. Another difference of interest is that Ofwat's approach did not allow for a negative carryover i.e., underperformance was not considered to be persistent, it also capped the carryover at the base year (penultimate year) of the price control period. Therefore, while Ofgem's, the AER's and Sydney Water's mechanisms are symmetric Ofwat's was not (although the capex scheme in PR09 was).

For the most part all the regulators tried to balance the incentives across opex and capex, although as we noted above this is not necessarily achieved when mixing ex ante and in perpetuity sharing factors.

4.4. Comparative assessment

In Table 4.2, we undertake a comparative assessment of these efficiency incentives against the current regime. (A more detailed evaluation of the approaches is set out in Annex A.) This assessment is based on the whole regime not the opex and capex mechanisms separately. We consider there to be benefits from changes to the existing regime, but there is no clear favoured approach – instead we think there are lessons to be learned from each of these examples in arriving at a preferred option. This is particularly the case around incentive strengths and how incentives were equalised across capex and opex. The latter point is important, as Ofgem and Ofwat moved to totex approaches (and menus) as they saw

[26] Ofwat, *Periodic review 2004 – A further consultation on incentive mechanisms: Rewarding future out-performance and handling under-performance of regulatory expectations*, June 2003.
[27] Ibid.

deficiencies in using separate opex and capex carryover mechanisms to equalise the incentive strength.

Table 4.2: Comparative assessment of efficiency incentive regimes relative to current approach

	Current approach	Ofgem – DPCR5	Ofwat – PR04	Ofwat – PR09	AER – EBSS and CESS	Sydney Water proposal	IPART modified EBSS
Criteria 1 - Effective and minimises gaming	Amber	↑	↑	↑	↑	↑	↑
Criteria 2 – Equal capex/ opex treatment	Red	↑	↑	↑	↑	↑	≈
Criteria 3 – Time independent	Red	↑	↑	↑	↑	↑	↑
Criteria 4 – Continuity of incentive strength	Red	↑	↑	↑	↑	↑	↑
Criteria 5 – Transparent, consistent, replicable (simple) and proportionate	Amber	↓	↑	↓	≈	≈	↓
Criteria 6 – Practical and implementable	Green	↓↓	↓	↓↓	↓	↓	↓

Key: Red = Significant issues, Amber = Some issues, Green = Confident that no material issues. ↑= improvement on current approach, ↓ = worsening of current approach, ≈ = similar to current approach.

In our assessment, we believe that there are clear benefits from introducing carryover mechanisms for opex and capex. However, these mechanisms do introduce more complexity into the regime and specific choices around how the mechanisms work affect the overall complexity and may impact on better regulation principles (Criteria 5).

It is difficult to assess precisely how successful these mechanisms have been in jurisdictions where they have been introduced as there is no counterfactual. However, the carryover mechanisms have been broadly seen by regulators as, while imperfect, an improvement upon the standard CPI-X regime for the reason of making the incentive time independent. Both Ofwat and Ofgem, have commented that they believe strong incentive are appropriate for companies to achieve greater efficiencies. We note that while the AER applies the EBSS to companies it believes are close to the efficiency frontier, it has not done so for companies it

believes are much higher than this. This is because it does not consider these companies will outperform the allowances and therefore consumers should not bear the cost of overspends relative to the allowances.

A critical element which is not specifically highlighted in the table is how regulators manage the delivery of capex outputs. As we noted in Text box 4.1, ESC pulled its capex carryover mechanism due to concerns about whether capex underspends were truly efficient or just unsustainable deferrals. Ofgem is also currently working through the process of aligning distribution network operators' (DNOs') actual capex during DPCR5 with output they should have delivered and attempting to determine if there were any inefficient deferrals for which the DNOs' should not be rewarded.[28] While IPART already undertake an ex post assessment of capex and RAB reflects actual capex, if a carryover mechanism were introduced it would increase the overall incentive strength on Sydney Water and it may result in the perverse incentives of increasing Sydney Water's capex forecast and/or increasing the value of deferrals. However, it is generally considered that in principle equalising the capex incentives overtime and with opex is appropriate.

[28] Ofgem, *DPCR5 Closeout Methodologies – further changes since informal consultation*, December 2015.

5. OUR PROPOSED OPTIONS

5.1. Selection of proposed options

5.1.1. Opex carryover mechanism

We consider there is a good case for introducing an opex EBSS (carryover mechanism) to smooth the timing of the incentive to make efficiency savings, and both our options include a variation of this type of mechanism. The evidence from UK and the AER indicates that carryover mechanisms have had positive impacts in terms of efficiency. However, it is difficult to separate the exact impact of a carryover mechanism, and that of the implicit CPI-X regime incentives and the choice of cost assessment approach.

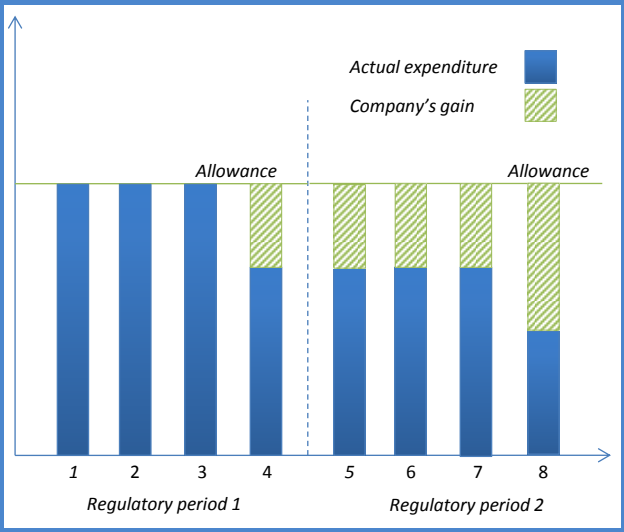
We are generally inclined to relatively simple opex carryover mechanism approaches, similar to that used by the AER and Ofwat in older price controls, as these approaches provide equivalent strength and continuous incentives. The incentive strength can also be kept low until there is greater confidence in the benefits of the incentive, and recognising that the incentive mechanism is primarily to equalise the timing for making efficiency savings.

While we have attempted to keep the mechanisms proposed relatively simply, we note the choice of the length of the retention period (and hence the incentive strength) can impact on the complexity of the model. This is due to data for the final year of the price control not being available when setting the next regulatory period allowance. We describe this issue and some examples of fixes in Text box 5.1.

Text box 5.1: Data lag (final year)

An issue with an opex carryover mechanism is that there is a ***lag between the data used for the assessment period*** of a base-step-trend approach and the first year of the next regulatory period. Due to the timing of a regulatory review i.e. taking place during the last year of the control period, the final year of actual expenditure is not available. Therefore it is arguable that a company has the greatest incentive to make savings in the final year of a regulatory period as it will retain these for a period of time longer than a full regulatory period. This is illustrated in Figure 5.1**Error! Reference source not found.** below, where the base year (used to set allowances) is the penultimate year (the third year).

Figure 5.1: Company gains from second to last year being used as 'base' and savings made in the final year of the period



The data lag is an issue Ofwat consulted on when it moved from a five year retention period (PR99) to a six year retention period (PR04). In a 2003 consultation paper,[29] Ofwat set out its proposal for increasing the retention period (the year the savings were made plus five additional years of retention) with the rationale "[t]o eliminate the problems arising from the final year".[30] Ofwat noted in the costs and benefits of this approach that making this adjustment would increase the incentive mechanism and delay the transfer of benefits to customers by one year, however it did not that this should (in principle) stimulate companies to out-perform further.[31] Ofwat did also consider that moving to a six year retention period better aligned the opex incentive strength with the capex incentive strength. Ofwat did move to a six year retention period for PR04 and PR09.

We also note that IPART, in relation to its efficiency carryover mechanism for Sydney's Desalination Plant,[32] adopted the approach of estimating the final year actual opex using available data at the time of the next determination.[33] While this does correct the carryover, it may reduce the incentive on the SDP to provide accurate forecasts of opex efficiency savings for the final year as it would retain any difference between IPART's estimate and its actual opex for six years rather than the intended five.

[29] Ofwat, *Periodic review 2004 – A further consultation on incentive mechanisms: Rewarding future out-performance and handling under-performance of regulatory expectations*, June 2003.
[30] Ibid, page 31.
[31] Ibid.
[32] IPART, *Sydney Desalination Plant – Efficiency and Energy Adjustment mechanisms,* April 2012.
[33] Ibid, page 27.

The options focus on what we believe are implementable carryover mechanisms. Under both options, as with the current regime, if IPART identify savings which Sydney Water has yet to make and sets allowances using these then Sydney Water will not receive any benefit from no implementing these savings earlier. This acts as the *stick* to help ensure that Sydney Water makes efficiency savings when they identify them.

Option 1 – Symmetric opex carryover mechanism only

One option is to introduce an carryover mechanism for opex only. This is similar to the most recent proposal presented in Sydney Water's revised proposal, and similar to the approach used by the AER. This would reduce the different incentive strength that applies to opex in different years of the price control under the current approach.

On capex, the current approach, akin to a traditional CPI-X incentive, would apply. There is less focus on the timing impact as actual capex has less of role in setting the cost allowance in the next period than opex does.

Option 2 – Asymmetric opex carryover mechanism only

The same approach as Option 1, however temporary outperformance would be rewarded at 100% (as is currently the case), while underperformance would be borne in full by Sydney Water. This is based on the rolling opex mechanism used by Ofwat in PR99 to PR09.

5.1.2. Capex carryover mechanism

We support in principle adopting a similar mechanism for capex, which would remove the timing distortion for capex, and potentially allow the incentives to make efficiency savings to be equalised between opex and capex. However, we do not support the implementation of a capex carryover mechanism at this stage in the current price determination process.

Introducing a capex carryover mechanism along the lines of Sydney Water's proposal will add a significant level of complexity to the price control without much benefit (if the capex covered is only 9.5%). We advise IPART to consider the nature of Sydney Water's expenditure program, and in particular the potential for opex and capex substitution to decide whether the costs associated with implementation are likely to be worth incurring for the potential benefit. A capex carryover mechanism, seeking to equalise across opex and capex, will be of greatest value if there are material opportunities for substitution between opex and capex options to address network requirements. In addition, aspects to consider are whether capex could be linked to outputs to ensure that deferrals towards the end of the period can be assessed robustly.

The capex EBSS proposed by Sydney Water would equalise the incentives over time, but like IPART we note that this equalisation will increase the risk of 'inefficient' deferral toward the end of a price control which would need to be assessed. We also have concerns about whether basing the ex ante incentive rate on the implied in perpetuity opex sharing factor

does equalise the incentive rates between opex and capex. As we have discussed earlier the implied opex sharing factor is dependent on the approach to assessing costs. In addition, as IPART point out, difference between allowed WACC and the utility's actual WACC may also impact on the sharing rate.

Regardless of whether some proportion of capex is subject to a carryover mechanism or not, IPART needs to be able to monitor Sydney Water's capitalisation to ensure that this is not changing over time unless agreed by IPART (and with appropriate adjustments to carryover amounts).

While we have focused on implementable options given the stage the price determination is at, towards the end of the section we discuss how if IPART introduces any of our options, it could be a first step to consider introducing the approaches used by Ofgem and Ofwat at future price control reviews. Given the implications of such approaches for the overall regulatory framework, including the setting of the baseline expenditure, their implications need to be considered carefully.

5.2. Option 1 – Symmetric opex carryover mechanism only

5.2.1. Description

The opex carryover mechanism involves the introduction of a rolling incentive scheme whereby financial savings should be independent of the time when this is made during the regulatory period. This involves savings being made in a certain year with a holding period of a set number of years,[34] which may overlap price control periods. This is based on an incremental saving, due to opex being seen to be recurrent.

This recurrent nature also impacts on how the opex allowance is set for future periods. Currently IPART use a revealed cost approach for opex, taking expenditure from a base year[35] and bringing this forward to the following period, subject to efficiency challenges estimated from an expenditure review. The benefit to consumers comes through regulated companies' revealing lower costs, which assists IPART's cost assessment process, with companies keeping the benefit for a set number of years before consumers benefit from lower allowances relative to the counterfactual.

