# Asset valuation of government business enterprises: a reevaluation of pricing issues



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#### Asset valuation of government business enterprises: a reevaluation of pricing issues

by

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#### Preface

In 1996, the Public Sector Accounting Centre of Excellence of the Australian Society of Practising Accountants, in conjunction with the Independent Pricing and Regulatory Tribunal of New South Wales (IPART) published a Discussion Paper entitled *Asset valuation by government trading enterprises: an evaluation of pricing issues.* This work was published at an opportune time, as it coincided with the commencement of the Australian National Competition Policy which, among other things, led to the establishment of a number of states, territory and federal government regulatory bodies with the responsibility of setting prices of monopoly infrastructure facilities. The Australian National Competition Policy from the mid-1990s onwards was applied to both government-owned and privately-owned utilities.

Many government-owned enterprises operate as monopolies, or with considerable market power, and in the absence of market disciplines they have been subjected to various forms of regulatory control as part of the National Competition Policy, to ensure that monopoly rents, or excessive profits, are not extracted from consumers. As the facilities of these businesses have tended to be capital-intensive, the determination of asset valuations, as the 1996 Discussion Paper envisaged quite correctly, was to become a key part of regulatory processes.

Much of the information provided in the Discussion Paper was based on the experiences of overseas regulators in the United States and the United Kingdom, because at the time of its release the development of price regulation of utilities in Australia was still in its infancy. The notable exception to this was the examples of the work undertaken by IPART. Since 1996, an extensive array of work has been conducted by economic regulators in Australia on the valuation of assets and its relationship to the pricing of the services of these facilities. In addition, the adoption of international accounting standards in Australia since 2005 has had an impact. In terms of asset valuation, the use of fair value has become common and the work of CPA Australia on this issue is extensive (e.g. see CPA Australia & Edgerton 2013).

Throughout the same period, it should also be borne in mind that a great number of government business enterprises were privatised, and although they are still the subject of regulation, in many cases they are so today as privately-owned enterprises. This means that the range of companies regulated as governmentowned is narrower than it once was, dominated now by water, ports and electricity transmission/distribution entities.

The valuation of assets as part of the regulatory process was envisaged by the 1996 Discussion Paper to have a far-reaching effect on government business enterprises within the context of cost recovery policy and price setting. Government business enterprises generally seek or are required, to recover the

cost of services, including a return on investments. This has consequential implications on their revenue and pricing.

In considering the various alternatives for establishing the valuation of assets for price regulation, the primary consideration is to provide appropriate price signals for new investment while at the same time ensuring that consumers are not exploited. Under-pricing of utility services erodes the capital base and the capacity of a business to remain financially viable, while over-pricing results in monopoly rents being extracted.

Different asset valuation methods result in significantly different valuation figures for the same assets. Government business enterprises price their goods and services in order to achieve a rate-of-return target on their investments and assets. Accurate asset valuation and capital cost allowances are not only calculated so that appropriate utility prices can be generated, but also to ensure that efficient network usage and efficient investment in the medium and long term can be achieved.

Asset valuation methodologies generally are not defined in the regulatory framework. For decades, the issues of measurement (asset valuation) in financial reporting have been discussed widely by both professional and academic accounting forums. The Discussion Paper in 1996 reported that the deprival value method was commonly recommended for use for asset valuation in pricing determinations in the Australian context. Yet despite these early recommendations, a range of alternative valuation techniques have subsequently been used by economic regulators in Australia. Some of these alternatives are in conflict with existing accounting standards, and have meant that additional costs have been incurred in maintaining separate accounting and regulatory records.

In light of the experience with asset valuations since 1996, it seems an opportune time to review the experiences of Australian regulators. The purpose of this study, therefore, is to update and extend on the 1996 publication. Many years have passed since its publication, and a number of developments in asset valuation have occurred since then that are of particular relevance to CPA Australia and its members.

Given the changes in government departments and ownership of business enterprises, this paper aims to identify current infrastructure assets and pricing issues. It aims also to identify the problems associated with asset valuation, and gain insights into the pricing/costing issues associated with asset valuations.

Equally important, the most appropriate asset valuations that are adopted should satisfy accounting statutory reporting requirements. Government departments are able to discharge public accountability through maintenance of relevant and reliable information as required in its audited financial statements (paragraphs OB4 and OB16 of Chapter 1 *The objective of general purpose financial reporting* of *Conceptual Framework CF 2013–1*). Both the regulators and utility businesses

are able to discharge public accountability via maintenance of reliable and relevant information disclosed in audited financial statements. Changes in international accounting standards since 1996, however, have added an additional level of complexity to the issues that have arisen since then.

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Bruce Cohen Private consultant and former director of Snowy Hydro, Melbourne Water and VicTrack

Noelle Jones Principal Consultant, Network Strategies

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#### **Chapter One**

#### Introduction

The manner in which assets are valued can have significant implications, not only for financial reporting and performance monitoring, but also in establishing the way in which prices are determined by government business enterprises. However, a major issue for government business enterprises in consistently pricing their products or services consistently in such a way that they are able to achieve the rates of return governments are increasingly demanding they do on their investments and assets.

A government business enterprise is a government producer of goods or services that try to cover most of its expenses via revenue from the sale of goods and services to the public (also known as government trading enterprises' or 'stateowned enterprises'. There is, therefore, a difference between a government business enterprise and normal government agencies (e.g. health care, social services and education providers). The latter generally generate minimal revenue compared with the expenses they incur, while the former often cover most, or all, of their costs. Although these enterprises in recent times generally are separate corporations, previously many operated as government commissions, boards, authorities or even departments (e.g. the old Post-Master General's Department was once Australia's largest business enterprise and was structured as a government department).

In recent years, a great many government business enterprises have been privatised in Australia. There are still a few significant ones, however, especially in the water, sewerage, rail tracks, ports, communications and electricity distribution and transmission industries. In each of these cases, the enterprises tend to be capital-intensive, have considerable amounts of long-life physical assets, have highly specialised assets and have some degree of market power.<sup>1</sup>

In these cases, governments, both state and federal, are interested not only in ensuring that their businesses generate a reasonable rate of return, but that they do it in a way that does not extract monopoly rents from consumers. In the Australian case, this often means that government business enterprises are the subject of formal regulatory regimes. This is because one of the requirements of the National Competition Policy since the mid-1990s is that government

<sup>&</sup>lt;sup>1</sup> In the communications sector there is Australia Post and the newly established National Broadband Network. The assets of the latter company are mix of assets with long lives (cable, duct, etc) and assets with short lives due to technological change.

businesses enterprises with degrees of market power are treated the same way as their privately-owned counterparts.

At the same time that pricing regimes have been developed by the state and federal governments in Australia, and abroad have required that their business enterprises adopt a range of accounting practices. The formulation of improved accounting practices has occurred with a growing acknowledgement by policy makers that government agencies are often responsible for a range of assets, often large in scale, which represents a substantial investment of resources by the government. There has also been acknowledgement that there is a need to improve the management of assets. This has occurred as a result of various reasons, but mainly because of the increasing pressure on governments to provide additional services, because of the aging nature of most infrastructure assets, and because of the restricted nature of funding available to governments (CPA Australia & Edgerton 2013).

Governments also have been inclined increasingly to insist that the assets of government agencies be valued in their financial statements using the fair value method, as is defined by international accounting standards. The purpose of financial statements is to provide managers and investors with information that can assist them to come to intelligent and informed decisions. The fair value of assets reflects the value of assets at their level of future economic benefit to their owners, as of the reporting date of the assets that are being valued.

In Australia, the Australian Accounting Standards take precedence. The AASB adopted a sector-neutral perspective. No specific guidance is provided in the Australian Accounting Standards as to whether government business enterprises are considered as not-for-profit or for-profit entities. However, the AASB defines not-for-profit entities as entities which main objective is not to generate profit. Deegan (2012, p. 5) maintains that in recent years governments and government departments are adopting accounting procedures that are used by business entities in the private sector as they are privatised. There are some differences between the reporting practices of government business enterprises and those which have been privatised. The discussion in this monograph applies to government business enterprises not subjected to privatisation.

In contrast to the Australia Accounting standards, paragraph 16 of the International Public Sector Accounting Standards Board, IPSAS *Disclosure of Financial Information about the General Government Sector* specifically maintains that GTEs (including utilities) generally operate with a view to profit and are no different from entities conducting activities in the private sector.

Under the Australian Accounting Standards, paragraph 62 of the AASB 13 or IFRS 13 *Fair Value Measurement* (September 2011) and paragraph 33 of AASB 116 or IAS 16 *Property, Plant and Equipment* (June 2009) state that fair value is permitted to be estimated using either an income or a depreciated replacement cost (DRC) in circumstances where there is no market-based evidence of fair

value. For highly specialised assets, commonly found within government agencies, the valuation of infrastructure assets for financial reporting purposes typically is undertaken using a DRC approach. The DRC approach determines the existing assets' replacement cost in their current state of repair. A valid argument for the use of this approach is because the assets held by Australian not-for-profit government agencies would not be primarily dependent on the assets' ability to generate net cash inflows for the business.

In most instances when the appropriateness of the two approaches are considered, Australian not-for-profit government agencies would be limited to the adoption of the DRC approach in the determination of fair value for their infrastructure assets. The DRC communicates to users of financial statements the value of the assets to the public and consumers that is it reflects the cost of replacing the service capacity of the assets if the assets were lost or destroyed.

In practice, government business enterprises such as water businesses are public sector entities and for-profit entities for financial reporting purposes. That is, an active and liquid market for the assets in question exists where the DRC of the assets is more than the net present value of the cash flows generated from the use of the assets. The income (cash flow) approach considers the economic value generated by the assets and the business, provided that sufficient reliable cash flow or earnings information is available; whereas the DRC approach considers the cost of replacing the assets. It is possible for this valuation approach (DRC) to be used based on a market approach. The market-based, specifically the income approach often is used by for-profit organisations, including Melbourne Water and South East Queensland Water. A valid argument for the use of this approach is that asset valuation reflects the underlying value of the assets based on their ability to generate future cash flows in order to provide a monetary return to the business.

Paragraph 21 of the IPSAS *Disclosure of Financial Information about the General Government Sector* defines infrastructure assets as displaying the following characteristics. (i) They are part of a system or network; (ii) they are specialised in nature and do not have alternative users; (iii) they are immovable; and (iv) they are subject to constraint on disposal. In contrast to the Australia and International Accounting standards, paragraphs 47-48 of the IPSAS Property, Plant and Equipment recommend fair value to be estimated using the DRC of an asset (equivalent to the reproduction, restoration or service unit cost) because of the assets' unique characteristics as described.

Under limited guidance from the Australian Accounting Standards, Deloitte Energy & Resources (2010, p. 3) recommends that the application and appropriateness of the approaches must be assessed to ensure accounting information is relevant to economic decision-making needs of the users of the financial statements. These approaches, however, are not necessarily consistent with those of the regulators that use asset valuations as a part of their pricing regulation.

These attitudes, however, are not necessarily consistent with those of the regulators that use asset valuations as a part of their pricing regulation.

The objective of this report is to provide a re-evaluation of asset valuation issues as they apply to government business enterprises in Australia. While much of the discussion is about government-owned enterprises, some applies also to privatelyowned enterprises, especially those that fall under the jurisdiction of Australian regulators in terms of pricing issues. This report aims to facilitate discussion of the manner in which pricing issues and asset valuation approaches have developed in Australia since the mid-1990s, and to consider the degree to which asset valuation techniques, in terms of the manner in which they are used in pricing, can be reconciled with those applied in financial reporting.

#### The scope and objectives of the study

The principal objectives of this study are to review pricing issues arising from asset valuation, and to explore appropriate asset valuation methods for pricing purposes. This study was undertaken in the context of the publication of a Discussion Paper in 1996 entitled *Asset valuation by government trading enterprises: An evaluation of pricing issues*, by CPA Australia and the New South Wales Regulator, IPART. This study has also been informed by work conducted previously by various state and federal government-based regulators, and the work of CPA Australia including publications such as *Valuation and depreciation: A guide for not-for-profit and public sector under accrual accounting standards* (2013).

The study covered three main areas:

- identification and evaluation of possible variations in asset values within the concept of historical, current and market value;
- examination of the impact of asset valuation on the financial performance, pricing and cost recovery policies of enterprises and governments; and
- exploration of appropriate asset valuation methods for pricing purposes, especially in those instances where government price regulators are involved.

# Approach and methods

The approach adopted in this current study was to review the accounting and regulatory practices of Australian government business enterprises and regulators, as well as several from overseas. The following research methods were employed.

A comprehensive review of overseas regulatory pricing experiences was undertaken, along with financial reporting approaches used in countries such as New Zealand, the United States, the United Kingdom and those in the European Union.

A similar, more extensive survey was also undertaken of regulatory and financial reporting practices of Australian government regulators and business enterprises. Previous work that has been conducted on the valuation of regulated asset bases since the publication of the 1996 Discussion Paper has been considerable. This survey therefore drew heavily on professional, government and academic literature.

Two main case studies were included in this paper to provide an additional understanding of the asset valuation issues. One was of Fremantle Ports in Western Australia, to enable understanding of how the performance monitoring of government business enterprises is undertaken, and the role that asset valuation plays in this. The second was of Melbourne Water, reviewing the ways in which asset valuations can differ, depending on the methods used, and the impact this can have on price regulation. Finally in addition to the two main case studies a third is provided as an example of the use of the building block approach as the role asset valuation plays in this process in Appendix 2. This third case study is on Airservices Australia.

A cross-sectional questionnaire was sent to government business enterprises throughout Australia, to seek perceptions on pricing issues. These enterprises were concentrated in the water, electricity and transport industries. Each questionnaire gathered data on asset valuation methods used and the potential issues that these caused. Responses were also sought on any issues arising from price setting.

#### **Structure of the report**

The report is structured into seven sections in addition to this introductory chapter:

- Chapter 2 examines the general background of asset valuation methods and the objectives of asset valuation in terms of financial reporting.
- Chapter 3 discusses the manner in which the financial performance of government business enterprises is monitored.
- Chapter 4 gives a description of cost recovery, the determination of rates of return and their impact on pricing. It provides an example relating to Fremantle Ports in Western Australia.
- Chapter 5 provides a background to natural monopoly, regulation, the building block approach and price caps.
- Chapter 6 provides examples of approaches to asset valuation for price regulation from a range of countries, as well as that of Melbourne Water.
- Chapter 7 describes and analyses the results of the survey of literature and the questionnaire.

• In final chapter an overall summary is provided, and some conclusions and recommendations are made.

# **Chapter Two**

# Asset valuation methods and objectives

# Introduction

Asset values are required for the purposes of financial reporting, performance monitoring, taxation, insurance, asset management and pricing. Accounting for asset values should therefore not be considered in isolation. Pricing, investment, the capital structure and economic objectives all interact with the performance monitoring and measurement of the actual accounting outcome.

Over the years, a variety of approaches to the valuation of assets has been advocated. Each approach has a variety of pros and cons, and in different circumstances different approaches might be most appropriate.

Before reviewing the relationship between the pricing of the goods and services provided by government business enterprises and the valuation of their assets, it is important to look at the general purposes of asset valuation and the approaches to it that can be used.

# **Financial reporting**

To ensure public accountability, the maintenance of relevant and reliable information on assets and the disclosure of such information are required within audited financial statements.

Financial reporting involves a process of collecting, analysing and reporting financial information. This is undertaken in order to satisfy the decision-making needs of stakeholders external to an entity. Financial statements may be used by a range of stakeholder groups for a variety of reasons. They are, however, aimed mainly at the information needs of potential and existing investors and creditors. This information assists these interested parties in making decisions about whether to provide resources to the organisation. Those decisions can involve the selling, buying or holding of equity and debt in the organisation, and the provision of settling of loans and other forms of credit.

The basic purposes of financial reporting can be found in the *Conceptual Framework for Financial Reporting* (released by the IASB in September 2010 and the equivalent Australian Accounting Standard Board (AASB) *CF 2013–1 Amendments to the Australian Conceptual Framework* (December 2013), which replaced the former 1989 *Framework for the Preparation and Presentation of Financial Statements*).

In 2002 the Financial Reporting Council (which oversees the AASB) made the decision to commit Australia to adopting the accounting standards issued by the IASB, to bring Australia in line with international accounting practices. These standards are known as the International Financial Reporting Standards.

After the decision made in 2002 (and implemented from 2005), Australia no longer made full use of the contents of the conceptual framework that was developed in the early to mid-1990s. Parts of this conceptual framework (more specifically the two SAC concepts - SAC 3 Qualitative Characteristics of Financial Information, and SAC 4 Definition and Recognition of the Elements of Financial Statements) were replaced by the IASB Framework for the Preparation and Presentation of Financial Statements (a document prepared by the International Accounting Standards Committee in 1989, and in turn adopted by the AASB in 2004). However, two of the pre-existing SACs (SAC 1 Definition of the Reporting Entity, and SAC 2 Objective of General Purpose Financial *Reporting*) were retained in Australia after 2005, because the issues related to these statements were not covered in the then IASB framework. With the amendments made to the IASB Conceptual Framework for Financial Reporting in 2010, however, parts of SAC 2 were no longer applicable in Australia. SAC 2 was superseded by AASB CF 2013-1 Amendments to the Australian Conceptual Framework (December 2013).

As of January 2014, the Australian pronouncement makes amendments to the Australian Accounting Standards Board's (AASB) *Framework for the Preparation and Presentation of Financial Statements*. AASB CF 2013-1 incorporates Chapter 1 *The objective of general purpose financial reporting* and Chapter 3 *Qualitative characteristics of useful financial information* from the International Accounting Standards Board's *Conceptual Framework for Financial Reporting* (October 2010).

The valuation of assets is therefore an important part of both Australian and international accounting standards. Proper accounting for assets not only recognises the level of public investment in infrastructure, but provides relevant information on asset condition.

The objectives of accounting for assets are as follows:

- To provide information on assets useful to users (shareholders, debt providers, creditors, consumers, employees) for evaluating and making decisions about the allocation of scarce resources.
- To assist the management of organisations and their governing bodies in discharging their accountability.
- To assist in the assessment of the performance, the financial position, and financing and investing of organisations.

Information on asset values should satisfy the concepts set out in *Chapter 3: Qualitative Characteristics of Useful Financial Information* of AASB *Framework*  *for the Preparation and Presentation of Financial Statement* (September 2009) – that is, relevance, reliability, comparability and understandability.

The IASB Conceptual Framework for Financial Reporting (September 2010) – and hence the AASB Framework for the Preparation and Presentation of Financial Statements (September 2009) – defines an asset as being: 'a resource controlled by the entity as a result of past events and from which future economic benefits are expected to flow to the entity' (paragraph 49(a)). This means that the assets themselves can have a physical or non-physical form. That is, physical plant and equipment clearly are assets, but so are patents and intellectual property, which can be used to generate future income.

As government business enterprises tend to be capital-intensive, the accounting treatment applied to asset valuations is important, especially for physical capital items. AASB 116 *Property, Plant and Equipment* covers the issues involved with the identification, measurement and disclosure of the value of property, plant and equipment. Paragraph 15 of AASB 116 states: 'It is required that an item of property, plant and equipment that qualifies for recognition as an asset should be measured initially at its cost of acquisition'. Paragraph 14 of AASB 116 states: "An item of property, plant and equipment that qualifies for recognition as an asset shall be measured at its cost". After the initial recognition of the asset at cost, however, the organisation may decide to adopt either the cost or the fair value approach in determining the value of an asset.

However, AASB *Framework for the Preparation and Presentation of Financial Statement* (September 2009) proposes that a number of different asset valuation be employed to different degrees and in varying combinations in financial statements. When approaching the valuation of assets, the basis for valuing them can be historical cost, current cost, realisable (settlement) value and present value (paragraph 100). As many assets can be of a reasonable age and have little relation to their original cost of acquisition, or since assets might be acquired through the exchange of shares in a company, questions may arise about an appropriate 'cost'. The fair value approach generally has therefore increasingly been the preferred approach by Australian companies.

IFRS 13 or the equivalent AASB 13 *Fair Value Measurement* (September 2011) defines the fair value of an asset as being the price that would be received by the owner to sell an asset, or would be paid to transfer a liability in an orderly transaction between market participants at the date of value measurement (paragraph 9). The valuation of assets plays an important part in the assessment of the performance of organisations and this is especially true of government business enterprises.

#### **Performance measurement**

Government business enterprises generally are subjected to far less market-based performance monitoring than private sector enterprises. Because of this

government business enterprises are subjected to far less market disciplines, it is often necessary to develop alternative monitoring programs and incentive mechanisms to ensure they perform efficiently. Much attention has been placed on the assessment of comparative financial performance.

Therefore, to ensure that the financial indicators used to assess the performance of government business enterprises can be compared with that of others', it is important that a consistent approach to the valuation of assets is used.

In Australia during the 1980s and 1990s, both the national and state governments paid particular attention to the measuring of the performance of government business enterprises. In doing so, particular attention was paid to the valuation of assets. Further detail on these developments is provided in later chapters.

#### **Price regulation**

The objectives of financial reporting for price regulatory purposes are no different from those demanded by users of general purpose financial reports. Regulatory authorities, however, generally have legislative power to command special purpose financial reports and to seek additional financial information.

Reporting of asset values must be able to satisfy the same concept set out in SAC 3. That is, the measurement of all components of the asset base should ideally be objective and not the subject of arbitrary judgements.

In searching for the best available measurement of asset valuation, the objectives of consistency with regulated pricing and investment decisions should not be ignored. The key objectives of pricing are that prices should:

- be set at a level which encourages efficient investment and operational decisions;
- not extract monopoly rents;
- be fair and equitable to all users;
- be set at the lower of the efficient cost of providing the service; and
- as far as practicable, be maintained at a stable and consistent level with minimum price shocks.

A regulated price that is set at too low levels could lead to an under investment in capital expenditure and a running down of the infrastructure. Low profits can also have an impact on the ability of a company to borrow to finance capital extensions.

The key asset valuation objectives with respect to pricing considerations are therefore:

- 1. The asset valuation should be consistent with an efficient price level that is, the price level should be a reflection of the most efficient cost of providing the good or service.
- 2. The valuation should reflect the financial condition of the business entity, whether its revenue is sufficient for asset replacement and business expansion where justified economically.

The exceptional case is that prices may be set below cost if assets are built to satisfy specific government directives. Generally, however, the government owners of assets will normally specify that the prices be set at a level that is sufficient to recover the costs of the assets, and to provide for some reasonable rate of return.<sup>2</sup>

#### Asset values for tax purposes

In general, historical cost forms the underlying basis for ascertaining the amount of depreciable assets for income tax assessments. In situations where partly used assets are acquired by a company from a third party in an arm's length transaction, however, the market buying price of assets or the fair purchase consideration, is allowed for tax deduction purposes.

Corporatised government business enterprises are required to pay tax. This ensures competitive neutrality between public and private entities. In some cases, historical costs for both existing and new assets apply; in other cases, the tax and book depreciation charges are calculated on the same opening asset values. This is deemed as a practical compromise to avoid maintaining two sets of accounts for existing assets. For new assets, historical cost is used for tax equivalent calculations.

#### Alternative valuation methods

There are generally two approaches to valuation: a cost-based approach and a value-based approach. The possible valuation methods are illustrated in Figure 2.1 below.

 $<sup>^{2}</sup>$  There are some exceptions to this where governments have set prices at low levels for political reasons.



Figure 2.1: Overview of valuation methodologies

#### Valuation of a business entity

Three valuation methods are commonly used for the valuation of a business entity, which are as follows.

- Discounted cash flow (DCF) using a DCF approach, the value of the enterprise is the future expected cash flow discounted at a rate that reflects the risk associated with that cash flow. This is generally referred to as the 'economic value'.
- A price-earnings (P/E) ratio a P/E ratio approach to the valuation of assets requires the establishment of a level of maintainable earnings, which is capitalised at a multiple indicative of business growth prospects and risks of the enterprise. The P/E ratio provides an easily calculated estimate of the market valuation of a firm, and frequently gives a good approximation of the value of the shares of the firm. The P/E valuation method, however, does not allow for the timing of cash flow streams, and may not be appropriate for firms with large capital expenditure programs.
- Dividend yield and growth model this approach assumes that the value of an enterprise is equal to the present value of future dividends, discounted by the cost of equity capital.

#### **Cost-based approach to asset valuation**

The cost-based approach to the valuation of assets has commonly been used in financial reporting. It is still extensively used by small firms today, while larger firms have tended to move to the fair value approach. The cost-based method used will generally depend on the accounting regime adopted. In undertaking this approach there needs to be a reasonable level of confidence that accounting records are accurate and complete, especially in line with valuation of individual assets. Generally, some form of independent certification is needed of the existence and value of the asset base.

Original costs measured by actual costs paid by an entity and adjusted for depreciation are considered easily verifiable; hence the attraction for smaller firms to use this approach. This approach can be inaccurate, however, in periods of pronounced inflation, particularly for infrastructure assets.

Modern equivalent asset valuation requires asset valuation with reference to the expected replacement cost of the assets with those of a similar operational capability. The modern equivalent asset valuation approach, however, may provide different operational capabilities – in terms of revenue earning capacity or operating costs (e.g. maintenance costs). In these cases, adjustments need to be made to asset values. For short-term assets, the historical and replacement costs of assets tend to be similar. For longer life assets (as is common in the utilities industry), there can be important differences between these valuations.

An optimised replacement cost approach involves a greater degree of engineering judgement and discretion than does replacement cost. For instance, during a technical appraisal and system optimisation of assets, any over-capacity or over-specification adjustment will generally be made where the assets are found to exceed the prudent engineering and economic standards. In theory, a greenfield design of an entirely new system can be applied. Such an exercise would, however, generally not be warranted because of the time and cost involved and external constraints such as customers' locations and historical service area boundaries.

The challenge is to obtain current cost measurements for existing assets, particularly long-life infrastructure assets. Allowance for technological change and redundancy represents a major difficulty. This is because conceptually, technological change has an effect similar to negative inflation. It is, however, difficult to fully reflect technological change in any asset revaluation.

#### Asset value based on earning potential

This approach is very similar to the business/economic valuation of an entity. The net present value that is obtained from a discounted cash flow provides an estimate of the asset value of a business entity's ability to generate cash flow on

an ongoing basis. The cash flow generating capacity, however, is affected by a range of different factors, including market trends, growth competiveness of the industry both now and in the future, and the entity's effectiveness in controlling operating costs. The applicable discount rate is then therefore determined by the firm's cost of capital.

There is a problem of circularity; however, within regulated government business enterprises (see Figure 2.2 below).

This takes place where the value of assets depends on a government business enterprise's income as follows:

- The government sets income (through price regulation or subsidy) based on a 'fair' rate of return.
- The rate of return depends on the value of the business.

#### Figure 2.2: The valuation circularity



Some have argued that economic valuation should not be based on its present price value but on the price level that reflects a commercial rate of return. Solving the circularity problem, however, requires agreement by the government business enterprise with government/regulators over the acceptable prices/subsidies of the asset valuation of the existing capital base.

# Conclusion

The valuation of assets plays an important role in generating financial information for both managers and owners of companies. The valuation of assets has also become increasingly important in monitoring the overall performance of government business enterprises in more recent years. The different approaches to the valuation of assets can change the apparent performance of a business, and it is, therefore, important that an appropriate approach to accounting for assets is used. Caution should therefore be used when valuing assets and when using these valuations. The shift from asset accounting based on historical cost to current cost methods has narrowed the gap between book and market value. The more recent extensive use of fair value should narrow this even further. In the absence of a sizeable market for assets, however, and because of the often specialised use of assets, the calculation of a fair value also does face some difficulties.

While it is desirable to have a single method of valuation for financial reporting, performance monitoring and price regulation, this has not been the case in Australia so far. Attempts therefore need to be made to reconcile various asset values, so that any differences arising from different approaches are transparent.

# **Chapter Three**

# Asset valuation and the evaluation of financial performance

# Introduction

As various approaches to the valuation of assets can be used, it is important to be clear about how they differ and what the consequences of these differences are. In this chapter, the various approaches to the valuation of assets are described, and then examples are provided of some of their relevance to government business enterprises in Australia.

#### Accounting for infrastructure assets

Over time, a variety of different accounting approaches into the valuation of infrastructure assets have developed. These approaches include:

- historical cost accounting;
- current cost accounting ;
- value-based;
- hybrids; and
- infrastructure renewal accounting.

Within most of these approaches, depreciation is calculated in order to write off the cost of the assets over their expected service lives.

#### Historical cost accounting

The use of historical cost valuation is based on using the original cost of the acquisition of the assets to a company. Historical cost valuation previously has been widely used, but it is now often recognised as having a number of limitations. For instance, unless there is no inflation, use of historical cost accounting may lead to an overstatement of profit. This may leave a company unable to replace its equipment. Some have therefore argued that this method fails to provide a meaningful base for performance measurement, particularly of government business enterprises generally which own long-life infrastructure assets (Lee & Fisher 2004, p. 351).

Historical costs are still currently used to value assets for many firms, particularly those that are small in size and have limited resources available to conduct asset valuations. The advantage of historical cost accounting is the low cost of undertaking it and its general familiarity and simplicity. Most government business enterprises, however, have considerable accounting resources, and are especially capital-intensive, so no longer use this approach today.

### **Current cost accounting**

Current cost accounting has been used widely in the past, especially by government business enterprises in Australia. Under Australia's version of current cost accounting, assets can be reported at a written-down current cost. The current cost of an asset generally is measured by referring to the lowest possible cost at which the gross service potential of that asset could be achieved in the normal course of its business.

Generally, current cost accounting is not a system that takes into consideration inflation very well. It does, however, allow for price changes specific to the business to be incorporated when reporting the amount of assets employed and profit levels.

There are two main concepts of capital maintenance that exist in current cost accounting: financial equity and operating capability. In common terms, 'financial equity' refers to the maintenance of the financial equity of a company in real terms. This means that holding gains/losses on monetary liabilities/assets are incorporated in the profits, and the restatement of non-monetary assets is taken to the current cost reserve. The 'operating capability' refers to the ability of a company to maintain the same level of output of goods and/or services over time. Holding gains of a capital nature are not included in profits.

Under the concept adopted in paragraph 102 of the AASB *Framework for the Preparation and Presentation of Financial Statements* (September 2009), capital represents the operating capability of the entity. Paragraph 105 of the framework states that the current cost operating profit can be established after accounting for the effect of price changes on the funds needed to maintain the net operating assets of the firm. It does not, however, take into account the manner in which these assets are financed. The impact of price changes is accounted for as follows.

- Depreciation is established on the basis of the gross current cost of tangible assets, as distinct from their original historical cost.
- A cost of service adjustment is allowed to account for the impact of price changes on the stock consumed.
- Gains (losses) on holding monetary items are included.

Price setting based on the use of current cost asset valuation (paragraph 100(b) of the AASB *Framework for the Preparation and Presentation of Financial Statements* (December 2007) and depreciation should ensure that an organisation generates cash flows sufficient to replace assets and maintain physical operating capacity.

#### Value-based accounting

In Australia in recent times, most major corporations have adopted the fair value method of valuation as part of the country's movement towards the adoption of International Financial Reporting Standards. International standards were formally adopted in Australian in 2005, and since then many companies including government business enterprises have adopted them.

Under the fair value approach, an estimate is made of the potential market price of an asset. It doing so, it takes into account factors such as: the acquisition/production/distribution costs of the asset, the replacement costs, or the costs of close substitutes; the actual utility of the asset at a given level of development of capability; the risk characteristics; and the cost of and return on capital and any individually perceived utility.

