Bulk Water Prices from 2005/06

Issues Paper

INDEPENDENT PRICING AND REGULATORY TRIBUNAL
OF NEW SOUTH WALES

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Issues Paper

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1 INTRODUCTION

The Independent Pricing and Regulatory Tribunal of NSW (the Tribunal) is currently conducting a review of prices for services relating to the provision of bulk water for extraction by farmers, industrial users and town water suppliers from water sources managed by State Water and the Water Administration Ministerial Corporation (WAMC). The objective of the review is to determine the maximum charges for these services to apply from 1 July 2005.

The review is taking place at a time when there is much debate in the community about sharing water resources between competing user groups and the environment. This debate has intensified with the drought and concern about the impacts of global warming on long-term weather patterns. It is also being driven by improvements in scientific knowledge about surface and groundwater systems, their management needs and the potential environmental impacts of extractions from these systems. However, while the prices charged for water extractions provide a signal to users about the cost of service provision, pricing is not currently used as a major tool in managing and allocating water resources.

The Tribunal last set prices for bulk water services in 2001, when the former Department of Land and Water Conservation was responsible for providing these services. Since then, this Department has been restructured, and functions related to river and storage operations on regulated rivers are now performed by State Water Corporation, a newly corporatised entity governed by the *State Water Corporation Act 2004*.[1] Functions related to water resource management (WRM) are performed by the newly formed Department of Infrastructure Planning and Natural Resources (DIPNR) on behalf of the WAMC.[2] The newly established Catchment Management Authorities (CMAs) may also have some role in WRM, although at this stage the extent of their involvement is unclear.[3]

Therefore for this determination, the Tribunal will set the maximum prices for services provided by State Water and WAMC in making available and supplying bulk water to users from regulated, unregulated and groundwater sources. The specific services reflected in these prices include those involved with:

- making water available
- making WAMC's or State Water's water supply facilities available
- supplying water, whether by means of WAMC's or State Water's water supply facilities or otherwise.

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1 Further information on the rationale for the corporatisation is available in a paper released earlier this year by the Department of Energy, Utilities and Sustainability titled *Proposal for Comment: State Water Corporatisation.*

2 The Water Administration Ministerial Corporation is the legal entity that has made available and provided bulk water in the past. DIPNR's WRM activities involved in making available and providing bulk water will continue to fall under this legal entity. Therefore, while DIPNR performs the WRM activities, WAMC is the legal entity that provides the services for which the Tribunal sets prices.

3 Due to the timing of this restructuring, the Tribunal was not able to review bulk water prices from 2004/05, as was foreshadowed at the 2001 review. Instead, the Government legislated (through the *State Water Corporation Act 2004*) to apply a 2 per cent increase to the existing prices until the Tribunal makes a new determination of prices.

Separate prices will be set for services provided by State Water and by WAMC. However, depending on the availability of information from State Water and DIPNR, the Tribunal may not be able to finalise the prices for all services by the same date, and prices may apply for different time periods.

Please note that the Tribunal is concurrently conducting a review of State Water's operating licence. A separate issues paper is available for this review.[4]

1.1 Review process

As part of the review process, the Tribunal will consult with key stakeholders, including State Water, DIPNR and environmental, community and water users' advocacy organisations. It asks State Water and DIPNR to make submissions to the review, detailing their pricing proposals and providing comprehensive financial information on the projected operating and capital expenditures they believe are necessary to maintain customer service levels and respond to regulatory and customer demands. These submissions will be made available to the public on the IPART web site www.ipart.nsw.gov.au. It also invites all other interested parties to make submissions, commenting on State Water's and DIPNR's submissions, the issues raised in this paper, and other matters relating to bulk water prices.

The Tribunal will commission an independent consultant to assess the efficiency of State Water's and DIPNR's projected operating and capital expenditures, and will make this consultant's report available on its website. It may engage further consultants to help it review other issues where specialist expertise is required.

The Tribunal also plans to hold public hearings/workshops to provide further opportunity for stakeholders to present their views. In addition, it will release a draft report, and invite stakeholders to make further submissions on this report, the consultant's review of operating and capital expenditures, and any matter raised in the public hearings. After it has considered these submissions it will make its final determination and release its final report.

An indicative timetable for the review is provided below. Details on how to make submissions can be found at the front of this paper.

Indicative review timetable

Task	Timeframe*
Release issues paper	September 2004
Receive submissions from State Water and DIPNR	29 October 2004
Start review of State Water and DIPNR capital and operating expenditures	October 2004
Receive public submissions	17 December 2004
Release consultant's report into operating and capital expenditure	January/February 2005
Hold public hearing and workshops	February/March 2005
Release draft determination	May 2005
Receive submissions on draft determination and consultant's report	June 2005
Release final determination	August 2005

* Please note these dates are indicative and may be subject to change.

4 IPART, *Review of Operating Licence for State Water Corporation*, September 2004.

1.2 Tribunal's considerations

In setting bulk water prices, the Tribunal is required to consider a broad range of issues, including social and agency-specific concerns. It will be guided primarily by section 15 of the *Independent Pricing and Regulatory Tribunal Act, 1992* (see Attachment 1), which requires it to consider a range of matters related to:

- **consumer protection**—protecting consumers from abuses of monopoly power; standards of quality, reliability and safety of the services concerned; social impact of decisions; effect on inflation
- **economic efficiency**—greater efficiency in the supply of services; the need to promote competition; effect of functions being carried out by another body
- **financial viability**—rate of return on public sector assets including dividend requirements; impact on pricing of borrowing, capital and dividend requirements of agencies
- **environmental protection**—promotion of ecologically sustainable development via appropriate pricing policies; considerations of demand management and least-cost planning.

In considering these matters, the Tribunal will need to balance the diverse needs and interests of stakeholders—such as customer affordability issues, environmental impacts and the maintenance of the overall quality of services provided to customers—as well as ensuring the long term financial viability of State Water and services provided through the WAMC.

The Tribunal will also take into account guidelines issued by the Council of Australian Governments (COAG). COAG has recently issued revised guidelines as part of the *National Water Initiative*, which has built on the principles established in the 1994 COAG *Water Reform Framework*.[5] A key theme in both these documents is to set water prices to achieve full cost recovery.

The Tribunal will take all these matters, plus the information and analysis it obtains through its investigation and public consultation, into consideration in reaching its conclusions on prices for bulk water services.

1.3 Structure of this paper

To assist stakeholders in making submissions, this paper explains how the price review will be undertaken, provides background information, and outlines the issues on which the Tribunal particularly seeks comments. Chapters 2 and 3 provide an overview of the activities related to bulk water services the Tribunal regulates, and the approach it has taken in setting prices for these services to date. The remaining chapters explain the key steps in the price determination process the Tribunal will use for this review, and highlight the key issues for each step:

- Chapter 4 looks at establishing how the Tribunal will determine the efficient costs of State Water and DIPNR and assess how these costs are likely to change over the determination period

[5] The NWI agreement has recently been signed by the Federal Government, and most State and Territory governments. An outline of the NWI is provided in Attachment 2.

- Chapter 5 explains how the Tribunal will allocate these efficient costs between extractive users and the community
- Chapter 6 outlines the price setting process, including determining an appropriate price structure for bulk water services to promote economic efficiency and ecologically sustainable development, and analysing the likely customer and social impacts of any price changes.

2 ACTIVITIES COVERED BY BULK WATER PRICES

The bulk water prices regulated by the Tribunal are charged for extractions from regulated rivers, unregulated rivers and groundwater sources. These prices aim to recover the costs incurred by State Water and DIPNR in making available and supplying this water to extractive users. This chapter outlines the role of each of these agencies and the main activities they undertake in relation to bulk water services—including river operations, water resource management and licensing activities.

2.1 River operations activities

River operations activities relate to those activities undertaken to provide bulk water to users on regulated rivers.[6] They include:

- water delivery operations (taking customer orders, determining and implementing storage releases, monitoring water usage and administering customers' water accounts)
- asset management of dams, weirs and other water storage structures
- flood mitigation including (inflow and outflow forecasting, floodwater routing).

Most of these activities are provided directly by State Water, while some are provided through interstate bodies including the Murray-Darling Basin Commission (MDBC) and the Dumaresq-Barwon Border River Commission (DBBRC). The role and activities of these service providers are explained below.

2.1.1 State Water

State Water is a statutory State-owned corporation recently corporatised under the *State Water Corporation Act 2004*. Its principal objective is to supply water to licensed users, the environment and stock and domestic users in an efficient, effective and financially responsible manner.

State Water operates 18 major dams and more than 400 weirs and associated assets on regulated rivers. It has around 6,000 customers, including irrigation corporations, country town water supply authorities, farms, mines and electricity generators. It also meets community needs by providing water for stock and domestic users. The business is also responsible for delivering environmental flows on regulated rivers.

State Water operates under a regulatory framework similar to those of Hunter Water, Sydney Water and the Sydney Catchment Authority. It is subject to:

- an Operating Licence administered by the Portfolio Minister
- periodic audits of its performance against the terms and conditions of this licence
- a Statement of Corporate Intent negotiated annually with the Treasurer
- Water Management Works Approvals issued by DIPNR in accordance with the *Water Management Act 2000*

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6 Regulated rivers are rivers where the natural flow of water is regulated by infrastructure such as dams or weirs managed by State Water.

- Memoranda of Understanding negotiated with other key regulatory agencies such as the Department of Environment and Conservation.

State Water is currently operating under an interim licence, while the Tribunal undertakes a review to recommend the terms of its initial Operating Licence. The conditions imposed as part of the initial licence may affect the range of activities State Water is required to undertake to comply with the licence, and the performance standards it is required to meet. If so, the cost implications of these conditions will need to be considered as part of this and subsequent price reviews.

2.1.2 MDBC and DBBRC

The Murray-Darling Basin Commission (MDBC) and the Dumaresq-Barwon Border River Commission (DBBRC) are cross jurisdictional bodies established to "promote and co-ordinate effective planning and management for the equitable, efficient and sustainable use of the water, land and other environmental resources". Some bulk water is provided to users under the 'umbrella' of these bodies. Although the assets involved in providing these services are owned and operated by individual state authorities they are managed at the direction of the MDBC and DBBRC.[7]

The costs of managing and maintaining assets under these arrangements are jointly paid for by the signatory states. The costs are then allocated to each state in a proportion defined under the terms of the agreement. For example, at the time of the last determination, River Murray Water, the water business of MDBC, undertook works to enhance spillways to meet contemporary flood design standards, construction of new salt interception schemes and multi-level offtakes on dams. A proportion of the costs for these works was allocated to NSW.

NSW Treasury pays the NSW share of costs and allocates these costs to State Water. State Water includes these costs in the cost information it submits to the price review so they can be recovered through its bulk water prices.

