ICRC

independent competition and regulatory commission

Water and Wastewater Discussion Paper 1

Technical Regulatory Issues

Report 14 of 2006
November 2006

The Independent Competition and Regulatory Commission (the Commission) was established by the *Independent Competition and Regulatory Commission Act 1997* (ICRC Act) to determine prices for regulated industries, advise government about industry matters, advise on access to infrastructure and determine access disputes. The Commission also has responsibilities under the Act for determining competitive neutrality complaints and providing advice about other government-regulated activities.

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Foreword

The Independent Competition and Regulatory Commission (the Commission) is responsible for determining the tariffs that ACTEW Corporation (ACTEW) applies for the provision of water and wastewater services in the Australian Capital Territory (ACT). In order to determine these charges, the Commission undertakes a comprehensive inquiry into ACTEW's water and wastewater business on a regular basis, typically once every four or five years. Each inquiry results in the determination of a price path to apply for the length of the subsequent review period. The most recent review determined a price path to apply for the four years from 1 July 2004 to 30 June 2008.

It should be noted that the tariffs for water and wastewater set by the Commission recover the prudent and efficient costs of ACTEW providing those services. They do not include a recovery of the scarcity value of water, nor do they include costs incurred by the ACT Government to manage water conservation in the territory. The ACT Government has introduced a Water Abstraction Charge which goes towards the recovery of these costs. In addition, the ACT Government has announced a tax to apply to utilities in the ACT. These are costs that may also be included in the final price that consumers pay for water and wastewater services. However, the Commission is not responsible for determining these charges and taxes.

In preparation for the next price inquiry, which will determine water and wastewater tariffs to be charged by ACTEW and to apply in the ACT from 1 July 2008, the Commission is releasing a series of discussion papers. These papers, and any comments made in response, will form the basis of the regulatory approach to be adopted by the Commission in conducting the inquiry. This discussion paper is the first of three discussion papers the Commission intends to release between late 2006 and early 2007.[1]

This discussion paper describes the technical regulatory issues the Commission must consider in the context of the upcoming price inquiry. The discussion paper begins by providing an overview of the regulatory method to be adopted by the Commission. The paper then discusses in detail issues related to the length of the regulatory period, the building-block method, calculation of the revenue stream, and the manner in which tariffs are calculated.

The importance of water management, including water and wastewater pricing, has been brought to public attention in recent years as a result of the drought which has affected the ACT and much of south-eastern Australia. In the ACT, the increased prominence given to water management and, in particular, to the security of water supply culminated in a debate surrounding the possible construction of a new dam. It was in this context that a pipeline between the Cotter and Googong catchments was constructed, increasing the ability of ACTEW to store water from the Cotter catchment. In addition, the ACT Government introduced water restrictions during the drought, and Permanent Water Conservation Measures were introduced in the ACT in March 2006.

The Australian Government and state and territory governments have identified water management as a significant issue. The National Water Initiative, signed by all members of the Council of Australian Governments (COAG) in 2004, builds on the 1994 COAG framework for water reform. The Australian Government has implemented the Australian Government Water Fund, which provides funds for projects that invest in water infrastructure and improved water management

[1] The five discussion papers that the Commission initially intended to release have been condensed into three.

techniques. The significance of water management is also demonstrated by the recent establishment of the Office of Water Resources within the Department of the Prime Minister and Cabinet.

The attention being given to water management issues by governments, as well as the increasing public awareness of water management issues, is an indication of the importance of water resources. The task of the Commission in completing the 2007–08 price review and approving water and wastewater tariffs for the following years, while having regard to government policies and relevant social, economic and environmental considerations, is an important step in any national water management strategy.

As always, the Commission believes that a crucial part of the regulatory process is community involvement. The Commission will seek submissions from the ACT community on matters relating to water and wastewater pricing and the level of service that consumers expect to receive for the price they pay.

Based on this discussion paper series, and any submissions made in response to the discussion papers, the Commission will release a working conclusions paper in the first half of 2007. As the initial step in the formal price inquiry process, the paper will detail the Commission's approach to the 2007–08 price determination. The Commission expects to release a draft decision by October 2007 and a final decision by March 2008. The Commission will seek comments from interested parties, and intends to hold a public hearing, between the releases of the draft and final reports.

Event	**Date**
Release of information paper	August 2006
Release of discussion paper 1	November 2006
Release of discussion paper 2	December 2006
Release of discussion paper 3	January 2007
Close of submissions on discussion papers	9 March 2007
Release of working conclusions paper	April 2007
Close of submissions on working conclusions paper	July 2007
Release of draft report	October 2007
Close of submissions on draft decision	December 2007
Public hearing	December 2007
Release of final report	March 2008

Paul Baxter
Senior Commissioner

15 November 2006

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1 Overview

1.1 Introduction

The Independent Competition and Regulatory Commission (the Commission) is responsible for regulating the tariffs that ACTEW Corporation (ACTEW) applies for the provision of water and wastewater services in the Australian Capital Territory (ACT).

The tariffs are designed to recover the reasonable costs expected to be incurred by ACTEW for the provision of water and wastewater services during the regulatory period.[2]

The determination of the tariffs represents the culmination of hundreds of decisions. The individual decisions cannot be made in isolation, and the outcomes of many of the choices impact on others. Indeed, making a choice at one stage of the regulatory process may preclude another action at a later stage. The aim of this series of discussion papers is to identify the individual decisions, elicit debate on these matters, and determine the most appropriate response to achieve the best regulatory outcome for the ACT.

This chapter provides an overview of context in which these decisions will be made, describing the Commission's statutory obligations, and the regulatory process the Commission will adopt, in conducting the tariff review. This chapter also summarises the regulatory framework that applies to water and wastewater tariffs, highlighting the points on which decisions are required, and explaining where those points will be explored in this paper or subsequent discussion papers.

1.2 Statutory obligations

Under the *Independent Competition and Regulatory Commission Act 1997* (ICRC Act), the ACT Government can issue the Commission with terms of reference to make a price direction in a regulated industry. According to s. 20(1) of the ICRC Act, at the conclusion of an inquiry the Commission must decide the levels of prices for services for the period specified in the reference.

Section 20(2) of the ICRC Act specifies that, in making the decision, the Commission must have regard to the following factors:

(a) the protection of consumers from abuses of monopoly power in terms of prices, pricing policies (including policies relating to the level or structure of prices for services) and standard of regulated services; and

(b) standards of quality, reliability and safety of the regulated services; and

(c) the need for greater efficiency in the provision of regulated services to reduce costs to consumers and taxpayers; and

(d) an appropriate rate of return on any investment in the regulated industry; and

(e) the cost of providing the regulated services; and

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[2] The ACT Government levies a Water Abstraction Charge (WAC) in addition to the charges determined by the Commission. The WAC is calculated to recover any costs incurred in the management of the catchment, the scarcity value of water and a measure of the environmental impact. For more information, see the Commission's *Final Report: Water Abstraction Charge*, Report 13 of 2003, October 2003.

(f) the principles of ecologically sustainable development mentioned in subsection (5); and

(g) the social impacts of the decision; and

(h) considerations of demand management and least cost planning; and

(i) the borrowing, capital and cash flow requirements of people providing regulated services and the need to renew or increase relevant assets in the regulated industry; and

(j) the effect on general price inflation over the medium term; and

(k) any arrangements that a person providing regulated services has entered into for the exercise of its functions by some other person.

Section 20A(1) states that:

> a price direction must include a direction about the pricing of regulated services in the form of either or both of the following:
>
> (a) a price, a maximum price or both a minimum and maximum price for each regulated service;
>
> (b) a maximum total amount (***revenue cap***) that may be earned by a person providing regulated services from the provision of those services.

The Commission must also be mindful of the *Utilities Act 2000* (Utilities Act). The Utilities Act does not provide the Commission with any guidance when undertaking a price direction. Rather, the Utilities Act sets out the licence conditions applicable to utilities operating in the ACT, and governs the introduction of industry codes with which utilities must comply. The Commission must consider how the requirements of these codes may influence the costs incurred by the regulated business. In addition, the Utilities Act details the rights and obligations of consumers and utilities, as well as providing the framework under which the Essential Services Consumer Commission operates.

1.3 Regulatory process

A regulatory review of ACTEW's water and wastewater network begins with a reference to the Commission from the relevant Minister. After receiving a reference, the Commission typically releases an issues paper and seeks input from interested parties. However, in the case of this review, the Commission is releasing a series of discussion papers and seeking input from interested parties before receiving a reference. The Commission intends to release a working conclusions paper once a reference has been received and responses to the discussion papers have been reviewed. That paper will outline the Commission's preliminary views on the method to be applied to the regulation of the services provided by ACTEW.

The Commission will seek submissions on the working conclusions document from interested parties. In addition, the Commission expects to receive a single submission from ACTEW, outlining ACTEW's response to the working conclusions document and providing a detailed description of its expected capital expenditure, operating and maintenance expenditure, weighted average cost of capital, demand forecasts, and other factors relevant to the review.

The Commission intends to engage an independent engineering consultant to assess the ACTEW submission and provide advice as to its appropriateness given the current state of the water and wastewater network. Based on this advice and submissions from other interested parties, the Commission will release a draft decision, and invite submissions in response. Following consideration of the responses and any additional information that comes to light via a public hearing, the Commission will release its final decision, which will determine the manner in which water and wastewater tariffs will apply over the length of the regulatory period.

1.4 Regulatory issues

In conducting previous reviews into water and wastewater, electricity, and gas networks, the Commission has adopted the approach referred to as 'incentive regulation'. This approach encourages the regulated business to seek efficiencies throughout the regulatory period, by enabling it to retain any cost savings until the following regulatory period. The length of the regulatory period is typically four or five years: enough time for the regulated business to generate and retain significant savings. The length of the regulatory period and the incentives created are examined in Chapter 2 of this discussion paper.

Incentive regulation, with extended regulatory periods, was developed to address the shortfalls of the previously common 'rate of return regulation'. Under rate of return regulation, revenues or prices were set for a short period of time, often only one year. At the end of the regulatory period, any efficiencies that had been achieved by the business were returned to customers via lower prices in the following regulatory period. This gave the regulated business little incentive to seek efficiencies, because it was unable to retain any savings for an extended period of time. It also encouraged the regulated business to overcapitalise, because the business could receive a return on capital investment in perpetuity, while the returns on investing in efficiency programs were quickly removed from the business. The Commission is unaware of any current instances of rate of return regulation in Australia.

Regulators at both the national level and the state/territory level have considered introducing an efficiency carryover mechanism to further increase the incentive for regulated businesses to seek efficiencies throughout the regulatory period. Another suggested modification to the current approach has been the inclusion of an automatic mechanism that links service standards with price, aimed at achieving an efficient level of service.

These two mechanisms were the subject of in-depth investigation by the Commission during 2005.[3] Although the Commission decided not to include either mechanism in its regulatory framework, it considers the creation of appropriate incentives for the regulated business to be an important element of the regulatory regime. The conclusions of the 2005 review inform the Commission's discussion of service standards and efficiency incentives, in this and subsequent discussion papers.

Under incentive regulation, the efficient costs of operating the business for the length of the regulatory period are determined, and tariffs are calculated such that the regulated business recovers these costs. The approach adopted to calculate the efficient costs of operating the business is referred to as the 'building-block method' and is calculated as follows:

Total efficient cost	=	return on capital *plus*
		return of capital (depreciation) *plus*
		operating and maintenance costs
where the return on capital	=	weighted average cost of capital (WACC) *multiplied by*
		regulated asset base.

The building-block method is used by regulators throughout Australia, and overseas.