The fair value approach is used as a certainty of the market value of an asset where a market price cannot be determined (usually because there is no established market for the asset). IFRS 13 *Fair Value Measurement* was adopted by the IASB on 12 May 2011, and adopted by the AASB in September 2011 as AASB 13 *Fair Value Measurement*. In AASB 13, the fair value of an asset is defined as being 'the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the market date'.

In the case of government business enterprises and other government service providers, however, it has been recognised that the valuing of assets using a market-based approach might involve some difficulties (Ernst & Young 2013; Watson 2014). This is applicable, for instance, in the case of water infrastructure assets (Deloitte 2010a, 2010b; Pawsey & Crane 2014).

If it is not possible to obtain market-based evidence of the fair value of an asset because of the specialised nature of the property, plant and equipment, and if the asset rarely is sold, then an organisation may need to make an estimate of the fair value using an income or a depreciated replacement cost approach. Given the nature of many government business enterprises' assets, market-based evidence of a fair value is unlikely to exist. Where this is the case, the Australian accounting standards allow for the fair value of an asset to be estimated using an income approach or a depreciated replacement cost approach.

Generally, government business enterprises attempt to use market-based valuations, and then either an income-based approach or replacement cost approach for other assets. In this way, market data can often be obtained from the observed transactions for the asset or for similar assets. For example, non-current assets such as buildings might have readily available commercial values.

# Hybrid models

In addition to using the previous individual methods, it is possible to use a combination of individual methods. Deprival value is one such combined approach used in accounting theory to establish the appropriate measurement basis for asset valuation. That is, the deprival value of an asset is the degree to which an entity is 'better off' because it owns an asset. Deprival value is based on the notion that the value of an asset is equivalent to what the owner would lose if they were deprived of the asset. It is built on the notion that the owner of an asset can generally use that asset to derive greater value than that which would be obtained from the sale of the asset.

The deprival value approach postulates that the maximum value at which an asset should be stated is its replacement cost because, by definition, the owner can be compensated for the loss from deprival of the asset by incurring a cost that is the equivalent of the replacement cost. If that amount, however, is more than the amount that can be derived from owning the asset, then the asset should be valued at no more than its recoverable amount. The recoverable amount is, in turn, defined as the greater of the net selling price of the asset and its value in use (that is the present value of any future returns made by continuing to use the asset).

The origin of the term 'deprival value' is usually ascribed to J.C. Bonbright's 1937 work, *The Valuation of Property*. In his work in 1975, *Accounting values and inflation*, W.T. Baxter was the first to use the specific term 'deprival value'. During the 1970s the deprival value approach to asset valuation played a major role in the development of accounting techniques, as it was a time of inflation and it was endorsed by a number of official contemporary reports in the United Kingdom, Australia and New Zealand (United Kingdom, Inflation Accounting Committee 1975; Australia, Committee of Inquiry into Inflation and Taxation 1975; New Zealand, Committee of Inquiry into Inflation Accounting 1976). Deprival value also formed the basis of the disclosures required in the United States under SFAS 33 (Financial Accounting Standards Board 1979).

More recently, the International Public Sector Accounting Standards Board discussed the deprival value approach and its application to valuing liabilities under the relief value model. This was in a Consultation Paper that was issued as part of its project to develop a Conceptual Framework for General Purpose Financial Reporting by Public Sector Entities.

#### Infrastructure renewal accounting

One final alternative that has been used previously is that of infrastructure renewal accounting. It was first introduced into the United Kingdom at the time that many assets in that country were privatised, and was subsequently adopted by some enterprises in Australia. For instance, renewal accounting was recently adopted by Sun Water, a Queensland Government business enterprise and provider of bulk

water services, and Southern Rural Water in Victoria, for pricing and management reporting (SAHA International 2010, pp. 7 & 52).

In the United Kingdom, there was a common view that current cost accounting asset values were too high and that asset lives were too short (Lobina & Hall 2001, pp. 7–9). This view was based on the fact that estimates of capital spent for renewal were significantly less than current cost accounting depreciation. A new method infrastructure renewal accounting was therefore introduced. The accounting policy subsequently was applied for both current cost accounting and historical cost accounting in the United Kingdom water industry (Office of Water Services 2007).

The basic premise underlying the renewal accounting approach is that infrastructure assets have infinite lives, which means that their operating capacity can be maintained in perpetuity. Infrastructure renewal expenditure is therefore charged against the profit and loss statement of the firm for the maintenance of the operating capability of the infrastructure. This charge to the profit and loss account for infrastructure renewals expenditure then takes into account the planned expenditure on the maintenance of the serviceability of the assets in accordance with the operational policies and standards underlying the firm's investment program. It is indexed to reflect the impact of price changes since the program was established. Any expenditure during the year is charged to the infrastructure renewals provision section of the organisation's accounts.

#### Australian Accounting Standards for asset valuation

In Australian Accounting Standards, AASB *Framework for the Preparation and Presentation of Financial Statements* (September 2009) sets out the following definition of assets:

Assets are service potential or future economic benefits controlled by an entity as a result of past transactions or other past events (paragraph 49 (a)).

The IASB presently is reviewing the proposed new definition of an asset (July 2013). As discussed in paragraphs 2.6–2.16 of (Invitation to Comment) ITC 29, A review of the IASB's Conceptual Framework for Financial Reporting, the proposed new definition of an asset is: 'A present economic resource controlled by an entity as a result of past events'. The present accounting standards for asset reporting use historical cost or revaluation.

Accounting for the revaluation of non-current assets is provided for in AASB 116 or the equivalent International Accounting Standard IAS 16 *Property, Plant and Equipment*, paragraphs 29–33:

• The revaluation of a class of non-current assets shall not result in the carrying amount of any assets within that class exceeding its recoverable

amount. A downward revaluation of a non-current asset shall be undertaken when and only when it's carrying amount is greater than its recoverable amount.

• The standard does not apply where, pursuant to legislation, ministerial directive or other government authority, non-current assets of reporting entities provide goods and services at no charge, or at less than full cost recovery.

The recoverable amount is defined as being the net amount that is expected to be recovered through cash inflows and outflows that come about from the asset's continued use and then subsequent disposal. The accounting standards do not specify the need for discounting, but allow for the net present value concept to be used. The recoverable amount based on discounted net cash flow is deemed the economic value under the concept of deprival value.

However, if the deprival value method is to be adopted for financial reporting, there will be a need to modify AASB 116/IAS 16 and paragraphs 43–49 *Depreciation of Non-current Assets* to incorporate the net present value concept under economic valuation of future service potential.

The first stage of the valuation of infrastructure assets involves an estimation of their written-down current replacement cost. The second stage of asset valuation involves the application of the cash-generating unit test. Regardless of the measurement basis adopted for infrastructure assets, the recoverable amount of the cash-generating unit(s) will be its 'value in use'.

In the case of Sydney Water, for instance, its water infrastructure assets are recorded at a recoverable amount – that is, the revaluation model based on a fair value determined on the basis of the depreciated current replacement cost of its assets (Sydney Water 2013, p. 80). When a cash-generating unit test was carried out as of 1 July 2013, the asset valuation resulted in Sydney Water's impairment valuation decrease of its system asset and easement values by \$28.940 billion to their recoverable amount. The overall effect of the asset revaluation resulted in impairment adjustments in respect of the system assets, which was recognised in the asset revaluation reserve of a net decrease of \$15.607 million (Sydney Water 2013, p. 52).

In contrast, Melbourne Water adopted a historical cost approach as the measurement basis up to until financial year-end 2009. Melbourne Water adopted the revaluation model – that is, a fair value of infrastructure assets using the 'income approach' or a discounted cash flow method (Table 6.5 in this report and Melbourne Water 2013, p. 95; Pawsey & Crane 2014).

#### The effects of asset valuation on financial performance

Financial targets for government business enterprises are of fundamental importance for the government as owner, and for the boards and management of
the enterprise. They are used by the government business enterprises for capital investment decisions, and by the government as a benchmark for monitoring the performance of an enterprise and its management. Most state governments have target rates of return for their government business enterprises; the target economic rate of return on assets for Fremantle Ports set by the Western Australian Government, for instance, being eight per cent (Fremantle Ports 2013).

There are, however, practical constraints on performance measurement using accounting-based financial targets, mainly due to difficulties associated with asset valuation; particularly the substantial investment in long-life infrastructure assets owned by government business enterprises.

Historically, measurement of non-current assets of government business enterprises in Australia was based on historical cost. This practice was gradually changed with the adoption of replacement cost concepts by utilities in the 1980s. From the 1980s onwards, assets were valued at the written-down current cost consistent with the old Australian Accounting Standard, Statement of Accounting Principles 1 (SAP 1), which no longer exists. In the 2000s, many utilities in Australia changed to the use of fair value to determine asset valuations for financial reporting purposes. Sydney Water, for instance, in the mid-2000s adopted the fair value approach for valuing property, plant and equipment assets. In the case of Sydney Water, fair value also became the requirement of New South Wales Treasury's mandates regarding options to be adopted by New South Wales' Government entities under the Australian Accounting Standards (Sydney Water 2009, p. 17; Sydney Water 2013, p. 79).

The IPART, in its early deliberations on pricing determinations, identified an apparent inconsistency between the very low accounting rate of return reported by many government business enterprises (which revalued their assets) and their high levels of cash (Australian Society of Certified Practising Accountants & Independent Pricing and Regulatory Tribunal 1996, p. 20). A possible explanation put forward was that a government business enterprise may be at the bottom of its investment cycle or at the low renewal/replacement period. Melbourne Water's 2009/10 financial report, for instance, showed that the business was at the bottom or end of its investment cycle and low renewal/replacement period. The net cash flow from its financing activities was \$633.3 million and trending downwards in the next three financial years (see Table 3.1 below). This may, however, also be a result of excessively high book values being attributed to asset revaluations (as occurred in financial year 2009/10), with a consequent increase in depreciation.

	2008/09	2009/10	2010/11	2011/12	2012/13
	\$million	\$million	\$million	\$million	\$million
Total assets	5,421.1	6,061.1	6,744.1	7,076.8	11,688.6
(historical cost)					
Revaluation of		8,948.3	9,754.5	10,034.1	14,478.1
assets using fair					
value					
Total liabilities	3,419.3	4,929.9	5,379.7	5,495.1	10,116.7
Total equity	2,001.8	4,018.4	4,374.8	4,539.0	4,361.4
Earnings before	173.8	238.5	214.1	372.7	(45.1)
income taxation					
Net cash flow	278.8	302.9	266.6	520.0	219.3
from operating					
activities					
Net cash flow	(935.4)	(936.2)	(785.8)	(620.2)	(361.2)
from investing					
activities					
Net cash flow	656.4	633.3	520.9	98.6	286.9
from financing					
activities					
Depreciation	105.8	122.0	231.9	242.6	315.9
Dividend paid	72	79.8	26.5	118.4	94.5
Return on asset	6.0	5.7	4.7	6.3	4.1
%					
Return on equity	6.4	6.2	3.8	6.1	(0.7)
%					

 Table 3.1: Financial data for Melbourne Water 2008/09 to 2012/13

Source: Melbourne Water, Annual reports

Melbourne Water first adopted a fair value asset valuation in the financial year 2009/10, with the fair value of property, plant and equipment being determined using a depreciated replacement cost method; specifically the 'income approach' (DCF) method (Victoria, Auditor-General's Report 2013, p.32). The method estimated the fair value of the assets by discounting the estimates of future cash flows to their present values.

Melbourne Water's total assets consist of property, plant, equipment and infrastructure assets, and these assets represent around 96 per cent of total assets (Victoria, Auditor-General's Report 2013, p. 31). In the financial year 2009/10, the assets calculated with reference to historical cost values were revalued using the fair value approach. This was the first significant departure from the recording of long-lived assets at historical cost by the organisation. The revaluation of assets resulted in the book values of the assets being lifted from \$6,061.1 million to \$8,948.3 million; an increase of nearly 48 per cent.

A large revaluation also was recorded in the following financial year (2010/11). The revaluation included all of the remaining infrastructure assets, including land. For the same group of assets, the result of the revaluation using fair value added \$3,010.4 million to assets previously valued at \$6,744.3 million using book value; an increase of 45 per cent.

The same sequence of major asset revaluations continued subsequently. On 30 June 2012, the fair value was \$10,034.1 million, while in the following year \$14,478.1 million.

The increase in asset valuation was a direct impact of the capital expenditure on the desalination plant along with investment in other infrastructure. The carrying amount of Melbourne Water's assets now totalled \$14,478.1 million under fair value, as compared with \$5,421.1 million five years earlier under historical cost. These revaluations resulted in substantial increases in reported depreciation expenses, reducing profit that was the numerator in return on assets and equity calculations. Asset revaluations using fair value have inflated total asset values (the denominator in return on asset calculations) and total equity figures (the denominator in the return on equity calculations). A summary of revaluations and their impact on the reported indicators of financial performance of the firm is shown in Table 3.1 above.

Another example is the case of TasRail. The Tasmanian Government bought the rail company TasRail from Pacific National (Tasmania) Pty Ltd for \$32 million in 2009 (Asciano 2009). At the time of purchase, many sections of the rail line in Tasmania were close to the end of their life as a result of under-investment in maintenance (TasRail 2013, p. 49). Asset revaluation requires that the redundant assets should be impaired to nil in accordance with paragraph 31 of the Australian Accounting Standard (June 2009), because they do not provide any direct commercial return to TasRail now or into the foreseeable future. This created an impairment charge (expense) to TasRail's profit and loss, which was recognised in 2012/13 (loss of \$45.2 million), in 2011/12 (loss of \$3.7 million), and in 2010/11 (loss of \$30.4 million) respectively. The impairment expenses have had a direct negative impact on TasRail's net income.

The company recorded net losses of \$47.4 million in 2012/13 (TasRail 2013), \$36.8 million in 2011/12, and \$27.1 million in 2010/11 (TasRail 2012). The impairment losses in relation to the Tasmanian Government's funded capital expenditure and replacement cost were recognised and offset against equity in accordance with paragraph 40 of the Australian Accounting Standard (June 2009) (TasRail 2013, p. 68). The impairment losses subsequently impacted on the capital structure (equity) of the company and were recognised as a non-cash item. Since 2009 the company has paid or declared no dividends.

As discussed, the adoption of new asset valuation methods not only affects the reported financial performance, but is likely to reduce the accounting profits available for financial distribution to governments. For a restructured

government-owned business, the decision on the operating balance of assets may also have consequential effects on capital structure decisions.

# Conclusion

Since the publication of the 1996 Discussion Paper, there have been a number of changes that have occurred in the way in which government business enterprises are financially organised in Australia. The most important change has been the continued privatisation of the companies, which has meant that today they are a more concentrated group of organisations, mainly water supply, ports and electricity line businesses. Those that have not been privatised have generally lost their regulatory functions and operate as standalone commercial corporations, governed by a board of management with fairly transparent goals in terms of their financial performance.

Governments are now more inclined to place specific requirements on these organisations to achieve set rates of return in terms of their investments, which in turn heightens the need to ensure that consistent approaches to asset valuations are made. In this sense, the difference between these corporatised government enterprises makes use of accounting practices that are similar to those of the private sector. The main difference is a technical one of how to deal with the problems of their possessing physical assets with long lives, and which often have very specialised uses. The lack of markets for these assets increases the incentives of these government business enterprises to continue using cost-based valuations rather than market-based. Monitoring the performance of government business enterprises by the various governments in Australia will mean there will be a continued interest in the manner in which their assets are valued.

# **Chapter Four**

# Cost recovery, rates of return and pricing issues

### Introduction

Since the 1990s many government business enterprises in Australia have been privatised, although there remain a range of enterprises that are still in government ownership. In Australia in the 2010s, most water and sewerage suppliers, and ports and electricity distribution/transmission networks (outside of Victoria and South Australia), along with Australia Post and Airservices Australia, which are owned by the national government, remain in government ownership.

Those enterprises still in government ownership are expected to make a reasonable return to the government that owns them. They also generally are required to generate enough income to finance any investment in them, or to be able to service any debt they have accumulated without being a burden on taxpayers.

As noted previously government business enterprises in Australia tend to be capital-intensive and are concentrated in the utilities sector, which means the recovery of capital costs from pricing, and therefore revenue streams, is essential to ensure sufficient investment is maintained by the government. Pricing therefore needs to be established at levels that enable revenue that is sufficient to provide a reasonable return on capital invested.

In line with this, this chapter provides a general background on the issues associated with cost recovery, rates of return and pricing. In the following section, a discussion of cost recovery and pricing is given. This is followed by sections on the difference between economic and accounting costs, the importance of depreciation, and some other related pricing issues. In the final section of this chapter, some general conclusions are provided.

### **Cost recovery and revenue requirements**

Concerns about the financial and efficiency performance of government business enterprises became widespread in the late 1980s and early 1990s. At this time, a number of studies of government business enterprises found that they were operating below world's best practice levels (e.g. see Electricity Supply Association of Australia 1994; Bureau of Industry Economics 1996). As the Australian economy opened up to increasing levels of international competition, it became apparent that government business enterprises needed to raise their levels of efficiency. This was accomplished by both increasing levels of competition in the utilities sector, but also by increasing the amount of performance monitoring of government business enterprises.

In July 1991, the Steering Committee on National Performance Monitoring of Government Trading Enterprises was created at a Special Premier's Conference. The role of the Steering Committee was to assist in the development of a consistent approach to performance monitoring for government business enterprises across the national, state and territory governments. The gauges used included financial performance indicators (profitability and financial management indicators), productivity indexes, and estimates of economic rates of return. The Steering Committee was especially keen on developing an approach to determining economic rates of return (Australia, Steering Committee 1996). The distinction between economic and accounting returns is a common one made in economics.

Economic rates of return measure accounts for the total returns from an investment, as a percentage of the market value of the enterprise. This measure for a government business enterprise can thus be expressed in the following way:

Economic rate of return =  $\frac{\text{Net cash flow} + \text{change in market value}}{\text{Capital base}}$ 

The calculation of accounting rate of return involves dividing an organisation's profit by the average written-down value (WDV) of the assets.

Accounting rate of return =  $\underline{\text{Earnings before interest and tax}}$ Average total assets

Within the private sector, the economic income from investments comprises dividend and interest streams, as well as capital gains and losses in share and bond prices. For government business enterprises, dividend and interest streams are often observable, but equity is not traded. Asset values and net investment during the year are therefore used as a substitute for the market value and the capital base.

After the achievement of substantial reform of government business enterprises in Australia, including the privatisation of many, the Steering Committee recommended in 1997 that was no longer needed and that it could be disbanded. The Productivity Commission at this time, therefore, decided to continue monitoring the performance of government business enterprises under its general research program, but sought to limit its publication of indicators to financial indicators such as profit margins, returns on assets and equity, debt to equity ratios, total liabilities to equity, and other financial management ratios (removing for instance indicators of productivity and efficiency). These indicators continued until 2008 when the exercise was discontinued (Productivity Commission 2008). Despite improvements in the performance of government business enterprises in Australia since the late 1980s, in its final report the Productivity Commission stated that: "Many GTEs continue to be commercially unsustainable. The majority failed to achieve even the risk-free rate of return" (Productivity Commission 2008, p. III).

For a government business enterprise to remain viable and profitable in the longer term, the price of the goods and services that it provides should be sufficient to cover three main items:

- the operating costs of the enterprise (both the direct costs and overheads);
- depreciation (return of capital); and
- a rate of return on the capital employed (interest costs on debts, as well as some target rate on equity to satisfy the government).

If prices are set below the costs of supply, then there will be an incentive to consumers to purchase more of the product. The proper identification of costs and their use in the setting of prices, therefore, can send a signal to consumers and can replicate the function of markets in the efficient allocation of resources.

Prices should also be set at levels that encourage the economically efficient use of, and investment in, the businesses in question. This involves three elements of efficiency: dynamic, productive and allocative. Dynamic efficiency means that businesses have appropriate incentives to invest, innovate, improve the range and quality of services, increase productivity and lower costs over time. Productive efficiency means that businesses have the appropriate incentives to produce services at least cost, and allocative efficiency means that businesses employ resources to produce goods and services that provide the maximum benefit to society. An important condition for allocative efficiency is that prices for services reflect the value society places on the next best alternative use of the resources used to produce the service

Apart from the overall costs of supply, the allocation of costs and therefore pricing to different consumer groups can raise major equity concerns. In order to avoid cross-subsidisation of one class of customer with another, prices for each group should be based on the cost of providing them with that good or service. In order to determine the overall costs, and allocation of costs, however, the value of assets used for service delivery may be required in deciding both overall and relative prices.

The problems associated with cross-subsidisation can be acute in the case of government business enterprises, in that they are often the subject of political pressures and because they often have some degree of market power. This means that competition can generally be expected to pressure a company to price at close to the cost of provision. If a government business enterprise, however, has some degree of market power, it might be able to maintain cross-subsidies for some time. Most government business enterprises are capital-intensive (e.g. water supply and electricity distribution entities having heavy sunk costs in pipes and wire networks); a factor that is generally reflected in their high asset-to-sales ratios. In such circumstances, asset-related costs (depreciation and a rate of return) constitute a large proportion of the total costs. This leads to three main issues:

- how to value the assets for the purpose of setting prices;
- how to determine the return of capital (depreciation); and
- how to estimate the cost of capital (the return on capital).

Sufficient revenue should be raised by the sale of products to recover the costs of delivery of the services. The process of determining revenue requirements can be shown in the following equation:

 $\mathbf{R} = \mathbf{O} + \mathbf{D} + \mathbf{r}\mathbf{B} + \mathbf{T}$ 

Where R = revenue requirement

O = operating expenditure D = depreciation allowance r = rate of return B = asset base or capital baseT = tax

The importance of asset valuation on price/revenue setting is demonstrated by the B in the equation.

There is an alternative approach to determining the recovery of the cost of capital investment, which is known as the annuity approach. Under this approach, the initial investment is converted into a series of annual receipts, so that the present value of these annual receipts equals the initial investment. That is, the cost of the annuity replaces the conventional method of separately accounting for the depreciation cost and the cost of capital. The rationale behind this approach is that the investment will provide a flow of benefits or services to users over the economic life of the assets. The proponents of this approach, however, consider that pricing decisions will no longer be dependent on accounting identities, which gives rise to questions about the depreciation rate, the asset value and the rate of return.

The main concerns about the annuity approach are:

- the possible over-capitalisation, as returns may be seen to be guaranteed; and
- administrative difficulties given the wide variation in the expected asset lives for infrastructure assets in a particular industry.

### **Depreciation and replacement expenditure**

Depreciation is the loss of value in facilities not restored by current maintenance, which often occurs due to wear and tear, decay, or obsolescence. The annual depreciation expense component of revenue requirements provides for the recovery of a company's capital investment over the anticipated useful life of the assets. The funds resulting from the inclusion of depreciation expenses in the annual revenue requirements are retained in the business, and are available for use as a source of capital for replacement, improvement, expansion of its system, or repayment of debt and redemption of equity.

The cost of depreciation is an estimate of the fall in the economic value of a firm's asset base over time, as its useful life becomes shorter. From an accounting point of view, a depreciation cost is important because it aligns the fall in the asset base's value with the revenue generated by the asset (Deegan 2013).

A comprehensive discussion of depreciation is contained in Deegan (2013), where depreciation is viewed as a process of:

- the allocation of cost; and
- valuation.

Depreciation is a well-accepted accounting practice, and is used to allocate cost (Deegan 2013, Chapter 4). There are a number of depreciation methods which are used in accounting practice, such as constant decreasing or increasing depreciation charges. However, there is no single method of allocating depreciation that is consistently used; that is logical and completely defensible above the other methods. Many authors have noted that allocation of cost is arbitrary (e.g. Deegan 2008, Chapter 4).

Under the concept, depreciation can be measured as the change in the value of an asset that takes place between the start and end of a reporting period. This is, in fact, the concept of economic depreciation. Two valuation approaches to measuring depreciation are outlined: discounted-contributions valuation and current-price valuation.

Depreciation as a process of valuation could involve changes in either value-inuse (i.e. a change in market value) or value-in-exchange. The valuation approach has been adopted in Australian Accounting Standards regarding *Superannuation entities* in AASB 105X and *General Insurance Activities* in AASB 1023. These accounting standards suggest that allocation and valuation approaches to depreciation can co-exist.

Some government business enterprises have reported reduced profits after revaluing their asset base on a written-down current replacement cost basics (see example of Melbourne Water in Table 3.1). Their cash flow from operations, however, is not significantly affected, which raises two questions:

- The first is whether the cash flow measure (profit plus depreciation) or the profit measure (after deduction of depreciation) is the most relevant.
- The second is whether current cost accounting depreciation charged to profits should over a long time match the expected expenditure on replacement, which is necessary to maintain the service provided.

The use of cash flow or profit measures depends on the purpose of providing the information. That is, the cash flow measure indicates that the enterprise is receiving adequate funds to provide for the future maintenance and growth of the organisation. Cash flow ratios are also key financial indicators used by credit rating agencies.

For government business enterprises, however, to have a continued incentive to maintain and invest in a business enterprise, investment must earn an adequate rate of return. Any measure of profitability will therefore need to include a charge for depreciation, to allow for the return of capital invested.

Given the 'lumpiness' of capital investment in most infrastructures, it is difficult to compare depreciation charges and planned replacement expenditure over the long term. Generally, a long-term view should be taken, however, to consider the timing of replacement and depreciation levels.

The return on the capital value is also sensitive to the assumed depreciation profiles. The adoption of longer asset lives, for example, will generate lower annual depreciation charges and therefore higher annual returns. The accounting depreciation policy can therefore have an effect on the cost level in a given year and on the cost profile over time. This is an important issue in the case of a number of infrastructure utilities, where the assets may have potentially long lives.

Annual depreciation should correspond with the rate at which an asset's service generally is used. That is, when an enterprise has a large number of assets which range widely and are of different ages, straight-line depreciation is considered an acceptable approximation on practical grounds. Alternatively, depreciation charges can be based on a particular consumption profile.

For long-lived infrastructure, there is uncertainty, however, regarding the asset lives (e.g. rail track, roads, gas pipelines and dams). In some cases (e.g. telecommunications), rapid technological change also might make it difficult to anticipate the life of assets. In recognition of this, therefore, condition-based depreciation has been proposed and adopted in some cases (Paragraph 4 of Interpretation 1030 Depreciation of Long-lived Physical Assets: Condition-Based Depreciation and Related Methods – September 2007).

For network assets (e.g. water and sewerage systems) that are viewed as having infinite lives, depreciation is sometimes is replaced with an infrastructure renewals charge (as adopted in the English water industry) (Office of Water Services 2007, p. 12). The approach of renewal accounting, however, is not permitted in relation to reporting of government business enterprises (Australia, Steering Committee 1994, p. 62).

From a regulatory perspective, the concern is that asset lives for infrastructure assets have generally been under-estimated, and this has exacerbated the early build-up of cash, long before assets need to be replaced. The extension of asset lives has previously been associated with technological developments, conservative estimates and improved asset management techniques. There is a concern, however, about intergenerational equity, that over-provision of depreciation in the early years may result in the current generation of consumers paying too much for the replacement of assets (Deegan 2013).

### Other issues

Apart from the method of asset valuation, there is an issue of whether rate-ofreturn measures should be based on all assets held, notably on developer funded (or donated) assets and community services investment, and required of a government business enterprise.

#### Contributed and gifted assets

Some government business enterprises receive funds and contributions to build an asset, or receive the completed assets from a developer, customer or other external party. In some industries these assets can be significant. The Sydney Water Corporation, for instance, has estimated that over 20 per cent of its water infrastructure assets were acquired at no cost or nominal value from developers (Australian Society of Certified Practising Accountants & Independent Pricing and Regulatory Tribunal 1996).

In the past there have been numerous accounting practices adopted for capital contributions, including:

- inclusion in the profit and loss as revenue in the year it is received; and
- amortisation through the profit and loss account over the expected useful life of the asset.

Under these two sample options, a government business enterprise technically owns the assets and depreciates them over time. This approach, however, may not be consistent with paragraph 92 of the *Framework for the Preparation and Presentation of Financial Statements* (January 2009), which supports that such non-reciprocal transfers qualify for the definition and measurement of income. ITC 29, however suggests that such transaction may be subjected to measurement uncertainty. Another option is that contributions received from customers towards the cost of capital works, whether for existing or new assets, is netted out against the cost of capital works, and the net amount is depreciated. This method was adopted by some of the Victorian electricity companies in the 1990s before they were privatised (Australian Society of Certified Practising Accountants & Independent Pricing and Regulatory Tribunal 1996).

In recognition that the capital is free, it is logical to exclude these assets from the capital base for rate-of-return consideration. This is consistent with the view of the Productivity Commission, and the earlier Steering Committee on National Performance Monitoring of Government Trading Enterprises, that a rate of return not be sought on private contributions (Australia, Steering Committee 1994, 1996). Given that the government business enterprise will eventually replace these assets, it is appropriate for them to charge an amount equivalent to a return on capital against revenue. The question of whether the reported net asset base should be adjusted, however, will depend on the initial accounting treatment.

The current accounting treatment of the contributed and gifted assets for financial reporting purpose can be found in paragraph 15.1 of the AASB *Property, Plant and Equipment* (IAS 16) (June 2009). This accounting standard provides that where an asset is gifted or contributed to the entity, the cost of the asset is fair value as at the date of acquisition. In contrast, on the basis of the determination of regulated utility prices, contributed or gifted assets are excluded from the calculation of asset base (Productivity Commission 2008, p. 24; National Water Initiative Pricing Principles 2010, p.8).

#### Community services investments

Community service obligations are those activities which a government requires a government business enterprise to comply with that normally would not be economical to produce without government direction or support. The level of these obligations and how they are funded, however, varies from enterprise to enterprise. In some cases, if the obligations are too large to be borne by the enterprise, then they are funded by government subsidies from the overall budget. For instance, in the financial year 2012/13, the New South Wales Government provided a subsidy of \$2,752 million to the Rail Corporation New South Wales (RailCorp), which is the custodian of the state's railway real estate, infrastructure and trains (RailCorp 2013). In other cases, they are funded by the government by cross-subsidies in pricing. In 2012/13, for instance, Australia Post reported that it cost that organisation \$177.5 million to pay for its community service obligations to deliver standard sized mail at a single price to anywhere in Australia regardless of the cost of delivery (Australia Post 2013).

To ensure that an enterprise is not disadvantaged commercially because of government requirements, these obligations should be funded either through cross-subsidies that are explicitly specified, or by paying an appropriate subsidy from the budget. In the 2010s, this is generally the case, and most cross-subsidies are reported in the annual reports of government business enterprises.

If these obligations, however, are not directly compensated, then the rate-of-return requirement is required to be amended through either:

- adjustments to the rate-of-return target
- adjustments to the asset base to exclude community services assets
- adjustments to the business enterprise's income, to impute a value to the provision of the obligation. In this case, the notional net economic cost of the obligation activities would be added to the income, so that the income figure is not distorted.

Obligation-specific assets should be identified clearly, to ensure transparency of the costs of the obligations. Depending, however, on the funding arrangements, adjustments to the rate of return and/or asset base may be required.

#### Ring-fencing

Ring fencing of activities occurs when a portion of a company's assets or profits are financially separated without necessarily being operated as a separate entity. This might be for creating asset protection schemes with respect to financing arrangements, for segregating into separate income streams for taxation purposes, or for regulatory reasons.

Utilities are commonly the subject of ring-fencing where a regulated utility business financially separates itself from a parent company that engages in nonregulated business. This is done mainly to protect consumers of from the extension of monopoly power from the natural monopoly element of an industry to other elements. Regulated and non-regulated elements of an industry can be carried out within a single entity because of the synergies involved in performing multiple elements.