2.2 Water resource management activities

Water resource management (WRM) activities arise from the need to manage a resource that is being consumed by a wide range of user groups. The overriding aim of the WRM activities is to ensure the long-term sustainability of the resource, to allow continued water extraction and maintain the health of the natural ecosystem.

WRM activities are wide ranging and involve all activities associated with managing the water resource, including regulated and unregulated rivers and groundwater. They include specific activities to rectify problems resulting from excessive water extraction, and broader activities relating to managing the overall health of the catchment areas which also benefit river and groundwater systems.

[7] The main assets falling under the management of the MDBC include the Hume Dam, Dartmouth Dam and the Menindee Lakes storage scheme, as well a range of diversion weirs. The main assets falling under the DBBRC include Glenlyon Dam and Bogabilla Weir.

At the last price determination, the Tribunal engaged ACIL Consulting to conduct a review of WRM activities. In conducting its review, ACIL noted the difficulty in defining what constitutes WRM activities. For the purpose of the pricing review, ACIL suggested that WRM activities could be defined as those activities:

- that would **not** be necessary were it not for the past, current and future patterns of extractive water use including construction and operation of dams, weirs and pumps etc
- that are concerned directly with the hydrology of the NSW surface and groundwater systems (as opposed to wider catchment management activities, although there are close linkages)
- where the benefits to extractive users are insufficient on their own to justify the costs of the activities.[8]

Based on this definition the WRM activities regulated by the Tribunal involve activities such as:

- collecting data to gain a better understanding of the levels of extractions as well as the potential implications of this extraction for the river system. This also includes the activities involved in managing the database
- developing policies to manage the resource which could involve broader Government policy development to manage the interstate sharing of resources
- developing plans/strategies to allocate water amongst users and the environment and to remediate problems such as salinity or blue green algae
- implementing these plans and monitoring compliance against the plans.

Most of these activities are performed by DIPNR, while some are performed through the MDBC and DBBRC.

2.2.1 Department of Infrastructure, Planning and Natural Resources

DIPNR is a newly formed department with wide-ranging responsibilities, which include managing NSW's water resource under the *Water Management Act 2000*. This Act requires DIPNR to introduce Water Sharing Plans to manage the resource, with clear objectives required to be specified in each of the plans. These plans also specify the rules for accessing and sharing the resource.

While the broad range of WRM activities undertaken by DIPNR are reasonably clear, there is some uncertainty as to the level of activities (and consequent costs) that will be undertaken in future years. This partly reflects the fact that the Water Sharing Plans, which may have a bearing on the required activities and their level, have not, as yet, been introduced for all areas.[9]

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8 ACIL, *Review of water resource management expenditure in the NSW Department of Land and Water Conservation and State Water Business*, p ii.

9 As at 1 July 2004, 31 Water Sharing Plans have come into affect, largely on regulated rivers and in some unregulated areas.

There is also some uncertainty as to how these WRM activities will be provided. For example, the activities of the newly formed Catchment Management Authorities (CMAs) may impact on the WRM functions undertaken by DIPNR. Further, the CMAs may undertake some WRM type activities themselves but these may be funded through an alternative mechanism (eg Commonwealth funds) and may not be recoverable from extractive users.[10]

The CMAs were established in January 2004 following a recommendation of the Native Vegetation Reform Implementation Group. The intention was to ensure the better management of our native vegetation and protection of natural resources while minimising the restriction on farming activities. The existing Water Management Committees are expected to continue in the short term with their functions possibly being subsumed by the CMAs in the future. At this stage, it is not clear whether the activities of the CMAs will have a bearing on the WRM activities relating to making water available and/or water extraction.

2.2.2 MDBC and DBBRC

The MDBC and DBBRC have responsibility for coordinating and managing WRM activities from a 'whole of system' perspective where the issues involve more than one state. These include activities such as monitoring water quality, managing ground water, monitoring bores and developing/implementing salinity mitigation strategies.

As with the river operations costs, the NSW share of these WRM costs are paid by NSW Treasury in accordance with terms of the agreements. These costs are then allocated to DIPNR and will be reflected in DIPNR's costs submitted to the Tribunal.

2.3 Licensing activities

DIPNR is responsible for administering the planning and water management consents (access and approvals) under the *Water Management Act 2000*. This includes a wide range of activities such as administering licence applications, renewals and transfers (both temporary and permanent). It also includes transactions on works and use approvals in areas subject to water sharing plans.

The relevant provisions of the Act came into effect from 1 July 2004. While some of these activities are consistent with DIPNR's previous licensing activities some relate to entirely new categories of activities or to activities previously licensed in a different manner.[11] There may be uncertainties regarding the future costs of undertaking these new activities.

[10] The total budget for the CMAs is $119 million per annum, with $82 million of this funded by the Commonwealth Government through the National Action Plan for Salinity and Water Quality and the Natural Heritage Trust grant processes.

[11] Examples of these new transactions for which fees are not currently being charged include the transfer of ownership of an access licence, a term transfer of access licence, and the subdivision of an access licence.

3 TRIBUNAL'S APPROACH TO SETTING BULK WATER PRICES

The Tribunal has had a role in rural bulk water pricing for some eight years. In 1996, it undertook a major research project to review and reform charges for bulk water services. This review set the overall framework and underlying principles for its regulation of bulk water prices. Since then, it has made four price determinations—in 1997/98, 1998/99, 2000/01 and 2001/02—through which it further developed and refined its regulatory approach.

One of the Tribunal's key objectives for price reform over this time was to set charges to progressively increase the level of cost recovery, in accordance with agreed COAG objectives and taking into account the impact on customers. It also restructured prices to improve cost reflectivity and improve conservation signals to users.

This chapter briefly explains the Tribunal's approach to regulating bulk water prices to date, to provide the context for this review.

3.1 Establishing the underlying principles for bulk water pricing

The Tribunal's 1996 review of bulk water prices recommended how prices should be set to achieve the best possible balance between competing claims within the community. The 1996 Interim Report established the principles that have guided the Tribunal's subsequent determinations.[12] The aim of the principles was to set prices that would encourage the former DLWC to provide the bulk water services in an efficient manner as well as to ensure that users were provided with a signal to more efficiently manage the resource. These principles were that:

- water charges should be based on the efficient economic costs of providing water services
- the administrator of water resources should receive sufficient funds to achieve financial stability and deliver an appropriate level of water services
- pricing policy should encourage the best overall outcome for the community from the use of water and the other resources used to store, manage and deliver that water
- the cost of water services should be paid by those who use the services. Those who cause more services to be required, or benefit more, should pay more
- pricing policy should promote ecologically sustainable use of water and of the resources used to store, manage and deliver that water.

The Tribunal's 1996 review also provided detailed guidance on particular issues. In particular, it defined how the term 'economic costs' should be interpreted. The Tribunal believed that these costs should include:

- recurrent costs of administration, operations and any maintenance, on regulated rivers, unregulated rivers and groundwater sources
- recurrent costs of resource management on regulated rivers, unregulated rivers and groundwater sources

12 The principles adopted by the Tribunal also took into account the *Water Reform Framework* endorsed by the Council of Australian Governments (COAG) at the February 1994 meeting.

- recurrent costs of dealing with the external environmental impacts of water use
- a capital charge calculated using an annuities approach to fund refurbishment and replacement of infrastructure assets on regulated rivers. This should not include a rate of return on existing infrastructure assets[13]
- a depreciation charge for those fixed assets that have finite lives[14]
- a real rate of return on new investments and augmentations to existing infrastructure on regulated rivers
- licensing and other regulation related costs[15]

The report recommended that where costs differed between regions, such differences should be reflected in regional charges so as to ensure that those responsible for causing (or benefiting from) services paid for these services. This led to the Tribunal adopting a valley-based approach to pricing in subsequent determinations.

The Tribunal also recommended the use of an asset annuity approach to fund asset refurbishment and replacement, which acts as a proxy for asset consumption. The main justification for this approach was to ensure that, at a minimum, prices embodied the costs associated with the preservation of the assets' ongoing service potential. This would ensure that sufficient funds were available to cover essential maintenance and renewal and finally, replacement, when this becomes necessary.

One of the implications of this approach was that a depreciation charge would apply for those assets that have short lives, and an annuity capital charge would apply for long-lived assets that require replacement or refurbishment.

3.2 Implementing price reform

After the 1996 review, the Tribunal began implementing reforms to bulk water prices through its price determinations. Its key objectives were to improve price structures and to set prices to recover a greater proportion of the users' share of efficient costs. It also refined its regulatory approach to cost sharing, the treatment of the annuities and the value of the Regulatory Asset Base (RAB).[16]

3.2.1 Improving cost recovery

In its 1997/98 determination, the Tribunal recommended real price increases of up to 20 per cent for customers on regulated rivers, and an average of 15 per cent for unregulated rivers and groundwater customers.

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13 The annuity charge is explained in more detail in Chapter 4.

14 There are many of these 'depreciable assets' within the groundwater and regulated river operations such as groundwater monitoring bores and non-infrastructure assets like mobile plant and equipment.

15 IPART, *Bulk Water Prices - An Interim Report,* October 1996, p 63.

16 The RAB is a measure of the financial value invested in the water business and bears no relationship to the value of the physical assets. It represents the value a market would place on the business if it was to be sold, given its potential to earn revenue and profits under existing prices.

These increases (and those recommended in the next two reviews) were limited due to uncertainty about the robustness of the cost data provided by DLWC and the impacts of the price movements on customers. The Tribunal put forward recommendations to assist the former DLWC in establishing a more robust and transparent cost base for the bulk water determinations. Key recommendations included:

- ringfencing State Water from DLWC (consistent with the 1994 COAG Water Reform Framework)
- establishing sound, transparent service agreements with related businesses (ideally the services would be subject to open tender)
- requiring valley based accounts to be produced and independently audited (available on a quarterly and annual basis).[17]

For the 2001/02 determination, the Tribunal received substantially improved financial data from DLWC. As a result it increased prices to improve cost recovery levels across all sources of extraction, particularly in regulated rivers where a number of valleys were projected to achieve full cost recovery by 2003/04.[18] Based on the costs and cost allocation methodologies used in the 2001/02 determination, by 2003/04, 94 per cent of costs were expected to be recovered across regulated valleys, although the level of cost recovery varied significantly. In unregulated and ground water areas, approximately 30 per cent of the users' share of efficient costs was expected to be recovered by 2003/04.

While full cost recovery was anticipated in a number of regulated valleys, there remained a large number of valleys (particularly on unregulated rivers and groundwater) where the level of cost recovery was low.

