



ICRC

independent competition and regulatory commission

## **Draft Report**

**Water Abstraction Charge**

**September 2003**

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

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

## Foreword

The Treasurer issued a reference to the commission on 23 May 2003 to investigate and provide advice on an appropriate level for the Water Abstraction Charge. The reference also required that the commission advise on an appropriate methodology for the calculation of the charge in future years.

In this Draft Report on the investigation the commission has addressed the issues it considers critical to fully addressing the terms of the reference. The commission has drawn on a range of sources in its investigations, including submissions from a number of parties following the publication of the issues paper in July 2003. The commission's considerations have also taken into account the advice it provided to the government in 1999 when the Water Abstraction Charge was introduced, and changes that have occurred in the supply of urban water since that time.

The Draft Report deals with what the commission considers are a range of crucial issues in determining the charge and has also looked at the role that the charge might play in moderating demand for a scarce but essential resource. In the course of its inquiries, the commission has also looked at the equity issues that surround the charge, considering the impact on consumers, supplier and the environment. In doing so, the commission has become aware that there are impacts on the commission's pricing for water role that need to be given detailed attention as part of the current review of ACTEW's prices for water and wastewater services.

The commission has released this Draft Report to provide an opportunity for further debate of issues and refinement of its thinking on the matters raised in the reference. The commission is due to report to the Government by 10 October 2003. Submissions on the matters raised in the Report are now sought from interested parties. Submissions on the Draft Report will close on 7 October 2003. Submissions may be provided to the commission either in writing, or electronically or facsimile. The addresses to which submissions may be directed are shown in the inside cover of this Report. For further information on the investigation please contact the Commission on 62050799.

Paul Baxter  
Senior Commissioner  
9 September 2003



## Contents

<b>Foreword .....</b>	<b>iii</b>
<b>1. Introduction.....</b>	<b>1</b>
Overview .....	1
Transparency .....	1
Flexibility .....	2
Legality .....	2
<b>2. Methodology.....</b>	<b>3</b>
Introduction .....	3
Water supply costs.....	4
Scarcity value of water.....	5
Environmental costs.....	7
Ability of ACT Government to impose a WAC.....	8
Enumerating the costs.....	10
The WAC calculation .....	11
Table 3.1 Government Water Supply Expenditures .....	11
Figure 3.1: Volume and Price of Temporary Water Trades on the Murrumbidgee: August 2001 – June 2003 .....	12
Relaxing the assumptions on pass through of the WAC.....	13
Pass through of the WAC.....	13
Constant per kL WAC.....	13
Implications for future WACs.....	14
Formulae for the calculation of the WAC.....	15
<b>4. Demand Management .....</b>	<b>17</b>
<b>5. Impact of WAC Charges on Consumers .....</b>	<b>21</b>
Low income and larger households .....	21
Table 5.1 Household Water Bills under Different WAC Rates .....	22
Table 5.2 Number of Households by Occupancy: ACT .....	23
Non Residential Users.....	24
<b>6. Impact on ACTEW .....</b>	<b>27</b>
<b>7. Conclusion and Recommendations.....</b>	<b>29</b>
WAC Methodology.....	29
Calculation of the WAC for 2003/04.....	32
WAC as a Demand Management Tool .....	32
Impact upon Consumers.....	32
Changes in the Relative Value of Water Over Time .....	32
Impact on ACTEW .....	33
<b>Attachment 1: Terms of reference.....</b>	<b>35</b>
<b>Attachment 2: Glossary and abbreviations.....</b>	<b>39</b>
<b>Attachment 3: List of submissions.....</b>	<b>41</b>



## 1. Introduction

The commission has received a reference from the ACT Government requesting that the commission consider and advise on a methodology for the calculation of the Water Abstraction Charge (WAC) and an appropriate level for the WAC.<sup>1</sup>

The commission has been asked twice before to provide advice on aspects of the WAC. As part of the 1999 price direction for water the commission provided advice on the level of the WAC and subsequent to that the commission determined the operational details for charging the WAC to customers. In relation to this latter instance, the commission determined that the WAC was to be passed on by ACTEW Corporation to water users in the ACT through the charges made by ACTEW.<sup>2</sup>

### Overview

The WAC is designed to achieve two goals. Firstly, it sends a signal to consumers about the true costs of water. This encourages efficient use and investment in water saving devices. Secondly, the WAC recovers those costs of water provision not covered by the regulation of the local provider of water, ACTEW. This ensures that there is appropriate cost recovery and reduces the potential for cross subsidisation from other sources of revenue available to the Government.

The commission's preferred method for calculating the WAC is to settle on those costs that the WAC should cover, measure those costs and then divide by the appropriate number of kilolitres of water consumed to yield a value for the WAC. This ensures that all the relevant costs are identified and valued to the extent possible, and that the costs are then spread over all water usage in the ACT.

In considering the appropriate methodology for calculating the WAC the commission has concluded that this methodology must satisfy three criteria:

- Transparency
- Flexibility
- Legality

### Transparency

The WAC satisfies the condition of transparency if identification and measurement of the costs is done in a way that draws upon readily available data and that uses a method of calculation that is repeatable.

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<sup>1</sup> Copy of reference at Attachment I

<sup>2</sup> Page i of the Commission's February 2000 Pass Through of the Water Abstraction Charge: Price Direction.

## **Flexibility**

The WAC value should be able to be easily changed on a yearly basis if any of the underlying factors change.

## **Legality**

The determination of the WAC and the collection of the WAC from consumers of water should not go beyond the powers of the ACT Government to set and collect charges and fees. To this end, the commission sought advice of counsel about legal issues associated with the WAC. In particular, the commission sought confirmation that the WAC as currently applied is essentially a regulatory mechanism in which the quantum of the charge reflects discernible and measurable costs to government (and therefore the community), including social and environmental as well as economic factors. The WAC should not merely raise revenue as this may lead to constitutionality questions regarding the government's ability to set and collect the fee.

Based upon these general principles, the commission has developed a broad methodology for calculating the magnitude of the WAC and its application to water users in the ACT. Using this methodology, the commission has then calculated a WAC charge that could be applied in the current year and established the practicality and repeatability of the methodology developed.

The commission is now seeking comments on this draft report before presenting its final report and recommendations to the government for their consideration.

## 2. Methodology

### Introduction

In developing a methodology for determining the level of the WAC the commission maintains the assumption that the WAC will be passed on directly to consumers. In addition, the commission notes that the WAC as currently applied is passed on at a per kilolitre rate. Under these assumptions the WAC forms part of the price of water consumers face. The effective price of water a customer faces is the price per kilolitre of water plus the WAC. These are important assumptions and will be discussed in detail in Section 3.

In its issues paper the commission listed three possible costs of water not covered by the regulatory arrangements applying to ACTEW, the territory's water and sewerage provider. These costs are:

- catchment management costs directly incurred by the ACT government,
- environmental costs, and
- the scarcity value of water.

The commission believes that a broader definition of costs directly incurred by the government should be included in the WAC calculations. This definition should include, in addition to the catchment management costs, all costs the government incurs in the maintenance, regulation and assurance of water supply. This would cover costs incurred in possibly more than one department or agency. Thus, the costs that the government incurs as part of the overall administration of the territory's water resources are included in this definition of government costs.

In evaluating water supply, environmental and scarcity related costs for inclusion in the WAC calculation, the commission proposes adopting a two-stage process. Firstly, the costs must pass a **reasonability** test—that is, the costs proposed for inclusion in the WAC determination must be appropriately characterised as directly related to the provision of water and water related services in the ACT. Secondly, the costs must be easily **measurable**. Measurability is crucial in that the WAC should not be seen as arbitrary. The commission has sought legal advice on the adoption of reasonability and measurability tests and considers that it is highly desirable that these two tests be met in any determination of the WAC.

For the purpose of measurement of costs the commission considers that costs should fall into two classes. First, there are those costs that apply to all units of water abstracted within the ACT. For example, costs spent on catchment management as well as other government expenditures would fall into this category. The commission will term these costs **water supply costs**. Water supply costs are apportioned over the amount of water abstracted to obtain the cost per kilolitre. An alternative type of costs is those costs that depend on the amount of water the ACT does not return to the water catchment.

Currently, sixty five gigalitres are abstracted but only thirty five gigalitres are returned through the water treatment facility. Thirty gigalitres of water are lost to the

water system. Costs that relate to the water not returned to the system are called **flow costs**. These costs will vary with the amount of water not returned and an example would be the scarcity value of water. If the ACT returned every drop of water to the water system that it abstracted then there would be no scarcity value of water. It is those gigalitres of water not returned that have an alternative use. Ultimately the flow costs are apportioned over the abstracted level of water.

The following section addresses the question of the identification of these reasonable and measurable water supply costs in the current circumstances.

### **Water supply costs**

In the 2003-04 ACT Budget, the government plans to spend \$990,000<sup>3</sup> on catchment management. This is a direct cost related to the provision of water supply the territory bears through the territory Budget and that is not incurred by ACTEW. There are other government expenditures on a variety of programs directly related to water supply which properly should also be recovered from water users in the ACT. Examples include expenditures on parks and conservation, wildlife research and environment protection, as well as the water administration and regulation costs of several government departments. All of these costs are recurrent expenditures and do not include any capital expenditures. Further details are provided in chapter 3.