There is a variety of ways that ring fencing can be achieved: legal/organisational separation, financial/accounting separation, information separation, cost allocation etc. In some industries, the separation of non-contestable from contestable services can be formal and distinct, involving structural separation. Structural separation automatically gives effect to the financial separation of contestable and non-contestable activities. However, it may not extend to separate ownership. Instead, it could involve the creation of different companies or legal entities with common ownership. This approach has been adopted in the electricity industries. In such cases, intra-firm barriers may be necessary to strengthen the integrity of the separation process and ensure that business relations between entities are at arm's length.

### **Private sector comparisons**

The adoption of different asset valuation bases has previously caused difficulties in comparing financial performance between government business enterprises and private sector corporations. As most major corporations in Australia are adopting fair value to determine asset valuations, this difficulty might diminish in time, but at the moment some still remain. One outstanding difficulty is that asset revaluations are not undertaken to the same extent in the private sector as in the public. Basically, only land and buildings are generally revalued based on market value.

This can be explained by the following factors:

- Private sector asset lives are often not generally as long as those of infrastructure assets used by government businesses such as water supply and electricity distribution. The acquisition costs of many privately-owned assets are therefore close to a market value.
- Revalued asset values are not allowed for tax purposes for commercial entities.
- For price takers in a competitive market environment, the reported asset values have less significance than for a regulated monopoly.
- Cash flows emphasis management is more concerned with cash flowbased returns than with accounting return, in recognition that cash flow is the main driver for the creation of shareholder value.

Despite the problems associated with making comparisons between government owned enterprises and private sector companies, returns on assets are still commonly used to illustrate the performance of government business enterprises.

One way to study how the manner of asset valuation can affect the financial performance of a government business enterprise is to look at a case study, as is done below.

# **Case study – asset valuation and financial performance of Fremantle Ports**

In the Australian economy, ports are a vital interface between this country and the rest of the world. In an increasingly competitive world economy, it has become more important than ever for Australia to have access to efficient distribution networks. The Exports and Infrastructure Taskforce (2005, p. 13) reported that more than 99 per cent of Australia's exports by weight, and 79 per cent by value leave Australia via sea transport through ports. In the financial year 2008/09, Australia's port throughput was approximately 875 million tonnes of goods, with approximately 87 per cent of this made up of exports (Australia, Infrastructure Australia and the National Transport Commission 2010, p. 9).

In addition, Australia is a geographically isolated country, and because of its physical size, it is dependent on maritime trade for its economic development. Trading activities through the national ports largely shape Australia's ability to achieve higher levels of productivity and development. In Australia, sixty ports handle 95 per cent of the volume of traffic into and out of the country (Infrastructure Australia and the National Transport Commission 2010, p. 10).

Historically, ports have been considered to be 'natural monopolies' due to the presence of scale and scope economies, high levels of fixed capital, immobile facilities (assets), and high sunk costs. While this is true in most cases, in some parts of the country competition between ports exists (e.g. between the ports of Sydney and Newcastle). The long distance between many of the major ports helps to give them market power.

The major ports in Australia face the possibility of being the subject of the country's national access regime that regulates monopolies, because they are considered to be of national significance. In practice, however, they are generally regulated by state-based regulators, as ports have traditionally been operated in Australia by state government authorities. Many are still operated by state government-owned business enterprises.

Port organisations in Australia vary widely, but one obvious similarity exists across most. This is that they have adopted a 'landlord' model of operation, under which they carry out only the core activities of exercising overall control over the port. Landlord ports now dominate, where the port rents or leases sites or facilities to private companies (e.g. stevedoring companies) contracted or privatised services such as pilotage, harbour towage, mooring and unmooring, but still exercises overall control (Productivity Commission 2008, p. 257; Infrastructure Australia & the National Transport Commission 2010, p. 6; Western Australia, Department of Transport 2013, p. 4).

The Fremantle Port Authority, also known as Fremantle Ports, is a government business enterprise owned by the Government of Western Australia. It was established under the Western Australian *Port Authorities Act 1999*. It began originally as the Fremantle Harbour Trust in 1903, established to operate the port facilities at Fremantle. The port is operated largely as a commercial entity and employs over 300 people, and annually handles over 30,000 tonnes of cargo (see Table 4.3). It is geographically located so that it can operate as the major mixed cargo port in Western Australia, and is the only port with container handling facilities in that state. In 2012/13, an estimated 66 per cent of total revenue of the organisation was generated from cargo (Fremantle Ports 2013, p. 124). Table 4.3 provides some non-financial data on the business and its growth in recent years.

Fremantle Ports provides main facilities management services such as shipping scheduling and berth allocation, port communication, and safety issues. Other services such as pilotage are contracted out to Fremantle Pilots, while towage and stevedoring are contracted out to private providers. Two of the five jetties in the Outer Harbour (Kwinana Bulk Terminal and the Kwinana Bulk Jetty) are owned and operated by Fremantle Ports. The other three jetties (Alcoa, BP Refinery and CBH jetties) are operated by private companies (Fremantle Ports 2013, p. 11). This makes the Ports Authority's situation different to similar organisations like those in New Zealand, for instance, where port organisations generally operate stevedoring and harbour towage activities, as well as manage property.

The organisation is required to provide the relevant Western Australian Minister with an annual report, and this report complies with legislative requirements on what needs to be included. The Fremantle Ports' Annual Report is available to the public on its website. Its financial performance is a measure of the organisation's success in meeting the expectations of its various stakeholders (e.g. the users and government), as well as balancing its competing interests. The performance outcomes of the organisation are key indicators of the success of its governance arrangements.

The following financial performance indicators are included in the report: the return of assets, the economic rate of return on assets, the free cash flow, the current ratio and the interest cover. These ratios provided in the annual reports are in line with the Productivity Commission's work on the financial performance of government trading enterprises research paper entitled the *Financial Performance of Government Trading Enterprises 2004-2005 to 2006-2007* (Productivity Commission 2008). The ratios are not audited, but are selected as indicators because they are considered appropriate to be used in evaluating the performance of a government business enterprise such as Fremantle Ports.

	Operating profit (\$000)	Dividend payout (\$000)	WDV of fixed assets (\$000)
2005/06	13,280	na	158,315
2006/07	17,360	4,891	161,340
2007/08	25.379	6,030	173,453
2008/09	19,311	8,940	208,854
2009/10	19,652	6,860	316,548
2010/11	17,127	9,532	397,974
2011/12	28,031	6,146	397,416
2012/13	53,213	10,903	413,298

 Table 4.1: Fremantle Ports – financial performance, 2005/06 to 2012/13

Source: Fremantle Ports, Annual reports

Table 4.1 provides financial performance indicators for Fremantle Ports for the years 2005/06 to 2012/13. Fremantle Ports' operating profit before tax increased from \$13.2 million in 2005/06, to \$53.2 million in 2012/13. Fremantle Ports complied with the Western Australia Government's financial policy, whereby as one of the Western Australian port authorities it is required to pay dividends of 65 per cent of after-tax profits to the Government.

The payment of dividends can be adjusted for special circumstances if this is approved by the Western Australian Government. In accordance with the Australian Accounting Standards and the *Port Authorities Act 1999*, Section 84, \$10.9 million worth of dividends in respect of the financial results for the year ended 30 June 2012 was paid by 30 June 2013 (see Table 4.1).

Year	Return on assets (%)	Economic rate of return on assets	Free cash	Current ratio	Interest cover (%)
		(%)	flow (%)	(times)	
2005/06	8.1	6.0	79.8	1.9	5.43
2006/07	9.6	6.2	87.6	1.7	6.52
2007/08	8.6	5.3	87.1	1.6	9.16
2008/09	12.7	8.2	92.2	2.1	8.45
2009/10	6.9	4.8	94.5	0.8	7.55
2010/11	6.1	4.8	78.8	1.0	3.11
2011/12	9.0	7.2	69.1	1.1	2.91
2012/13	13.5	10.4	72.9	1.4	4.81

Table 4.2: Fremantle Ports – financial performance indicators, 2005/06 to2012/13

Source: Fremantle Ports, Annual reports

Table 4.2 provides a summary of Fremantle Ports' key financial ratios for the financial years 2005/06 to 2012/13. A high return on assets ratio of 12.7 per cent in the financial year 2008/09 indicates a higher operating profit (before tax) in relation to the value of the assets. The return on assets, however, varied over the years, from the lowest (6.1 per cent) recorded in 2010/11 to the highest (13.5 per cent) in 2012/13. A target of eight per cent was set by the Western Australian Government for the year 2012/13. The Western Australian Government requirement is that deprival value be used to determine the target rate-of-return asset valuation. This is in contrast with Fremantle Ports' own use of fair value in its annual reports.

A high return on assets may indicate that the assets are overvalued. In Table 4.1, Fremantle Ports' written down value of its non-current assets as at 30 June 2013 was \$413.3 million.

As with other reporting entities, Fremantle Ports' transition date to AIFRS was as at 1 July 2004. This was the date Fremantle Ports' first fully AIFRS compliant reflected in its financial report for the year ended 30 June 2006 when Australia adopted the International Accounting Standards. Fremantle Ports' financial reports are prepared on an accrual basis and use historical cost accounting. In terms of the assets, property, plant and equipment are recorded at deemed cost, and no revaluations have been carried out since 1998 (Fremantle Ports 2006, p. 83). As of 2013, property, plant and equipment are recognised at their historical cost. Fair value accounting is used if the items are acquired at no cost or for a nominal cost at the date of acquisition. The straight-line depreciation method is used (Fremantle Ports 2013, p. 79).

A return on assets higher than the targeted return suggests that the assets are being used efficiently in comparison with operating profits earned. The Western Australia Government as an investor will not be likely to make further investments in assets if it predicts that the cash flow invested will not repay or provide a sufficient return.

The economic rate of return of the Port is the rate of return earned on average current and non-current assets. The Western Australian Government policy from July 2000 onwards has required that Fremantle Ports report a rate of return on its assets valued using the deprival value approach. The target of the rate is set by the Western Australian Government. In financial year 2012/13, an economic rate of return of 10.4 per cent was a significant increase compared with previous years.

In terms of the free cash flow ratio in 2012/13, there was 72.9 cents (out of every \$1) of net cash flow available as a source of funds from operating activities after meeting interest costs. In terms of the current ratio, there was \$1.40 of current assets available to pay for every \$1 of current liabilities due in the next 12 months. In terms of the interest coverage ratio, the company is able to use its net income 4.8 times to meet interest costs.

Table 4.5. Fremanice Forts non-imaneial indicators, 2005/00 to 2012/15				
Year	Total trade	Average total employment		
	(mass tonnes '000)			
2005/06	25,044	269		
2006/07	25,053	272		
2007/08	26,131	299		
2008/09	26,603	309		
2009/10	26,168	306		
2010/11	26,123	319		
2011/12	28,212	338		
2012/13	31,980	335		

 Table 4.3: Fremantle Ports – non-financial indicators, 2005/06 to 2012/13

Source: Fremantle Ports, Annual reports.

One of the most important features shared by Australian ports is their largely immobile assets (Infrastructure Australia and the National Transport Commission 2010, pp. 11 & 13). Ports' assets are resources that need to be managed sustainably to ensure that the supply of these resources is sufficient to meet demand in the long term. Achieving this requires comprehensive management of the assets. In doing so, a better identification of the future necessary investments in assets that is required.

# Conclusion

For government business enterprises, prices should be set at levels to cover the costs of supply, including depreciation and a rate of return. The case study of Fremantle Ports illustrates the sensitivity of asset valuation for the levels of depreciation and rate-of-return outcomes. In doing so, valuation affects the level of prices to cover costs, especially given the importance of capital assets.

In the 1996 Discussion Paper, the merits of determining an 'economic cost' were discussed, along with economic depreciation and economic rates of return. In the monitoring of government business enterprises in more recent times, financial ratios of the sort popularly used by private sector companies have mostly been used.

At present, most government business enterprises use a combination of assets valued at cost and fair value depending on the types of assets. In most cases, prices should be set at levels sufficient to sustain the physical capacity of the infrastructure assets.

In the absence of market values, it is common for the capital base to be simply rolled forward, incorporating any additional investment, and deducting any depreciation or disposals.

# **Chapter Five**

# **Approaches to asset valuation for price regulation**

#### Introduction

The valuation of assets plays an important part in the price regulation of government utilities (electricity, gas supply, telecommunications, rail and water supply). As most utilities are capital-intensive, the recovery of capital costs from pricing, and therefore revenue streams, is very important to ensure sufficient investment is maintained in the utilities industry. Pricing therefore needs to be established at levels that enable a level of revenue sufficient to provide a reasonable return on capital invested.

This need to set prices at levels sufficient to generate a reasonable return, however, has to be balanced with the concern that utilities organisations might have a degree of market power they can use to exploit consumers. This balance is true regardless of whether the utilities are government or privately-owned.

It is for this reason that in a number of countries, privately-owned utilities have been the subject of some form of price regulation for a long period of time (e.g. the United States, Canada and Japan). In Australia, most utilities were government-owned before the 1990s (the most important exception being the gas supply industry in many state capital cities), and were therefore left to set prices through political decision-making.<sup>3</sup>

Since the 1990s, many utilities in Australia have been privatised and regulatory arrangements have been established to regulate the prices of access to the monopoly components of these industries. As most of the utilities that have remained in government hands have been corporatised (i.e. established as corporately separate, commercially-oriented organisations), they have also been subjected to price regulation.

In order to review how asset valuation techniques impact price regulation, it is important to examine price regulation in both Australian and international contexts. In this chapter, therefore, a general background is provided on the nature of the relationship between regulated pricing and asset valuations, and is then followed in Chapter 6 by an examination of asset valuation approaches used in both Australia and overseas.

<sup>&</sup>lt;sup>3</sup> Butlin, Barnard and Pincus (1982). In Australia, the privately-owned gas supply industry was the subject of economic regulation throughout the twentieth century. This regulation was first introduced in 1912 by the New South Wales Government for the Sydney gas supply industry (Abbott 2013).

# Natural monopoly

Traditionally, regulation of pricing by governments has been concentrated on utilities that are regarded to have some degree of monopoly power. The Oxford Dictionary defines a monopoly as being the: 'exclusive possession or control of the supply of or trade in a commodity or service'. The word 'monopoly' itself originated via Latin from the Greek word 'monopolion'; 'monos' means 'single' and 'polein' means 'sell'. For example, in Australia, Australia Post has a legislated monopoly on all standard sized letter services (Australia Post, Customer service charter). In contrast, some utilities (or segments of utilities) are regarded as having 'natural monopoly' characteristics. A natural monopoly is a condition where the lowest long-run average cost is achieved, when production is served by a single and largest supplier of the entire market for a particular industry.

The origins of the concept of natural monopoly usually are attributed to the English philosopher and economist John Stuart Mill and his publication *Principles of Political Economy*, first published in 1848. In this work, he made specific reference to network industries (e.g. gas, roads, rail, canals and water supply) as being "practical monopolies". Mill's description of natural monopolies fits with the modern definition of this term, as he claimed that government is partly in control of the business or retains power over it if it owns or regulates its prices.

In more recent times, Posner (1969, p. 548) suggested that natural monopoly is a particular relationship between demand and the supply technology used. In addition, Kahn (1971, pp. 119-123) described natural monopolies as the inherent tendency to decrease unit cases over an entire range of a market. The general characteristics of a natural monopoly can be comprised of large fixed investments, fixed and essentially immovable connections between customers and suppliers, and the obligation to provide an instantaneous supply of the product even if there are wide fluctuations in demand by customers for the service. Posner also argued that network effects could lead to subadditive costs, and that when more customers are connected to the network, cost per customer will increase as more are connected to the network. This means that average costs per customer will increase, although it still may be more efficient for a single enterprise to supply the network service.

Kahn (1970, pp. 119, 173) argued further that both the existence of economies of scale and fixed or sunk costs can contribute to the absence of competition within a natural monopoly business, resulting in single firm production rather than the existence of a small number of firms. Kahn stressed that where economies of scale can be achieved, there is often a related effect in the form of potential social costs associated with 'duplicated facilities'. That is, a combination of economies of scale and sunk costs will allow a natural monopoly to emerge in the market. Carlton and Perloff (2004, p. 104) maintained that a natural monopoly is a single firm in a market, whereby total output costs would increase when two or more companies produce the same service.

These researchers all stressed that in terms of an enterprise's cost function, it would be more efficient for a single firm to produce the service, assuming that costs are lowest based on the same technology and input prices. By adding one more customer, the enterprise's revenue will increase and the average cost of providing services to customers will decrease. As long as the natural monopolist's average cost of serving customers is decreasing, a single large firm can efficiently serve the entire customer base efficiently.

Baumol (1977, pp. 809–810) not only formalised but also extended the definition of a natural monopoly. He established that a natural monopoly is an industry where multi-enterprise production is costlier than the production by a single monopoly firm. That is, a single company can produce to supply a service to the entire market at a lower per-unit cost compared with two or more firms (subadditivity of the cost function). Baumol linked the definition of a natural monopoly to the mathematical concept of the subadditivity of the cost function. He claimed that: "scale economics (are) neither necessary nor sufficient for a monopoly to be the least costly of productive organisation". According to Baumol, economies of scale are not a necessary but instead a sufficient condition for subadditivity. This theory demonstrated that economies of scale do not, on their own, constitute a barrier to entry. In order for economies of scale to deter entry, they must be associated with sunk costs, that is investments made in longlife physical assets.

Since the early 1990s in Australia, the emphasis when looking at natural monopolies has been to identify those that are 'uneconomic to duplicate' and which are important bottlenecks. Under the National Competition Policy, the federal and state governments are expected to promote competition in markets as much as possible, and subject to price regulation those infrastructure facilities that are natural monopolies and for which access to is essential for the promotion of competition in related upstream and downstream markets (Productivity Commission 2014). In the rail industry, for instance, it is access to the rail track and terminals that is considered to be the bottleneck facility, and above-track rail freight trains that have the potential to operate competitively if access to the track infrastructure can be arranged (Australian Competition and Consumer Commission 2008).

Across all markets, prices and profits are the signals which indicate to investors and business managers the market forces of demand and supply. At the same time, competition creates a mechanism that promotes the greatest level of efficiency. In doing so, competition is a mechanism which helps to promote community welfare. Competition policy, therefore, is not about encouraging competition to exist for its own sake, but rather it seeks to facilitate effective competition in the interests of economic efficiency and community welfare.

While access to monopoly elements aide entry to downstream and upstream markets and competition in these markets, the monopoly element service provider may still be able to capture monopoly profits through its selection of pricing arrangements for access to the bottleneck facility. When this occurs, then the full benefits of access and competition, in terms of economic efficiency (in particular allocative and dynamic efficiency) and welfare benefits for final consumers will not be created. Therefore, potentially regulation becomes an important component of the creation of efficient outcomes.

Laffont (1994, pp. 507–508), and Loeb and Magot (cited in Pardina, Rapti & Groom 2008, p. 2) identified a framework of regulation as being a type of application of the principal-agency problem, which is based on the contractual relationship between a principal – in the form of the government or the regulatory institution – and an agent, which is the regulated monopoly enterprise. Williamson (1976, pp. 73–104) and Schmalensee (1979, pp. 151–170) both maintained that regulation can be either an explicit or implicit contract between the regulatory authorities, suppliers and consumers.

In competitive markets, an efficient supply is assumed. In the case of a monopoly market, a regulated supplier enjoys a stream of residual income, which depends upon the costs it incurs, relative to the prices that it would set under a contestable market. The regulator which regulates the supplier has to balance the legitimate business interests of the owner against the rights of access seekers and users to efficiently price services. These competing interests can impact prices and the incentive for investment in essential infrastructure. Prices must therefore be set correctly; otherwise incorrect signals will be sent to both investors and consumers, resulting in a less than efficient allocation of resources.

Where natural monopoly exists, the regulatory goal is to improve the incentives for owners so that their behaviour is more closely aligned with those in a competitive market. The key task of the regulator is to balance these interests. In balancing these interests, regulators should be conscious of ensuring that investors receive an adequate return on their investments. This, in turn, would mean that the valuation of assets has for a long time constituted an important part of the regulatory process.

In determining prices of regulated services, the regulators are concerned with a range of different factors including the need to:

- protect the interests of the users of regulated services, in respect of prices and service standards;
- promote economic efficiencies; and
- promote competition between suppliers which may involve access to certain infrastructure facilities.

Depending on the overall regulatory framework adopted, economic regulators may also consider other factors such as the protection of the environment to ensure ecologically sustainable outcomes. The challenge is to balance these often conflicting demands.

# Regulation

The practice of the regulation of monopolies was mostly developed in the United States, and through most of this process the valuation of assets has played a central role. Although the regulation of monopolies pre-dates the 1930s in the United States, it was not until this time that the notion of what constituted a 'public utility' was generally accepted as being legitimately regulated by either state, federal or municipal authorities. Prior to the 1930s, government price regulation was constitutionally narrow; the landmark case being the *Munn v. Illinois 94 U.S. 113 (1877)*. In this case, the Supreme Court upheld legislation which had been proposed by the National Grange to regulate the rates of railroads owned by grain elevators. Under this legislation, the grain elevators and warehouses in Chicago were required to obtain licences, and then to charge prices which did not exceed specified levels.

The most important factor in the Court's decision was that the ownership of these facilities constituted a monopoly. The Court declared that the business interests (in this case private property) that were being used for public good needs could be regulated by the government. It was after the *Munn* case that state governments were permitted to regulate utility businesses such as railroads; this case was also regarded as a milestone in the growth of federal government regulation in the United States. Bonbright (1961, p. 8) argued that legally the product had to be 'important' or 'necessary', and the production technology had to have natural monopoly characteristics.

Another leading case in the United States was *Smyth v. Ames 171 U.S. 361 (1898)*. The case was argued on 5–7 April 1897 in the Supreme Court of the United States. In *Smyth v. Ames*, the Court made void a schedule of railroad tariffs, and then went on to define the constitutional limits of governmental power to regulate railroad and utility rates. In doing so, the Court found that the regulated industries were constitutionally entitled to earn a 'fair return' on the 'fair value' of their business. Under the fair value rule, a governmental regulator was not only required to determine a so-called 'rate base', which means the present value of the enterprise's assets, but also had to allow the company to charge rates sufficient to earn a normal return on that value. Three approaches for asset base valuations were also identified from the decisions of this Court case: historical cost, market or fair-value and replacement cost.

The *Smyth v. Ames* decision, however, was subjected to criticism at the time, and since, mainly because it was felt that application of the fair value rule was impractical, given the complex administrative proceedings required to determine the current value of utility assets as the rate base. The problem of 'circularity' was also identified. That is, it was illogical for a utility's value to be determined by its rates, as it is impossible to set rates according to an enterprise's value, since that value cannot be determined until the rates are known. Despite these criticisms, the decision in *Smyth v. Ames* was adhered to and set the constitutional

limits of rate regulation for over 46 years in the United States. This notion of fair value remained until it was overruled in *Federal Power Commission v. Hope Natural Gas Co. 320 U.S. 591 (1944)*.

By 1944, the United States Supreme Court had accepted that the problem of circularity existed – that is, fair value is the end product of the process of ratemaking and not the starting point. This meant that rates could not be set to depend upon a fair value when the value of the enterprise was dependent on earnings under whatever rates may be anticipated. Put differently, the original intention was that the rate base should be used to determine asset value, not the other way around.

Following the *Hope* decision, there was no specific asset valuation methodology adopted for utility businesses' regulated assets. The decision ended not only the Supreme Court's role in settling disputes between regulators and the regulated enterprises, but also put an end to the use of fair value as the appropriate asset valuation methodology. In practice, the decision as to which asset valuation methodology needs to be used was henceforth left to the regulatory commissions that had been established.

Today, the United States Supreme Court's judicial precedents influence subsequent utility regulation in the United States, and have been adopted by regulators in the United Kingdom and Australia. Similar principles were also confirmed in the Supreme Court of Canada in *British Columbia Electric Railway Co. v. Public Utilities Commission, [1960] S.C.R. 837.* 

Traditionally in the United States, rate-of-return regulation was used to set prices for utility businesses. This approach allowed utility businesses to charge prices that provided them with a maximum allowable revenue cap. The business was generally given a review period of three to five years to recover relevant costs, and was also allowed to recover its asset value through depreciation charges (return of capital), and earn a return on the outstanding balance. In theory, this approach sets prices that recover, fully, the most efficient costs of service provision, including the significant impact of consumption behaviour and investment activity. This is the reason why capital charges were said to allow 'a return of and on' the asset base. The regulator was expected to increase prices whenever the organisation's revenue requirements rose under rate-of-return regulation. Price control was intended to last for a defined regulatory period, usually between three and five years, regardless of what happened to the enterprise's costs. It was, however, possible for the utility businesses, being natural monopolies, to meet targets simply by increasing prices and revenues, or by reducing the quality of service, rather than by seeking the most efficient methods of production (Temple-Heald 1991, p. 12).

In Australia throughout the twentieth century, most utilities were governmentowned and were not the subject of rate-of-return regulation. The major exception to this was the gas supply industry, which was operated by private companies in a number of major urban centres. In most cases these utilities companies were subjected to rate-of-return regulation, where they were allowed revenue calculated to cover a specific rate of return on their assets plus operating costs. Assets were valued at historical costs and straight-line depreciation was used (Abbott 2013).

In the United States, Averch and Johnson (1962, pp. 1052-68) concluded that the regulated business operates inefficiently because the social cost is not minimised at the output the business selects. They claimed that it is difficult to determine the correct rate of return, as there is a poor incentive for cost reduction, and the regulatory practices provide an incentive for a business to operate even at a loss, as certain activities are considered to be public knowledge and can be subsidised. Averch and Johnson argued that as pricing was based on the value of the asset base there was a tendency for regulated companies to over-invest in the capital base. This tendency was later referred to as "gold plating".

Concerns arose about the impact of rate-of-return regulation on the efficiency of utilities, which led to the development of the more incentive-based price cap approach. Incentive-based price capping (in the form of CPI-X – where X is an achievable efficiency gain) was developed in the United Kingdom in the 1980s (Pollitt 1999) for use in regulating the privatised British utilities. Price cap regulation fixes prices for extended periods of time, and then allows returns to the company to fluctuate, but eventually resets the price cap to produce a desirable return. In recent practice, incentive components have been incorporated into the rate-of-return approach, making the practice of price control in many jurisdictions a hybrid of the two. There are examples of both approaches being used in Australia, as well as examples of the two being used in combination.

### **Cost-based rate-of-return approach**

As previously mentioned, the traditional method of determining prices was the cost-based rate-of-return approach, which was previously heavily used in the United States. This approach to pricing makes use of a cost-of-service estimation in determining allowed revenue to flow to the regulated enterprise. This means that the owner of the asset is permitted to set its prices, so that they generate no more than a specified, regulated return that covers the cost of providing that service.

The regulator, in establishing the allowed revenue stream, first would first determine what the cost of providing the service is. These costs would include such items as the operating, maintenance and administrative costs, as well as a return of capital (depreciation) and a return on capital. In using this approach, the regulator would become directly involved in the determination of a rate of return that is allowed for the capital invested, which in turn means that the infrastructure owner's capital stock needs to be valued to form what is known as the 'rate base'. The regulator also needs to determine a specified rate of return.

To make use of this approach, the return on capital (or a methodology for deriving it) and the value of the asset base to which it is applied (and the methodology used for valuing the asset) need to be established. Finally, the methodology used to calculate the return of capital (depreciation) would need to be determined. Although this approach means that all costs are calculated and covered, it has generally been historically referred to as 'rate-of-return' regulation because of the emphasis on the return needed to cover the costs of capital (NERA 2014).

Problems can arise if a requirement is set that revenue strictly complies with the cost of service. The main problem is that it may create an incentive for the asset owner to deliberately choose an inefficient mix of productive inputs. This is the so-called 'Averch-Johnson effect'. That is, if the asset owner increases their investment in physical capital, which in turn raises the value of the rate base, then the allowable revenue will rise.

In the past, different measures have been undertaken to minimise these adverse incentives. The most common measure is to use forecasts of the future cost of the service to establish a revenue cap, or a corresponding price cap. Within this constraint there are, therefore, incentives for the owner of the assets to minimise their production costs and avoid over-capitalisation in order to improve profitability. This revenue cap might also incorporate an incentive mechanism, such as CPI-X or some variant, to create pressure to further improve levels of efficiency.<sup>4</sup>

In Australia where this approach has regularly been used, regulators use a building block methodology to determine allowed revenues (NERA 2014). Expressed in its simplest form, the building block approach is illustrated as follows in Figure 5.1:

<sup>&</sup>lt;sup>4</sup> As is the case in the National Electricity Code; see Australian Competition and Consumer Commission (1998c & 1999a).

#### Figure 5.1: The building block equation



MAR = maximum allowable revenue WACC = post-tax nominal weighted average cost of capital RAB = regulatory asset base D = depreciation OPEX = operating and maintenance expenditure

An annual forecast of the revenue requirement is generally calculated, based on an estimate of funds the enterprise requires to efficiently deliver its services to consumers and to meet its regulatory obligations. Some common characteristics of the building block approach are as follows:

- the use of periodically reviewed price caps, which include a fixed duration (generally between three and five years) to recover the revenue requirement;
- the use of a two-part tariff in the case of some services (made up of a fixed service availability tariff and a variable volumetric tariff);
- the use of inclining block tariffs, where the variable component of charge is set to two or more usage blocks, with increasing prices as consumption increases;
- the use of postage stamp pricing, where uniform prices are charged to customers in different geographical regions or across different customer types; and
- the use of developer charges, where users pay upfront charges to the enterprise to cover the infrastructure costs incurred in meeting new developments.

The revenue cap is another indirect method to control the prices. With this form of control, the maximum revenue allowed to be received by the asset owner is set at the commencement of a regulatory period, and it is up to the owner to adjust prices, quantities or costs, as long as revenue does not exceed the stipulated revenue cap. This approach provides the enterprise with an incentive to improve its efficiency; however, it can also be a disincentive to sell more of its service.

This form of control has been known to be problematic because the provider is exposed to the risk of unexpected increases in demand, and in such cases the asset owner must be able to meet any new demands by either lowering the costs or the price below its revenue requirements to stay within the cap (Australian Competition and Consumer Commission 1999c). On the other hand, when demand is lower than expected, the provider would have an incentive to increase prices, which would impose additional costs on consumers.

# **Price caps approach**

Under the price cap approach, maximum prices are set that the owner of a regulated asset can charge for its services. The price cap then applies for a defined period; typically for between three and five years. The asset owner can then retain all the extra profits that they have generated by reducing the operating costs of the enterprise over the regulated period. After the period has ended, the price caps are generally reviewed.

Price caps have the advantage that they can be adjusted for the effects of inflation and for any expected future cost savings when they are reviewed. Because of the inflation component, the price cap approach is often called 'RPI-X' (in the United Kingdom) or 'CPI-X' (in Australia and the United States). The price caps are adjusted automatically for inflation, as measured by the retail price index (RPI) or the consumer price index (CPI). They can also be adjusted by reducing prices in line with any expected future cost savings caused by potential rises in productivity (X).

The X factor is generally estimated as an expected productivity improvement in excess of those for the general economy as a whole. In Australia, this approach has been used to determine the prices of airport services (Australian Competition and Consumer Commission 1998b) and in the past for some of Telstra's retail telecommunications services,<sup>5</sup> and is currently used for the government-owned water sector in the Northern Territory (Utilities Commission 2013).