3.2.2 Restructuring prices

The Tribunal has also restructured bulk water prices to improve cost reflectivity and send clear signals to users about the need to conserve water. Key changes to the price structures included introducing:

- In 1997/98, a two-part tariff for regulated rivers with a fixed charge on licence entitlement and a variable charge on water usage.
- In 1998/99, a flat fee per hectare on unregulated rivers as a proxy for water usage. This was an interim arrangement, given that most users were not metered.
- In 2000/01, a two-part tariff structure on unregulated rivers that included a fixed charge and a variable charge (based on usage). This charge was to be phased in once users were converted to volumetric licences and were metered.

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17 The Tribunal also recommended ways to improve customer service standards including the establishment of the Customer Service Committees to assist scrutinising the costs and services being proposed by State Water/DLWC and to influence decisions on how bulk water services are delivered in their valleys. Other recommendations included reviewing the billing systems, establishing protocols for dealing with customer complaints and conducting customer surveys.

18 The level of full cost recovery was determined based on the projected efficient costs and a user share of these costs. Both the efficient costs and user shares are subject to review, which may alter the level of efficient costs to be recovered from users in the upcoming determination.

3.2.3 Refining the regulatory approach

While the Tribunal's regulatory approach has been guided by the principles established in the 1996 review, it recognises that price regulation is an evolutionary process. It gradually refined a number of aspects of its regulatory approach through its price determinations, including adopting a 'line in the sand' approach to the opening value of the RAB, adjusting the treatment of capital annuities, and modifying the basis for allocating costs between extractive users and the community.

Adopting a 'line in the sand' approach

As part of its 1998/99 determination, the Tribunal refined its treatment of the RAB. This determination explicitly stated that existing assets should be treated as sunk costs with the charges limited to the costs of maintaining service capacity. Consequently, the Tribunal decided to draw a 'line-in-the-sand' and determine that all water assets put in place prior to 1 July 1997 should not be included in the asset base for pricing purposes. This resulted in the existing asset base being valued at $0 for regulatory purposes.

The key implication of this valuation was that a rate of return would not be charged on those assets in place prior to 1 July 1997. This was consistent with the view that much of the irrigation infrastructure was constructed with non-commercial objectives[19] in mind, and so a commercial return on this historical expenditure was not justified. The Tribunal decided that only capital expenditure after 1 July 1997 should earn a rate of return.

Adjusting the treatment of the capital annuities

In the 2001/02 review, there was some debate as to the role of annuities and their relationship to the RAB. In the draft report, the Tribunal argued that capital expenditure funded through the annuities would, in addition to the annuities charge, be allowed to earn a rate of return calculated on the value of the RAB. The RAB value was to be calculated based on the cumulative addition of actual capital expenditure since 1 July 1997. [20]

Following further modelling and input from stakeholders the Tribunal clarified its position in the 2001 final determination and stated that the annuity (as proposed at that time) "should not be added to the RAB and earn an explicit rate of return (in addition to that implicit in the calculation of the annuity). The annuity would, therefore, maintain DLWC's water assets at their real 1997 value." This meant that assets funded through the annuity would not enter the RAB and generate an additional return.

The Tribunal also noted that capital expenditure on short-lived assets that have a market value should be depreciated.[21]

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19 Other objectives included flood mitigation and providing incentives to encourage the development of irrigation agriculture.

20 IPART, *Department of Land and Water Conservation Bulk Water Prices from 1 October 2001 - Draft Report*, October 2001, p 85.

21 IPART, *Department of Land and Water Conservation Bulk Water Prices from 1 October 2001*, p 24.

Modifying the basis for cost allocations

In the 1998/99 review the Tribunal considered further on what basis costs should be shared between extractive users and the Government (on behalf of the community). The Tribunal considered both the polluter-pays (also known as impactor pays) and beneficiary pays principles.[22] The Tribunal noted that neither approach was perfect, and that cost sharing still required a significant degree of judgement.

In the 1998/99 report, the Tribunal nominated a set of ratios for allocating efficient costs between bulk water users and the Government. Individual ratios were allocated to 20 'product groups', which is essentially a grouping of functional areas to categorise bulk water activities. The ratios were based on a mix of 'impactor pays' and 'beneficiary pays' principles, developed through consultation with the former DLWC and user groups. This result was a hybrid approach that was weighted more towards a beneficiary pays approach.

For the 2001 review, the Tribunal employed ACIL Consulting to review the merit of the cost allocation principles.[23] ACIL developed a conceptual framework to determine how the costs should be shared. ACIL then applied this framework, which involved reviewing the WRM and river operation activities and allocating these to 'subproduct' groupings.[24]

While ACIL's review and proposed aggregated costs shares were reasonably well accepted by stakeholders, there remained substantial debate over how capital expenditure costs incurred to ensure structures comply with occupational health, public safety and environmental standards should be shared. Under ACIL's approach these costs were fully allocated to the Government.

The Tribunal accepted the majority of cost shares proposed by ACIL but, following further consideration and stakeholder input, decided that the compliance capital costs should be shared equally between the Government and extractive users. The Tribunal, however, noted that further assessment of the costs sharing ratios was required.[25]

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22 A more detailed explanation of these principles is provided in Chapter 5.

23 As part of the project ACIL was also required to review the appropriate level of water resource management costs that should be allowed in determining prices.

24 'Subproducts' are a more detailed breakdown of functional activities of the agency. 'Products' are an aggregation of the 'subproduct' activities.

25 A detailed discussion of the cost allocation methodologies, the ACIL review and the Tribunal's approach for this review is discussed in Chapter 5.

4 ESTABLISHING EFFICIENT COSTS

The first step in the Tribunal's price determination process will be to establish the efficient costs of supplying bulk water to extractive users in NSW and managing the State's water resources to ensure their long-term sustainability for each year of the 2005 determination period. These costs include those that will be incurred by State Water in undertaking its river operations activities, and by DIPNR in undertaking its water resource management (WRM)[26] and licensing activities. The Tribunal's approach to establishing these costs is discussed below.

4.1 Costs of river operations activities

State Water's costs in undertaking its river operations activities include operating expenditure, capital expenditure on long-lived assets, and capital expenditure on short-lived assets related to regulated rivers.[27] These costs include a proportion of the costs associated with Murray-Darling Basin Commission (MDBC) and Dumaresq-Barwon Border River Commission (DBBRC) activities on these rivers.

4.1.1 Operating expenditure

Operating expenditure includes all expenditure related to the operation, maintenance and administration of State Water's core business of providing bulk water services. These costs are substantial as they include labour, materials, contracting and energy costs.

For this determination, the Tribunal will be reviewing the estimates of projected operating expenditure provided by State Water and has asked it to provide information on the potential for further future efficiency gains. The Tribunal has also asked State Water to provide:

- Information on the drivers behind projected operating expenditures over the determination period.
- Details of any service agreements between State Water and DIPNR. For example, one issue the Tribunal will need to consider is whether State Water will be responsible for billing all groundwater and unregulated river customers on behalf of DIPNR. If so, the Tribunal expects that, at a minimum, clear contractual arrangements between the two agencies will be in place.
- Details of the portion of the MDBC and DBBRC operating costs attributed to NSW. The Tribunal expects that the method for allocating these costs will be robust and transparent.
- Details of any cost implications of the extension of State Water's activities to include the functions of the Fish River Water Supply Authority.
- Steps taken to 'ring fence' any non-regulated costs and revenues.[28]

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26 WRM activities relate to regulated rivers, unregulated rivers and groundwater systems.

27 Extractive users on unregulated rivers and groundwater systems do not pay for river operations activities.

28 State Water undertakes other income-earning activities not subject to regulation by the Tribunal, such as hydro electricity generation, rental of cottages and accommodation charges at dams. The Tribunal expects that the costs provided for in the determination of bulk water charges will exclude the costs associated with these activities.

The Tribunal will engage an independent consultant to review State Water's estimates of its projected operating costs to determine whether they are efficient.[29] The consultant will examine both historical costs and the key drivers behind the projected operating costs.

The information provided by State Water and the consultants will be used in conjunction with the Tribunal's own analysis to determine appropriate levels of future operating expenditure related to river operations activities. The Tribunal's analysis may include benchmarking State Water's performance in relation to specific activities compared to the performance of other bulk water providers, such as Goulburn-Murray Water.

The Tribunal welcomes comments on:

* ***the efficiency of the projected operating costs outlined in State Water's submission***
* ***whether there is scope for State Water to achieve further efficiency gains over the next price determination period.***

4.1.2 Capital expenditure on long-lived assets

State Water's capital expenditure includes expenditure for asset maintenance and replacement to ensure that the assets can maintain their current service potential into the future, and compliance-related expenditure on long-lived assets.[30] This expenditure is reflected in State Water's Total Asset Management Plan (TAMP), which provides forecasts for the next 30 years.

The Tribunal has requested that State Water outline a proposed capital expenditure program for the determination period that is consistent with its TAMP, and details of the MDBC and DBBRC capital costs to be attributed to NSW over this period. It will also engage an independent consultant to review:

- the capital costs provided for in State Water's TAMP, including the timing, necessity and efficiency of this expenditure
- State Water's proposed capital expenditure for the determination period, including where any efficiency gains can be made
- the prudence of the actual expenditure State Water incurred over the last determination period
- the portion of the MDBC and DBBRC capital costs attributed to NSW.

It is possible that, for a range of reasons, actual capital expenditure in the current period will differ from that expected when the current price determination was made in 2001. As a general principle, extractive users should only pay for actual capital expenditure that is deemed to have been prudent, and for future capital expenditure that is deemed to be efficient.

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29 The consultant will need to form its view on efficient costs in the context of the existing standards in State Water's Operating Licence and any potential changes to these standards which may effect the cost of providing bulk water.

30 Compliance related expenditure includes capital costs associated with ensuring structures such as dams and weirs comply with relevant dam safety standards, meet relevant public safety and occupational health and safety (OHS) standards and comply with contemporary standards to mitigate the environmental impacts of stream interruption.

The Tribunal welcomes comments on:

* *the projected capital expenditure program outlined in State Water's submission, and the outcomes that it is expected to achieve*
* *the prudence of State Water's past capital expenditure.*

Once the Tribunal establishes the efficient level of capital expenditure State Water will require over the determination period, consistent with its TAMP, it then needs to consider the most appropriate way to fund this expenditure. Two main approaches can be used to fund new investments in long-lived assets:

- the first is for users to fund the assets directly through upfront and concurrent contributions, the size of which are determined using an annuity or sinking fund approach
- the second is for State Water to pay for the assets using its own funds and to recover those outlays from users of the assets over the life of those assets.

These approaches are discussed below. A more detailed discussion is also provided in Attachment 4.

Funding by users through an annuity or sinking fund approach

The Tribunal has used an annuity approach in all bulk water determinations since 1996. In the last determination in 2001, this approach involved converting State Water's efficient capital expenditure profile over a period of 30 years into the future into an annualised charge or annuity—effectively averaging its 30-year expenditure profile into 30 annual payments.