The recent bushfire, however, and the expenditure that must be incurred in replacing capital assets that were destroyed in the fires, highlight the need to deal with capital expenditures in the general methodology for determining water supply costs. For example, suppose the government planned a significant one-off expenditure on catchment management. This might include the reinstallation of some capital assets destroyed or damaged by the bushfires. How should this expense be included? The commission takes the view that this type of expenditure should be rolled over several (say, three) years in the calculation of the WAC even though the expense may have occurred in only one budgetary year. The primary benefit of this approach is that it smooths the impact on the WAC rather than there being a significant jump in the WAC in any one year followed by a return to the original level, all other things being equal.

An alternative approach would be to treat capital expenditures on the water catchments in the same fashion as capital expenditure is treated in the price direction for ACTEW, that is by allowing a return on capital and a return of capital (that is, depreciation) over time. The goal is to spread the cost of the capital infrastructure over its useful life while giving the capital owner a fair rate of return on invested capital. This ensures that there are sufficient incentives for ACTEW to invest in new infrastructure. The regulator has the duty to evaluate capital expenditures as to whether they are prudent and efficient.

The commission rejects this approach for the WAC. Given that most capital expenses are relatively small and recovery of costs would occur over a potentially long time, the quantum in the WAC would be small. To the extent that these expenditures are not

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<sup>3</sup> Department of Urban Services, Environment ACT, Parks and Conservation

exorbitant compared to other components of the WAC, smoothing the costs into the WAC over several years allows the government to recover the costs without an undue burden on water users. For example, \$1 million invested by the government in capital infrastructure with an expected life of 20 years would be valued at a current cost of approximately \$100,000—that is, \$50,000 in return of capital assuming straight-line depreciation over the 20 years, and \$50,000 as a return on capital assuming a 5% rate of return. This would equate to a 0.15 cents per kilolitre increase in the WAC. If the \$1 million capital investment were spread over three years at \$333,000 per year, then the addition to the WAC would be 0.5 cents per kilolitre. Thus, given the likely overall size of the expenditures concerned and their WAC equivalents, it is the commission's view that the additional administrative costs associated with a process that applies a return on and of capital expenditure for catchment management purposes is not an efficient means of addressing this issue. Therefore, the commission will consider a methodology that allows recovery of these costs over a shorter time.

### Scarcity value of water

The discussion above has focussed upon the actual direct costs that are borne by the territory through the Budget. However, the value of water extends beyond simply these direct costs. It is generally recognised that there are a number of other 'costs' that form part of the total value of water. For the sake for the discussion that follows, these are referred to as **flow costs** and are interpreted to include both the scarcity value of water and the environmental cost and impacts of the use of water for consumptive purposes.

The commission believes that there is a scarcity value for water and the government should be able to recover this cost in the WAC. In taking this view the commission believes that a scarcity value passes both the *reasonability* and *measurability* tests. The commission bases this view on the following arguments.

Water has alternative uses. Water not used in the ACT can flow downstream and be used for other purposes such as irrigation. Appealing to basic economic reasoning satisfies the reasonableness test. If there were no alternative use for the water in the ACT catchments, then it would have no value. It is the fact of alternative use that gives this water a scarcity value. Just as goods that are traded internationally determine a domestic value equal to the international price (in the absence of domestic market power), the scarcity value of water depends on traded prices of water.

One issue with respect to the reasonableness test is the fact that the ACT has not yet formally agreed a cap on diversions on water in the Murray-Darling Basin (MDB). The ACT Government has signed a memorandum of understanding (MoU) with regard to the cap, but the actual quantum of water that is available under the cap has yet to be agreed by the ACT and other members of the MDB Ministerial Council. Agreeing the quantum of the cap will formally set an upper limit on the ACT's net consumption from the MDB, although the ACT will be able to purchase additional water entitlements above and beyond the cap from other holders of water rights in the Murray-Darling system. Once this formal cap process and water trading arrangements are agreed between the MDB members, there will be a clear test of the reasonableness

of the scarcity value used in the WAC calculation, namely the price that the ACT has to pay to obtain additional water above and beyond its cap entitlement.

ACTEW in its submission to this inquiry<sup>4</sup> notes that it believes that the scarcity value of water is already reflected in the price that ACTEW charges for its own services. ACTEW argues that the marginal cost of water provided through its own reticulation system depends upon the timing and cost of new augmentations to supply. Thus it is claimed that to some extent consumers are already meeting some of the cost associated with the scarcity of water, as the timing and size of these augmentations is partly driven by the frequency and magnitude of rainfall.

The commission acknowledges that to an extent this additional augmentation cost included in the prices charged by ACTEW reflects the scarcity of water and the need to invest in infrastructure to ensure reliability of supplies in the future. However, the commission notes that the major catchment costs, including a recovery of a return on the investment in the construction of the dams and associated infrastructure forming the Googong and Cotter catchment systems, is not included in the revenue collected by ACTEW from its charges. Rather, ACTEW's recovery includes only the costs of maintaining the dam infrastructure in perpetuity, which effectively represents a recovery of current costs, not costs directly associated with providing new catchment area infrastructure in order to address the need for additional water supplies in the future. Thus, there is no double counting of the scarcity value in terms of the charges already being collected by ACTEW from its customers.

ACTEW also raised concern about the possibility that irrigation water market prices reflect the "*endemic under recovery of upstream infrastructure costs rather than the intrinsic value added by water*" and thus "*the water prices faced by ACT consumers may not align with the socially efficient level*"<sup>5</sup> The commission recognises that the use of market prices for water, where water is traded, reflects an approximation of the scarcity value of the water. As discussed below, the commission is also conscious that the market value for irrigation water varies over the water trading season depending the condition of crops, and the frequency and extent of rain across the area to be irrigated. However, the water market trading price provides the best independent source of information that can be used to reflect the scarcity value of water. Rather than trying to develop a value by comparing the value-adding opportunities for the use of water in all circumstances elsewhere in the relevant river valley, the commission believes the water trading prices provide a practical proxy for use in valuing the scarcity value within the WAC. This belief is based on ease of application and because the principle determinants of the market price are the scarcity and the potential value of alternative uses of the water,

Measurability of the scarcity value using water trading prices raises some important issues. There are two potential approaches to measuring the scarcity value of water reflecting the fact that water is traded on two levels, namely the trading of either

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<sup>4</sup> *Regulatory Submission and Response to the Commission's Issues Paper-Water Abstraction Charge* ACTEW, August 2003, p16

<sup>5</sup> *Ibid* p16

permanent or temporary rights. Once the ACT joins the cap on diversions, it will be able to trade in both markets.

The commission believes that using prices from the trading of temporary entitlements of water is the preferred method for valuing scarcity for purposes of determining the WAC. Temporary trading represents the current market price for the water, incorporating the current estimate of the added value of alternate uses for the water, the scarcity value of the water at a particular point in time, and the market's assessments of the medium term outlook for the availability of additional water.

The alternative of using the permanent entitlement market has its virtues. The price of permanent entitlements represents the long-term value of water and as such it treats water as a capital asset. Thus, use of the long term value of water would provide some degree of stability to the WAC. The permanent entitlement price does not vary as much as the temporary entitlement price, which is a response to short term supply and demand conditions.

Use of the long term price would still need to reflect the changes over time in that price. Furthermore, it would need to be apportioned over some appropriate period, reflecting the fact that the permanent trade provides access to a water entitlement in perpetuity. This creates potential administrative difficulties. Furthermore, there is the potential loss of immediacy in the market signals that a temporary trade price would offer. The temporary trade price will reflect the current state of demand for and availability of water. Again from an administrative perspective it may be appropriate to smooth the temporary price for water over more than one period. However, even with this adjustment there is likely to be a more immediate response to changes in water availability and alternative use options than is available from the permanent trade price.

## **Environmental costs**

Environmental costs represent the most difficult set of costs to measure with respect to the calculation of the WAC. There is no doubt that, on the one hand, the mere existence of the dams and associated water works to provide water for ACT residents has greatly altered the environmental landscape, perhaps detrimentally in the ACT and beyond. On the other hand, the city of Canberra could not exist in its present form without the dams and associated infrastructure. The commission prefers to take a less expansive view of the environmental costs resulting from water use in the ACT and to focus solely on those costs relating to environmental flows.

The commission takes this view knowing that there are other potential environmental costs that could be included. The commission faces three prospective dilemmas when considering possible costs for inclusion. Firstly, the commission wishes to avoid the double counting of environmental costs. The interrelatedness of many environmental effects implies that counting each effect separately would result in over counting. Secondly, some environmental costs, while satisfying the condition that they are reasonable, may fail the condition of measurability. Thirdly, some environmental costs may fail for the reverse reason of passing measurability but failing reasonability.

The environmental cost the commission is recommending for inclusion is the environmental effect on the flow of water downstream. This gets at the core of the territory's water usage. We alter the timing and magnitude of downstream flows by retaining water in dams and by not returning all the water we abstract to the downstream water system. As a proxy for this cost, the commission proposes to treat the environmental cost as a flow cost. To attach a value to this cost the commission plans to use the downstream cost of maintaining or augmenting river flows.

The environmental flow cost meets the conditions of measurability and reasonableness. There is a well developed proposal for rescuing environmental flows and an associated cost per megalitre of water recovered. Realising that the level of downstream flows is under control of the ACT satisfies reasonableness. If the application of the WAC significantly reduced watering on gardens and green spaces, the effects on environmental flows would be diminished. This is the environmental variable that is actually under control of the ACT.

