

Investigation into Water and Wastewater Service Provision in the Greater Sydney Region

Issues Paper



IPART

**INDEPENDENT PRICING AND
REGULATORY TRIBUNAL**
of New South Wales

Investigation into Water and Wastewater Service Provision in the Greater Sydney Region

Issues Paper

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Independent Pricing and Regulatory Tribunal
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Inquiries regarding this review should be directed to:

Stephanie Biesaga ☎ 02 9290 8456

Colin Reid ☎ 02 9290 8414

Independent Pricing and Regulatory Tribunal of New South Wales

Level 2, 44 Market Street, Sydney NSW 2000

☎ (02) 9290 8400 Fax (02) 9290 2061

www.ipart.nsw.gov.au

All correspondence to: PO Box Q290, QVB Post Office NSW 1230

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1 INTRODUCTION

The supply of water is a major issue for the greater Sydney region. Over the past 20 years, the demand for water in the region has regularly exceeded the estimated long-term Supply (the “sustainable yield”) from existing infrastructure. In addition, the severe drought in recent years has dramatically lowered the levels in the region’s water supply storages, highlighting the need to address the imbalance between water supply and demand.

In October 2004, the NSW Government released its Metropolitan Water Plan for Sydney,¹ which sets out actions required over the next 25 years to ensure sustainable water supplies for Sydney. These actions include addressing the balance between water supply and demand through a variety of responses, such as demand management programs, increased emphasis on water recycling, and securing additional supplies for the greater Sydney region. A key aim of the plan is to encourage the involvement of the private sector in developing innovative methods of service provision, particularly the provision of recycled water services. The Government is also developing a metropolitan strategy for recycled water, which aims to maximise the use of recycled water to replace potable water where feasible.

The Metropolitan Water Plan has important implications for the pricing of water and wastewater and the structure of the water industry in Sydney. There is also external pressure on the government to reform the water industry. In particular, Services Sydney (a private sector firm) approached Sydney Water with a proposal to enter the sewerage service market. When the proposal was not successful, it pursued the matter with the National Competition Council and, more recently, the Australian Competition Tribunal.

The Metropolitan Water Plan recognises that some reform of the water industry is necessary. However, the Government is concerned that a holistic approach to reform be taken. To provide some guidance for this process, it has asked the Independent Pricing and Regulatory Tribunal of NSW (the Tribunal) to provide independent advice on the pricing and alternative arrangements, including possible private sector involvement, for the delivery of water and wastewater services in the greater Sydney region. (The full terms of reference for this review are provided in Appendix A).

Currently, Sydney Water Corporation (Sydney Water), a statutory State-owned corporation, provides all water and wastewater services in the greater Sydney region (Sydney, the Blue Mountains and the Illawarra). The Tribunal will examine the ways in which Sydney Water provides these services, with a view to recommending options for service provision in the most efficient, effective and sustainable way. In interpreting the terms of reference, the Tribunal will take into account implications for Sydney Catchment Authority (the Catchment Authority), where appropriate.

1.1 Invitation to make submissions

As part of its review, the Tribunal will consult with Government, the water and wastewater industry, water and wastewater customers and other stakeholders. All interested parties are invited to make submissions to the review.

¹ NSW Government, *Meeting the challenges: Securing Sydney’s water future, The Metropolitan Water Plan*, October 2004.

To help with the preparation of submissions, this paper outlines the Tribunal's approach to the review and discusses some of the key issues and options it will consider:

- Chapter 2 provides important context for the review, including an overview of the Metropolitan Water Plan, the way in which water and wastewater services are currently delivered and priced, and Sydney Water's regulatory and legal framework
- Chapter 3 describes the Tribunal's approach to the review, including how it interprets its task and the key strategic issues it intends to consider
- Chapter 4 outlines some alternative options for the structure of the water and wastewater industry
- Chapters 5 and 6 explore the pricing and other implications of reforms to the structure of the water and wastewater industry
- Chapter 7 describes a possible framework for evaluating the costs and benefits of alternative industry structures.

The Tribunal particularly seeks comments on the issues raised in this paper. However, it also welcomes submissions on all issues relevant to assessing potential options for water and wastewater service delivery that interested parties believe should be addressed. Details on how to make submissions are provided at the front of this paper (opposite the table of contents).

2 CONTEXT OF THE REVIEW

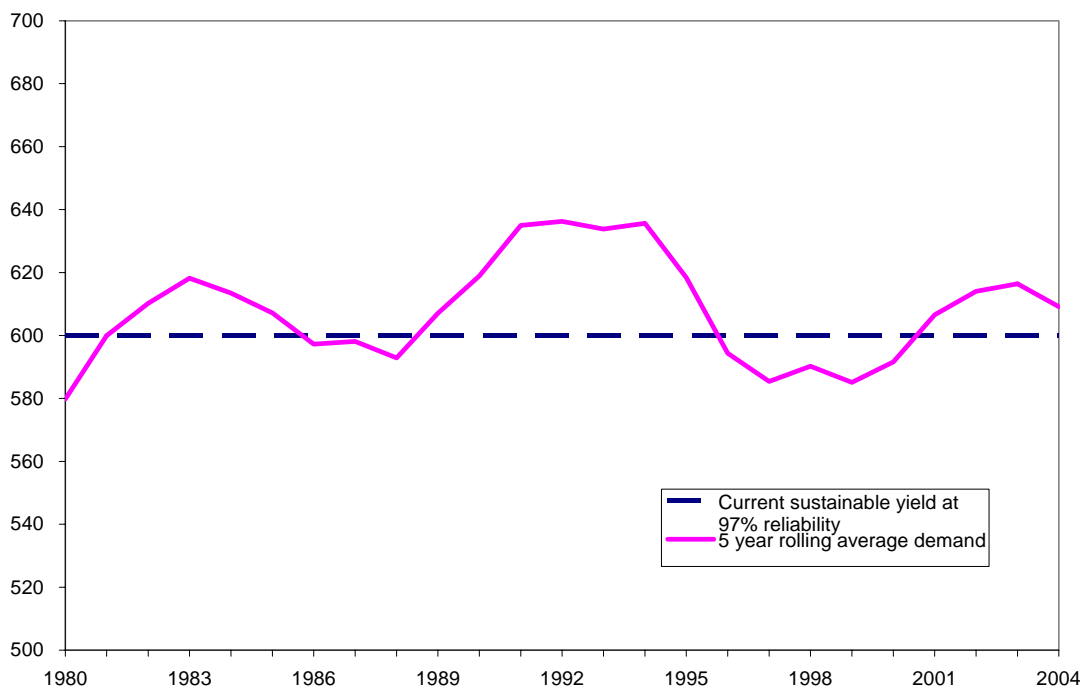
In conducting the review and making its recommendations, the Tribunal will need to take into account the particular context of this review. This context includes the balance between Sydney’s water demand and supply, the Government’s Metropolitan Water Plan and principles for managing Sydney’s water supplies, planning responsibilities for Sydney’s water services, the current arrangements for water and wastewater service delivery in Sydney, and Sydney Water’s current legal and regulatory framework.

2.1 Sydney’s water demand and supply

In the last two decades, demand for water in Sydney has regularly exceeded the estimated sustainable yield from its water supply storages. Figure 2.1 shows the total amount of water supplied to Sydney Water each year since 1980, compared with the current estimate of sustainable yield from the Sydney Catchment Authority’s storages.²

Given the Government’s policy of no new dams, the need to provide for environmental flows, and Sydney’s steady population growth of about 36,400 people each year, there is a clear need to address the balance between water supply and demand. If no action is taken, Sydney’s demand for water would exceed the 600 gigalitre per annum sustainable yield of existing water supplies by an estimated 200 gigalitres per annum by 2029.³

Figure 2.1 Total volume of water supplied to Sydney Water (in Gigalitres), 1980-2003



Source: Sydney Water Corporation, Annual Information Returns.

² The current estimate of sustainable yield is 600GL/year. Independent Pricing and Regulatory Tribunal, *Sydney Catchment Authority Audit 2001/02*, January 2003, p 8-1.

³ NSW Government, *The Metropolitan Water Plan 2004*, October 2004, p 2.

2.2 Metropolitan Water Plan

The Metropolitan Water Plan is the NSW Government's strategy to ensure that Sydney has enough water for consumption and environmental purposes over the next 25 years. While the plan indicates that the Government will still play a central role in achieving additional supplies and savings of water, one of its key elements (or aims) is to encourage the private sector to find innovative solutions.

Specific actions under the plan include:

- modifying dams to allow extraction of previously inaccessible deep water
- increasing transfers of surplus water from the Shoalhaven to Sydney
- developing a contingency plan for building a desalination plant for Sydney
- planning the construction and operation of a western Sydney recycling initiative, to supply recycled water to 'growth centres'
- establishing a new \$30 million demand management fund for cost effective water conservation projects
- requiring Government agencies, local councils and the largest water-using businesses to develop and implement water conservation plans and water efficiency measures
- taking measures to reduce leakage in Sydney Water's system, including Operating Licence conditions
- implementing a water labelling and standards scheme for appliances and fixtures
- developing a new water education plan for NSW
- extending the subsidy for the installation of water efficient showers and other fittings in households
- continuing to subsidise installation of rainwater tanks in existing homes, until July 2008
- requiring dwellings in Sydney to be water efficient at the point of sale, from 1 July 2007
- constructing improved outlet works at dams to facilitate environmental flow releases.

The Metropolitan Water Plan also provides that irrigators in the Hawkesbury-Nepean region will be able to continue trading water, to encourage the use of water where it is most highly valued. The Government will examine and eliminate any unnecessary barriers to the trading system.

The terms of reference for the Tribunal's review do not specifically include examining the purchase and use of irrigation water to meet metropolitan water demand. However, the Tribunal notes the reference to total water cycle management. This appears to imply that if there are feasible options in the future for efficiently using irrigation water to meet metropolitan water demand, then any unnecessary barriers should be removed.

2.3 Principles for managing Sydney's water supplies

The Metropolitan Water Plan also sets out the Government's broad principles or objectives in managing Sydney's water supplies. These include to:

- minimise the risk of water shortages by diversifying sources of supply
- ensure secure water supplies
- protect and restore river health
- adopt a partnership approach with the community
- provide good quality and cost-effective water supply services
- foster innovation
- increase the efficient use of water
- match the grade of water use to its end use
- optimise the use of existing infrastructure
- appropriately target future investment
- make decisions adaptively
- ensure actions are acceptable to the public, affordable, feasible and sustainable.

These objectives show that in addition to aiming to improve efficiency in the provision and use of water, the Government is concerned with broader social objectives such as ensuring security of supply, protecting the environment and the health of natural river systems, making sure that the quality of water is suitable for its intended use (eg, drinking water does not have any adverse health impacts), and ensuring that water and wastewater services are affordable and available to all in the community.

This mix of objectives also highlights key challenges or issues associated with reform of the water and wastewater industry. Regulations and a central planning function must be in place to ensure that the industry meets the broader social objectives of protection of human health, reliability of supply and universal supply. At the same time, such controls should not raise unnecessary barriers to innovation by private developers and service providers.

2.4 Planning for the provision of water services in Sydney

Responsibility for both natural resource management and infrastructure planning in NSW rests with the NSW Department of Infrastructure, Planning and Natural Resources (DIPNR).

Through the *Water Management Act 2000* and the *Water Act 1912*, DIPNR is responsible for managing access to natural resources, including surface water and groundwater, to ensure that they are used sustainably. Under these Acts, DIPNR issues licences that entitle the holders to a volume or share of available water, taking into account available stocks of the resource and the needs of the environment.

For example, DIPNR issues a licence to the Catchment Authority that entitles it to take and use water from water sources provided it meets certain conditions. The aim of this licence is to balance water extractions with the long-term sustainable health of catchments and rivers affected by the Catchment Authority's operations. The conditions in the licence affect the

sustainable yield of water available from the Catchment Authority's storages, especially the requirements for minimum environmental flows and the regulation of inter-basin transfers.