[3] Independent Competition and Regulatory Commission (ICRC), *Final Decision: Review of Efficiency and Service Standard Incentive Mechanisms*, Report 16 of 2005, December 2005. The Commission's reports are available on its webpage, at www.icrc.act.gov.au.

An alternative to the building-block method that is currently being investigated by regulators is the total factor productivity (TFP) approach. TFP alleviates the need for regular price determinations because, once prices have been set, they adjust over time based on productivity improvements within an industry. The Commission notes the work currently being undertaken by the Essential Services Commission with the aim of developing a TFP measure of electricity distribution businesses in Australia. However, the Commission believes that, although the adoption of a TFP approach may be feasible in the future, it is unrealistic to consider introducing TFP at this point in time because of its intensive data requirements.

The building-block method is discussed in detail in Chapter 3. Chapter 3 also discusses related issues including the roll-forward of the regulated asset base, the treatment of gifted assets, the linkage between the level of service provided and the efficient costs incurred, and the treatment of unregulated services. The issue of calculating the WACC is complex enough to warrant a full discussion paper, and will be covered in Discussion Paper 2.

Chapter 4 discusses the forecasting of capital and operating costs, and how these costs are used in calculating the total efficient cost of the regulated business under the building-block method.

Once the efficient costs of the regulated business have been determined, it is necessary to model the revenue stream and the way revenue is to adjust annually. The Commission has previously adopted a 'CPI plus X' mechanism, where the adjustment by the CPI allows for inflation and the adjustment by the X factor represents the 'real' change in revenues. The X factor provides a mechanism by which revenues or prices from the preceding regulatory period can be adjusted over time to match the efficient costs of the current regulatory period. As such, the X factor establishes the manner in which the revenue stream of the business adjusts during the regulatory period.

The Commission must decide whether the X factor is to apply to:

- total revenue
- average revenue

  or
- weighted average prices.

Once this decision has been made, the Commission must decide whether to calculate the X factor to establish:

- an unsmoothed revenue stream, where X factors are set on an annual basis to reflect the total efficient cost of the year in question as calculated using the building-block method
- a smoothed revenue stream, where the X factor is set to ensure that the total efficient cost and expected revenue over the regulatory period (for example, five years) are equal in net present value terms

  or
- a glide path, where the X factor is calculated to match the total efficient cost with the expected revenue in the final year of the regulatory period.

To either a smoothed revenue stream or a glide path, there is the possibility of adding a P_0 adjustment. A P_0 adjustment results in most of the effect of the X factor being applied in the first year, rather than being spread out over the course of the regulatory period. It can be an adjustment for the entire effect, or a partial adjustment.

The possible approaches to calculating the X factor are discussed in Chapter 5. The approach to adjusting annual tariffs is the subject of Chapter 6.

Once the method for adjusting tariffs has been established, the Commission must consider the structure of the tariffs. This issue will be addressed in Discussion Paper 3.

2 Length of the regulatory period

2.1 Introduction

The first decision to be made by the Commission will be to set the length of the regulatory period. The length of the regulatory period affects the incentive for the regulated business to seek and achieve efficiency gains: longer regulatory periods create greater incentives. Expected revenues or prices are set for the length of the regulatory period, and the regulated business is able to keep any cost savings it achieves through efficiency during that period until the following regulatory period. At the end of each regulatory period, the regulator takes into account any efficiencies achieved and returns some or all of the savings to consumers by way of tariff adjustments.

This incentive approach was adopted to address some of the shortcomings of rate of return regulation, such as the lack of incentives for the regulated business to seek efficiencies and the motivation for the regulated businesses to overcapitalise. The longer regulatory periods also mean that incentive regulation reduces the number of reviews required, which decreases the regulatory costs incurred by both the business and the regulator. In addition, it is argued that establishing a price path for a reasonably long period of time creates a predictable environment for the business to operate in and increases certainty for consumers in regard to future prices.

However, the implementation of extended regulatory periods necessarily implies that the delivery of the benefits of efficiency gains to consumers is delayed. Also, because the determination of tariffs is based on estimates of future costs—and the further in advance the regulator is forecasting, the more uncertainty surrounds the estimates—a forecasting error may lead to either undercollection or overcollection of revenue by the regulated business. When determining the length of the regulatory period the Commission must weigh up the advantages of a longer regulatory period against these potential disadvantages.

2.2 Commission's previous decisions

The Commission's current water and wastewater decision is in place for four years, from 1 July 2004 to 30 June 2008. In deciding on a four-year direction, the Commission was conscious of uncertainties regarding medium-term ACT water use forecasts and ACTEW's operating and capital expenditure projections. The Commission stated that it believed the adoption of a four-year price path would reduce the risk associated with these issues and ensure that tariffs for water and wastewater services would be appropriate for the duration of the regulatory period.

The previous water and wastewater price direction implemented by the Commission was for a period of five years, from 1 July 1999 to 30 June 2004.

The Commission recently reviewed price directions for ActewAGL's electricity distribution and gas distribution networks. The Commission adopted a regulatory period of five years for electricity distribution, from 1 July 2004 to 30 June 2009, and a regulatory period of five and a half years for gas distribution, from 1 January 2005 to 30 June 2010.

2.3 Decisions in other jurisdictions

Jurisdictional regulators are responsible for determining water and wastewater charges in New South Wales, Victoria and Western Australia. In other jurisdictions, state or local governments determine and levy water and wastewater charges.

The Independent Pricing and Regulatory Tribunal (IPART) in New South Wales recently released a set of price determinations. Two determinations apply for three and a half years: the decision applying to the Sydney Water Corporation, from 1 October 2005 to 30 June 2009, and the decision applying to the Hunter Water Corporation, from 1 November 2005 to 30 June 2009.[4] The decisions regarding the Gosford City Council and Wyong City Council apply for three years, from 1 July 2006 to 30 June 2009.[5] IPART believed these regulatory periods would balance the competing needs to improve efficiency and reduce regulatory uncertainty, while minimising the risk that changes in the industry will affect the appropriateness of the determination.[6]

The Essential Services Commission (ESC) is responsible for the regulation of Victorian metropolitan and regional water businesses. The regulatory period adopted by the ESC in its initial review of water and wastewater services is three years, from 1 July 2005 to 30 June 2008. The ESC was compelled to adopt this period, by a Water Industry Regulatory Order which outlines the regulatory principles to be adopted by the ESC. In future the length of regulatory periods will be determined by the ESC.[7]

In Western Australia, the Economic Regulation Authority (ERA) adopted a regulatory period of 10 years. It appears the relatively long regulatory period was adopted to offset fluctuations in water consumption due to factors such as water restrictions. In addition, the ERA argued that a relatively long regulatory period reduces the annual price variations that might occur from year to year to maintain an annual efficient cost when restrictions are imposed.[8] Included in the ERA decision is an ability to periodically review prices if forecast and actual demands differ significantly.[9]

2.4 Preliminary view

It is the Commission's preliminary view that five years would be appropriate as the length of the forthcoming regulatory period. This is one year longer than the current regulatory period.

Since the release of the current determination, the ACT Government has implemented Permanent Water Conservation Measures and ACTEW has completed of a suite of capital works, including the Mt Stromlo Water Treatment Plant and the Cotter to Googong Bulk Water Transfer Scheme. In addition, ACTEW has adopted a capital monitoring program that allows the Commission a greater understanding of forthcoming capital expenditure over the medium to long term.

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[4] Independent Pricing and Regulatory Tribunal (IPART), *Sydney Water Corporation, Hunter Water Corporation, Sydney Catchment Authority: Prices of Water Supply, Wastewater and Stormwater Services, Final Report*, September 2005, p. 20.
[5] IPART, *Gosford City Council, Wyong Shire Council: Prices of Water Supply, Wastewater and Stormwater Services, Report*, May 2006, p. 13.
[6] IPART, September 2005, p. 21.
[7] Essential Services Commission (ESC), *Water Industry Act 1994, Water Industry Regulatory Order 2003*.
[8] Economic Regulation Authority (ERA), *Final Report: Inquiry on Urban Water and Wastewater Pricing*, November 2005, p. xiii.
[9] ERA, November 2005, p. 14.

These changes will assist the Commission to make forecasts and decisions with more certainty than was possible in the previous review. Therefore, the Commission considers that an increase in the length of the regulatory period from four to five years is appropriate.

3 Building-block method

3.1 Introduction

The first step towards determining tariffs is to calculate the total efficient cost of the business.

In regard to water, this includes all of the prudent and efficient capital and operating costs associated with:

- maintaining dams and related infrastructure
- treating water
- reticulating water throughout the ACT, and maintaining the reticulation system
- reading meters and billing consumers.

Costs incurred to maintain security of supply are also included.

In regard to wastewater, the efficient costs of collecting, pumping and treating wastewater are included in the costs to be recovered in the tariff. These costs take into account the costs of treating the wastewater before it is returned to the catchment.

The total efficient cost is calculated using the building-block method as follows:

Total efficient cost	=	return on capital *plus*
		return of capital (depreciation) *plus*
		operating and maintenance costs
where the return on capital	=	weighted average cost of capital (WACC) *multiplied by*
		regulated asset base.

This approach is referred to as the 'building-block method' because each component is individually calculated and the components are combined to determine the total efficient cost. This chapter examines each of the components, and the associated issue of how service standards may affect efficient costs.

The annual total efficient costs calculated for ACTEW's water network for the current price determination are shown in Table 3.1.

Table 3.1 Water network total efficient costs, 2004–05 to 2007–08

Year ending 30 June (nominal dollars)	2004–05 $'000	2005–06 $'000	2006–07 $'000	2007–08 $'000
Operating expenditure	30,568	30,692	31,580	32,674
Depreciation	10,146	10,643	11,006	11,405
Return on fixed assets (pre-tax)	31,023	32,281	32,628	33,070
Total efficient cost	**71,737**	**73,616**	**75,215**	**77,149**

Source: ICRC, *Final Report and Price Direction: Investigation into Prices for Water and Wastewater Services in the ACT*, March 2004, p. xxiii.

3.2 Return on capital

The return on capital (shown as the return on fixed assets in Table 3.1) is calculated by multiplying the regulated asset base (RAB) by the WACC.

The WACC represents the opportunity cost of capital to the regulated business. That is, the WACC is the return the regulated business could have earned had it invested in the next best alternative investment with the same level of risk. In determining the WACC, the Commission aims to grant a return equal to that necessary to induce the regulated business to remain in the market. The calculation of the WACC will be examined in detail in Discussion Paper 2.

The RAB is the capital base on which the regulated business receives a return (equal to the WACC). The RAB forecasts for ACTEW's water network for the current regulatory period are shown in Table 3.2.

Table 3.2 Water network regulated assets base, 2004–05 to 2007–08

Year ending 30 June (nominal dollars)	2004–05 $'000	2005–06 $'000	2006–07 $'000	2007–08 $'000
Opening value	427,856	458,526	463,780	468,450
Capital expenditure	33,259	7,576	3,572	5,230
Disposals/assets written off	Nil	Nil	Nil	Nil
Depreciation	10,146	10,643	11,006	11,405
Indexation	7,556	8,322	12,105	14,132
Closing value	**458,526**	**463,780**	**468,450**	**476,406**

Source: ICRC, *Final Report and Price Direction: Investigation into Prices for Water and Wastewater Services in the ACT*, March 2004, p. 48.

The return on capital is calculated as the average RAB (opening value plus closing value, divided by two) multiplied by the WACC. The closing value of the RAB is calculated as follows:

Closing value of RAB = opening value *plus*
capital expenditure *less*
disposals *less*
depreciation *plus*
indexation.

3.2.1 Initial valuation of the RAB

The RAB is a financial concept, not a registry of physical assets. In assessing a regulated business's capital investment costs, the Commission first has to consider whether the RAB should represent a financial valuation of the firm or a financial valuation of the physical assets employed in the production of the regulated goods and services. Once it has determined what the RAB represents, the Commission must decide how to perform the valuation.