The Conservation Council in their submission to the WAC Issues Paper argues for a broader interpretation of environmental costs recognising that ecosystems have an inherent value.<sup>6</sup> While the commission is sympathetic to this view, the difficulty is satisfying the measurability condition, especially at the level of the incremental effect on water supply costs. ACTEW in its submission notes that environmental costs should be included in the WAC until the price of water charged by ACTEW reflects the full marginal cost of water including all environmental costs.<sup>7</sup> The commission rejects this view. The regulation of water provision in the ACT is done so that the costs that ACTEW incurs are recovered through the prices charged for water. The WAC is designed to recover those costs not directly attributable to ACTEW. Thus, the commission would not propose to include environmental costs in ACTEW's charges where ACTEW does not meet these costs.

### **Ability of ACT Government to impose a WAC**

In its submission to the inquiry, the Property Owners and Ratepayers Associations of the ACT Inc raised the question of whether the WAC was nothing more than a revenue raising device used by the ACT Government.<sup>8</sup> The fundamental argument of this submission is that "*ratepayers feel that the use of levies and charges as a general revenue source is totally unacceptable*".

The issue touched upon in this submission raises a valid point particularly from the perspective of the powers of the ACT Government to impose levies of this nature. The commission has given consideration to this question, especially in the context of recent court decisions that have cast some doubt over the ability of state and territory

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<sup>6</sup> Conservation Council of the South East Region and Canberra Inc, 19 August 2003, page 1

<sup>7</sup> op cit page 14

<sup>8</sup> Peter Jensen, President, Property Owners & Ratepayers Associations of the ACT Inc, submission 20 August 2003

governments to make certain charges or levies that could be interpreted as taxes or an excise under s90 of the Constitution<sup>9</sup>.

The commission has sought legal advice on the correct interpretation of s90 of the Constitution and the implications of a number of court decisions that have addressed various aspects of this power. In particular, the commission is concerned to determine to what extent if at all, the WAC could be used as a demand management tool.

Research available to the commission indicates that the elasticity of demand for water is very low and that if the WAC was intended to function as a demand management tool in its own right, the level of WAC may need to be set at a significantly higher level than that previously adopted. For example, based upon the average domestic household consumption of 280 kilolitres per annum, the increase in the WAC from 10 cents to 20 cents to take effect from 1 January 2004 represents an increase in costs (on an annual basis) of only \$28. Based on demand elasticity estimates of as low as -0.22, it is the commission's view that a price increase of this order is likely to have very little effect on the total level of water consumption in the ACT.

To meet the requirements of the Constitution and in the context of the courts' interpretation of the Constitution on this matter, the commission, in providing advice on the WAC, has had regard to the following principles, namely:

- that the quantum of the charge should reflect discernible and measurable costs to government (and therefore the community),
- discernible and measurable costs can include social, environmental as well as economic costs, and
- the charge should not merely be for revenue raising purposes.

These principles are reflected in the recommendations made in this report and any consideration of amendments to the WAC level or the methodology used to set the WAC, other than that recommended in this report, should have regard to and abide by these principles if the ACT Government is to avoid some form of a constitutional challenge.

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<sup>9</sup> Relevant cases include *Ha v New South Wales* (1997) 189 CLR 465, *Capital Duplicators Pty Ltd v Australian Capital Territory* [No 2] (1993) 178CLR 561,

### 3. Calculating and Applying the WAC

In this section the basic relationships between water supply costs to be recovered and the resulting WAC will be built-up. As discussed above, there are two types of costs to be accounted for: water supply costs, in the form of government expenditures, and flow costs, in the form of the downstream environmental cost and scarcity value. There is a different approach to dealing with these types of costs. Also, the goal is to propose a framework for future calculations of the WAC. Next, some implications of changes in behaviour such as reductions in use of water on lawns and gardens or increases in the reuse of water are examined. Finally, the benefits of differentially charging the WAC on diverse water types are studied.

#### Enumerating the costs

In this section the procedure for determining the level of the costs used to determine the WAC will be explained. In keeping with earlier discussions about costs the commission will apportion costs to water supply costs and flow costs.

The treatment of water supply costs is straightforward. Eligible costs need to be identified and measured. As discussed in the previous section, the commission is proposing that a wider definition of costs be included. In the issues paper, the only costs identified were those costs directly dealing with catchment management. However, the commission is aware of a wider range of costs that are directly attributable to the management and administration of the ACT's water supplies. In the context of the proposed methodology to be used to calculate the WAC, these additional costs should be included.

To translate government expenditures into the WAC calculations requires dividing the level of government expenditures by the expected level of water abstracted. For every one million dollars of dedicated government expenditure on water supply the WAC increases by 1.5 cents. Dividing \$1,000,000 by 65 gicalitres (the expected yearly consumption of water) and rescaling the units of water yields approximately 1.5 cents per kilolitre.

The scarcity value of water and environmental costs are flow costs. As such scarcity value and environmental costs apply to the amount of water not returned to the catchment system. Currently, of the 65 gicalitres abstracted, only 35 gicalitres are returned through the water treatment plant. Thus, to spread a proposed cost related to the 30 gicalitres lost to the system over the 65 gicalitres abstracted one needs to multiply the cost per megalitre by 30/65. The implication is that for every \$100 per megalitre of flow cost this becomes approximately 4.6 cents per kilolitre added to the WAC.

To calculate the scarcity value of water, the commission has decided to use the weighted average of trading prices for the previous two years. First, the weighted average price of water is determined for each year. Prices are weighted by the quantity of water traded. Past prices are used, as there is not an active futures market for water trading. Rather than sum the weighted average prices of the two previous years the commission believes that the previous year should be weighted double to the

year two years preceding. The calculation of the WAC relating to the scarcity value of water is two thirds times the average price in last year plus one third times the average price two years ago.

Environmental costs are treated differently in that they represent capital costs, as these expected costs relate to permanent improvements in water flows. For the purposes of calculating the charge for the WAC, the correct approach is to calculate a return on the capital cost. The commission will apply a risk free rate of return to this investment in order to derive an annual cost.

### The WAC calculation

The current ACT budget includes expenditure of \$5.3 million on water supply related programs. Included in this figure are catchment management costs as well as the costs associated with the management and regulation of water as incurred by other government departments and agencies. These are detailed in Table 3.1. The result is the first component of the WAC being valued at 8.2 cents per kilolitre.

**Table 3.1 Government Water Supply Expenditures**

Parks and Conservation	\$1.5m
Wildlife Research and Monitoring	\$0.3m
Environment Protection	\$2.2m
CUPP	\$0.3m
Treasury	\$0.4m
Health	\$0.2m
Chief Minister's	\$0.2m
JACS	\$0.2m
<b>Total</b>	<b>\$5.3m</b>

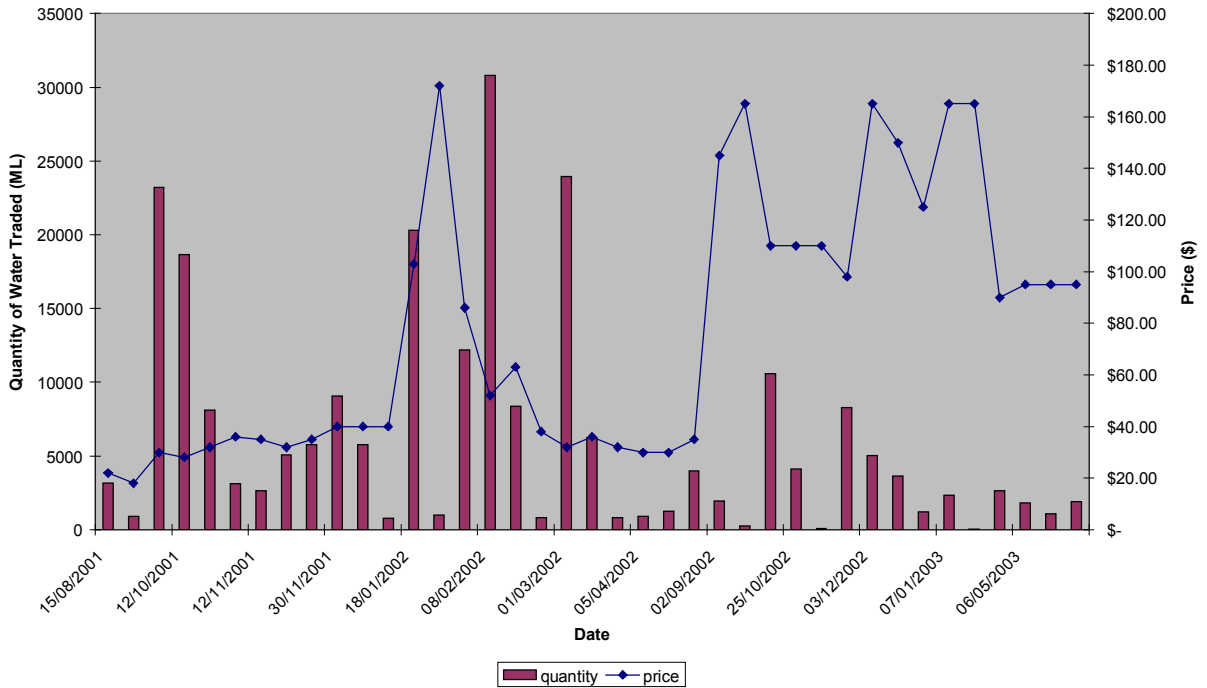
Source: Environment ACT, Department of Urban Services

This expenditure does not include any expenditure for bushfire recovery. The ACT government is currently considering the cost of repairing the catchment areas around the Cotter system following the January 2003 bushfires. Further Budget appropriation is expected for this task in the next six to twelve months. Additional appropriations, some of which may be capital expenditures would inflate the result. Preliminary estimates of additional appropriation for water supply are in the order of \$6 million. Of this amount, \$3 to \$4 million may be capital costs. This would add an additional 5 to 6 cents to the WAC.