DIPNR is also responsible for co-ordinating the Government's decision-making for major infrastructure projects, to ensure that these projects address the Government's key priorities. This includes, for example, planning and co-ordinating the provision of water and wastewater infrastructure to new release areas.

2.5 Water and wastewater service delivery in Sydney

Responsibility for the supply of potable water in the greater Sydney region is divided between Sydney Water and the Catchment Authority. The Catchment Authority was established in 1998 to manage water catchments to ensure water quality, and to supply bulk water to Sydney Water from a system of dams and other infrastructure. Sydney Water's role is to filter and deliver potable water to end-customers, and to transport and treat wastewater.

The obligations of these agencies are set out in legislation, Operating Licences and Sydney Water's Customer Contract. Under the Customer Contract, Sydney Water provides water, wastewater (including recycled water) and stormwater drainage services to a population of around 4 million in the Sydney, Blue Mountains and Illawarra regions (Figure 2.2 below). It contracts the delivery of some aspects of these services to private sector firms via a competitive tendering process.

Each of Sydney Water's services, the way in which these services are priced, and private sector involvement in their delivery are discussed below.

2.5.1 Water services

Sydney Water supplies more than 1.5 billion litres of water to more than 1.6 million homes and businesses each day. It buys bulk water from the Catchment Authority, then treats it in accordance with the Australian Drinking Water Guidelines at ten water filtration plants. This involves removing organic matter, sediment and minerals (such as iron and manganese), disinfecting the water with chlorine, and adding fluoride (to aid in the prevention of tooth decay). More than 80 per cent of the water it receives from the Catchment Authority is treated in its largest plant, located at Prospect.

After treatment, water is delivered to customers through a network of 260 service reservoirs, 152 pumping stations and 20,867 kilometres (km) of water mains.⁴

2.5.2 Wastewater services, including recycled water

Sydney Water collects and treats more than 1.3 billion litres of wastewater from homes and businesses each day. Of this, around 39 million litres is recycled each day. Its wastewater infrastructure consists of 23,014 km of sewer pipes in 28 separate sewerage systems, and 31 Sewage Treatment Plants (STPs).

⁴ Sydney Water Corporation, *Sydney Water Submission to the Independent Pricing and Regulatory Tribunal Review of Metropolitan Water Agency Prices*, November 2004.

Figure 2.2 Sydney Water’s area of operations



Source: Sydney Water Corporation pricing submission.

Wastewater collected in the sewerage system flows to STPs, where it is treated before being recycled (ie, reused) or discharged to rivers or oceans in accordance with licence conditions issued by the Department of Environment and Conservation (DEC). Around 86 per cent of wastewater is processed at the three biggest coastal plants, located at Malabar, North Head and Bondi.⁵

⁵ Ibid.

Wastewater to be recycled undergoes a series of treatments, including micro filtration and chlorination. There are currently strict guidelines in place that restrict the use of this recycled water to toilet flushing, outdoor purposes (such as car washing, gardening, plus park and golf course irrigation) and industry. Sydney Water has a number of water recycling schemes that help reduce discharges of treated wastewater to the environment and reduce demand on existing and future water supplies.

For example, recycled water is used in the Rouse Hill Development Area in Sydney's north-west. The area includes parts of Rouse Hill, Parklea, Stanhope Gardens, Glenwood, Acacia Gardens, Kellyville, Kellyville Ridge and a small part of Castle Hill and Quakers Hill. More than 15,000 properties in the Rouse Hill Recycled Water Area are currently connected to recycled water and recycled water has been available since August 2001. These properties have two water supplies – recycled water and potable water (dual reticulation). The recycled water taps, pipe-work and plumbing fittings are coloured lilac to ensure that recycled water is not confused with potable water. The next stage of the project, announced in August 2004, will service an additional 10,000 lots with recycled water and potable water. Final completion of the infrastructure works for this stage is scheduled for 2006.⁶

Over the last decade, recycled water use in Sydney has increased from 6.2 billion litres per year to 14 billion litres per year. However, the Government is aiming for much greater levels of recycling over the next 25 years.⁷ Consequently, recycling is a key component of the Metropolitan Water Plan – particularly in regard to the provision of water services to new release areas in Sydney's west.

2.5.3 Stormwater services

Management of stormwater assets in Sydney is currently undertaken by more than 40 stormwater asset owners – primarily Sydney Water and local councils. Sydney Water provides stormwater drainage facilities to approximately 450,000 homes and businesses. It operates 436 km of stormwater channels, mostly in the south and south-western suburbs of Sydney. It also operates and maintains stormwater pollution control devices. Each year, approximately 1,930 cubic metres of rubbish and 1,567 tonnes of sediment are collected by gross pollutant and sediment traps.⁸

In the past, Sydney Water has argued that other agencies may be better placed to undertake stormwater responsibilities. The then Healthy Rivers Commission has also expressed the view that “responsibility for effective stormwater planning, design, management, maintenance and retrofitting should be clearly vested in local government.”⁹

The terms of reference for this review do not specifically include considering the provision of stormwater drainage services. However, they do require the Tribunal to have regard to integrated water cycle management. The Tribunal notes that there is potential to harvest stormwater for reuse. Options include substituting water supplies through on-site rainwater tanks, community collection and storage for irrigation and aquifer storage and recovery.¹⁰

⁶ Sydney Water Corporation website, www.sydneywater.com.au

⁷ NSW Government, *The Metropolitan Water Plan 2004*, October 2004, p 13.

⁸ Sydney Water Corporation, *Sydney Water Submission to the Independent Pricing and Regulatory Tribunal Review of Metropolitan Water Agency Prices*, November 2004.

⁹ NSW Government, *Statement of Joint Intent for the Hawkesbury-Nepean River System*, 12 March 2001, p 25.

¹⁰ CSIRO, *National Conference on Water Sensitive Urban Design – Sustainable Drainage Systems for Urban Areas*, August 2003, Melbourne.

Harvesting or recycling stormwater can reduce demand for other water sources, reduce pollution loads in waterways and reduce the occurrence of flash flooding (which occurs when stormwater drainage capacity is exceeded by stormwater run-off).

2.5.4 Pricing

The Tribunal began regulating the prices charged by Sydney Water for its services in 1992 (it has regulated the price Sydney Water pays the Catchment Authority for bulk water since 2000). At that time, Sydney Water's pricing structure comprised a mixture of components including property-based charges, pre-paid water allowances, fixed charges and usage charges.

In 1993, the Tribunal conducted an inquiry into the pricing of water and related services. As a result it made a series of recommendations, many of which have been implemented in subsequent pricing determinations, including:

- the introduction of two-part tariffs, incorporating a fixed component and a component that varies with usage, for water services
- the introduction of cost reflective pricing – linking prices paid by customers to the cost of service delivery
- the removal of cross-subsidies between different customer classes and types of services
- the removal of property-value-based charges (progressively from 1993/94) in favour of user-based charges for all services and
- the removal of all pre-paid water allowances (in 2000).

The Tribunal has generally retained uniform or 'postage stamp' pricing for Sydney Water, with all customer classes paying the same price for a service, regardless of the variations in the cost of service delivery that exist between different parts of the supply network.¹¹

In July 2004, the Tribunal released a report on its Investigation into Pricing Structures to Reduce the Demand for Water in the Sydney Basin. In relation to retail water prices, it found that the most suitable structure for Sydney is likely to be an 'inclining block' structure, which includes a two-tiered variable water use charge and a lower fixed access charge.

¹¹ This is the case across each of the four metropolitan water businesses regulated by the Tribunal. However, in 2000 the Tribunal accepted a proposal from Hunter Water Corporation to provide a small and variable discount to very large customers on water use above 50,000kL per annum, which reflected locational variation in the extent of delivery assets used by these customers.

The rate of return earned by Sydney Water on its regulatory asset base (RAB) is set out in the Table 2.1 below. Water restrictions associated with the drought have lowered water consumption and in turn reduced the rate of return earned in recent years.

Table 2.1 Rate of return earned by Sydney Water

| Real rate of return on RAB | 2001 | 2002 | 2003 | 2004 | 2005 |
|----------------------------|------|------|------|------|------|
| | 6.6% | 5.8% | 4.3% | 5.9% | 4.7% |

The Tribunal is currently conducting a review of the prices charged by Sydney Water (and the other metropolitan water agencies). The review will set the prices applying to water, wastewater and stormwater services from the second half of 2005 for the next few years.

In the last price determination for Sydney Water (2003), the Tribunal adopted a light-handed approach to regulating recycled water, with a view to facilitating its increased use by customers. It set a zero charge for effluent or treated sewage product, with the costs of extraction from Sydney Water's sewerage system borne by the customer. It set a recycled water price only for customers within the Rouse Hill Development Area. Otherwise, the last determination was silent on the pricing of recycled water, allowing Sydney Water to develop its own approach.

The Tribunal required Sydney Water to develop recycled water principles prior to the 2005 price review. These principles are outlined in Sydney Water's March 2005 Supplementary Submission to the Tribunal on the Review of Metropolitan Water Agency Prices. In general, Sydney Water believes that the price of recycled water should recover the efficient cost of service provision, be set on a scheme-by-scheme basis, and encourage the development of recycled water services.

2.5.5 Private sector involvement

Sydney Water currently contracts out some of its activities to private sector firms using a competitive tender process. These activities include meter reading, routine maintenance, and the operation of some sewerage plants and water filtration plants. It estimates that private sector competitive tenders account for around 35 per cent of its total operating expenditure and 90 per cent of its capital expenditure. (See section 4.1.1 for more details.)

2.6 Sydney Water's legal and regulatory framework

The regulatory framework under which Sydney Water operates has several key elements:¹²

- legislation, which establishes the objectives and functions of Sydney Water, and sets out the minimum requirements to be included in its Operating Licences
- an Operating Licence, which sets out legally enforceable minimum standards and other requirements
- a Customer Contract between Sydney Water and its customers
- a range of other bodies regulating specific aspects of Sydney Water's operations.

¹² IPART, *End of Term Review of the Operating Licences for Sydney Water Corporation and the Sydney Catchment Authority - Issues Paper*, October 2003, pp 7-11.

Section 21 of the *Sydney Water Act 1994* sets out three objectives for Sydney Water. They are:

1. To be a successful business and, to this end:
 - a) to operate at least as efficiently as any comparable businesses
 - b) to maximise the net worth of the State's investment in the Corporation
 - c) to exhibit a sense of social responsibility by having regard to the interests of the community in which it operates.
2. To protect the environment by conducting its operations in compliance with principles of ecologically sustainable development contained in Section 6 (2) of the Protection of the Environment Administration Act 1991.
3. To protect public health by supplying safe drinking water to its customers and other members of the public in compliance with the requirements of any operating licence.

Sydney Water's Operating Licence:

- authorises Sydney Water to carry out its functions within a defined area
- nominates water quality requirements
- establishes minimum performance standards
- sets out the respective rights and obligations of Sydney Water and its customers
- provides reporting requirements for environmental issues
- promotes consumer protection and fair competition
- details what is required in the independent audits of performance against the licences.

The Tribunal is responsible for monitoring Sydney Water's compliance with its Operating Licences through annual Operational Audits. As part of this role, it also advises the relevant Minister on issues relating to compliance, and can impose penalties if Sydney Water contravenes its licence. The Tribunal is also required to determine the maximum prices Sydney Water can charge for specified monopoly services.

Other bodies regulating specific activities or aspects of Sydney Water's business include:

- The **Department of Environment and Conservation (DEC)**, the environmental regulator for NSW, responsible for licensing sewage treatment services and the general mitigation of activities that cause pollution.
- **NSW Health**, responsible for monitoring and regulating the safety and quality of potable water provided to customers, and where appropriate, providing advice on wastewater management activities that impact on public health.

3 THE TRIBUNAL'S APPROACH TO THIS REVIEW

The terms of reference for this review ask the Tribunal to investigate possible pricing principles and alternative arrangements (including possible private sector involvement) for the delivery of water and wastewater services in the greater Sydney area, taking into account a range of specified factors (see Appendix A). Based on this investigation, the Tribunal is to make recommendations with a view to providing these services in the most efficient, effective and sustainable way. In approaching this task, the Tribunal intends first to interpret what it has been asked to do, then identify and consider the central strategic issues that this involves.