To understand the subtleties of the first decision, it is necessary to recall the motivations behind regulation. The primary motivation of regulation is to ensure that a business that has a natural monopoly does not earn monopoly profits. To achieve this goal, regulators set prices on a cost recovery basis—that is, the business can expect to earn revenue roughly equivalent to its costs of operating the business. The RAB is valued as a component of the cost of operating the business. The secondary motivation of regulation is to create proper incentives for the regulated business to invest in infrastructure, to counter the possibility of either underinvestment or overinvestment.

The Commission takes the view that the RAB is a financial valuation of the physical assets and not a financial valuation of the firm. The financial value of a firm is a measure of what an investor would pay for the business. In theory, this should correspond to the present discounted value of future cash flows to the owner of the business. However, it can imply that increases in shareholder value should be reflected in an adjustment of the RAB, which would lead to a spiralling of the value of the firm and the RAB. Also, if an investor were willing to purchase a regulated enterprise at a price in excess of the current value of the firm this would imply that that the RAB should be revised upward to justify the purchase price. This sort of self-justification approach to the RAB potentially leads to nonsensical outcomes whereby an investor pays well over the reasonable value of the business then demands that the regulator compensate the owner at the higher value.

Accepting the RAB as a financial valuation of the physical assets leads to the next issue, which is the method of valuing the physical assets. The RAB does not represent the price that would be paid if the assets or some subset of the assets were to be sold. What it does represent is a financial valuation of the physical assets such that a return can be attached to those assets.

The Commission takes the view that the value of the asset base should be based on the actual cost of the assets to the regulated business, provided that two conditions are met. First, only assets that satisfy a prudence test are included in the RAB. Prudence is evaluated once only, around the time of installation.[10] It would violate an implicit contract if a regulator were to declare that investment made many years ago and previously judged to be prudent was no longer determined to be prudent and therefore had been removed from the RAB. This sort of outcome would create an asymmetric risk for the regulated business of a kind that should be avoided. The second condition is efficiency: only the efficient costs of capital expenditure are included.

The beauty of this approach to valuing the physical assets is that it corresponds to the Commission's approach to rolling forward the RAB (described in Section 3.2.2), in that the RAB will be the depreciated actual cost of the physical assets adjusted to maintain their real value. One consequence of this approach is a consistent treatment of gifted assets. Because the regulated business paid nothing for the gifted assets they would have a zero value in the RAB, but any future costs for maintaining or ultimately replacing those assets would be recovered (as long as those expenditures met the prudence and efficiency tests).

It is important to note that the current replacement cost of assets does not enter into the valuation process. The valuation of the physical assets is based on the actual or historic cost of those assets. Replacement cost would potentially be valid as method of valuing the assets only if the assets could easily be sold and transferred to an alternative use, or if an alternative network could be built providing potential competition in the provision of the regulated services. As both of these conditions fail in the case of water and wastewater services in the ACT, replacement cost has no place in determination of the RAB.

It is also important to note the approach used to value the asset base when independent regulation was first imposed on the ACTEW network in the late 1990s. At the time of establishing an independent pricing model for the activities of ACTEW, the Commission did not have access to a full set of historical figures on infrastructure investment in the water and wastewater business in

[10] Generally, prudence tests are performed as part of the price review. For example, during the next review the Commission will evaluate the prudence of all of ACTEW's capital expenditure made during the current regulatory period. Of course, much of ACTEW's capital expenditure was included in the efficient capital spending during the previous price review and therefore is highly unlikely to be considered imprudent in next review.

the ACT. Furthermore, there was a concern that some infrastructure investment may have been made for reasons other than those that might be regarded as commercial and economic. The various 'owners' involved had had a variety of objectives in mind when they committed expenditure to new capital works in the ACT, and not all of that expenditure may have passed the normal prudence and efficiency tests undertaken by an independent regulator.

In order to establish a starting point for the ACTEW RAB, the Commission adopted an approach described as 'drawing a line in the sand'. The Commission opted to use an estimate derived from a return on assets test (RAT), working back from the prices existing at that time and the anticipated revenue that could be generated by the business, based on best estimates of demand, assuming no additional investment in the business. The estimate derived from this approach provided an approximation of the financial value of the physical assets as a starting point for regulatory price determination. The Commission accepts that there was a great deal of 'regulatory judgment' applied in that decision, but takes the view that the decision, once made, was final.

In summary, the Commission has adopted the financial value concept to determine the RAB. Initially, the Commission used a RAT test to determine the value at a particular point in time. Subsequently, the Commission has used the value of prudent and efficient new capital expenditure (that is, the financial value of new assets) as the basis for rolling forward the RAB, having allowed for inflation indexation, to maintain the real value of the investment by the owners, and depreciation, to reflect the aging of the assets and their use in the production process.

3.2.2 Roll-forward of the RAB

The Commission must determine the opening value of the RAB in the initial year of the regulatory period, based on actual capital expenditure in the preceding period. For all subsequent years, the opening value is simply the closing value from the previous year, calculated using the formula set out in Section 3.2. Table 3.2 shows the RAB values used in the current price determination.

It is important to note that the forecast closing value of the RAB in 2007–08 (as shown in Table 3.2) would not be used as the opening value of the RAB in 2008–09 in the forthcoming price determination, unless the forecast capital expenditure matched the actual expenditure undertaken during the current regulatory period. The method adopted to determine the opening value of the RAB is to 'roll forward' the RAB from the initial year of the previous regulatory period, using actual expenditure.

The roll-forward used to calculate the opening value of the RAB for ACTEW's water network for 2004–05 is shown in Table 3.3. The opening value in 1998–99 was taken as the starting point.[11] The Commission then assessed the actual value of new capital expenditure that had occurred during the previous regulatory period. (To assist in this process, the Commission usually engages an independent engineering consultant to review the actual capital expenditure and advise the Commission on the level of prudent and efficient expenditure.) Based on the actual value, disposals, depreciation and indexation were recalculated to arrive at the closing value of the RAB in 2003–04. This figure was taken to be opening value for the RAB in 2004–05. The Commission expects to adopt a similar process when calculating the opening value of the RAB in 2008–09.

[11] This value was verified during the previous price review.

Table 3.3 Roll-forward of the regulated assets base, 1998–99 to 2003–04

Year ending June 30 (nominal dollars)	1998–99 $'000	1999–2000 $'000	2000–01 $'000	2001–02 $'000	2002–03 $'000	2003–04 $'000
Water						
Opening value	329,600	330,484	338,817	357,551	365,739	377,438
Capital expenditure—additions (net of capital contributions)	4,858	7,659	5,282	6,720	7,497	49,030
Disposals/assets written off	–	–	–	–	–	–
Depreciation	6,869	6,895	7,507	7,770	8,249	8,661
Indexation	2,895	7,568	20,959	9,238	12,452	10,049
Closing value	**330,484**	**338,817**	**357,551**	**365,739**	**377,438**	**427,856**

Source: ICRC, *Final Report and Price Direction: Investigation into Prices for Water and Wastewater Services in the ACT*, March 2004, p. 41.

The roll-forward of the RAB is a relatively straightforward procedure. However, the Commission is considering whether there is a need to adjust the total efficient cost during the following regulatory period to account for discrepancies between the forecast and actual capital expenditure during the regulatory period itself. For example, Table 3.4 shows the Commission's forecasts of capital expenditure for the 1998–99 to 2003–04 regulatory period.

Table 3.4 Forecast capital regulated assets base, 1998–99 to 2003–04

Year ending June 30 (nominal dollars)	1998–99 $'000	1999–2000 $'000	2000–01 $'000	2001–02 $'000	2002–03 $'000	2003–04 $'000
Water						
Opening value	329,600	335,000	351,800	363,300	380,100	398,300
Capital expenditure—additions (net of capital contributions)	7,400	15,500	10,100	15,300	16,700	3,300
Disposals/assets written off	—	—	—	—	—	—
Depreciation	6,900	7,000	7,400	7,600	8,000	8,400
Indexation	4,900	8,400	8,800	9,100	9,500	10,000
Closing value	**335,000**	**351,800**	**363,300**	**380,100**	**398,300**	**403,100**

Source: Independent Pricing and Regulatory Commission, *ACTEW's Electricity, Water and Sewerage Charges for 1999/2000 to 2003/2004, Price Direction*, May 1999, p. 52.

There are obvious differences between forecast expenditures in Table 3.4 and the actual expenditures in Table 3.3. Where actual prudent and efficient capital expenditure was above what was forecast, ACTEW underrecovered revenue. Conversely, where actual capital expenditure was below what was forecast, ACTEW overrecovered revenue.

Section 4.2 discusses whether and how it may be appropriate to adjust the total efficient cost in the following regulatory period to take any overrecovery or underrecovery of revenue into account.

3.2.3 Calculation of the RAB for the forthcoming regulatory period

The calculation of the RAB involves forecasting:

- capital expenditure
- disposals
- depreciation
- indexation.

Other issues, such as how to treat gifted or purchased assets and how to allow a return on working capital, must also be considered.

Capital expenditure

Capital expenditure typically refers to expenditure on tangible, long-lived assets, including the planning and construction costs of infrastructure works. Chapter 4 examines the issues the Commission must consider in forecasting capital expenditure.

Disposals

Disposals are assets the regulated business no longer has in its possession. In general, the regulated business may no longer have possession of an asset because the asset has reached the end of its useful life and has been junked, or because the asset has been sold.

The Commission has two options for assessing the value of an asset that is junked prior to the end of its expected life.[12] First, the asset may be removed from the RAB and the remaining value of the asset may be depreciated in a single year. Second, the asset may be left in the RAB, allowing the business to receive a return on and a return of the asset for the remainder of its expected life.

These two approaches are equivalent in net present value terms (ignoring the impact of indexation on retaining a fraction of assets in the RAB in perpetuity). Therefore, the Commission has no preference between removing a junked asset from the RAB and allowing the regulated business to receive the remaining depreciation in a single year, or leaving the asset in the RAB.

However, the treatment of an asset that has been sold must be carefully considered. Leaving such an asset in the RAB allows the regulated business to continue to receive a return on an asset it no longer has in its possession and for which it has been compensated via the proceeds of the sale. Therefore, the Commission considers it appropriate to remove sold assets from the RAB.

The Commission would adjust the RAB by the remaining depreciated value of the asset, thereby removing the asset from the RAB. The total efficient cost would then be adjusted by the notional profit or loss made on the sale. That is, if a notional profit (or loss) were made, the total efficient cost would be reduced (or increased) by that amount. An investigation to ensure a fair sale price had been received would also be required.

For example, consider a situation where the regulated business sells an asset for $12 that had a depreciated regulatory value of $5. Under the approach suggested, the Commission would reduce the RAB by $5, the remaining depreciated value of the asset, thereby removing the asset from the RAB. In addition, the Commission would reduce the total efficient cost by the notional profit from the sale, in this instance $7. Adopting an approach such as this would ensure that the regulated business receives an amount equal, in net present value terms, to that which it would have received had it held onto the asset for the remainder of its useful life.

Another issue related to the disposal of assets is that of stranded assets. Stranded assets are those assets which, having been approved by the regulator, become redundant through no fault of the regulated business. For example, a pipeline to a proposed property development that has been approved by the regulator may be stranded if the development does not go ahead.

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[12] In this instance, ‘expected life’ refers to the length of time over which an asset is depreciated.

One approach would be to simply remove the redundant assets from the RAB and prohibit the business from receiving a return on and return of those assets. However, a possible consequence of removing assets from the RAB is that it exposes the regulated business to a degree of uncertainty about its ability to generate a return on investment that was considered prudent by the Commission at the time of its inclusion in the RAB.