Interest on outstanding balances is implicitly included in the calculation. In any year where the amount of the annual annuity payment is greater than the amount to be spent on capital works, the balance of the account attracts interest. The converse applies where the amount of capital expenditure exceeds the value of the annual annuity and the balance of unspent annuity payments from previous years.

The main reasons the Tribunal has opted for the annuity approach in the past include that it:

- allows the cost of lumpy capital expenditure to be spread over a number of years, to minimise the impacts on users in a particular period
- should help ensure that sufficient funds are available to meet the refurbishment requirements of the assets over their lifetime.

However, some stakeholders may see the first of these reasons as a negative. If major components of capital expenditure are likely to be required in the long term, the current cohort of water users could be called upon to contribute to work that will not be undertaken until up to 30 years into the future. Conversely, where major works are required in the short term, these costs are effectively spread over future cohorts of water users.

This approach seeks to allocate the funding risk of future works required to maintain the service potential of infrastructure from the provider of the infrastructure, in this case State Water, to water users. It is appropriate when an irrigation system's longer term financial viability is limited but its users want the service potential embodied in the system to be maintained.

Funding by State Water

Although the Tribunal has used an annuity approach in the past, it is worth considering whether this approach is still the most appropriate mechanism for funding capital expenditure on long-lived assets, particularly in the light of State Water's recent corporatisation. As a corporatised entity, State Water may be able to borrow funds more effectively than the former DLWC. It could then fund new and replacement capital expenditures when required, and recoup its investment over the life of the assets in question after the works are completed.

If funding by State Water was considered more appropriate, at least two potential approaches could be used:

- **The first is a rate of return approach.** The Tribunal uses this approach in determining prices for other regulated businesses, including the metropolitan water agencies. Under this approach, capital expenditure is initially funded by the agency, and the value of the completed work is incorporated into a Regulatory Asset Base.[31] Assets are then depreciated, and a rate of return that reflects the risk-adjusted opportunity cost of the funds invested is allowed on the value of the RAB.

  A difference between the rate of return approach and the user-funded annuity approach used in the past is that the rate of return approach treats all capital expenditure in the same way, irrespective of whether it is related to long-lived or short-lived assets, (ie all prudent capital expenditure is rolled into the RAB and subject to depreciation and rate of return charges).

  The rate of return approach may be more consistent with the requirements under the National Water Initiative, which requires a "continued movement towards *upper bound pricing* for all rural systems, where practicable". *Upper bound pricing* encompasses the recovery of "operational, maintenance and administrative costs, externalities, taxes or tax equivalent regimes (TERs), provision for the cost of asset consumption and cost of capital, the latter being calculated using a weighted average cost of capital" (WACC)[32]. However, the National Water Initiative recognises that this may not always be achievable for rural and regional water.[33]

  If a rate of return approach were to be adopted it may require an opening RAB to be established. This would need to be done having regard to the Tribunal's previously adopted 'line in the sand approach' where State Water's existing assets (as at 1 July 1997) were valued by the Tribunal at $0 for pricing purposes (see Chapter 3). The Tribunal would need to carefully consider all the implications of such an approach before adopting it for this determination.

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31 Issues relating to establishing and rolling forward a Regulatory Asset Base are discussed in the Tribunal's Final Report on *NSW Electricity Distribution Pricing 2004/05 to 2008/09.*

32 The NWI also provides for the "achievement of *lower bound pricing* for all rural systems in line with existing NCP commitments". *Lower bound pricing* is defined as "the level at which to be viable, a water business should recover, at least, the operational, maintenance and administrative costs, externalities, taxes or TERs (not including income tax), the interest cost on debt, dividends (if any) and make provision for future asset refurbishment/replacement. Dividends should be set at a level that reflects commercial realities and stimulates a competitive market outcome." It is not clear how much the upper and lower bounds differ from each other. The difference is likely to vary from valley to valley.

33 Attachment 2 provides an overview of the *National Water Initiative.*

- **The second approach is the constant amortisation approach.** Like the annuity approach, this approach involves an annuity concept. However, instead of water users contributing to the cost of works upfront, State Water initially funds the works and amortises the cost in equal annual amounts over the life of the assets in question. These amounts are then reflected in the price of water, to recover the monies outlaid by State Water from water users. Thus the amounts represent the users' progressive consumption of the assets' service potential over their useful life, and a return on the funds invested.

  Unlike the annuity approach, with the constant amortisation approach the risk associated with the provision of future works required to maintain the service potential of the infrastructure remains with State Water. This approach is suited to irrigation systems where the longer term financial viability is more certain.

To use either of these approaches, the Tribunal would need to determine an appropriate opportunity cost of capital, or rate of return, to apply to State Water's investments in capital works. For other regulated businesses, the Tribunal uses the weighted average cost of capital approach (WACC) to determine an appropriate range for this rate of return. The WACC is calculated by estimating the cost of debt and equity, weighted to take into account their relative proportion of the total capital. The cost of equity is calculated using the capital asset pricing model (CAPM), which incorporates the risk free rate and an industry's risk premium relative to the risk free rate. [34]

The Tribunal believes that deciding on the most appropriate approach for funding capital expenditure on long-lived assets is a critical issue for this review. It will be important to ensure that State Water has sufficient funds to adequately maintain and replace its infrastructure, as well as appropriate incentives to undertake this work in a cost effective way. The security of water entitlements and hence their value rests, in large part, on the integrity of the infrastructure necessary to provide the water.

The appropriateness of a user-funded approach versus an agency-funded approach depends in large part on the long-term financial viability of the irrigation area involved. Given that irrigation schemes are likely to be assessed as having different degrees of financial viability, it may be that a mix of the funding approaches is appropriate.

Irrespective of the approach adopted, the Tribunal will need to consider whether and how charges determined in previous determinations should be updated to reflect changes in capital expenditure since they were originally calculated. For example, actual capital expenditure since the 2001 determination may differ from the expenditure profile used to derive the annuity charge initially. Some proposed works may not have proceeded, while some new works (not previously identified) may have been undertaken. In addition, the forecast capital expenditure profile for future works may differ from the profile used for the 2001 determination, due to changes in needs or priorities.

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[34] A general formulation for WACC is: $WACC = R_e \times (S/V) + R_d \times (D/V)$, where R_e is the return to equity, S is market value of equity, R_d is the return to debt, D is market value of debt, V is market value of debt plus equity. A detailed discussion of the WACC can be found in the IPART document *NSW Electricity Distribution Pricing 2004/05 to 2008/09: Final Report*, June 2004, p 217.

The Tribunal welcomes comments on:

* *What approach to funding capital expenditure should be adopted when pricing water services to ensure that capital expenditure requirements can be met.*
* *An appropriate rate of return for State Water.*

4.1.3 Capital expenditure on short-lived assets

The approach to funding capital expenditure the Tribunal has used in the past provides for a depreciation charge to apply on the value of short-lived assets. These include assets such as mobile equipment to support bulk water infrastructure assets.

The Tribunal will request State Water to separately identify these short-lived assets and the underlying assumptions for calculating the depreciation charge. Although these assets contribute relatively little to the cost base, it also intends to give further consideration to how best to fund new expenditure on short-lived assets, and will review its past regulatory approach for consistency with other businesses it regulates.

4.2 Costs of WRM activities

DIPNR's costs in undertaking its water resource management (WRM) activities include the operating and capital expenditure it incurs in managing the State's regulated river, unregulated river and groundwater systems.

It is often difficult to clearly determine the extent to which the need to undertake WRM activities arises from the actions of water users. However, for the costs of these activities to be assigned to water users, in whole or part, there should be a clear connection between the provision and use of water services and the WRM activities undertaken.

4.2.1 Operating expenditure

DIPNR has undergone some restructuring since the Tribunal's last price determination, which may affect the provision (and therefore the costs) of WRM activities. For example, there is some uncertainty about the level of WRM activities DIPNR will undertake in future years, and how the activities of the newly formed Catchment Management Authorities (CMAs) will impact DIPNR's WRM activities.

For this determination, the Tribunal seeks information from DIPNR on:

- its WRM activities, highlighting particular changes in functions or processes that have an impact on the expenditure to be recovered from users and the community
- the estimated costs of these activities
- the role of the CMAs in relation to the water related WRM functions that may have previously been undertaken by the Department.

The Tribunal also expects DIPNR to separately identify any costs attributed to the MDBC and DBBRC. The method for allocating these costs to NSW should be clearly articulated and justified by DIPNR.

DIPNR has recently advised the Tribunal that, due to the uncertainties noted above, it will not be in a position to provide a robust assessment of its likely future WRM costs within the timeframe for this review. It proposes to provide an interim submission only, and a detailed submission between July and September 2005 that will allow the Tribunal to set a longer term price path from 1 July 2006.

This means that the Tribunal will need to consider how it can set bulk water prices from 1 July 2005 to 30 June 2006 to recover the costs of those WRM activities that will continue to be provided by DIPNR. One option may be to maintain the WRM component of prices at their 2004/05 level as an interim arrangement. Another option, which DIPNR indicates that it will propose, is to increase the WRM component of prices by the movement in the Consumer Price Index.

The Tribunal welcomes comments on:

* ***whether there is a connection between the provision and use of water services and the WRM activities usually undertaken by DIPNR, and if so, the strength of this connection***
* ***the efficient costs of providing WRM services***
* ***the role of the CMAs in relation to WRM services***
* ***DIPNR's proposal to set WRM prices from 1July 2005 to 30 June 2006 based on the current prices plus a CPI increase.***

4.2.2 Capital expenditure

DIPNR's costs in undertaking its WRM activities also include capital expenditure on short-lived assets, such as groundwater monitoring bores. In previous determinations, the Tribunal's regulatory approach has provided for a depreciation charge to apply on the value of these short-lived assets.

For this determination, the Tribunal requests DIPNR to separately identify the short-lived assets associated with its WRM activities and the underlying assumptions for calculating the depreciation charge. It will consider further how new expenditure on short-lived assets should be funded.

4.3 Costs of licensing activities

DIPNR is responsible for regulating the access and use of the water resource and any works associated with the storage or diversion of the water from source to extraction by users. The costs of these activities should be recovered through separate licence fees, not through bulk water prices. The Tribunal will set these fees as part of this determination.

At the last determination, the former DLWC indicated its intention to introduce a new licensing system under the *Water Management Act 2000*. As a result the Tribunal fixed the maximum charges for licence applications, renewals and permanent transfers at the level determined in 1998.