The scarcity value of water is readily measurable due to the volume of water traded. Water is traded throughout the Murray-Darling Basin, but there is no market for tradable water that includes the ACT, as the ACT has not yet joined the cap on diversions. The nearest market is the market for water along the Murrumbidgee River. As this is downstream from the ACT, the commission considers this the best proxy for the scarcity value of water in the ACT. There are several organisations that facilitate water trading along the Murrumbidgee River. The largest water trading organisation in Australia is Water Exchange with extensive water trading along the

Murrumbidgee. Below is a chart showing the quantity and price of temporary water trading on the Murrumbidgee River over the past two growing seasons.<sup>10</sup>

**Figure 3.1: Volume and Price of Temporary Water Trades on the Murrumbidgee: August 2001 – June 2003**



The weighted average price in 2002/03 was \$120 per megalitre and the weighted average price in 2001/02 was \$48 per megalitre. With two thirds of the weight on previous year and one third on the year before that the average price is \$96 per megalitre for WAC calculations for the 2003/04 year. This implies a scarcity value component of the WAC at 4.4 cents per kilolitre.

According to the MDBC estimates, the average cost to preserve or recover permanently one megalitre of water in the system is \$2000. This must be considered a capital cost, as explained above. The average interest rate on 10 year government bonds in the month preceding the budget announcement (April 2003) was 5.35%.<sup>11</sup> This figure is available from the Reserve Bank of Australia. Multiplying \$2000 by 5.35% yields an annualised environmental cost of \$107 per megalitre. This implies an environmental component of the WAC of 4.9 cents per kilolitre.

<sup>10</sup> Sourced from [www.waterexchange.com.au](http://www.waterexchange.com.au).

<sup>11</sup> Note if the WAC is being determined as part of the budgetary process the appropriate month would be April. This is because territory budgets are usually presented in May.

Based on the cost estimates outlined above, the WAC would be set at 17.5 cents per kilolitre, being the sum of the three components.

## **Relaxing the assumptions on pass through of the WAC**

The commission identified two assumptions currently used for the WAC. These are the assumption that the WAC will be passed on directly to consumers and that the WAC will be passed on in its current form at a per kilolitre rate.

### **Pass through of the WAC**

The alternative to passing the WAC through as a separate charge is for the WAC to become part of the cost of water provision by ACTEW. This would allow the commission to include the WAC as a cost to be included along with the costs of providing and maintaining reservoirs and reticulation networks. These costs would be borne by ACTEW directly. ACTEW could then recover those costs from consumers through the price people pay for the water they use for residential and commercial purposes.

This alternative does have merit in that it would provide the commission with greater latitude when making price directions. However, given the magnitude of the WAC compared to ACTEW's other recoverable costs, it is difficult to argue that this latitude is necessary. Further, as the amount of the WAC would need to be forecast, it is likely that there could be significant under or over collection of the WAC. This would add to the complexity of administering the charge and might imply a charge that is not directly related to actual costs that are to be recovered.

### **Constant per kL WAC**

In its issues paper, the commission raised the possibility of a variable WAC. One possibility would be for a step in the WAC, in the same way as there is a step in the price of water. This is proposed in the Conservation Council's submission.<sup>12</sup> There is already a large step increase in the price of water after 175 kilolitres per year, designed to discourage large usage. A step in the WAC, at the level of the current step in the price of water, could impose an unnecessary additional financial burden on larger households for essential water usage. There would be the possibility of over or under collection of the WAC costs. Demand at different levels of consumption would need to be forecast to allow the setting of the WAC at a rate sufficient to allow ACTEW to recover its costs. ACTEW, in its submission, notes that this proposal would increase the administrative costs of charging the WAC to consumers. For these reasons, the commission has rejected this approach.

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<sup>12</sup> Op cit page 2

## Implications for future WACs

In this section, the commission demonstrates the implications of changes in water consumption patterns on the calculation of the WAC. Two scenarios are considered, including reductions in consumption consistent with the territory Water Strategy and increases in the level of water reuse. The current consumption statistics will remain the base, namely 65 gigalitres abstracted, 35 gigalitres returned through water treatment, and 30 gigalitres lost to the system.

Consider the situation where there is a significant reduction in the level of discretionary water use that reduces the amount of water lost to the system. For the sake of this example, suppose that the new consumption figures are 55 gigalitres abstracted, 35 gigalitres returned and 20 gigalitres lost. Thus, there is a 10 gigalitre reduction in discretionary outside water use while all other consumption remains the same.<sup>13</sup> There are two contrary effects in this case. Firstly, reducing the amount of water not returned reduces the total flow cost, which should reduce the WAC. Secondly, reducing the total water abstracted increases the WAC, as measured in cents per kilolitre, as the cost is spread over a smaller base. Whether the WAC rises or falls depends on the relative magnitude of the water supply costs to flow costs. A rising WAC in this case could imply that water users without any non-discretionary water use would pay more for their water as discretionary consumption by others falls.

An alternative situation would be to consider an increase in the reuse of water. Reuse of water occurs in two ways. There is formal reuse of water where it is processed in a treatment plant and then reused on ovals and other green spaces.<sup>14</sup> Formal water reuse can be measured. There is also informal water reuse where households and other establishments reuse water. For example, attaching a discharge hose leading to the garden from a washing machine results in reuse. Informal reuse cannot be readily measured. The government encourages both types of reuse.

To analyse the effects of an increase in reused water on the WAC consider the effect of 10 gigalitres of reused water. If that amount of water perfectly replaces 10 gigalitre of water that would not otherwise have been returned, the effects of this change can be accounted. There are still 30 gigalitres of unreturned water, 20 gigalitres supplied from potable water and 10 gigalitres as a result of reuse. Reused water that replaces potable water leaves the net flows unchanged. Twenty five gigalitres would be the amount returned though water treatment and 55 gigalitres would be the amount abstracted. The water supply costs would remain unchanged, as would the flow costs. The flow costs do no change, as the same amount is lost as with no increase in reuse. The conclusion is perverse, in that the WAC will rise as more water is reused. This arises because the same cost level is spread over a smaller base of abstracted water.

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<sup>13</sup> This is the equivalent of a 15% reduction in usage. The ACT Government's report "Water ACT – A Draft Policy for Sustainable Water Resource Management" released in July 2003 calls for a 13% per capita reduction in consumption by 2013.

<sup>14</sup> The water is not treated to a potable level but is safe for irrigation purposes.

This raises the possibility for a differential WAC to be charged for reused water. If the WAC were to be charged on reused water, only the flow costs should be allocated to the reused water recognising that there are important environmental reasons for reusing water and that the reuse of water affects the return of water to the system. The next section details the formulae for calculating the WAC for the cases with and without a WAC on reused water which overcomes this problem.

### Formulae for the calculation of the WAC

Let  $TW_t$  be the total water abstracted in year  $t$  measured in kilolitres.

Let  $LW_t$  be the water not returned to the system in year  $t$  measured in kilolitres.

Let  $RW_t$  be the reused water in year  $t$  measured in kilolitres.

Let  $SC_t$  be the proposed water supply costs in year  $t$  measured in dollars.

Let  $FC_t$  be the expected flow costs in year  $t$  measured in dollars per kilolitre.

Let  $k$  be the proxy for the environmental benefit for the reuse of water where  $k = 1$  means no environmental benefit and as  $k$  become larger the environmental benefit increases.

The formula uses retrospective use data as the best forecast of future years' demand and forward looking costs.

If  $RW_t = 0$  or if reused water is not charged a WAC, then the WAC on potable water equals

$$WAC_t = \frac{SC_t + (LW_{t-1} \times FC_t)}{TW_{t-1}}$$

where  $WAC_t$  is the WAC charged in year  $t$  on all potable water. The WAC is charged in dollars per kilolitre.

If there is reused water and there are differential WACs for reused and potable water then they are given by:

$$WAC_t^R = \frac{FC_t}{k}$$

$$WAC_t = \frac{SC_t + \{(LW_{t-1} - RW_{t-1}/k) \times FC_t\}}{TW_{t-1}}$$

where  $WAC_t^R$  is the WAC charged in year  $t$  for reused water and where  $k$  is initially 1.5.



## 4. Demand Management

The commission has been asked to advise on the value of the WAC as a demand management tool and its impact on consumer behaviour. The commission believes that the WAC on its own has a minimal impact on demand. There are several reasons for this. The WAC as part of the overall price for water is a small percentage of the total price and the proposed increase in the WAC results in small relative increases in the effective price of water. It is generally acknowledged that the level of demand for water is insensitive to changes in the price of water, although there has been some research that suggests a structural change in demand behaviour in certain circumstances.<sup>15</sup>

Currently, the tariff for water has three components; a fixed charge, a charge per kilolitre for the first 175 kilolitres a consumer uses in the year, and a higher charge for each kilolitre above the first 175 kilolitres. This type of tariff structure is called increasing block pricing with a fixed component. The rationale behind increasing-block pricing is that it encourages conservation by penalising high levels of consumption while at the same time assuring consumers have access to a minimal amount of water for basic needs.