Therefore, it may be appropriate that once an investment has been deemed prudent by the regulator and included in the RAB the regulated business is able to receive the full return on and return of the asset. The Commission has no preference as to whether this is effected by removing the stranded asset from the RAB and allowing the remaining depreciable amount to be claimed in a single year, or simply leaving the stranded asset in the RAB. An approach such as this reduces the uncertainty faced by the regulated business and signals that the business can confidently invest in capital projects.

Depreciation

Depreciation is subtracted annually from the asset base to account for the loss in value of assets over their productive lives. Depreciation is discussed further in Section 3.3.

Indexation

It is necessary to index the RAB to maintain its value in real terms over the length of the regulatory period. The Commission has previously adopted the approach of forecasting CPI and using this as the value by which the RAB is inflated. The Commission considers that this remains an appropriate manner by which to index the RAB during the regulatory period.

Gifted assets

Gifted assets are capital assets which are constructed by a third party and given free of charge to the regulated business. In previous determinations, the Commission has concluded that it is inappropriate for the regulated business to include these assets in the RAB and receive a return on and return of these assets. However, the Commission has allowed the regulated business to recover costs associated with the operation and maintenance of gifted assets. The Commission considers that it remains appropriate to treat gifted assets in this manner.

However, gifted assets are treated as revenue for taxation purposes. Therefore, gifted assets result in the regulated business paying tax for which it would not otherwise have been liable. This represents a cash flow issue for the business. For example, consider a situation where the regulated business receives a gifted asset worth $100. The business immediately incurs a tax liability of $30, according to the current corporate tax rate. However, as the business is able to depreciate the gifted asset, it is able to recoup this $30 over the life of the asset. In this instance, the business is compensated for the gifted asset in nominal terms.

A possible remedy to this cash flow problem would be for the Commission to model actual taxes paid by the regulated business, as opposed to using the statutory tax rate of 30%, in the calculation of the WACC. Under such an approach, taxation would be modelled as a separate line item in the business's operating costs and a post-tax WACC would be estimated. This approach has been adopted by the Australian Competition and Consumer Commission in its regulatory price determinations. The issue of whether a post-tax or pre-tax WACC should be adopted will be examined in Discussion Paper 2.

Purchased assets

Purchased assets are assets constructed by a third party and purchased by the regulated business. The Commission must consider a number of factors before allowing such assets to be included in the RAB.

First, it is necessary to ensure that the cost of the work has not already been recovered from an alternative party and that the 'sale' of the asset is not some form of contrivance whereby consumers effectively pay twice for the functionality and utility provided by the asset. For example, if ACTEW were contemplating the purchase of capital works from a property developer, it would be necessary for the Commission to determine that the cost of the works had not already been recovered in the price of the land. If the capital works costs had been recovered in the sale of the developed property, it would be inappropriate for the developer to sell the assets to ACTEW. This would effectively result in the developer recovering the cost of the assets twice and consumers paying for the utility of the assets twice.

Similarly, if an agency of the ACT Government were to consider selling capital assets to ACTEW, it would be necessary to ensure that the cost of these works was not already being recovered from another source—for example, the Water Abstraction Charge.

Once it had been established that the cost of the asset had yet to be recovered, the Commission would subject the asset to the prudence and efficiency tests that apply to all assets included in the RAB. That is, the asset would be assessed to determine whether its construction was prudent, and whether the price paid by ACTEW for the asset represented an efficient price. Typically, an independent engineering consultant engaged by the Commission would conduct this assessment.

Working capital

Working capital represents liquid funds a business keeps on hand to meet obligations as they arise. A consequence of maintaining a working capital account, rather than investing in physical capital, is that the business is denied a return on that capital. An argument is often made that, in the calculation of the total efficient cost, a separate line item should be included to allow the regulated business to receive a return on working capital equal to that received on invested capital.

The Commission considers it legitimate that the regulated business receive a return on working capital. However, the regulatory model adopted by the Commission in previous decisions already allows a return on working capital, through the manner in which cash flows are modelled. Cash flows in the regulatory model are based on ordinary annuity principles which assume cash flows occur at the end of the year. In reality, cash flows occur throughout the year. Therefore, the regulated business has access to cash flows for up to 12 months before they are accounted for in the regulatory model, allowing the business the opportunity to earn a return on the funds.

It is therefore implicit in the regulatory model previously adopted by the Commission that a return on working capital is granted, removing the need for a separate line item within the total efficient cost build-up to account for working capital. The Commission's preliminary view is that the same form of regulatory model will be adopted in the forthcoming price review.

3.3 Return of capital

The second component of the building-block method is the return of capital (shown as depreciation in Table 3.1). The return of capital is calculated as the average annual value of the RAB divided by the average remaining effective life of the assets included in the RAB.

The return of capital component of the building-block method is equal to that value subtracted from the asset base when calculating the RAB (as shown in Table 3.2). Once the regulated business has received the return of capital as a separate line item, the capital is removed from the RAB so that the regulated business no longer receives a return on that value.

The treatment of the return of capital in this way arises from the manner in which the Commission allows the business to recover capital expenditure. An alternative treatment of capital expenditure would entail allowing the business to fully recover any capital expenditure in the year the expenditure was incurred.[13] This approach would alleviate the need to calculate a RAB and determine the appropriate return (WACC), because the business would recover costs in the year in which they were incurred.

However, given the long productive lives of many capital projects, it is appropriate to distribute the recovery of expenditure over the assets' useful lives. This approach is more reasonable from an intergenerational equity perspective. For example, consider the construction of a dam. It would be inequitable for the cost of the dam to be recovered from consumers in a single year, given that the dam would provide services to future generations over an extended period of time.

To address this issue, the Commission includes all capital expenditure in the RAB. Depreciation represents the recovery by the regulated business of capital previously invested by the business. The rate at which the RAB is depreciated is aimed at aligning the recovery of the capital invested with the productive life of the assets. In addition, the regulated business receives a return on the assets included in the RAB equal to the WACC. This is to allow the business to receive a return on the assets equal to the opportunity cost of the capital.

The Commission has adopted a straight-line approach to calculating depreciation. Under this approach, an equal proportion of the asset is depreciated over each year of its estimated effective life. In the most recent determination, the Commission adopted an average remaining asset life of 44 years for existing assets and 66 years for new assets. It should be noted that depreciation for regulatory purposes differs from depreciation for tax purposes.

The Commission's preliminary view is that the current approach to calculating the return of capital will be retained for the forthcoming price review.

3.4 Operating and maintenance expenditure

Operating and maintenance expenditure accounts for the final cost building block (shown as operating expenditure in Table 3.1). This expenditure can include recurrent operating costs, such as maintenance works and wages, and other costs not related to specific capital projects. The full value of efficient operating and maintenance expenditure is recovered in the year in which it is incurred, due to the immediacy with which benefits accrue from the expenditure.

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[13] This is the approach applied to operating and maintenance costs, as discussed in Section 3.4.

The forecasting of operating and maintenance expenditure is examined in Chapter 4. The Commission makes no adjustment to revenue for any discrepancies between forecast and actual operating and maintenance expenditure over the previous regulatory period. This creates an incentive for the regulated business to seek efficiencies and cost savings in relation to operations and maintenance, as it is able to retain any such savings in perpetuity.

The efficient operating costs determined by the Commission for the current regulatory period for the operation of the water and wastewater networks are displayed in Table 3.5 (note that amounts in Table 3.5 are shown in 2002–03 dollars, not nominal dollars as used in the other tables).

Table 3.5 Water and wastewater networks efficient operating costs, 2004–05 to 2007–08

Year ending 30 June (2002–03 dollars)	2004–05 $'000	2005–06 $'000	2006–07 $'000	2007–08 $'000
Asset Management Plan projects	32,964	33,339	33,927	34,673
Other operational costs, including asset planning and management, project management, labour, ActewAGL service provision, overheads	24,950	25,244	25,488	25,696
ACTEW corporate costs	3,969	3,687	3,698	3,605
Drought and fire recovery costs	1,514	0	0	0
Less efficiency factor	289	582	884	1,190
Add allowance for redesigning bills	250	0	0	0
Total	**63,358**	**61,689**	**62,228**	**62,784**
Final decision—water	**29,247**	**28,846**	**28,929**	**29,059**
Final decision—wastewater	**34,111**	**32,843**	**33,300**	**33,725**

Source: ICRC, *Final Report and Price Direction: Investigation into Prices for Water and Wastewater Services in the ACT*, March 2004, p. xxiii.

3.5 Service standards

Both the requirements of regulated service standards and competitive pressures to deliver additional unregulated services may have an impact on the calculation of the total efficient cost of a regulated business.

3.5.1 Regulated services

Under section 20(2)(b) of the ICRC Act, the Commission must have regard to standards of quality, reliability and safety when undertaking a price direction into a regulated business. The standard of service the regulated business is required to provide must be precisely defined in order to determine the total efficient cost. A higher (or lower) standard of service will increase (or decrease) the costs of the business and, consequently, the total efficient cost determined by the Commission.

The level of service which ACTEW must provide is specified by its obligations under the Utilities Act, its licence conditions, and the Consumer Protection Code. ACTEW's compliance and performance against these requirements is assessed annually in the Commission's compliance and performance reports. ACTEW must also comply with a range of other codes, including the Water and Sewerage Network Boundary Code, Dam Safety Code, Water and Sewerage Network Code, Water and Sewerage Service and Installation Code, Water Metering Code, and Water Supply and Sewerage Service Standards Code.

Investigation of service incentive schemes

During 2005, the Commission released a series of reports on incentive mechanisms, examining the characteristics of the current regulatory regime as it relates to the distribution businesses operating in the ACT, namely, ActewAGL Distribution (electricity and gas) and ACTEW (water and wastewater).[14]

Under the current approach to regulation, there may be little incentive for a regulated distribution business to improve service quality. In fact, it may be the case that the only incentive is for the business to reduce costs, which may be to the detriment of service quality. A service incentive scheme aims to create a situation in which revenues adjust in response to changes in service quality, providing an incentive for the business to seek the efficient level of service.

In considering the potential role of a service incentive scheme, the Commission considered the current level of service, using two information sources. The first source was the Commission's annual reviews of ActewAGL's and ACTEW's levels of compliance and performance against the standards set under the Utilities Act and various industry codes. The compliance and performance reports generally indicated a high level of service.

The second information source the Commission referred to was a willingness-to-pay study conducted on behalf of ActewAGL and ACTEW. The study revealed a high level of satisfaction with the standard of service received by customers in the ACT. For residential customers, 95% reported electricity and water supply to be 'good' or better, and 98% reported natural gas supply to be 'good' or better.

In addition, the Commission noted that it had recently conducted a review of the Consumer Protection Code which had ensured that an appropriate minimum level of service was to be provided.

The Commission concluded that the levels of service provided by ActewAGL and ACTEW were of a high standard. Based on that finding, the Commission stated that the introduction of an incentive scheme might not be expected to have a great impact on service standards.

The Commission also considered a range of issues related to the design of an incentive scheme and concluded that any scheme should be symmetrical and correctly calibrated. That is, the scheme should allow for both increases and decreases in the level of service and equate rewards and punishments for each. In addition, the scheme would need to allow the current level of service to shift to the efficient level, at which the marginal cost incurred by the business to increase the level of service would equal the marginal benefit to consumers.

The Commission also observed that regulatory costs may increase if a service incentive scheme were implemented. The Commission stated that, if the increase in costs caused by the introduction and inherent complexity of a service incentive scheme outweighed the potential benefits of the scheme, the adoption of a scheme may in fact lead to a reduction in welfare. The possibility for manipulation was also identified as an issue that would need to be considered should a scheme be implemented.