3.1 Interpreting the task

In the past, the planning process for the provision of water has been highly centralised. Although demand management has played an important role in recent times, most solutions for water services have involved centralised planning decisions on relatively large capital projects (eg, large dams and wastewater treatment plants). This centralised system has resulted in the State making large investments in the water industry, which now represent 'sunk' costs.¹³

The Government's Metropolitan Water Plan is a shift away from this central planning paradigm, as one of its key elements is to encourage the private sector to developing innovative solutions to Sydney's water problems. This suggests that part of the Tribunal's task is to consider the extent to which decision-making in the water industry can be decentralised, and appropriate incentives created, to improve efficiency in the provision of water services.

While there will still be a role for centrally planned large-scale capital projects in solving Sydney's water problems, there may be an increased role for smaller-scale solutions – such as demand management/water conservation projects or activities, recycling schemes, and other alternative, non-traditional sources of water. This could mean greater involvement for private sector firms – and for households, developers, local councils and entrepreneurs. However, moving away from relying mostly on dams to relying on a much wider range of supply options will make the system more complex to manage. It will therefore be important to establish a robust framework for making choices between the alternative options. It will also be important to consider the conditions under which new service providers will gain access to the existing water and wastewater transportation networks.

Experience in other deregulated industries suggests that innovation can potentially play an important role in solving Sydney's water problems. For example, in the energy industry, deregulation has stimulated the emergence of Coal Seam Methane as an energy source, developed by a small number of entrepreneurial companies. In the water industry, some of the emerging solutions may turn out to be more important than currently foreseen, or other solutions may emerge.

¹³ Sunk costs are costs that have been incurred and cannot be reversed (ie, they cannot be recovered on leaving the market or industry).

At the same time, it is important to be mindful that water and wastewater services are essential to the public. In considering any move towards decentralised decision-making in the provision of water services, the need to maintain a 'back-stop' centralised planning function to ensure security of supply should be taken into account, as should the need to ensure that the Government's broader social objectives continue to be met. These objectives relate to health (water quality), environmental impacts and water conservation (demand management), and an equitable charging regime for these services.

In addition, water services have been priced at a uniform (or postage-stamp) price across Sydney Water's area of operations, despite the fact that the cost of servicing customers varies geographically. Consideration of industry reform would need to take into account the implications of this price structure for the various alternative industry structures.

Given all of the above, the Tribunal's task is interpreted as being to explore the extent to which incentives could feasibly be created to encourage decentralised decision-making in the water industry where this leads to greater efficiency, while still:

- allowing for central planning where this is most efficient
- ensuring security of supply through a centralised back-stop planning process, and
- ensuring that objectives for health, the environment, water conservation and social equity are met.

The Tribunal seeks comments on this interpretation of its task.

3.2 Identifying the key strategic issues

Encouraging decentralised decision making is likely to involve structural reform of the water industry, and increasing competition. Thus, in undertaking the above task, the Tribunal will need to evaluate the various options for the structure of the water and wastewater industry that would allow for increased competition. (These options are discussed in Chapter 4.)

One of the key considerations for this evaluation will be the trade-off between the productive efficiency that can result from the economies of scale and scope associated with one vertically integrated service provider, and the dynamic and productive efficiency gains that might be achieved through increased competition (net of any increase in transactions costs and transition costs). (See Box 3.1 for an explanation of these concepts.)

However, in considering this trade-off, the Tribunal will take into account a range of strategic issues, or pre-conditions that may need to be met, for any move towards decentralised decision-making to be effective and acceptable to the Government. These issues include:

- clearly defined the boundaries between centralised and decentralised decision making and, where decentralised decisions are to be made, ensure competitive neutrality across all industry participants
- potential ways in which private sector firms could be involved in service provision in the water industry, and the likely efficiency (and other) benefits of this involvement
- provision of an appropriate centralised back-stop planning process

- the need to ensure that broad Government objectives related to health, the environment and water conservation continue to be met
- the implications of the current pricing arrangements
- the implications for the State's existing investments in infrastructure, and how those investments might be accessed by new entrants
- the likelihood that any industry reform will need to be implemented in stages.

Each of these issues is discussed below.

Box 3.1 The role of industry reform and competition

The aim of industry reform is generally to improve the efficiency of service delivery. Competition is a mechanism through which decentralised decision making and efficiency improvements can be encouraged. According to economic theory there are three types of efficiency – technical or productive efficiency, allocative efficiency and dynamic efficiency.

Productive efficiency is said to be achieved when a given output is produced at minimum possible cost, given the available production technology and input prices. This type of efficiency is relevant to the goal of delivering water and wastewater services at the lowest possible cost to the consumer. Competition, where feasible, is one means by which firms can be forced to produce and price goods and services at the least possible cost to consumers. Incentive-based regulation is another means for encouraging productive efficiency for services provided by a monopoly business.

Allocative efficiency is maximised where resources are allocated so that the value in the use of the product at the margin is equal to the increment in the cost of supplying the product at the margin, including any external costs and benefits from the activity. The necessary rule can be summarised as the application of marginal cost pricing. Competition, where feasible, is one means of encouraging allocative efficiency, as firms that can use resources more productively bid them away from others. Allocative efficiency for monopoly services can be encouraged through the process of setting regulated pricing structures.

Dynamic efficiency relates to processes of technological and managerial innovation – the ability of producers to improve the quality and cost of their goods and services and to respond to emerging market developments. Such efficiency gains are particularly attractive when dealing with an increasingly scarce and valuable resource such as water. Removing artificial regulatory barriers to entry may be important in promoting the investigation and commercialisation of new water sources, or the more efficient use of current water stocks including water conservation.

Competition is not an end in itself – it is merely a means to the end of increasing consumer welfare. For some activities, which are generally characterised as natural monopolies,¹⁴ it is not appropriate or possible to introduce competition. When competition is not feasible, or is not considered worthwhile, then effective regulatory and institutional arrangements for protecting the interests of customers and promoting efficiency need to be established. Experience in other network industries indicates that competition is a matter of degree, varying in extent from industry to industry.

¹⁴ Natural monopolies occur when the market is served most cheaply by a single firm rather than a number of competing firms and are characterised by economies of scale, which means that unit costs decline throughout the relevant range of production as output increases. They can also be characterised by economies of scope, which means that it is cheaper for one firm to provide two or more related products and services together, than for each of them to be provided by a separate firm. Economies of scope typically arise from the use of common assets to produce separate products (eg, cable television networks delivering both broadcast entertainment services and telecommunications services, utilising much of the same infrastructure). Significant sunk costs are also a feature of natural monopolies. These costs cannot be recovered if an entrant leaves the market. They also act as a barrier to entry.

The estimated benefits from introducing competition should be compared to the costs of its implementation. These implementation costs fall into two categories – the costs of transition to the new arrangements and the increase in transaction costs associated with an increased number of market participants. The term ‘transaction cost’ refers to the cost of providing for some good or service through a market (ie, a number of firms offering the good or service) rather than having it provided from within one firm. (In order to carry out a market transaction it is necessary to discover who it is that one wishes to deal with, to conduct negotiations leading up to a bargain, to draw up the contract and to undertake the inspection needed to make sure that the terms of the contract are being observed.)

If a decision is taken to introduce greater competition for certain functions involved in water service delivery, the most important requirement would be to establish an environment where competition can take place. It is difficult to predict the extent to which competition may develop and the extent of efficiency benefits that will arise. The emphasis should be on creating a transparent and predictable environment, which separates the potentially competitive components of the industry.

3.2.1 Boundaries between centralised and decentralised decision making

Even if some decision making is decentralised, it is likely that centralised decision making will still be more efficient in relation to some functions – for example, planning. It will be important to clearly define the boundaries between centralised and decentralised decision making, to avoid duplication of effort.

The introduction of decentralised decision making should be accompanied by efforts to foster a competitively neutral environment for all industry participants. Competitive neutrality exists where government-owned businesses do not enjoy net competitive advantage over their private sector competitors (or potential competitors) simply by virtue of their public sector ownership. Similarly, private sector competitors (or potential competitors) would not be unduly favoured, so as to encourage their participation (or entry into) the industry or specific parts of the industry.

3.2.2 Possible private sector involvement

To evaluate how various options for industry structure might support private sector participation, the Tribunal needs to have an understanding of the potential scope for private sector involvement and the potential benefits and risks.

As noted in Chapter 1, one private sector firm – Services Sydney – has made a proposal to Sydney Water to participate in the market for sewerage services. Its proposal involves it constructing a deep tunnel system between the three major Sydney ocean outfalls. The tunnel would divert sewage to a water reclamation plant, which could produce water for a variety of uses – for example, subject to meeting environmental and health requirements, this water could be transferred back to the Hawkesbury-Nepean River for environmental flows. Current Sydney Water customers could choose Services Sydney’s alternative water plan by subscribing to its sewerage services company.¹⁵

¹⁵ See www.waterworks.net.au

However, apart from this proposal, the Tribunal does not have detailed knowledge of the types of projects and services that may be potential candidates for private sector provision, the criteria the private sector and other stakeholders consider important in identifying such projects, or more specifically the extent to which private sector developers have approached the Government or Sydney Water with proposals for service provision.

The Tribunal understands that DIPNR is currently coordinating development of the Government's Recycled Water Strategy. The Tribunal will consider the scope for private sector involvement in the implementation of this strategy.

The Tribunal seeks:

- *comments on how the private sector can be involved in service provision in the water industry, including the criteria that could be considered in evaluating proposals for private sector service provision*
- *specific information on the extent to which there may be benefits created through private sector service provision (for example, more efficient use of water resources, lower costs, improved service quality) and the risks that need to be considered.*

3.2.3 Ensuring security of supply

Notwithstanding any move to more decentralised decision making, the Government can be expected to continue to manage the risks associated with security of supply, by providing for a central back-stop industry planning role.

In addition, industry reform is likely to necessitate change in the allocation of risk and liability in the water industry. Allowing new entrants in the provision of water and wastewater services will require consideration of an appropriate allocation of risks, responsibilities and liabilities between market participants.

3.2.4 Meeting objectives for human health, the environment and water conservation

Ensuring appropriate quality of potable and non-potable water is a key issue in the water industry. At present, NSW Health sets water quality standards for potable water, and Sydney Water and the Catchment Authority both have a role in managing the risk of these standards being breached. Other grades of water supplied by Sydney Water (eg, recycled or re-use water) must be supplied according to relevant guidelines specified by NSW Health, DEC, DIPNR and/or the Department of Primary Industries.

Allowing new entrants in the industry might affect Sydney Water's ability to meet these quality standards. For example, it could result in changes in the chemical composition of water and wastewater. In this event, careful consideration would need to be given to maintaining the quality and technical standards that protect customers and the infrastructure network.

Achieving objectives relating to the environment is also a key issue in the water industry. For example, maintaining environmental standards assists in the management of the environmental impacts of the water industry's operations. DEC currently licences sewage treatment services, and sewage treatment plants are monitored to prevent the release of insufficiently treated effluent. Environmental trade-offs may need to be made in trying to

balance Sydney's water demand and available supply. In this context, under the Metropolitan Water Plan, the Government will develop a water sharing plan for Sydney, which will allocate shares of water for environmental flows, irrigators and consumption by Sydney's residents and businesses.¹⁶

According to the Metropolitan Water Plan, the implementation of new water conservation measures is necessary to ensure future water supply continuity.¹⁷ To this end, the Plan announced the creation of a demand management fund – money for cost effective water conservation projects – to encourage the uptake of demand management measures that are not financially viable in the short term.¹⁸

Mitigating the environmental impacts of wastewater services, providing for environmental flows and implementing demand management initiatives have associated positive externalities.¹⁹ Consideration will need to be given as to how the Government's environmental objectives would be achieved in the presence of a move to more decentralised decision making.