Price caps possess a few advantages. Most importantly they provide an incentive to the regulated enterprise to reduce costs. Price caps also have the advantage that they are relatively simple to apply, particularly where existing prices are used as a starting point.

<sup>&</sup>lt;sup>5</sup> The initial price cap on Telstra (1989 to 1992) was applied to a weighted basket of services which comprised line rental plus local, STD and international calls. After the initial three year period several other services were added to the basket, the X-factor was changed and caps were introduced for some services within the basket, as well as the cap on the basket. Later the emphasis in telecommunications regulation shifted from retail services to wholesale services. Price caps tended not to be used for regulating wholesale prices.

The RPI-X price cap approach was developed in the United Kingdom in the 1980s, in order to avoid the problems that were associated with trying to base prices on estimates of costs. In practice, however, price caps still needed to be related in some way to the costs of providing a service. Often the way in which that occurred was to use a cost-based approach to determine the prices of a regulated company in a base year, and then apply a CPI-X price cap in each succeeding year. If this did not take place, and existing prices are instead used as the base point for the price cap, then a regulator would need to be satisfied that these prices reflect efficient costs, or alternatively that the X value that is set is at a level for a convergence towards efficient costs over time.

One of the disadvantages of the price cap approach (or indeed most types of price regulation) is that in providing an incentive to the company to cut costs, it may also provide an incentive for the regulated company to cut service quality as well. Quality monitoring is therefore generally undertaken as part of the price cap approach. In addition, a regular review process is often incorporated which involves a review of historical costs and profits. This is because price cap regulation can hold down prices for services that are not subjected to competition.

Incentive-based price caps were first introduced by the British Government to regulate British Telecom in 1984. Sappington et al. (2001, pp. 71–79) reported that the first price cap regulation was introduced in 1992 for the United States telecommunication markets when the markets became increasingly competitive because of technological change. In Australia the price cap regulation was first used to regulate Telecom in 1989, with a CPI -4 per cent formula. The scheme was applied to regulatory periods of every three years after July 1989 (Australian Competition and Consumer Commission 1999b).

The price cap approach is prescriptive where in those specific services are set for the term of the regulatory period, with explicit efficiency factors built into the price path. In applying this approach, one advantage is that it provides some price-certainty for the regulated company, along with a strong incentive to improve efficiency. The regulated company, however, is unlikely to make price adjustments in response to changes in demand or its operating costs over the regulatory period. Price caps are similar to a revenue cap in that the price cap may be applied to particular customers or services.

In addition to price caps, a weighted price approach may be undertaken. This approach to price control means that price increases are set on the basis of a weighted average of the prices of a basket of services. Generally, the weights are based on the actual quantity of service sold, and they are fixed with reference to a base year. Instead of prices being regulated, the weighted average revenue cap approach of control limits the provider's average revenue. Prices can be rebalanced, as long as the adjustment does not exceed the average revenue cap set originally.

The weighted cap normally is established on the basis of a benchmark revenue requirement set by the regulator. This is set in conjunction with using a demand forecast. A weighted average revenue cap indirectly controls prices by placing a cap on the average level of revenue. The purpose of this approach is to allow the regulated enterprise some flexibility, in order to adjust the prices and quantities of different services supplied. However, one of the disadvantages of having increased price flexibility is that there might be greater price volatility for customers. Yet this approach to price control does not restrict the company from expanding its customer base if it wishes to.

One jurisdiction that has opted for a weighted average revenue cap to regulate prices is the Independent Competition and Regulatory Commission in the Australian Capital Territory (Independent Competition and Regulatory Commission 2008).

# Asset valuations

The cost-of-service rate of return and price cap approach require the establishment of a capital value or rate base for the purposes of rate of return, either explicitly under the rate-of-return approach or implicitly under the price cap approach. Both also involve the examination of the cost structure and assessment of the appropriate rate of return. The difficult question concerns the capital or asset base to which the rate of return needs to be applied.

Regulatory prescribed accounting may therefore be required for regulated enterprises. This special purposes reporting, however, does not necessarily solve the question of establishing the capital base for rate-of-return considerations. There is evidence of significant discrepancies between accounting-based asset values and regulatory capital values based on the market capitalisation of these privatised utilities.

In the absence of a market value for enterprises that are under government ownership, a regulator has to consider:

- what are the practical solutions to establishing asset values; and
- how will GAAP apply in the context of a regulatory environment.

The primary purpose of any regulatory framework is to integrate all of the elements, components and issues which the regulators will need to address in establishing the regulatory asset base value. The framework is expected to highlight the effects of price regulation on asset accounting for regulated enterprises.

In conceptual terms, the components for establishing a framework for regulated asset values are:

• objective asset values (to achieve harmony with pricing objectives);

- basis of measurement (assessment criteria and alternative methods);
- relationship with accounting asset values (i.e. net book value);
- applicability to rate-of-return regulation considerations; and
- asset reporting by regulated enterprises.

In principle, the price determined should satisfy four principal criteria:

- economic efficiency that is, that the prices determined to reflect efficient costs;
- sustainability of the enterprises existing infrastructure system (maintenance of service capability) that is, whether the projected cash flows are adequate to sustain the enterprise over the longer term;
- financial attraction for investment in new capacity; and
- equity between customers (current and future) and investors.

The regulator needs to take account of the interests of both customers and shareholders. Prices should be set to provide a return of capital and a return on capital.

# **Regulatory issues**

In considering an appropriate method to measure the assets of capital base, the key regulatory issues are:

- selection of the regulatory asset value;
- consequential effects on the calculation of depreciation charges;
- relationship between depreciation and replacement expenditure;
- compatibility between the regulatory asset base and the return to be applied to the asset base;
- implications of ongoing asset revaluation on price regulation;
- accounting for over-capacity, over-design, gold-plating and the consequences of past decisions; and
- non-commercial/public assets for community service obligations.

The accounting for over capacity and excessive asset expenditure can be a controversial one (point six above). In infrastructure industries, it is often considered good practice to deploy a reasonable amount of spare capacity to meet peak periods, or in some instances to make preparations in anticipation of a future technology upgrade. The key question then becomes what level of capacity is regarded as "over engineering" and what levels is regarded as reasonable. Views on this may differ.

In general, government business enterprises have a high proportion of long-lived assets that have been purchased at different points in time and are subject to different price levels. Historical cost figures, therefore, may have a limited application under these conditions.

The use of estimated replacement values, however, to set prices may give undue discretion to government business enterprises, or require detailed regulatory involvement in the valuation of assets. Depreciated optimised replacement cost (DORC) is, therefore, a preferred method, which enables the regulator to eliminate over-investment, gold-plating and any inefficient past investments (Australian Competition and Consumer Commission 1999c).

Market values, if available, are the best-starting points to establish the value of existing assets for price regulation. If market values are not available, asset values may be determined based on independent valuations, such as the present value of the estimated cash flows of the business.

The business's present value of estimated future cash flows using a discount rate commensurate with the risks involved is in many cases an appropriate measure of the value of assets. However, the complexity is that the regulated price can change the value of an asset. For instance, a regulator may exclude certain assets from the asset base of a rate-of-return calculation. In such circumstances, the economic value of the asset or the carrying amount (in accounting terms) will be reduced.

To, therefore, derive an initial asset value, the circularity problem of asset value rate-of-return income may be solved by assuming that prices are maintained at present levels. That is, using current price levels may result in economic values lower than DORC. The difference may be substantial for government business enterprises, especially if:

- the enterprise currently is earning a return on existing assets below their weighted average cost of capital; and
- there is an inclusion of assets in the DORC that does not generate income.

The possible gap between the economic valuation and the DORC can occur if charges to customers have been set by a government business enterprise or utility company at a level less than a full rate of return.

A choice must, therefore, be made when setting charges, between accepting market valuation and applying a rate of return on book value. In the case of using a market valuation, which is significantly below that of the accounting book value, allowing a full rate of return (equal to the market cost of capital) on higher replacement costs would lead to a substantial windfall to the government owners, at the expense of the customers of the business. Yet, this would not necessarily improve the effectiveness of economic signals.

Many infrastructure assets owned by government business enterprises have little or no resale value unless in their use as a network or system. In the absence of market-based valuation, the optimised deprival valuation, together with the economic value test, is a feasible possible option. That is, if the company is subsequently privatised, market capitalisation would be based on investor perceptions of the value of its projected future earnings. To make an assessment of the value of the company, investors would inevitably apply some level of discount to reflect their perceptions of risk. Effectively, this risk would be that the company's profitability may not be sustained because the implied level of higher charges may not be sustained. Under such circumstances, it is possible to have a lower market value than DORC.

Flowing from determination of the appropriate asset base is the calculation of depreciation. Depreciation affects the assessment of the asset's useful life, the reported value of the asset base, and the method adopted for assigning depreciation to individual years (e.g. straight-line or declining balance). From an accounting point of view, a depreciation charge aims to match the decline in value with the revenue generated by the asset base.

Regulators often link the level of depreciation to the level of funds required to finance replacement expenditure. Depreciation based on current valuation (e.g. replacement cost accounting) is often seen as a broad indication of the quantum of funds required for asset replacement over time. Depreciation is explicitly allowed for in a regulated environment, and is matched by a corresponding cash inflow. For long-lived assets, this implies a significant build-up in cash in the years leading up to the eventual replacement of assets.

In considering the appropriateness of depreciation charges, the economic regulator needs to consider the following:

- whether depreciation represents the economic cost of service;
- whether the depreciation charge represents a surrogate for replacement capital expenditure, which means that depreciation charges are sufficient to cover necessary replacement expenditure that is, funding for the replacement of the asset base for the business; and
- whether the depreciation charge is appropriately calculated from an accurately valued asset base, making appropriate assumptions on the lives of the assets.

The lives of infrastructure assets have generally been underestimated, and this has exacerbated the early build-up in cash. The extension of asset lives has instead been associated with technological developments, past conservative estimates and improved asset management practices. For network assets, it is unusual to replace the whole network in one year.

The lifetimes of assets have often been under-estimated, and this has created challenges for regulators and pricing decisions. The assets may have been fully depreciated, even though they are still generating returns. This has been one of the major factors behind the decision of regulators to move to using forward-looking costs when regulating legacy networks. The economic regulator also needs to consider issues associated with determining replacement costs. If technological change is occurring definitions of the modern equivalent assets may

be an area of dispute. This has been an area of controversy in the case of telecommunications but less so in other infrastructure industries.

In the past, accounting standards did not specify a particular asset valuation method; and written-down replacement cost was widely adopted by most government business enterprises in Australia. In more recent times, however, fair value techniques have been increasingly adopted in line with international practices (see Table 6.2 in Chapter 6).

For administrative simplicity, it is desirable that the valuation method used for the regulatory asset base be consistent with the accounting valuation. If the regulatory valuation measure is significantly different from that adopted for accounting purposes, there will be a need for the reporting of a separate set of regulatory accounts for pricing purposes.

Some considerations in assessing the composition of the asset base for price regulation are:

- the treatment of customer funded and donated assets;
- the inclusion of works in progress;
- excess capacity;
- gold-plating;
- stranded assets;
- uneconomic investments;
- capitalisation policies; and
- accounting for externalities.

From the regulatory perspective, the following assets should be eliminated from the government business enterprise's asset base for rate-of-return considerations

- assets funded by customers
- community assets
- assets for non-regulated activities.

Even though it may be a regulator's intention to use accounting book values for rate-of-return considerations, it is more desirable to link the regulatory asset value with the balance sheet net book value reported in the financial statements. This is because the accounting returns are widely applied and are very often used to compare with the financial targets set by the government.

A regulator may also wish to explain its decision in terms related to balance sheet returns. To do this, the first step is to identify the accounting book value of eligible assets to which a return is allowed to be earned, and then to reconcile the book value with the regulatory asset value.

While the regulatory asset value, however, does not necessarily conform to reported asset value in general financial statements, it is important to understand the relationship because it helps to explain the difference in the rate of return assumed by regulators in various jurisdictions. The reconciliation between regulatory asset values and accounting book values can be a complex exercise involving adjustments and examination of accounting practices.

# Conclusion

Typically, price regulation is applied to those enterprises that possess some natural monopoly characteristics. In Australia, this type of regulation now applies to both privately and government-owned organisations. The two main approaches used are either a cost-based rate-of-return approach or a price cap approach. In Australia, the former is the most common approach used; often referred to as a 'building block approach'.

A cost-based approach requires that some estimation of the regulatory asset base be made, which in turn makes the issue of the manner in which assets are valued a very important one. That said, in recent years even the price cap approach has led to important discussions over the valuation of assets.
# Chapter 6

# Examples of approaches to asset valuation for price regulation

## Introduction

When the 1996 Discussion Paper was published, the introduction of the National Competition Policy was only just taking place. This meant that the types of examples in the Discussion Paper of asset valuations in the context of pricing arrangements mainly came from overseas (i.e. the United States and the United Kingdom). The notable exception was examples of the work undertaken by IPART NSW.

Since 1996, an extensive array of work has been conducted by economic regulators in Australia on the valuation of utility assets and its relationship to the pricing of these facilities' services. There has been the establishment of a number of states, territory and federal government regulatory bodies with responsibility for setting prices of monopoly infrastructure facilities.

Through the same period, it should also be borne in mind that a great number of government business enterprises were privatised, and although they are still the subject of regulation, in many cases they are so today as privately-owned companies. This means that the range of companies regulated as government-owned is narrower than it once was, dominated now by water companies, ports and electricity transmission/distribution firms.

The valuation of assets as part of the regulatory process was envisaged by the authors of the Discussion Paper to have a far-reaching effect on government business enterprises within the context of cost recovery policy and price setting. In light of the previous experience of asset valuations since 1996, it is possible to review the experiences of Australian regulators, as well as provide additional examples from overseas regulators. The purpose of this chapter is therefore to provide a review of the changes that have occurred in the ownership of Australian utilities, and competition policy, and to then provide examples of the manner in which government business enterprises are regulated in terms of price, and the impact that asset valuations have had on this.

## National Competition Policy (Australia)

In 1992 an independent committee of inquiry, the National Competition Policy Review Committee, was established by the Prime Minister Paul Keating, to inquire into and provide advice on possible changes to legislation and other measures in relation to the scope of the *Trade Practices Act 1974* and the application of competition policy. The review was commissioned at a time of major microeconomic reform, which had caused major changes in a number of areas, but seen slow progress in some areas because of the constitutional limits on the application of the Australian Government's *Trade Practices Act 1974*, and the operation of business enterprises owned by the federal and state governments. This review was to have important implications for the manner in which government business enterprises were to operate in the future.

The Review Committee presented its report (commonly referred to as the 'Hilmer Report' after its Chairman Fred Hilmer) in 1993, and its principal recommendations were as follows:

- To bring all commercial activity in Australia within the purview of the *Trade Practices Act 1974*, regardless of legal form or ownership of the enterprise; thus putting to an end anomalies arising from the division of constitutional authority between the federal and state governments.
- To establish a set of principles which all governments should adopt, the most important of which were: (a) legislative or regulatory impediments to competition should be subject to review to ensure the costs associated with reduced competition were exceeded by public benefits; (b) before engaging in commercial activity, state-owned entities should be subject to 'competitive neutrality' requirements to address distortions to competition arising from their various policy privileges.
- To reform the organisational arrangements of competition policy in Australia, by expanding the role of the Trade Practices Commission (to be renamed Australian Competition and Consumer Commission) and establishing a Competition Policy Council to advise on issues arising from the intergovernmental arrangements.
- To establish a new regulatory regime, to prevent enterprises that controlled an 'essential facility' with natural monopoly characteristics from abusing their market power. The new 'access regime' was to be part of an expanded *Trade Practices Act 1974* (National Competition Council 1998).

The Report's recommendations were endorsed by the federal and state governments in their entirety, and the recommended changes to the *Trade Practices Act 1974* were implemented. The Report was also used as the basis for the negotiation of the Competition Principles Agreement, which was concluded at the 1995 meeting of the Council of Australian Governments (COAG), and the associated *Competition Policy Reform Act 1995*.

The main objective of the National Competition Policy, as it applied to the public sector, was to achieve the most efficient provision of government-provided goods

and services through reforms designed to minimise restrictions on competition and promote competitive neutrality. This included such rulings as the structural reform of government-owned monopolies and required owners of monopoly facilities (both government and privately-owned) to negotiate third-party access agreements with other users (National Competition Council 1998).

In terms of the government-owned enterprises, the overall aim of the National Competition Policy was to promote a greater efficiency in their operations through the use of enhanced competition. Although the review and subsequent implemented policy did not advocate the privatisation of government business enterprises, this was already occurring and promoted it by making the operation of these enterprises more risky to governments.

### Government business enterprises and privatisation

Government business enterprises are government authorities which provide goods and services directly to the community and whose costs of operation are covered by the sale of these goods or services. In the past, Australia's federal and state governments have operated a range of enterprises. These have tended to be concentrated in the energy (electricity and gas), transport (ports, railways and aviation), finance (banks and insurance) and communications (telephone and post) sectors, but have also included printers, betting agencies and defence manufacturers (Butlin, Barnard & Pincus 1982).

During the years of the Australian Labor Party governments led by Bob Hawke and Paul Keating (1983–1996), and the Liberal–National Coalition governments of John Howard (1996–2007), national large-scale privatisation of many government business enterprises occurred. Over the same period, a number of state governments also carried out privatisation of government-owned enterprises.

In the financial year 1989/90, the output of government-owned enterprises in Australia comprised seven per cent of gross domestic product (GDP), nine per cent of employment, and 14 per cent of gross fixed capital expenditure. By 2011/12, due to privatization, the output of government-owned enterprises had fallen to only 1.3 per cent of GDP, and their gross fixed capital expenditure had fallen to only 1.8 per cent of the total (Australian Bureau of Statistics, 5204.0).

In total, the proceeds of the privatisation of government business enterprises in Australia amounted to around \$194 billion in constant 2000 dollar terms (Abbott & Cohen 2014). While in many cases there was considerable controversy over privatisation, there were very few cases where changes of government caused the

privatisations to be reversed.<sup>6</sup> Instead, most governments have accepted them, and in some cases even carried out further privatisations.

There have been a number of rationales put forward internationally for the privatisation of government business enterprises. These include the desire to reduce government involvement in industry; to broaden the ownership of shares; to improve the efficiency of the sectors involved; to use the proceeds to reduce levels of public debt; and to help provide additional resources for expansion of public services in other areas such as education and health (Pollitt 1999).

Even though all of these factors were relevant in the Australian scenario, the last reason was probably the most crucial. Faced with resource constraints, governments in Australia at both the national and state levels have found that the privatisation of government business enterprises has enabled them to finance the expansion of public services or cuts in taxation. This has taken place even when ostensibly governments were attempting to reduce levels of government debt. In the process of reducing debt, lower interest payments needed to be made, and if these interest payments were greater than the returns on retaining the state assets, then governments were able to increase their expenditure on other services (Abbott 2008; Maddock 1995). However, from the sale of those assets all through this process, and despite the governments' desire to raise funds through privatisation, arguments have also been made that privatisation would lead to a more efficient allocation of resources and operation of the enterprises privatised.

In Australia, the process of privatisation has been linked to the policies of deregulation and increased competition. Regulation that impedes competition was often previously put in place to protect the revenue streams of government business enterprises. For instance, in the case of Australia Post, the prohibition on the delivery of standard sized mail by private companies. In the absence of government ownership, however, the motivation to regulate market entry was reduced. Deregulation also encouraged privatisation, as enhanced competition raised the financial risks to governments of owning businesses. As a result of this close link between privatisation and deregulation, it is often difficult to distinguish the gains in operational efficiency between the two.

In terms of timing, the main era of privatisations in Australia was in the early to mid-1990s, when the Australian and Victoria governments, in particular, became interested in the selling of government business enterprises. These two governments together make up the largest part of the privatisations in Australia.

The Australian Government during the Hawke–Keating era began by privatising relatively small entities that operated in markets that were fairly competitive. Examples of these include the Williamstown Naval Dockyard, the Belconnen

<sup>&</sup>lt;sup>6</sup>In Australia these have been rare. Examples include that of the Tasmanian and Victorian rail freight businesses, which were separately privatised by the Australian and Victorian governments in the 1990s, and later taken back into government ownership.

Shopping Mall, the Defence Service House Corporation loan portfolio, AMDEL, the Commonwealth Accommodation & Catering Services, part of the Australian Industry Development Corporation, and the Australian Defence Force Home Loan Franchise (Reserve Bank 1997).

This was followed by the sale of a number of financial services companies by governments at both the state and national levels. In 1991, the Hawke Government, for instance, sold part of the Commonwealth Bank in order to finance the takeover of the State Bank of Victoria. The latter was taken over because of the failure of its merchant banking arm, Tricontinental, in the previous year. The remaining shares of the Commonwealth Bank were privatised in 1993 and 1996 by the Keating Government. The sale of the State Bank of Victoria and the Commonwealth Bank were followed by the privatisation of other financial services companies around Australia, in markets that were fairly competitive (especially since the deregulation of the Australian banking system during the early to mid-1980s).

All of the governments in Australia ended up privatising their assets in the financial services sectors, and later on most in the gambling sector. State insurance companies were also sold in Victoria and New South Wales in 1992, Tasmania and Western Australia in 1993, and South Australia in 1995 (Reserve Bank 1997).

After the success of the sale of part of the Commonwealth Bank, the Keating Government also privatised the national airlines, Qantas, between 1993 and 1995, which had earlier been merged with government-owned domestic Australian Airlines. Up until this stage, the Hawke and Keating governments had only privatised assets that operated in markets with a fair degree of competition. This approach can be seen quite clearly in the case of aviation. At first, the government deregulated the aeronautical industry (1990), and then privatised Qantas in this competitive market. In the case of the major airports, which had a degree of market power in their respective cities, the Hawke Government corporatised them in the form of the creation of the Federal Airports Corporation, but did not privatise them (Eames 1998).

The financial crises that occurred in Victoria and South Australia in 1990 to 1991 led, after changes of government in both states, to further privatisations. In both cases these privatisations went beyond those of the national government, in that they occurred in businesses with degrees of market power (for example in energy and transport) and not only entities in fairly competitive markets (e.g. banking and insurance). The Liberal–National Coalition Government led by Jeff Kennett in Victoria (1992–1999) was the most enthusiastic of the state governments for privatisation, and in the mid-1990s sold the government-owned electricity, gas supply, and public and freight rail transport industries, along with some ports. In South Australia, the Olsen Liberal Government (1996–2001) sold the electricity and gas supply industries, and the seaports. The sale in Victoria of the electricity and gas industries was an especially large undertaking, and raised \$23 billion for electricity and \$5 billion for gas (Victoria, Auditor-General 1998). An additional \$2.5 billion was raised from the sale of such sectors as insurance, rail freight, ports, a betting agency and a plantations corporation. The proceeds in South Australia were sizable, but not on the same scale – \$721 million for gas transmission/distribution and rail, and \$4.7 billion for electricity (Abbott & Cohen 2014).

The energy privatisations involved the horizontal and vertical separation of companies, and took place at a time when the federal and state governments were implementing the National Competition Policy, which was designed, among other things, to introduce competition into the utilities sector, and to regulate access to the monopoly elements of these utilities (King & Maddock 1996).

After the Howard Liberal–National Coalition Government came into federal office in 1996, privatisations continued with the staged sale of Telstra and the privatisation of the major airports. In both cases, however, issues regarding the degree of market power of the privatised companies remained.

Another privatisation by the Howard Government was the sale of parts of the Australian Government-owned railways, which involved both the sale of competitive elements (above-track freight operations) and monopoly elements (tracks in South Australia and Tasmania). The interstate track was kept in a government-owned enterprise (the Australian Rail Track Corporation), while the interstate freight operations, which had earlier been made part of government-owned enterprise National Rail in 1992 (along with the interstate operations of FreightCorp and V/Line; the New South Wales and Victorian operators), was privatised in 2002.

In the 2000s, the pace of privatisation slowed somewhat, but eventually spread to the energy sectors in both Queensland and New South Wales, at least in the generation and retail segments of the electricity industry.<sup>7</sup> In each case, Labor state governments privatised retail segments in the energy sector, along with above-track freight operations (rail track remained in government ownership, as did electricity transmission and distribution).

<sup>&</sup>lt;sup>7</sup> In New South Wales the government sold two power stations of Delta Electricity to Energy Australia for \$160 million in July 2013, leaving it with two other power stations. Macquarie Generation was sold to AGL for \$1.7 billion pending approval by the ACCC. In July 2013 Origin Energy bought Eraring Energy \$659 million (\$50 million in cash as well as \$609 previously in 2010 to purchase the generators electricity (*Daily Telegraph*, 1 July 2013). The New Zealand firm Trustpower later bought the companies renewable energy generators for \$72.2 million in June 2014 (between August 2013 and June 2014 these were owned by the New South Wales Government company Green State Power).

By the late 2000s, most of the Australia's government business enterprises had been sold, although there remained some important areas where they still existed. Most water supply and sewerage enterprises remain government-owned. The exception is in South Australia where the assets remain government-owned, although these are operated under contract by a private company.

Most major ports are also still under government ownership. Victoria's Kennett Government privatised a number of these in the early 1990s, but in the other states and territories they remained government-owned. The O'Farrell, now Baird, Government in New South Wales recently began the sale of its ports in 2013.

The electricity lines network enterprises are still in government ownership in New South Wales, Queensland, Western Australia, Tasmania, the Northern Territory and the Australian Capital Territory.<sup>8</sup> In contrast, these were privatised in both South Australia and Victoria in the 1990s, along with the generation and retail sectors in these states. Generation and retail have also been privatised in Queensland and New South Wales, although they remain government-owned in Western Australia, Tasmania and the Northern Territory. The jointly owned Snowy Hydro also remains in government ownership.

Finally, there are a range of other enterprises, such as Medibank Private,<sup>9</sup> Australia Post, urban transit authorities in some states, and rail companies in Victoria and Tasmania, that remain in government ownership. Another government-owned enterprise is the new company, NBN Co. In the run-up to the 2007 federal election, the opposition Labor Party announced that if they were elected they would build a "super-fast" national broadband network. After it was elected the Rudd Labor Government established NBN Co, a government-owned corporation, on 9 August 2009 to design, build and operate the national broadband network. Construction began with a trial rollout in Tasmania in July 2010 and since then construction has been undertaken in some of the mainland states. The company provides fixed-line and wireless broadband connections are sold to retail service providers, who then sell Internet access and other services to consumers. The NBN Co has been the subject of considerable political and industry debate for a number of years, both before and after construction actually commenced. After the Abbott Coalition Government was elected in 2013 a Strategic Review was undertaken of the company. The Review advocated a revised programme of

<sup>&</sup>lt;sup>8</sup> The Baird Government in New South Wales announced in June 2014 that it would lease the city based electricity distribution companies (Ausgrid, Endevour Energy) as well as the transmission company, but not the country based one (Essential Energy), if it was re-elected in 2015 (*Sydney Morning Herald* 10 June 2014). The Campbell Government in Queensland similarly stated that it would sell of lease that government's electricity generator companies (CS Energy, Stanwell), distributors (Ergon, Energex), transmission (Powerlink), Gladstone and Townsville Ports and the Mount Isa rail line (*Daily Telegraph*, 3 June 2014).

<sup>&</sup>lt;sup>9</sup> On 26 March 2014 the Minister for Finance, Mathias Cormann, announced that the Australian Government's health insurer, Medibank Private, would be sold through an initial public offering in the 2014-2015 financial year (*ABC News*, 26 March 2014).

construction involving less coverage and substantially lower costs (NBNCo 2013a). NBN Co submitted a pricing access undertaking to the ACCC in 2011. It subsequently submitted revised versions of the undertaking in 2012 and 2013 the latter being accepted by the ACCC in December 2013 (ACCC 2013; NBNCo 2013c). Overall, there remaining around 86 government business enterprises in Australia (see Appendix A) as at 2013.

The main similarities across most of the enterprises remaining in government hands are that they tend to be capital-intensive and have some degree of market power. This means that under the National Competition Policy they are the subject of regulation. Under the Competition Principles Agreement, a process was established whereby enterprises (either government or privately-owned) that were of 'national significance' and had control of essential facilities could be regulated, after application by users of the facilities, by the national regulator, the Australian Competition and Consumer Commission, if they were not already regulated by state-based authorities. This encouraged the state and territory governments to establish regulatory arrangements in each of their jurisdictions. In doing so, they took over a range of different regulatory functions.

# Regulators

The various economics regulators in each of the jurisdictions are listed in Table 6.1 below. These industries are also often the subject of other regulators is well in other areas such as for instance technical aspects, health and safety. Their various areas of responsibility are also provided.

#### New South Wales

The IPART is the economic regulator for New South Wales and was established in 1992. It evolved from the Gas Tribunal that regulated the gas supply industry in that state, and its creation pre-dated the implementation of the Competition Principles Agreement. It, therefore, has the longest experience in regulating utilities. It oversees the regulation of the water and sewerage, electricity and gas retail, and public transport industries. It also undertakes other tasks referred to it by the New South Wales Government, such as making recommendations on the level of local government rates.

#### Victoria

In Victoria, the economic regulator is the Essential Services Commission. It was created in 2002, and took over the responsibilities of the Office of the Regulator General which was established in 1994. The Office of the Regulator General had been created to regulate the privatised ports, and gas and electricity companies. Once established, the Essential Services Commission also took over the regulation of pricing of the government-owned water and sewerage enterprises. The Office of the Regulator General, like IPART NSW, was established prior to the Competition Principles Agreement. Today the Essential Services Commission is

responsible for the regulation of port charges, water and sewerage, rail access, electricity and gas retail.

#### Queensland

In the other jurisdictions, the creation of regulators came after the establishment of the Competition Principles Agreement. In contrast, the Queensland Competition Authority (QCA) was established in 1997 and provides oversight only when matters are referred to it by the Queensland Government. Its responsibilities cover water and sewerage, rail access, electricity and gas retail, and local government rates.

#### South Australia

The Essential Services Commission is South Australia's economic regulator and was created in 2002. Its areas of responsibility include water and sewerage, port charges, rail access, and electricity and gas retail. In South Australia, all regulated businesses were privatised in the 1990s.

#### Western Australia

Western Australia's Economic Regulation Authority was established in 2004. Its responsibilities include water and sewerage, port charges, rail access, and electricity and gas retail/distribution/transmission. As privatisation is more limited in Western Australia compared with other jurisdictions, the Economic Regulation Authority largely regulates corporatised government business enterprises.

#### Tasmania

In Tasmania, the Office of the Tasmanian Economic Regulator was created in 2009. Its areas of responsibility include water and sewerage, electricity and gas retail. It replaced the Government Prices Oversight Commission.

#### Northern Territory

The Northern Territory's Utilities Commission was created in 2000. Its responsibilities include the regulation of water and sewerage, and electricity and gas retail/distribution/transmission. It is similar to the Western Australian body in that it only regulates government business enterprises.

#### Australian Capital Territory

In the Australian Capital Territory, the Independent Competition and Regulatory Commission was created in 1997. Its areas of responsibility include water and sewerage, electricity and gas retail.