We would suggest that these factors could be addressed by keeping the incentive strength relatively low as a percentage of the savings, and we also see no reason why the incentive strength, aside from being time independent, should be higher than it is currently. In other words, we consider that the retention period should be limited to four years, including the year the efficiency gains (losses) are made. Our reasoning is that IPART does not have the same tools, such as benchmarking, at its disposal as some other regulators (due to the lack of

[34] The incentive strength increases with the length of the holding period, however we do not consider that it is feasible to set the holding period shorter than the price control length as this would distort the incentives.
[35] This base year is taken from towards the end of the previous regulatory period.

comparators), which means there is little objective evidence (aside from independent reviews) about how close Sydney Water is to the efficiency frontier for an equivalent business. Therefore providing and 'additional' reward is inappropriate.

We discuss below how the mechanism may work and how the incentive payments would be factored in to setting the revenue for Sydney Water. There are various approaches to this, but we consider it is important that a clear, relatively simple and well understood approach is set out in advance by IPART. However, if the retention period is set to four years then administering the mechanism becomes more complex as an adjustment is required for the final year of the price control (where actual data is not available until the start of the following price control). Making a final year adjustment may weaken the incentive on Sydney Water to provide IPART with robust data for its forecast opex in the final year. This is because IPART may use this information to set lower allowance in the following period, for which Sydney Water would only receive one year of benefit.

The sharing rate on permanent overspend and underspend are symmetrical i.e., both borne for four years. Sydney Water would bear (receive) the time value of any temporary overspend or underspend, but that would be all. A permanent overspend would mean that relative to the outputs it produces Sydney Water's costs increased. This could be for a variety of reasons, including increasing input costs (relative to CPI), tighter labour markets, etc.

For capex, we propose retaining the current approach. Capex is perhaps more nuanced than opex, with the role of the RAB and a less clear approach to setting the cost baseline for future periods. Sharing factors typically involve the simplifying assumption that actual capex does not impact directly on future allowances; this is the opposite to the opex impact of lower costs into perpetuity.[36] Capex may be seen as being very different to opex and limited potential for (undetected) switching between the two. This may depend on the ex post scrutiny applied by the regulator. Capitalised opex which IPART deems should not be added to the RAB should be added back to actual opex. This prevents Sydney Water benefiting from

5.2.2. Mechanism's workings

In developing a mechanism to achieve the above description we have relied on the models used by the AER, and those put forward by Sydney Water, IPART and Incenta. In order to keep the mechanism relatively simple we have not made an adjustment for the time value of money.

For the purpose of demonstrating that the incentive strength is equalised over time we provide a sharing factor consistent with Sydney Water approach. This requires an assumption, which does not hold in practice, that IPART uses the revealed expenditure in the penultimate

[36] This means that opex incentives are typically underestimated, due to savings to the allowance unlikely to extend to perpetuity in practice, while there is likely to be an impact on allowances from reduced capex, therefore the strength of the capex incentive represents an upper bound.

year of the preceding price control to set allowances for the next price control.[37] In practice the sharing factor is dependent on how IPART sets allowances at future price controls, i.e., whether it relies on a single base year, the use of expenditure reviews, benchmarking, etc. As IPART has discretion over how it sets the allowances the sharing rate will vary across regulatory periods (not withstanding any changes in the discount rate). The carryover amount however is set independently of the future allowances.

The mechanism is based on the following principles:

- Sydney Water retains the benefit of permanent outperformance for four years.
- Sydney Water bears the loss of permanent underperformance for four years.
- The four year retention period results in a (in perpetuity) sharing factor of 18.6% (based on a 5% discount rate).
- Period 2 allowances set to reflect efficient costs (using the penultimate year of the preceding price control as the base year).
- The base year (the penultimate year of the preceding price control) should be adjusted to ensure that non-recurrent efficiency gains (losses) are excluded from the carryover allowances for Sydney Water.

In order to meet the principle of only allowing four years of retained benefits (losses), no explicit carryover allowance should be given for any underspend in the final year of the price control (Year 4). We assume, in line with Incenta,[38] that as actual opex information for Year 4 will not be available when IPART undertakes its review any efficiency savings Sydney Water achieves in this year will not be reflected in the allowances. Therefore, Sydney Water will retain the gains for the final year plus the four years of the next price control (see next page for explanation for how this is addressed).[39]

In order to prevent Sydney Water retaining five years' worth of benefits for permanent efficiency gains made in Year 4, an adjustment to Sydney Water's opex allowance for Period 3 should be made. This adjustment will need to be determined by IPART to reflect the difference between actual and allowed opex in Year 4.

5.2.3. Examples

We provide a few examples of the mechanism in the tables below. We provide a description of the model formula and more examples in ANNEX B. The greyed cells are fixed at zero indicating that no value is placed on Year 4 actuals at the time of setting Period 2 allowances. Consumers are deemed not to benefit from the mechanism until Period 2 (of course in practice they benefit if allowances are set lower than actual in Period 1). Table 5.1 shows the

[37] We have 'greyed' the text in these cells to show that they are hypothetical values.
[38] Sydney Water, *Response to IPART Issues Paper*, October 2015, Incenta attachment pages 11-11.
[39] We note that this is dependent on how IPART assesses costs, but we believe on balance that this still provides Sydney Water with a consistent incentive.

simple case of outperformance from Year 1. There is no carryover as Sydney Water retains the benefit within Period 1.

Table 5.1: Option 1 mechanism – Permanent outperformance from Year 1[40]

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100	*90*	*90*	*90*	*90*	
2	Actual (A)	90	90	90	90	*90*	*90*	*90*	*90*	
3	Implied actual (IA)				90					
4	Under (over) spend (UO)	10	10	10	10					
5	Incremental saving (I)	10	0	0	*0*					
6	Under (over) spend + carryover									
7	1	10	10	10	10					
8	2		0	0	0	0				
9	3			0	0	0	0			
10	Year 4 implied gain (loss) (Y)				0	0	0	0	0	
11	Year 4 actual out (under) performance adjustment - to be netted off carryover in Period 3 (FA)									0
12	Carryover (CO)					0	0	0	0	0

Company benefit (undiscounted)	*10*	*10*	*10*	*10*	*0*	*0*	*0*	*0*	*0*
Consumer benefit (undiscounted)					*0*	*0*	*0*	*0*	*0*
Company benefit (discounted)	*10*	*10*	*9*	*9*	*0*	*0*	*0*	*0*	*0*
Consumer benefit (discounted)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Discount rate	*5.0%*								
Company NPV	*37.2*								
Consumer NPV	*162.8*								
Sharing factor	*18.6%*								

Table 5.2 shows a permanent outperformance from Year 3. We can see that the sharing rate, 18.6%, is the same as if the outperformance occurred in Year 1. Sydney Water receives two years of carryover allowance.

Table 5.2: Option 1 mechanism – Permanent outperformance from Year 3[41]

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100	*90*	*90*	*90*	*90*	
2	Actual (A)	100	100	90	90	*90*	*90*	*90*	*90*	
3	Implied actual (IA)				90					
4	Under (over) spend (UO)	0	0	10	10					
5	Incremental saving (I)	0	0	10	*0*					
6	Under (over) spend + carryover									
7	1	0	0	0	0					
8	2		0	0	0	0				
9	3			10	10	10	10			
10	Year 4 implied gain (loss) (Y)				0	0	0	0	0	
11	Year 4 actual out (under) performance adjustment - to be netted off carryover in Period 3 (FA)									0
12	Carryover (CO)					10	10	0	0	0

Company benefit (undiscounted)	*0*	*0*	*10*	*10*	*10*	*10*	*0*	*0*	*0*
Consumer benefit (undiscounted)					*0*	*0*	*0*	*0*	*0*
Company benefit (discounted)	*0*	*0*	*10*	*10*	*9*	*9*	*0*	*0*	*0*
Consumer benefit (discounted)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Discount rate	*5.0%*								
Company NPV	*37.2*								
Consumer NPV	*162.8*								
Sharing factor	*18.6%*								

Table 5.3 below shows the effect from permanent underperformance in Year 3. Sydney Water bears the full cost of this for the final two years of Period 1 and two years into Period 2.

[40] Sharing factors shown in the examples are based on in perpetuity calculations.

[41] Discount rate adjusted to show sharing rate from the point in time outperformance begins.

Table 5.3: Option 1 mechanism – Permanent underperformance from Year 3[42]

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100	*110*	*110*	*110*	*110*	
2	Actual (A)	100	100	110	110	*110*	*110*	*110*	*110*	
3	Implied actual (IA)				110					
4	Under (over) spend (UO)	0	0	-10	-10					
5	Incremental saving (I)	0	0	-10	*0*					
6	Under (over) spend + carryover									
7	1	0	0	0	0					
8	2		0	0	0	0				
9	3			-10	-10	-10	-10			
10	Year 4 implied gain (loss) (Y)				0	0	0	0	0	
11	Year 4 actual out (under) performance adjustment - to be netted off carryover in Period 3 (FA)									0
12	Carryover (CO)					-10	-10	0	0	0

	Company benefit (undiscounted)	*0*	*0*	*-10*	*-10*	*-10*	*-10*	*0*	*0*	*0*
	Consumer benefit (undiscounted)					*0*	*0*	*0*	*0*	*0*
	Company benefit (discounted)	*0*	*0*	*-10*	*-10*	*-9*	*-9*	*0*	*0*	*0*
	Consumer benefit (discounted)	*0*	*0*	*0*	*0*	*9*	*9*	*0*	*0*	*0*
	Discount rate	*5.0%*								
	Company NPV	*-37.2*								
	Consumer NPV	*-145.1*								
	Sharing factor	*-20.4%*								

Adjusting the base year

There are two cases where mechanism may not work without an adjustment; one-off outperformance or underperformance in the penultimate year (Year 3). We illustrate the case of underperformance in Year 3 below.

Table 5.4 shows what would happen if the underperformance was only temporary in Year 3. Sydney Water would only bear the time value of money cost. However, if IPART had reviewed this and decided it was temporary and set allowances at an efficient level for Period 2 then the results would look like those in Table 5.5, which would appear to penalise Sydney Water from the one-off overspend in the same way as if this had been considered a shift to a more inefficient (recurring) state.

[42] Discount rate adjusted to show sharing rate from the point in time underperformance begins.

Table 5.4: Option 1 mechanism – Temporary underperformance from Year 3 (Period 2 allowance unadjusted)[43]

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100	*110*	*110*	*110*	*110*	
2	Actual (A)	100	100	110	100	*100*	*100*	*100*	*100*	
3	Implied actual (IA)				110					
4	Under (over) spend (UO)	0	0	-10	0					
5	Incremental saving (I)	0	0	-10	*0*					
6	Under (over) spend + carryover									
7	1	0	0	0	0					
8	2		0	0	0	0				
9	3			-10	-10	-10	-10			
10	Year 4 implied gain (loss) (Y)				10	10	10	10	10	
11	Year 4 actual out (under) performance adjustment - to be netted off carryover in Period 3 (FA)									0
12	Carryover (CO)					-10	-10	0	0	0

Company benefit (undiscounted)	*0*	*0*	*-10*	*0*	*0*	*0*	*10*	*10*	*0*
Consumer benefit (undiscounted)					*0*	*0*	*0*	*0*	*0*
Company benefit (discounted)	*0*	*0*	*-10*	*0*	*0*	*0*	*8*	*8*	*0*
Consumer benefit (discounted)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Discount rate	*5.0%*								
Company NPV	*6.1*								
Consumer NPV	*0.0*								
Sharing factor	*100.0%*								

Table 5.5: Option 1 mechanism – Temporary underperformance from Year 3 (Period 2 allowance adjusted)

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100	*100*	*100*	*100*	*100*	
2	Actual (A)	100	100	110	100	*100*	*100*	*100*	*100*	
3	Implied actual (IA)				110					
4	Under (over) spend (UO)	0	0	-10	0					
5	Incremental saving (I)	0	0	-10	*0*					
6	Under (over) spend + carryover									
7	1	0	0	0	0					
8	2		0	0	0	0				
9	3			-10	-10	-10	-10			
10	Year 4 implied gain (loss) (Y)				10	0	0	0	0	
11	Year 4 actual out (under) performance adjustment - to be netted off carryover in Period 3 (FA)									0
12	Carryover (CO)					-10	-10	0	0	0

Company benefit (undiscounted)	*0*	*0*	*-10*	*0*	*-10*	*-10*	*0*	*0*	*0*
Consumer benefit (undiscounted)					*0*	*0*	*0*	*0*	*0*
Company benefit (discounted)	*0*	*0*	*-10*	*0*	*-9*	*-9*	*0*	*0*	*0*
Consumer benefit (discounted)	*0*	*0*	*0*	*0*	*9*	*9*	*0*	*0*	*0*
Discount rate	*5.0%*								
Company NPV	*-27.7*								
Consumer NPV	*17.7*								
Sharing factor	*-61.0%*								

Table 5.5 indicates that if IPART recognised temporary overspends in setting the opex allowance it would result in Sydney Water bearing four years of carryover for the temporary overspend. We do not consider that this would be in line with the intentions of the mechanism, and therefore IPART may wish to adjust the base year (and hence the carryover) for the value it deems to be no-recurrent (e.g., setting Year 3 actual to 100 in the above example). This is in line with the AER's approach to its opex EBSS.[44] While this requires IPART

[43] No adjustment is required in Year 9 for the implied gain in Year 4, as there was no actual gain made by the company.