For this determination, the Tribunal seeks information from DIPNR on the introduction of this new licensing system and the proposed licence fees to apply. It expects that any proposed fees should be supported by evidence of the underlying costs of providing the service. The Tribunal will need to ensure that the costs of these licensing activities are not also being reflected in normal bulk water prices.

In assessing the licence fees the Tribunal will also consider benchmarking these fees against other fees charged for similar administrative services. If robust cost information is not available, the Tribunal will need to consider how the maximum licence fees should be set.

5 ALLOCATING EFFICIENT COSTS BETWEEN USERS AND THE COMMUNITY

After the Tribunal has established the efficient costs of State Water and DIPNR, the next step in the price setting process is to determine how these costs should be shared between extractive users and the Government (on behalf of the community). The object of cost sharing is to ensure, as far as possible, that extractive users and the community pay a fair share of the efficient costs of managing the bulk water system. The users' share of the costs is then passed on to users through prices for bulk water.

This chapter provides an overview of the principles and approaches used for allocating costs in previous determinations and the Tribunal's proposed approach for this determination.

5.1 Principles and approaches used in previous determinations

The Tribunal's approach to cost allocation has been to establish general principles to guide the allocation of costs for each specific activity. There are two broad principles used for determining how costs related to natural resource management should be shared—the 'impactor pays' approach and the 'beneficiary pays' approach.[35]

The 'impactor pays' approach seeks to allocate costs to different individuals or groups in proportion to the contribution that each individual or group makes to creating the costs (or the need to incur the costs). The impactor is defined as any individual or group of individuals whose activities generate the costs or a justifiable need to incur the costs that are to be allocated.

The 'beneficiary pays' approach seeks to allocate costs to different individuals or groups in proportion to the benefits that each individual or group stands to derive from the costs being incurred. The beneficiary is defined as any individual or group of individuals who derive benefits from the costs that are to be allocated. These benefits may result from their own use of the services involved (in which case the beneficiary is also the impactor) or be in the form of reduced damage to their interests due to the usage patterns of others. In the latter case the beneficiary is sometimes referred to as the victim.

As noted in Chapter 3, for the 1998/99 determination the Tribunal used a mix of 'impactor pays' and 'beneficiary pays' principles to determine the cost allocations, with more weight placed on a 'beneficiary pays' approach. For the 2001/02 determination, based on advice on allocating WRM costs from ACIL Consulting, it revised its approach to place more weight on the 'impactor pays' approach.

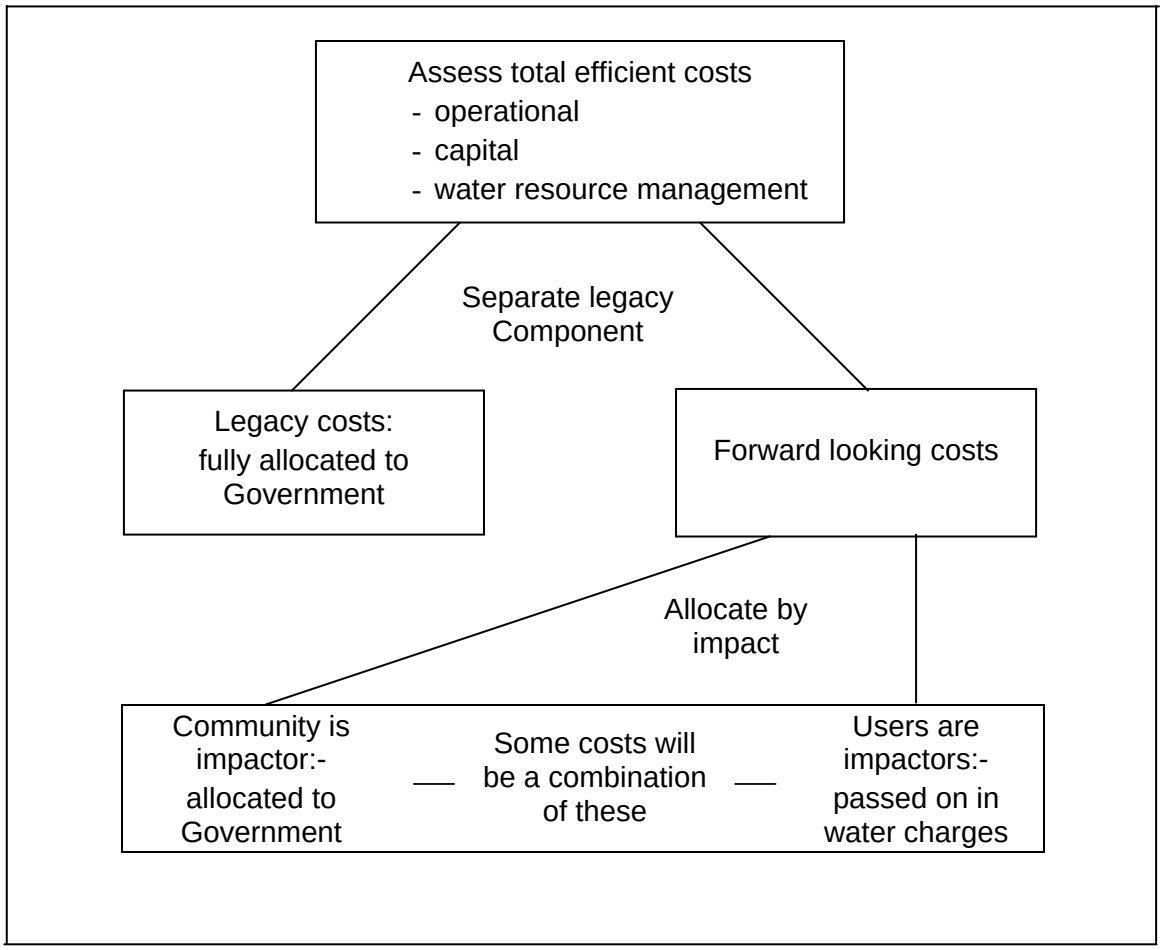
[35] A detailed discussion of the two approaches is provided in a report by the Productivity Commission *Cost Sharing for Biodiversity Conservation: a conceptual framework*, accessible from the website (http://www.pc.gov.au/research/staffres/csbc/csbc.pdf).

5.1.1 ACIL's recommended approach

As part of its 2001 price review, the Tribunal asked ACIL Consulting to review the extent to which WRM expenditure should be recovered from users. ACIL reviewed the cost allocation methodology used by the Tribunal at the 1998/99 determination and considered alternative allocation principles. ACIL recommended that the Tribunal modify its cost allocation methodology used at the 1998/99 determination, as it believed it could potentially result in perverse incentives.

ACIL recommended the use of the impactor pays approach. It also distinguished between future expenditure that related to current and future uses (forward looking costs) and those that related to past uses and activities (legacy costs). The ACIL approach involved the application of both the 'legacy cost' approach and the 'impactor pays' principles for determining cost shares, as outlined in Figure 5.1 below.

Figure 5.1 Cost Allocation Process (at sub-product level)



Under ACIL's approach, current and future water users would not be required to meet the expenditure that were defined as 'legacy costs' and these costs would be fully paid for by the Government.[36] Importantly, ACIL interpreted 'legacy costs' to include:

- expenditure necessitated by the activities of past users (eg costs associated with ongoing salinity intrusions attributable to past extractive users)
- infrastructure maintenance and renewals expenditure that are higher due to poor management practices in the past
- costs resulting from ongoing changes to community standards such as dam safety and occupational health and safety, implying that any enhancement of a standard (past or future) gives rise to a legacy.

Forward looking costs were then allocated to current stakeholders in proportion to the contribution their current and future actions have on the need to incur these expenditures. ACIL applied this principle to activities defined at a subproduct level.[37]

The application of the ACIL approach resulted in a significant proportion of costs being allocated fully to either extractive users or Government. This provided a clear outcome from the cost allocation process, which provided clearer signals to the planning process.

Under the ACIL approach compliance capital expenditure incurred to ensure structures comply with occupational health and public safety standards and environmental standards were classified as 'legacy costs' and, therefore, fully allocated to the community.

5.1.2 Tribunal's approach for 2001/02 determination

In the 2001/02 determination, the Tribunal supported the key principles recommended by ACIL. In particular, the Tribunal supported the use of the 'impactor pays' approach for several reasons:

- it was more likely to send appropriate economic signals for minimising overall future costs, bearing in mind the consensus-based approach to river management inherent in the new Water Management Act
- it was more straight forward to apply in practice than the beneficiary pays approach. Formally assessing the benefits to different stakeholder groups to determine the cost shares is likely to be much more difficult.[38]

The Tribunal also supported the principle of excluding 'legacy costs' from the users' share (ie allocating zero per cent of the costs to users). It noted that this was intuitively consistent with the 'line-in the sand' approach it had adopted in allocating a zero value to pre-1997 assets. However, while it accepted the general principle of 'legacy costs', it had some reservations accepting ACIL's interpretation of what expenditure was classified as giving rise to a legacy.

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36 ACIL noted that this approach was consistent with the Tribunal's prior decision to write infrastructure asset values down to zero at July 1997.

37 ACIL noted that activities defined at a 'subproduct' level, were more clearly applied. ACIL also believed that determing cost shares at 'subproduct' level was more equitable, given that the subproduct activities varied considerably between valleys. Application of the principles at product level would potentially result in in equities between valleys.

38 IPART, *Bulk water prices from 1 October 2001 - Draft Report*, p 32.

In the draft determination, the Tribunal supported ACIL's view that costs attributable to past activities and costs resulting from ongoing changes to community standards should be treated as a 'legacy costs'.[39] However, the cost shares resulting from this approach generated substantial debate among stakeholders.

Particular concerns were raised about capital costs for structures to mitigate environmental impacts (eg fish ladders to enable native fish passage on existing structures, multi level water offtakes in dams to reduce cold water pollution). Under the ACIL approach two-thirds of these costs were allocated to Government. Concerns were also raised about the allocations of compliance capital costs in the areas of occupational health and safety and public safety, which were allocated fully to Government.[40]

Following further consideration and consultation, the Tribunal revised its interpretation of legacy costs. It concluded that 'legacy costs' should be those current and future costs attributable to past (pre 1997) activities and/or the cost of restoring natural and artificial infrastructure to prevailing 1997 community standards. Expenditure required to meet standards established after July 1997 would therefore not form part of the legacy. The Tribunal also concluded that capital costs to mitigate environmental impacts had a legacy component.

The result of revising this interpretation was that costs resulting from ongoing changes to community standards were shared equally between extractive users and the Government. The Tribunal also concluded that capital costs for structures to mitigate environmental impacts should be shared equally between users and Government.

In drawing its conclusions on cost shares, the Tribunal noted that further assessment of these cost sharing ratios was required. It also cautioned that the approach to cost allocation will inherently require a significant level of judgement.