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[14] Copies of the reports, including the discussion paper, draft decision, and final decision, can be found on the Commission's website, at www.icrc.act.gov.au/icrcreportsandpapers.

The Commission concluded there was no evidence that the current level of service was dramatically different from the efficient level and that, therefore, the costs involved in implementing an incentive scheme would be likely to outweigh the benefits.

Commission's previous decision

The Commission's most recent price determination required ACTEW to achieve no worse than current service standards as reported in the Commission's compliance and performance reports for 2002–03 and 2003–04.[15] The Commission adopted the standard of service presented in these reports because it was:

- based on requirements set out in public documents such at the Utilities Act and Consumer Protection Code
- publicly available
- subject to audit.

The Commission stated that the requirement to achieve no worse than current standards did not mean that allowing a single indicator to fall below the 2002–03 and 2003–04 levels would be regarded as a failure. Rather, the Commission stated that it would have regard to the whole suite of indicators when reviewing ACTEW's service levels.

At the time of the price direction, the Commission did not envisage any alteration to these service standard requirements during the regulatory period. However, the Commission included a 'service standard event' in the pass-through provisions, allowing ACTEW to recover any additional costs incurred should the minimum standards be altered.

Decisions in other jurisdictions

The approach adopted by IPART in New South Wales is similar to that in operation in the ACT. The water utilities in New South Wales must comply with their licence conditions and various other applicable codes. When determining prices, IPART sets prices in the expectation that current service levels will be maintained. In addition, IPART states that it expects that cost reductions and efficiency savings will not be obtained at the expense of service standards.[16]

In Victoria, service standard targets are based on the performance of the business over the preceding three years. The aim of this approach is to ensure that customers receive a standard of service that would, on average, be no worse than the existing performance level. Guaranteed service level payments have been adopted by some businesses to address the concern that, while average service may exceed the minimum standard, some customers may receive below-average service.[17]

The provision of water utility services in Western Australia is governed by the *Water Services Licensing Act 1995*. The Act establishes a licensing regime to which the various water utilities must adhere. The licence conditions require, among other things, the provision of a determined level of service, a determined quality of water supply, and mechanisms for dealing with customer

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[15] ICRC, *Final Report and Price Direction—Investigation into Prices for Water and Wastewater Services in the ACT*, Report 8 of 2004, March 2004, p. 19.
[16] IPART, September 2005, pp. 131, 144 and 155.
[17] ESC, *Metropolitan and Regional Businesses' Water Plans 2005–06 to 2007–08, Final Decision*, June 2005, pp. 10–25.

complaints. In its determination of prices, the ERA took into account the need for the water utilities to meet these licence conditions.[18]

3.5.2 Unregulated services

Unregulated services are those services provided in the open market and therefore subject to competitive market pressures. Unregulated services provided by ACTEW during the current regulatory period include reuse water and trade waste services as well as the supply of bulk water to Queanbeyan. There is a need to identify which services provided by the regulated business can be classified as 'competitive' and therefore excluded from price regulation.

There is an incentive for a regulated business to shift costs from unregulated services to the regulated side of the business. By doing this, the business can recover the costs of providing unregulated services via regulated tariffs, potentially allowing it to undercut competitors in the unregulated market.

The Commission, through its engineering consultants, investigates the method adopted by the regulated business to allocate costs between regulated and unregulated services, to ensure there is no opportunity for the regulated business to receive a double return on assets. The Commission considers the current approach to be sufficient to prevent the transfer of costs between the regulated and unregulated business.

3.6 Preliminary view

The Commission's preliminary view is that it is appropriate to adopt the building-block method as the basis for determining the total efficient cost of the regulated business.

In relation to calculating the opening value of the RAB, the Commission's preliminary view is that the approach adopted in previous reviews remains appropriate. This approach involves engaging an independent engineering consultant to review the prudence and efficiency of actual capital expenditure undertaken during the regulatory period. Informed by the consultant's advice, a roll-forward of the RAB takes place, based on the audited figures for capital expenditure, depreciation and indexation.

In relation to disposals, the Commission's preliminary view that it has no preference between removing a junked asset from the RAB and allowing the regulated business to receive the remaining depreciation in a single year or leaving the RAB unadjusted. However, the Commission considers that if an asset is sold an adjustment to the RAB and total efficient cost is necessary. In regard to stranded assets, the Commission's preliminary view is that the regulated business should receive the full return on and return of any assets which have been deemed prudent by the Commission and later made redundant through no fault of the regulated business.

The Commission considers the current manner in which the RAB is indexed by way of the CPI remains appropriate.

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[18] ERA, November 2005, pp. 55–59, 117–121 and 151–154.

The Commission's preliminary view is that gifted assets should be excluded from the RAB. Purchased assets should be included in the RAB only if they have passed the prudence and efficiency tests and their cost has not been recovered elsewhere.

The regulatory model adopted by the Commission implicitly incorporates a return on working capital. Therefore, the Commission's view is that it is inappropriate to include a separate line item to account for working capital in the calculation of the total efficient cost.

The Commission's preliminary view is that the straight-line approach to the calculation of depreciation remains appropriate. Similarly, the Commission considers that the current manner in which operating and maintenance expenditure is determined remains broadly appropriate.

The Commission considers there would be no benefit from revaluing the asset base. Rather, the Commission considers that, to provide the regulated business with the correct incentives to invest, it is appropriate that the RAB, once established, be left unadjusted for any change in the theoretical replacement cost of the assets or revaluation based on the current profitability of the business.

In relation to service quality, the Commission's preliminary view is that, during the forthcoming regulatory period, ACTEW will be required to achieve a level of service no worse than the current standard as indicated in the Commission's annual performance and compliance report. As is the case during the current regulatory period, if a single indicator falls, this will not necessarily indicate that ACTEW has failed to achieve the required level of service. The Commission is conscious that the efficient costs incurred by ACTEW are highly contingent on the level of service to be provided, and will continue to allow ACTEW to recover any legitimate costs incurred in achieving the required level of service.

The Commission considers that the approach currently adopted to ensure there is no transfer of costs between regulated and unregulated services remains appropriate.

4 Forecast expenditure

4.1 Introduction

Forecasts of expenditure, for the length of the regulatory period, play a crucial role in the calculation of the total efficient cost of the regulated business.

During 2005, the Commission released a series of reports examining the incentive characteristics of the current approach to economic regulation in the ACT as it relates to the forecast of capital and operating expenditure.[19] As part of that review, the Commission considered the potential to introduce some form of efficiency carryover mechanism. ActewAGL (electricity and gas distribution) and ACTEW (water and sewerage) proposed the introduction of an efficiency carryover mechanism.

Upon completing the review, the Commission decided against the introduction of such a mechanism. However, the Commission made a commitment to review its approach to forecasting capital and operating expenditure, prior to the next price determination, to ensure that the incentive characteristics of the current price path determination model are fully realised.

The regulatory method of forecasting is broadly the same for capital and operating expenditure. That is, the regulated business provides the regulator with a submission detailing its expected future expenditure. The regulator usually engages an independent engineering consultant to assess the submission and advise on the appropriateness of the capital works program and the efficient level of operating expenditure necessary to achieve the required level of service and maintain the network to an appropriate standard over the regulatory period. The consultant considers the necessity and efficiency of the proposed costs using all available information, including costs of other comparable businesses and previous actual costs of the business. Taking into account the consultant's advice, the regulator determines the efficient levels of capital and operating expenditure that the regulated business may recover in each year of the regulatory period.

This chapter discusses issues that the Commission and any consultant it engages must consider in assessing expenditure proposals and forecasting efficient capital expenditure (in Section 4.2) and operating expenditure (in Section 4.3).

Central to the forecasts of capital and operating expenditure required to determine efficient costs are forecasts of customer numbers and use of services. These forecasts are discussed in Chapter 5 and Chapter 6.

4.2 Capital expenditure

Capital expenditure typically refers to expenditure on tangible, long-lived assets, including the planning and construction costs of infrastructure works. Capital expenditure is often characterised by its one-off nature. For example, projects such as the construction of the Mt Stromlo Water

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[19] Copies of the reports, including the discussion paper, draft decision, and final decision, can be found on the Commission's website, at www.icrc.act.gov.au/icrcreportsandpapers.

Treatment Plant and the Cotter to Googong Bulk Water Transfer Scheme are considered to be capital projects because they are one-off projects that will provide services over an extended period of time. The capital expenditure forecasts for ACTEW's water network for the current regulatory period are shown in Table 3.2.

4.2.1 Forecasting capital expenditure

It is expected that, in submitting its proposed capital works program, the regulated business would include in the proposal all future capital expenditure it envisages undertaking. However, the regulated business has an incentive to include in the proposal capital works projects above those necessary to operate the network efficiently. In addition, the regulated business has an incentive to overstate the expected costs of the projects in its capital works program.

This incentive to overstate expected costs and propose unnecessary projects exists because the regulated business receives a return on and a return of all projects the regulator includes in the RAB for the length of the regulatory period. While only actual prudent and efficient capital expenditure will be included in the roll-forward of the RAB that occurs at end of the regulatory period, the business receives a return on and a return of all forecast capital expenditure included in the RAB for the length of the regulatory period, regardless of how much of that expenditure is actually undertaken.

Similarly, the regulated business may have an incentive to undertake unnecessary capital projects if it is confident that these projects will be included in the RAB. This incentive to overcapitalise the network may exist if the return granted on capital expenditure (equal to the WACC) is in excess of the actual opportunity cost of capital. In this situation, the regulated business would be guaranteed an 'excess' return on its investment in perpetuity.

To address these matters, the Commission engages an independent engineering consultant to assess the proposed capital works program. Typically, the engineering consultant identifies a number of proposed capital expenditure projects as being a representative sample of forthcoming projects. These projects are individually assessed for prudence and efficiency. The prudence test involves determining whether the project proposed by the regulated business is necessary. If the project is prudent, the engineering consultant then assesses the expected cost of the project to verify that the cost proposed by the regulated business is efficient.

If a project has been classified as prudent and efficient, the engineering consultant recommends that it be included in the RAB, allowing the business to receive a return on and return of the expenditure for the length of the regulatory period. At the conclusion of the regulatory period, the projects that were actually undertaken are reassessed for prudence and efficiency, and their prudent and efficient value is included in the RAB for perpetuity.

The Commission is currently considering whether it is appropriate for the regulated business to be compensated for prudent overspend against the forecast, or to have any returns due to underspend against the forecast removed, through an adjustment in the total efficient costs for the following regulatory period, in net present value terms.

A decision to adjust revenue such that only actual prudent and efficient costs are recovered reduces the incentive for the regulated business to seek efficiencies in the completion of capital works. Without such an adjustment, if the business is able to complete a project for less than the cost granted by the regulator, the business is able to retain the cost savings for the length of the

regulatory period. However, if the business is aware that any cost savings will result in a reduction of the efficient cost in the following regulatory period, it has a diminished incentive to seek efficiencies. In addition, if revenue is to be adjusted, the business has no incentive to prudently defer a project if new information indicates that the project could successfully be postponed.

However, by leaving revenue unchanged, the regulator creates an incentive for the business to include projects in its capital works program that it knows are unnecessary or can be deferred successfully. Due to the information asymmetry that exists between the regulator and the regulated business, there is a possibility that the regulator will approve a project which, given access to more information, it may have considered inappropriate.

The Commission has previously identified these regulatory challenges surrounding the forecasting of capital expenditure. To improve the availability of information regarding ACTEW's capital works program, the Commission introduced a capital monitoring program as part of the current price determination. The program requires ACTEW to provide information to the Commission regarding actual capital expenditure and expectations of future capital expenditure on an annual basis. The information produced as part of this program will be supplied to the engineering consultant to assist in the investigation of proposed capital expenditure for the water and wastewater networks in the forthcoming review.