3.2.5 Pricing implications

The current postage-stamp pricing arrangements have different implications under the alternative models for service provision outlined in this paper, while a departure from uniform pricing has implications for customers. Another pricing-related issue is the impact that Sydney's current imbalance between water supply and demand is likely to have on the long-run cost (and hence the price) of water.

Postage stamp pricing

In economic terms, current water prices in Sydney are distorted in that they are not purely cost-reflective. These prices are based on the average cost of supply, and are uniform throughout the region ('postage stamp pricing'), despite the fact that the cost of providing water services actually varies throughout the area.

This pricing structure could impact competition in the wholesale water and wastewater market, and potentially put the incumbent (Sydney Water) at a disadvantage if a competitor chooses to selectively service only the lowest cost/highest return customers. It could also result in less efficient decisions on the location of new assets (such as decisions on locating new water or wastewater facilities that lead to higher costs for provision of monopoly transport services) than in the presence of cost reflective pricing. However, options which move to more fully cost-reflective pricing could impact negatively on some customers, particularly low income households.

¹⁶ NSW Government, *The Metropolitan Water Plan 2004*, October 2004, p 25.

¹⁷ Op. cit. p 6.

¹⁸ Op. cit. p 16. Legislation to establish the fund has been introduced into Parliament.

¹⁹ An *externality* is any impact that human activity causes and the costs or benefits of which are excluded from the decisions made by the economic agents who are involved in the transactions. This type of situation exists because property rights in relation to the externality are not well defined. As a result, the externality is not traded in any market and there is no avenue for financially compensating or charging the affected party. Because these effects are not reflected in market prices – or in the case of water, in potentially regulated prices – market failure is highlighted by the existence of externalities.

The social equity implications of such price increases could be addressed in a number of ways – such as through adjusting cost-reflective prices (for example, by retaining a degree of averaging, and thus uniformity, in prices); providing for non-distorting internal cross-subsidies (for example, lump sum transfers within or between regions); and/or providing for targeted subsidies to customer groups where cost-reflective retail prices raise concern for affordability. Price shocks from an immediate move to cost-reflective prices could be managed through rebalancing of prices over time.

In principle, no option would be precluded by the retention of postage stamp pricing, and such a pricing regime could be broadly consistent with all the alternative arrangements for service provision examined in Chapter 4. However, as set out in Chapter 5, the Tribunal would need to analyse the various options for reconciling objectives for equitable retail pricing with the potential need for cost-reflective pricing for the wholesale (or transportation) market, to understand the practical implications of each option.

Cost of supply

Economic theory suggests that the efficient price for any product is its marginal cost of supply – that is, the incremental cost to the supplier of producing an additional unit of the product. For a water agency, the marginal cost of supply represents the additional cost of supplying an additional kilolitre of water to a customer, or taking action to reduce the customer's demand by one kilolitre. In theory, setting water prices based on marginal cost sends the appropriate signal to both customers and the agency about the cost of both consuming an additional kilolitre of water and offering an additional kilolitre for sale.

To ensure that demand for water in Sydney can be met by the available supply, measures will have to be taken to obtain water from alternative sources and/or limit demand (as recognised in the Government's Metropolitan Water Plan). Each of these measures involves capital and operating costs over a number of years, which are part of the long-run marginal cost (LRMC) of water supply. In other words, LRMC represents the incremental cost of funding measures to bring the demand and supply of water into balance over a suitably long time period (for example, 25 years). LRMC is calculated by dividing the costs of balancing demand and supply in the Sydney area by the additional amount of water supplied or saved by supply augmentation and/or demand management measures.

The Tribunal has previously stated its intention to use LRMC as a reference point for setting water usage prices at both the wholesale and retail level.²⁰ However, in doing so, the Tribunal has been careful to note that attempting to calculate long run marginal cost is inherently complex. It involves accurately estimating the costs and water savings associated with demand management and supply augmentation options that may be available in the future. The timing of implementation of these options can significantly influence the calculation of LRMC, so the options also need to be ordered sequentially.

²⁰ IPART, *Investigation into Price Structures to Reduce Demand for Water in the Sydney Basin*, July 2004, p 7.

Ideally, water prices should be based on a reliable estimate of LRMC of supply that includes the least cost sequence of measures needed to achieve a water supply/demand balance in the Sydney basin. This would signal the scarcity value of water and encourage efficient investment in demand management and/or supply augmentation measures. If prices were based on a LRMC estimate that is too high, it would encourage inefficient over-investment in demand management and/or supply augmentation. If prices were based on a LRMC estimate that is too low, it could lead to under-investment in demand management and supply augmentation (and thus fail to close the demand/supply gap).

Regardless of the complexities associated with producing an accurate estimate of LRMC, it appears that water prices may have to rise if they are to reflect the LRMC of water supply. For example, Sydney Water's preliminary estimates suggest that the LRMC of water supply is likely to be above the current variable charges by a margin of around 40 per cent.²¹

For further discussion of the issues associated with LRMC, see the Tribunal's *Investigation into Price Structures to Reduce Demand for Water in the Sydney Basin* (July 2004).

3.2.6 Implications for existing investments in infrastructure

Any reform of Sydney's water industry will have a financial impact on the existing asset owners and operators – that is, the State of NSW. The implications of the various options for industry structure on the large historical investment made by the State in Sydney Water's infrastructure need to be considered.

Reform options involving competition in the market for water or sewerage services could result in Sydney Water losing some sales of water and sewerage services to new entrants. Clearly, there would be a financial impact associated with a declining customer base. This could be addressed through higher retail prices charged by Sydney Water, so its costs could be recovered over a smaller customer or volumetric base. Even so, competition could result in stranding of Sydney Water's assets.

Such adverse impacts might be an important concern for Government. If they are considered likely, it may be desirable for the Tribunal, in considering the alternative reform options, to give more weight to those that encourage competition for services to be provided by new assets (ie, those required to meet growth in demand or replace assets that have reached the end of their life), and less weight or priority to those that have adverse financial impacts on Sydney Water's existing assets. Alternatively, it may be possible to compensate Sydney Water for any asset stranding experienced on the basis of 'rule changes' in the water industry.

A further alternative would be for Sydney Water to price competitive services at their long run marginal cost. If it did, it would not necessarily recover all its fixed costs and would compete with alternative service providers while making a loss and/or experiencing a write down of its capital base. This could represent an economically efficient outcome, and could be expected to occur in a competitive market. Such an asset write-down would encourage technological change and genuine competitive entry into the industry.

²¹ Sydney Water Submission to the Independent Pricing and Regulatory Tribunal Review of Metropolitan Water Agency Prices, November 2004, p 85.

3.2.7 Need for staged implementation of reform

To the Tribunal's knowledge, no other jurisdiction has considered water industry reform under such complex conditions as currently face Sydney's industry. Given this, a staged approach to reform may be appropriate (eg, involving pilot schemes for large customers or geographically distinct areas), to manage transition and minimise execution risk while allowing for the development of relevant skills and knowledge (including administrative and regulatory capacity). A staged approach may also allow a more accurate assessment of the costs, benefits and risks of moving to the next stage of reform.

In evaluating options for industry reform, what other issues or pre-conditions should the Tribunal consider?

4 OPTIONS FOR INDUSTRY STRUCTURE

As Chapter 2 discussed, under the current industry arrangements, Sydney's water and wastewater services industry is dominated by Sydney Water, a large, vertically integrated monopoly that provides:

- treatment, transport and retailing services to water customers
- collection, transport, treatment, disposal and retailing services to wastewater customers.

Because of its monopoly status, many of the services Sydney Water delivers, and the standards to which it delivers them, are regulated (this includes the prices of the monopoly services and service standards specified in its operating licence). The delivery of these services involves bulky and often expensive investments. However, in making planning decisions under the current arrangements, Sydney Water can take advantage of any economies of scale that exist, and (in principle) can optimise investment in infrastructure across its entire system.

There are many options for increasing the level of competition in the water industry. These options can be broadly divided into those that retain the existing structure of the industry (ie, a vertically integrated provider of services) and those that involve structural change. The options can be further distinguished between those that retain a monopoly franchise and those that involve giving competing agents access to the water and wastewater networks. This chapter discusses the options within these categories, providing an overview of the options and the degree of change they represent. While the options in this chapter are discussed separately, they may be implemented separately or, in some cases, together.

4.1 Overview of options and degree of change they would involve

The options discussed in this chapter are summarised in the diagram below. It shows the scope of reform options and combinations of options available, ranging from measures to increase competition within the current industry structure, increased private participation in management, introduction of third-party access, to major structural change to the water industry. Examination of the options presented in this diagram, particularly in the context of reform processes in other utility industries, also shows that reform could follow a gradual or sequential approach.

The top left hand quadrant represents the current industry structure. Sydney Water is a large vertically integrated monopoly, which undertakes competitive procurement. Under this structure, the scope for competitive contracting could be expanded by increasing the extent of competitive procurement or moving to a more outcomes-focused system of competitive sourcing.

Competition could be introduced into the water industry by allowing firms to compete for the right to supply water and sewerage services to specific areas (the top right hand quadrant of the diagram). Private sector firms could bid for the right to manage and operate Government owned assets for a specified period of time and/or the private sector could bid for the right to own and operate infrastructure to service new release areas.

Yardstick competition – which would involve dividing Sydney up into more than one zone, each served by a separate utility – would require more significant structural change. Under yardstick competition, each firm would be a monopoly in their particular geographic area, but would be subject to competitive pressure by comparison with the utilities serving other areas.

The ‘single buyer’ model would generally involve separating the retail component from other elements of the water supply system. It involves a single buyer planning for and purchasing the supply requirements for all customers in a defined geographic area. For Sydney, several retail businesses could be established (eg, one or more retail businesses covering Sydney’s existing area could be established and new retailers could also be introduced for new land release areas), with each subject to a system of yardstick competition.

Third-party access options (the bottom half of the diagram) vary in the extent to which they would require a changed industry structure.

Reform in some utility industries has focused on providing third-party access to the natural monopoly elements of a vertically integrated business, so as to introduce competition for large customers (bottom left hand quadrant). Examples include early reforms in electricity and gas, current changes to water services in England and Wales, and telecommunications reforms in Australia.

Arrangements that involve third-party access together with structural change are shown in the bottom right hand quadrant. These involve a structural unbundling of existing vertically integrated services so as to separate the natural monopoly elements from the potentially competitive components of the water supply system. Under these options, access to those elements in the supply chain exhibiting natural monopoly elements (eg, transmission) would be shared via access arrangements and competition would be introduced into the potentially competitive components of service supply (eg, retail). A major feature of energy industry reforms in Australia has been the unbundling of the activities of an incumbent, vertically integrated provider.

Private sector participation in management could be introduced into any of these options. However, as mentioned below, one of the disadvantages of this option is that it may preclude future structural change and may limit competition amongst private participants.

4.2 Options that retain the existing industry structure

4.2.1 Extending competitive procurement

As Chapter 2 discussed, notwithstanding Sydney Water's monopoly status, there is already some competition for the provision of services in Sydney's water and wastewater industry. Sydney Water contracts out some of its activities to the private sector using a competitive tender process. Its Asset Solutions group defines particular projects and activities that are suitable for contracting out. With appropriate design of the tender process, and incentives on Sydney Water to reduce costs, there is scope for efficiencies under this mechanism.

The scope of services that Sydney Water currently contracts out ranges from operations and maintenance work, which may be administered through a service contract, through to large capital works, which may be administered through a build-own-operate (BOO) or build-own-operate-transfer (BOOT) arrangements.

Sydney Water estimates that private sector competitive tenders provide approximately 35 per cent of total operating expenditure and 90 per cent of capital expenditure. Activities that are currently contracted out include:

- meter reading
- routine maintenance
- operation of some smaller sewerage treatment plants (STPs) and sewerage systems
- operation of water filtration plants (under BOO contracts).

Sydney Water retains those activities requiring coordination across its systems (eg, planning) or direct interaction with customers (eg, customer service, billing, and emergency maintenance).

The Tribunal seeks views as to whether other activities may be competitively procured, or how contracting out might be used in conjunction with the other options discussed in this chapter.