5.2 Proposed approach for this determination

The Tribunal believes that the cost allocations used in the 2001/02 determination were a considerable advance on those used in previous determinations. It also recognises that this process involved a considerable workload for all stakeholders, but resulted in general agreement on the majority of cost shares used in the 2001/02 determination.

For the 2005/06 review, there may be merit in maintaining this approach and using the conceptual approach outlined in Figure 5.1. However, the Tribunal acknowledges that any conceptual approach may have flaws or result in perverse outcomes, and therefore should not be followed in a mechanistic manner. Judgement still needs to be exercised.

The Tribunal also recognises that there is likely to be some disagreement on the interpretation of 'legacy costs' and resultant cost shares in relation to compliance capital costs. For this review, it believes it may be beneficial to focus efforts on reviewing the cost shares used in the last determination related to compliance capital expenditure that remain contentious.

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39 IPART, *Bulk water prices from 1 October 2001 - Draft Report*, p 31.

40 The concerns related to the application of the cost allocation principles in the ACIL Report which, some stakeholders argued, would result in no forward compliance related expenditure being allocated to bulk water users.

The cost shares arrived at for the 2001/02 determination were, with some exceptions, well accepted by stakeholders. A review of all cost shares would involve substantial additional effort and it is not immediately clear whether greater consensus on cost shares could be reached. The Tribunal is, however, prepared to consider further individual cost shares where new information has become available since the 2001/02 determination or where circumstances have changed. If there are likely to be significant changes in WRM activities following the restructure of the former DLWC, then it may be appropriate to re-examine the relevant cost shares more fully. The Tribunal will, in any event, re-examine the costs shares for the compliance related capital expenditure as noted above.

The Tribunal expects DIPNR and State Water to put forward a clearly articulated position on cost shares for this price determination.

The Tribunal welcomes comments on:

* ***whether there are new arguments against the cost sharing approach used for the last determination***
* ***what costs should be considered as 'legacy costs'***
* ***what cost sharing arrangement should apply to compliance-related capital expenditure***
* ***whether there is a connection between water extraction and the various WRM activities, and the extent of this connection.***

6 SETTING PRICES

Once the users' share of the efficient costs is determined, the next step in the Tribunal's process is to set prices to recover these costs. Prices are set based on an assumed level of bulk water sales. Given the difficulty in predicting year-to-year water sales, the Tribunal has previously used a long run average of historical water sales.

The Tribunal will need to determine:

- the most appropriate price structure, considering the incentive effects and the impact on revenue stability for the agency
- the appropriate level and rate of change for prices, considering the current levels of cost recovery and the potential impacts on customers.

For this determination, as the Tribunal will be setting separate prices for State Water and DIPNR, it will be required to separately consider these issues in relation to river operations and WRM activities.

6.1 Determining appropriate price structure

In determining an appropriate price structure the Tribunal takes account of a range of matters including how the structure promotes economic efficiency, ecologically sustainable development and demand management. It also considers the potential impact on customers of alternative price structures.[41] The diversity of these factors may require the Tribunal to trade off different factors, for example, customer affordability issues with environmental impacts.

There are currently a wide range of price structures in place for bulk water extraction from regulated rivers, unregulated rivers and groundwater sources:

- All tariffs on regulated rivers have a two-part structure, comprising a fixed charge (based on the volume of entitlement) and a usage charge per megalitre of metered water extraction.
- On unregulated rivers, licence holders are charged on the area of land being irrigated or, where metering is in place, a two-part tariff applies, similar to that in regulated rivers. In addition, different charges apply for irrigators and town/industrial customers.
- For groundwater extraction in areas that have a management plan in place and are metered, a base fee per property and a two-part tariff apply. In areas where metering is not in place, a base charge per property and a fixed entitlement charge apply. (A detailed list of current price structures is provided in Attachment 3.)

For this determination, the Tribunal will review current price structures. There are a number of specific issues it will consider, including refining two-part tariffs and the discount for wholesale irrigation customers.

41 These are key obligations for the Tribunal under section 15 of the IPART Act.

6.1.1 Two-part tariff

A key element of the Tribunal's price structure has been the use of two-part tariffs with a fixed and usage component to recover the user share of efficient costs. The benefit of the two-part tariff is that it provides State Water and DIPNR with some revenue stability through the fixed charge, and also provides a signal to extractors to use water efficiently through the volume-based usage charge.

In applying the two-part tariff, the Tribunal will need to consider a number of issues including:

- the balance between the fixed and usage components of two-part tariffs
- whether a two-part tariff should apply for both river operations and WRM charges
- how to reflect the different security levels in the charging structure
- whether two-part tariffs can be introduced for unregulated river customers.

Balance between fixed and usage charges

In determining an appropriate balance between the fixed and usage components of the two-part tariff, the Tribunal will need to consider:

- the relative fixed and variable costs of providing the services
- the implications for the financial viability and revenue stability for State Water and DIPNR
- the benefits of having a demand management signal to customers against the ability to pay higher usage charges.

Under the current price structures there is a wide variation in the balance between entitlement and usage charges in different valleys. For example, for regulated river customers, the usage charge (expressed as a percentage of the low security entitlement charge) varies from 26 per cent in the Murrumbidgee Valley to 135 per cent in the Macquarie Valley. At the last determination, the Tribunal noted that these variations did not reflect the different costs involved and encouraged the former DLWC to investigate the matter further before the next determination. For unregulated river customers, the two-part tariff was set so that the ratio between the entitlement and the usage charges was 60:40. The Tribunal noted that this was a fair compromise between the need for consumption-based price signalling[42] as well as a stable revenue stream.

For this determination, the Tribunal will consider reviewing the balance between fixed and usage charges in each valley in light of further information provided by State Water and DIPNR.

The Tribunal welcomes comments on the appropriate balance between fixed and usage charges.

42 This was also a key requirement of COAG Water Reform Framework, discussed further in Attachment 2.

Reflecting WRM costs in the two-part tariff for regulated rivers

Extractive users on regulated rivers pay for both river operations and WRM activities.[43] In past determinations, the user's shares of WRM and river operations costs on regulated rivers were bundled together with a charge set for the combined services. Given that the Tribunal is now required to set separate prices to recover the costs of the river operations activities performed by State Water and the WRM activities performed by DIPNR, it is appropriate to consider whether a two-part tariff should be applied to the latter.

One option is to reflect the river operations costs in the fixed and usage components of regulated river customers' two-part tariff, and reflect the WRM costs in the fixed charge only. This is likely to be more cost reflective, given that the vast majority of WRM costs do not vary with the level of usage in each valley. However, it may result in a higher fixed component of the charge, which may reduce the strength of the demand management signals sent by the usage component.

Another option is to set one two-part tariff to reflect WRM activities, and another two-part tariff to reflect river operations activities. This may be less reflective of fixed and variable costs, but is likely to improve the demand management signals to users. Under this approach, State Water and DIPNR would face volatility in their revenue streams as both the agencies would derive revenue from the usage component of the charge. However, if a large proportion of State Water and DIPNR's revenue is derived from users with high security licences, any potential revenue volatility will be reduced because these users will receive their full entitlement in all except the driest years.

The Tribunal welcomes comments on whether a two-part tariff should apply for both WRM and river operations activities on regulated rivers.

Balance between high security and low security entitlement charges

Water access licences entitle the holder to extract up to a specified volume of water. For each megalitre of that entitlement, a fixed annual charge applies. This charge varies according to whether the licence holder's entitlement is categorised as being high and low security (or the likelihood of the licence holder being able to extract the entitlement in a particular year). Owners of high security entitlements are usually able to extract the total volume of the entitlement in all but the severest drought, while owners of low security entitlements are able to extract a specified proportion of the entitlement volume each year. The proportion varies according to water availability. The costs involved in providing high security entitlements are higher than those for low security entitlements, because greater storage capacity is required.

To reflect the higher costs of providing high security water, the Tribunal has set higher charges for high security entitlements than for low security entitlements. At the last determination, however, it noted that the current charges do not necessarily reflect the different costs involved. For example, in some valleys it appears to be cheaper (per megalitre of water received) for an extractor to hold a high security licence than a low security licence. The Tribunal has previously encouraged the former DLWC to review the costs of providing high security and low security water to enable the Tribunal to review the balance between high security and low security charges.

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43 Users on unregulated rivers and groundwater only pay for WRM activities and do not incur the costs of operations on regulated rivers.

The Tribunal welcomes comments on the appropriate balance between high security and low security entitlement prices.

Introducing two-part tariffs in unregulated rivers

At the last determination, the former DLWC was in the process of converting licences on unregulated rivers previously based on the area (ha) or the licence holder's pump capacity to volumetric licences. The Tribunal set prices to allow for the phasing-in of these arrangements with the end goal of applying two-part tariffs for unregulated rivers once metering had been introduced. Since then, the Tribunal has received a number of representations from irrigator groups frustrated at the lack of progress on converting licences, even though the irrigators may have already installed metering systems.

The Tribunal will assess DIPNR's progress in converting to volumetric licences and charging extractive users in line with the two-part tariffs. If substantial progress has not been made, it will need to consider how prices should be set for water extraction on unregulated rivers. One option is for the Tribunal to remove the 'interim' charges and set the two-part tariffs (with a volumetric entitlement component ($/ML) and a usage component ($/ML)) on the assumption that metering is already in place. This would provide DIPNR with an incentive to progress the conversion, as it would not be able to charge extractive users based on the interim arrangements.

The Tribunal welcomes comments on:

* *the progress of converting to volumetric licences and applying the two part tariffs on unregulated rivers*
* *how prices for extractive users on unregulated rivers should be set if volumetric licences have not been established and metering is not in place*
* *the percentage of entitlement extractive users on unregulated rivers receive in an average year.*

6.1.2 Discounts for wholesale irrigation customers

Wholesale irrigation customers currently receive discounts on their entitlement charges. At the last determination, the former DLWC indicated that these discounts were not justified on cost grounds, but because the wholesalers provide information that assists DLWC in performing its functions, it proposed that the discounts be retained at current levels.

The Tribunal accepted DLWC's proposal, primarily because the information required to fully evaluate these discounts was not available. It indicated that a review of the wholesale customer discounts was required at the next determination, and encouraged the former DLWC to investigate them in the intervening period. The Tribunal intends to consider this again as part of this price review.

The Tribunal welcomes comments on:

* *whether wholesale discounts are still appropriate*
* *if so, what level of discount for wholesale customers is appropriate.*

6.2 Determining appropriate level and rate of change for prices

As well as considering the structure of prices, the Tribunal will determine an appropriate level for each price. As discussed in Chapter 3, one of the Tribunal's objectives is for prices to fully recover the users' share of State Water's and DIPNR's efficient costs. However, even when these costs are well defined, it is not always appropriate to increase prices to this cost reflective level. The Tribunal must also consider the potential impact of any movement in prices on customers and society (or a particular community) in general. For vulnerable customer groups, these impacts could be significant.