[44] AER, *Explanatory Statement – Efficiency Benefit Sharing Scheme for Electricity Network Service Providers,* November 2013, pages 15-16.

to make a determination on this amount, it is a relatively transparent approach. This would mean though that Sydney Water would not bear the time value of money of the temporary overspend.

5.2.4. Assessment

The table below provides an assessment against our assessment criteria of this option.

Table 5.6: Assessment of opex symmetric carryover mechanism

Criteria	Assessment
Effective	The opex carryover mechanism leads to stronger incentives to reduce opex in the latter years of a regulatory period. This should help to reveal lower costs and be in the long-term benefit of consumers, but also will smooth the timing of the incentive to make efficiency savings. While the sharing factor appears lower than the AER's we note that this is consistent with the current incentive rate (ignoring time inconsistency) and still provides Sydney Water with a substantial reward for outperformance. The incentive strength on temporary (one-off) overspend or underspend is weaker than the current regime as Sydney Water only bears (retains) the time value of money and consumers bear the remainder. However, as one-off variations do not provide a significant amount of useful revealed data this may be appropriate.
Equal treatment of cost category	There is a different treatment of opex and capex costs, with the potential for gaming between the two. The introduction of an opex carryover mechanism increases the scope for a capex bias in later years of a regulatory period.
Time independence	This mechanism would remove the time varying aspect of the current incentive strength in the current regime.
Continuity of incentive	The incentive is symmetric. However, it does depend on the interaction with IPART cost assessment approach.
Transparent, consistent, replicable (simple) and proportionate	The use of a rolling incentive mechanism is well established in economic regulation and is transparent in the incentive for firms to reduce their expenditure. Adjustment to the penultimate year are required to remove temporary under/ over spends. The final year adjustment does add a level of complexity to the mechanism that may not be desirable.
Practical and implementable	be overly difficult, the actual sharing rate is dependent on how IPART set allowances, the WACC and the length of the price control. There is some complexity with making an adjustment for the final year, but as long as this adjustment is made to meet the principles

Criteria	Assessment
	of the mechanism then the specific approach can be refined over time.

5.3. Option 2 – Asymmetric opex carryover mechanism only

5.3.1. Description

This option is similar to Option 1. The critical difference is that Sydney Water retains 100% of any temporary outperformance, but bears the full cost of any outperformance. This is similar to Ofwat's PR04 and PR09 opex carryover mechanism.

5.3.2. Mechanism

The mechanism is based on the following principles:

- Sydney Water retains the benefit of any permanent outperformance for four years.
- Sydney Water retains the benefit of any temporary underspend in any given year. This is based on the difference between the temporary underspend and any recurring outperformance. This is done by constraining outperformance carryover to the base year.
- Sydney Water bears any underperformance in full. (Although this will be netted off any outperformance.)
- The four year retention period for recurring outperformance results in a (in perpetuity) sharing factor of 18.6%. The same as Option 1. However, any temporary underperformance or outperformance changes this rate.
- Period 2 allowances should be set to reflect efficient costs (using the penultimate year of the preceding price control as the base year).
- The base year (the penultimate year of the preceding price control) should be adjusted to ensure that non-recurrent efficiency gains (losses) are excluded from the carryover allowances for Sydney Water.

In order to meet the principle of only allowing four years of retained benefits (losses), no explicit carryover allowance should be given for any underspend in the final year of the price control (Year 4). We assume, in line with Incenta,[45] that as actual opex information for Year 4 will not be available when IPART undertakes its review any efficiency savings Sydney Water achieves in this year will not be reflected in the allowances. Therefore, Sydney Water will retain the gains for four years through the next price control.[46]

[45] Sydney Water, *Response to IPART Issues Paper*, October 2015, Incenta attachment pages 11-11.
[46] We note that this is dependent on how IPART assesses costs, but we believe on balance that this still provides Sydney Water with a consistent incentive.

In order to prevent Sydney Water retaining five years' worth of benefits for permanent efficiency gains made in Year 4, an adjustment to Sydney Water's opex allowance for Period 2 should be made during Period 3 price control (to ensure time consistency). This adjustment will be IPART's determination of the difference in permanent efficiency savings between in Sydney Water's actual and allowed opex in Year 4.

5.3.3. Examples

We provide a few examples of the mechanism in the tables below. We provide a description of the model formula and more examples in ANNEX C. The greyed cells are fixed at zero indicating that no value is placed on Year 4 actuals at the time of setting Period 2 allowances. Any underperformance is set to zero before carryovers are calculated.

Table 5.7 illustrates that permanent outperformance in Year 1 results in the same sharing factor and gains to Sydney Water as the mechanism described in Option 1.

Table 5.7: Option 2 – Permanent outperformance from Year 1

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100	*90*	*90*	*90*	*90*	
2	Actual (A)	90	90	90	90	*90*	*90*	*90*	*90*	
3	Implied actual (IA)				90					
5	Under (over) spend (UO)	10	10	10	10					
6	Outperformance (setting negatives to zero) (Z)	10	10	10	*0*					
7	Constrained to base year (Year 3) (c)	10	10	10	*0*					
8	Under (over) spend + carryover (I)									
9	1	10	10	10	10					
10	2		0	0	0	0				
11	3			0	0	0	0			
12	Year 4 implied gain (loss) (Y)				0	0	0	0	0	
13	Year 4 permanent outperformance adjustment - to be netted off carryover in Period 3 (FA)									0
14	Carryover (CO)					0	0	0	0	

	Company benefit (undiscounted)	*10*	*10*	*10*	*10*	*0*	*0*	*0*	*0*	*0*
	Consumer benefit (undiscounted)					*0*	*0*	*0*	*0*	*0*
	Company benefit (discounted)	*10*	*10*	*9*	*9*	*0*	*0*	*0*	*0*	*0*
	Consumer benefit (discounted)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Discount rate	*5.0%*								
	Company NPV	*37.2*								
	Consumer NPV	*162.8*								
	Sharing factor	*18.6%*								

Table 5.8 illustrates what happens when Sydney Water temporarily outperforms in Year 2. Sydney Water receives the full benefit from the outperformance, but that is all. The sharing rate is 100% of the temporary underspend. However there may be information in that revealed expenditure which will help IPART set allowances in future periods, which means consumers may benefit in the future.

Table 5.8: Option 2 – Temporary outperformance in Year 2

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100	*100*	*100*	*100*	*100*	
2	Actual (A)	100	80	100	100	*100*	*100*	*100*	*100*	
3	Implied actual (IA)				100					
5	Under (over) spend (UO)	0	20	0	0					
6	Outperformance (setting negatives to zero) (Z)	0	20	0	*0*					
7	Constrained to base year (Year 3) (c)	0	0	0	*0*					
8	Under (over) spend + carryover (I)									
9	1	0	0	0	0					
10	2		0	0	0	0				
11	3			0	0	0	0			
12	Year 4 implied gain (loss) (Y)				0	0	0	0	0	
13	Year 4 permanent outperformance adjustment - to be netted off carryover in Period 3 (FA)									0
14	Carryover (CO)					0	0	0	0	

Company benefit (undiscounted)	*0*	*20*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Consumer benefit (undiscounted)					*0*	*0*	*0*	*0*	*0*
Company benefit (discounted)	*0*	*19*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Consumer benefit (discounted)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*

Discount rate	*5.0%*
Company NPV	*19.0*
Consumer NPV	*0.0*
Sharing factor	*100.0%*

Table 5.9 illustrates what happens if Sydney Water were to substantially outperform in Year 2, but outperform by a lesser degree in Year 3. As carryover outperformance is constrained to the base year, Sydney Water only receives the additional outperformance in Year 2 for one year, and only receives a carryover for the recurring outperformance.

Table 5.9: Option 2 – Outperformance in Year 2 followed by a lower permanent outperformance

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100	*90*	*90*	*90*	*90*	
2	Actual (A)	100	80	90	90	*90*	*90*	*90*	*90*	
3	Implied actual (IA)				90					
5	Under (over) spend (UO)	0	20	10	10					
6	Outperformance (setting negatives to zero) (Z)	0	20	10	*0*					
7	Constrained to base year (Year 3) (c)	0	10	10	*0*					
8	Under (over) spend + carryover (I)									
9	1	0	0	0	0					
10	2		10	10	10	10				
11	3			0	0	0	0			
12	Year 4 implied gain (loss) (Y)				0	0	0	0	0	
13	Year 4 permanent outperformance adjustment - to be netted off carryover in Period 3 (FA)									0
14	Carryover (CO)					10	0	0	0	

Company benefit (undiscounted)	*0*	*20*	*10*	*10*	*10*	*0*	*0*	*0*	*0*
Consumer benefit (undiscounted)					*0*	*0*	*0*	*0*	*0*
Company benefit (discounted)	*0*	*20*	*10*	*9*	*9*	*0*	*0*	*0*	*0*
Consumer benefit (discounted)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*

Discount rate	*5.0%*
Company NPV	*47.2*
Consumer NPV	*152.8*
Sharing factor	*23.6%*

As for Option 1, IPART will need to consider whether adjustments are required to the Period 2 allowance in order to avoid over-rewarding temporary outperformance.

5.3.4. Assessment

The table below provides an assessment against our assessment criteria of this option.

Table 5.10: Assessment of opex asymmetric carryover mechanism

Criteria	Assessment
Effective	The opex carryover mechanism leads to stronger incentives to reduce opex in the latter years of a regulatory period. This should help to reveal lower costs and be in the long-term benefit of consumers, but also will smooth the timing of the incentive to make efficiency savings. While the sharing factor appears lower than the AER's we note that this is relatively consistent with the current incentive rate (ignoring time inconsistency) and still provides Sydney Water with a substantial reward for outperformance. The incentive strength on temporary overspend or underspend is the same as the current regime, however any permanent outperformance depends on how IPART set the Sydney Water's future allowances.
Equal treatment of cost category	There is a different treatment of opex and capex costs, with the potential for gaming between the two. The introduction of an opex carryover mechanism increases the scope for a capex bias in later years of a regulatory period.
Time independence	This mechanism would remove the time varying aspect of the current incentive strength in the current regime.
Continuity of incentive	The incentive is asymmetric as underperformance is borne in full by the company.
Transparent, consistent, replicable (simple) and proportionate	The use of a rolling incentive mechanism is well established in economic regulation and is transparent in the incentive for firms to reduce their expenditure. The final year adjustment does add a level of complexity to the mechanism that may not be desirable.
Practical and implementable	The introduction of a rolling incentive regime for opex should not be overly difficult and is a feature of each of our options. However, the actual sharing rate is dependent on how IPART set allowances, the WACC and the length of the price control.

5.4. Recommendation

We consider that both options set out above could better meet our criteria than IPART's current approach. We consider that Option 2 should be implemented as a way to equalise the incentives for Sydney Water to seek opex savings across the price control period. We prefer this over Option 1 as we consider it better preserves the incentive on management to manage costs year-on-year, and ensures consumers do not bear the costs of underperformance.

With either opex options there is significant complexity added from the requirement to make an adjustment in future for the final year (for which actual data is not available at the time of the next price control review). A way around this complexity would be to extend the retention period to five years. This would eliminate the need for the final year adjustments, this would mean a simpler mechanism with more transparency around the incentive properties throughout the period, however it would increase the incentive by 25% and delay savings being passed on to consumers.

We consider that a carryover mechanism covering all capex may be desirable in the longer term, but without further understanding of the nature of Sydney Water's capex program, including its substitutability with opex, we are reluctant to propose a carryover mechanism for capex at this stage.

5.5. Future options for IPART to consider

5.5.1. Use of a totex approach

We have not discussed the use of a totex approach here, either for cost allocation (in setting an allowance e.g. totex benchmarking) or cost recovery (through incentive mechanisms).