4.2.2 Introducing competitive sourcing

Another option for increasing competition without significant structural change would be to establish a more flexible approach to competitive tendering by Sydney Water. Rather than seeking competitive bids for defined projects (as it does at present), Sydney Water could set out its requirements for water supply or sewerage treatment and call for bids to meet these requirements ('competitive sourcing'). This would provide bidders with greater freedom to put forward proposals that meet Sydney Water's objectives in the most effective way.

For example, to achieve the objective of an increase in water supply, a water utility could call for bids to construct a specific infrastructure project (eg, a pipeline to bring water from a dam outside the metropolitan area). Alternatively, it could call for bids for bulk water supply. This latter option would open the way for innovative solutions. One bidder may offer to provide the water by fixing leaks in part of the network, while another may propose a

recycling project. This outcomes-focused form of competitive tendering would allow the utility to select the most cost-effective option available to achieve its objective.²²

4.3 Options involving structural change and monopoly franchise

4.3.1 Allowing competition to provide services in a specific geographic area

This option involves auctioning the exclusive right to supply water and sewerage services to a specified standard to customers within a specific area. It has been used in France and the Philippines. It is likely to require some structural change to the industry. It could be expected to lead to an efficient (least cost) outcome,²³ although this will be heavily influenced by the size of the entry and exit costs faced by the bidding firms.

The scope of arrangements of this type generally increases as the length of the arrangements increases. For example, a management contract is generally short term (3-5 years) and involves bidding for the right to manage the operations and maintenance of the business, with low associated costs of entry and exit. In this instance, ownership of the assets, along with responsibility for planning and investment, remains with the asset owner. Lease contracts, which are generally medium term (8-15 years), involve the right to bill customers as well as operate and maintain the system. Long-term concession contracts (20-30 years) add the right to invest in the system.

Establishing the length (and scope) of such arrangements generally involves making a trade-off between the competitive pressure maintained by re-tendering rights, and the advantages enjoyed by incumbents (eg, superior information and sunk costs). A further consideration is the size of entry and exit costs, which may be large enough to preclude the initial competition in the absence of long-term contracts, or to limit subsequent competition.

While this option is included in the set of options involving structural change, such an approach could also be applied to the whole of Sydney Water without changing existing industry structure. The Government would retain ownership of the assets, and invite the private sector to bid for a contract to operate and maintain the assets and provide a customer interface. Similar arrangements currently apply in Adelaide.²⁴

New infrastructure could also be sourced in this way, with the Government inviting the private sector to bid for service provision to new areas. This may or may not involve private sector ownership of assets and, given the existing configuration of the system, would likely require access to Sydney Water's assets. The Tribunal understands that the Government is contemplating arrangements of this type for the new growth areas of Sydney.

²² See "Improving Water Services through competition" Public Policy for the Private Sector, World Bank Group December 1998, Michael Webb and David Ehrhardt.

²³ In recent years, reform of the water sector in other jurisdictions has used competition for the market as an efficient way of introducing private sector participation, and this approach has delivered benefits to consumers (see examples and references listed in "Improving Water Services through competition" Public Policy for the Private Sector, World Bank Group December 1998, Michael Webb and David Ehrhardt).

²⁴ In 1996 the SA Government awarded United Water a 15-year contract to manage and operate the metropolitan Adelaide water and sewerage systems on behalf of SA Water. United Water's contract with SA Water requires it to meet specific quality standards. The contract also sets strict performance targets for customer service based on response times to water mains bursts and other problems.

4.3.2 Establishing yardstick competition

Yardstick (or comparative) competition involves arrangements under which competitive pressure is exerted on a firm with a monopoly in one particular geographic area by assessing its performance through comparison with similar firms in other geographic areas. Such a regime anticipates that information about the relative performance of particular geographic monopolies will drive each one to improve performance. Yardstick competition exists in Melbourne and in England and Wales, and can be expected to provide strong incentives for efficiency. However, there is no standard method for establishing the comparability of different businesses, particularly in relation to efficient costs.

One option for the greater Sydney metropolitan area is to split Sydney Water's existing area of operations into major system or geographic areas for the purposes of establishing yardstick competition.²⁵ The impact on efficiency across the existing water and sewerage infrastructure will depend on the economies of scale that exist, the size of the markets in question, and the costs of establishing competing businesses. These costs would be driven by the physical configuration of the assets. Under yardstick competition, prices within an area could be uniform, but may differ between areas based on the underlying costs. A desire to maintain a higher degree of postage stamp pricing, in the absence of targeted subsidies to address social equity concerns, may limit this reform option.

4.3.3 Retaining retail franchises and introducing competing suppliers

To maximise the benefits associated with competition, recent reforms to energy, transport and other utility industries in jurisdictions around the world have separated potentially competitive sectors from the natural monopoly elements.

Utility distribution networks are often labelled natural monopolies, as they demonstrate significant economies of scale and they require large and long-lived investments that cannot be recovered if an entrant leaves the industry. In contrast, energy production (electricity generation and gas extraction) and retail supply have been identified as being potentially competitive.

The nature or existence of a natural monopoly can change over time, due to factors such as technological change. For example, the argument that the telecommunications access network, which connects households and firms to the local exchange, is a natural monopoly has been significantly weakened by the development of new technologies based on wireless distribution.²⁶

In the energy sector, an initial starting point for reform in several countries²⁷ is the 'single buyer model'. Under this model, one firm is responsible for planning and purchasing the supply (ie generation) requirements of all customers in a defined geographic area, and conducting competitive auctions for new generation as necessary. Often the single buyer has been unbundled or separated from generation, transmission and distribution elements of the industry. For example, the single buyer can be a retail business, or it may be separated from the retail business(es). As well as allowing for the introduction of competition in the

²⁵ This could involve private sector competition to service one or more of the existing areas or new areas.

²⁶ Baldwin, R. and Cave, M. (1999) *Understanding Regulation: Theory, Strategy and Practice*, Oxford: Oxford University Press, p 205.

²⁷ For example, Hungary and Pakistan.

provision of supply (in this case generation), the single buyer model can provide security for private sector investors within a new and untested regulatory framework.²⁸

An unbundled single buyer could be established for all water and wastewater services in the Sydney metropolitan area. This entity would be responsible for purchasing water and wastewater services for all customers in this area. It would be unbundled to some extent from existing water and wastewater treatment and possibly transmission and distribution elements. Alternatively, multiple buyers could be established.

The structure of the Victorian water industry has evolved to a single buyer model with three retail businesses arranging the provision of water and wastewater services, principally from Melbourne Water, but also through procurement from the private sector. Recent reforms are shifting the responsibilities for provision of services closer to the retail companies. The Victorian government has announced that it intends to allocate major Bulk Water Entitlements to the three Victorian Water Businesses. Melbourne Water's role will be to manage the Bulk Water Entitlements on behalf of the three retailers. The retailers have an obligation to supply all customers in their geographic areas, but will be able to trade Bulk Water entitlements between themselves and with neighbouring rural water supply authorities. The Essential Services Commission requires Melbourne Water to establish an unbundled storage, harvesting and transportation charge by June 2006.

The starting point for determining the potential for extending competition to different components of the water and wastewater system is to analyse the functional elements of the entire water supply service to determine which are competitive and which are natural monopolies. Box 4.1 provides a preliminary discussion of the competitive and monopoly elements of Sydney's water and wastewater service, based around establishing a single buyer model. To develop this and other models further would require a formal evaluation of these elements.

Box 4.1 Identifying the competitive and monopoly functional elements of Sydney's water and wastewater service

Water services

Water storage and harvesting

The creation of the Catchment Authority in 1998 separated water storage and harvesting from the means of transporting and distributing it. There is potential for some competition within this element. A single buyer could secure supply from the Catchment Authority, and possibly also obtain bulk water from other sources via desalination, groundwater or recycling - depending on the viability of these alternative sources.

Water treatment

Water treatment could be natural monopoly in a small market that is at a distance from other markets, but is likely to be competitive as the size and density of the market increases.

Water transportation

Water transportation (which involves two separate roles - water transport and system operation) appears to be characterised by natural monopoly. Given the economies of scale and scope associated with infrastructure networks, it is generally cheaper for water to be transported by a single transmission and distribution system rather than by two or more competing alternatives. This is also true in other utility industries (eg, energy and rail), however unlike these other industries the costs (and prices) associated with the transport component of water and sewerage services in Sydney have not been disclosed separately from the retail component (the commodity component is the price paid by Sydney Water to the Catchment Authority).

²⁸ "Competition in the power sectors of transition economies", Working paper No 41, European Bank for Reconstruction and Development, August 1999, David Kennedy.

Retail services

The retail component involves two roles – planning and risk management associated with procuring supply of the service, and all aspects of the customer interface (metering, billing and customer service). Sydney Water currently provides retailing services for all customers in the greater Sydney metropolitan area, and these are priced and sold to customers as a bundled service with the transport and bulk water components. It is possible that the emergence of multi-utility retailers providing energy and telecommunications retail services will lead to interest from potential new entrants wanting to offer retail water services.

Sewerage services

Sewage transportation

In common with water, the piped sewerage network exhibits natural monopoly characteristics.

Retail services

The arrangements for sewerage service retailing are similar to those for water services, with the additional function of effluent testing and strength measurement (particularly for the trade waste sector). Again, in common with water, the financial unbundling of the transport and treatment components from the retail component is fundamental to the development of competition. Introducing competition in retail services also has associated costs, requires the introduction of supplier of last resort arrangements and increases transactions costs in the industry.

Wastewater treatment and disposal

For sewage treatment and disposal, there may be potential for the emergence of effective competition in treatment facilities (eg., small scale, on-site treatment plants for industrial users). Alternatively, it may be desirable for Sydney Water to offer an unbundled, tariff-based service to all potential treatment plant users.

Possible single buyer model for Sydney

A single buyer model for Sydney is possible. The following model meets the essential features of the single buyer model, but also seeks to minimise the extent of changes required.

Retailers

A single retailing business, or two or more retail businesses, covering Sydney Water's existing area would be established along the lines of the Melbourne structure. An option is to establish new retailers for the new growth areas in Sydney's south west and north west.

A common legislative and regulatory framework would be established for the retail businesses. The key responsibility of the retailers would be the efficient planning and provision of water and wastewater services in their geographic region including provision of customer service functions. A system of yardstick competition could be established to compare retailer performance.

The retailers could own small local competitive assets, including local water harvesting, storage and water treatment facilities and small local wastewater treatment assets.

A decision would need to be made about whether the retailers could own monopoly water and wastewater distribution assets (as in Melbourne), or whether they should be involved only in customer service, contracting and risk management (this structure is now being increasingly adopted in the energy sector).

Sydney Water

Sydney Water would take responsibility for monopoly assets including the bulk water and wastewater transmission system, and possibly the water and wastewater distribution systems. The costs of each functional element would be unbundled and charged separately.

Sydney Water would also be allocated large competitive water treatment and wastewater services. These would be established as ring-fenced business units.

Sydney Catchment Authority

The Catchment Authority would remain unchanged. Consideration would need to be given to establishing a system of Bulk Water entitlements that would be allocated to the retail businesses.

Private sector involvement

The retailers would not own any monopoly transmission assets and would have limited ownership of competitive assets. The retailers' incentive would be to plan and provide for new water and wastewater assets in the most cost effective and efficient way.

Further work would be required to define exactly how the private sector would be involved. Broadly speaking, each retailer could be required to issue regular draft and final planning statements that set out and update future anticipated water and wastewater requirements, and options for supply, which may comprise bulk water from the Catchment Authority via the Sydney Water system, water recycling, conservation initiatives, stormwater harvesting and purchase of irrigation water. Consultation would be undertaken on these plans to take account of relevant environmental requirements, state government planning requirements and community views.

These plans would provide information to the private sector, government, Sydney Water and the Catchment Authority. Based on these plans, retailers would issue broad statements of requirements and seek bids from the private sector, the Catchment Authority and Sydney Water. These could be compared with options for internal procurement.