At the last determination, the Tribunal relied on two studies conducted by NSW Agriculture on irrigation farming in the Peel and Lachlan Valleys to assess the likely customer impact of proposed price increases. The studies constructed 'representative' commercial farms for different geographical zones and investigated the impact on farm profitability of price increases needed to achieve full cost recovery. For this determination, the Tribunal will seek updated information from similar studies. It will also review whether additional studies on different regions are available to assist in the assessment of customer impacts.

In making past determinations, the Tribunal has acknowledged that significant increases in bulk water prices will put pressure on profit margins throughout the irrigation sector. It recognised that for irrigators facing financial pressure, price increases will exacerbate these problems. This led the Tribunal to establish a transition path with a cap on the rate of increase in annual prices. As a result of the cap on price increases, full cost recovery has not been reached for all valleys.[44]

The Tribunal will continue to consider transitional price paths where customer impacts are considered excessive. However, this will need to be balanced against the achievement of full cost recovery.

The Tribunal welcomes comments on what transition path and rate of increase is reasonable for prices in valleys where prices are not yet at full cost recovery level.

[44] In the situation where full cost recovery is not achieved, the balance of the users' share of costs is provided to DIPNR and State Water as a Community Service Obligation payment from Government.

ATTACHMENT 1 REQUIREMENTS UNDER SECTION 15 OF THE IPART ACT

In its periodic price-setting role for water, the Tribunal is always guided by the requirements of the IPART Act. Section 15 of the IPART Act requires the Tribunal to consider a range of matters in making its pricing decisions. These can be grouped as follows:

Consumer Protection

- the protection of consumers from abuses of monopoly power in terms of prices, pricing policies and standard of services
- the standards of quality, reliability and safety of the services concerned (whether those standards are specified by legislation, agreement or otherwise)
- the social impact of the determinations and recommendations
- the effect on general price inflation over the medium term.

Economic efficiency

- the cost of providing the services concerned
- the need for greater efficiency in the supply of services so as to reduce costs for the benefit of consumers and taxpayers
- the need to promote competition in the supply of the services concerned
- the impact on pricing policies of any arrangements that the government agency concerned has entered into for the exercise of its functions by some other person or body.

Financial viability

- the appropriate rate of return on public sector assets, including appropriate payment of dividends to the Government for the benefit of the people of New South Wales
- the impact on pricing policies of borrowing, capital and dividend requirements of the government agency concerned and, in particular, the impact of any need to renew or increase relevant assets.

Environmental

- the need to maintain ecologically sustainable development (within the meaning of section 6 of the *Protection of the Environment Administration Act 1991*) by appropriate pricing policies that take account of all the feasible options available to protect the environment
- the consideration of demand management (including levels of demand) and least cost planning.

ATTACHMENT 2 INTERGOVERNMENTAL AGREEMENTS ON WATER POLICY

In undertaking its price determinations the Tribunal gives consideration to policies adopted at a national level and agreed upon by relevant states and territories. The first intergovernmental water reform framework was endorsed by COAG in 1994.[45] The Commonwealth Government has recently released a further policy document, the *National Water Initiative* that refreshes the 1994 COAG agreement and provides guidance for, amongst other things, water pricing reform throughout Australia.

As part of the intergovernmental agreements, the National Competition Council reviews each state and territory's progress in implementing these reforms. Progress is rewarded by tranche payments by the Commonwealth government under the National Competition Policy.

A2.1 1994 COAG Water Reform Framework

Pricing principles were developed by Federal and State governments, through COAG, as part of a national framework of water reform. The principles were put forward in the *Water Reform Framework* which was endorsed by COAG at a meeting in February 1994.

The key bulk water pricing principles agreed by COAG at this meeting included:

- consumption based pricing to achieve full cost recovery and positive return on assets by 2001/01, wherever practical
- ensuring that sufficient funds are set aside for asset refurbishment, and
- full and transparent disclosure of actual costs with separate CSO funding of any shortfall between costs and water revenue.

The COAG water reform framework required governments to implement two-part water pricing, comprising an access charge and a charge to reflect usage, by no later than 1998. However, exemptions to two-part pricing could be obtained if it could be shown that adoption would not be cost effective. Prices were to be set to recover all costs, including externality costs (as defined) and to ensure the viability of water businesses.

A key issue for COAG has been determining the extent of under recovery of costs, due to definitional and measurement problems. At the February 1998 meeting of the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) guidelines were adopted to help clarify issues relating to cost recovery. The floor of that range was defined as:

> …to be viable a water business should recover, at least, the operational, maintenance and administrative costs, externalities, taxes or TERs (not including income tax), the interest cost on debt, dividends (if any) and make provision for future asset refurbishment/replacement.[46]

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45 Although the first priority for all pricing determinations of the Tribunal is to ensure compliance with section 15 matters of the IPART Act. However, most of the water principles established by COAG are consistent with the section 15 requirements. A possible area of divergence has been that the Tribunal must also assess the social impacts of price determinations and protect from the abuse of monopoly power.

46 IPART, *Bulk water prices for 1998/99 & 1999/00*, p 35.

The upper bound range of cost recovery incorporated provision for a rate of return on new capital investments.

A2.2 National Water Initiative

The *Intergovernmental Agreement on a National Water Initiative* (NWI) was entered into by the Commonwealth government and most state and territory governments. The NWI was formally adopted at the COAG meeting of 25 June 2004.

The NWI attempts to provide guidance on policies to improve the management of Australia's water resources. The stated purpose of the NWI is

> …in recognition of the continuing national imperative to increase the productivity and efficiency of Australia's water use, the need to service rural and urban communities, and to ensure the health of river and groundwater systems by establishing clear pathways to return all systems to environmentally sustainable levels of extraction.

A key objective of the NWI is

> …to provide greater certainty for investment and the environment, and underpin the capacity of Australia's water management regimes to deal with change responsively and fairly.

While the document deals with all aspects of managing the water resource, the issues of relevance to the Tribunal's review relates mainly to the pricing principles being proposed. The principles essentially build on those developed in the 1994 COAG Agreement. The principles of relevance to this review include:

- establish pricing policies for water storage and delivery in rural and urban systems that facilitate efficient water use and trade in water entitlements (clause 65),
- continue to use consumption based pricing (end 2008) (clause 65i),
- achieve full cost recovery of water services including recovery of environmental externalities (clause 65ii),
- apply consistent pricing policies across sectors and jurisdictions where entitlements are to be traded (clause 65iii),
- apply lower and upper bound levels of cost recovery, as recommended by ARMCANZ in 1998, including a move towards upper bound pricing by 2008 for metropolitan water agencies (clause 65i) and recognition that the upper bound level may not always be possible for rural and regional water (clause 66v),
- achieve full cost recovery for all rural surface and groundwater based systems, recognising that there will be some small community services that will never be economically viable but are necessary for social and public health reasons (clause 66v),
- establish consistent approaches to pricing and attributing costs of water planning and management by 2006 (clause 67),
- examine the feasibility of using market based mechanisms such as pricing to account for positive and negative environmental externalities associated with water use (clause 73ii),
- implement pricing that includes externalities where found to be feasible (clause 73iii),

- use independent bodies to set or review prices for water storage or delivery by government water service providers (clause 77i) and publicly review and report on pricing by government and private water service providers (clause 77ii).

ATTACHMENT 3 CURRENT PRICE STRUCTURES

There is a wide range of price structures that apply to different extractive users. These are outlined below.

Regulated rivers

Regulated rivers are rivers whose flows are regulated by dams/weirs. State Water's activities are largely based around regulated rivers. A large proportion of the costs to be recovered from users relate to State Water's operating and capital expenditure, although it also includes some WRM costs.

On regulated rivers, water extractors can hold a variety of licences. Each licence type attracts different water prices. All tariffs on regulated rivers have a two-part structure comprising a volume-based entitlement charge and a usage charge. These licence types include general security, high security, high flow and wholesale licences.

General security licence. Owners of low security entitlements are able to extract a specified proportion of the entitlement volume each year, which varies according to water availability. These licences are charged a general security fixed price and a usage price corresponding to the valley for which the licence was issued.

High security licences. Holders of these licences are guaranteed to receive 100 per cent of their licence entitlements in all but the worst drought years. This greater security justifies a price premium to reflect the additional cost of supplying high security water.

High security licence holders are charged a high security fixed price and usage price (at the same price as for general security licences) corresponding to the valley for which the licence was issued. The high security fixed price represents a premium on the low security price.

Wholesale licences. These licences are issued to irrigation districts which purchase large amounts of water and on-sell it to customers within the district (the prices within the irrigation district are set by their Board in negotiation with their shareholders). Holders of these licences receive a wholesale discount.

The discounts are charged as a proportion of the high security and low security fixed entitlement charges. The level of discount received varies between irrigation districts, largely due to historical factors.

High flow licences. High flow licences permit access to water only when river flows reach a certain height. The Tribunal has set the same usage price for all water accessed in regulated rivers, whether it is accessed as allocation, off-allocation or high flow water.

Unregulated rivers

Unregulated rivers make up all other rivers that are not classified as 'regulated rivers'. The water flows in these rivers are not influenced by State Water's operations. The costs to be recovered from users, therefore, largely relate to natural resource management costs.

Extractors from unregulated rivers include both irrigators as well as town and industrial customers.

Area based and volumetric licences. Irrigators on unregulated rivers have historically been subject to an area based charge, although these licences are gradually being converted to volumetric licences. If a user holds an area based licence, there are no limits on the volume of water which may be used, and usage is not metered (except for some large users on the Barwon-Darling River).

Water users are charged either an area based or a volumetric charge, depending on whether the licences have been converted to a volumetric basis. A minimum bill applies if charged by area and a base charge applies if charged for usage. Once water users are converted to a volumetric licence and metered, a two part tariff with an entitlement and usage charge will apply.

At the 2000/01 determination the Tribunal also set a two-part tariff consisting of a fixed charge (based on entitlement volume) and a usage charge (based on the metered volume of usage). Once licences had been converted to volumetric licences and metering was in place the two-part tariff would apply.

High flow licences. High flow licences permit access to water only when river flows reach a certain height. In the last determination the Tribunal set high flow licences on unregulated rivers on the same basis as all other irrigation licences. For licence holders whose usage is metered, the usage component of the two part tariff applies.

Town and industrial customers whose usage is metered (but have not been allocated an entitlement volume) are charged on a per licence plus usage basis. This usage charge differs to the usage charge for irrigation licences. Once the customers have been allocated an entitlement volume, the charge per licence will no longer apply and the valley based two-part tariff that applies for irrigation licences will apply for town and industrial suppliers.