The fixed charge is currently \$125 per year, and the per kilolitre charges are 43 cents per kilolitre for the first 175 kilolitres and \$1.05 for each subsequent kilolitre. The WAC is currently 10 cents per kilolitre with an expected rise to 20 cents on 1 January 2004 and with a further 5 cents being added on 1 July 2004. Under the current WAC, the effective price consumers pay for water is 53 cents per kilolitre for the first 175 kilolitres and \$1.15 for each subsequent kilolitre. Thus the 10 cent increase results in a 23 percent increase in effective price for the first step but only a 9.5 percent increase for consumers who will consume more than 175 kilolitres.

If the goal of the WAC is to assist in managing the demand for water, it is important to take into account whether the demand for water is elastic. Elasticity is measured as the ratio of the percentage change in quantity demanded in response to a percentage change in price. If a good or service has an elasticity of  $-1.0$  this implies a 10% increase in price would result in a 10% reduction in the quantity demanded.

Water is a good with relatively low elasticity of demand. A study undertaken by ACTEW indicates that in the ACT the demand elasticity of water is  $-0.22$ .<sup>16</sup> That is, increasing prices by 10% will result in a 2.2% reduction in demand. However, it is useful to think of water consumption in two very broad categories: discretionary, and non-discretionary. The elasticity associated with each category of consumption is likely to differ. Thus, the potential for price to affect consumption of water will relate to the consumption category in which individual consumers find themselves.

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<sup>15</sup> Graham, David, & Scott, Shona. 1997, Price Elasticity and Sustainable Water Prices: Policy Directions: page 10. The report found that the 1994 price reforms had significantly altered the relationship between the price of water and residential consumption, noting that this change 'had typically occurred amongst middle-class households in older, more established suburbs using around 350kl of water per year'.

<sup>16</sup> Ibid, Page 11 (iv) "Price Elasticity Results: Aggregating consumption data across all Canberra Suburbs revealed that the short run price elasticity of demand for water in Canberra is  $-0.22$ .

The conclusion is that a 10 cent (or even 15 cent) increase will have little demand management consequences when taken in isolation. This point is acknowledged by ACTEW in its submission to the inquiry.<sup>17</sup> The commission notes that ACTEW has argued that strong community support and continued price reform will be required if the government's targets for reductions in water consumption are to be achieved. In this regard ACTEW notes that, on the basis of its estimates,

*'the demand response due to continued increases in the overall price of water (including both ACTEW's charges and the WAC) towards the full long run marginal cost of supply will, in combination with decreasing average block-size, increased penetration of internal water saving devices and other demand management strategies, contribute towards the (government's) target reductions in per capita consumption'*<sup>18</sup>

The commission agrees with ACTEW's assessment of a need for a package approach to demand management rather than reliance upon one single mechanism, namely the WAC, as the sole demand management tool. Price increases, when coupled with non-price demand management programs, are more likely to generate synergies that result in greater than expected outcomes. For example, a concerted education and information campaign coupled with discounts or rebates for water saving appliances and a well publicised price increase could result in substantial reductions in household consumption levels.

The commission will be considering in further detail what response it should take when structuring individual water prices as part of the current review of ACTEW's price path for water and sewerage services. The incorporation into that price structure of a block tariff approach which applies a much more aggressive price rise for increases in consumption above certain minimum levels will be one of the issues that the commission will consider as part of that determination.

One option as part of the application of the WAC may be to consider applying the WAC at different rates for different levels of consumption. A rising rate of WAC as consumption levels increase could be argued to provide a more overt pricing signal to consumers of the additional environment and scarcity costs that are being incurred at the margin by the increase in demand. Provided ACTEW recovered only sufficient funds to meet the WAC charge which it pays to the government on the total consumption of water across the territory, it could be argued that this approach represents a more appropriate method for the WAC charge in order to contribute towards the overall demand management task.

However, the commission has some concerns regarding this approach. These concerns are primarily the administrative tasks involved in ensuring that ACTEW does not either over or under recover its WAC payments obligations, and the extent to which an increasing per kilolitre WAC charge would effectively improve the demand management attributes of the WAC over the alternate option of applying the WAC at

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<sup>17</sup> ACTEW op cit page 17

<sup>18</sup> Ibid page 18

a single rate per kilolitre consumed. The issue of the administrative tasks involved in applying a variable WAC rate have been discussed in the previous section. In terms of the likely demand management impact, the commission notes that the relative size of the WAC as is justified by the underlying costs that are incorporated in this charge, and the ACTEW charges for its services is such that there would be very little perceived cost impact at the margin for higher users of water. Rather than seek to address this matter through a WAC charge that is variable over different levels of water consumption, the commission is more inclined to consider this issue in the context of the overall pricing of water by ACTEW.

The commission also notes that there is strong support within the community for greater levels of water reuse. The most popular and readily implementable method that can be adopted by domestic household consumers is the reuse of washing and bathing water. ACTEW has reported that it has undertaken trials of various grey water reuse programs and has developed a water mining irrigation system at Southwell Park and the reticulation of treated water from the Fyshwick treatment plant for irrigation of sports fields in inner northern Canberra.

Perhaps the largest and most successful water reuse program in operation in Canberra is the Lower Molonglo Water Quality Control Centre. This facility returns water to the Murrumbidgee at a very high level of quality for reuse further down stream. Up to 40% of the ACT's gross use of water for consumptive purposes from the Cotter and Googong catchment systems is returned to the river in this way. User charges collected from domestic water consumers by ACTEW currently meet the full cost of the operation of this facility. Thus the cost of this facility, although contributing to water reuse and environmental improvement, is not included in the WAC.

By comparison to the relative cost and efficiency of the Lower Molonglo facility, the cost of the operation of other water reuse programs in use in the ACT such as the water mining projects operated by ACTEW or the private reuse arrangements implemented by individual consumers, is not considered in this report. However, the commission notes that any decision regarding the determination of the size, and application, of the WAC to individual consumers should be structured to encourage efficient and environmentally appropriate reuse programs.

As noted above, it is the commission's view that, in terms of demand management, the WAC needs to be applied in a way that supports other programs and mechanisms designed to encourage a more responsible attitude to the use of water. Should this involve the establishment of government funded programs designed to encourage consumers to reduce their water consumption, there is a strong argument for the inclusion of these costs in the WAC calculation. Such an approach would provide a further price incentive for the take-up of the water conservation programs that the government may adopt.



## 5. Impact of WAC Charges on Consumers

The terms of reference for the inquiry require the commission to consider the impact of the increase in WAC charges on consumers. Those groups of consumers who are normally thought of as facing particular hardship as a consequence of price increases for necessities such as water are lower income households, larger households and recipients of concession payments. Any increase in the price of water will have an impact at some level on this group of consumers. In a number of submissions to the inquiry, including those from the ESCC and the Conservation Council of the South East Region and Canberra, the issue of potential adverse impacts on these consumer groups has been highlighted.

There are also other groups that could potentially be disadvantaged by an increase in the WAC. These include business requiring higher volumes of water such as plant nurseries and golf courses. There is also the potential for an adverse impact on the reuse of water if the application of the WAC and the pricing of water are not compatible with water reuse strategies. Each of these matters needs to be considered in the context of any final decision on the composition, size, and application of the WAC to water pricing.

### Low income and larger households

As discussed in previous sections the WAC forms a small part of the overall price of water and as such has a small impact on the budgets of most water consumers. However, many households may find it difficult to meet the additional expense of the WAC due to their size or income levels. Since the WAC is not included in the concession payments scheme, low-income households do not receive any relief from the increase.

In its issues paper, the commission demonstrated the effects an increase in the WAC would have on different types of households. If the average household consumption of water is 280 kilolitres per year a 10 cent increase in the WAC will result in a \$28 increase in their yearly water bill.<sup>19</sup> A 15 cent increase results in a \$42 increase.

In its submission to the inquiry, ACTEW has provided information on the relative impact of the WAC at the 10 cent and 20 cent per kilolitre level to average bills for different levels of consumption. (Table 5.1). In terms of the present charge of 10 cents per kilolitre, this highlights the point that the WAC as a proportion of the total water bill increases as a proportion as demand increases, rising towards 9.4% of the bill (excluding a WAC charge) under a 10 cent WAC charge, and towards 18.8% under a 20 cent charge. Thus for the average consumption of 280 kilolitres, the additional cost of the move from a 10 cents per kilolitre WAC to 20 cents per kilolitre is \$28 (an 8.3% increase), and this represents in total 18% of the total bill excluding a WAC charge (up from 9% previously).

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<sup>19</sup> This assumes no change in their consumption pattern. Including a 10 cent WAC, the yearly bill for a household consuming 280 kilolitres is \$321. Thus a \$28 increase would result in a less than 10 percent increase in their bill.