The bidding process would need to be carefully designed to ensure that it is not too expensive and uncertain for the private sector while still providing scope for innovation. Lessons could be drawn from private sector participation in other areas, such as toll roads.

As the retailers would have a monopoly franchise over the customers in an area, they would be able to enter into long-term contracts, thereby enabling private providers to arrange low cost financing. Contracts would include appropriate performance incentives.

4.4 Options that involve third-party access

A further alternative for reform is to introduce third-party access. Under third-party access, a new entrant shares access to those facilities in the supply chain exhibiting natural monopoly characteristics, while competing in the areas that are potentially competitive. The notion of third-party access underpins the reforms observed in electricity and gas industries in many jurisdictions (including Australia, the UK and North America). In general, third-party access has been introduced to enable large customers to choose their supplier, with arrangements often being extended to smaller customers once they have been found to be working effectively. Services Sydney's proposed arrangements involve third-party access to

Sydney Water's sewerage infrastructure and supplier choice for residential wastewater customers.

Third-party access arrangements require a high-level of administrative and regulatory capacity. For example, complex metering and payment systems are needed to facilitate relationships between firms that compete while sharing a single network or facility. As with other options, reform is only justified if the efficiency gains from competition outweigh these administrative and regulatory costs.

Third-party access could build on an unbundling of Sydney Water's activities into monopoly and competitive functions needed to support a single buyer model (although third-party access can be introduced into a vertically integrated business as well). Progressive unbundling of the activities of an incumbent, vertically-integrated service provider has been a feature of energy industry reforms. The extent of unbundling has ranged from accounting separation through to full legal separation or divestment.

Third-party access would support common carriage across the water and sewerage transportation networks. Under such an arrangement, new entrants would use Sydney Water's networks, but compete to supply customers with those services deemed potentially competitive (eg, supply of bulk water, water treatment, sewage treatment and disposal, retail services). In England and Wales, common carriage is currently being introduced in the water sector.

To introduce or develop supply-side competition in the water industry, potential new entrants must be able to:

- obtain a source of raw or treated water
- gain access to water transport infrastructure
- acquire customers through participating in the retail market.

A further option would be competition in retail services only. Under this arrangement, new entrants would purchase water and sewerage services from the incumbent service provider, at the point where the network meets the customer's premises. The services are then resold to the customer. Competition in retail services was introduced in England and Wales for large customers (this arrangement was known as 'inset appointments') and would support the bundling of service provision across different utilities.

4.5 Private sector participation in management

A further option – involving private sector firms in the management of service delivery in the water industry – could be applied in combination with any of the options discussed above. This option has been implemented in Canberra, where utility service provision is managed under a joint venture between ACTEW and AGL.²⁹ There could be various other models for introducing private sector participation in management. However, a disadvantage of this option is that it may preclude future structural change and may limit competition amongst private participants.

The Tribunal seeks views on:

- *whether there are other industry structure models, or alternative commercial or technical arrangements, which warrant consideration*
- *where the opportunities for benefits from implementing options are largest, and where the implementation risks are lowest*
- *the next steps in implementing one or more of the models above.*

²⁹ ActewAGL formed in October 2000 when the Australian Gas Light Company (AGL), a private sector group, and ACTEW Corporation, a government-owned enterprise, entered into a utility joint venture. Ownership of ActewAGL is shared equally between AGL and ACTEW Corporation. The company is organised into two partnerships - ActewAGL Distribution and ActewAGL Retail.

The ActewAGL Distribution partners are ACTEW Distribution Limited and AGL Gas Company (ACT) Proprietary Limited. Under the distribution arm:

- ActewAGL Networks plan, develop, construct, operate and maintain the electricity network in the ACT and the gas networks in the ACT, Queanbeyan and Nowra.
- ActewAGL Water division provide water and wastewater services under contract to ACTEW Corporation who have ownership of the ACT's water and wastewater assets.

The ActewAGL Retail partners are ACTEW Retail Limited and AGL ACT Retail Investments Proprietary Limited. Under the retail arm ActewAGL supplies electricity, natural gas, water and wastewater services to customers.

5 IMPLICATIONS OF INDUSTRY REFORM FOR PRICING

Under the current industry structure, Sydney Water charges a uniform, bundled price for water and sewerage services, with maximum prices being regulated by the Tribunal. Introducing competition to the industry will provide a profit opportunity under those options that are less costly than the least-cost portfolio of options able to be identified by Sydney Water as a central planner. Thus, to evaluate each of the structural models discussed in Chapter 4, the Tribunal will need to consider the implications for pricing – including the pricing of access by third parties to Sydney Water’s water and sewerage infrastructure, and the final price paid by customers.

5.1 Access prices

Whether or not industry models that involve third-party access are viable will depend largely on how access is priced.³⁰ To determine the price of access, it will be necessary to establish the costs of the access service. This requires the allocation of costs to Sydney Water’s water and sewerage activities, based on customer characteristics and geographic location, and the consideration of any joint and common costs.³¹

There are several approaches to such cost allocation. In evaluating these approaches, the Tribunal will have regard to the following principles:

- access prices should encourage efficiency
- access prices should compensate Sydney Water for the net losses unavoidably incurred when providing access as compared with continuing to provide the service
- customers not yet eligible for competition should not subsidise the competitive markets
- new entrants (or potential new entrants) should be treated in a competitively neutral way.

³⁰ A ‘right’ of access is equally important. The non-price issues associated with reform are discussed in Chapter 6.

³¹ Joint and common costs are those costs incurred in the supply of a group of services that cannot be directly attributed to any one service (they typically derive from economies of scope). There is no standard method for allocating such costs in the right proportions to the various activities.

5.1.1 Approaches

The Tribunal is considering three approaches for determining access prices, each of which provides for the access price to be set somewhere between the avoidable cost of service (the lower bound) and the stand-alone cost of service (the upper bound).³² Setting prices somewhere between these two bounds is consistent with generally accepted principles for pricing of monopoly infrastructure assets. The Tribunal adopts this approach in relation other industries, such as electricity distribution.³³

The first approach is to base the access price only on the (long run) incremental costs associated with providing access (LRMC pricing). These costs may involve, for example, the extra administrative costs associated with arranging access, any modifications that have to be made to the infrastructure to allow that access, and any ongoing operating and maintenance costs that arise as a consequence of the access being granted. A more sophisticated approach to calculating LRMC might be to reflect the extent of congestion and spare capacity in different parts of the system.

One of the potential advantages of LRMC pricing is that, because the incremental costs of access are likely to be relatively low, the resulting charge will also be relatively low. This is because monopoly water and wastewater infrastructure is likely to be characterised by economies of scale, with marginal costs being less than average costs.

If the intention of industry reform is to actively encourage entry, this approach could therefore be seen as advantageous. However, the LRMC approach also has a number of disadvantages. Because the resulting charge is based on *incremental* costs, it fails to recover any of the joint/common costs associated with the infrastructure. The price charged may therefore be 'too low' to recover the full or true costs of access, resulting in an inefficiently large amount of entry. To the extent that joint costs include socially desirable factors such as universal service obligations, the LRMC approach will not provide for the recovery of any of these costs from the entrant.³⁴

Further, the LRMC approach fails to recover any *sunk* costs associated with stranded assets that are no longer used due to the new entrant. (For example, were a new entrant to require access to the sewerage transportation system so as to divert sewage after the primary treatment phase, this could lead to the stranding of assets constructed to perform secondary/tertiary treatment, and/or sea outflow assets – either in their entirety, or by significantly reducing the capacity requirements for these assets.) If the incumbent fails to recover sunk costs, it may make losses or experience a write down in its capital base. As motioned previously, this could represent an economically efficient outcome, and could be expected to occur in a competitive market.

³² Avoided costs are, as the name suggests, costs that are 'reversible', that the incumbent will no longer incur as a result of the entrant's coming into the market. They might include, for example, power and chemicals costs, and in the longer term, reduced maintenance costs. Stand alone costs are the costs that an entrant would face if they had to provide the service on a 'stand alone' basis (ie, without having access to any existing assets).

³³ The rationale for setting prices somewhere between these two bounds is that it ensures that customers are not paying (i) less than the minimum cost that the entrant would incur in providing the service (if prices were set lower than this, potential entrants would not be able to make sufficient returns to enter the market); and (ii) more than the cost if the entrant had to replicate the assets (this would send a price signal for inefficient entry).

³⁴ Factors such as these can contribute to 'cherry picking' (discussed further in section 5.1.2).

The second approach to determining access prices is to use a building block or cost method. This approach addresses some of the problems of LRMC pricing. It involves calculating the average revenue that the infrastructure owner requires to recover capital and operating costs (including universal service obligations), and using this revenue requirement as the basis for determining average access charges. Two-part access prices could be set, with a variable (or usage) component reflecting LRMC signals, and a fixed component that recovers remaining revenue requirement (ie, is non-distortionary).

One of the advantages of the building block approach is that stakeholders are generally familiar with it (as it is used for access pricing in the electricity and gas industries). Another is that it allows all costs to be recovered.

The third approach to access pricing is to set charges for access by subtracting from retail prices the costs avoided by providing access ('avoided costs'). This method is also known as the Efficient Component Pricing Rule (ECPR), and has a number of regulatory precedents (for example, it is being implemented as part of the introduction of access to water networks in England and Wales).

While the ECPR approach may result in higher charges for the entrant than the LRMC approach, it has the advantage of ensuring that the entrant makes a contribution to any joint/common costs associated with the infrastructure, thereby avoiding the problem of inefficient entry.³⁵ It can also be used to help provide for the recovery of costs associated with stranded assets, and allows the costs of any social obligations (such as universal service) to be fully recovered (including a contribution from the entrant). Another advantage of the ECPR approach is that if only a small amount of new entry is anticipated, the administrative effort of calculating access prices for the entire network and the need to consider rebalancing of retail prices can be avoided. (The respective pros and cons of the LRMC and ECPR approaches are discussed in more detail in Appendix 2.)

A key decision in considering the overall methodology for determining access prices is the extent to which the access price can be allowed to vary geographically – that is, whether a single 'postage stamp' access price is to be imposed, or whether the access price can vary from location to location, depending on the costs of supply in that particular area.

The costs of service can vary significantly within a water/sewerage provider's area. Economic theory suggests that, in the light of this, there are two main arguments for also allowing access prices to vary with location. First, this ensures that efficient locational price signals are sent to entrants. Second, it helps avoid the risk of 'cherry picking' (discussed below).

Allowing access prices to vary with location is not without its disadvantages. Establishing a different access price for every single location in an incumbent's supply area will impose administrative/transactions costs (primarily for the incumbent) and may reduce transparency. A compromise is to adopt zonal pricing that averages the individual access prices determined for each location into a number of zones.

³⁵ Ie, cherry-picking will only take place where it is 'efficient' – where the entrant can undercut the avoidable cost of the incumbent.

Another consideration is the implications that this has for postage-stamp pricing at the *retail* level (ie, for end customers). There may be pressure to rebalance retail tariffs to reflect access charges so as to avoid incentives for inefficient entry. However, retail-level postage stamp pricing may be considered desirable for a number of social reasons. For example, it may be argued that because water supply and some form of sewage disposal service are generally seen as essential services, it is desirable to structure prices so that no customer ends up having to pay ‘too much’ (in terms of affordability) for supply, irrespective of where they live. Retail-level postage stamp pricing may be seen as a way to achieve this, in that it allows customers in low cost-of-supply areas to cross-subsidise customers in high cost-of-supply areas.

Thus a further consideration is whether it is desirable (and if so, possible) to retain a postage stamp approach to *retail* pricing, while still creating some form of location-based price signal for *access*. While in principle uniform retail pricing could be maintained alongside any of the options set out in Chapter 4, in practice postage stamp pricing may be difficult to implement with some options, and some compromise between uniform and fully cost reflective pricing may be necessary. One option that might be considered here is some form of locational levy, charge or subsidy, chargeable to the entrant and varying by location, aimed at providing the same locational incentives that would be achieved were there no postage-stamp pricing.