This can be considered a variant or progression from our second option, however there are likely to be sub-options under this approach, for example:

- *Totex cost recovery only* - Separate opex and capex cost assessment to establish a capitalisation rate, but expenditure treated using the same mechanism.
- *Totex cost assessment and recovery* – Totex allowance set and expenditure treated the same way.

The role of revealed costs and a less intense procedure to setting cost allowances means that this option is not available to IPART in the short-term. It may however represent a medium- or long-term objective for the regulator, as it clearly will remove concerns around a capex bias (or potential opex bias).

5.5.2. Use of menu regulation

A further progression available would be the use of menu regulation to introduce an explicit truth-telling incentive, as we have witnessed from both Ofgem and Ofwat. At DPCR5, Ofgem found that companies 'forecasts have been much more robust than those submitted at DPCR4, which is a positive response to our information quality incentive.'[47]

Menu regulation requires the setting of an independent baseline with a one-shot game ideally. In the Sydney Water context, such a policy is not available.

[47] Ofgem (2009) DPCR5 Initial Proposals – Cost Assessment, p106.

In considering our options, it is important to bear in mind future possibilities and not restrict options available to IPART in the future, while not having too much focus on the long-term such that issues arise in the short-term.

5.5.3. Recommended next steps

Moving further towards the current approaches used by Ofgem and Ofwat would be relatively fundamental changes to the approach to regulation used by IPART, even if it accepts one of our options set out above. We are also aware that the circumstances in which IPART regulates Sydney Water are different to the circumstances that Ofgem and Ofwat regulate within. For example, Ofgem and Ofwat are generally regulating a number of similar companies, which provides a range of benchmarking and comparison options. Ofgem and Ofwat are also regulating companies that are almost exclusively privately owned, unlike Sydney Water, which is State owned.[48] Nevertheless, given that the evidence suggests that there are benefits come from incentivising totex and using menus as part of the regulatory framework, using Ofgem and Ofwat's approaches, we would encourage IPART to explore these options over the next two years and in particular outside of any particular price control review, and to consider whether they could be introduced in some form at future price control reviews for water companies.

[48] Dwr Cymru, which is regulated by Ofwat, is a mutual company, rather than having private shareholders.

6. CONCLUSION

The existing approach to CPI-X regulation used by IPART provides relatively strong incentives for Sydney Water to seek efficiency savings, but these incentives are stronger in the early years of the price control period, and more limited towards the end of the price control period. In addition to distorting the way the business is operated, the lower incentives towards the end of the regulatory period may affect whether the baseline opex used to inform setting the opex for the next price control period is as efficient as possible.

The removal of this distortion by equalising the incentives has been adopted by a number of regulators. We have developed two options for IPART to remove this distortion. These options are similar, but they differ primarily by how they treat overspends. We have explained how the options can work in detail, and discussed how they interact with setting the opex forecast for future price control periods. While there are benefits of both options, on balance we recommend the second option, and note that its asymmetric treatment of opex overspends preserves an aspect of the current arrangements, while reducing the distortion within period for making efficiency savings. IPART will need to consider the options and our recommendation in the context of the overall regulatory framework for Sydney Water, including how it intends to set the baseline opex in the future.

We support in principle adopting a similar mechanism for capex, which would remove the timing distortion for capex, and potentially allow the incentives to make efficiency savings to be equalised between opex and capex. Sydney Water proposed that an EBSS be introduced for about 9.5% of capex. Although we support a capex carryover mechanism in principle, we are recommending that IPART consider the benefits of its introduction and how it could be implemented in the subsequent price control period. A capex carryover mechanism will be of greatest value if there are material opportunities for substitution between opex and capex options to address network requirements.

We have also suggested that IPART should consider further some of the approaches adopted by Ofwat and Ofgem, including assessing costs on a totex basis, and rewarding high quality business plans. But we recognise that the particular characteristics of Sydney Water and IPART's current regulatory approach, mean that careful consideration of introducing some of these approaches needs to be undertaken.

ANNEX A INCENTIVE MECHANISMS REVIEWED

Table A.1: Current IPART approach to Sydney Water

Element	Detail
Context	The current approach involves the full retention of any differences between allowed and actual expenditure within the price control period, for both opex and capex. Treatment is the same for both overspend and underspend, and no distinction is made between permanent and temporary. The rationale for the approach is that the incentive aims to reveal Sydney Water's efficient costs in the long-term best interests of consumers. The price control is four years in length for Sydney Water, a state owned company.
How is the efficient baseline set?	The baseline is set separately for opex and capex components. Opex is considered to be a recurrent cost. Therefore actual expenditure is used as a guide for setting opex in the next price control period. The current approach involves setting a baseline on a year towards the end of the price review period for the next four years. This is not direct and IPART remains discretion to normalise the value or apply step changes to the future allowance. Capex is seen to be less recurrent and therefore the role of actual expenditure is less direct. There is an ex post review of costs incurred in the previous period to assist with the setting of the baseline, which may weaken the incentive on the company to move costs to the base year.
Objective of the incentive	Through allowing Sydney Water to retain within period savings (and disincentive within period overspends), it aims to mitigate the information asymmetry that exists and reveal efficient costs. The approach is simple and transparent, whilst remaining appropriate in the absence of benchmarking.
Incentive(s)	
Degree of sharing (incentive strength)	The incentive strength is 100% for the difference between the cost allowance and outturn cost (or return on capital) each year for both capex and opex. This does not change. However, the effective strength of the incentive does change based on time due to the approach taken on setting the cost allowance. At the start of the period, a permanent saving will lead to four years of benefits. However, if the saving is made in the third year of a four year control, the benefit is only kept for two years. In both cases, the saving will be reflected in the cost allowance for the next regulatory period.

Coverage	The incentive covers the majority of both opex and capex, with limited cost items subject to pass-through conditions.
Symmetry	The same incentive strength applies to both underspend and overspend for opex. However, it is not symmetric for capex. Outperforming the allowance only permits the company to maintain the financing and depreciation benefits of the higher allowance for the regulatory period, while the lower value goes into the asset base. Costs above the allowance are not added to the asset base unless the ex post review finds these to be prudent and efficient (in which case, they only lose out on the additional foregone financing and depreciation costs).
Other considerations:	
There is no role for dead bands, cap and collars, re-openers or volume drivers. There is no ex post adjustment for the return on or of capital. In the case of an underspend this means that the return and depreciation from this amount are retained within the price control period.	
Advantages	
IPART's current approach provides a relatively strong incentive for Sydney Water to make efficiency savings in the early years of each price control period, and more limited incentives to make savings in the final years of the price control period. The incentive is transparent and predictable, and likely well understood by Sydney Water and other stakeholders.	
Disadvantages	
The current approach provides limited incentive for Sydney Water to minimise costs in those price control years that might be used as the basis to set baseline costs for the next price control period (the later years of the price control period), so the incentive strength is not time independent. The regulatory regime makes no attempt to equalise the incentives on the business to choose between opex and capex for network requirements.	
Risks	
The absence of an opex EBSS in IPART's current approach risks not providing a strong enough incentive to be confident that Sydney Water is seeking out all available efficiency savings particularly later in the price control period, and therefore that the baseline being used to set subsequent price control levels may not be based on the most efficient costs. However, this may be primarily a timing issue rather than an issue with the overall incentive to make efficiency savings, because there is a strong incentive for Sydney Water to make efficiency savings in the first couple of years of the price control period. The extent to which the lack of a capex EBSS raises similar concerns depends on the materiality of controllable capex, and the degree of opportunities to substitute opex and capex to meet network requirements.	
Evaluation	
There is scope to improve IPART's current approach to provide better incentives to make efficiency savings in each year of the price control period, and to promote better trade-offs between opex and capex. As some of the subsequent case studies illustrate, such improvements can potentially be obtained without making the regulatory regime overly complex and therefore creating significant risks of unintended consequences.	

This approach has been used for the current Sydney Water price review period (2012-16); Sydney Water have indicated in its pricing proposal that they have made combined cost savings on capex and opex in this period of A$450m. It is a light touch approach that does not require significant auditing or efficiency reviews. Sydney Water have referenced the impact on the timing of decisions and have asked for a stronger incentive to drive cost efficiencies. The current approach is relatively simple, but based on different treatment of opex and capex could lead to opex-capex substitutability. If a company is outperforming on capex, there is limited benefit of additional capex outperformance, so opex may be substituted for capex. If a company is underperforming on capex, there will be the incentive to substitute capex for opex due to different treatment.
Sources
IPART Issues Paper (2015) *IPART Final Determination for Sydney Water 2012-16 (2012)*

Table A.2: Sydney Water revised proposal

Element	Detail
Context	Sydney Water proposed an EBSS (carryover) scheme for controllable costs on both opex and capex. The incentive strengths would be consistent across capex and opex. This would involve a four year carry-over period (in addition to the year of the gain/loss). Treatment of underspend and overspend is the same. The rationale for this is that the decision should be independent of the time within the price control period when this gain is made. We focus on its revised proposal in its response to the IPART Issues Paper, as this corrects an oversight in the original model. This is described by Incenta, Sydney Water's consultants, as being very similar to the AER model.
How is the efficient baseline set?	The approach does not involve a change to the benchmarking approach. In its calculations, Sydney Water assume that Year 3 is used as the baseline for cost allowances in the next price review period. However we understand that this is a simplifying assumption to calculate incentive strength and Sydney Water does not propose that IPART no longer retain discretion. Sydney Water accepts the ongoing role of efficiency reviews.
Objective of the incentive	The proposal aims to provide stronger incentives to drive efficiencies towards the latter half of the regulatory period and reduce the likelihood of perverse incentives (both on timing and on capex/opex substitutability).
Incentive(s)	
Degree of sharing (incentive strength)	The proposal for the EBSS involves retaining the full benefit of an underspend or overspend in the year in which it is incurred, as well as retaining the benefit for a fixed number of years. The stated incentive strength (taking into account the impact of future cost allowances) increases with the length of the carryover period.[49] To avoid double counting, based on the assumption that the third year is used as the basis for next period costs, the efficiency change in the last year of the price control will not be subject to the incentive, so there should not be an efficiency carryover amount in respect of the final year of the regulatory period. Temporary or permanent overspend, when the time value of money is included, are shared at 23%. For example, if Sydney Water temporarily underspends in Year 1, it does not return then benefit to consumers until five years later (which effectively includes a 23% reduction based on a 5% discount rate).

[49] In terms of the incentive strength presented, this assumes an ongoing benefit to consumers from revealed costs.

Coverage	For opex, bulk water costs (40% of opex) are excluded as this is deemed to be uncontrollable by Sydney Water. On capex, the incentive proposed is not intended to cover any wastewater capex and represents 9.5% of capex for 2016-20. This is for capex that, according to Sydney Water, has a recurrent expenditure profile like opex and has a capex-opex trade-off, such that there is limited scope for different incentives to distort the choice of capex or opex.[50] The proposal excludes 'cost contingency projects', those where the timing or costs are uncertain, so these are dealt with separately outside the main price review.
Symmetry	The proposed approach involves the use of the same incentive applying to both overspend and underspend for the parts of capex and opex that are covered under the incentive.
Other considerations:	
Sydney Water has proposed a cap and floor for rewards and penalties of A$50m for the capex and opex EBSS schemes individually.	
Advantages	
The advantages would be similar to the AER's approach, except that the benefits of equalising the opex and capex incentives would be limited by the relatively small amount of capex included within the incentive. However, this could be seen as testing the overall approach before increasing the amount of capex included within the incentive at future price control reviews.	
Disadvantages	
It is not clear why permanent and temporary overspends should be treated differently within the incentive. If the expenditure is broadly considered to be controllable then Sydney Water should be managing its business by seeking to avoid all types of overspends and look for any underspends, while delivering its required quality of service. This proposal may weaken Sydney Water's incentive to avoid temporary overspends.	
Risks	
If IPART is not confident that Sydney Water is performing relatively close to the efficiency frontier there is risk that implementing this approach rewards Sydney Water for making efficiency savings it arguably should not be rewarded for making, based on an argument that consumers should not directly or indirectly fund a business reaching the efficiency frontier. In practice, it is not likely to be as clear cut and Sydney Water are incentivised under a CPI-X framework anyway, but IPART may want to consider the incentive rate to apply depending on its confidence about the efficiency of Sydney Water. This is similar to the differential incentive rates Ofwat applies depending on its assessment of how efficient each water business is. There would need to be an agreed approach to distinguish between permanent and temporary overspends in the base year. Given it is unlikely that any such distinction will be able to be developed ex ante in an unambiguous way that applies to all possible circumstances, there may be a risk that any definitions are subject to some 'gaming' by the business, and IPART may struggle to challenge distinctions made by the company due to problems of asymmetric information.	