**Table 5.1 Household Water Bills under Different WAC Rates<sup>20</sup>**

<b>Consumption kl</b>	<b>2003/04 Bill (excluding WAC charge)</b>	<b>2003/04 Bill with 10c/kl water abstraction charge</b>	<b>2003/04 Bill with 20c/kl water abstraction charge</b>	<b>Nom % portion of bill of 10c/kl water abstraction charge</b>	<b>Nom % portion of bill of 20c/kl water abstraction charge</b>
<b>0</b>	\$125.00	\$125.00	\$125.00	0.0%	0.0%
<b>50</b>	\$146.50	\$151.50	\$156.50	3.4%	6.8%
<b>150</b>	\$189.50	\$204.50	\$219.50	7.9%	15.8%
<b>280</b>	\$310.50	\$338.50	\$366.50	9.0%	18.0%
<b>350</b>	\$384.00	\$419.00	\$454.00	9.1%	18.2%
<b>400</b>	\$436.50	\$476.50	\$516.50	9.2%	18.3%
<b>500</b>	\$541.50	\$591.50	\$641.50	9.2%	18.5%
<b>700</b>	\$751.50	\$821.50	\$861.50	9.3%	18.6%
<b>850</b>	\$909.00	\$994.00	\$1079.00	9.4%	18.7%
<b>1000</b>	\$1066.50	\$1166.50	\$1266.50	9.4%	18.8%

For households consuming around the average level of consumption of 280 kilolitres, an increase of \$28 per annum up to \$42 per annum when the WAC goes to 25 cents per kilolitre from 1 July 2004, may not appear to be very significant. However, there is the potential that the WAC could go to higher levels over time, and that the cumulative impact on low income and large households could become more significant. Even at levels of \$28 to \$42 per year, this represents an additional cost burden for some households who may be unable to adjust their level of consumption.

Examining the size distribution of households in the ACT allows some observations to be made concerning the likely effect on particular groups of households, particularly larger households who might not have any ability to reduce their water consumption. The following table (Table 5.2) shows the size distribution of households in Canberra. While most households are one and two person households, 10 percent of households have 5 or more members and almost 3,000 households have 6 or more. If the average indoor consumption per person were 56 kilolitres per year<sup>21</sup> then a 6 person household would consume 336 kilolitres per year. Larger households would consume even more.

<sup>20</sup> ACTEW op cit page 19

<sup>21</sup> Water Corporation of WA 'Domestic Water use Study in Perth 2002'. Average in-house usage of water

**Table 5.2 Number of Households by Occupancy: ACT**

<b>Number of Persons in Household</b>	<b>Number of Households</b>	<b>Percent of Households</b>
One	25,516	23.1
Two	35,981	32.6
Three	19,176	17.4
Four	18,674	16.9
Five	8,027	7.3
Six or more	2,977	2.7
<b>Total</b>	<b>110,351</b>	<b>100</b>

Source: ABS Census 2001

Households consuming around 336 kilolitres per year under existing water prices would face a 8.3% increase in their water bill as a result of a WAC increase from 10 cents to 20 cents, and then a further 3.9% increase from 1 July 2004. The overall increase from the prices that applied at 10 cents per kilolitre in 2002/03 would be of the order of \$50 per annum for these households, or approximately \$1 per week. This may not represent a particular burden for some households, but represents a cost increase that is almost impossible to avoid if 56 kilolitres of water per household member is regarded as the minimum required to meet normal personal hygiene, cooking and drinking requirements. Clearly for other households this would represent a burden that they could not avoid.

For those households that are dependent on government pensions and similar benefits, the relative impact of an increase in water charges of \$1 per week will be much greater than for non government support dependent families. Based on ABS Household Expenditure Survey data for 1998/99<sup>22</sup> total incomes for households in this government pensions category with one parent and dependent children (adjusted to 2002/03 equivalents) are of the order of \$350 to \$400 per week. These are households that may fall into the category of requiring an extra \$1 per week to meet a WAC increase from 10 cents per kilolitre to 25 per kilolitre. For old aged pension couples whose average weekly household income from pension sources is of the order of \$285 per household, the likely level of non-discretionary consumption will be of the order of 112 kilolitres. At this level of consumption they are facing a potential increase in their water charges of around \$17 per annum or less than 0.1% of their weekly income.<sup>23</sup>

To the extent that these households consume above the basic unavoidable levels of consumption, their WAC charge will increase. Thus the estimates provided above represent an absolute minimum cost increase that can be expected by these families/households. It would be unreasonable to assume however, that their level of consumption of water will be constrained to this bare minimum and that they should

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<sup>22</sup> ABS Household Expenditure Survey, Canberra Cat No. 6530.0

<sup>23</sup> These comparisons are made on the basis of the average weekly household incomes of relevant household groups as reported in the Household Expenditure Survey and adjusted to 2002/03 values. The maximum fortnightly government pension for a couple is currently \$367.50 each, or \$367.50 per week per household for a couple falling into this category.

be expected to exclude themselves from any form of water use beyond that required for basic hygiene, cooking and drinking purposes. Thus, the commission anticipates that the actual additional cost will be higher than the amounts identified above. The extent of any increase however, will be in part at the discretion of the household concerned.

The commission notes that, to the extent that the WAC does not increase significantly beyond the 25 cents per kilolitre currently projected, the additional burden of the WAC charge will not, on average, create undue hardship for consumers in the lower income and larger family categories. The commission also notes that the government has in place funding provisions whereby it is able to meet up to half of the water costs for those families who are concession cardholders. However, the commission is concerned to note that the assistance provided by the government for these families does not extend to the meeting of any part of the WAC charge. Consideration should be given in special circumstances to providing some relieve for certain households and families from the blanket ban on assistance designed to cover water charges. The commission remains to be convinced that all benefit recipients under the current concession arrangements should be entitled to the special concession on the WAC component of the water costs. However, the commission believes that there is merit in the government allowing some discretion in this area. The commission will be recommending that the government give consideration to allowing the ESCC to provide access to some extra concession payment in exceptional cases where warranted. This would only be allowed on a case-by-case basis rather than the blanket concession that is currently applied to all concession cardholders.

## **Non Residential Users**

Unlike other major cities, the ACT does not have many large industrial and commercial water users. ACTEW advises that it has approximately 8800 non residential water customers who consume in total around 16400 megalitres per annum in total. For these users, the proposed increase in the WAC from 10 cents per kilolitre to 25 cents per kilolitre can represent around a 15% increase in their water charges (and up to 30% of their overall water bill exclusive of a WAC charge).<sup>24</sup> For these consumers there may also be limited opportunities for any reduction in consumption, at least in the short term. The government does not necessarily wish to discourage the presence of these businesses in the ACT, particularly if the inclusion of a WAC in the water charge in the ACT represents an additional direct cost in the ACT that is not charged in other locations.

To the extent that the WAC encourages greater diligence in water use and reuse by these types of businesses, and particularly those that use large quantities of water, the WAC has effectively achieved its task. Thus for nurseries, golf courses and similar businesses, the increase in the WAC will provide an incentive for the adoption and use of water saving systems. There will ultimately be a pass through of the WAC costs to consumers of seedlings, flowers and other nursery items or in golf course use

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<sup>24</sup> A Submission from the Murrumbidgee Country Club has highlighted the extent of these extra costs plus the potential inequality with water charges applying to other golf courses

fees. However, there will be strong competitive pressure between the various producers and retailers to minimise the impact of the WAC increase and thereby address the water conservation objectives that the WAC is intended to encourage.

The commission is concerned however, that there may be the potential for inappropriate price signalling by the application of a WAC to reuse water. The potential problem has been highlighted by some of the golf course operators in the ACT and refers to the reuse of water by these and other businesses. It is highly desirable to encourage efficient reuse of water as this helps to delay the need for the construction of new dams or other water supply options such as the Tantangara dam diversion of water into upper Cotter catchment. To the extent that these alternative water capture or supply options are delayed (or indefinitely postponed), there is environmental benefit to the river system and a reduction in the infrastructure costs that the ACT consumer must meet.

The question then arises as to whether the WAC should be applied to the reuse of water and if so, at what level. This has particular relevance to certain business users such as golf courses and potentially other industrial users who may be considering alternative sources of water such as bores or reuse programs. Examples of water reuse programs that are currently in place or are about to be brought on-stream including the Southwell Park water mining project, and the Fyshwick mini sewerage re-treatment program which is designed to provide water for public park irrigation in the inner northern suburbs of Canberra. Water reuse programs are also being actively discussed at individual residential dwelling level, with householders being encouraged to reuse their washing and bathing water for purposes of watering the lawn or gardens. With the continuing threat of severe water restrictions into the foreseeable future, these types of reuse programs will become increasingly popular in the general community.

There is a question as to the relative cost effectiveness of some of these reuse schemes, and whether the further encouragement of these schemes is ultimately to the long-term advantage of the ACT. Currently the ACT has a world-class water treatment facility at Lower Molonglo that returns up to 40% of the water extracted from the Googong and Cotter catchments to the Murrumbidgee. There is a small amount of direct reuse of the water from this facility in the ACT, being a golf course and vineyards in Holt. Further down stream, users of water from the Murrumbidgee benefit from the quality and volume of water that is returned to the river via the Lower Molonglo Treatment Works. From all indications, this facility is relatively more efficient in the treatment of water for reuse purposes than some of the smaller reuse treatment facilities being operated in other parts of Canberra. Thus, there is a question from a purely economic efficiency perspective as to why this facility should not be used to treat water and return it for further use within Canberra. This is an issue that can be more fully explored as part of the commission's review of ACTEW's prices for water reticulation and wastewater management.