4.3 Operating expenditure

Operating expenditure is unrelated to capital projects and can include recurrent operating costs, such as ongoing maintenance works and wages. The efficient operating costs for ACTEW's water and wastewater network as determined by the Commission as part of the current price direction are shown in Table 3.5.

4.3.1 Forecasting operating expenditure

Because of the recurrent nature of operating costs, prior-year expenditure can be useful in predicting future-year expenditure. For example, it is reasonable to assume that the number of employees of the business (and, consequently, the wage bill) is likely to remain relatively constant. Table 3.5 demonstrates that, in the current price direction, each year's forecast operating expenditure is strongly correlated with the forecast for the previous year.

If the regulated business is aware that its actual costs from the preceding regulatory period are to be used as a guide by the independent engineering consultant and regulator when determining costs for the forthcoming regulatory period, the incentive for the regulated business to seek efficiencies is diminished, because any reduction in costs is likely to result in a future reduction in allowed operating expenditure. Indeed, the regulated business may have the incentive to increase costs towards the end of the regulatory period, if it believes that an increase in actual costs will result in an increased allowance in the following regulatory period.

Basing forecasts on productivity measures has been suggested as an alternative approach to forecasting operating expenditure, reducing the reliance on historical data. Under a productivity approach, the allowance for operating expenditure adjusts over time based on productivity improvements within the industry. The improvements in productivity are assessed on the basis of a range of data, including publicly available information from sources such as the Australian Bureau of Statistics as well as more complex data from sources such as comparable businesses.

Adopting a productivity measure divorces historical costs from future forecasts, thus eliminating the incentive for the regulated business to 'game' the regulator by increasing expenditure towards the end of the regulatory period. However, successfully implementing a productivity approach requires an audited starting point from which future expenditure can adjust, extensive historical data regarding the business, and detailed data from a range of public and private sources.

The Commission considers that, although the introduction of a productivity approach to forecasting operating costs may be possible in the future, it is unrealistic to consider such an approach as part of the forthcoming price direction, because of its intensive data requirements.

Efficiency carryover mechanisms have been suggested as a way to encourage a regulated business to seek additional efficiencies in its operations, and induce it to reveal its actual costs. When the Commission concluded that there was no justification for the implementation of an efficiency carryover mechanism in the ACT in 2005, it based this decision on the shortcomings of efficiency carryover mechanisms adopted in other jurisdictions, including:

- the difficulties associated with identifying efficiency gains (or losses) as opposed to reductions (or increases) in input costs
- the manner in which transitory efficiency gains (or losses) are taken away (or rewarded) in the following regulatory period
- the heavy reliance on forecasts, especially the final year forecast, creating an incentive for the regulated business to attempt to game the regulator.

However, the Commission is also conscious that the method of forecasting operating expenditure can reduce the incentive for the regulated business to seek efficiencies. If efficiency gains could be easily verified and measured, it might be possible to quarantine those efficiency gains from future forecast operating costs, allowing the business to retain those gains for longer than the current regulatory period.

4.4 Preliminary view

The Commission's preliminary view is that the most appropriate way to forecast capital expenditure is to continue with the current approach, whereby capital projects are examined on a case-by-case basis.

In addition, the Commission considers that it is inappropriate to adjust revenue in the following regulatory period to take account of any difference between forecast and actual capital expenditure, given that such an approach would decrease the incentive for the regulated business to seek efficiencies and prudently defer projects. The Commission notes that this view is consistent with the practices of other Australian regulatory agencies.[20]

However, should the Commission observe a situation where it appears the regulated business has been systematically underspending on required capital works, the Commission will consider whether a regulatory response is required, including a possible adjustment to the efficient cost in the following regulatory period.

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[20] See, for example, the Australian Competition and Consumer Commission–Australian Energy Regulator, *Decision: Statement of Principles for the Regulation of Electricity Transmission Revenues*¸ December 2004.

The Commission's preliminary view is that the most appropriate way to forecast efficient operating expenditure is to continue with the current approach, whereby the proposed operating expenditure submitted by the regulated business is examined in detail. The Commission considers that it is appropriate that an independent engineering consultant review the submission in the context of all available information, including historical cost as well as benchmarking against comparable businesses. In addition, the Commission will continue to investigate the relationship between forecasting and efficiency incentives, and endeavour to provide the appropriate signals to encourage ACTEW to seek efficiencies.

5 Revenue stream

5.1 Introduction

Once the efficient building-block costs for the duration of the price review have been determined, the Commission must establish how revenues will adjust annually over the regulatory period and, ultimately, how prices will be calculated. The revenue stream needs to match the efficient building-block costs to ensure the appropriate degree of cost recovery.

There are several methods to match revenues with efficient costs, as discussed in this chapter. The method used to determine the revenue stream also dictates the way in which prices are determined; this process is described Chapter 6.

The first decision that needs to be made is whether to predetermine prices or to apply an 'X factor'. Predetermining prices means setting prices for the length of the regulatory period as part of the price determination. The alternative to predetermining prices is to adopt a mechanism that determines how prices or revenues will adjust over time, such as a 'CPI plus X' mechanism.[21] Under this mechanism, the adjustment by the CPI allows for inflation and the adjustment by the X factor represents the 'real' change in revenue or prices.

As discussed in Section 5.2, the X factor provides a means by which revenues from the end of the preceding regulatory period can be adjusted over the course of the regulatory period in order to recover the efficient costs for the regulatory period. If prices are predetermined, they must be real prices, and the actual prices consumers face during the regulatory period depend on the CPI. The calculations needed to determine the two alternatives are similar.

If the X factor approach is adopted, the Commission must begin by choosing the variable to which the X factor will apply. As discussed in Section 5.3, the options are:

- total revenue
- average revenue
- weighted average prices.

Next, the Commission must decide how to set the X factor. As discussed in Section 5.4, the options are:

- an unsmoothed revenue stream, where X factors are set on an annual basis to reflect the total efficient cost of the year in question as calculated using the building-block method
- a smoothed revenue stream, where the X factor is set to ensure that the total efficient cost and expected revenue over the regulatory period (for example, five years) are equal in net present value terms
- a glide path, where an X factor is calculated to match the total efficient cost with the expected revenue in the final year of the regulatory period.

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[21] The Commission is adopting the convention of 'CPI plus X' for this discussion paper. The X factor could be positive or negative. A negative X factor would imply that the adjustment factor would be less than the CPI.

In addition, if either a smoothed revenue stream or a glide path approach is adopted, there is the possibility of adding a P_0 adjustment. A P_0 adjustment results in most of the effect of the X factor being applied in the first year, rather than being spread out over the course of the regulatory period. It can be an adjustment for the entire effect, or a partial adjustment.

Forecasts of customer numbers and demand, as discussed in Section 5.5, are necessary to determine both the X factor and annual tariffs.

Regardless of the approach adopted to calculate annual tariffs through the X factor variable, a fixed revenue regime may be implemented by way of an 'overs/unders account'. The implementation of a fixed revenue stream is discussed in Chapter 6.

5.2 Advantages of using an X factor

Predetermined price paths are widely used in the regulation of water. In New South Wales, IPART has predetermined prices using a glide path with a P_0 adjustment approach to calculating the revenue stream.[22] This differs from the approach adopted in Western Australia, where the ERA, in predetermining prices for its 10-year price determination, has stated that prices should be set such that they recover the present value of the total efficient cost of the regulated business (that is, a smoothed X factor). [23] A similar approach appears to have been adopted in Victoria by the ESC.[24]

The predetermined prices are specified in 'real' terms, because future CPI levels cannot be accurately forecast at the time of the price determination. Predetermined nominal prices cannot be set, because unanticipated changes to the CPI would result in those prices being inconsistent with recovering efficient costs. For example, if an unanticipated large increase in the CPI resulted in a large increase in nominal costs faced by the regulated business (such as labour costs), the regulated business would run at a loss, because the nominal prices would not reflect the CPI increase.

The extent to which predetermined prices successfully match the determined revenue stream relies on the accuracy of forecasts of customer numbers and use. This is discussed in more detail in Section 6.3, which examines the implications of predetermining prices in the context of the Commission's options for setting annual tariffs for water and wastewater.

The predetermined price path approach incorporates the same calculations as are used in the determination of an X factor, such that prices equate expected total revenue with the value of the total efficient costs. However, the Commission believes there are two reasons to favour the X factor approach.

First, the predetermined price path locks in not only real prices but also relative prices for the different components of the tariff structure, for the duration of the price direction. There is no flexibility in the relative prices of the tariff structure if prices are predetermined.

Second, the X factor approach leaves scope to adjust the absolute level of prices if circumstances change during the regulatory period. For example, the unanticipated imposition of high-level water

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[22] IPART, September 2005, p. 100.
[23] ERA, November 2005, p. 14.
[24] See, for example, ESC Urban Water Price Review 2005–08, available at www.esc.vic.gov.au/public/Water/Regulation+and+Compliance/Decisions+and+Determinations/Urban+Price+Review+2005-08/Urban+Water+Price+Review+2005-08.htm.

restrictions could be factored into prices under the X factor approach, whereas predetermined prices, if maintained, could not compensate for a change in water restrictions event.[25]

5.3 Applying the X factor

The X factor is applied to either total revenue, average revenue or weighted average prices, to ensure that the net present value of costs for the regulatory period equals the net present value of revenue over the same period. The choice of the variable to which to apply the X factor has implications for the forecasts that are needed to determine the level of the X factor. More importantly, if the actual level of use or number of customers differs from the forecast values, the choice of the variable to which to apply the X factor affects the return the regulated business earns.

5.3.1 Total revenue

If the X factor is applied to total revenue, the calculation of the X factor is relatively straightforward. The X factor is solved such that the present discounted value of efficient costs is equal to the present discounted value of expected revenue. The X factor could be negative, if annual revenue is expected to fall over time, or positive, if annual revenue is expected to increase in real terms over time.

A positive X factor is not necessarily an indication that the business is becoming less efficient. Efficient costs could be rising because customer numbers or the level of total demand are growing. The business could be becoming more efficient, in that the cost per customer or cost per kilolitre could be falling over time despite total costs increasing with an increase in demand.

Customer numbers and use forecasts do not enter into the calculation of the net present value of the revenue stream under this option. In the calculation of the revenue stream, this implies that, if the X factor is applied to total revenue, a regulated business has no incentive to misrepresent its forecasts to attempt to achieve a favourable outcome. This is in contrast to the situation should either an average revenue or weighted average price approach be adopted.

5.3.2 Average revenue

Under an average revenue calculation of the X factor, the average revenue per unit is calculated for the last year of the previous regulatory period then adjusted annually by the CPI plus the X factor. In the water industry, average revenue caps are typically applied on a per customer basis. This has been the Commission's approach for the previous two price directions, although it is also possible to calculate average revenue on a per kilolitre basis.

The implementation of an average revenue cap on a per customer basis requires forecasts of customer numbers for the length of the regulatory period. These forecasts are required to establish the initial-year average revenue per customer, and the way this adjusts over the length of the

[25] This highlights one of the important issues in that will be analysed in Discussion Paper 3. The adoption of predetermined prices implies that the regulated business bears all of the risk from changes in volumes, if there is no adjustment mechanism allowing the tariff structure to respond to changes in external demand factors such as the imposition of water restrictions. Alternatively, the X factor approach allows the regulator to adjust absolute price levels over time to compensate for changes in the level of demand. Thus, demand-side risks can be shared by consumers and the regulated business.

regulatory period. Similarly, if average revenue per kilolitre is used, forecasts of volumes are needed. The calculation is performed by determining the level of the X factor such that the average revenue over the price direction multiplied by forecast customer numbers equals costs in net present value terms.