[50] The IPART Issues Paper states that this is for critical water mains and reticulation renewals, plus electricity. However, this was written prior to Sydney Water's revised proposal, which reduced coverage on capex to 9.5% from 10-15% in their initial pricing proposal.

Evaluation
Sydney Water's proposal has the potential to improve the incentives for it to seek and reveal efficiency savings, particularly for opex. Given the relatively small amount of capex proposed to be included it is less clear whether the proposal would make a material difference to removing distortions in the incentives to undertake capex rather than opex to address network requirements. The proposed distinction between permanent and temporary overspends risks undermining the incentive for Sydney Water to make efficiency savings, creates the potential for 'gaming', and introduces a potentially material regulatory burden to implement the distinction on an ongoing basis. This is a proposal, therefore we do not have information on how it has performed in the context of Sydney Water. The approach should reduce the distortionary impact of the current approach to influence the timing of expenditure and there is an attempt to address potential gaming through an opex-capex trade-off. There is a much stronger incentive on capex under such an approach, as the full difference between costs are captured, rather than the difference in return and depreciation only. However, ideally the capex and opex covered must be precisely the proportion of costs that are subject to an opex-capex bias otherwise the potential for gaming exists. This proportion is not straightforward to estimate. In addition, having some capex items incentivised one way and other capex items subject to other incentives means there is scope for gaming in different accounting categorisation. To alleviate this will impose costs of a review.
Sources
Sydney Water Pricing Proposal (2015) *IPART Issues Paper (2015)* *Sydney Water Response to IPART Issues Paper (2015)* *Incenta report on incentives on behalf of Sydney Water (2015)*

Table A.3: IPART modified EBSS

Element	Detail
Context	IPART's response to the Sydney Water proposal involved a modified incentive regime. This is called the modified EBSS, with a revised efficiency carryover scheme being proposed for a portion of opex, but with no carryover mechanism on capex. This is seen to address the concern that there is an incentive to delay efficiency savings from the end of one regulatory period to the beginning of the next. The modified EBSS would only apply to incremental efficiency gains, with clawback if the expenditure increases back up to the allowance. For losses above the allowance, this is not included in the EBSS. If there are decreases to the allowance, the gains are not included.
How is the efficient baseline set?	IPART set the efficient baseline using revealed cost information from Sydney Water, but this is supplemented with its own assessment and independent reviews of Sydney Water's required expenditure.
Objective of the incentive	By not allowing the firm to benefit from incremental gains when still above the regulatory allowance, IPART are seeking to achieve a fairer outcome for consumers. The incentive for an opex EBSS aims to reduce information asymmetry through better revealed cost information. In looking at the current approach to capex, we have noted concerns IPART has had with the introduction of an EBSS. The stronger financial incentive from such a scheme could increase the benefits from over-forecasting capital expenditure.
Incentive(s)	
Degree of sharing (incentive strength)	Outperformance on opex allowances are treated in the same way as the Sydney Water revised proposal, with full retention of benefits for the year in question as well as a carryover period. Sydney Water had proposed a five year holding period, but IPART has looked at alternatives of four years and two years. Opex underperformance will be borne by Sydney Water under IPART's proposals. IPART did not consider there was merit to introducing a capex EBSS at this stage, so the approach is the same as the current form of regulation for capex.
Coverage	IPART did not modify the costs to be included under its modified opex EBSS mechanism from Sydney Water's proposal. IPART did not propose to introduce a capex EBSS.
Symmetry	A different incentive applies when costs are above the allowance compared to when costs are below the allowance for opex. The current approach to capex also faces different incentives, as the utility faces muted incentives below the allowance, but

	strong incentives to avoid inefficient overspend above the allowance.

Other considerations:

IPART has suggested that mitigating the risk of gaming should reduce the risk for a cap and collar to be applied on the EBSS.

Advantages

IPART's approach has the benefit of an EBSS opex as per the application by the AER and previously Ofgem and Ofwat. Depending on the current level of efficiency of Sydney Water, the introduction of the EBSS may provide a particularly strong incentive to seek further efficiency savings that feed through to the level of future baselines, thereby benefiting consumers.

Disadvantages

To the extent there are significant substitution possibilities between opex and capex, IPART's proposal not to introduce a capex EBSS would mean that distortions in the choices between opex and capex would remain, and may lead to inefficient expenditure decisions.

Risks

Unlike Sydney Water's proposal, IPART's distinction between permanent and temporary efficiency gains should be capable of more automatic implementation, as efficiency gains are only considered permanent if the level of opex remains below the estimate of opex made by IPART when setting the price control. The risk is that Sydney Water's incentives to seek efficiency savings could be limited, particularly in later years of the price control review if an unexpected increase in opex has already occurred that means they cannot bring the level of opex below the forecast level by IPART. In that case, Sydney Water's incentive to make future efficiency savings is equivalent to the current approach used by IPART, where Sydney Water would only retain the efficiency savings for the remaining years of the price control.

Evaluation

The introduction of an opex EBSS compared to the current IPART approach should improve incentives for Sydney Water to make efficiency savings throughout the price control period, which should feed through as a benefit to consumers, particularly at future price control reviews. If there was a genuine one off increase in opex above the level forecast by IPART when setting the price control review, then Sydney Water's incentive to seek efficiency gains in the later years of the price control period would be similar to the incentive under IPART's current approach. In this respect the incentive is not continuous and of a similar strength in all circumstances.

IPART's proposal not to have a capex EBSS means that there will continue to be different incentives on Sydney Water that may influence its choice between opex and capex options to address network requirements.

The approach removes the different effective incentive strength based on the time of investment on opex and does not necessarily involve high transaction costs if the scope for gaming is minimal.

The issues regarding capex remain under this approach and the potential for distortionary substitutability between opex and capex increases where firms are outperforming on capex (as there is more scope to substitute capex for opex) but reduces where firms are underperforming on capex.

Sources

IPART Issues Paper (2015)

Table A.4: Ofgem incentive regime

Element	Detail
Context	The electricity distribution regime in Great Britain covers 14 networks, each privately owned. Prior to the RIIO price controls (introduced from 2013 for transmission and gas distribution, 2015 for electricity distribution), the length of the regulatory period was five years. We focus on Ofgem's, the energy regulator's, approach at DPCR5 (2010-15) as this addresses many of the issues relevant to the issue at hand. IPART (2011) discussed this approach and its implications. The approach introduced involved a fixed split of capex and opex for capitalisation under totex-based menu regulation, called the Information Quality Incentive (IQI).
How is the efficient baseline set?	Ofgem undertook independent comparative benchmarking across the networks on a totex basis rather than individual capex and opex allowances.
Objective of the incentive	Prior to DPCR5, Ofgem had perceived there to be issues with capex and opex trade-offs. This followed the introduction of rolling incentives in response to evidence that firms responded to the different incentive strengths in each year of the price control under the classic CPI-X framework from DPCR1 to DPCR3. This approach aimed to provide incentives for companies to submit accurate business plan forecasts and achieve efficient expenditure within the regulatory period.
Incentive(s)	
Degree of sharing (incentive strength)	The sharing factor depends on the expenditure forecast submitted by the company, with the column in the menu dependent on this. Ofgem had initially set a 20-40% incentive strength, but increased this to 30-50% for the determination in order to more strongly incentivise opex and capex at a time of increased investment. This represents an overall incentive rate, but Ofgem distinguish between fast money (paid as cash) and slow money (that goes through the asset base). 85% is apportioned to slow money – fast money can be assumed to carry a 100% incentive strength, with slow money's effective incentive strength being estimated using a weighted average approach.
Coverage	The majority of costs (c.85%) were included within the IQI mechanism at DPCR5. Costs excluded include non-operational capex, business support costs, traffic management costs and pensions. These costs were managed under the traditional CPI-X framework. We note that in DPCR4, Ofgem only included a sliding scale rolling incentive mechanism on capex.

Symmetry	The same incentive strength does apply to underspend and overspend. However this may differ by network. In addition, the incentive strength is determined by those networks owned by the same party, such that perverse incentives are reduced between networks under common ownership.

Other considerations:

There were clawback mechanisms on expenditure, with Ofgem conducting a review of whether outputs were met. In the absence of this, revenue can be clawed back.

No deadbands or cap and collars apply, with the approach ensuring that the approach accounts for the return on and of capital within the period.

Although not introduced at the start of the DPCR5 determination, for the RIIO price controls, there is an annual updating mechanism that will operate. This may help alleviate some concerns regarding timing, but imposes additional transaction costs and may lead to greater volatility in charges.

Advantages

While the move to DPCR5 incentive regime was driven by a number of factors, Ofgem had highlighted concerns with the companies gaming the unequal incentive on opex and capex. In this regard, the totex incentive was designed to:

- Equalise the incentive between opex and capex; and
- Remove the issue of time varying incentive strength by not using a 'base' year.

Increasing the coverage of the incentive to all totex (apart from a few specific cost items) was a natural extension from the DPCR5 decision to the RIIO price controls.

If Ofgem's approach has the intended effect on the behaviour of the businesses it should significantly address a number of the shortcomings identified with relatively traditional applications of the RPI-X approach to regulation, which IPART currently applies.

In practice, Ofgem has not been willing to offer a 'pure' menu regulation approach, but instead has constrained the choices available to the businesses.

The premise that the companies share an exact percentage of any outperformance during a price control, regardless of the classification of expenditure, is straightforward (but as discussed below the mechanism is complex).

Disadvantages

Ofgem's approach to an efficiency sharing scheme is complex and is difficult to understand. It is not always transparent how consumers are benefiting from it. The sharing factor interacts with a number of other variables to be consistent with Ofgem's objectives increasing its complexity. Ofgem also has in place numerous other incentives and it is not always clear how these interact with the overall efficiency incentive.

Ofgem needs to establish an independent baseline to assess the companies' expenditure against.

While the incentive arrangements were designed to help minimise the distortions between capex and opex, we understand that Ofgem is currently facing a significant task in closing out the DPCR5 allowance. This is because there was significant underspending on capex by a number of DNOs and Ofgem is seeking to determine whether this is (in)efficient deferrals, efficiencies or volume effects.

Risks

Ofgem's overall approach is more complex than, for example the AER's, which is evaluated below. This may create greater risks of unintended consequences, and make it harder to fully evaluate which elements of the regime are helping to achieve which outcomes. The relative complexity of the regime may also raise questions about how effective each element of the incentives is.