The issue for consideration as part of this report is whether or not the current application of the WAC acts to discourage water reuse. The commission notes that there are instances where the WAC is being applied to water that is reused via dams that catch run off on golf courses. Some golf courses are reliant upon the use of potable water, the gathering of the run off from irrigation of these courses, and the reuse of that water. There are also examples of golf courses that have access to water

on which no WAC is charged. Clearly there are issues of equity regarding the application of the WAC, be it on golf courses or be it for domestic households who have access to bore water or water captured from other sources but on which no WAC is charged.

Desirably, the WAC should be applied in such a way as to ensure equity across all users of water in the ACT. Also, desirably, the WAC should be applied in a manner that does not discourage the reuse of water in an economically and environmentally efficient manner. The commission believes that there are good grounds for applying a form of the WAC to reuse water. This will avoid a situation where, because of the reuse and therefore the reduced flow of water below the Lower Molonglo Treatment Works, those consumers using potable water have to pay an additional charge reflecting the reduced water flows from the ACT as a result of the implementation of reuse programs. At the same time, the WAC rate for reuse should reflect the flow costs as described above, but should not include any contribution to the direct catchment management and associated costs. Thus a differential would apply between the WAC applied to potable water that is taken direct through ACTEW's reticulation system, and the WAC that is applied to water that is supplied for reuse purposes. This reuse WAC would be applied to water extracted from dams and similar holding areas on golf courses. Potable water that is used by these businesses would be charged at the standard WAC rate.

For domestic household consumers who may choose to adopt some form of reuse program, no additional WAC should be applied, simply because there is no readily simple and cost effective way of administering such a charge. However, as part of the regular review of the WAC charge, consideration should be given to the impact of these household based reuse programs, and if it appears that they are adding to the overall flow costs of the use of water for consumptive purposes in the ACT, consideration may need to be given to some other form of WAC response.

## 6. Impact on ACTEW

Consideration needs to be given to the likely impact of an increase in the WAC on ACTEW's operations. The commission notes that any increase in the level of the WAC will to a limited extent have a negative impact on the revenue collected by ACTEW to cover its water reticulation and treatment services.<sup>25</sup> Based upon the elasticity of demand estimates previously discussed, an increase in the price for water will result in a small decrease in quantity demanded. The commission provided for this effect when determining the maximum allowable revenue for ACTEW's water business during the previous price direction.<sup>26</sup> ACTEW supported the approach adopted by the commission previously to address the elasticity effect, by making provision in the price path for ACTEW's water and wastewater services rather than addressing it in the WAC.<sup>27</sup> ACTEW has proposed that the commission consider taking into account the effect of future changes in the WAC on ACTEW's revenue requirement during the next regulatory period, should changes to the water abstraction charge occur in that period.<sup>28</sup>

The commission notes that in its previous advice on the WAC, it allowed the WAC cost to pass through in full. It proposes to adopt the same approach in relation to future WAC charges. However, in the course of the next price direction, the commission will consider whether a provision is also needed to allow pass through of the effects of future changes in ACTEW's revenues that result from WAC induced reductions in demand.

In considering an appropriate approach to this issue, the commission is aware that as revenue falls due to reduced consumption, some operating and maintenance costs are also likely to fall. This reduction in costs will reduce the impact of declining demand on ACTEW's underlying profitability. However, much of ACTEW's cost base is comprised of fixed costs such as a return on its fixed asset base and recovery from depreciation of that asset base. These costs will continue into the short term, at least while ACTEW reconfigures its business to meet a lower level of demand.

If the level of consumption and use of water falls markedly, then there is also a follow-on effect in terms of future capital costs. To the extent that these costs are indivisible or unable to be broken down into smaller items of equipment, there may continue to be ongoing capital costs at levels commensurate with higher levels of water demand. Thus, the commission will need to consider an appropriate response to ACTEW's revenue needs in the context of the likely changes in demand and impact upon ACTEW's operating and capital costs in future periods. The commission

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<sup>25</sup> ACTEW acknowledged that the Commission in its Issues Paper had given due regard to this effect. ACTEW, 2003 op cit p.22

<sup>26</sup> Page 59 of the Commission's May 1999 Price Direction for ACTEW's electricity, water and sewerage charges for 1999/2000 to 2003/2004

<sup>27</sup> ACTEW, 2003 p.23

<sup>28</sup> *ibid*

proposes to consider these issues as part of the current review into ACTEW's water and wastewater prices.

The reference directs the commission to consider the likely impact of the WAC on ACTEW's future infrastructure costs. The commission notes that with anticipated small impact on demand for water from the WAC itself, the impact on the future infrastructure costs of ACTEW are likely to be minimal in the short term. The ACT government in consultation with ACTEW and other interested parties is currently considering possible options to ensure the future reliability of the ACT's future water supplies. These options include some significant infrastructure projects costing upwards of \$100 million.<sup>29</sup> For each year that these projects can be delayed as a result of good demand management activities, there is a potential saving to the ACT of over \$5 million in the cost of risk free funds to finance a project of \$100 million in value aside from any recovery of the capital cost over time. As a proportion of the total consumption of water in the ACT, this represents a saving of around 7.5 cents per kilolitre for each \$100 million in infrastructure costs.

The commission notes ACTEW's claim that administrative costs associated with the WAC, in the first period of its application from 1999 to 2004, were absorbed into its operating costs. However, ACTEW have noted that if the WAC were restructured in a way that increased those administrative costs it would seek to recover those costs in the future.<sup>30</sup> To the extent that there may be some additional administrative costs that under previous arrangements would not be recovered as part of ACTEW's regulated price path, the commission would in principle include those administrative costs in the regulated price for water and wastewater services. However, the commission notes that this matter will be dependent upon ACTEW bringing forward arguments and evidence to the effect that there are additional costs which would not otherwise be included in the price path recovery of ACTEW's general operating and capital costs, and those costs are economic, efficient and verifiable.

ACTEW has also raised concerns about the possible limitations on the pass through of the WAC that could arise should the commission decide to apply a side constraint on any increase in water prices under the new price path. The commission acknowledges that the wording of any side constraint arrangements may hinder the intended application of the WAC, and will therefore exclude the WAC pass through from any side constraint arrangements should these be adopted in the price path determination.

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<sup>29</sup> Environment ACT 'Our Water Future, Beyond the Drought and Water Restrictions' Workbook 27 August 2003

<sup>30</sup> *ibid*, p. 12

## 7. Conclusion and Recommendations

In response to the terms of reference issued by the Treasurer, the commission has undertaken an analysis of the issues that impact upon the determination of a WAC and considered submissions from interested parties. This document, its conclusions and recommendations represents a draft report to the ACT government on which the commission now seeks public comment and input. Upon receipt of this comment, the commission will consider its findings and then present final advice to the government.

The following are the draft recommendations of the commission.

### WAC Methodology

- *Principles*

The methodology for determining and applying the WAC should satisfy the following assessment criteria:

- transparency
- flexibility
- legality

In addition, when determining the costs for inclusion in the WAC, the following two tests should be met:

- reasonability test
- measurability test

- *Coverage of the WAC*

The WAC should seek to recover reasonable costs associated with the management and operation of the ACT's water catchment and overall water administration and regulation, plus appropriate environmental costs and the scarcity value of water.

These costs can be broadly termed as:

- *water supply costs*
  - covering the catchment management costs, and all other costs incurred by the ACT government in the maintenance, regulation and assurance of water supply (but excluding costs already recovered by ACTEW as part of their water and wastewater prices)
- *flow costs*
  - being environmental costs and the scarcity value of water

- *Applying the WAC formula*

The WAC should to the extent possible reflect actual costs that are incurred by the ACT government or costs that are reflected in imposts that are borne as a result of the ACT's abstraction of water for consumptive purposes. The objective of the WAC is to recover direct and indirect costs incurred and to provide a price signal which can

contribute to the efficient and environmentally sensitive use of water for consumptive purposes.

The WAC should be determined on an annual basis with any change in the WAC to take effect from 1 July of each year.

Data sources for use in calculating the WAC are:

1. *Water Supply Costs*

- Financial data provided by Environment ACT on the budgeted costs for the following year of managing the Googong and Cotter catchment areas, being those water supply costs within the Department of Urban Services falling within Parks and Conservation
- Financial data provided by Environment ACT/ACT Treasury on the budget cost for the following year for:
  - administration of the ACT's water supplies
  - regulation of the ACT's water supplies
  - funding of water management and demand management programs in the ACT
  - being those water related costs falling within the Department of Urban Services (Wildlife Researching Monitoring, Environment Protection, Canberra Urban Parks and Places) and Department of Treasury, Health, Chief Minister, and Justice and Community Safety

- With the exception of capital costs, all costs will be applied on an annual basis; capital type costs will be apportioned over a three (3) year period.

- Water supply costs will be allocated on a per kilolitre basis using the anticipated demand for water in the ACT in the following year commencing 1 July.

2. *Flow costs*

- Scarcity value of water costs will be estimated using the annual weighted average value of temporary sales of water along the Murrumbidgee River registered by the Water Exchange<sup>31</sup> for the previous two years, with the weighted average water years to be calculated on the basis of two-thirds Year  $t-1$  and one-third Year  $t-2$  where year  $t$  is the year for which the new WAC is to be set
- Environmental costs are to be determined from time to time from information provided by the Murray Darling Basin Commission on the cost of downstream river restitution
  - the value for the 2003/04 year is given as \$2,000.00 per megalitre

Flow costs are to be apportioned to demand for water on the basis of the ratio of water not returned to the system to total water abstracted.