If average revenue is based on customer numbers, the regulated business has an incentive to understate its forecasts of customer numbers. This follows from the fact that reducing the customer number forecasts in the calculation of expected revenue implies a higher average revenue and, ultimately, a higher X factor. Similarly, if average revenue is based on kilolitres, the business has an incentive to understate its forecasts of use.

5.3.3 Weighted average prices

Applying the X factor to weighted average prices is common in electricity regulation, where there are often numerous tariffs (such as peak, off-peak, residential and business tariffs). The revenue stream is determined by applying the X factor to the tariffs set in the last year of the previous regulatory period and multiplying by forecast customer numbers and use for each tariff offered.

The information requirements for applying the X factor to weighted average prices are large. Forecasts are needed not only for customer numbers and overall demand, but also for use under each component of the tariff structure. The current tariff structure has three steps and a fixed component; forecast volumes and customer numbers would be needed for each step. As is the case in applying the X factor to average revenue, the regulated business has an incentive to understate its forecasts to achieve a higher X factor.

Setting annual tariffs under a weighted average price approach typically relies on using historical data as the weights in the calculation of weighted prices. Given the volatility in water use, using actual use data as the weight could result in significant variability in the revenue stream over time. In addition, if pricing decisions are devolved to the regulated business, there is a risk of the business manipulating relative prices to its advantage.

The Commission does not consider a weighted average price approach to be suitable for regulating water and wastewater tariffs in the ACT, given the restricted tariff offerings and the possibility for either undercollection or overcollection of revenue as a consequence of determining tariffs using historical data.

5.4 Calculating the X factor

As identified, the X factor may be calculated in one of three ways, to produce an unsmoothed revenue stream, smoothed revenue stream or glide path. The affect of the X factor in a smoothed revenue stream or glide path may be further refined by applying a P_0 adjustment.

5.4.1 Unsmoothed revenue stream

An unsmoothed revenue stream adopts the total efficient cost for each year (as shown for the current price determination in Table 3.1) as the basis on which tariffs are determined. Each year, tariffs are set to recover the total efficient cost for that particular year. This approach potentially exposes customers to dramatic fluctuations in prices, and the regulated business to fluctuations in revenues. For example, a one-off major increase in operating and maintenance expenditure would

produce an increase prices for one year and a fall in prices the following year, creating welfare concerns for consumers and uneven cash flows for the business.

5.4.2 Smoothed revenue stream

Under a smoothed approach, a revenue stream is calculated such that the net present value of the expected revenues is equated to the net present value of the total efficient cost by way of a constant X factor. Such an approach removes variation between years, giving customers greater certainty regarding prices and the business greater certainty regarding revenues.

5.4.3 Glide path

Under a glide path approach, the X factor is calculated such that the revenue recovered in the final year of the regulatory period equals the total efficient cost as calculated for that year. The business's revenue stream during the intervening years may be higher or lower than the total efficient cost calculated using the building-block method, depending on the relative revenue position in the last year of the previous regulatory period and fluctuations in the total efficient cost throughout the regulatory period.

This is the approach adopted by IPART in its regulation of water and wastewater networks.[26] IPART argues that the glide path creates greater incentives for the regulated business to seek efficiency gains.

The Commission considered such an approach as part of its 2005 review of incentive mechanisms. While the Commission concluded that a glide path may create some additional incentives for the business to seek efficiencies, it had concerns regarding the adoption of such an approach. These included the heavy reliance placed on the final-year total efficient cost forecast, and associated inaccuracies in that forecast, as well as the potential that the business may either overrecover or underrecover revenue over the length of the regulatory period.[27]

5.4.4 P_0 adjustment

A P_0 adjustment may be applied to either a smoothed or glide path revenue stream. A P_0 adjustment is an adjustment made in the first year of a regulatory period to align current prices more closely with the calculated revenue stream.

The idea behind adopting a P_0 adjustment is that, following the initial price shock in the first year, there are minimal adjustments to prices in the remaining years of the regulatory period. Such an approach brings forward for consumers any price reductions that may exist as a result of a reduction in the total efficient cost. Similarly, a P_0 adjustment allows the regulated business to recover any additional revenues more immediately, given an increase in the total efficient cost.[28] Typically, the P_0 adjustment is calculated such that prices in subsequent years simply adjust by inflation (that is, remain constant in real terms).

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[26] IPART, September 2005, p. 100. IPART also includes a P_0 adjustment.

[27] The Commission's investigation of incentive mechanisms in 2005 contained a detailed analysis of the incentive properties of smoothed and glide path revenue streams. Copies of the reports of that investigation can be found on the Commission's website, at www.icrc.act.gov.au/icrcreportsandpapers.

[28] If a smoothed revenue stream is adopted, the revenue collected by the business remains constant in net present value terms. However, if a glide path is adopted, a P_0 adjustment can alter the total revenue collected by the business.

5.5 Forecasts of customer numbers and demand

In the current price direction, the Commission adopted an average revenue approach, which required that customer numbers be forecast for the length of the regulatory period.

In determining the forecasts of customer numbers, the Commission adopted an approach similar to that used to determine prudent and efficient capital and operating expenditure. That is, the Commission received a submission from ACTEW outlining the expected movement in customer numbers and use over the regulatory period. The Commission then instructed an independent forecasting expert to assess the submission from ACTEW and provide advice on the most appropriate forecasts to adopt. Based on this advice, the Commission determined the forecast level of customer numbers to adopt in the calculation of the X factor and revenue stream.

As part of the most recent price review, ACTEW provided the Commission with two sets of demand forecasts. The first set of forecasts was used for determining capital and operating expenditure, and the second was used for calculating the revenue stream. The two sets of forecasts differed: those used for determining capital and operating expenditure were greater than those used for calculating the revenue stream.

The difference between the two sets of forecasts may be explained because the forecasts used for capital and operating purposes may err on the side of caution, given the high value placed on supply reliability. However, there is also an incentive for the regulated business to overstate forecasts used for determining capital and operating expenditure and understate forecasts used for calculating the revenue stream. The regulated business has an incentive to overstate forecasts used in the calculation of expenditure, as any increase in forecast expenditure increases the total efficient cost of the business and, therefore, increases revenues. The incentive to understate forecasts used in the calculation of the revenue stream exists because a low forecast of customer numbers and use will necessitate a higher price to recover the determined revenue stream. To address these concerns and to provide an external evaluation of the forecasts, including the reasonableness of the underlying assumptions, the Commission engaged an independent forecasting expert to provide advice on the appropriateness of the ACTEW forecasts.

An argument made by regulated businesses is that they have superior knowledge of the business and therefore are able to provide the most accurate estimates of costs and forecasts of demand. The Commission's role is to act as an independent arbitrator between the business and consumers, who have opposing interests in terms of the relationship between cost and revenue. The Commission considers it appropriate that, in order to weigh up these competing interests and determine a suitable outcome, the Commission retains the ability to determine forecasts and request relevant information from the regulated business.

5.6 Commission's previous decision

In its most recent water and wastewater determination, the Commission applied an X factor under a smoothed revenue approach, such that the total efficient cost and expected revenue generated were equal in net present value terms. In addition, the Commission adopted an average revenue cap on a per customer basis. This required the Commission to make forecasts of customer numbers for the length of the regulatory period, in order to calculate the average revenue per customer in the initial year of the regulatory period and how this figure was to adjust in subsequent years via the X factor. The Commission elected not to apply a P_0 adjustment.

5.7 Preliminary view

The Commission's preliminary view favours the continued use of a smoothed revenue stream, given that it ensures the notional revenue received by the regulated business equals that determined in the calculation of the total efficient cost in net present value terms. In addition, such an approach reduces variation between years, providing greater certainty and less volatility for the business and consumers. The Commission has yet to form a preliminary view on the implementation of a P_0 adjustment.

The Commission will outline its preliminary view regarding the variable to which to apply the X factor once it has considered its effect on the annual tariff-setting process (as discussed in Chapter 6).

6 Tariff setting

6.1 Introduction

Once the decision on the type of revenue stream has been made, the Commission must decide on the appropriate approach to determine annual tariffs. The manner in which the X factor is applied will produce a headline figure which becomes the starting point for calculating annual tariffs. A key consideration will be the extent to which forecasts of customer numbers and/or use are relied on in the calculation of annual tariffs. The respective roles of the regulated business and the regulator in providing information and calculating tariffs will also need to be considered.

This chapter discusses the approaches that may be applied to the recovery of the revenue stream. The structure of tariffs will be the focus of Discussion Paper 3.

6.2 Fixing the revenue stream

The Commission must consider whether it is a requirement of the regulatory regime that the revenue collected by the business must exactly match that determined in the calculation of the revenue stream. An exact recovery of the revenue stream can be achieved through the implementation of an 'overs/unders account'. Alternatively, some deviation between actual revenue and the revenue stream may be deemed acceptable.

An overs/unders account ensures that any overrecovery or underrecovery of revenue in a particular regulatory period is accounted for by adjusting the allowed revenue (and, consequently, adjusting tariffs) in the following regulatory period.[29] Typically, overs/unders accounts are implemented in conjunction with a revenue cap, although there is no requirement that this be the case.

A possible benefit of an overs/unders account is that it reduces the risk faced by the business, as any underrecovery of revenue is included in the efficient cost for the following regulatory period. This means that the business is insulated from the effects of inaccurate forecasts of customer numbers and use. Reducing the revenue risk faced by the business may also allow for a lower WACC than may have been otherwise calculated. At the same time, consumers are not disadvantaged by paying prices that allow an overrecovery of revenues by the business.

However, an overs/unders account creates the perverse effect that, if a reduction in demand results in a decrease in costs, the regulated business has an incentive to seek to reduce demand. The business benefits because, given that revenues are fixed, a reduction in costs will increase profits. While a mechanism that encourages the business to reduce water consumption may be reasonable from the perspective of possible environmental concerns regarding excessive water use, it is inappropriate that the business may receive not only the benefit of the cost saving but also the revenue forgone from reduced consumption.

[29] The fact that prices must be set for the next year before total revenue in the current year can be calculated implies that an over/unders account cannot be implemented on a year-by-year basis.

Similarly, the regulated business may seek to achieve cost savings by restricting the number of new connections it undertakes and reducing the quality of service it provides. In essence, an overs/unders account breaks the link between service quality and revenues, increasing the incentive for the regulated business to minimise service quality in order to maximise profits (regardless of the approach adopted to setting prices). While mandatory connection policies and the adoption of minimum service levels (as exist currently in the ACT) can address these concerns, a regulatory regime that creates such an incentive should be avoided.

6.3 Setting tariffs for the length of the regulatory period

As discussed in Section 5.2, tariffs may be set for the entire length of the regulatory period as part of the price determination process. This would entail the Commission setting the real tariffs ACTEW could charge for water and wastewater services for each year of the forthcoming regulatory period, as part of the price determination, and leaving these prices unadjusted in real terms until the following determination. Such an approach removes the need for an annual tariff adjustment.[30] However, this approach necessarily implies that customer numbers and use are forecast for the length regulatory period, in order to calculate tariffs such that the revenue stream is recovered over the length of the regulatory period.

The reliance on forecasts of customer numbers and use exposes the regulated business to risks associated with inaccurate forecasts. An increase in demand relative to the forecast will increase revenues. Conversely, if customer numbers and levels of use are lower than expected, the revenue of the regulated business will be below the calculated revenue stream.

While forecasts may be accurate in the early years of a regulatory period, it is likely that forecasts and actuals will diverge before the period ends. Any divergence between actuals and forecasts will result in revenue being either overcollected or undercollected relative to the calculated revenue stream, potentially by a significant amount. This is inappropriate, given the aim of matching actual revenues as nearly as possible to the revenue stream.