Evaluation
Ofgem approach to regulating the distribution businesses evolved to address issues it has identified with its historical approaches. The complexity of Ofgem's incentive mechanisms (and benchmarking) are a result of the deficiencies it identified with more simply separate rolling opex and capex mechanisms. Its current regime attempts to address a number of identified concerns including poor quality business plans, distortions in the timing of when efficiency savings are made, and distortions in opex and capex trade-off decisions. It is probably too early to say the extent to which Ofgem has been successful in addressing these issues. The general application of CPI-X regulation in the energy sector has promoted significant efficiency improvements over a number of price control periods. Menu regulation remains in use for the RIIO price controls and is seen as a positive mechanism. In addition, Ofgem has stated that the quality of business plans has become more robust and its benchmarking approach more sophisticated. DPCR5 also had several features of the subsequent RIIO regime, including a greater focus on outputs rather than inputs, which facilitated a greater role for consumers to engage in the regulatory process. Under the totex approach, the idea of a capex bias does not appear to be an issue. However, we have noted that the timing of a saving affects the incentive strength and this may be more of an issue over an eight year price control. This has not been resolved since the problem was observed in the DPCR1-DPCR3 price controls in particular. The longer price control also places a greater pressure on getting the baseline correct, however reduces transaction costs and facilitates longer-term planning. In DPCR5, the totex allowance was outperformed by 5.8%. This compares to outperformance at DPCR4 of 6.7% on capex and 9.1% on opex.
Sources
Ofgem (2009) DPCR5 Final Proposals: Cost assessment *Ofgem (2009) DPCR5 Initial Proposals: Cost assessment* *Ofgem (2009) DPCR5 Initial Proposals: Incentives and obligations* *IPART (2011) Incentives for Cost Saving in CPI-X regimes.* *QCA (2014) Incentive regulation: Theory and Practice*

Table A.5: Ofwat incentive regime

Element	Detail
Context	In this case study, we compare the PR04, PR09 and touch on PR14 regimes from the UK water and sewerage regulator, Ofwat. As part of the controls, 19 privately owned water and sewerage companies are regulated. At PR04 a rolling incentive for capex and opex was used. At PR09, opex used a rolling incentive mechanism, whilst for capex menu regulation was used in the form of the Capex Incentive Scheme (CIS). PR14 saw Ofwat move to a totex menu approach.
How is the efficient baseline set?	For PR04 and PR09, opex costs were set by rolling forward the penultimate year of the previous regulatory period after an assessment that this figure is appropriate and representative of efficient costs faced by the company. An efficiency challenge was then applied to this number, which was implemented through benchmarking and the use of company-specific factors. Companies not at the frontier were expected to close 60% of the gap to the efficient level within the price control. Capex was based on business plans, costs submissions, annual returns and dialogue as part of the determination process. In PR14, efficient baselines were set for totex using historical data, and rolled forward using cost drivers.
Objective of the incentive	At PR04 and PR09 the carryover incentives were to strengthen the incentive on the companies, ensure continued time-independency and equalise the incentive across opex and capex. For PR14, the move to a totex approach was a clear change to address the perceived capex bias in the sector due to different incentives applying for opex and capex. It was also part of a broader move to reform the regulatory settlement process, including a greater focus on outputs, incentives and the role of the consumer.
Incentive(s)	
Degree of sharing (incentive strength)	For PR04, an incentive strength of 100% applied for both opex and capex, in addition to multipliers. For PR09, the incentive strength on capex was reduced to 15-40%, with a 100% incentive on opex. For PR14, the strength on totex was calculated to be broadly consistent with the effective incentive strength at PR09 (c.45-55%). Companies were able to select their capitalisation rate at PR14 from a range, providing that they could justify this.
Coverage	PR04 and PR09 covered controllable costs at the service level. This meant that there were separate allowances for water and sewerage, with conditions in place to prevent gaming between categories.

	The totex menu includes the majority of costs, with only some more minor exclusions e.g. pension deficit recovery costs and other non-controllable costs.
Symmetry	In PR04 and PR09, the same incentive strength did not apply symmetrically for underspends and overspends. Overspends were borne in fall by the company. Temporary underspends were incentivised at 100%. Figure A.1 provides an illustration of this mechanism and Table A.1 provides a description of the different lines. In PR14, the incentive was symmetric across all expenditure.
Other considerations:	
Similar to the Ofgem approach, Ofwat do consider outputs to ensure that underspends are due to efficiency rather than non-delivery of outputs. Ofwat do not include a cap or collar mechanisms, nor deadbands in their approach. The incentive figures are estimated based on a NPV basis, such that the return on and of capital is captured in the formulation of incentives.	
Advantages	
The advantages of the current regime would be similar to those that could potentially be achieved by Ofgem's approach. The advantage of the rolling mechanism used in previous price controls was that it was relatively simple. The extra year and multipliers also increased the (carrot) incentive rates on the companies. The rolling mechanisms were seen positively by stakeholders and was believed to have helped drive efficiencies.	
Disadvantages	
The rolling mechanism and separate mechanisms on opex and capex were not considered to have solved the capex bias problem. Ofwat's current approach has similar disadvantages to Ofgem's approach. Ofwat's has a relatively complex set of incentives, and still involves a very extensive review before setting the price control. Ofwat has retained a five year price control period, so the reviews occur more often than Ofgem's eight year price controls.	
Risks	
Ofwat's previous incentive mechanism were relatively simple and were similar to those employed by the AER (discussed below). Like Ofgem, Ofwat's PR14 incentive mechanisms (and benchmarking) are a result of the deficiencies it identified with more simply separate rolling opex and capex mechanisms. Given the range of different incentives inherent within Ofwat's current approach, similar to Ofgem's, there may be a risk of unintended consequences, and it can be difficult to understand cause and effect, to evaluate the effectiveness of the different elements of the incentives.	
Evaluation	
Like Ofgem, Ofwat has gradually evolved its incentive framework, and for PR14, it has made relatively significant changes to equalise the incentives between opex and capex as options to address network requirements. This builds on the previous rolling incentives that provided continuous incentives to make efficiency savings and were viewed positively by stakeholders, but with acknowledgement of their deficiencies.	

Given the current price control period has only just commenced it is too early to evaluate how the changes have worked in practice. The general application of CPI-X regulation in the energy sector has promoted significant efficiency improvements over a number of price control periods. The CIS introduced at PR09 was extended to include opex for the current price control determination. This approach sets efficiency incentives equal to one another, with companies choosing capitalisation rates. This features differs from Ofgem, who use equal treatment on cost recovery as the basis for addressing a potential capex bias.
Sources
Ofwat (2014) PR14 Final Determination *CEPA (2012) Incentives and menus* *Ofwat (2009) PR09 Final Determination*

Figure A.1: Ofwat PR09 rolling opex incentive mechanism

Operating Expenditure			AMP4 period					AMP5 period				
Financial year			2005-06 £m	2006-07 £m	2007-08 £m	2008-09 £m	2009-10 £m	2010-11 £m	2011-12 £m	2012-13 £m	2013-14 £m	2014-15 £m
1	**Initial regulatory assumption**		**270**	**265**	**265**	**260**	**255**					
2	+/- IDoK adjustments											
3	+/- logging-up or down		-	-	-	-	-					
4	Less shortfalls		-	-	-	-	-					
5	**Revised regulatory expectation**		**270**	**265**	**265**	**260**	**255**					
6	Actual Expenditure		255	250	240	238	?					
7	Less atypical & exceptional costs		-	-	-	-	-					
8	Less any cross-subsidy adjustment		-	-	-	-	-					
9	**Adjusted actual expenditure**		**255**	**250**	**240**	**238**	**?**					
10	Outperformance		15	15	25	22	?					
11	Outperformance (setting negatives to zero)		15	15	25	22	?					
12	**Outperformance constrained at 2008-09 level**		**15**	**15**	**22**	**22**						
13	**Incremental outperformance in 2005-06**		**15**	15	15	15	15	**15**				
14	**Incremental outperformance in 2006-07**			**0**	0	0	0	0	**0**			
15	**Incremental outperformance in 2007-08**				**7**	7	7	7	7	**7**		
16	**Incremental outperformance in 2008-09**					**0**	0	0	0	0	**0**	
17	**Incremental outperformance in 2009-10**						**?**	**?**	**?**	**?**	**?**	**?**
18	**FINAL INCENTIVE ALLOWANCE**							**22**	**7**	**7**	**0**	

Source: Ofwat

Table A.2: Ofwat PR09 rolling opex incentive mechanism

Line	
1	This is the operating expenditure assumed at the 2004 periodic review.
2	Adjustment to reported operating expenditure for IDoKs.
3	This line includes operating expenditure associated with agreed logging up and down of outputs.
4	Adjustment to reported operating expenditure for shortfalls.
5	Sum of lines 1 to 4.
6	Actual operating expenditure including exceptional costs reported in June Returns.
7	Exceptional and atypical costs.
8	Adjustments made to reported operating expenditure to reflect trade with associates.
9	Sum of lines 6, 7 and 8.
10	Outperformance in each given year (line 5 minus line 9).
11	As line 10 but with negative outperformance set to zero.
12	Outperformance in any year cannot be higher than outperformance in the final year 2008-09. Any outperformance higher than the 2008-09 outperformance is constrained at the 2008-09 level.
13	Incremental outperformance in 2005-06. Since 2004-05 is not used in the calculation, this line is the total outperformance for 2005-06. Outperformance in this year has already been kept for 5 years, so the first 5 years' outperformance is not included in the calculation of the opex incentive allowance.
14	Incremental outperformance in 2006-07. This is the constrained outperformance for 2006 in line 12, minus the sum of the incremental outperformance for the preceding years (line 13).
15	Incremental outperformance in 2007-08. This is the constrained outperformance for 2007 in line 12, minus the sum of the incremental outperformance for the preceding years (lines 13 + 14).
16	Incremental outperformance in 2008-09. This is the constrained outperformance for 2008 in line 12, minus the sum of the incremental outperformance for the preceding years (lines 13 + 14 + 15)
17	Incremental outperformance in 2009-10. Not known at PR09
18	Final incentive allowance: the sum of lines 13, 14, 15 and 16

Source: Ofwat

Table A.6: AER incentive regime

Element	Detail
Context	Under the National Electricity Rules (NER) the AER has the discretion to set efficiency benefit sharing schemes (EBSS) for opex and capex for each of the Distribution Network Service Providers (DNSPs). Under the NER the AER determines the parameters of the incentive, including the sharing factor, can set different parameters for each DNSP. The NER sets out principles and factors that the AER has to consider when developing the incentives. The AER produces a guideline that it must update every three years, setting out how it intends to apply the EBSS for opex and capex, but it still has discretion to deviate from this guideline when making the determination for each DNSP.
How is the efficient baseline set?	The NER was updated in 2012, which made some changes to the approach the AER can take to set the efficient baseline. There are a number of factors the AER must consider when setting the baseline, including historical expenditure and its benchmarking analysis, but the AER has discretion about which of these factors to place greatest weight on when setting the baseline. The AEMC considered that the NER did not restrict the analytical techniques that the AER could use. The AER stated in its guideline that it will place greater weight on revealed costs for recurrent expenditure, which tends to arise more for opex than capex. In practice the AER has placed greater emphasis on the results of benchmarking for DNSPs that it considers are not close to the efficiency frontier to set opex since the 2012 changes to the NER. Prior to that the AER had relied predominantly on a revealed cost approach to set the baseline, which continues to be the approach it predominantly uses for DNSPs it considers to be close to the efficiency frontier.
Objective of the incentive	The objective of the EBSSs for opex and capex is to provide an incentive for DNSPs to make efficient expenditure decisions throughout the regulatory period, and counteract the declining incentive to make efficient decisions later in the regulatory period. The introduction of the EBSS for capex in 2012 by the AEMC was also intended to allow the AER to achieve a better degree of consistency in the incentives to undertake opex and capex in each year of the regulatory period. This should promote more efficient choices when either opex or capex options can address a network requirement.
Incentive(s)	
Degree of sharing (incentive strength)	The AER's opex and capex EBSSs have a symmetrical sharing factor of 30% for the DNSPs and 70% for consumers. The sharing factor estimate relies on a real discount rate of 6%. Only permanent outperformance (underperformance) is rewarded (penalised).

	The AER adjusts the retention or loss for the capex EBSS in each year to account of the financing costs saved or incurred to make the incentive the same in each year of the regulatory period. The gain or loss to the DNSP is calculated as an NPV amount at the end of the regulatory period to be applied as an adjustment to allowed revenue for the next regulatory period.
Coverage	The AER has developed EBSSs for opex and capex, which have very similar design features.
Symmetry	Yes. However, the ex post capex assessment can create distortions as over expenditure can be excluded from RAB.
Other considerations:	
The NER obliges the AER to review ex post the efficiency of all DNSPs capex. Where a DNSP has spent more than the AER's capex estimate at the time of the determination, the AER is required to consider whether any of the expenditure was inefficient, such that it should not be included in the Regulatory Asset Base (RAB). The AER will adjust the loss under the EBSS for any expenditure excluded from the RAB to ensure the DNSP does not bear more than a 100% loss on the expenditure. The NER includes a number of provisions that allow for the NSPs to seek a passthrough or re-opener of their revenue determination in some limited circumstances. Any revenue changes as a result of passthroughs or re-openers are treated as outside the EBSS incentives.	
Advantages	
The AER's opex and capex EBSS meet a number of the criteria, including the opex EBSS having contributed historically to revealing efficiency savings, providing equal incentives over time, and being transparent and predictable, in part because the opex and capex EBSSs are relatively simple in design. Going forward equivalent sharing factors between the opex and capex EBSSs should promote more efficient opex to capex trade-offs in business decision-making.	
Disadvantages	
The AER's approach of separate incentives with equivalent sharing factors between opex and capex is probably not as good at promoting efficient opex and capex trade-offs as the Ofgem and Ofwat totex approaches. The importance of this consideration depends on the scope of opex and capex substitution possibilities. It is also not clear that an ex ante incentive rate on capex is equivalent to a in perpetuity rate on opex. The AER's 30% sharing factor retained for five years provides a relatively large reward to businesses with opex and capex below the level forecast by the AER when the price control was set. This is particularly the case where they initially retain more the $1 for any $1 underspend on opex. It also provides a significant relief from overspends. Setting sharing factors at this level suggests the AER sees the EBSS as a primary means to incentivise efficiency savings, rather than just being about providing equal strength incentives to make efficiency savings across the price control period. There is a risk that rewards of this size might provide businesses with greater reward than needed to reveal efficient costs, particularly if benchmarking is used to inform setting the forecasts of opex and capex. The approach also means that temporary outperformance or underperformance is not borne by the companies. Although the capex incentive does not increase the initial strength of the incentive, the AER acknowledges that with the introduction of the capex EBSS there is a greater incentive on the	

companies to defer capex as they receive a greater financial reward towards the end of the period than previously.