Jurisdiction	Name	Areas of responsibility
Australia	Australian Energy	Electricity & gas distribution and
	Regulator-ACCC	transmission
	Australian Competition	Telecommunications, airports
	and Consumer	monitoring and post
	Commission	
New South	IPART	Water & sewerage, train/bus/ferry
Wales		charges, rail access, electricity &
		gas retail, local government rates
Victoria	Essential Services	Water & sewerage, port charges,
	Commission	rail access, electricity & gas retail
Queensland	Queensland Competition	Water & sewerage, rail access,
	Authority	electricity & gas retail, local
		government rates
South Australia	Essential Services	Water & sewerage, port charges,
	Commission	rail access, electricity & gas retail
Western	Economic Regulation	Water & sewerage, rail access,
Australia	Authority	electricity & gas
		retail/distribution/transmission
Tasmania	Office of the Tasmanian	Water & sewerage, electricity &
	Economic Regulator	gas retail
Australian	Independent	Water & sewerage, electricity &
Capital Territory	Competition and	gas retail
	Regulatory Commission	
Northern	Utilities Commission	Water & sewerage, electricity &
Territory		gas retail/distribution/transmission

Table 6.1: Regulatory agencies in Australia

#### Australia

At the national level, the Australian Competition and Consumer Commission (ACCC) was created in 1995 from the merger of the Trade Practices Commission, and the Prices Surveillance Authority. It took over telecommunications economic regulation from AUSTEL in 1997. After it was established, it also began to regulate access to electricity and gas transmission, although this responsibility was passed to the affiliated Australian Energy Regulator in 2005. Prior to 2005, the state-based regulators undertook the regulation of electricity and gas distribution, which was also passed to Australian Energy Regulator. The two exceptions were Western Australia and the Northern Territory regulators, which retained these functions because both are outside of the National Electricity Market.

## **Regulated asset valuations in Australia**

The creation of the various regulators in Australia has meant that there is now a variety of different approaches to regulation and asset valuation across a range of industries.

In the Australian context, the main methods that have been used to determine asset valuations for pricing purposes have been the DORC, the optimised deprival value and the 'line-in-the-sand' approach.

The use of the DORC reflects the view that asset valuations are appropriate, as they approximate what a new entrant would need to enter a market – as well as the price that would prevail – if the asset owner were operating in a workable competitive market. The DORC approach has often been applied in Australian circumstances, but in a number of cases where it has led to price decreases.

That is, in the case of deprival value, the valuation represents the opportunity cost incurred if an organisation were to be deprived of the service potential, or the future economic benefit of the assets in question. Deprival value is generally defined as being the lesser of the economic value of the asset (net present value of future cash flows, and net realisable value from selling the assets for their scrap value), or the DORC. In practice, this approach has rarely been used in Australia, because of the perceived circularity problem with determining an economic value of the asset. The application has therefore tended to reduce to the application of a DORC.

One of the earliest references to the principles of asset valuation in the context of regulatory decision-making in Australia was provided by the ACCC in 1999, when it published its *Draft Statement of Regulatory Principles for the Regulation of Transmission Revenue*. This publication was pursuant to the ACCC's functions under the National Electricity Code, and in doing so the publication described DORC as a valuation methodology that: "would be consistent with a price charged by an efficient new entrant into an industry, and so it is consistent with the price that would prevail in the industry in the long run equilibrium" (Australian Competition and Consumer Commission 1999, p. 39).

The ACCC subsequently applied the DORC in the cases of electricity and gas transmission lines and pipes under its jurisdiction (Australian Competition and Consumer Commission 1998, 2000, 2001a, 2001b, 2002a, 2002b 2002c, 2003a, 2003b). The decision to implement a uniform approach to electricity network pricing in the National Electricity Market originated from a COAG meeting in 1994 (at the same time a National Gas Code was also developed) (Council of Australian Governments 1994). At this time, the various jurisdictions agreed that a common approach to asset valuation, rates of return and pricing methodologies should be undertaken, and that a code of conduct should be developed to ensure consistency in the economic regulation of transmission and distribution assets.

Under the National Electricity Code, responsibility for the regulation of pricing of the transmission network went to the ACCC, and for the distribution networks to the state and territory jurisdictions (a similar split of responsibilities was applied to the gas industry). The distribution and transmission regulatory provisions within the National Electricity Code came into effect in the Australian Capital Territory and New South Wales in 1999, followed by other jurisdictions.

Prior to the enactment of the National Electricity Code in 1997, the COAG had agreed that when valuing the assets of government-owned network enterprises, the deprival value methodology should be used in preference to others (National Competition Council 1998). In line with this agreement, the jurisdictions previously used deprival value when valuing their government-owned transmission and distribution network assets, leading up to the introduction of the National Electricity Code. In Western Australia, a separate Code was introduced in 2004. This Code gave the asset owner the option of proposing either a DORC or optimised deprival value approach (*Western Australian Government Gazette* 2004).

In the case of the electricity transmission networks, the ACCC applied a DORC to asset valuation (Australian Competition and Consumer Commission 2000a, 2001a, 2002a, 2002b, 2003). For distribution networks, New South Wales, South Australia, Western Australia, Queensland, the Australian Capital Territory and Tasmania also applied a DORC (Independent Pricing and Regulatory Tribunal 2005; Economic Regulatory Authority 2007; Queensland Competition Authority 2001; Independent Competition and Regulatory Commission 1999; Office of the Tasmanian Economic Regulator 1999). In each case, it was accepted that the DORC was less than the economic value of the assets, and therefore the DORC was consistent with the deprival value approach.

In Victoria, the value of the two rural-based electricity networks was set below the DORC, and the three urban networks above the DORC. This was done so that prices could be equalised across the five privatised distribution networks. These valuations were then locked in by the Victorian Government in 1995 (Essential Services Commission 2005b). In Western Australia, the transmission and distribution network owner, Western Power, proposed the use of the optimised deprival value methodology. This method was approved by the Economic Regulation Authority of Western Australia (Western Power Corporation 2004).

The DORC approach was also used by the ACCC to value gas transmission pipeline assets. The Economic Regulation Authority in Western Australia, however, preferred to accept the proposal of the asset owners to use deprival value. In the case of the gas distribution networks, regulators (except in Western Australia) tended to use the DORC approach, although it is noteworthy that by 2000 all of the government-owned gas transmission and distribution networks in Australia had been privatised. At the same time that reforms were being instituted in the Australian electricity and gas industries, the COAG was also looking at implementing reforms within the state- and territory-based water and sewerage industries. Following a review in 1993, the COAG agreed in the following year to implement a strategic framework for the reform of the Australian water industry (Council of Australian Governments 1994). In doing so, COAG accepted that: "the deprival value methodology should be used for asset valuation unless a specific circumstance justified another method".

One area of regulation for government business enterprises that has occurred across all jurisdictions (with the exception of the national government) has been the water supply and sewerage industry. For this reason, the water supply industry provides a good example of regulation, as it is applied by the various state- and territory-based regulators on government business enterprises. Table 6.2 provides detail of the approaches used to regulate water prices in the industry across the various Australian jurisdictions as at 2014. Table 6.3 provides similar data for regulated, non-water businesses in Australia, and Table 6.4 provides an international comparison.

With respect to the water and sewerage industry, the line-in-the-sand approach has been commonly used. In some cases, the line-in-the-sand method has been referred to as a form of deprival value. The line-in-the-sand has most often been used in situations where the water businesses are government-owned. It has the effect of locking in past prices and returns, and might therefore have the effect of locking in past monopoly prices.

The 'line in the sand' valuation is an asset valuation technique not discussed in great detail in academic journals. The 'line in the sand' valuation has been proposed by utilities asset owners and accepted by some regulators in Australia in some circumstances. It can be expressed as the EV limb of the deprival value technique and simply takes the existing net income stream as the basis for the estimation of an asset's value (NERA Economic Consulting and PricewaterhouseCoopers 2009, p. 16). The 'line in the sand' valuation has been adopted by some Australian regulators to establish the initial RAB for the purpose of determining the price of water utilities. Future capital expenditure undertaken after the initial 'line in the sand' valuation is 'rolled into' the RAB 'at cost'.

The approach used in most jurisdictions (with the exception of the Northern Territory) is the cost-of-service building block approach. As previously mentioned, this approach is heavily dependent on the valuation of assets, especially if the industry is a fairly capital-intensive one. The approach used therefore depends on a range of factors, not least the resources available to the regulators to independently assess the validity of the asset valuation techniques used by the enterprises. In Tasmania and South Australia, the regulators accepted their limitations and accepted the asset valuations from these enterprises (and their approaches to asset valuation). This meant that both replacement cost and fair value approaches were used to value assets in these jurisdictions, even though

deprival value was advocated as the best way for a regulator to assess the value of assets for pricing purposes.

	Form of	Financial	Regulated	Regulated
	regulation	reporting*	capital base	depreciation
New South	Cost-of-service	Historical	Deprival	Straight-line method
Wales	building block	cost & fair	value/Line-in-	-
	approach	value	the-sand + roll	
			forward	
Victoria	Cost-of-service	Fair value	Deprival/	Straight-line method
	building block		Line-in-the-	
	approach		sand + roll	
			forward	
Queensland	Cost-of-service	Fair value	DORC + roll	Straight-line method
	building block		forward	
	approach			
South	Cost-of-service	Fair value	Fair value +	Straight-line method
Australia	building block		roll forward	
	approach			
Western	Cost-of-service	Historical	Deprival value	Straight-line method
Australia	building block	cost & fair	+ roll forward	
·	approach	value		
Tasmania	Cost-of-service	Historical	DORC + roll	Straight-line method
	building block	cost & air	forward	
A / 1º	approach	value		
Australian	Cost-of-service	Historical	Deprival	Straight-line method
Capital	building block	cost & fair	value/ Line-in-	
Territory	approach	value	the-sand + roll	
NT (1	D:	TT' / ' 1	forward	
Northern	Price cap	Historical	INA	INA
Territory		cost & fair		
		value	1	

 Table 6.2: Regulatory approaches – Australian water industry, 2014

\*Sydney Water, Melbourne Water, SEQ Water, SA Water, Water Corporation of WA, Southern Water (Tasmania), ACTEW (ACT), Power and Water Corporation (NT)

Source: IPART 2000; Essential Services Commission 2005b; Queensland Competition Authority 2005; Essential Services Commission of South Australia 2005a, 2005b; Economic Regulation Authority 2005; Office of the Tasmanian Economic Regulator 2008; Independent Competition and Regulatory Commission 2008; Utilities Commission 2012

Company	Industry	Jurisdiction	Valuation in	
		& regulator	regulation	
Australia Post	Post	ACCC	Fair value	
Australian Energy Market	Electricity	AER	DORC	
Operator				
ARTC	Rail	ACCC	DORC	
VicTrack	Rail	ESC (Victoria)		
NBNCo	Communicatio	ACCC	Actual costs	
	ns			
Queensland Rail (Aurizon	Rail	QCA	DORC	
Networks from 2013)		(Queensland)		
Office of the Rail	Rail	ESCSA (South	DORC	
Commissioner		Australia)		
RailCorp	Rail	IPART (NSW)	DORC	
Country Rail Infrastructure	Rail	IPART (NSW)	DORC	
Authority				
Transgrid	Electricity	IPART (NSW)	DORC	
	transmission			
Powerlink	Electricity	QCA	DORC	
	transmission	(Queensland)		
Transend	Electricity	OTER	DORC	
	transmission	(Tasmania)		
Western Power	Electricity	ERA (Western	Deprival value	
	transmission	Australia)		
	distribution			
Power and Water	Electricity	UC (Northern	Deprival value	
	lines	Territory)	then DORC	
AusGrid	Electricity	IPART (NSW)	DORC	
	distribution			
Endeavour Energy	Electricity	IPART (NSW)	DORC	
	distribution			
Essential Energy	Electricity	IPART (NSW)	DORC	
	distribution			
Energex	Electricity	QCA	DORC	
	distribution	(Queensland)		
Ergon Energy	Electricity	QCA	DORC	
	distribution	(Queensland)		
Aurora	Electricity	OTER	DORC	
	distribution	(Tasmania)		
ActewAGL	Electricity	ICRC (ACT)	DORC	
	distribution			

Table 6.3: Non-water, government-owned regulated businesses in Australia

Source: ACCC 2008; IPART 2012; Essential Services Commission 2013; QR Network 2008; Essential Services Commission of South Australia 2005a, 2005b; Economic Regulation Authority 2005; Utilities Commission 2013; NERA/PricewaterhouseCoopers

<b>Regulatory sector</b>	Australia	United	United	New Zealand
		Kingdom	States	
Airports	-	IMV	-	Deprival
				value*
Electricity and gas	Deprival	IMV	DHC	Deprival value
	value,			
	DORC			
Rail	DORC	IMV	DHC	-
Telecommunications	TSLRIC	LRIC	TELRIC/	Deprival value
			DHC	
Water	Deprival	IMV	DHC	-
	value;			
	DORC/ EV			

 Table 6.4: International regulatory asset valuation methods

\*Price monitoring

Source: Commerce Commission 2002, 2006; NERA/PricewaterhouseCoopers 2009

IMV = initial market value; LRIC = long run incremental cost; TELRIC = total element long run incremental cost; TSLRIC = total service long run incremental cost

In each case, once the original assessment has been undertaken, regulators have rolled forward investment and depreciation into the original value used. This process is one that explicitly accepts the limitations of the regulators when it comes to regulatory assessing of the value of assets. Instead, once an assessment has been made, a simple rolling forward valuation has been used. Finally in the case of depreciation, a straight-line method has generally been used.

## **Case study – Melbourne Water**

Melbourne Water is the city's bulk water supplier and is a statutory corporation owned by the Victorian Government. It manages the water supply catchments, treats and supplies drinking and recycled water, and removes and treats sewerage from the metropolitan water retailers in the Greater Melbourne region (Melbourne Water 2013, p. 1). In Victoria, the Essential Services Commission regulates the price of water, and monitors the service standards of the 19 Victorian government-owned water businesses including Melbourne Water (Essential Services Commission 2013, p.1). The legislative framework that guides the Essential Services Commission in carrying out its role is the *Essential Services Commission Act 2001* and the *Water Industry Act 1994*. The *Water Industry Regulatory Order* (WIRO) set outs the regulatory principles that water businesses must comply with, while proposing prices and rules the Essential Services Commission is required to adopt in its price reviews (Essential Services Commission 2013, pp. 1–2).

The AASB Framework for the Preparation and Presentation of Financial Statements (September 2009) is relevant to asset valuation. According to

paragraph 101, historical cost accounting is the main approach to measurement; however, this approach is being replaced by fair value accounting. The International and Australian accounting standard setters are moving steadily towards a fair (market) value asset as the preferred valuation approach.

Table 6.5 below shows that the asset valuation technique can have a significant impact on the reported value of the assets. Melbourne Water's 2011 annual report, for instance, revealed that the value of its water infrastructure assets was \$3,728,819,000 using a historical cost accounting valuation as of 30 June 2010 (Melbourne Water 2011, p. 73). For the same group of assets, asset valuation was \$6,507,714,000 under fair value (Melbourne Water 2010, p. 74; Melbourne Water 2011, p. 72), \$6,034,970,000 under deprival value (Essential Services Commission 2009, p. 25), and \$3,300,709,000 under the WDV replacement cost approach (Australia, National Water Commission 2012).

Asset valuation occurs for Melbourne Water for three main reasons. First, valuation occurs for financial reporting purposes. These valuations are needed to measure the net worth of the business and to inform stakeholders of the wealth (assets) held in the business. Asset valuations are therefore used to generate ongoing measures of the business's productivity and a rate of return on assets. A return on assets ratio is then calculated to estimate how efficient the business is at using its assets to generate profit. Under the fair value approach, assets are valued at their present discounted value of the future net cash inflows that they are expected to generate (value-in-use or expected future economic benefit of the assets) in the normal course of business. The historical costs approach, in contrast, represents the amount of capital expenditure (net depreciation) that has been invested over the longer term in building up the assets.

The second reason why the assets of Melbourne Water are valued is for pricing purposes. The Essential Services Commission uses deprival value to create an asset base as part of the building block approach to determining the price of water.

The third reason why Melbourne Water assets are valued is so that they can be compared with those other water businesses. The National Water Commission, in conjunction with the Water Services Association of Australia, requires its member water businesses to report asset valuation using a WDV replacement cost. The WDV is the book value of the assets, and it represents services or benefits currently embodied in the assets. The WDV replacement cost allows water businesses to compare asset values from one year to the next. At the same time, using the same asset valuation technique allows consistency and comparability across different jurisdictions. This approach is used by the National Water Commission because it is the easiest way to gain consistency across a wide range of water businesses (Australia, National Water Commission 2012).

Financial	2006/07	2007/08	2008/00	2000/10	2010/11	2011/12
Financiai	2000/07	2007/08	2008/09	2009/10	2010/11	2011/12
year						
Historical	2,730,057	2,892,204	3,064,833	3,728,819	4,082,198	4,892,688
cost (\$)						
Fair	-	-	-	6,507,714	6,740,147	7,428,892
Value (\$)						
Differenc	-	-	-	2,778,895	2,657,949	2,536,204
e between						
historical						
cost and						
fair value						
Deprival	4,162,210	4,457,310	5,233,020	6,034,970	6,515,000	6,688,040
value (\$)						
WDV	3,405,204	3,705,840	4,07,1138	3,300,709	3,314,070	3,361,516
replaceme						
nt cost (\$)						

Table 6.5: Asset valuation of Melbourne Water, 2006/07 to 2011/12 (\$000)

Source: Essential Services Commission 2009, pp. 24–25; Melbourne Water 2008 to 2013; Australia, National Water Commission 2012

The fair value approach used by Melbourne Water is consistent with AASB 116 or IAS 16 *Property, Plant and Equipment*, and is the recommended method of the Auditor-General Victoria (2004) for the purpose of asset valuation for financial reporting for Victorian local governments. Melbourne Water adopted a change in its accounting policy in measuring its physical infrastructure assets on a fair value basis, away from using a historical cost basis, as of 30 June 2010 (see Table 6.5 above).

Deprival value was originally the preferred approach of government policymakers in valuing network assets for the pricing of utilities (performance monitoring), and was considered to be the best estimate of what a private provider would pay for a similar asset. Deprival value was endorsed by the COAG as the basis for water pricing in all jurisdictions and was agreed by all state and territory governments (Australia, National Water Commission 2010).

In Victoria, in its first regulatory price determination in 2004, the Essential Services Commission made use of a form of deprival value (line-in-the-sand). As part of the price review process, clause 14(a)(iv) of the WIRO required the Essential Services Commission to ensure that the prices proposed by the water businesses allowed them to recover a return on assets in place as of 1 July 2004. Following a request from the Victorian Minister of Water and the Essential Services Commission, Melbourne Water asset values were locked in at their 1 July 2004 value and then rolled forward on an annual basis to reflect new investments, depreciation and asset disposals. The line-in-the-sand or economic value approach and straight-line depreciation were used, which entailed reverse

engineering the of building block framework to determine asset values that would be consistent with the pricing policy (Melbourne Water 2005, pp. 134–135).

The line-in-the-sand approach has been adopted by a number of Australian utilities, such as the New South Wales urban water businesses, rural Victorian electricity distributors, and two of the three Victorian gas distributors (Essential Services Commission 2004, p. 8; Melbourne Water 2004, p. 7; NERA Economic Consulting & PricewaterhouseCoopers 2009, p. 22).

Since water prices were set by the Essential Services Commission in 2009, the water supply industry has experienced significant change. The 2009 Water Price Review was the second regulatory period, the fifth review of water prices, and was proposed to cover a four-year regulatory period from 1 July 2009 to 30 June 2013. A long period of drought and unexpected low inflows to dams, rivers and aquifers has resulted in a major decision by the Victorian Government of investing in new sources of water supply, particularly investment in an alternative source of water independent of climate that is a desalination plant (Essential Services Commission 2013, p.4). In 2009, Melbourne Water and the four retail water businesses (City West Water, Yarra Valley Water, South East Water and Western Water) submitted their Water Plans (including forecast costs, delivery volumes, prices, service levels, and capital works programs) to the Essential Services Commission for review. Proposed prices in the Water Plans were based on the building block methodology, and were set to meet and recover the total revenue requirement made up of forecast costs for the four years regulatory period. The final decision was released by the Essential Services Commission, following further consultations (Essential Services Commission 2009, p. 1; Essential Services Commission 2013, p. 2).

It is likely that the third, current, regulatory period, which runs from the financial year 2013 to 2018 will likely witness reductions in spending, reflecting the completion of major investments. The major cost driver over this period is the desalination plant that was formally commissioned for the commencement of payments on 17 December 2012. Capitalisation of the plant and desalination security payments (which enable the plant to produce water) are to be charged to customers in the years 2015 to 2018 of the regulatory period (Essential Services Commission 2013, p. 4).

In 2013, Melbourne Water proposed future revenue of \$8,611.9 million over the five-year regulatory period. The Essential Services Commission approved a revenue of \$4,786 million for a shorter period of three years (instead of five years), which commenced on 1 July 2013 for 2013/14 and 2015/16 (Essential Services Commission 2013).

Table 6.6 shows the breakdown of the revenue requirements of Melbourne Water, according to this final decision. Its revenue requirements for the final two years of the plan, 2016/17 and 2017/18, are indicative estimates only (assuming the Essential Services Commission had approved a five-year regulatory period). In

making its decision, the Essential Services Commission confirmed the need to capitalise a portion of the desalination plant costs, and accepted Melbourne Water's assessment, which forecasts that the capacity to do so would be in the later years (2015 to 2018) of the five-year regulatory period. The decision to shorten the regulatory period to three years was due to the material but unclear changes to the modelling assumptions made by Melbourne Water following the draft decision.

Table 6.6: Melbourne Water's breakdown of revenue requirement based onbuilding block methodology – final decision, 2013/14 to 2015/16 (\$ million)2012/13

	2013/14	2014/15	2015/16	2016/17 (estimate)	2017/18 (estimate)
Operating	1,001.1	994.8	983.2	948.0	950.8
expenditure					
Return on capital	395.3	388.7	382.3	375.9	396.6
(existing assets)					
Return on capital	10.6	31.7	51.2	68.3	81.9
(new investments)					
Return of capital	152.0	173.7	193.0	208.3	218.3
(depreciation)					
Tax liability	4.2	10.1	13.9	18.3	22.4
Total	1,563.3	1,599.1	1,623.6	1,618.9	1,643.0
	\$4	4,786.0 milli			

Source: Essential Services Commission 2013, p.36

<b>Table 6.7: U</b>	pdated regulator	ry asset base (\$	5 million), 2012/13
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	2007/08	2008/09	2009/10	2010/11	2011/12
Opening RAB	5,597.1	5,942.6	6,995.3	7,872.2	8,444.3
Plus gross capital	495.3	1212.9	1058.0	791.6	555.8
expenditure					
Less customer	44.4	45.8	47.9	55.5	66.9
contributions					
Less proceeds from	1.2	4.8	13.0	30.7	5.4
disposals					
Less regulatory	104.3	109.5	120.3	133.2	143.9
depreciation					
Closing RAB	5,942.6	6,995.3	7,872.2	8,444.3	8,783.9

Source: Essential Services Commission 2013, p.36

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
					(estimate)	(estimate)
Opening RAB	7,830.9	8,861.1	9,180.7	9,507.3	9,763.1	9,981.7
Plus gross	292.7	521.7	541.0	495.9	480.0	379.6
capital						
expenditure						
Less customer	60.4	29.7	38.6	44.6	51.2	56.6
contributions						
Less proceeds	0.0	11.4	2.0	2.5	1.9	2.0
from disposals						
Less	155.1	152.0	173.7	193.0	208.3	218.3
regulatory						
depreciation						
Closing RAB	8,861.1	9,180.7	9,507.3	9,763.1	9,981.7	10,084.4

Table 6.8: Melbourne Water rolled forward regulatory asset base (\$ million),2012/13

Source: Essential Services Commission 2013, pp. 37, 101

A hybrid form of price control was adopted by the Essential Services Commission, whereby it approved price caps control for Melbourne Water (and the water retail businesses). Based on the figures in Table 6.8 Melbourne Water's total expenditure for the five-year regulatory period is \$4,877.9 million.

A key component of Melbourne Water's revenue requirements is capital expenditure. It is stated in clause 14 of the WIRO that the Essential Services Commission must ensure the prices charged by enterprises under its purview provide it with a sustainable revenue stream, and must not reflect monopoly profits or inefficient expenditure. This price must allow the enterprise to recover expenditure on renewing and rehabilitating existing assets. Not only must proposed expenditure forecasts be efficient, they must also account for a planning horizon that extends beyond the next regulatory period.

The Essential Services Commission approved \$1,549.6 million of capital expenditure for the next three years. Any material changes to forecasts for these three years must be reconciled by Melbourne Water and reassessed for Water Plan 4 when this expenditure is reassessed.

Table 6.7 above shows the updated regulatory asset base. As at 1 July 2012, the Essential Services Commission approved the initial regulatory asset base, \$8,783.9 million, to reflect verified net capital expenditure. Subsequent years' opening regulatory asset base were based on forecasts by the Essential Services Commission. In Table 6.8, the closing regulatory asset base for 2012/13 was \$8,861.1 million, which became the opening regulatory asset base (capital expenditure) for 2013/14.

A number of specific projects initiated in response to government policy were rolled into Melbourne Water's 2012/13 regulatory asset base and considered capital expenditure. Table 6.8 above shows the estimates of the opening asset base for each year – calculated by using annual forecasts for net capital expenditure, depreciation and disposals for subsequent years in the regulatory period.

In setting prices, the water businesses (including Melbourne Water) were allowed to recover a rate of return on their existing assets and on any new capital expenditure. A post-tax weighted average cost of capital of 4.5 per cent was adopted by the Essential Services Commission, based on current market conditions (Essential Services Commission 2013, p. 111).

This case study highlights some of the challenges faced by Melbourne Water, particularly in relation to pricing issues. In the regulatory period 2009 to 2013, Melbourne faced a long period of drought, resulting in major investments in new sources of water supply. These investments were specifically made in alternative sources of water, independent of climate changes, and the result was the construction of a desalination plant. The current regulatory period experienced a reduction in spending and the completion of a major investment phase. This case study reinforces the view that capital expenditure is a key component of the estimation of a revenue requirement.

In terms of financial results, Melbourne Water's annual reports revealed that the business reported a net loss of \$45.1 million in year 2012/13, compared with a net profit of \$372.8 million in the previous financial year (2011/12). Melbourne Water suffered a net loss following a 12-month price freeze, and rebates came only in July 2012.

A report from the Auditor-General Victoria has raised concern about Victorian water businesses' financial viability, particularly their ability in servicing and repaying debt (Victoria, Auditor-General's Report 2013). Interest-bearing liabilities have increased by \$10.3 billion or 248 per cent over the past five years. Finance costs have accounted for 21 per cent of the water industry's total operating costs each year. In the financial year 2012/13, debt increased by \$5.4 billion or 59 per cent, due predominantly to the desalination plant being recognised as a finance lease by Melbourne Water (Melbourne Water 2013).

Under the regulatory regime, the regulatory asset base (rather than the normal mainstream accounting asset value) is both an accounting number and asset valuation, used to determine the value of all new and old physical assets funded directly by the business. The regulatory asset base is used to determine the total revenue requirement by the business, based on efficient costs, and specifies the price that business can charge from their customers. The price of water is a reflection of the regulatory asset base. The opening regulatory asset base was set higher than accounting asset values, allowing in particular returns on capital/capital expenditure (investment of new assets), depreciation expense and

operating expenditure to be recovered through prices charged by Melbourne Water and other Melbourne metropolitan water businesses.

In terms of the sustainability of Melbourne Water and the impact of the current water pricing model, the revaluation of utility (infrastructure) assets increased the value of the assets reported in the financial reports. At the same time, it increased the difference between the regulatory asset base and accounting asset values. Over time, this magnified the shortfall between water prices charged by the business and the total revenue required to meet efficient operating costs. The difference between the regulatory asset base and the accounting asset values has therefore been pointed out as the main key factor in the operating losses of a number of regional urban and rural water businesses in Australia.

## The United States approach

In the United States, utilities can be investor-owned, government-owned or cooperative. Investor-owned utilities have the majority share in electricity, gas and telecommunications markets, although government-owned is also common for electricity. In water markets, the majority are government or cooperative-owned, but again investor-owned companies also exist. In addition, most major airports are government-owned (mainly by local government authorities). A similar situation exists in Canada.

The regulatory structure is complicated in the United States because of the federal government system. That is, each of the 50 states has its own regulator, and federal government institutions regulate utility services traded across state borders. Regulatory commissions act as a substitute for the marketplace, setting revenue and output prices to satisfy customer demand.at non-monopolistic prices, and ensuring appropriate performance.

Regulation achieves its aims by regulating output prices through the determination of a fair and reasonable rate of return that utilities are allowed to earn. The regulation of utility outputs involves two major tasks: the first is to set the proper level of rates in the aggregate, and the second is to develop the structure of rates (i.e. the rate design).

Regarding the first step, the determination of rates is implemented by defining a total revenue requirement, referred to as the 'total cost of service'. United States regulators determine the rates that should be sufficient to cover the costs of utilities, including taxes and depreciation, plus an adequate dollar return on the capital invested. The expected return is obtained by multiplying the allowed rate of return by the asset base.

The asset base is essentially the net book value of the utility's assets that are considered 'used' and 'useful' in providing the service, with some reasonable allowance added for working capital requirements. It may also include any new investment to be undertaken by the utility. An estimate of revenue requirements is derived through the scrutiny of the total company costs during a test year, adjusted for known changes between the test year and the period for which the rates will be in effect.

While each state commission and regulatory body has its own rules, regulations and policies for determining total revenue requirement, the general approach adopted involves the consideration of the asset base as part of the determination of the revenue requirement. In simple terms, the asset base is defined as:

- net plant in services;
- property held for future use;
- working capital; and
- construction work in progress.

In principle, the alternative methods of valuation of the asset base are:

- original cost;
- reproductive cost;
- replacement cost; and
- fair value.

The measurement of this base has been the most widely disputed legal issue in the history of the United States public utility regulation. When the plant is newly constructed, the equipment is acquired and the difference between historical and replacement costs would not differ significantly. As time goes by, however, it has been argued that the original costs lose their original economic significance.

The major division of practice and opinion on these issues of asset valuation has been between the position that:

- as long as the assets remain used and useful for their intended purpose, they should stay in the rate base at their original costs, subject to systematic annual deductions for physical and functional depreciation – the original cost or net investment principle of rate-making, which is accepted in the majority of the states; and
- the costs should be written down, so as to take account of major changes in construction costs or in general price levels referred to as the 'fair value principle'.

Valuation of the asset base was highly controversial before the landmark Hope decision in 1944. In the Hope decision, the United States Supreme Court eliminated the necessity for regulatory commissions to rely on reproduction cost exclusively in determining rates. The end result doctrine was promulgated that as long as investors were fairly treated and as long as rates were fair to consumers, the Supreme Court would not dictate any particular rate base. In the Hope decision, the Court dealt a major blow to the nation of the fair value rate base. The inherent circularity of a fair value rate base, whereby rates are made to

dependent on earnings under whatever rates are anticipated, was recognised by the Supreme Court. Attention then shifted from the rate base to the fair rate of return, although controversy over the rate base still remains.

The most extreme instance of conversion to the original cost base involved the Pennsylvania Supreme Court, which in 1980 ruled that original cost was the sole measure of statutory fair value.

Original costs measured by the actual costs paid by the utility adjusted for depreciation were considered verifiable, definite, widely used, but inaccurate in periods of pronounced inflation. Adoption of a fair value measure of the rate base has, however, been seen as the most expedient way to make amends for the failure of the original cost standard and to make allowances for price inflations.

Although the use of original cost is largely accepted for determining the rate base, one major concern is the choice between original cost and subsequent acquisition cost. There is a debate question on whether any excess in acquisition cost, even if allowed in the rate base, should be subject to special types of amortisation. There is a further question on whether the amortisation should be charged to annual operating expenses, or whether the amortisation should be recognised 'below the line', thereby taking place at the expense of the corporate shareholders.