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<sup>31</sup> Refer [www.waterexchange.com.au](http://www.waterexchange.com.au)

- The WAC will be applied on a per kilolitre basis and will apply at the same rate per kilolitre for all consumers.

A WAC should be applied to reuse water when metered, the value of the WAC should include the flow costs but not the water supply costs as defined above. The flow costs should also be adjusted to reflect the environmental benefit of water reuse. This adjustment is reflected in the  $k$  factor in the following formulae.

The calculation of the WAC for any particular year should be based on the following formulae:

Let  $TW_t$  be the total water abstracted in year  $t$  measured in kilolitres.

Let  $LW_t$  be the water not returned to the system in year  $t$  measured in kilolitres.

Let  $RW_t$  be the reused water in year  $t$ .

Let  $SC_t$  be the proposed water supply costs in year  $t$  measured in dollars.

Let  $FC_t$  be the expected flow costs in year  $t$  measured in dollars per kilolitre.

Let  $k$  be the proxy for the environmental benefit for the reuse of water where  $k = 1$  means no environmental benefit and as  $k$  become larger the environmental benefit increases.

The formula uses retrospective use data and prospective costs.

If  $RW_t = 0$  or if reused water is not charged a WAC, then the WAC equals

$$WAC_t = \frac{SC_t + (LW_{t-1} \times FC_t)}{TW_{t-1}}$$

where  $WAC_t$  is the WAC charged in year  $t$  on all water. The WAC is charged in dollars per kilolitre.

If there is reused water and there are differential WACs for reused and potable water then they are given by:

$$WAC_t^R = \frac{FC_t}{k}$$

$$WAC_t = \frac{SC_t + \{(LW_{t-1} - RW_{t-1}/k) \times FC_t\}}{TW_{t-1}}$$

where  $WAC_t^R$  is the WAC charged in year  $t$  for reused water and initially  $k$  is 1.5.

## **Calculation of the WAC for 2003/04**

On the basis of the application of the WAC formula as outlined above, the WAC to apply in the current first half of the year 2003/04 could be as high as 17.5 cents per kilolitre.

Anticipated additional catchment reconstruction costs to be incurred after 1 January 2004 will increase the maximum WAC that could be recovered using this formula to 23 cents per kilolitre

No calculation has been made for a WAC to apply to any metered reuse water.

## **WAC as a Demand Management Tool**

The commission finds that the WAC of itself will not be the main demand management tool for the achievement of the government's Water Strategy. However, the WAC, in conjunction with other programs including education and the structure of prices charged by ACTEW for its water reticulation and wastewater treatment services, will contribute to demand management in the ACT. The commission will consider the demand management aspects of pricing in as much as they relate to ACTEW's charges, as part of its review of ACTEW's price path for water.

The Commission recommends that the WAC should be applied at the same average rate per kilolitre to all consumers to avoid complex administrative supervision and management.

## **Impact upon Consumers**

The Commission notes that the proposed increase in WAC will not represent a significant cost impact for most consumers. However, the Commission is concerned that there will be some households who will suffer some hardship, particularly in situations here they do not have discretion to reduce their consumption of water.

The government should give consideration to extending the present subsidy for water costs provided to concession cardholders to include a subsidy on the WAC element of the water charge. This would only be applied in exceptional circumstances and be administered by the ESCC in consultation with Treasury.

The commission has noted that there is evidence of some inequality in the application of WAC on some sources of water. The full WAC should be paid on all potable water supplied by ACTEW to all customers and to water abstracted from other sources in the ACT. A differential WAC should apply to water that is supplied from metered water reuse programs.

## **Changes in the Relative Value of Water Over Time**

The commission recognises that over time there will be changes in the relative value of water. This will reflect changes in the direct costs that the ACT government will incur or changes in the environmental costs of scarcity value of water. The

commission envisages that the government will review the level of the WAC on a regular basis and possibly annually in recognition of these changing values. The methodology proposed by the commission allows for an annual updating of the WAC.

### **Impact on ACTEW**

The commission notes that the use of the WAC along with other policies as a demand management tool could have an impact upon ACTEW's financial position, particularly in relation to future revenues. The commission will consider argument from ACTEW concerning ways in which the price path currently under review, might be adapted to meet any possible change in demand patterns which could impact on ACTEW's future revenue or costs.

The commission proposes to allow ACTEW to recover appropriate overheads and costs in administering the WAC. However, these costs will be reviewed as part of the current price path review.

The WAC should be treated as a pass through cost by ACTEW. Thus, the commission will ensure that any side constraints that might be applied to the price path for ACTEW's water and wastewater services will not conflict with the full pass through of the WAC.



## **Attachment 1: Reference issued by the ACT Treasurer**

### **Australian Capital Territory Reference to the Independent Competition and Regulatory Commission to investigate water sewerage and trade waste pricing for the period 1 July 2004 to 30 June 2009 and other water related matters**

#### **Disallowable instrument DI2003-70**

made under the

#### ***Independent Competition and Regulatory Commission Act 1997, Section 15 (Nature of industry references) and Section 16 (Terms of industry references) Reference for Investigation Under Section 15***

Pursuant to subsection 15(1) of the Act, I refer to the Independent Competition and Regulatory Commission (the "Commission") the matter of:

1. the provision of advice to the Government on the appropriate methodology for the determination of the water abstraction charge, the appropriate level for the charge, and the impact on consumers; and
2. an investigation into and determination of a price path for regulated water, sewerage and trade waste services provided by ACTEW Corporation.

#### ***Specified Requirements in Relation to Investigation Under Section 16***

Pursuant to subsection 16(1) of the Act, I specify the following requirements in relation to the conduct of the investigation: The investigation is to be conducted in two stages and consider the following matters:

#### **Stage I**

#### ***Specified Requirements in Relation to Investigation Under Section 16(2)(b)***

The Commission should advise on the charge to utility service providers and extractors of water from Territory-owned water resources. Specifically, the Commission should consider and advise on:

- a) The methodology for the calculation of the Water Abstraction Charge on an annual basis, the appropriate components of the charge, including but not limited to catchment management costs, the opportunity cost of water usage, the

- environmental cost of extraction and the current value of water as a resource;
- b) An appropriate level for the Water Abstraction Charge;
- c) The value of the charge as a demand management tool and its impact on consumer behaviour;
- d) The impact of the charge on low income earners and larger households and concession payment requirements;
- e) Consideration of changes in the relative value of water due to environmental change, the costs of maintaining the quality and security of supply of water, drought conditions, flooding etc; and
- f) The impact of the charge on ACTEW Corporation's revenue and expenditure, including future infrastructure costs.

*Specified Requirements in Relation to Investigation Under Section 16(2)(a)*

The Commission should report to Government on Stage I of these terms of reference by 31 August 2003.

## **Stage II**

*Specified Requirements in Relation to Investigation Under Section 16(2)(b)*

The Commission is to review and report on an appropriate costing and pricing methodology and pricing level for regulated water, sewerage and trade waste services for the five -year period 1 July 2004 to 30 June 2009.

As provided under section 20(2), (3) and (4) of the Act, the Commission will have regard to such matters as standards of service, efficiency, appropriate rates of return, the cost of provision of services; the principles of ecologically sustainable development, social impacts, demand management, requirements for maintenance and renewal of infrastructure, the effect of price inflation; and arrangements entered in to by the regulated service provider; and specifically,

- a) Examination of the impact on cost and revenue structures of unmetered properties;
- b) Coverage of services and analysis of which services are contestable;
- c) Consideration of appropriate incentives for ACTEW;
- d) The value of water and sewerage assets in the ACT and appropriate, risk-adjusted, commercial rates of return on capital utilised;
- e) Future capacity requirements;
- f) The impacts on consumers and demand, including disadvantaged consumers, low

- income earners and large households, and the adequacy of concessions for services; and
- g) The impact on ACTEW's Community Service Obligations.

*Specified Requirements in Relation to Investigation Under Section 20B* Reset principles

The Commission is also to consider the principles which should apply to any price reset during the period.

*Specified Requirements in Relation to Investigation Under Section 20C*

The Commission should advise on effective dates of the price direction.

*Specified Requirements in Relation to Investigation Under Section 16(2)(a)*

The Commission should report to Government on Stage II of these terms of reference by 31 March 2004.

Ted Quinlan  
Treasurer  
14 May 2003



## Attachment 2: Glossary and abbreviations

1999 Price Direction	The commission's May 1999 Price Direction for ACTEW's electricity, water and sewerage charges for 1999-2000 to 2003-2004
ACT	Australian Capital Territory
ACTEW	ACTEW Corporation
c/kL	cents per kilolitre
COAG	Council of Australian Governments
Commission, the	Independent Competition and Regulatory Commission
CSO	community service obligation
elasticity	The ration of the percentage change in quantity demanded in response to a percentage change in price for a good or service
ESCC	Essential Services Consumer Council
EWC	Environmental Works Charge
ICRC Act	<i>Independent Competition and Regulatory Commission Act 1997</i>
increasing-block pricing	A tariff structure in which usage is broken into blocks and the tariff per unit increases with each successive block
MDB	Murray-Darling Basin
WAC	Water Abstraction Charge



## **Attachment 3: List of Submissions**

ACTEW Corporation

Property Owners and Ratepayers Association of ACT

Conservation Council of the South East Region and Canberra (Inc)

Murrumbidgee Country Club Inc

ACT Council of Social Services Inc