Risks

The AER has identified that the opex EBSS may not be appropriate where a business' current actual costs are significantly above the efficiency frontier, and has not applied the opex EBSS in these circumstances. IPART may want to consider whether its EBSS should only be rewarding efficiency improvements from an already relatively efficient baseline rather than rewarding catch-up to the frontier. Or at least it may want to consider whether the same sharing factor should apply to both types of efficiency savings. Depending on how IPART sets the baseline level of costs, it may be that the EBSS should only play a role in smoothing the timing of the incentive to make efficiency savings.

While the AER intend to make an adjustment to the capex EBSS payments where material amounts of capex is deferred to future periods, it is not clear to us how will make this assessment. We note this is something Ofgem is struggling with and was a key reason ESC stopped using a capex EBSS. We do note that this problem exists whether capex is under an EBSS or not as under a CPI-X the companies retain all the financing and deprecation benefits until the next price control.

Evaluation

The AER's EBSSs are good examples of relatively simple EBSS mechanisms that are therefore transparent and predictable. The opex EBSS is considered to have worked well over a period of time in incentivising businesses, particularly privately owned ones, to make and reveal efficiency savings. The AER's recent introduction of a capex EBSS provides the potential to better equalise opex and capex incentives. Overall the AER's approach provides an implementable example of a relatively simply designed EBSS for opex and capex, in a situation where the cost assessment is not done on a totex basis, and revealed cost is the predominant way to set the baseline, particularly for opex. The AER's approach could also be a first step towards implementing approaches similar to those used by Ofwat and Ofgem at future price control reviews.

As discussed above, IPART may want to consider whether the size of reward and protection from overspend offered by the AER's scheme is greater than required, if the EBSS is primarily to smooth the timing of the incentive to make efficiency savings.

The EBSS for opex has been in place for a number of regulatory periods, and had generally been regarded as achieving its objectives. When the NER was changed for other aspects of the AER's approach to network regulation in 2012, no stakeholder proposed changes to the opex EBSS. It was seen, particularly for the privately owned network businesses as having provided an incentive to make efficiency savings across the regulatory period.

It is too early to evaluate the impact of the EBSS for capex introduced in the NER in 2012, and only now beginning to be implemented in DNSPs revenue determinations by the AER.

Sources

Rule Determination, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012, AEMC, November 2012.

Expenditure Forecast Assessment Guideline For Electricity Distribution, AER, November 2013.

Capital Expenditure Incentive Guideline for Electricity Network Service Providers, AER, November 2013.

Final Decision, SA Power Networks determination 2015-16 to 2019-20, AER, October 2015. This source is used as an example of a recent AER final decision, noting that the AER makes multiple revenue determinations for different DNSPs each year.

Final Decision, Ausgrid distribution determination 2015-16 to 2018-19, AER, April 2015.

ANNEX B OPTION 1 – FORMULA AND EXAMPLES

We have provided IPART with Microsoft Excel models for this option, however we provide a range of examples of the mechanism working in this Annex.

In order to prevent Sydney Water retaining five years' worth of benefits for permanent efficiency gains made in Year 4, an adjustment to Sydney Water's opex allowance for Period 3 should be made. This adjustment will need to be determined by IPART to reflect the difference between actual and allowed opex in Year 4.

Based on implementing the opex carryover mechanism for regulatory Period 1, (for illustrative purposes) using Year 3 as the base for setting allowances in Period 2 and using a regulatory period of four years (IPART's current regulatory period length), the following formulae apply for the mechanism:

- RA_t = IPART's allowance for opex in year t.
- A_t = Sydney Water's actual opex in year t.
- IA_t = Sydney Water's implied actual opex in year t-1. Only applicable for the final year (Year 4), where actual data is unavailable at the time of IPART setting allowances for the next regulatory period ($IA_4 = A_3$).
- UO_t = Sydney Water's under (over) spend against its allowances ($RA_t - A_t$) in year t.
- I_t= Incremental out (under) performance in year t relative to that achieved in previous years ($UO_t - UO_{t-1}$). $I_1 = UO_1$, $I_4 = 0$. Incremental out (under) performance is retained for four years (year actual out (under) performance plus three years).
- Y_t= The actual and implied gain (loss) made by Sydney Water in the final year of the period ($Y_t = IA_4 - A_4$).
- FA_t= The adjustment required in Period 3 to ensure that Sydney Water does not retain (bear) out (under) performance in the final year for five years, rather than the intended four years ($FA_9 = A_4 - IA_4$). See Example 8 below.
- CO_t= The carryover (or incentive allowance) Sydney Water receives in future periods from out (under) performance in Period 1:
    - $CO_5 = I_2 + I_3$
    - $CO_6 = I_3$
    - $CO_9 = FA_9$

Below we provide examples of how the mechanism works. We have not shown any estimates for Period 2 and 3 besides the carryover allowance. This reflects IPART having discretion over how allowances are set for each period. However, the benefits to consumers, and implied (Year 4) gains and losses, are based on the underlying assumption that the revealed opex in the penultimate year (Year 3) is used to help IPART set allowances in the next period.

Outperformance

Table B.1 below provides an example of the mechanism working when Sydney Water outperforms from Year 2 onwards.

Table B.1: Option 1: Example 1

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	100	80	80	80					
3	Implied actual (IA)				80					
4	Under (over) spend (UO)	0	20	20	20					
5	Incremental saving (I)	0	20	0	*0*					
6	Under (over) spend + carryover									
7	1	0	0	0	0					
8	2		20	20	20	20				
9	3			0	0	0	0			
10	Year 4 implied gain (loss) (Y)				0	0	0	0	0	
11	Year 4 actual out (under) performance adjustment - to be netted off carryover in Period 3 (FA)									0
12	Carryover (CO)					20	0	0	0	0

Tables B.2 to B.3 provide examples of how the mechanism works when outperformance is made in different years in Period 1. In Example 2, outperformance occurs in Year 1, Year 3 and Year 4. In this example, Sydney Water benefits by 80 – savings of 20 retained for four years ($UO_t + CO_t$) – and consumers benefit on a permanent basis from Year 7.

Table B.2: Option 1: Example 2

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	80	100	80	80					
3	Implied actual (IA)				80					
4	Under (over) spend (UO)	20	0	20	20					
5	Incremental saving (I)	20	-20	20	*0*					
6	Under (over) spend + carryover									
7	1	20	20	20	20					
8	2		-20	-20	-20	-20				
9	3			20	20	20	20			
10	Year 4 implied gain (loss) (Y)				0	0	0	0	0	
11	Year 4 actual out (under) performance adjustment - to be netted off carryover in Period 3 (FA)									0
12	Carryover (CO)					0	20	0	0	0

In Example 3, outperformance occurs in Year 3 only. As this is the penultimate year it is assumed to be the base year for Period 2 allowances. In this example, Sydney Water benefits by 60 in relation to the incentive allowance and consumers benefit on a permanent basis from Year 7. However, if Sydney Water's gain in Year 3 was only temporary it would make an implied loss as the IPART would have set the allowance lower than required based on Sydney Water's Year 3 actuals. Sydney Water's total benefit in this case would be 0. (No adjustment (*FA)* would be applied in Period 3 as Sydney Water actuals were in line with allowances.)

Table B.3: Option 1: Example 3

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	100	100	80	100					
3	Implied actual (IA)				80					
4	Under (over) spend (UO)	0	0	20	0					
5	Incremental saving (I)	0	0	20	*0*					
6	Under (over) spend + carryover									
7	1	0	0	0	0					
8	2		0	0	0	0				
9	3			20	20	20	20			
10	Year 4 implied gain (loss) (Y)				-20	-20	-20	-20	-20	
11	Year 4 actual out (under) performance adjustment - to be netted off carryover in Period 3 (FA)									0
12	Carryover (CO)					20	20	0	0	0

Underperformance

Examples B.4 and B.5 illustrate that underperformance in the first two years would not result in Sydney Water bearing the losses (aside from the time value aspect).

Table B.4: Option 1: Example 4

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	120	100	100	100					
3	Implied actual (IA)				100					
4	Under (over) spend (UO)	-20	0	0	0					
5	Incremental saving (I)	-20	20	0	*0*					
6	Under (over) spend + carryover									
7	1	-20	-20	-20	-20					
8	2		20	20	20	20				
9	3			0	0	0	0			
10	Year 4 actual and implied gain (loss) (Y)				0	0	0	0	0	
11	Year 4 permanent out (under) performance adjustment - to be netted off carryover in Period 3 (FA)									0
12	Carryover (CO)					20	0	0	0	0

Table B.5: Option 1: Example 5

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	120	120	100	100					
3	Implied actual (IA)				100					
4	Under (over) spend (UO)	-20	-20	0	0					
5	Incremental saving (I)	-20	0	20	*0*					
6	Under (over) spend + carryover									
7	1	-20	-20	-20	-20					
8	2		0	0	0	0				
9	3			20	20	20	20			
10	Year 4 actual and implied gain (loss) (Y)				0	0	0	0	0	
11	Year 4 permanent out (under) performance adjustment - to be netted off carryover in Period 3 (FA)									0
12	Carryover (CO)					20	20	0	0	0

Example 6, set out in Table B.6, shows that a permanent underperformance (from Year 2) would result in an overall loss of 80, with a single year negative carryover.

Table B.6: Option 1: Example 6

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	100	120	120	120					
3	Implied actual (IA)				120					
4	Under (over) spend (UO)	0	-20	-20	-20					
5	Incremental saving (I)	0	-20	0	*0*					
6	Under (over) spend + carryover									
7	1	0	0	0	0					
8	2		-20	-20	-20	-20				
9	3			0	0	0	0			
10	Year 4 actual and implied gain (loss) (Y)				0	0	0	0	0	
11	Year 4 permanent out (under) performance adjustment - to be netted off carryover in Period 3 (FA)									0
12	Carryover (CO)					-20	0	0	0	0

Mixed performance

Examples 7 and 8 show varied performance. Table B.7 illustrates example 7 where outperformance in the first year is followed by recurring underperformance in Year 3. In this example, Sydney Water bears a total cost of 80 (an overspend of 20 multiplied by four years).

Table B.7: Option 1: Example 7

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	80	100	120	120					
3	Implied actual (IA)				120					
4	Under (over) spend (UO)	20	0	-20	-20					
5	Incremental saving (I)	20	-20	-20	*0*					
6	Under (over) spend + carryover									
7	1	20	20	20	20					
8	2		-20	-20	-20	-20				
9	3			-20	-20	-20	-20			
10	Year 4 implied gain (loss) (Y)				0	0	0	0	0	
11	Year 4 actual out (under) performance adjustment - to be netted off carryover in Period 3 (FA)									0
12	Carryover (CO)					-40	-20	0	0	0

Example 8, below, provides an illustration of how the mechanism works when an underspend is followed by outperformance in year 2 and 4, and a par performance in the Year 3. If Year 3 is considered to be efficient then mechanism would provide a -20 adjustment in Year 3 to prevent the temporary gain in Year 4 being retained by Sydney Water. If IPART deemed that the Year 3's underperformance was temporary then it could adjust the base year down to ensure that the carryover was more reflective of the true outperformance.

Table B.8: Option 1: Example 8

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	120	80	100	80					
3	Implied actual (IA)				100					
4	Under (over) spend (UO)	-20	20	0	20					
5	Incremental saving (I)	-20	40	-20	*0*					
6	Under (over) spend + carryover									
7	1	-20	-20	-20	-20					
8	2		40	40	40	40				
9	3			-20	-20	-20	-20			
10	Year 4 implied gain (loss) (Y)				20	20	20	20	20	
11	Year 4 actual out (under) performance adjustment - to be netted off carryover in Period 3 (FA)									-20
12	Carryover (CO)					20	-20	0	0	-20

ANNEX C OPTION 2 – FORMULA AND EXAMPLES

We have provided IPART with Microsoft Excel models for this option, however we provide a range of examples of the mechanism working in this Annex.