#### Financial reporting

The regulatory commissions in the United States generally regulate on a book value basis. The financial accounting standards for regulated enterprises are encapsulated in four statements issued by the Financial Accounting Standards Board (FASB) of the Financial Accounting Foundation:

- Accounting for the Effects of Certain Types of Regulation (FASB No 71, 1982)
- Accounting for Abandonment and Disallowances of Plant Costs (FASB No. 90, 1986)
- Accounting for Phase in Plans (FASB No. 92, 1987)
- Accounting for the Discontinuation of Application of FASB Statement No. 71 (FASB No. 101, 1988).

FASB No. 71 was issued in December 1982. This statement applied to purpose external financial reports for a company that has regulated operations meeting all of the following criteria:

- The enterprise's rates for regulated services or products provided to all its customers are established by, or are subject to, approval by an independent third-party regulator, or by its own governing board empowered by statute or contract to establish rates that bind customers.
- The regulated rates are designed to recover the specific costs or provide the regulated serve or products.

• It is reasonable to assume that rates set at a level to recover the enterprise's costs can be charged to and collected from customers. This criterion requires consideration of anticipated changes in levels of demand or competition during the recovery period for any capitalised costs.

These statements provide accounting guidance in the preparation of general purpose financial statements for most public utilities. Circumstances are specified as to when costs can be recognised for recovery purposes.

Amendments to FASB No. 71 were made to alter the accounting treatment of plant abandonments and cost disallowance of recently completed plants (FASB No. 90), as well as the rate moderation, trending or phase-in plans that were developed to alleviate the problem of rate spikes (FASB No. 92).

In recognition of the changing environments which might result in an enterprise's operation no longer meeting the criteria for a regulated operation (e.g. deregulation or increasing competition), FASB No. 101 specifies how a company's discontinuation of application of statement shall be reported in the company's general purpose external financial statements.

#### Fair rate of return

Regulatory commissions derive their conclusions as to a rate of return from the estimate of the cost of capital. In the computation of the weighted average cost of capital, there are a number of issues, particularly capital structure issues and derivation of the cost of equity capital.

Although the original cost measure of the rate base is widely accepted by regulatory commissions, there is no legal requirement of rate base uniformity throughout the United States. As a result, the question often arises whether it would be fair for the same rate of return under 'original cost net-investment' rate base to be applied to a higher or lower fair value rate base.

Some argue that the concession of a current cost asset base in excess of the original investment should be wholly or partly offset by a lower allowed rate of return. On this issue, the positions of the various commissions have not been uniform.

In the United States, the Federal Communications Commission (FCC) decided that a total element long-run incremental cost (TELRIC) based pricing of discrete network elements, such as local loops and switching, was preferred. TELRIC attempts to capture forward-looking costs for an efficient firm. Accordingly, there is no use of historical cost information (Wall Communications 2012, p. 50). Canada's asset valuation approach is also similar to the Current Cost Accounting (CCA) approach (CRTC 2006).

When price caps were first introduced in the United States, all 50 states used rateof-return regulations for state telecommunications. Price cap regulation was first introduced in 1990, and by 1996, 35 states had adopted a price-cap regulation, mainly for retail services (Ai & Sappington 2002).

#### The water industry

In 1954, the American Water Association prepared and published Determination of Water Rate Schedule, which was issued as the first American Water Works Association manual on water rates. The fundamental principle was the use of cost-of-service based rates.

A water utility, whether government or investor-owned, must consistently provide adequate income to successfully meet its obligations to its customers. The base for the rates, including the rate of return, must reflect anticipated future conditions as well as historical costs.

Generally, the development of water rates involves the:

- determination of the total annual revenue requirements for the period for which the rates are to be effective
- allocation of the total annual revenue requirements to the basic functional cost components
- distribution of the component costs to the various customer classes, in accordance with their requirements for services
- design of water rates that will recover from each class of customers within practical limits, the cost of services to the customer.

The amount of revenue required may be determined by either the cash-needs approach or the utility approach.

The cash-needs approach requires that the revenue of the water utility must be sufficient to cover all cash needs, including the operation and maintenance expenses, debt service requirements, and capital expenditure not debt-financed. The approach has generally been used by government entities.

The utility approach to determining revenue requirements is mandated for all investor-owned water utilities and for most government-owned systems under the jurisdiction of state commissions and other regulatory bodies. Apart from the operation and maintenance expense components of total revenue requirements, capital-related costs under the utility approach comprise two components: depreciation expenses and return on rate base.

The utility approach of determining revenue requirements requires the establishment of a rate base, defined to be the value of the assets on which the utility is entitled to earn a return, and the fixing of a fair rate of return on the new rate base. The rate base is primarily composed of the value of the utility's plant

and property usefulness in serving the public. Contributions for construction and customer advances for construction are generally deducted from utility plants in service for rate base determination. The identification of the value of the rate base, whether it is net book value or an established fair market value, must reflect the utility's need to maintain future customer needs.

In the case of the water industry, it is complicated by the structure of the industry. That is, in the United States there are around 50,000 water systems, most of which serve less than 3,000 customers each. The water utility industry is, therefore, a patchwork of thousands of government and privately-owned water utilities.

The majority of the water utilities are government-owned and vary considerably in size. In recent years, there has been some consolidation of the businesses, especially the privately-owned, publicly traded ones. Of the investor-owned utilities, two main categories exist: publicly traded companies (some of considerable size) and a large number of small, non-traded companies. It is the former that generally attracts government regulation. These businesses are regulated, for the most part, by individual state government public utility commission services or public service commissions. Usually, state legislatures have awarded these commissions the power to regulate utilities. In some states, commissions regulate hundreds of water utilities. In Arizona, for example, the Arizona Corporation Commission regulates approximately 400 water utilities.

Most of the regulators of the water industry in the United States use a cost-ofservice approach, with the regulated rate of return based on some valuation of assets. In some jurisdictions, however, incentive regulation has been introduced, but this is typically also based on a cost-of-service benchmark. Various asset valuation approaches have been used in the regulation of the United States water industry, but the most common approach has been, and still is, a depreciated historical cost approach.

In terms of general financial reporting, many of the water businesses, because of their government ownership, follow government accounting standards. The water accounting methods of the government-owned water systems in the United States are maintained in accordance with its GAAP for government entities. These businesses generally apply all applicable Government Accounting Standards Board pronouncements on accounting and reporting.

Traditionally this has meant that government-owned water enterprises have used some variant of historical costs, which is also true of privately-owned businesses. In more recent times, fair value has also been used for some classes of assets. A typical approach is that used by the private company Aqua America, which uses the fair value approach to determine the value of its current assets (e.g. financial instruments), and then records physical assets at an estimated original cost of utility plant when it was first devoted to the utility service. An applicable depreciation is then recorded. The cost of new units of property and betterments are subsequently capitalised into the asset base (Aqua America 2012, p. 36).

Many government-owned water businesses follow a similar approach. The Los Angeles Department of Water and Power, Water System, values its financial investments explicitly at fair value, and then physical assets are valued by making estimations of the original costs of plant and capitalising any investments (Los Angeles Department of Water and Power 2012). The Miami-Dade Water and Sewer Department also values capital assets by capitalising at cost (Miami-Dade Water and Sewer Department 2012, p. 39).

Financial assets, on the other hand, are taken at their market value which approximates a fair value. A similar approach is undertaken by Chicago's Metropolitan Water Reclamation District of Greater Chicago, which records capital assets at a historical cost or estimated historical cost (Metropolitan Water Reclamation District of Greater Chicago 2012, p. 66).

Not all water businesses, however, value their physical assets using some variant of historical costs. Some water enterprises in the United States use discounted cash flows or capitalised earnings, but among the larger businesses a historical approach for the physical assets remains common (Hayward 2005).

# The United Kingdom approach

In the United Kingdom, the regime of economic regulation of utilities was established in the 1980s. In the 1980s and 1990s, the British Government undertook an extensive program of privatisation of government-owned enterprises (Pollitt 1999), and several government agencies were established in the 1980s to regulate the activities of these privatised industries.

In the United Kingdom, there was a strong link between the privatisation of government business enterprises and the establishment of regulatory agencies. This differentiates it from the case of the National Competition Policy in Australia, where the broad framework of regulation was to apply to both privately or government-owned businesses, regardless of ownership; dependent instead on the degree to which the business had monopoly power.

The first major privatisation was of British Telecom in 1984. The British Government set up a regulatory agency – the Office of Telecommunications (OFTEL) – to oversee the regulation of prices and the service provided by this newly privatised company (Armstrong 1998; Cook 1998). It legislated to allow for new entrants into the market. After its creation, OFTEL was headed by a Director General of Telecommunications who had statutory powers and duties independent from the government (Helm & Jenkinson 1998). This pattern of the creation of a regulatory agency, headed by a single Director General with statutory powers, was followed by the British Government when the gas, airports, water, electricity and rail industries were all privatised.

After the creation of OFTEL, the Office of Gas Supply (OFGAS) was established in 1986 when British Gas was privatised. The Office of Electricity Regulation (OFFER) was then established in 1989 when the electricity industry was broken up and privatised, and in the same year the Office of Water Services (OFWAT) was created when the water supply companies in the United Kingdom were sold. Finally in 1993, the Rail Regulator was created to regulate the privatised rail industry. In each case, the regulatory agency was similar in structure to that of OFTEL.

When faced with the privatisation of British Telecom, and later other utilities, the British Government had a number of regulatory choices suggested to it in a report presented by Stephen Littlechild (1983). The two main choices presented in terms of economic regulation were to impose either a form of rate-of-return regulation (the method that was extensively used in the United States, involving the regulation of profits on the basis of an allowed rate of return on their capital assets) or RPI-X (the method proposed by Littlechild, which set a maximum price which would be increased over a period based on the rate of inflation minus some X factor, which might reflect expectations about the size of likely future productivity growth). The government subsequently accepted the RPI-X proposal.

Initially, it was envisaged that RPI-X regulation in telecommunications would be 'regulation with a light hand', which would prevent excessive exploitation of monopoly power until competition in the industry caused regulation to become unnecessary. It was also hoped that the process would avoid the quasi-judicial processes common in the United States' rate-of-return regulation, where regulated companies or their customers may apply for changes in prices on the grounds of a change to the rate of return on the businesses' assets. It was also anticipated that the appointment of single Director General's rather than boards or commissions would lead to a more streamlined approach to regulation.

The RPI-X approach (known in Australia as 'CPI-X') involves a price cap for a given year period, based on judgements about a number of factors. For instance, a business is allowed to make greater profits if it manages to achieve greater efficiency than expected between regulator reviews. At each round of new regulatory review, the additional efficiency gain will be returned to customers through lower prices. This approach was originally designed to avoid the need for detailed information about a regulated company's financial accounts, capital expenditure and future demand prospects. It also provided companies with incentives to pursue their objectives, including their statutory obligations, as effectively as possible. In the United Kingdom, price caps were used for retail services in telecommunications and other methods for wholesale services (e.g. LRIC for mobile networks, regulated asset base for fixed networks).

In practice, there was a convergence between RPI-X and rate-of-return regulation. That is, the estimation of the X factor needed to incorporate an estimation of costs and also a satisfactory rate of return on investment (Armstrong 1995; O'Neill & Vass 1996; Baldwin & Cave 1999). This meant that some estimation of capital expenditure and asset valuations became necessary. In the case of the X incentive factor, these were also progressively introduced into many rate-of-return regimes around the world, increasing the degree of convergence.

In the setting of the X value in the price cap, a number of elements arose. These included the amount of operating expenditure needed by the regulated enterprises to cover the ongoing costs of supply, the amount of capital expenditure needed to be financed from profits, the future demand growth of the business, the expected improvements in productivity, the allowed rate of return on assets, and the size of the initial asset base.

The calculation of the allowed rate of return required the assessment of a fair return on the funds of shareholders. This meant that the size of the initial asset base involved an assessment of the opening value of the asset base at the beginning of the previous review period, and then allowed new investment less depreciation. Each of these was the subject of detailed analysis by the regulators.

Typically regulators estimate operating expenditure with reference to past trends in costs and capital expenditure, via the detailed auditing of investment plans and requirements for environmental clean-up expenditure to be carried out by businesses. The regulators then calculate the allowed rate of return by adding an equity premium appropriate to companies in the risk of businesses to an estimate of the risk-free rate.

To begin with, the capital base would have been calculated from the initial market value (including debt) of the enterprises at privatisation, plus net capital expenditure. Later estimates, however, were provided by companies of their historical and replacement cost of capital. As part of the price control process, the regulator needed to form a view on an appropriate rate of return over the medium term, and the capital value to which that rate should be applied. Different approaches were accepted by individual regulators in calculating the amount of the enterprises' capital base in the United Kingdom.

The target rate of return is determined based on the assessment of the cost of capital. Generally, this is done (using either the capital asset pricing model or the dividend growth model) in light of evidence of risk-free returns, equity returns and the equity risk premium. The use of different rate-of-return targets is due to the relative level of risk that each industry faces. That is, where a company's profitability is more variable, investors/shareholders would usually require a higher return. To aid regulators, enterprises have generally have been required to provide annual data as part of 'regulatory accounts', usually in the form of historical cost or replacement cost valuations.

This situation can be seen in the case of telecommunications. In the United Kingdom in the 1980s, a pure RPI-X approach was used to set the retail prices of British Telecom. Gradually costs, asset values and rates of return were all used to calculate the X value, and a hybrid approach emerged. The Federal Office of Communications, OFCOM, in determining asset values, valued British Telecom

assets using a historical cost accounting approach until 1997, and then switched to a current cost accounting approach (CRTC & Wall Communications 2012, p. 24). Other countries in the European Union, such as France, Germany and Sweden, have also used a current cost accounting approach to the determination of asset valuations in their telecommunications industry (CRTC & Wall Communications 2012, pp. 33, 38, 42).

In some ways, this change to the CCA approach mirrors that of the change in the manner in which British companies report their asset values. Traditionally United Kingdom utility businesses adopted historical cost accounting for statutory financial reporting.<sup>10</sup> Current cost accounting was, however, often also used often in financial reporting.<sup>11</sup> In more recent years they have begun to change to meet international standards, using a fair value approach.<sup>12</sup>

Over time, the structure of the regulators also began to change. When the Labour Party assumed government in 1997, it produced a document entitled: *A fair deal for consumers: Modernising the framework for utility regulation* (1998). It recommended that in making decisions, regulators similarly consult with stakeholders as they do in United States rate cases (Baldwin & Cave 1999; United Kingdom, Department of Trade and Industries 1998). The Labour Party moved also to create regulators that were more like the United States commissions in structure, gradually replacing the Director Generals with boards or commissions.

In addition, the regulators were originally industry specific, but gradually became broader in scope. For instance, in 2000, OFGAS and OFFER were merged to form the Office of Gas and Electricity Markets (OFGEM), which operated under a board. In 2004, the Rail Regulator was replaced by a nine-member board called the Office of Rail Regulation (ORR). In 2006, OFWAT was reorganised as the Water Services Regulation Authority under a board (although still known publicly as OFWAT), and in 2001 the OFTEL was merged with the broadcasting functions of government to create the Federal Office of Communications (OFCOM) with a board. In 2010, OFCOM took over regulation of postal services from the Postal Services Commission (POSTCOMM), which had been created in 2000 to license new postal operators and also the government-owned Royal Mail. POSTCOMM and OFCOM, in regulating the services of Royal Mail, provide the only examples of regulators subjecting a government-owned business to economic regulation in the United Kingdom.

#### Water regulation

In understanding how asset valuations became important in the RPI-X process in the United Kingdom, it is necessary to look at a single industry – water and

<sup>&</sup>lt;sup>10</sup> For instance, see the annual reports for National Grid (the English transmission company) in 2004.

<sup>&</sup>lt;sup>11</sup> For instance, see the annual reports for Southwest Water in 2004.

<sup>&</sup>lt;sup>12</sup> For instance, see the annual accounts of National Grid and Southwest Water (2013).

sewerage. In this industry, government water authorities in England and Wales were privatised in 1989. At privatisation, a regulatory framework was created to ensure quality and service standards, and to set prices. The framework for regulation of the privatised water companies in England and Wales comprised three elements: economic regulation, quality regulation and customer representations.

A system of incentive-based price cap regulation was adopted, with the objective of promoting competition between the 10 water and sewerage companies and 21 water-only companies. In the case of water, the privatisation situation was different from other industries, in that water quality standards at privatisation were below European standards, which meant that the companies were required to invest substantial sums in improving quality. This, in turn, meant that pricing arrangements had to allow for increased prices and revenues.

A five-year price path was determined at the time of privatisation, and periodic reviews of pricing were undertaken. These were undertaken in 1994, 1999, 2004, 2009 and 2014. In 2009, OFWAT published its determination of price limits for the period 2010 to 2015 (Office of Water Services 2009)

In undertaking these reviews, periodic review of OFWAT set price limits for water and sewerage services, with a variant of the RPI-X approach. The RPI+K price formula limits the price increase to the entire range of regulated water services provided by the businesses for each charging year, where RPI is the retail price index, and K = Q - X, where X is the efficiency elements and Q represents the incremental cost of new quality obligations. The elements of cost allowed for in determining price limits are: operating expenditure, capital maintenance and a return on capital (Office of Water Services 2009). For the period 2009 to 2014, the industry average for the K was 0.5 (Office of Water Services 2009, p. 23).

As part of the regulatory regime, the water and sewerage companies were required to provide financial data to the regulator annually, in addition to their normal reporting requirements.

The water companies are required to prepare:

- accounts showing the performance of the industry as a whole;
- segmental information regarding regulated businesses and non-regulated businesses, including turnover, profits and net assets; and
- regulatory accounting statements covering the core regulated water services under a set of regulatory accounting guidelines developed by OFWAT (Office of Water Services 2013).

The accounting policies used in regulatory accounts are based on historical and current cost accounting, incorporating adjustments for real financial capital maintenance, depreciation, working capital disposal of fixed assets and financing. Assets are valued using historical or replacement costs. Traditionally this is how the water industry valued assets for reporting purposes, although in recent times businesses have shifted to using fair value in line with international accounting standards.

Return on capital is measured as the profit divided by the assets or capital employed in the business. OFWAT uses the current cost profit after tax (i.e. revenue net of operating expenditure, capital maintenance and taxation) as the key measure of profit (Office of Water Services 2009).

As noted, choice of asset value can have a significant effect on the indicated levels of return. Two approaches were therefore originally considered by OFWAT in determining the appropriate value:

- market values; and
- asset value in the regulatory accounts.

The market values were compared with book values of assets shown in regulatory accounts. At privatisation, the market valuation of the water companies was assessed at  $\in 100$  billion, compared with the floatation proceeds of  $\in 5.2$  billion (giving a market capitalisation to asset ratio of almost 1:20). Market capitalisation increased to  $\in 6.1$  billion at the end of the first day's trading (Australian Society of Certified Practising Accountants & Independent Pricing and Regulatory Tribunal 1996).

The market valuation related principally to the equity component of a company's capital. That is, to determine the total value, the value of debt is added (or any cash balance deducted). In principle, the market value of debt should be used, but in practice, only book values are generally readily available.

OFWAT considered that a current market value might not have been the appropriate basis for establishing a reasonable return. Market capitalisation, for example, could be affected by short- or medium-term fluctuations in share prices generally.

On the other hand, there was also no justification for applying the cost of capital to the full current cost value of the asset, which could result in a significant redistribution of income from consumers to shareholders; nor given the long life of infrastructure assets, was there any economic reason to do so. It was necessary, however, to apply a capital base which allowed shareholders a reasonable return – otherwise, uncertainty over returns would jeopardise the attraction of new capital investment.

To, therefore, overcome the problems of valuing the assets of the water industry, OFWAT developed a regulatory capital value. For the calculation of returns at the periodic price review, the value was measured by the market valuation over 200 days immediately after floatation, adjusted to take into account the net (after allowing for current cost accounting depreciation) new capital expenditure

allowed for in initial price limits with certain adjustments. That is, the regulatory capital value = initial value + net capital investment to year t-1 + net new capital investment in year t.

The initial values for the water companies in 1989 were £8 billion for 31 companies; by 1995, this regulatory capital value had increased to £16 billion. On the basis of new capital expenditure, the capital value of the companies increased to £27 billion by 2005; which further increased to €48 billion in 2011 (Office of Water Services 2009).

## The New Zealand approach

After an exchange rate crisis in 1984 and a change in government, New Zealand embarked on a period of comprehensive economic reform. This reform involved financial and exchange market deregulation, tax reform, labour market reform, and the corporatisation and privatisation of government business enterprises (Evans, Grimes, Wilkinson & Teece 1996).

In 1987, Telecom New Zealand was separated from the post office by the New Zealand Government, and in 1990, it was privatised. At the time it was privatised, it was decided to avoid more intrusive regulation of the company, instead relying upon 'light-handed regulation' which consisted of Information Disclosure requirements and application of general competition law under the *Commerce Act 1986* (New Zealand, Ministry of Commerce & the Treasury 1995).

At this time, reform of the electricity sector occurred. In April 1987, the Electricity Corporation of New Zealand (ECNZ) was created as a separate company under the *State-Owned Enterprises Act 1986*. In the early 1990s a separate transmission company (Transpower) was created, and the electricity supply organisations (distribution and retail) were established as separate corporatised (mainly trust-owned) organisations. ECNZ was subsequently broken up into separate generation companies, and a wholesale electricity market began in October 1996. In 1998 retail was separated from distribution, and most retail operations were taken over by the generator companies (Abbott 2010; New Zealand, Energy Markets Group, Energy and Communications Branch, 2012).

The *Electricity Act 1992* was subsequently passed, which required Information Disclosure requirements (similar to those required of Telecom New Zealand) of the electricity wires businesses. This came into force in 1994, and was revised in 1999; included were financial performance measures based on standard asset values, and a range of other performance measures.

In 1999 the Labour Government began to conduct a series of reforms in the electricity industry, to bring it back into line with international trends. After an inquiry in 2000, changes in 2001 included giving the Commerce Commission power to control the price or revenue of the wire businesses which breached thresholds set by it (Commerce Commission 2003). Further changes in 2004 gave

power to the newly-established Electricity Commission to approve transmission pricing; these pricing powers were later shifted to the Commerce Commission. Additional changes in 2009 made the consumer-owned distribution businesses exempt from the price-quality regulation, although they were still subject to the Information Disclosure regime (Commerce Commission 2009). The method used by the Commerce Commission was the CPI-X approach (Commerce Commission 2013).

After a review of the telecommunications industry in 2000, and the subsequent establishment of the *Telecommunications Act 2001*, a regulatory regime was also introduced for that sector (Howell 2009). For interconnection in the mid-2000s, the Commerce Commission commenced developing a TSLRIC model but it was never completed – the parties came to a commercial arrangement and thus there was no price determination by the regulator. Prices of other access services were not based on New Zealand costs but benchmarks were used (of LRIC-based rates in other jurisdictions) or retail-minus (in the case of bitstream). The Commerce Commission is currently implementing a TSLRIC approach for fixed access services (unbundled copper local loop and bitstream access) (Howell 2009).

The Information Disclosure requirements established in the 1990s still exist, and are used for a number of industries including the electricity distribution businesses, major airports, and gas pipelines.

Unlike in Australia, there is no regulation of the water enterprises (largely local government-owned) or of rail track access (the rail industry was privatised in 1993, with the track being taken back into government ownership in 2003 and above-track freight in 2008). No regulated monitoring of ports is undertaken either.

In New Zealand concerns were raised about the quality of infrastructure asset valuations (especially local government assets) in the 1990s, which led to the establishment of the New Zealand National Asset Management Steering Group (NZNAMSG). The NZNAMSG produced its first guidelines in 1996, where it gave guidance on the estimation of optimised replacement and optimised deprival values for assets. Subsequent updates were periodically made periodically to these guidelines.

Although an optimised deprival approach was adopted by the New Zealand Government in the 1990s as part of its Information Disclosure requirements, and this method was advocated as advisable by the NZNAMSG, most government business enterprises continued to use a variety of asset valuation techniques. Transpower, for instance, continued to use historical costs until it changed to fair value in 2013 (Transpower 2013). Vector Energy (electricity and gas distribution) used the lesser of replacement costs or an economic value, until it later changed to historical costs for its fixed costs and fair value for its financial assets (Vector Energy 2013). WaterCare still uses replacement costs for its fixed assets, and fair value for its financial assets (WaterCare 2013). Some other government business
enterprises like the Greater Wellington Water and Hawkes Bay Airport still use historical costs (Greater Wellington Water 2013; Hawkes Bay Airport 2013).

Each government business enterprise in New Zealand uses whatever method it finds most appropriate, although there has been a slight trend towards the use of fair value, as generally used in the large corporation, private sector.

In the regulatory field ODV has been preferred, and as New Zealand is a unity state with a single regulator, there has been a greater degree of unity of approach compared with the federal Australian Government sector and the multi-regulator situation in the United Kingdom. However, regulation is still more limited when it comes to government-owned enterprises. That is, the water sector is unregulated (although largely local government-owned), rail track access is unregulated, and airports are the subject to only Information Disclosure requirements as is the privatised gas supply industry. Therefore, the only examples of regulated government-owned businesses are the electricity transmission company Transpower and some of the jointly private\public\trust-owned electricity distribution businesses.

## Conclusion

Within capital-intensive industries, the return on capital is an important issue. In determining an allowable regulated rate of return, a considerable element of judgement is involved. For example, the level of the rate of return, the extent of the capital base to which it is applied, and the valuation of the capital base are all important. If the allowed rate of return is fixed at too low a level, it can seriously impair the ability of an enterprise to maintain capacity. If set too high, and if the enterprise has market power, monopoly rents might be extracted from consumers.

Among the regulatory authorities examined, different asset/capital base estimation methods have been used for the purposes of price regulation. These include historical cost, replacement cost, line-in-the-sand and deprival value. In some cases, an optimised approach has also been used, combined in some cases with incentive mechanisms, aimed at improving the efficiency of the regulated enterprises. In this chapter, examples have been provided from Australia, the United Kingdom, the United States and New Zealand.

## **Chapter Seven**

## Survey and questionnaire on asset valuation and pricing

## Introduction

In order to gain further information on the application of asset valuations to pricing of government business enterprises, a survey of valuation approaches used by these enterprises was undertaken, along with the circulation of a cross-sectional questionnaire. All the organisations included were those with substantial infrastructure investments.

The questionnaire that was circulated in July 1995 as part of the 1996 Discussion Paper differs from the present questionnaire in that the former had a heavy emphasis on the proposed application of deprival value in regulatory asset valuations. This is because since 1996, most regulators in Australia have chosen to use alternatives, such as a line-in-the-sand or the DORC approach, and because the valuation of assets for reporting purposes has moved towards the use of fair value.

In addition, it is now possible to draw on considerable work undertaken both by regulators and government business enterprises that have been published since 1996. In this chapter, the survey work and administered questionnaire in this study are first explained. In the following section, the results of the two activities are explained, and in the next some regulatory aspects are analysed. In the final section of this chapter, overall conclusions are made.

## Survey and questionnaire

As part of this project, two separate tasks were carried out. The first was a survey that was undertaken of government business enterprises, on their approaches to asset valuation and its relation to the regulation of pricing. This survey involved 90 government business enterprises, including a review of their financial reports to determine each enterprise's approach to asset valuation, and a review of each jurisdiction's regulators' approach to valuating asset bases as part of price regulatory decisions. All of these enterprises are capital-intensive businesses with substantial infrastructure investments; see Appendix A for a list of these government business enterprises surveyed.

In addition to the survey, a questionnaire was sent to a number of government business enterprises. The copy of this questionnaire is in Appendix B. In combination, the purpose of the survey and questionnaire were to:

- identify the different ways that government business enterprises value assets, especially based on their use of fair value
- study the approaches adopted by regulators in determining the prices of government business enterprises
- study how asset valuation can impact on costs and prices.

In December 2013, the questionnaire was sent to a number of government business enterprises. In total 25 responses were received, including enterprises from the water, transport, electricity network and port industries. The majority were from the water industry (around half), reflecting that in Australia today the largest group of government business enterprises are the water and sewerage enterprises. The results were collated and considered.

There were three sections in the questionnaire. Some questions had a fixed set of alternative answers, and others were in the form of open-ended responses. A copy of the questionnaire is provided in Appendix B.

Section	Purpose
A. General	General information on business activities and asset
	information
B. Asset valuation	Gathering information about the practical problems
approach used	of implementing assets
C. Asset valuation	Collection of ideas and insights into the
and pricing	pricing/costing issues associated with asset valuation

 Table 7.1: Overview of questionnaire design and survey

## Results of the survey and questionnaire

### Assets

The approach to valuing assets depends to some degree on the types of assets held. That is, there are different categories of infrastructure assets, with depreciation rates varying between categories. Most of the government business enterprises were either water and sewerage, port or electricity network businesses (transmission or distribution); others included entities such as Australia Post and Airservices Australia.

Because of the general nature of these government business enterprises, all of those surveyed had substantial non-current assets in the form of property, plant and equipment and intangible assets (e.g. software or water rights). In addition, they also held other current assets in the form of financial assets, such as cash, bonds and derivatives, as well as trade receivables and other assets. Typically the value of the property, plant and equipment made up over 80 per cent of the assets held.<sup>13</sup> Therefore, to a large degree the most important issue in valuing assets is how to treat these forms of assets.

#### Current assets

Across all the entities surveyed, it was most common to use the fair value approach to determine the value of financial assets and trade receivables. In the case of these types of assets, there is generally readily available market information of their value and potential earnings, which is why a fair value approach was generally used.

#### Intangibles

In the case of intangibles, in general, the surveyed entities simply valued them simply at cost. For instance, Melbourne Water valued:

Intangible assets (primarily consisting of information technology software and renewable energy certificates) ... at cost less accumulated amortisation and impairment. Costs incurred subsequent to initial acquisition are capitalised when it is expected that additional future economic benefits will flow to the Corporation (Melbourne Water 2013, p. 82).

Nearly all of the enterprises take a similar approach to the valuation of intangibles.

### Property, plant and equipment (at cost)

The major type of asset held by these capital-intensive government business enterprises is property, plant and equipment. As much of these infrastructure assets are very specific to the service they perform, they have no resale value, and in the case of water assets there is little experience in Australia of their privatisation. Of the 90 entities surveyed, 55 are the subject of formal regulation of pricing. Across the other unregulated organisations, most are ports that to some degree would have some amount of market power, but are not the subject to regulation.

In terms of the valuation of these assets, the main approach (for 64 of the entities) is to value their physical assets on the basis of some form of cost (replacement or historical). In many cases, assets were valued at historic cost and then revalued periodically if circumstances changed. A typical example is that of Fremantle Ports which states that:

Items of property, plant and equipment ... are recorded at the cost of acquisition less accumulated depreciation and impairment losses. Any subsequent cost of replacing/upgrading an item of property, plant and

<sup>&</sup>lt;sup>13</sup> For instance, see the Victorian water company City West Water, which in June 2013 had total assets of \$1,953 million, of which 1,680 were in the form of property, plant and equipment.

equipment is recognised in the carrying amount of the item if it is probable that the future economic benefits embodied within the part will flow to Fremantle Ports (Fremantle Ports 2013, p. 79).

Taking the valuation of these assets at cost and then subsequently revaluing them at a later date using a fair value approach, where possible, or a replacement cost approach, is the most common form of asset valuation technique.