One way to address this issue would be to shorten the length of the regulatory period, thereby reducing the length of time for which forecasts are required. However, this would need to be balanced against the decreased incentive for the business to seek efficiencies.

Setting tariffs for the entire length of the regulatory period also has implications for demand management. In the case of water, where it can be assumed that the marginal cost of producing an extra kilolitre of water is much less than the marginal price of water, the regulated business has the incentive to seek to increase sales to increase profits. From a water conservation perspective, a tariff-setting arrangement that encourages an increase in water consumption creates an inappropriate incentive for the business.

A further characteristic of the water industry is that use is influenced by external factors such as the weather and the imposition of water restrictions. This increases the level of uncertainty surrounding forecasts of demand and exposes the regulated business to additional risk, although this type of risk can be reduced by means of pass-through mechanisms. Pass-through mechanisms are considered in Discussion Paper 3.

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[30] An annual adjustment based on the CPI may be required to maintain the value of the prices in real terms.

6.4 Setting tariffs annually

An alternative to setting tariffs for the length of the regulatory period is to set tariffs annually, using the most recent available information on customer numbers and demand. This approach would address concerns associated with the inaccuracy of long-term forecasts, and ensure that expected revenue in the following year would, as nearly as possible, match that set out in the determined revenue stream. The annual adjustment could be based on either total revenue or average revenue.

6.4.1 Calculating annual tariffs under a total revenue calculation

If the X factor is applied to total revenue to determine the revenue stream (as discussed in Section 5.3.1), annual tariffs are calculated directly from the maximum allowable revenue. The maximum allowable revenue in any year during the regulatory period is the maximum allowable revenue from the previous year multiplied by one plus the CPI plus the X factor. Forecasts of customer numbers and use are required for the following year only, and are used to calculate tariffs such that the revenue recovered does not exceed the maximum allowable revenue for that year.

Forecasting customer numbers and use for a single year only minimises the pitfalls associated with incorrect forecasting and the potentially significant deviation from the revenue stream that may occur when forecasts are relied on for many years ahead, as under the predetermined price path approach. Forecasts for a single year can take into account all available information, including recent trends in customer numbers and use and the potential effects of water restrictions.

6.4.2 Calculating annual tariffs under an average revenue calculation

If the X factor is applied to average revenue to determine the revenue stream (as discussed in Section 5.3.2), forecasts of customer numbers and use for the length of the regulatory period must be made at the time of the price determination. In addition, forecasts of customer numbers and use are required annually during the regulatory period. These forecasts are used to calculate tariffs on an annual basis such that the notional revenue for each year (as calculated by applying projected customer numbers or use to the average revenue) is not exceeded.

In effect, two different sets of forecasts of customer numbers are being used in the calculation of tariffs. The first, used to calculate the initial-year average revenue per customer and the X factor, is based on the best forecasts of customer numbers for the length of the regulatory period available at the time of the price determination. In the first year of the regulatory period, the initial-year average revenue per customer amount is multiplied by the initial-year forecast of customer numbers to determine the maximum allowable revenue. Tariffs are then determined, based on estimated use, such that the expected annual revenue is less than or equals the maximum allowable revenue.

For the second year of the regulatory period, the maximum allowable revenue is calculated as the initial-year average revenue per customer, adjusted by the CPI and the X factor, multiplied by an updated forecast of customer numbers. The updated forecast of customer numbers is usually based on the most recent information available. Tariffs are then calculated in the same manner as in the initial year, such that the expected revenue is less than or equals the maximum allowable revenue.

If this second set of forecast customer numbers differs from that used in the calculation of the initial-year average revenue cap and X factor, the allowable revenue will differ from that level of

revenue used in the determination of the X factor. If this occurs, the regulated business will either overcollect or undercollect revenue relative to the revenue stream required to recover projected costs. This situation continues in the remaining years of the regulatory period, and is likely to be exacerbated as any the divergence between the two sets of forecasts increases.

6.5 Commission's role in setting tariffs

Under the average revenue approach adopted by the Commission in the current regulatory period, ACTEW submits forecasts to the Commission annually. Each submission contains forecasts of customer numbers and use for the forthcoming year. The submission also contains proposed tariffs, based on a model developed by ACTEW, that recover the notional efficient cost as calculated from the revenue stream. The Commission then verifies the forecasts and calculations provided by ACTEW to confirm that the expected revenue equals the notional efficient cost and is therefore in accordance with the price direction. This process, which is prescribed in the 2004 price direction, puts the Commission in the position of approving ACTEW's proposed tariffs.

In recent years there has been considerable discussion between ACTEW and the Commission regarding the appropriateness of the assumptions adopted in the forecasts of customer numbers and use and, consequently, the tariffs proposed. It has often been the case that the tariffs proposed by ACTEW have been amended by the Commission. This process has increased the regulatory burden on both ACTEW and the Commission and has led to a degree of uncertainty regarding the manner in which tariffs for each year will be determined.

An alternative approach would be for the Commission to retain the power to set annual tariffs. If such an approach were adopted in the forthcoming price direction, the Commission envisages that the annual price-setting process would consist of ACTEW providing the Commission with the most recent available data on customer numbers and use, and any other relevant data, by a given date each year. The Commission could the make the required forecasts for the following year in a manner determined as part of the price direction.

The calculations supporting the tariffs would be made publicly available as part of the announcement of water and wastewater tariffs. The approach could include an ability to factor in pass-through events where appropriate. In addition, the price direction could outline the manner in which the price-setting process could be amended, should a need be identified.

The difference between these two possibilities rests on the degree of regulatory control. In both cases the Commission is responsible for setting water and wastewater tariffs. The first approach involves a proposal by the regulated business and an approval by the regulator. This includes approval of all the variables that enter into the tariff-setting determination, such as forecasts of customer numbers. The alternative approach would require the regulator to perform the forecasts rather than approve the business's forecasts. Ultimately, both approaches should lead to essentially the same outcome.

Given the natural monopoly characteristics of ACTEW, and its status as a government-owned entity, the Commission can see no valid reason why the details of the annual price resets could not be made publicly available as part of the announcement of tariffs. This would increase the transparency of the price-setting process and provide a greater degree of certainty for ACTEW and consumers regarding future water and wastewater tariffs, while reducing the regulatory burden.

6.6 Commission's previous decision

In its price determination for the current regulatory period, the Commission adopted an average revenue approach to set tariffs annually. At the time of the previous review, the Commission considered that the average revenue approach would provide an appropriate balance of risk between ACTEW and customers and, at the same time, provide incentives for ACTEW to reduce costs and provide services in response to customer demand.[31] In the price direction that operated from 1 July 1999 to 30 June 2004, the Commission also adopted an average revenue approach.

6.7 Decisions in other jurisdictions

IPART in New South Wales has adopted a predetermined price approach. The recent determinations released by IPART for Sydney Water Corporation, Hunter Water Corporation, Gosford City Council and Wyong City Council specify prices in real terms for the length of the regulatory period. As part of the annual price reset process, these real prices are adjusted to account for inflation.[32]

To address concerns regarding the businesses' exposure to risk arising from inaccurate consumption forecasts, for Sydney Water Corporation and Hunter Water Corporation IPART has stated that it may consider adjusting the efficient cost for the subsequent determination if the difference between actual and forecast consumption over the regulatory period is greater than a 10% 'deadband'.[33] However, it appears that no such adjustment process was included in the Gosford City Council and Wyong City Council determinations.

The ESC in Victoria is responsible for the regulation of 17 water businesses. In its recent review, the ESC adopted a predetermined price approach for 15 of the regulated businesses and a weighted average price approach for the remaining two businesses.[34] The ESC argued that a predetermined price approach was preferable given the shortness of the regulatory period (three years), the amount of data required under a weighted average price, the need to ensure a high degree of confidence that the businesses will implement appropriate tariff structures over the relatively short regulatory period, and the potentially greater certainty that predetermined prices provide to customers about prices and reduced administrative costs. However, where a business could demonstrate a clearly defined tariff strategy, where it would adequately consult with customers about price changes and where there was a limit on the extent to which prices could be adjusted, the ESC allowed a weighted average price approach.

Regardless of whether a predetermined price approach or a weighted average price approach is implemented, the only mechanism the regulated business appears to be able to use to adjust prices to account for inaccurate forecasts of consumption is to demonstrate a material error in the price determination. It is unclear whether inaccurate forecasts of consumption would fit this criteria.

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[31] ICRC, *Draft Report and Draft Price Direction: Investigation into Prices for Water and Wastewater Services in the ACT*, Report 16 of 2003, December 2003, p. 130.
[32] See IPART, September 2005, p. 96, for a discussion of the price-setting methodology.
[33] IPART, September 2005, p. 21.
[34] ESC, *Metropolitan and Regional Businesses' Water Plans 2005–06 to 2007–08, Final Decision*, June 2005, p. 147. The ESC refers to a weighted average price cap as a 'tariff basket'.

The ERA in Western Australia adopted a predetermined price approach for the 10-year regulatory period covered by its latest decision. Included in the ERA decision is an ability to periodically review prices if forecast and actual demands differ significantly.[35]

6.8 Preliminary view

The Commission's preliminary view is that it would be inappropriate to implement a fixed revenue regime, given the perverse incentives it would create for the business to reduce demand and service levels and to effectively be rewarded twice for reducing costs.

Similarly, the Commission considers that a predetermined price path would be inappropriate, given the length of time over which forecasts would be required and the possible deviation between expected and actual revenues that may occur.

In relation to calculating tariffs annually, the Commission is yet to form a preliminary view on whether a total revenue approach or an average revenue approach is preferable. However, the Commission notes that once the total efficient cost of the business has been determined, a total revenue approach avoids the need to use forecasts in the calculation of the revenue stream.

Finally, the Commission is considering whether it should be responsible for forecasting customer numbers and use and retain the power to calculate tariffs annually as part of the forthcoming price determination.

[35] ERA, November 2005, p. 14.

7 Community involvement

The Commission intends to release Discussion Paper 2, examining issues related to the calculation of the WACC, in December 2006, and Discussion Paper 3, examining the structure of water and wastewater tariffs, in January 2007.

The Commission is seeking comments from interested parties on the matters raised in the series of discussion papers and will accept submissions on individual papers or on the discussion paper series as a whole.

To enable the Commission sufficient time to consider the submissions before releasing a working conclusions document in April 2007, the deadline for submissions is Friday, 9 March 2007.

Submissions, correspondence or other enquiries may be directed to the Commission at the following addresses:

The Independent Competition and Regulatory Commission

GPO Box 296
CANBERRA CITY ACT 2601

Level 2
12 Moore Street
CANBERRA CITY ACT

The secretariat may be contacted at the above addresses, by telephone on 6205 0799, or by fax on 6207 5887. The Commission's website is at www.icrc.act.gov.au and its email address is icrc@act.gov.au or ian.primrose@act.gov.au.

For further information on this investigation or any other matters of concern to the Commission please contact Ian Primrose, Chief Executive Officer, on 6205 0779.

Glossary and abbreviations

ACT	Australian Capital Territory
ACTEW	ACTEW Corporation
COAG	Council of Australian Governments
commission, the	Independent Competition and Regulatory Commission
CPI	consumer price index
ERA	Economic Regulation Authority (Western Australia)
ESC	Essential Services Commission (Victoria)
ICRC Act	*Independent Competition and Regulatory Commission Act 1997*
IPART	Independent Pricing and Regulatory Tribunal (New South Wales)
RAB	regulated asset base
RAT	return on assets test
TFP	total factor productivity
Utilities Act	*Utilities Act 2000*
WAC	Water Abstraction Charge
WACC	weighted average cost of capital