Metropolitan water utilities. DIPNR currently charges Hunter Water Corporation and Sydney Water Corporation for resource management activities. This charge is based on a per megalitre of water usage.

Groundwater

Extractors from groundwater sources are charged according to whether they are located in Groundwater Management Areas (GMAs) or in Non-managed Areas.

GMA. Licence holders in management areas are charged a base fee per property, an entitlement charge to apply to megalitres of licence entitlement and a charge per megalitre of water used.

Usage in GMAs is metered or monitored. Customers in GMAs are charged a higher amount on the basis that there are higher costs associated with GMAs including higher levels of information collection, analysis, monitoring and metering of water usage.

Non-managed areas. In the Non-managed Areas licence holders are charged a base charge per property and an entitlement fee. Usage is not metered or monitored in non-management areas.

ATTACHMENT 4 OPTIONS FOR FUNDING CAPITAL EXPENDITURES

There are two principle methods of the funding capital works State Water proposes to undertake during the regulatory period and beyond. These are:

- For State Water to pay for the works out of its own funds and to recover the amounts outlaid over the life of the assets from the users of the assets.
- For users to fund the construction of the assets directly through upfront or concurrent contributions. The annuity approach adopted by the Tribunal in its last determination effectively calls for upfront or concurrent payments.

The first of these approaches—where State Water pays for the works initially—is consistent with the way goods and services are provided in a normal commercial environment. It is usual for businesses to fund their own capital investments and to recoup the cost of these investments through time from the sale of the goods and services generated by the investments made. The business also then bears the risk of inappropriate or unprofitable investments where the market demand and the prices the good or service can command are insufficient to fully recoup the funds outlaid, including a normal profit.

Unlike the former DLWC, State Water is a corporatised government owned business entity, which means it is able to borrow money to initially fund new and replacement investments in water storage and supply works.

The second approach lends itself to situations where either the business is not able to borrow sufficient funds to undertake the required work, or it is not confident that the prices it could charge would be sufficient to recoup the investment outlay over the service life of the investment in question. It effectively requires potential users to subscribe upfront to the cost of the investment. This means the users of the service are required to bear the risk associated with the investment.

These types of arrangements are most likely to be encountered in co-operatives and not-for-profit organisations. They may also be appropriate where an organisation cannot, for whatever reason, access debt and equity markets.

A4.1 Forms of capital recovery

In the lead up to the 2001 determination, the then DLWC proposed to the Tribunal that its future capital expenditure might best be recovered by means of an annual annuity payment calculated over a 30 year period and reflecting planned capital expenditure over that 30 year period. The Tribunal subsequently adopted this approach although there was some debate at the time about whether a return should also be allowed to the DLWC on the investments subsequently made.

Under this annuity approach current users of a service are required to contribute to the expected investment costs over the forthcoming 30-year period through a series of annual equal payments. Where there are cash surpluses over the 30-year period, interest accrues on the cash balance and this is used to help defray investment costs. Where there are cash deficits over the 30-year period, interest is charged on the outstanding balance. The

provision of funds in this way in advance of the construction of works is often called a Sinking Fund.

If State Water were to be required to fund new or replacement works itself and to recover the cost of these over the lives of the assets in question, there are at least two potential recovery options available. These can be described as:

- **A Rate of Return approach.** Under this approach an annual capital charge is structured to recover the value of the annual depreciation allowance to reflect the consumption of a portion of the asset. This also reflects a return of capital to the owner. A second component of the charge is a return or profit on the investment used to defray the cost of borrowing and provide a return to the owners of the business.
- **A constant amortisation approach.** This approach also uses an annuity formula to calculate the annual payment. However, instead of requiring payments in advance of the works being built this method calculates a series of constant annualised payments once the capital expenditure is incurred. The annualised payments provide a return to the owners of the business of the value of their initial outlay on the investments and a normal profit.

A4.2 An illustration

To better describe the various approaches a stylised example has been developed. The example assumes:

- a real discount rate (or rate of return) of 7 per cent per annum
- an asset life of 100 years (depreciated at 1 per cent per annum)
- a planned capital expenditure profile as set out in Table 1.

Table 1 Planned capital expenditure profile

Years	Planned Capital Expenditure Program ('000)	Planned Annual Capital Expenditure ('000)
1- 5	$90,000	$18,000
6-10	$135,000	$27,000
11-15	$53,000	$10,600
16-20	$17,000	$3,400
21-25	$39,000	$7,800
25-30	$13,000	$2,600

Table 2 Annuity (or Sinking Fund) Approach

Year	Planned Capital Expenditure	Annual Annuity
1	$18,000	$16,393
2	$18,000	$16,393
3	$18,000	$16,393
4	$18,000	$16,393
5	$18,000	$16,393
6	$27,000	$16,393
7	$27,000	$16,393
8	$27,000	$16,393
9	$27,000	$16,393
10	$27,000	$16,393
11	$10,600	$16,393
12	$10,600	$16,393
13	$10,600	$16,393
14	$10,600	$16,393
15	$10,600	$16,393
16	$3,400	$16,393
17	$3,400	$16,393
18	$3,400	$16,393
19	$3,400	$16,393
20	$3,400	$16,393
21	$7,800	$16,393
22	$7,800	$16,393
23	$7,800	$16,393
24	$7,800	$16,393
25	$7,800	$16,393
26	$2,600	$16,393
27	$2,600	$16,393
28	$2,600	$16,393
29	$2,600	$16,393
30	$2,600	$16,393
Total	$347,000	$491,782
NPV 30 Years	$203,418	$203,418

Under this approach and given the assumptions made, an annual charge of $16.4m would be levied on the users of the assets. These payments would progressively pay for the assets to be constructed. Assuming that no further works were required there would be no further payments required at the end of the 30-year period (apart for any operating expenses) until the works required replacement in 100 years time. This implies an intergenerational wealth transfer from the current generation of users to the next in the form of assets fully paid for but whose life is far from exhausted.

Table 3 Rate of return or regulatory asset base approach

Year	Opening Balance	Depreciation	Closing Balance	Return	Return and Depn
1	18,000	180	17,820	1,260	1,440
2	35,820	360	35,460	2,507	2,867
3	53,460	540	52,920	3,742	4,282
4	70,920	720	70,200	4,964	5,684
5	88,200	900	87,300	6,174	7,074
6	114,300	1,170	113,130	8,001	9,171
7	140,130	1,440	138,690	9,809	11,249
8	165,690	1,710	163,980	11,598	13,308
9	190,980	1,980	189,000	13,369	15,349
10	216,000	2,250	213,750	15,120	17,370
11	224,350	2,356	221,994	15,705	18,061
12	232,594	2,462	230,132	16,282	18,744
13	240,732	2,568	238,164	16,851	19,419
14	248,764	2,674	246,090	17,413	20,087
15	256,690	2,780	253,910	17,968	20,748
"					
25	282,920	3,340	279,580	19,804	23,144
26	282,180	3,366	278,814	19,753	23,119
"					
115	5,320	690	4,630	372	1,062
116	4,630	656	3,974	324	980
117	3,974	622	3,352	278	900
118	3,352	588	2,764	235	823
119	2,764	554	2,210	193	747
120	2,210	520	1,690	155	675
121	1,690	442	1,248	118	560
122	1,248	364	884	87	451
123	884	286	598	62	348
124	598	208	390	42	250
125	390	130	260	27	157
126	260	104	156	18	122
127	156	78	78	11	89
128	78	52	26	5	57
129	26	26	0	2	28
Total		$71,510		$445,208	$516,718
NPV 100 years		$29,026		$174,392	$203,418
NPV 30 years		$22,548		$144,680	$167,228

The rate of return approach aligns with traditional accounting treatment of depreciating assets to reflect the progressive consumption of service potential over time. Depreciation also reflects a return of the initial capital outlaid to the owner of that capital. Profit is earned in the form of a rate of return on the outstanding value of the assets.

Based on the assumptions made the sum of the rate of return and depreciation attains its maximum value of $23.144m in the 25th year. After that time this value progressively declines until the useful life of all assets is exhausted.

Table 4 Constant amortisation approach

Year	Planned Capital Expenditure	Annual Recovery Amount
1	$18,000	$1,261
2	$18,000	$2,523
3	$18,000	$3,784
4	$18,000	$5,046
5	$18,000	$6,307
6	$27,000	$8,199
7	$27,000	$10,092
8	$27,000	$11,984
9	$27,000	$13,876
10	$27,000	$15,768
11	$10,600	$16,511
12	$10,600	$17,254
13	$10,600	$17,997
14	$10,600	$18,740
15	$10,600	$19,482
16	$3,400	$19,721
17	$3,400	$19,959
18	$3,400	$20,197
19	$3,400	$20,436
20	$3,400	$20,674
21	$7,800	$21,220
22	$7,800	$21,767
23	$7,800	$22,314
24	$7,800	$22,860
25	$7,800	$23,407
26	$2,600	$23,589
27	$2,600	$23,771
28	$2,600	$23,954
29	$2,600	$24,136
30	$2,600	$24,318
"		
"		
115		$4,836
116		$4,597
117		$4,359
118		$4,121
119		$3,882
120		$3,644
121		$3,098
122		$2,551
123		$2,004
124		$1,458
125		$911
126		$729
127		$547
128		$364
129		$182
130		$0
Total	$347,000	$501,148
NPV 100 years	$190,110	$203,418
NPV 30 Years	$190,110	$158,015

Under the constant amortisation approach, a new annuity is calculated as each element of the capital program is completed and this is then charged to users. This charge is calculated over the expected life of each asset in question.

Under the assumptions made, this charge would reach a high point in year 30 of $24.318m and continue at that level until year 100, when the value would progressively decline as assets reach the end of their useful lives (assuming the assets are not to be replaced).

A4.3 Commentary

The present value of each of the suite of charging regimes is the same over the respective recovery period of each option. This is shown in Table 5.

Table 5 Net Present Values of alternative funding options

	Annuity approach	Rate of Return	Constant Amortisation approach
NPV 100 years	N/A	$203,418	$203,418
NPV 30 years	$203,418	$167,228	$158,016

The annuity approach recovers all its funds within a 30-year period, while the remaining two approaches recover the initial investments over the life of the assets. As a consequence, it can be argued that the current generation of water users will be asked to pay more under the annuity approach over a 30-year period than under the alternative approaches.

It will only be in the unlikely event that the life of an asset equals 30 years that the three approaches will give the same outcome in present value terms. However, the water industry is characterised by assets having very long useful lives. For instance, it is not uncommon for major concrete water storage dams to have life expectancies of 150-200 years. Weirs and similar structures often have lives of 80-100 years. These types of structures make up a substantial component of value of assets in the bulk water industry.