What this means, though, is that the various enterprises have different proportions of their assets either valued either at historical cost or at replacement value. For instance, one corporate finance officer of a water company stated that there was a preference for replacement cost over a market valuation for the following reason:

Government Trading Enterprises are required to comply with accounting standards and also Department of Treasury and Finance financial reporting directions, which deem depreciated replacement cost of capital to be applied. In the water industry, assets are highly specialised, resulting in difficulties in finding an active market to determine the market value.

Another respondent stated that:

Most infrastructure assets are at depreciated replacement cost. Historical cost is used between asset revaluations.

In this study, a number of cases the assets were valued at cost, with the majority being effectively valued at replacement cost. Yet despite a preference for this approach, it was not universal. Indeed, on this issue one Capital Manager stated the following:

Given assets owned by ... are rarely sold, so no market value exists and main classes are not purchased with sufficient regularity, such that replacement cost is often difficult to access.

In such instances, a reliance on the historical costs of acquisition occurred instead.

In determining a replacement cost a few enterprises chose to use an optimised replacement cost technique. Companies such as Hunter Water, the Sydney Water Corporation and the State Water Corporation of New South Wales all used the depreciated replacement cost on the basis of a Modern Engineering Replacement Asset (MEERA). Others such as the electricity network companies Essential Energy in New South Wales and Transend Networks used the DORC approach. In the Transend case:

The DORC value is derived from the gross optimised replacement cost after allowing for depreciation, which is calculated using the remaining useful life and assigned useful life of each class of asset (Transend 2013, p. 36).

#### Property plant and equipment (fair value of regulated enterprises)

Of the other entities listed, most (22 of them) used some method of fair value to value the property, plant and equipment. One common approach to achieving this was simply to use the income approach, by taking the regulated income stream allowed to the enterprise and using this as the basis of an estimation of the value of the assets.

An example of this is AusGrid, the New South Wales Government-owned transmission company. In its annual report it stated that:

to measure assets using the income approach. AusGrid's view is that the income approach reflects the nature of the current regulatory regime. The allowed revenue from the regulator is consistent with the principles of valuing specialised assets under the income approach (AusGrid 2013, p. 35).

In line with this, Ergon Energy, the Queensland electricity distribution company, stated that:

All regulated assets are measured at fair value less any subsequent depreciation ... The income approach was used as there was no marketbased evidence of fair value due to the specialised nature of the regulated assets (Ergon Energy 2013, p. 16).

Energex Energy, the other Queensland electricity distribution company, stated that:

The majority of the economic entity's property, plant and equipment is ... subject to regulation via a revenue cap. Accordingly, the fair value valuation ... is determined using a discounted cash flow (DCF) methodology (Energex Energy 2013, p. 36).

In New South Wales the transmission company, Transgrid stated:

In the current year, TransGrid has elected to adopt the option to measure the fair value of its assets using the income approach. TransGrid's view is that the income approach better reflects the nature of the current regulatory regime. The allowed revenue from the Australian Energy Regulator (AER) is consistent with the principles of valuing specialised assets under the income approach. The effect of this change in accounting estimate will reduce depreciation expense and increase profit/(loss) before income tax expense by approximately \$21.0million per annum in future years (Transgrid 2013, p.44)

Other organisations that are regulated and take this approach include ACTEW, the Australian Rail Track Corporation, City West Water, Endeavour Energy, Energex,

Ergon Energy, Melbourne Water, Powerlink, Rail Corp, SEQ Water, South East Water, Transgrid, and Yarra Valley Water. Melbourne Water, for instance, uses the DCF from its regulated revenue stream to value its assets.

It would generally be expected that in the future, the majority of these enterprises with regulated income flows would end up valuing assets based on regulated income streams.

One negative aspect of this common approach, however, is that the income flows themselves are based to a large degree by the asset valuation originally determined by the regulators. With the alternative building block approach to regulation, enterprises are allowed a regulated rate of return based on the regulated asset base. In Australia, regulators generally determine a rate base and then roll forward to value, adding to it an investment expenditure and deducting from its depreciation.

The electricity transmission and distribution companies AusGrid, Endeavour, Ergon, Powerlink, Ergon Energy, Transgrid and Energex, for example, all have regulated asset bases determined using the DORC approach (as with most of the electricity entities).<sup>14</sup> This base was then used to determine allowable income flows. The fair value estimates of these entities are therefore effectively a proxy for a DORC approach. RailCorp and SEQ Water asset valuations were all treated in a similar fashion.

In contrast, many of the water businesses had asset bases based on the line-in-thesand approach, such as those in Victoria and New South Wales. As the line-thesand approach is simply a type of valuation based on income flows converting to fair value approach, similar perpetuates apply to historical income streams to these organisations.

### Property plant and equipment (fair value of non-regulated enterprises)

In addition to the regulated enterprises, there are a number of government business enterprises that use the fair value approach to value their property, plant and equipment that are not regulated. Among these are the port businesses such as the Newcastle Port Corporation, the Port Kembla Port Corporation and the Sydney Port Corporation. In the case of the Sydney Port Corporation, it was stated that:

Fair value of property, plant and equipment is determined based on the best available market evidence, including current market selling prices for the same or similar assets. Where there is no available market evidence, the assets fair value is measured at its market buying price, the best indicator of

<sup>&</sup>lt;sup>14</sup> The ACCC adopted the DORC approach early in determining the value of electricity transmission assets (Australian Competition and Consumer Commission 1998). State regulators followed suit and used similar approaches, and later the Australian Energy Regulator continued the use of the DORC approach.

which is the replacement cost of the asset's remaining future economic benefits (Sydney Port Corporation 2013, p. 51).

Other companies such as Medibank Private, Delta Electricity, Hydro Tasmania and Macquarie Generation also used fair value.

This asset valuation technique is consistent with paragraph 62 of the Australian Accounting Standard Board AASB 13 (or IFRS 13) *Fair Value Measurement* (September 2011) recommendation of three techniques; that is the market approach, the cost approach and the income approach. Where there is no market base for determining 'fair value' of water infrastructure assets, the valuation techniques default to either the cost or income approach (paragraphs B8-B11 of AASB 13), consistent with paragraphs 26 and 33 of AASB 116 or IAS 16 *Property, Plant and Equipment* (IAS 16) (June 2009).

It would appear that among the ports the problem of the over-specialised character of the assets is less acute than in the case of water supply and electricity network businesses, and there is more relevant market-based information which to base fair value valuations on.

#### Depreciation

The straight-line method of depreciation is generally used by the surveyed entities. One interesting aspect of the assets is their expected lives. In some instances, water businesses noted that some of the physical assets they employed had effective lives of up to 200 years. In the case of port and rail asset lives, up to 100 years was common.

### Other findings

In 1996, a majority of respondents supported detailed national guidelines being adopted across all jurisdictions by each industry, to ensure consistency in asset valuations across jurisdictions. A similar view was expressed in response to the 2013 questionnaire by several enterprises.

In the 2013 survey, concerns were also expressed about the difficulty of assessment of modern equivalent assets, such as availability of technical data, age and change in technology. This was similarly noted in 1996.

The survey respondents were all able to achieve full recovery of their operating costs; depreciation was fully recovered by most but not all respondents. A few indicated that the regulatory regime was such that assets were valued well below book value, which meant that they only recovered a very low rate of return. In many cases, a DORC approach was used, or a line-in-the-sand approach which valued assets below book value, which lowered returns. This was also a concern expressed in 1996.

## **Regulatory assets approaches to regulation**

Of the 90 government business enterprises surveyed, 55 were the subject of some form of price regulation. In some instances, however, this did not involve any asset valuation. The water business of the Northern Territory run by the Power and Water Corporation is the subject of a CPI-X price cap, and the Victorian Regional Channels Authority is the subject of price monitoring (the latter not included in the 55 formally regulated enterprises). The State Transit Authority of New South Wales has fares the subject of a cost index, and Synergy, the Western Australian electricity retail company, had its prices based on a combination of network charges and a customer acquisition and retention cost.

 Table 7.2: Asset valuation of the regulatory asset base – Australian government business enterprises

DORC	21
Line-in-the-sand	24
Deprival value	5*
Historical costs	1
No asset valuation	3
Fair value	2
Total regulated entities	56 <sup>@</sup>

\*One was subsequently changed to DORC

<sup>@</sup> Adds up to 56 entities because the water business of the Power & Water of

the Northern Territory is included in the no asset valuation category and electricity business is included in Deprival value category.

With respect to regulatory asset values, most have been undertaken either by use of the DORC or line-in-the-sand approach. As previously mentioned, the electricity lines enterprises tended to have their assets valued using the DORC approach, and the water businesses under state regulators via the line-in-the-sand approach. However, there are some exceptions to this. For example, the Queensland water companies Sun Water and SEQ Water were regulated using the DORC approach (as well as TasWater).

No non-water entity had its assets valued using the line-in-the-sand approach, along with no private utility company. State-based regulators used this approach only for government-owned water enterprises, mainly to protect their revenue streams while at the same time capping their ability to raise prices.

Despite the enthusiasm for the deprival value approach by government authorities early in the 1990s, its formal use did not subsequently become widespread. One

major theme of the 1996 Discussion Paper was the expected problems associated with the use of deprival value. As regulators tended to prefer to use the DORC approach (as did the ACCC) or a line-in-the-sand approach (as the state-based water regulators tended to), use of deprival value was not widespread.

The only regulator that made extensive use of the deprival value approach in Australia was the Economic Regulation Authority of Western Australia. This regulatory agency used it to value the assets of the Bunbury Water Board, the Busselton Water Board, Western Power and the Water Corporation of Western Australia.

Likewise, deprival value has fallen out of use in financial reporting by companies, superseded by the introduction of fair value – a related valuation technique.

Some surveyed regulators stated that they felt the line-in-the-sand approach was effectively the equivalent of deprival value, and that using it met their obligations to use a deprival value approach.

In contrast, some surveyed regulators have stated that they thought the line-in-thesand approach was effectively an ODV approach, given that it used existing revenue streams to determine an asset value.

In 1999, for instance, the Independent Competition and Regulatory Commission in the Australian Capital Territory set a regulatory asset base for ACTEW's water and wastewater assets. In doing so it used a line-in-the-sand approach but stated that:

Thus the initial asset base set for ACTEW's water and wastewater assets was a form of optimised deprival value, ODV valuation, setting a starting point for the future roll-in of new investment and for the indexing of the values to approximate a current cost value for regulatory purposes (Independent Competition and Regulatory Commission 2003, p. 52).

It is important to note that the value of the regulatory asset base used for regulatory price setting purposes is different from the value that ACTEW itself uses for accounting purposes and financial reporting. This occurs for a range of reasons, including the manner in which the initial regulatory asset base is determined. There are, however, are a number of other reasons; for example, that gifted assets are not included in the regulatory asset base, but instead are reflected in the accounting value of the assets (Independent Competition and Regulatory Commission 2008, p. 81).

Whether the enterprises themselves wanted a line-in-the-sand or DORC approach depended on the relationship between the two. That is, if revenue streams were initially low, then a DORC approach was generally preferred. For instance, ACTEW argued in favour of the DORC approach (Independent Competition and Regulatory Commission 2008, p. 83), and Power and Water in the Northern

Territory also preferred a DORC to ODV approach (Utilities Commission 2009, p. 16).

## Preferred approach

In practice, the DORC was the preferred approach by many regulators, including the ACCC, IPART and QCA. The Essential Services Commission in Victoria also used the DORC approach for electricity and gas distribution, before passing these responsibilities to the Australian Energy Regulator. The line-in-the-sand approach was instead used for government-owned water businesses in Victoria and New South Wales.

#### Accepting the asset values of the company

With regard to Australia Post, the regulator accepted the company's fixed asset values as reasonable. In 2002 the ACCC stated that:

These characteristics suggest that the issue of asset valuation is less problematic for Australia Post than in other regulatory contexts. The ACCC's preliminary view is therefore to adopt the asset values provided by Australian Post as the basis for assessing its proposed prices (Australian Competition and Consumer Commission 2003, p. 14, Appendix B).

This view was reaffirmed in 2009.

Australia Post's fixed asset values were stated at cost, net of accumulated depreciation and/or accumulated impairment losses, if any.

In 2008 the Office of the Tasmanian Economic Regulator stated that the regulator was not in a position to request a full asset revaluation; instead to use the values provided by the water companies to the government as part of its Urban Water Review. These were mainly based on cost, but incorporated substantial revaluations on the part of the companies (Office of the Tasmanian Economic Regulator 2008, p. 82).

In consideration of the more recent revaluations, the Office of the Tasmanian Economic Regulator considered that the most appropriate starting point for the determination of the value of the regulatory asset base for the purposes of the Inquiry was the regulatory asset values provided to the Tasmanian Government in the most recent Urban Water Review.

### Pricing

The use of a line-in-the-sand or the DORC approach means that at times there is a difference between the regulated asset base of companies and the book value of their assets. This creates a degree of dissatisfaction among some enterprises, as they found it difficult to recover the costs of their investments. In this study, one finance manager stated:

...mainly that price settings should be reflected by current and relevant asset values, in order to adequately recover and plan for an assets replacement/renewal.

Another finance manager stated that:

Asset values and replacement should be used for price setting, otherwise assets will not be replaced except through borrowings.

Most surveyed businesses therefore expressed the view that:

Assets value adopted in price setting should take into consideration the accounting book value, as any material difference between the value used for price setting and book value may not be recovered (corporate finance office of a water company).

It was mainly the regulated enterprises that noted this difficulty. Those government business enterprises that were not regulated were instead able to set prices at levels to cover investment costs. One corporate finance officer stated that in their company it was:

... not a significant factor for our organisation. Pricing is set having regard to industry demand, future investment, and operating costs and return (corporate finance officer of a port corporation).

One final problem was the degree of perceived consistency:

... seems to be a great inconsistency in setting the regulatory asset value across entities/industries, which means varying price outcomes that may not be equitable (manager financial reporting of a water company).

### Deprival value

In the early 1990s, it was envisaged that deprival value would be the main approach taken to determine regulated assets for pricing purposes. For example, the COAG developed pricing principles for the water supply and wastewater industry. In its Transparency Statement – Part A of the principles, it was explained that the pricing principles are contained in the strategic framework for water, as set out in the Compendium of National Competition Policy Agreements (National Competition Council 1998, 2nd Edition). Section 3 of the strategic framework was specifically dedicated to the issue of pricing.

In addition, the Standing Committee on Agriculture and Resource Management (SCARM), through the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ), also provided a detailed set of pricing guidelines. These pricing guidelines are commonly referred to as the 'COAG Pricing Principles'. These pricing principles point out that the deprival value approach should be preferred in the use of valuing assets, unless there is a specific

circumstance which justifies the use of an alternative method. In many cases, alternative methods were subsequently used.

In its Final Report 2007/08, the Essential Services Commission of South Australia stated that the fair value approach to the valuation of assets (which in turn was based on the depreciated replacement cost) applied by SA Water was consistent with the use of deprival value, but requested that an explanation of the link between deprival value and fair value for SA Water be provided (Essential Services Commission of South Australia 2007a, p. 30). The fair value of the assets of SA Water was determined by its written-down current cost as being the lower of reproduction or replacement cost (SA Water 2013, p. 13). In this case, a replacement cost was effectively used; it was deemed a fair value and then stated as being the equivalent of a deprival value.

One exception to this is in Western Australia, where the regulator not only uses deprival value as part of its regulatory processes, but the Western Australian Government also required that government business enterprises report rates of return in terms of a deprival value valuation of assets. Therefore, in Western Australia assets are often valued at cost and deprival value, with the latter also calculated, in order to determine government agreed rates of return:

The accounts are kept at cost, but we use deprival value for our return on assets declaration (corporate finance officer of a Western Australian government business enterprise).

#### Impairment

Some government business entities have made an impairment charge against revalued assets. However, consideration of the need for an impairment charge is a mandatory requirement of the accounting standards. That is, if an entity uses replacement cost and subsequently makes an impairment charge, they are in fact adopting the deprival method.

In Victoria, Goulburn Murray Water stated that under the economic regulatory framework (i.e. line-in-the-sand) the company was unable to recover the majority of its statutory depreciation through customer charges.

Under the economic regulatory framework Goulburn-Murray Water is unable to recover the majority of its statutory depreciation through customer charges (Goulburn-Murray Water 2013, p.22)

In line with this, Sydney Water stated that:

Our return on assets in 2012/13 was 0.7% higher than the target of 6.3%. Our return on equity in 2012/13 was 1.4% higher than the target of 5.5%. The returns are based upon the regulated asset base valuation, which is significantly below the assets' depreciated replacement cost. Therefore, the results are low in respect of the replacement asset cost for a regulated utility with Sydney Water's level of commercial risk (Sydney Water 2013).

## Conclusion

The two main approaches to asset valuation in a price regulatory context are the line-in-the-sand and DORC approaches. The former has only been used in government-owned water enterprises; the latter has been used for both privately-owned and government-owned entities, and for water businesses in some jurisdictions (e.g. Queensland). However, not all organisations surveyed are happy with these approaches, as the valuations are not always in line with book values.

A deprival value approach has only been used explicitly only in Western Australia and the Northern Territory, although in some jurisdictions regulators have claimed that the two approaches used approximate the use of deprival value.

Attempts have been made by some enterprises to use their regulated revenue streams as a basis for the determination of a fair value estimate of their assets. This approach will in all likelihood become more common as companies attempt to expand their use of fair value from the determination of the value of their financial assets to that of their physical assets.

## **Chapter Eight**

## **Overall summary and conclusion**

## Introduction

This paper has looked at the manner in which assets are valued and their implications, not only for financial reporting and performance monitoring, but also in terms of evaluating the way in which prices are determined by regulated government business enterprises.

Since the original Discussion Paper was published in 1996, considerable work has been produced in Australia on the regulation of utility prices (including government-owned). In addition, governments have also been increasingly inclined to stipulate that their assets be measured in financial statements at fair value, as defined in international accounting standards.

The purpose of this paper has been to review past history of asset valuations since 1996, and the experiences of Australian regulators. Many years have passed since the publication of the 1996 Discussion Paper, and a number of developments in asset valuation have occurred since then that are of particular relevance to CPA Australia and its members.

## Regulation

In determining the prices of regulated services (including those provided by government business enterprises), an economic regulator must consider a number of factors. These include the protection of the interests of the users of the regulated services in terms of prices and standards, the promotion of efficiency and the promotion of competition between suppliers which may involve access to certain infrastructure facilities.

Therefore, in terms of pricing it should reflect the most efficient costs, but should also be sufficient for the owners of the enterprises to maintain the infrastructure and expand if necessary in response to growth in demand. There should also be equity between customers and investors, and a regulator needs to take into account the interests of both groups.

Depending on the circumstances, there may also be other matters that will need to be considered, such as the protection of the environment (e.g. water supply) and the demands on enterprises to cross-subsidise some services. The challenge for regulators is to be able to balance these demands, even when they conflict. There are a number of approaches to regulating prices, although the most common that has been adopted in Australia is a cost-based rate-of-return (building block) approach; in some circumstances, incorporating an incentive-based revenue cap. This approach involves an examination of the cost structure, and an assessment of asset valuations as well as appropriate rates of return. Despite following the United States approach more than that of the United Kingdom one (where incentive-based price caps are used), it is notable that the two main methods (costbased rate of return and incentive-based price caps) have converged somewhat over the years.

The focus of this paper has been on the determination of the asset base, rather than on the determination of appropriate rates of return. The determination of asset base valuations over the years has involved some degree of controversy, and there is some evidence that significant discrepancies between accounting-based asset values and regulated asset values has occurred.

## Asset valuations

In considering an appropriate method to use in measuring the value of assets, the key regulatory issues are:

- selection of the regulated asset base;
- the effect on the calculation of depreciation charges;
- the relationship between depreciation and replacement expenditure;
- compatibility between the regulatory asset base and the return applied to it;
- implications of ongoing asset revaluations on price regulation;
- accounting for over-capacity;
- gifted assets; and
- dealing with community obligations.

Selecting the appropriate approach to measuring assets is a critical step. The main criteria for assessing asset valuation methods for price regulation are the consistency with pricing objectives, the practicality, and the reasonableness of the outcomes to stakeholders.

Given that there is no perfect solution to the problems of valuing assets for pricing purposes, a fairly pragmatic approach has generally been taken in Australia. Most government business enterprises in Australia have a high proportion of long-lived assets which have been acquired at various points in time. Historical cost figures, therefore, have a limited application under these conditions.

The use of replacement costs, however, may give enterprises undue discretion to set asset valuations. In addition, there is a requirement to recognise inefficient past investments. Therefore, in Australian a DORC approach has been the preferred method by many regulators. This enables the regulator to eliminate prices that are based on over-invested assets and any past inefficient investments.

Although deprival value was envisaged originally as being an appropriate approach to asset valuation, in practice regulators were disinclined to use it. In some Australian jurisdictions, regulators instead used the line-in-the-sand approach to the value regulated assets. This involved using existing income flows to determine the value of assets.

In most Australian jurisdictions, once an original asset base was established, subsequent values were simply determined by adding investment expenditure to the original base and deducting depreciation and disposals.

# Relationship between regulatory asset base and accounting net book value

It is desirable that the valuation method used for regulatory purposes is in harmony with that used for financial reporting. If the regulatory valuation measure is significantly different from that adopted for accounting purposes, there will be a need for reporting of a separate set of regulatory accounts for pricing purposes.

In recent years, Australian enterprises, including those in the utilities sector, have been moving towards a system of fair value when it comes to the valuation of assets. Regulators, however, have not used this approach when it comes to the valuation of assets for regulatory purposes, although there is a degree of convergence between the methods used by regulators and these businesses.

First, many of the utilities businesses still use a cost-based (historical and replacement) approach to value many of their physical assets (as opposed to financial assets). This is because many do not have a resale value because of their highly specialised nature. This also means that many assets valuations of government business enterprises are still largely based on the revaluation of existing assets.

Second, a number of government business enterprises have begun to apply a fair value approach to asset valuation by taking their regulated income streams and using them as the basis for valuing their assets. This effectively gives them reported asset values similar to their regulated asset valuations. It would be expected that in the future more enterprises will extend their adoption of fair value by taking this approach.

## Conclusion

In the case of capital-intensive government business enterprises, the valuation of their assets cannot be undertaken in isolation. Accounting standards, pricing, economic and social objectives will all interact to determine the best approach to valuing assets. For a regulator, there are a number of considerations in addition to those that a business encounters when it values assets.

For practical purposes, it is preferable that there is some consistency between the manner in which businesses value for financial reporting purposes and the approach used by regulators for their purposes. Even if this cannot occur because of the different objectives of the two parties, it is important that there be a degree of transparency so that the relationship between asset valuation and the pricing of utilities can be understood.

Since 1996, there has been a considerable degree of development in the manner in which assets are valued by government business enterprises in Australia, both for financial reporting and regulatory purposes. The use of fair value has become more widespread in financial reporting, and optimised replacement cost and line-in-the-sand approaches used for regulatory purposes. Further development can be expected in the future with, perhaps, a degree of convergence occurring between the two.

## Appendix A

Jurisdiction	Company name	Industry	
Australia	Australia Post	Post	
	Australian Rail Track Corporation	Rail track	
	Australian Energy Market Operator	Electricity & gas	
	Airservices Australia	Aviation	
	Medibank Private	Insurance	
	NBN Co	Communications	
	Snowy Hydro	Electricity generation	
NSW	Hunter Water	Water	
	Sydney Water Corporation	Water	
	Sydney Catchment Authority	Water	
	State Water	Water	
	Newcastle Port Corporation <sup>a</sup>	Port	
	Port Kembla Port Corporation <sup>a</sup>	Port	
	Sydney Port Corporationα <sup>α</sup>	Port	
	Delta Electricity	Electricity generation	
	Macquarie Generation	Electricity generation	
	Green State Power	Electricity generation	
	Transgrid	Electricity transmission	
	AusGrid	Electricity distribution	
	Endeavour Energy	Electricity distribution	
	Essential Energy	Electricity distribution	
	Country Infrastructure Authority	Rail track	
	RailCorp	Rail track	
	State Transit Authority of NSW	Public transport	
VIC	Melbourne Water	Water	
	Yarra Valley Water	Water	
	South East Water	Water	
	City West Water	Water	
	Barwon Water	Water	
	Central Highlands Water	Water	
	Coliban Water	Water	
	East Gippsland Water	Water	
	Gippsland Water	Water	
	Goulburn Valley Water	Water	
	GWM Water	Water	
	Lower Murray Water	Water	
	North East Water	Water	
	South Gippsland Water	Water	

 Table A.1: Government business enterprises in Australia, December 2013

Jurisdiction	Company name	Industry
	Wannon Water	Water
	Westernport Water	Water
	Goulburn-Murray Water	Water
	Lower Murray Water Rural	Water
	Southern Rural Water	Water
	Port of Melbourne Corporation	Port
	Victorian Regional Channels Authority	Port
	VicTrack	Rail track
QLD	Sun Water	Water
	SEQwater	Water
	Gladstone Area Water Board	Water
	Mount Isa Water Board	Water
	Energex	Electricity distribution
	Ergon Energy	Electricity distribution
	Powerlink	Electricity transmission
	CS Energy	Electricity generation
	Stanwell Corporation	Electricity generation
	Ports North	Port
	Port of Townsville Limited	Port
	North Queensland Bulk Ports Corporation	Port
	Gladstone Port Corporation	Port
	Queensland Rail	Rail track
	Queensland Urban Utilities	Water
	Translink Transit Authority, Department of	Public transport
	Transport and Main Roads	
SA	Department of Planning, Transport &	Public transport
	Infrastructure (Office of the Rail	
	Commissioner) C.A. Wester $^{\alpha}$	
<b>XX</b> 7 A	SA water	Water infrastructure
WA	Water Authority of WA	Water
	Busselton water Board	Water
	Aqwest – Bundury water Board	water
	western Power	& distribution
	Horizon Power	Electricity transmission
		& distribution
	Svnergy*	Electricity retail
	Verve Energy*	Electricity generation
	Public Transport Authority	Public transport
	Fremantle Ports	Port
	Broome Port Authority	Port
	Bunbury Port Authority	Port

Jurisdiction	Company name	Industry
	Dampier Port Authority	Port
	Esperance Port Authority	Port
	Geraldton Port authority	Port
	Port Hedland Port Authority	Port
	Albany Port Authority	Port
TAS	TasWater <sup>@</sup>	Water
	Aurora Energy	Electricity distribution
	Transend Networks	Electricity transmission
	Hydro Tasmania	Electricity generation
	TasPorts	Port
	TasRail	Rail
	Metro Tasmania	Public transport
NT	Power and Water Corporation	Electricity & water
	Darwin Port Corporation	Port
ACT	ACTEW	Water

<sup> $\alpha$ </sup>In 2013, the New South Wales Government leased the Port Kembla and Sydney port assets to a private consortium. The two port corporations still exist as asset owners, similar to SA Water which owns but leases the water assets in that state, and the Port of Brisbane which is operated by a private company. The Newcastle Port Corporation was privatised in a similar fashion in May 2014.

\*In January 2014, Synergy and Verve were merged

<sup>(a)</sup>TasWater was formed in July 2013 by the merger of three water and sewerage companies and their jointly owned services company.

## **Appendix B**

## Questionnaire

#### FORM A.

Swinburne University of Technology

Project Title: Asset Valuation by Government Trading Enterprises: an evaluation of pricing issues.

#### Principal Investigator(s): Associate Professor Malcolm Abbott, Associate Professor Jean Raar, Angela-Tan-Kantor

1. I consent to participate in the project named above. I have been provided a copy of the project consent information statement to which this consent form relates and any questions I have asked have been answered to my satisfaction.

[For 2/3 below, list as appropriate, delete inapplicable text and add to/renumber the list as necessary]

#### 2. In relation to this project, please circle your response to the following:

•	l agree to be interviewed by the researcher <b>Yes</b>	No
•	I agree to allow the interview to be recorded by electronic device Yes	No
•	I agree to make myself available for further information if required <b>Yes</b>	No
•	I agree to complete questionnaires asking me about [insert topic(s)]	
	Yes	No

- 3. I acknowledge that:
  - (a) my participation is voluntary and that I am free to withdraw from the project at any time without explanation;
  - (b) the Swinburne project is for the purpose of research and not for profit;
  - (c) any identifiable information about me which is gathered in the course of and as the result of my participating in this project will be (i) collected and retained for the purpose of this project and (ii) accessed and analysed by the researcher(s) for the purpose of conducting this project;
  - (d) my anonymity is preserved and I will not be identified in publications or otherwise without my express written consent.

By signing this document I agree to participate in this project.

Name of Participant:	
Signature & Date:	

## **Questionnaire on Asset Valuation and Pricing Issues**

## SECTION A: GENERAL

1.	Name of Organisation
2.	Name and Contact details for the Chief Finance Officer
3.	Description of business activities
4.	What percentage of your entity is government owned?
5.	<b>Does the entity operate in a competitive market?</b> (Please indicate below 1 = Strongly Agree; 5 = Strongly Disagree).
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
6.	Do you consider the entity has significant market power? Yes 🗌 No 🗌
7.	Is the entity licenced by government to operate in the market? Yes D No
8. lf	f you answered YES to Question (9) above, can the government revoke, renew or transfer the licence? (Please indicate below 1 = Strongly Agree; 5 =Strongly Disagree. 1 2 3 4 5

9. Description of asset base:

				Mea	suren	nent	_
Major Asset categories	Gross	Estin Usefi	nated ul life	Repor Net bo valu	ted ook e	Basis of valuation	Depreciation Method

## 10. In your organisation what asset information is maintained in your asset register?

Date of acquisition:
Original estimate of asset life
Remaining asset life
Original purchase cost
Gross replacement cost
Written down historical cost
Written down replacement cost
Optimised deprival value
Net present value
Market value (if available)
Other (please specify)

1	2	3	4	4

#### SECTION B:

#### IMPLEMENTATION OF GUIDELINES ON ACCOUNTING POLICY FOR VALUATION OF ASSETS OF GOVERNMENT TRADING ENTERPRISES (GTEs) USING CURRENT VALUATION METHODS.

The 'Guidelines ' were developed and issues by the Steering Committee on National Performance Monitoring of Government Trading enterprises (GTE's) in 1994. The Guidelines adopted the concept of 'Deprival Value" as the appropriate current value basis for GTE asset valuation. Deprival value of an asset is the value to the entity of future economic benefits that the entity would forego if deprived of the asset. The basic

- principles are:
   Where an entity will replace an asset if deprived of it == → as the asset will be measured at its current cost.
  - Where an entity will not replace an asset if deprived of it == → the asset will be measured at the greater of its market value and the present value of future cash inflows expected from continued use of the asset.
  - Where an asset is surplus to requirements = → the asset should be measured at its market value.

As an update to information requested in the Discussion Paper in 1996, please answer he following questions.

12. Are you aware of the concept of deprival value adopted by the Steering Committee?

Yes 🗌	No 🗌
-------	------

13. Has your entity adopted the method off deprival value (DV)?

Yes No

15.

If 'Yes', go to question 14. If 'No' go to Question 22

14. In respect to the implementation of the DV method of asset valuation:

•	Capitalisation			
	threshold	 		
٠	Revaluation			
	threshold	 		
٠	Certification/audit			
	undertaken	 	•••	
		Yes 🗌	No	
Frequ	uency of			
reval	uation?	 		