Based on implementing the opex carryover mechanism for regulatory Period 1, (for illustrative purposes) using Year 3 as the base for setting allowances in Period 2 and using a regulatory period of four years (IPART's current regulatory period length), the following formulae apply for the mechanism:

- RA_t = IPART's allowance for opex in year t.
- A_t = Sydney Water's actual opex in year t.
- IA_t = Sydney Water's implied actual opex in year t-1. Only applicable for the final year (Year 4), where actual data is unavailable at the time of IPART setting allowances for the next regulatory period ($IA_4 = A_3$).
- UO_t = Sydney Water's under (over) spend against its allowances ($RA_t - A_t$) in year t.
- Z_t= Underperformance set to zero. If $UO_t < 0$ then $Z_t = 0$, else $Z_t = UO_t$. This presents permanent underperformance from entering the carryover allowance. This results in underperformance being treated as a one-off event.
- C_t= Incremental outperformance constrained to that of the base year. This allows for any temporary outperformance to be treated as a one-off.
- I_t= Incremental out (under) performance in year t relative to that max achieved in all years ($UO_t - UO_{t-1}$). $I_1 = UO_1$, $I_4 = 0$. Incremental out (under) performance is retained for four years (the year savings are made plus three years). Using the max outperformance prevents erratic performance (e.g., underperformance followed by outperformance followed by underperformance) leading to perverse results.
- Y_t= The actual and implied gain (loss) made by Sydney Water in the final year of the period ($Y_t = IA_4 - A_4$).
- FA_t= The adjustment required in Period 3 to ensure that Sydney Water does not retain outperformance in the final year for five years, rather than the intended four ($FA_9 = A_4 - IA_4$). This is constrained so that only an difference between 'actual' (rather than implied) gains and allowances are used in the calculation ($if\ RA_4 - A_4 = 0, then\ FA_9 = 0$) and so that underperformance will not result in an adjustment ($if\ FA_9 > 0, then\ FA_9 = 0$). This adjustment should only be made for permanent outperformance, if IPART deems outperformance in Year 4 is temporary then no adjustment should be made.
- CO_t= The carryover (or incentive allowance) Sydney Water receives in future periods from out (under) performance in Period 1:
    - $CO_5 = I_2 + I_3$

- $CO_6 = I_3$
- $CO_9 = FA_9$

Below we provide examples of how the mechanism works. We have not shown any estimates for Period 2 and 3 besides the carryover allowance. This reflects IPART having discretion over how allowances are set for each period. However, the benefits to consumers, and implied (Year 4) gains and losses, are based on the underlying assumption that the revealed opex in the penultimate year (Year 3) is used to help IPART set allowances in the next period.

Outperformance

Table C.1 below provides an example of the mechanism working when Sydney Water outperforms from Year 2 onwards.

Table C.1: Option 2: Example 1

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	100	80	80	80					
3	Implied actual (IA)				80					
4	Under (over) spend (UO)	0	20	20	20					
5	Outperformance (setting negatives to zero) (Z)	0	20	20	*0*					
6	Constrained to base year (Year 3) (c)	0	20	20	*0*					
7	Under (over) spend + carryover (I)									
8	1	0	0	0	0					
9	2		20	20	20	20				
10	3			0	0	0	0			
11	Year 4 implied gain (loss) (Y)				0	0	0	0	0	
12	Year 4 permanent outperformance adjustment - to be netted off carryover in Period 3 (FA)									0
13	Carryover (CO)					20	0	0	0	

Tables C.2 to C.3 provide examples of how the mechanism works when outperformance is made in different years in Period 1. In Example 2, outperformance occurs in Year 1, Year 3 and Year 4. In this example, Sydney Water benefits by 60 – savings of 20 retained for four years ($UO_t + CO_t$) – and consumers benefit on a permanent basis from Year 5.

Table C.2: Option 2: Example 2

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	80	100	80	80					
3	Implied actual (IA)				80					
4	Under (over) spend (UO)	20	0	20	20					
5	Outperformance (setting negatives to zero) (Z)	20	0	20	*0*					
6	Constrained to base year (Year 3) (c)	20	0	20	*0*					
7	Under (over) spend + carryover (I)									
8	1	20	20	20	20					
9	2		0	0	0	0				
10	3			0	0	0	0			
11	Year 4 implied gain (loss) (Y)				0	0	0	0	0	
12	Year 4 permanent outperformance adjustment - to be netted off carryover in Period 3 (FA)									0
13	Carryover (CO)					0	0	0	0	

In Example 3, outperformance occurs in Year 3 only. As this is the penultimate year it is assumed to be the base year for Period 2 allowances. In this example, Sydney Water benefits by 60 in relation to the incentive allowance and consumers benefit on a permanent basis from Year 7. However, if Sydney Water's gain in Year 3 was only temporary it would make an implied loss (from Year 4 onwards) as the IPART would have set the allowance in Period 2

lower than required based on Sydney Water's Year 3 actuals. Sydney Water's total implied benefit in this case would be -20. If IPART did deem that the underspend in Year 3 was temporary then it would need to adjust the base year actuals for the purposes of the rolling incentive. For example, if it deemed that 10 of the 20 savings were only temporary it could add 10 to the base year.[51]

Table C.3: Option 2: Example 3

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	100	100	80	100					
3	Implied actual (IA)				80					
4	Under (over) spend (UO)	0	0	20	0					
5	Outperformance (setting negatives to zero) (Z)	0	0	20	*0*					
6	Constrained to base year (Year 3) (c)	0	0	20	*0*					
7	Under (over) spend + carryover (I)									
8	1	0	0	0	0					
9	2		0	0	0	0				
10	3			20	20	20	20			
11	Year 4 implied gain (loss) (Y)				-20	-20	-20	-20	-20	
12	Year 4 permanent outperformance adjustment - to be netted off carryover in Period 3 (FA)									0
13	Carryover (CO)					20	20	0	0	

Table C.4 shows an example of temporary outperformance. Sydney Water would retain 100% of the savings, but only for a single year.

Table C.4: Option 2: Example 4

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	80	100	100	100					
3	Implied actual (IA)				100					
4	Under (over) spend (UO)	20	0	0	0					
5	Outperformance (setting negatives to zero) (Z)	20	0	0	*0*					
6	Constrained to base year (Year 3) (c)	0	0	0	*0*					
7	Under (over) spend + carryover (I)									
8	1	0	0	0	0					
9	2		0	0	0	0				
10	3			0	0	0	0			
12	Year 4 implied gain (loss) (Y)				0	0	0	0	0	
13	Year 4 permanent outperformance adjustment - to be netted off carryover in Period 3 (FA)									0
14	Carryover (CO)					0	0	0	0	

Table C.5 shows an example of outperformance in the final year. At the time of setting the allowance for Period 2, IPART will not have actual opex for Year 4. In this case the starting assumption is that the efficiency gain is permanent, therefore an adjustment (*FA*) is required in Period 3. However, if, during IPART's review of the Year 4 (and Period 2) expenditure determined that the gains was only temporary then it would not make the adjustment (*FA).*

[51] Note, this would change the value for UO_3 in the model, but not for what Sydney Water actually received.

Table C.5: Option 2: Example 5

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	100	100	100	80					
3	Implied actual (IA)				100					
4	Under (over) spend (UO)	0	0	0	20					
5	Outperformance (setting negatives to zero) (Z)	0	0	0	*0*					
6	Constrained to base year (Year 3) (c)	0	0	0	*0*					
7	Under (over) spend + carryover (I)									
8	1	0	0	0	0					
9	2		0	0	0	0				
10	3			0	0	0	0			
12	Year 4 implied gain (loss) (Y)				20	20	20	20	20	
13	Year 4 permanent outperformance adjustment - to be netted off carryover in Period 3 (FA)									-20
14	Carryover (CO)					0	0	0	0	

Underperformance

Tables C.6 to C.7 provide examples of how the mechanism works when underperformance is made in different years in Period 1.

Table C.6 shows a what happens from underperformance from Year 2 onwards. Sydney Water would bear the full cost of the underperformance, but there would be no negative carryover.

Table C.6: Option 2: Example 6

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	100	110	110	110					
3	Implied actual (IA)				110					
4	Under (over) spend (UO)	0	-10	-10	-10					
5	Outperformance (setting negatives to zero) (Z)	0	0	0	*0*					
6	Constrained to base year (Year 3) (c)	0	0	0	*0*					
7	Under (over) spend + carryover (I)									
8	1	0	0	0	0					
9	2		0	0	0	0				
10	3			0	0	0	0			
12	Year 4 implied gain (loss) (Y)				0	0	0	0	0	
13	Year 4 permanent outperformance adjustment - to be netted off carryover in Period 3 (FA)									0
14	Carryover (CO)					0	0	0	0	

Table C.7 shows a what happens from temporary underperformance in Year 3. Sydney Water would bear the full cost of the underperformance, but there would be no negative carryover. As, for illustration purposes, we assume Period 2 allowance is set based on Year 3, then the implied outperformance during Period 2 is 80. This outperformance is however clearly dependent on how IPART sets Period 2 allowances. As there was no actual outperformance in Year 4 IPART will not need to make and adjustment (*FA)* in Period 3 allowances.

Table C.7: Option 2: Example 7

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	100	100	120	100					
3	Implied actual (IA)				120					
4	Under (over) spend (UO)	0	0	-20	0					
5	Outperformance (setting negatives to zero) (Z)	0	0	0	*0*					
6	Constrained to base year (Year 3) (c)	0	0	0	*0*					
7	Under (over) spend + carryover (I)									
8	1	0	0	0	0					
9	2		0	0	0	0				
10	3			0	0	0	0			
12	Year 4 implied gain (loss) (Y)				20	20	20	20	20	
13	Year 4 permanent outperformance adjustment - to be netted off carryover in Period 3 (FA)									0
14	Carryover (CO)					0	0	0	0	

Mixed performance

In Table C.8 below we set out and example of a mix of outperformance and underperformance. In Year 1 the company outperforms, but this is followed by underperformance in Year 2, outperformance in Year 3 and then par performance in Year 4. Overall the company will benefit by 60 in Period 1. If allowances in Period 2 are set using Year 3 as the base and the company proceeded to underperform against this allowance in Period 2, then it would lose 80.

Table C.8: Option 2: Example 8

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	80	120	80	100					
3	Implied actual (IA)				80					
4	Under (over) spend (UO)	20	-20	20	0					
5	Outperformance (setting negatives to zero) (Z)	20	0	20	*0*					
6	Constrained to base year (Year 3) (c)	20	0	20	*0*					
7	Under (over) spend + carryover (I)									
8	1	20	20	20	20					
9	2		0	0	0	0				
10	3			0	0	0	0			
12	Year 4 implied gain (loss) (Y)				-20	-20	-20	-20	-20	
13	Year 4 permanent outperformance adjustment - to be netted off carryover in Period 3 (FA)									0
14	Carryover (CO)					0	0	0	0	

In Table C.9 below we set out and example of a mix of outperformance and underperformance. In Year 2 the company underperforms, but this is followed by underperformance in Year 3, outperformance in Year 3 and then even greater outperformance in Year 4. Overall the company will benefit by 50 in Period 1. If allowances in Period 2 are set using Year 3 as the base and the company proceeded to outperform against this allowance in Period 2, and gain 40. IPART would need to make an adjustment for Year 4 to ensure that the company did not retain the permanent efficiency savings in Year 4 for five years instead of four.

Table C.9: Option 2: Example 9

		Period 1				Period 2				Period 3
	Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Allowance (RA)	100	100	100	100					
2	Actual (A)	80	120	80	70					
3	Implied actual (IA)				80					
4	Under (over) spend (UO)	20	-20	20	30					
5	Outperformance (setting negatives to zero) (Z)	20	0	20	*0*					
6	Constrained to base year (Year 3) (c)	20	0	20	*0*					
7	Under (over) spend + carryover (I)									
8	1	20	20	20	20					
9	2		0	0	0	0				
10	3			0	0	0	0			
12	Year 4 implied gain (loss) (Y)				10	10	10	10	10	
13	Year 4 permanent outperformance adjustment - to be netted off carryover in Period 3 (FA)									-10
14	Carryover (CO)					0	0	0	0	