5.1.2 Relationship between access prices and retail prices

The relationship between access prices and retail prices has implications for the incumbent. Where competing suppliers are allowed, introducing differential access prices in the presence of uniform retail prices may create incentives for new entrants to cherry pick those customers that are cheapest to service. This would have impacts on the incumbent service provider, who may be left with an ‘average’ retail price to cover the costs of the most expensive customers (with subsequent implications for the Government (as shareholder) and/or for customers). This is demonstrated through the two worked examples on the next pages.

Example 1 shows how costs of service delivery vary between catchment areas for a hypothetical sewerage system. The zones in Catchment C are expensive to service, because they are fairly remote and so involve greater transport costs and because they require a more costly form of (inland) sewage treatment. Sub-zone 5 is particularly expensive to service on a per customer basis, due to its very low population compared to other areas. By contrast, Catchments A and B have significantly lower costs per customer, due to higher populations, shorter average length of sewer, and in the cases of zones 1 to 3, significantly lower treatment costs due to the use of sea outfalls.

If postage stamp pricing is applied to the whole area, the average price of 0.211 units provides scope for an entrant to cherry pick the lower cost zones (zones 1, 2, 3, and 4), as it could provide the services to these areas only at a lower price than 0.211 units per customer, and still make a profit. Were this to happen, the incumbent would lose its cheapest to supply customers, and these customers would no longer be available to cross-subsidise the more expensive customers in Catchment C. The incumbent would then be forced to operate at a loss (relative to its required rate of return).

If postage stamp pricing were applied on a per catchment basis, the example shows that there would still be room for cherry picking. In Catchment A, the entrant could cherry pick customers in zone 2. In Catchments B and C, the entrant could cherry pick customers in zones 4 and 6 respectively. Only with sub-zone pricing is the scope for cherry picking removed.

Example 2 shows a similar situation for water transportation. Here, once again postage stamp pricing means that the entrant has an incentive to cherry pick the customers that can be supplied for less than the average cost (of 0.341 units), in zones 1-4, leaving the incumbent making a loss on customers in Catchment C.

While continuing to set retail prices on a geographically uniform basis could increase the risk of cherry picking by new entrants, moving to more cost reflective retail pricing could hinder equity objectives of postage-stamp pricing arrangements.

The Tribunal seeks views as to the most appropriate method of calculating access prices, including the level of geographic disaggregation or differentiation, and whether there are alternative methods that should be considered.

Worked example 1: Scope for cherry-picking

Catchment A - high customer density, especially zone 2. Sea outfalls only, giving low treatment costs. Short average length of sewer.

Catchment B - high customer density, especially zone 4. Zone 3 low treatment costs (sea outfall), zone 4 higher (inland treatment). Short average length of sewer.

Catchment C - low customer density, especially zone 5. High treatment costs (inland). Long average length of sewer.

Sewerage

| | Catchment A | | Catchment B | | Catchment C | | Total |
|-------------------------------------|-------------|------------|-------------|------------|-------------|------------|-------|
| | sub zone 1 | sub zone 2 | sub zone 3 | sub zone 4 | sub zone 5 | sub zone 6 | |
| Customers | 1000 | 1500 | 1000 | 1500 | 100 | 200 | 5300 |
| sewerage transportation cost per km | 5 | 5 | 5 | 5 | 5 | 5 | |
| avg km transported | 20 | 20 | 20 | 20 | 60 | 60 | |
| inland treatment costs | | | | 10 | 10 | 10 | |
| sea outfall treatment costs | 2 | 2 | 2 | | | | |

Price at whole area level (per customer)

| |
|-------|
| 0.211 |
|-------|

Price at catchment level (per customer)

Catchment A

| |
|-------|
| 0.082 |
|-------|

Catchment B

| |
|-------|
| 0.088 |
|-------|

Catchment C

| |
|-------|
| 2.325 |
|-------|

Price at sub zone level (per customer)

Sub zone 1

| |
|-------|
| 0.102 |
|-------|

Sub zone 2

| |
|-------|
| 0.068 |
|-------|

Sub zone 3

| |
|-------|
| 0.102 |
|-------|

Sub zone 4

| |
|-------|
| 0.073 |
|-------|

Sub zone 5

| |
|-------|
| 3.100 |
|-------|

Sub zone 6

| |
|-------|
| 1.550 |
|-------|

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Worked example 2: Scope for cherry-picking:

Catchment A - high customer density, especially zone 2. Short average length of main.

Catchment B - high customer density, especially zone 4. Medium average length of main.

Catchment C - low customer density, especially zone 5. Long average length of main.

Water transportation

| | Catchment A | | Catchment B | | Catchment C | | Total |
|----------------------------------|-------------|------------|-------------|------------|-------------|------------|-------|
| | Sub zone 1 | Sub zone 2 | Sub zone 3 | Sub zone 4 | Sub zone 5 | Sub zone 6 | |
| Customers | 1000 | 1500 | 1000 | 1500 | 100 | 200 | 5300 |
| water transportation cost per km | 5 | 5 | 5 | 5 | 5 | 5 | |
| avg km transported | 20 | 20 | 40 | 40 | 60 | 60 | |
| pumping costs per km | 2 | 2 | 2 | 2 | 2 | 2 | |

Price at whole area level (per customer)

| |
|-------|
| 0.341 |
|-------|

Price at catchment level (per customer)

Catchment A

| |
|-------|
| 0.112 |
|-------|

Catchment B

| |
|-------|
| 0.233 |
|-------|

Catchment C

| |
|-------|
| 3.150 |
|-------|

Price at sub zone level (per customer)

Sub zone 1

| |
|-------|
| 0.140 |
|-------|

Sub zone 2

| |
|-------|
| 0.093 |
|-------|

Sub zone 3

| |
|-------|
| 0.280 |
|-------|

Sub zone 4

| |
|-------|
| 0.187 |
|-------|

Sub zone 5

| |
|-------|
| 4.200 |
|-------|

Sub zone 6

| |
|-------|
| 2.100 |
|-------|

5.2 Retail prices, developer charges and recycled water

Under the current uniform pricing arrangements, retail customers pay a periodic charge (equal to an average price) for a suite of services we can call ‘basic water’ and ‘basic sewerage’. The additional costs of servicing new developments are recovered through developer charges. Developer charges equal the incremental costs of development less the revenue stream received in the form of periodic charges, ie, the developer charge is the margin above the average cost of a particular connection.³⁶

It may be desirable to accompany the introduction of competition (either for the market or in the market) with increased cost-reflectivity in retail prices, to take advantage of economic signalling effects and thus any potential to increase allocative efficiency.³⁷ In this instance, the price of the basic services may differ between geographic locations – for example, based on the extent of pumping required for the supply of water, or the sewage treatment technology employed. Where available, customers could opt to pay extra for ‘service enhancement’ (eg, arrangements of the type proposed by Services Sydney) and/or new services (eg, recycled water).

As noted above, developer charges are currently a ‘balancing item’ on the difference between incremental costs and average prices. This arrangement has provided signals regarding the costs of urban development, which encourage less costly forms and areas of development, and has allowed retention of uniform periodic pricing. As for retail prices, if access is introduced, the regime could be retained, with additional charges for ‘service enhancement’. These arrangements are represented in Table 5.1 below.

Table 5.1 Uniform versus cost reflective retail pricing

| Uniform pricing | Cost reflective pricing |
|---|---|
| <ul style="list-style-type: none"> - basic water - basic sewerage | <ul style="list-style-type: none"> - basic services (possibly in geographic area) - service enhancement (eg, Services Sydney) - new service (eg, recycled water) |
| Recovered through periodic charge based on average prices and developer charges | Recovered through periodic charges on a cost or ‘service plus’ basis and developer charges (which may also contain service enhancements) |

³⁶ The developer charge is:
The sum of the capital expenditures over time required to service the development
Less the expected net operating profits (or losses) over time from providing services to that area.

³⁷ Allocative efficiency is defined in box 3.1.

Any move to cost-reflective charging will need to be assessed in light of the anticipated customer impacts, given the likely response of customers to price changes (the price elasticity of demand).³⁸ While estimates of elasticity, and the methodologies used to calculate them, vary considerably, the demand for water has generally been found to be reasonably inelastic (ie, small changes in price are unlikely to have large effects on demand).³⁹ However, changing the price structure for water can impact the elasticity of its demand (eg, elasticity can increase with the introduction of an inclining block tariff).⁴⁰

As set out in section 2.5.4, the Tribunal currently adopts a light-handed approach to regulating recycled water. Under the Metropolitan Water Plan, 80 gigalitres of water will be recycled to replace potable uses by 2029. In developing the *Metropolitan Strategy: Recycled Water*, DIPNR will identify options for meeting this target.

In the case of recycled water, the current pricing arrangements for both potable and recycled water may affect the commercial viability of alternative providers of recycled water. This also impacts the extent to which recycled water may be an attractive substitute for potable water supply, either directly, or by means of other uses that affect the supply of potable water in Sydney. In assessing the relationship between recycled and potable water prices, there is a need to recognise the benefits arising from the displacement of potable water demand by the provision of recycled water.

Whether retail prices reflect economic costs⁴¹ is particularly important, given the cost of new water sources (ie, recycled water and desalination) is likely to rise (ie, be higher than the current cost of water from the Catchment Authority), and an analysis of the forward-looking costs of new supply options will need to be undertaken.

The Tribunal seeks comments on:

- *the sustainability of uniform retail pricing under the structural models discussed above*
- *the appropriate relationship between recycled water and potable water prices.*

³⁸ The price elasticity of demand measures the change in quantity demanded (ie, the quantity of water used) which is brought about by a change in price. Where a small change in price results in a large change in the quantity demanded, demand is said to be elastic. Where a small change in price has little to no impact on the quantity demanded, demand is said to be inelastic. The extreme examples are perfect elasticity (where a price rise will reduce the quantity demanded to zero) and zero elasticity (where demand is constant regardless of changes in price).

³⁹ IPART, *Investigation into Pricing Structures to Reduce the Demand for Water in the Sydney Basin – Issues Paper*, pp 15-18, December 2003.

⁴⁰ Dalhusen, J., Florax, R., de Groot, H., and Nijkamp, P., (2001) "Price and income elasticities of residential water demand", *Tinbergen Institute Discussion Paper*.

⁴¹ Including the positive externalities associated with use of recycled water in place of potable water.

6 NON-PRICE IMPLICATIONS OF REFORM

Changes to the arrangements for service provision in the water industry are likely to have non-price implications for the existing legal, regulatory and commercial (or contractual) arrangements, which may require significant amendment to support an alternative model.

6.1 Legal and regulatory framework

The legal and regulatory framework is likely to require significant amendment to accommodate major change to the structure of the water industry. In this instance, it will be necessary to identify any changes to the current institutional and legal arrangements required to facilitate the introduction of an alternative structure.

For example, if a model involving competing suppliers is preferred, it will be necessary to ascertain whether the applicable legislation creates barriers to entry and competition in potentially competitive activities. If models involving third-party access are preferred, they will need to be supported by a legal right to such access. Similarly, it would be appropriate to examine whether there are any structural reforms that may enhance competition. For example, in ensuring open access to networks on a non-discriminatory basis, would an independent system operator be appropriate (eg, similar to the current National Electricity Market Management Company (NEMMCO) in the Australian electricity market)? Consideration would also need to be given to the nature and scope of the licences and permits that may be required.

The Tribunal seeks views as to whether the options described above are supported by the current institutional and legal arrangements and what key issues would need to be considered.

Under the various structural models, it may be appropriate to ensure that legislative obligations apply to activities rather than entities. Similarly, the current regime of licensing entities would need to be reformed so that different categories of licence would apply to different activities. In this instance, it will be necessary to ascertain which activities require licensing. In general, the licensing framework should at least distinguish between potentially competitive and natural monopoly activities, permitting entry and competition in those activities that are potentially contestable. Licences can be used to impose relevant legislative obligations on new entrants, such as obligations in relation to service quality, customer protection and environmental impacts, and technical and health requirements in relation to connecting to and using the system. They can also impose other supporting regulations (such as compliance, dispute resolution and enforcement), and potentially impose obligations to enter into certain contracts (such as use of system agreements).