- 16. What are the key variables/problem areas that have a major influence on the calculation for deprival value? ..... ..... 17. Are there any assets not recognised in the balance sheet due to 'reliable measurement' criteria not being met? ..... ..... 18. Is the DV method adopted for the valuation of the following assets? If Yes, % change in valuation Heritage • assets..... Land under infrastructure..... Community assets..... Assets funded by • taxpayer/customers..... Easements ..... Transportation..... Other, please indicate • ..... .....
- 19. If the response to Question 20 was "NO" what method does the entity adopt for the valuation of the following assets in financial reports?

•	Heritage
	assets
•	Land under
	infrastructure
•	Community
	assets
•	Assets funded by
	taxpayer/customers
•	Easements
•	Transportation
•	Other, please
	indicate

#### 20.

:

Under the deprival value approach, which of the following factors does the entity consider in the determination of replacement costs?

	1 = Strongly Agree; 5 = Strongly Disagree			gree	
	1 2 3 4			5	
Systems optimisation					
Planning horizon					
Change in capacity					
Reassessment of asset lives					
Technology					
Quality/Standards of services					
Efficiency improvements					
2 .					
Other, please specify					

21. How does the adoption of DV impact on depreciation? (e.g. % change).

Depreciation under valuation used for financial reports......
Other comments......

#### 22. Has the recoverable amount been applied?

• No • Yes	s on a total asset base		
• Yes	s, by each asset category		
<ul> <li>If year</li> <li>replay</li> </ul>	es, to the above, how does the acement cost?	ne RAT result com	npare with the depreciated
• Wha and	at assumptions have been ac cost outlays?	lopted in the estin	nation of income streams
your juris	diction, are you aware of any	/ Treasuring guid	elines/directions on asset

23. In your jurisdiction, are you aware of any Treasuring guidelines/directions on asset valuation subsequent to the release of the 1994 Steering Committee Asset Valuation guidelines?

.....

24. In your opinion, does the adoption of national guidelines by each industry ensure consistency in asset valuation across all jurisdiction? (1 = Strongly Agree ; 5 = Strongly Disagree)



25. How can the Asset Valuation Guidelines be improved? Please comment .

#### SECTION C.

#### ASSET VALUATION AND PRICING

Pricing is a key parameter in the determination of a GTE's earning capacity – which in turn is a primary driver of the economic valuation behind the deprival value method. On the other hand, asset valuation has a material impact on the cost allocation/recovering and the pricing regime.

26. In your entity, is asset valuation the basis for?

		1 = Strongly Agree; 5 = Strongly Disagree				
	1	2	3	4	5	
External Financial reporting						
Performance monitoring						
- External						
performance						
- Internal performance						
Price-setting						
Taxation						
Asset management						
Other, please explain						

27. What are the main asset valuation methods used by your entity for:

Financial performance reporting only
Internal performance monitoring
Price setting
Taxation
Internal performance incentives
Fair rate of return
Asset management
Other, please explain:

28. Is you entity subject to price regulation?

Yes	Ву	No	$\square$
100	<b>b</b> y		

29. If 'YES' to the above question, does the entity have the right to recover costs?

Entity costs only	Yes 🗌 N
An allowed level of costs	
whether or not these are incurred by the entity	Yes 🗌 N
	Entity costs only An allowed level of costs whether or not these are incurred by the entity

- Specific types of costs without limit
- Specific types of costs with a limit.

Yes		No	
Yes Yes		No No	
Yes	$\square$	No	

**30.** Is price setting designed to:

	1 = Strongly Agree; 5 = Strongly			gly	
Fair rate of return to entity	1	<b>2</b>	3	4	5
Fair rate of return to external stakeholders					
Reduce costs to customers					
Aid infrastructure investments					Ц
Increase/decrease supply and demand					
Cost recovery					
Entity costs only – for					
Example: Operating costs					
Depreciation	Н			$\square$	Н
Return on capital					
Other.					
An allowed level of costs (refer prior question)					
Specific types of costs					
Without limit					
With limit					
Other, please explain:					
31. In respect of depreciation of infrastructure assets, in your depreciation broadly over time, match the level of expendi Please comment	opini ture t	on she o rene	ould w the	asset	?
32. What asset valuation method is adopted for calculations to return on capital?	o dete	ermine	the er	ntity's	
	•••••				
33. What are your comments in response to the use of asset v	aluati	on for	price	setting	g?
	•••••			•••••	
	•••••		•••••		
			Continue	ed over th	e page

34. For pricing decisions, do you find in your entity that:

1 = Strongly agree 5 = Strongly disagree

Adjusted' Asset valuation is required for pricing decisions

Prices should be determined on the basis of asset valued according to DV

Cost recovering and a specific rate of return is more relevant

Economic rather than an accounting rate is important Other (please explain)

1	2	3	4	5

35. For pricing decisions, do you find in your entity that the following method/s of depreciation

Is used:



Straight line method

Reducing/diminishing balance method

A combination of the above are used for the same

asset

Units of production method

Depreciation methods are not relevant to pricing decisions

Other (please explain)

1	2	3	4	5

## Appendix C

## An example of the cost-of-service approach to price regulation (building blocks approach): Airservices Australia

Since the mid-1990s, the building block approach has been used extensively as the basis for regulating prices of monopoly facilities in Australia (both government and privatelyowned). One example of how this has been applied is for Airservices Australia.

Airservices Australia is an Australian Government-owned corporation, responsible for providing safe, secure, efficient and environmentally responsible services to the aviation industry (e.g. air traffic control, airways navigation and communication facilities, aeronautical data, and airport rescue and fire-fighting services). It was created in July 1995 when the Civil Aviation Authority was split into two separate government organisations (Airservices Australia and the Civil Aviation Safety Authority).

Initially, its services were declared under the *Prices Surveillance Act 1983*, but later had effect under Part VIIA of the *Trade Practices Act* (later still the *Competition and Consumer Act 2010*). This declaration meant that to change its prices, Airservices Australia had to apply to the ACCC for approval.

As part of this process, Airservices Australia developed a pricing model based on the building block approach. In 2004 the ACCC received a price notification from Airservices Australia, formalising a five-year pricing model. This price model used the building block approach to establish prices for the company's services. Table C1 below sets out the main figures relevant to the proposed building block approach.

To begin with, a regulated asset base was determined by Airservices Australia. There had been some previous criticism of how this had been conducted, so during its consultation process Airservices agreed on using independent consultant Hymans to provide valuation advice on its asset base (including the use of a DORC valuation). Hymans' total asset valuation for Airservices, as at September 2003, was \$338 million. Subsequent asset valuations used this figure as a base, and then rolled forward capital expenditure into it and deducted depreciation and disposals. These figures also appear in Table C1. This process continued after the five-year period was completed, and new price notifications were received by the ACCC.

Airservices Australia then estimated prices that would provide it with a revenue stream to cover its expected operating expenses, depreciation of its assets, and provide a rate of return on the estimated asset base. In its price notification, Airservices proposed a weighted average cost of capital of 9.75 per cent, which was based on a number of recommendations contained in a PricewaterhouseCoopers report it commissioned. The ACCC's view, however, was that an appropriate value for Airservices' weighted average cost of capital was 8.95 per cent. The latter was, therefore, determined and used as the basis for the determination of Airservices Australia's prices.

	2004/05	2005/06	2006/07	2007/08	2008/09
Return on assets (WACC 9.75%)	39.0	43.1	46.9	49.5	51.4
Total OPEX	482.4	507.7	519.7	538.6	555.8
Depreciation	77.1	74.4	76.8	78.6	78.3
Tax	4.8	5.3	5.8	6.1	6.3
Revenue (WACC 9.75%)	603.3	630.5	649.2	672.8	691.8
Revenue (WACC 8.95%)	599.5	626.3	644.7	668.0	686.8
Regulated asset base	400	442	481	508	527

Table C1: Airservices Australia's proposed building block (\$ million)

Source: Australian Competition and Consumer Commission 2004, p. 39. OPEX = operating expenses. WACC = weighted average cost of capital

## References

Abbott, M 2008, 'Electricity reform and gains from the reallocation of resources', *Electricity Journal*, vol. 20, no. 7, pp. 72-77.

Abbott, M 2010, 'The long term development of the New Zealand electricity supply industry', *New Zealand Economic Papers*, vol. 44, no. 1, pp. 75-89.

Abbott, M 2013, 'The gas industry origins of Australia's economic regulation of utilities', *Australian Economic History Review*, vol. 53, no. 2, pp. 167-186.

Abbott, M & Cohen, B 2014, 'A survey of the privatisation of government-owned enterprises in Australia since the 1980s', mimeo.

*ABC News* 2014, 'Medibank Private: Government Announces sale through IPO, subject to market conditions', 26 March. <u>http://www.abc.net.au/news/</u>

Aboody, D, Barth, ME & Kasnik, R 1999, 'Revaluations of fixed assets and future firm performance: evidence from the UK', *Journal of Accountability & Performance*, vol. 26, no. 1, pp. 149-178.

ACTEW 2013, Annual Report, Canberra: ACTEW.

Ai, C & Sappington, DEM 2002, 'The impact of state incentive regulation on the US telecommunications industry', *Journal of Regulatory Economics*, vol. 22, no. 2, pp. 133-160.

Airservices Australia 2011, Draft Price Notification, March.

Aqua America 2012, Growing Customers, Developing Employees: 2012 Annual Report, Bryn Penn: Aqua America.

Armstrong, M, Cowan, S, & Vickers, J 1995, *Regulatory Reform: Economic Analysis and British Experience*, Cambridge MA: MIT Press.

Armstrong, M 1998, in D. Helm & T. Jenkinson, ed., *Competition in Regulated Industries*, Oxford: Oxford University Press.

Armstrong, M & Sappington, D 2005, 'Recent developments in the theory of regulation', in M. Armstrong & R. Porter, eds., *Handbook of Industrial Organization*, vol. 111.

Asciano 2009, Annual Report, Sydney: Asciano.

Augsrid, 2013, Annual Report, Sydney: Ausgriad.

Australia, Committee of Inquiry into Inflation and Taxation 1975, *Inflation and Taxation: Report of the Committee of Inquiry into Inflation and Taxation*, Canberra: Australian Government Publishing Service.
Australia, Department of Transport and Regional Development 1996, *Pricing Policy Paper*, Information Paper, November, Canberra.

Australia, Exports and Infrastructure Taskforce 2005, Australia's Export Infrastructure: Report to the Prime Minister, Canberra.

Australia, Steering Committee on National Performance Monitoring of Government Trading Enterprises 1994, *Guidelines on Accounting Policy for Valuation of Assets* of Government Trading Enterprise, Melbourne.

Australia, Steering Committee on National Performance Monitoring of Government Trading Enterprises 1996, An Economic Framework for Assessing the Financial Performance of GTEs, Melbourne: Steering Committee, July.

Australia Post 2013, Annual Report, Sydney: Australia Post.

AustraliaPost2014,CustomerServiceCharter,http://auspost.com.au/media/documents/customer-service-charter-2013.pdf

Australian Accounting Standards Board 2013, Fair Value Measurement, December, www.aasb.gov.au

Advertiser 2009, 'Asciano Tassie rail sale', 8 September, p. 55.

Australia, Infrastructure Australia and the National Transport Commission, 2010, *National Ports Strategy: Background Paper*, Canberra.

Australia, National Water Commission 2010, National Water Initiative Pricing Principles, Canberra: NWC.

Australia, National Water Commission 2012, *National Performance Report 2011-12*, Canberra: National Water Commission.

Australian Bureau of Statistics 1989-2012, *Australian System of National Accounts*, 5204.0, Canberra: Australian Bureau of Statistics.

Australian Competition and Consumer Commission 1998a, *Economic Regulation of Airports – an Overview*, ACCC Information Paper, July, ACCC.

Australian Competition and Consumer Commission 1998b, Victorian Gas Transmission Access Arrangements: Final Decision, 16 December, ACCC.

Australian Competition and Consumer Commission 1998c, Regulation of Transmission Revenues, ACCC Issues Paper, May.

Australian Competition and Consumer Commission 1999a, *Statement of Regulatory Intent for the Regulation of Transmission Revenues*, May.

Australian Competition and Consumer Commission 1999b, Draft Statement of Regulatory Principles for the Regulation of Transmission Revenue, ACCC.

Australian Competition and Consumer Commission 1999c, *Access Undertakings – a Guide to Part IIIA of the Trade Practices Act*, Dickson ACT: ACCC.

Australian Competition and Consumer Commission 2000a, NSW and ACT Transmission Network Revenue Caps 1999/00-2003/04, 15 January, ACCC.

Australian Competition and Consumer Commission 2000b, *Access Arrangement by APT Pipelines (NSW) Pty Ltd for the Central West Pipeline*, 30 June, ACCC.

Australian Competition and Consumer Commission 2001a, *Queensland Transmission Network Revenue Cap 2002-2006/07*, 1 November, ACCC.

Australian Competition and Consumer Commission 2001b, *Final Decision: Access Arrangement proposed by Epic Energy South Australia Pty Ltd for the Moomba to Adelaide Pipeline System*, 12 September, ACCC.

Australian Competition and Consumer Commission 2002a, South Australian Transmission Network Revenue Cap 2003-2007/08, 11 December, ACCC.

Australian Competition and Consumer Commission 2002b, Victorian Transmission Network Revenue Caps 2003-2008, 11 December, ACCC.

Australian Competition and Consumer Commission 2002c, Access Arrangement proposed by NT Gas Pty Ltd for the Amadeus Basin to Darwin Pipeline, 4 December, ACCC.

Australian Competition and Consumer Commission 2003a, *Tasmanian Transmission Network Revenue Cap 2004-2008/09*, 10 December, ACCC

Australian Competition and Consumer Commission 2003b, *East Australian Pipeline Limited Access arrangement for the Moomba to Sydney Pipeline System*, 2 October, ACCC.

Australian Competition and Consumer Commission 2004, *Final Decision: Airservices Australia*, Price Notification, Melbourne, December.

Australian Competition and Consumer Commission 2008, *Final Decision: Australian Rail Track Corporation Access Undertaking – Interstate Rail Network,* July, Melbourne: ACCC.

Australian Competition and Consumer Commission 2008, ACCC Airports Reporting Guidelines, ACCC.

Australian Competition and Consumer Commission 2013, NBN Co Special Access Undertaking: Final Decision, December, Melbourne: ACCC.

Australian Society of Certified Practicing Accountants & the Independent Pricing and Regulatory Tribunal of New South Wales 1996, Asset valuation by government trading enterprises: an evaluation of pricing issues: a research project sponsored *by the Independent Pricing and Regulatory Tribunal,* Sydney: Public Sector Accounting Centre of Excellence.

Averch, H & Johnson, L 1962, 'Behavior of the firm under regulatory constraint', *American Economic Review*, vol. 52, no. 5, pp. 1053-1069.

Baxter, W. T. 1975, Accounting values and inflation, McGraw-Hill.

Baumol, WJ, & Willig, RD 1986, 'Contestability: developments since the book', *Oxford Economic Papers*, vol. 38, pp. 9-36.

Baumol, W 1977, 'On the proper cost tests for natural monopoly in a multiproduct industry', *American Economic Review*, vol. 67, no. 5, pp. 809-822.

Baumol, WJ, Bailey, ED & Willig, RD 1977, 'Weak invisible hand theorems on the sustainability of multiproduct natural monopoly', *American Economic Review*, vol. 67, pp. 350-365.

Bonbright, JC 1937, The Valuation of Property: a Treatise on the Appraisal of Property for Different Legal Purposes, New York: McGraw Hill.

Bonbright, JC, Danielson, AL & Kamerschen, DR 1961, *Principles of Public Utility Rates*, New York: Columbia University Press.

Butlin, NG, Barnard, A. & Pincus, JJ 1982, *Government and Capitalism: Public and Private Choice in Twentieth Century Australia*, Sydney: George Allen &Unwin.

Baldwin, R. & Cave, M 1999, Understanding Regulation: Theory, Strategy and Practice, Oxford: Oxford University Press.

British Columbia Electric Railway Co. v. Public Utilities Commission [1960] S.C.R. 837.

Canadian Radio-Television and Telecommunications Commission (CRTC) & Wall Communications 2012, A Study of Wholesale Costing Methodologies in Selected Countries.

Cook, P 1998, 'Privatisation in the UK: policy and performance', in D. Parker, ed., *Privatisation in the European Union: Theory and Policy Perspectives*.

Cowan, S 2006, 'Network regulation', *Oxford Review of Economic Policy*, vol. 22, no. 2, pp. 248-259.

Carlton, D & Perloff, J 2004, *Modern Industrial Organisation*, Fourth edn., Addison-Wesley.

Chamber, R 1966, Accounting, Evaluation and Economic Behaviour, Sydney: Sydney University Press.

Commerce Commission (NZ) 2002, Discussion Paper, Review of Asset Valuation Methodologies: Electricity Lines Businesses' System Fixed Assets, Wellington: Commerce Commission.

Commerce Commission (NZ) 2003, Decision Paper regulation of Electricity Lines Businesses, Targeted Control Regime, Threshold Decisions, Wellington: Commerce Commission.

Commerce Commission (NZ) 2006, Proposed Optimised Depreciated Replacement Methodology for Valuation of Powerco System Fixed Assets, Wellington: Commerce Commission.

Commerce Commission (NZ) 2009, Treatment of Consumer-Owned Electricity Businesses under the Initial Default Price-Quality Path, Wellington: Commerce Commission.

Commerce Commission, (NZ) 2013, *Electricity Distributors' Performance 2008 to 2011*, Wellington: Commerce Commission.

Council of Australian Governments 1994, *Communique*, 25 February, Hobart: COAG.

CPA Australia & Edgerton, D 2013, Valuation and depreciation: a guide for the non-profit and public sector under accrual based accounting standards, Southbank Vic; CPA Australia.

Daily Telegraph, 1 July 2013, 3 June 2014, Sydney.

Deegan, C 2013, *Australian Financial Accounting*, seventh edition, Mc-Graw Hill, North Ryde NSW.

Deloitte, 2010a Economic Regulation of the Australian Water Sector: Past, Present and Future, March, Deloitte Energy & Resources.

Deloitte, 2010b Determining the Fair Value of Australia's Water Infrastructure Assets, March, Deloitte Energy & Resources.

Eames, J 1998, Reshaping Australia's Aviation Landscape: the Federal Airports Corporation, 1986-1998, Sydney: FAC.

Economic Regulation Authority (WA) 2005a, *Final Report: Inquiry on Urban Water* and Wastewater Pricing, 4 November, Perth: ERA.

Economic Regulation Authority (WA) 2005b, *Final Report: Review of the Western Australian Railways Access Code 2000, 23* September, Perth: ERA.

Economic Regulation Authority (WA) 2007, *Final Decision on the Proposed Access Arrangements for the South West Interconnected Network, submitted by Western Power*, Perth: ERA.

Energex 2013, Annual Report, Brisbane: Energex.

Energy Regulatory Commission-Philippines 2007, Performance Based Regulation of Philippines, Electricity Distribution Companies, Regulatory Training Course, Session 2 – Asset Valuation Principles, Cebu, Baguio: ERCP.

Ergon Energy, 2013, Annual Report, Brisbane: Ergon Energy.

Ernst & Young, 2013 AASB 13 Fair Value Measurement: implications for the not for profit and public sectors, October, Ernst & Young.

Essential Services Commission (VIC) 2004, *Ministerial Advice: Approach to Determining Regulatory Asset Values for Victorian Water Businesses*, Melbourne: ESC.

Essential Services Commission (VIC) 2005a, *Review of the Victorian Rail Access Regime: Final Report*, Volume III: Supporting material, February, Melbourne: ESC.

Essential Services Commission (VIC) 2005b, Advice to the Minister for Water: regulatory asset values for the Victorian water businesses, March, Melbourne: ESC.

Essential Services Commission (VIC) 2009, *Price Review 2009: Greater Metropolitan Water Businesses - Final Decision*, Melbourne.

Essential Services Commission 2013 (VIC), Metropolitan Melbourne Water Price Review 2013 Final Decision: Melbourne Water: Melbourne Water Determination, Melbourne.

Essential Services Commission of South Australia 2005a, *Inquiry into the 2005-06 Metropolitan and Regional Water and Wastewater Pricing Prices: Final Report*, March, Adelaide: ESCSA.

Essential Services Commission of South Australia 2005b, South Australian Rail Access Regime: Changes to the Regulator Components: Final Decision, October, Adelaide: ESCSA.

Evans, LT, Grimes, A, Wilkinson, B, & Teece, D 1996, 'Economic reform in New Zealand 1984-95: the pursuit of efficiency', *Journal of Economic Literature*, vol. 34, pp. 1856-1902.

Evans, LT & Meade, RB 2005, Alternating Currents or Counter Revolution? Contemporary Electricity Reform in New Zealand, Wellington: Victoria University Press.

Federal Power Commission v. Hope Natural Gas Co. 320 U.S. 591 (1944).

Forrestal, L 2009, 'Asciano pulls out of Tasmania', *Financial Review*, 8 September, p. 45.

Fremantle Ports 2013, Annual Reports, Perth: Fremantle Ports.

Goldberg, V 1976, 'Regulation and administered contracts', *Bell Journal of Economics*, vol. 7, no. 2 (Autumn), pp. 426-448.

Goulburn-Murray Water 2013, Annual Report, Mildura: GMW.

Greater Wellington Water 2013, Annual Report 2012/13, Wellington: Greater Wellington Water.

Hawkes Bay Airport 2013, Annual Report 2012/13, Napier: Hawkes Bay Airport.

Hayward, DL 2005, 'Water utility valuation: beyond the dartboard approach', <u>http://www.haywardconsultinggroup.com/</u> accessed 26 March 2014.

Howell, B 2009, 'Politics and the pursuit of telecommunications sector efficiency in New Zealand', *Journal of Competition Law and Economics*, vol. 6, no. 2, pp. 253-276.

Independent Competition and Regulatory Commission (ACT) 1999, *ACTEW's* Electricity, Water & Sewerage Changes for 1999/2000 to 2003/2004 – Price Direction, May, Canberra: ICRC.

Independent Competition and Regulatory Commission (ACT) 2008, *Water and Wastewater Review: Final Report and Price Determination*, Report 1 of 2008, April, Canberra: ICRC.

Independent Pricing and Regulatory Tribunal (NSW) 2000, Sydney Catchment Authority: Prices of Water Supply Services Medium-Term Price Path from 1 October 2000, September, Sydney: IPART.

Independent Pricing and Regulatory Tribunal (NSW) 2005, *Final Determination: NSW Electricity Distribution Pricing 2004/05 to 2008/09*, June, Sydney: IPART.

Independent Pricing and Regulatory Tribunal (NSW) 2012, *Review of Access Pricing on the NSW Grain Line Network, Transport-Final Report, April, Sydney: IPART.* 

Infrastructure Australia and the National Transport Commission 2010, *Background Paper 1 for National Policy Strategy "Effective port governance and project evaluation"*, Melbourne.

Infrastructure Australia and the National Transport Commission 2011, National Ports Strategy: Background Paper, Canberra.

Kahn, A 1970, *The Economics of Regulation: Principles and Institutions*, Wiley, New York.

Kahn A 1971, *The Economics of Regulation: Principles and Institutions*, The MIT Press, New York.

King, S & Maddock, R 1996, Unlocking the Infrastructure: the Reform of Public Utilities in Australia, St Leornards NSW: Allen & Unwin.

Laffont, J 1994, 'The new economics of regulation ten years later', *Econometrica*, vol. 62, no. 3, pp. 507-537.

Lee, J, & Fisher, G 2004, 'Infrastructure assets disclosure in Australian public sector annual reports,' *Science Direct*, vol. 28, pp. 349-367.

Littlechild, S 1983, *Regulation of British Telecommunications' Profitability: Report to the Secretary of State*, London: Department of Industry.

Loeb, M & Magat 1979, 'A Decentralised Method for Utility Regulation', *Journal of Law and Economics*, vol. 22, no. 2, pp. 399-404.

Lobina, E & Hall, D 2001, '*UK water privatisation - a briefing*', Public Services Research, United Kingdom.

Los Angeles Department of Water and Power 2012, *Water System: Financial Statements and Required Supplementary Information*, Los Angeles: LADWP.

Maddock, R 1995, 'Australian lessons in implementing competition reform', *Economic Papers*, vol. 14, pp. 31-40.

Melbourne Water 2004 to 2013, Annual Reports, Melbourne: Melbourne Water.

Metropolitan Water Reclamation District of Greater Chicago 2012, 2012 Comprehensive Annual Financial Report, Chicago: MWRDGC.

Miami-Dade Water and Sewer Department 2012, 2012 Comprehensive Annual Financial Report, Miami: Miami-Dade County.

Mill, J 1926, Principles of Political Economy, Longman: London.

Munn v. Illinois 94 U.S. 113 (1877).

National Grid 2004, Annual Report, London: National grid.

National Competition Council 1998, *Compendium of National Competition Policy Agreements*, 2<sup>nd</sup> ed., June 1998, Canberra, AGPS.

NBNCo 2013a, Strategic Review Report, December, Sydney: NBNCo.

NBNCo 2013b, Annual Report, Sydney: NBNCo.

NBNCo, 2013c, NBN Co Special Access Undertaking: Given to the ACCC in Accordance with Part XIC of the Competition and Consumer Act 2010 (Cth), Sydney: NBNCo.

NERA Economic Consulting 2014, Regulatory Asset Valuation and Pricing: A Report to the Essential Services Commission, Sydney: NERA.

New Zealand, Committee of Inquiry into Inflation Accounting 1976, *Report of the Committee of Inquiry into Inflation Accounting*, Wellington; New Zealand Government Printer.

New Zealand, Energy Markets Group, Energy and Communications Branch 2012, *Chronology of New Zealand Electricity Reform*, June, Wellington.

New Zealand, Ministry of Commerce & the Treasury 1995, *Regulation of Access to Vertically-Integrated Natural Monopolies*, Wellington: Ministry.

New Zealand National Asset Management Steering Group 2001, New Zealand Infrastructure Asset Valuation and Depreciation Guidelines, Wellington: NZNMSG.

NERA Economic Consulting, Pricewaterhousecoopers 2009, Initial Value of Regulatory Assets – the Australian Experience: Report for Orion and Powerco, 6 December, Sydney: NERA.

Office of the Tasmanian Economic Regulator 2008, *Report of the Inquiry to Inform the Development of an Interim Pricing Order for the Tasmanian Water and Sewerage Sector: Final Report*, November, Hobart: OTER.

Office of the Tasmanian Economic Regulator 1999, *Final Report: Investigation into Electricity Pricing*, Hobart: OTER.

OFWAT 2007, Regulatory Accounting Guideline 1.04 – Guidelines for Accounting for Capital Maintenance Charges and Current Costs and the Analysis of Regulatory Capital Values, London: OFWAT.

OFWAT 2009, *Future Water and Sewerage Charges: 2010-2015 Final Determination*, London: OFWAT.

OFWAT 2013, Regulatory Accounting Guideline 3.07 –Guideline for the Format and Disclosures for the Regulatory Accounts, London: OFWAT.

O'Neill, D & Vass, P 1996, 'Incentive regulation: a theoretical and historical review,' Research Report 5, Centre for the Study of Regulated Industries, London.

*Oxford Dictionaries*, Oxford University Press, viewed <u>http://oxforddictionaries.com/.</u>

Pawsey, N. & Crane, L. 2014, 'Review of the statutory asset values of Victorian water businesses', Report, Centre for Water Policy and Management, La Trobe University.

Pollitt, MG 1999, 'A Survey of the Liberalisation of Public Enterprises in the UK since 1979', University of Cambridge, unpublished mimeo.

Posner, R 1969, Natural Monopoly and Regulation, Stanford Law Review.

Productivity Commission 2008, *Financial Performance of Government Trading Enterprises 2004-2005 to 2006-2007*, Productivity Commission Research Paper, Melbourne.

Productivity Commission 2014, National Access Regime, Melbourne, PC.

Productivity Commission 1998, International Benchmarking of the Australian Waterfront, Canberra: Australian Government Publishing Service.

Queensland Competition Authority 2001, *Final Determination: Regulation of Electricity Distribution*, May, Brisbane: QCA.

Queensland Competition Authority 2005, *Final Report: Gladstone Area Water Board: Investigation of Pricing Practices*, June, Brisbane: QCA.

QR Network 2010, QR Network's Access Undertaking (2008), Brisbane: QR Network.

RailCorp 2013, Annual Report, Sydney: RailCorp.

Reserve Bank of Australia 1997, *Reserve Bank of Australia Bulletin*, 'Privatisation in Australia', Sydney, RBA. December.

SAHA International 2010, Issues Paper on Renewals Annuity or a Regulatory Depreciation Allowance, Melbourne.

Schmalensee, R 1979, The Control of Natural Monopolies, Lexington Books.

Sinclair Knight Merz 2013, *Metropolitan Melbourne Water Price Review 2013, New Customer Contributions: Review Capital and Operating Expenditure,* Melbourne.

Smyth v. Ames 171 U.S. 361 (1898).

Southwest Water 2004, 2013, Annual Reports, Exeter UK: Southwest Water.

Sydney Morning Herald, 10 June 2014, Sydney.

Sydney Water 2009, 2013, Annual Reports, Sydney: Sydney Water.

Sydney Port Corporation 2013, Annual Report, Sydney: Sydney Port Corporation.

TasRail 2011, 2013, Annual Reports, Hobart: TasRail.

Temple-Heald, S 1991, *The Importance of Asset Valuation and Implications for Performance Monitoring of GTEs, Belconnen ACT: Industry Commission.* 

The Institute of Chartered Accountants 2013, *Financial Reporting Handbook*, John Wiley & Sons Australia Ltd, Melbourne.

Transend Networks, 2013, Annual Report, Hobart: Transend.

Transgrid 2013, Annual Report, Sydney: Transgrid.

Transpower 2013, Annual Report, Wellington: Transpower.

United Kingdom, Inflation Accounting Committee 1975, Inflation Accounting: Report of the Inflation Accounting Committee, London, Her Majesty's Stationery Office.

United Kingdom, Department of Trade and Industries 1998, A Fair Deal for Consumers: Modernizing the Framework for Utility Regulation, London: HMOS.

Utilities Commission (NT) 2009, *Final Determination: Networks Pricing: 2009 Regulatory Reset*, March, Darwin: UC.

Utilities Commission (NT) 2012, 2013, Utilities Commission Annual Report, Darwin: Utilities Commission.

Vector Energy 2013, Annual Report, Auckland: Vector.

Victoria, Auditor-General 1998. *Report on Ministerial Portfolios*, Melbourne: Victorian Auditor-General's Department.

Victoria, Auditor-General 2004, Auditor-General's Report on the Finances of the State of Victoria, Melbourne: Auditor-general's Department.

Victoria, Auditor-General 2013, Water Entities: Results of the 2012-13 Audits, Melbourne.

Victoria, Department of Sustainability and Environment 2005, *Guidance Note Fair Value Asset Valuation Methodologies for Victorian Local Governments*, Melbourne.

WaterCare 2013, Annual Report, Auckland: WaterCare.

Watson, H 2014, 'Implications for the not-for-profit and public sectors of AASB 13", *Charter*, December, pp. 46-47.

Western Australia, Department of Transport 2013, *The Role of Ports in Western Australia*, Perth.

Western Australian Government Gazette 2004, Electricity networks access code 2004, No. 205, 30 November, Perth.

Western Power Corporation 2004, Western Power Corporation, Physical Asset Valuations as at 30 June 2004, Distribution and Transmission Networks; Report to the Valuation Committee, June, Perth: WPC.

Williamson, O 1976, 'Franchise bidding for natural monopolies - in general and with respect to CATV', *Bell Journal of Economics*, vol. 7, no. 1 (Spring), pp. 73-104.