The incumbent's licence may also include an obligation to establish terms and conditions of third-party access to infrastructure, and conditions regarding the separation of activities or ringfencing. As noted in Chapter 4, a decision on the degree of separation or unbundling of Sydney Water would be needed. This separation could range from accounting separation of activities, through to full legal separation.

If there is a decision to introduce third-party access, this would need to be supported by a further suite of arrangements. One option is a negotiate-arbitrate regime, under which access is negotiated between parties on a case-by-case basis with a regulator arbitrating any disputes. Alternatively, the access provider could produce a standard set of terms and conditions for access (an 'access undertaking'). An arrangement of this type could involve a state-based regime (possibly administered through an access code or as a licence requirement) or submission to the Australian Competition and Consumer Commission under Part IIIA of the *Trade Practices Act 1974*. Decisions would be required on the content of the undertaking. For example, it could set out indicative reference service(s), and prices and standards for the reference service(s) could be regulated and published.

The Tribunal seeks views as to whether there are other access models that warrant consideration and the relative advantages and disadvantages of each.

Changing the arrangements for service provision in the industry would also change the requirements for regulation or oversight – for both monopoly and competitive components. Economic regulation may apply to access prices and service standards for monopoly functions as well as security of supply. Other forms of regulation applying to both monopoly and competitive components include technical, safety and product/quality regulation. The advent of new entrants into the industry is likely to lead to increased regulatory costs.

The Tribunal seeks views as to whether there are other regulatory and commercial arrangements required to support the options described above.

6.2 Role of government agencies

A move to one of the industry models discussed in Chapter 4 is likely to affect the current roles of government agencies, and in particular NSW Health and the Department of Environment and Conservation (DEC). Any regime that increases the number of parties injecting water, withdrawing effluent, or supplying recycled water will increase the need for effective monitoring, testing and inspection services. There may also be a need to review and strengthen compliance and enforcement arrangements.

It may be preferable to establish a clearer separation between the regulation and policy functions currently carried out by departments, so that the regulatory functions become more transparent and independent from government. This would provide greater certainty and increase confidence in the impartiality of any new arrangements. DIPNR's role in relation to infrastructure planning and co-ordination may also require modification, depending on the model selected.

In relation to planning, there may be benefits from establishing an independent planning agency (similar to the current National Electricity Market Management Company in the Australian electricity market). This could provide medium- and long-term planning information that supported both decentralised decision-making (identifying supply requirements and investment opportunities) and the back-stop security of supply planning role.

The Government will need to ensure an overall coordination function is established so that an integrated regulatory regime exists to support any new arrangements.

The Tribunal seeks views on:

- *the extent to which central agencies involved in the regulation of the water industry should be independent from Government*
- *whether any gaps in regulation emerge in considering a move away from monopoly service provision.*

6.3 Retail competition

Depending on the industry model chosen, a decision will be needed on whether retail competition in water and wastewater services should be introduced and, if so, to what extent.

If retail competition is introduced, additional customer protection arrangements may need to be put in place. These might include a provision for a supplier of last resort (which should generally be the dominant market player), along with customer switching and associated billing and metering arrangements. Dispute resolution and complaint handling procedures may need to be amended or at the very least broadened (eg, new entrants may be required to join the Electricity and Water Ombudsman NSW (EWON) or another approved dispute resolution body).

Evidence from the electricity industry in NSW highlights the costs of implementing full retail competition. The Tribunal allowed costs of \$150 million for the implementation of full retail competition across the four distribution network service providers in NSW. This amounted to \$16 to \$35 per customer per annum over a three-year period, depending on the service provider.

The Tribunal seeks views on the extent to which retail competition in the water industry is desirable.

7 EVALUATION FRAMEWORK

The terms of reference require the Tribunal to have regard to the costs and benefits of alternative industry structures (including transitional costs that may be incurred in changing to new structures). The Tribunal intends to develop an evaluation framework to meet this requirement. One possible evaluation framework is presented below. This framework draws together the various issues considered in previous chapters. It lists a set of evaluation criteria, but does not indicate the weight that might be attached to each criterion.

7.1 Evaluation criteria

Different structural options that encourage the involvement of the private sector in the provision of water and wastewater services have been defined. The evaluation criteria for assessing these can be grouped into the following categories:

- a) **Security of supply.** This involves assessing how the options ensure security of supply.
- b) **Net economic benefit.** This involves considering the productive, allocative and dynamic benefits and costs, transactions costs, and the risks and uncertainties associated with the assessment of those benefits and costs.
- c) **Environmental outcomes.** This involves achieving defined environmental outcomes at least cost.
- d) **Social outcomes.** This includes the effect on affordability and geographic equity.
- e) **Regulatory implications.** This involves assessing whether outcomes are acceptable for non economic regulation (eg, health).
- f) **Financial outcomes.** This includes assessing the financial impacts on existing asset owners and operators.

The full list of suggested evaluation criteria is as follows:

- a) Security of Supply
- b) Net economic benefit
 - How could the option promote allocative efficiency?
 - How could the option promote productive efficiency (for example by promoting cost minimisation and increasing service quality)?
 - Could the option result in a loss of productive or dynamic efficiency (for example, through loss of economies of scope and scale, reduced innovation, increased co-ordination costs)?
 - How could the option promote dynamic efficiency (including promoting the investigation and commercialisation of new water sources, the more efficient use of current water stocks, development of new technologies and processes etc)?
 - What are the implications for transactions and co-ordination costs?
 - Does the option ensure competitive neutrality between publicly owned and privately owned businesses? (Competitive neutrality is a factor that can encourage productive and dynamic efficiency.)
 - What transitional costs would be incurred?

- What transition risks might be created?
- c) Environmental outcomes
- Is the option able to be consistent with objectives for protection of the environment at least cost?
 - Can the option lead to improvements in environmental outcomes?
- d) Social outcomes
- Does the option lead to any adverse change in the level of average prices?
 - Does the option lead to pricing changes that give rise to concerns for affordability (social equity)
 - but which could be addressed through targeted subsidies (option); or
 - where targeted subsidies are not to be provided (alternative)?
 - Could the option lead to pricing changes that result in different prices for customers in different locations with the same consumption profile (geographical equity)?
 - Is there any risk that customers might not be offered supply?
- e) Regulatory implications
- Is the option able to be consistent with the need to protect public health (including ensuring the supply of safe drinking water, safe recycled water and ensuring appropriate management of wastewater) covering the ability to
 - effectively and efficiently allocate risk and liability; and
 - ensure effective regulation?
- f) Financial outcomes
- What are the implications for changes in financial returns to the businesses?
 - Does the option encourage competition for services provided by new assets only, or does it encourage competition for services provided by both new and existing assets?

7.2 Timeframes over which costs and benefits should be assessed

The need to focus on transition costs raises the question of the timeframe over which costs and benefits should be assessed. The Tribunal considers that costs and benefits of change need to be assessed over a long period of time. The Metropolitan Water Plan is focused over a 25-year period. It therefore seems appropriate to assess the costs and benefits of alternative arrangements for service provision over the long term, eg, 25-30 years.

The Tribunal seeks views on the evaluation framework.

APPENDIX A TERMS OF REFERENCE

Sydney Water Corporation is the statutory State-owned corporation responsible for delivering water and wastewater services to customers in Sydney, the Blue Mountains and the Illawarra. Since corporatisation, Sydney Water has made significant efficiency gains, leading to lower prices for its customers. At the same time, Sydney's demand for water now exceeds the sustainable yield of its catchment. The Government has developed the Metropolitan Water Plan which outlines a mix of actions which will deliver a long-term balance between supply of and demand for water. A key element of the Plan is encouraging the involvement of the private sector in developing innovative solutions to Sydney's water problems. These developments have important implications for the pricing of water and wastewater and for the structure of the water and wastewater services industry.

- 1) The Independent Pricing and Regulatory Tribunal (IPART) is requested, under section 9 of the *Independent Pricing and Regulatory Tribunal Act 1992*, to investigate and provide advice on possible pricing principles and alternative arrangements, including possible private sector involvement, for the delivery of water and wastewater services in the greater Sydney metropolitan area, with a view to making recommendations for providing these services in the most efficient, effective and sustainable way.
- 2) In conducting the review and developing recommendations, IPART is to
 - I. Have regard to:
 - i. The principles of integrated water cycle management;
 - ii. The roles and responsibilities of participants in the industry, both Government and private sector;
 - iii. Approaches taken in other jurisdictions to the pricing and delivery of water and wastewater services;
 - iv. Recent reforms in other industries with similar characteristics;
 - v. The costs and benefits of alternative industry structures, including transitional costs that may be incurred in changing to a new structure;
 - vi. The principles for pricing, including pricing for recycled water, that should be associated with existing and alternative industry structures;
 - vii. The principles for access that should be associated with alternative industry structures;
 - viii. Mechanisms for implementation of the pricing and access principles;
 - ix. Any impacts (including service provision, operational or financial impacts) on existing asset owners and operators;
 - x. Any impact on customers and in particular any differential impact on large families or low income households, and how these may be addressed;
 - xi. Any impact on human health; and
 - xii. Any impact on the environment.
 - II. Consult with Government, the water and wastewater industry, water and wastewater customers, and other interested parties.
- 3) IPART is to provide a final report to the Minister for Energy and Utilities within 9 months of receipt of these Terms of Reference.

APPENDIX B ADVANTAGES AND DISADVANTAGES OF LRMC AND ECPR APPROACHES TO ACCESS PRICING.

| | LRMC | ECPR |
|--|---|--|
| Main features | Charge for access based on 'bottom up' or 'building block' cost calculation, where the <i>unavoidable</i> costs of providing entry are added together to derive a charge. | Charge for access based on the retail tariff minus the <i>avoided costs</i> . Avoided costs refer to the elements of the service that the entrant does not use. ⁴² |
| Key advantages | <ul style="list-style-type: none"> • Entrant only pays for the <i>extra</i> costs that they impose – charge is therefore relatively low, and entry is encouraged. | <ul style="list-style-type: none"> • Allows joint costs to be recovered. Cost of stranded assets could be recovered. Incumbent able to earn an appropriate return on its assets. Incentives for future investment maintained. • Entry should only take place where efficient - ie, where the entrant's costs are lower than the incumbent's avoided costs. • Allows recovery of social obligations costs (eg universal service). |
| Key disadvantages | <ul style="list-style-type: none"> • No means for incumbent to recover joint costs, or costs of stranded assets. May create a disincentive to invest in future assets, due to increased uncertainty over ability to recover the costs if the sector is subject to competitive entry. • No provision for recovery of the costs of social obligations. • Price is 'too low' and may result in inefficient entry. • Calculation of incremental costs could be subject to debate. | <ul style="list-style-type: none"> • If maximizing entry is an aim, LRMC approach more likely to achieve this (lower charges).⁴³ • Clarity needed on time period over which avoided costs are to be measured (likely to be greater over long run). • 'Avoided' costs may be debated (eg extent to which incumbent needs to maintain capacity of unused assets as 'back up'- eg if the entrant fails). • If retail prices include monopoly rents, these will remain in charges to the entrant, which may deter entry.⁴⁴ • Incumbent has an incentive to understate avoided cost to deter entry – if information asymmetries are severe, this may be difficult to detect. |
| Implications for postage stamp pricing | Local LRMCs could vary substantially, making <i>transmission access</i> postage stamp pricing difficult. However, postage stamp pricing at the <i>retail</i> level would have no impact. | If retail prices are set on a postage stamp basis, but avoided cost is calculated on a <i>local</i> basis, this could distort signals for entry. |

⁴² For example, where an entrant gains access to the sewerage transportation system, but bypasses the incumbents sewage treatment assets, avoided costs would include the cost of the treatment assets that are not being used, and any other avoided costs such as outflow quality testing.

⁴³ However, a counter argument is that if the LRMC approach leads to an overall reduction in confidence in the sector concerning the ability of businesses to recover their full costs, this could in itself also deter entry.

⁴⁴ A counter argument is that economic regulation should be expected to address any concerns in this area.