



Department of
Environment and Conservation (NSW)

Our reference : HOF51287

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Independent Pricing and Review Tribunal
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31 JAN 2004



Dear Mr Cox

Thank you for the opportunity to make a submission to the Independent Pricing and Review Tribunal's inquiry Metropolitan Water Agency Prices.

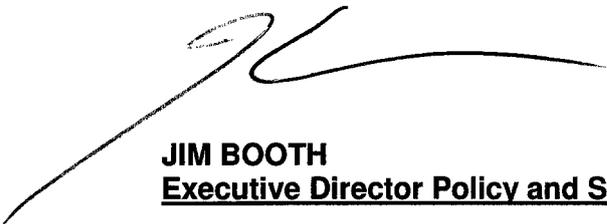
As the principal environmental agency in NSW, the Department of Environment and Conservation (DEC) is concerned with sustainable resource use and protecting the health of the environment. For the purpose of this review, DEC is principally concerned with the effect of pricing and related financial matters on environmental impacts, particularly those associated with resource depletion.

DEC recommends that:

- the full cost of water supply (including delivery, storage, treatment) should include environmental costs and taken into account long run costs of provision; and,
- the pricing determination should support the over-arching framework provided by the Metropolitan Water Plan.

Please see the attached submission for more detail on these and other issues. If you wish to discuss any matters in this submission, I can be contacted on 9995 5768.

Yours sincerely



JIM BOOTH
Executive Director Policy and Science

DEC SUBMISSION TO IPART'S REVIEW OF METROPOLITAN WATER AGENCY PRICES

EXECUTIVE SUMMARY	2
1. INTRODUCTION	4
1.1 DEC'S interest in water prices	4
1.2 Context of the Pricing Review	4
2. WATER PRICING AND THE ENVIRONMENT	7
2.1 Externalities and the role of regulation	7
3. DEC'S PREFERRED APPROACH TO SETTING WATER PRICES	10
3.1 The theoretical basis for price setting.....	10
3.2 Pricing Principles	12
4. IPART'S APPROACH TO PRICE SETTING	14
4.1 SWC's revenue determination.....	14
4.2 Capital expenditure and Demand Management	16
4.3 Incentive Regulation and efficiency gains	16
4.4 SCA's revenue requirement	17
5. DEC CONCERNS – COSTS OF WATER SUPPLY	18
5.1 Service quality standards, performance indicators and asset management.....	18
6. DEC'S CONCERNS – WATER CONSERVATION.....	21
6.1 Response to IPART's Price Structure Investigation	21
6.2 Demand Management Targets	25
6.3 Equity	26
6.4 Demand management in industry, commerce and agriculture	27
7. DEC CONCERNS – REUSE AND RECYCLING.....	28
Appendix 1 DEC response to Centre for International Economics report.....	30

EXECUTIVE SUMMARY

The implementation of appropriate price structures and levels for water services is an important element of the search for sustainable development. DEC's submission recommends that steps be taken towards eventual implementation of efficient water pricing, commencing with a move to usage-based charging and a retail inclining block tariff, consistent with Government decisions on the Metropolitan Water Plan.

Full cost recovery – including environmental costs

DEC submits that the full cost of water supply (including delivery, storage and treatment) should include environmental costs and take into account long run costs of provision. As described further below, DEC also submits that in the medium to long-term, efficient water pricing must recognise the growing imbalance between consumptive demand and sustainable yield from the catchments for water in the metropolitan area.

Pricing determination must be made in the context of Metropolitan Water Plan

This pricing determination should support the over-arching framework provided by the Metropolitan Water Plan (MWP), consistent with the MWP's robust assessment of supply and demand-side measures across the water cycle, while also allowing SWC and private sector participants to pursue cost-effective management and supply augmentation measures over time.

A strong case for pricing reform to promote efficiency

Given the measures under the MWP, the potential for price to reduce consumption is strengthened. DEC encourages IPART to use this opportunity to build on the work already carried out on step pricing to better reflect the constrained nature of Sydney's water supply. Water is not like other commodities for which IPART has a price-setting role, because it is a naturally limited resource.

As such, DEC submits that IPART should take a broad approach and a long-term view by investigating efficient pricing frameworks while this next price determination is running its term.

Price structures for this determination

DEC supports the use of a retail inclining block tariff in the short to medium-term, as discussed by the Tribunal. If IPART chooses to implement a retail inclining block tariff, there should be a clear message provided about the purpose of the tariff and the rationale for the level of the step price and the water usage point at which it commences (eg by relating the step price to a benchmark sustainable yield from the catchments).

DEC submits that water charging should be based on usage as far as possible, to maximise the conservation signal and reward consumers who use water sparingly. By giving water users greater control over their bills, pricing structures with a greater focus on water usage may be fairer and more efficient.

DEC recommends that IPART consider allowing costs of providing treated, recycled water to be recovered through the potable water price where this reduces the cost of environmental impacts of discharges from sewage treatment plants or reduces the need for costly augmentation of water supply or sewage treatment plants.

Equity

DEC is concerned that if pricing reform ignores water scarcity and the long-term cost of water supply, prices will be higher than necessary for all users, including low-income households. While DEC notes that equity considerations can be accommodated through the price structure, a pricing determination that places primary consideration on affordability and equity impacts may forgo opportunities to encourage much-needed behaviour change.

Revenue risk

DEC considers that any increase in revenue due to price rises is not cause for concern *per se*, and should be considered by IPART as a potential funding stream for the demand management fund under the Metropolitan Water Plan.

Recovery of costs for environment protection and water demand management programs

Both Sydney Catchment Authority and Sydney Water Corporation will invest in new infrastructure and programs as the supply and demand management measures presented in the Metropolitan Water Plan are progressively implemented.

Pricing reform will involve integrating the water management effort across the water cycle and responsible agencies, allocating appropriate responsibility and costs. DEC submits that IPART should:

- allow SCA to recover through prices many supply-side options needed to implement environmental flows and other necessary catchment management activities
- require that Sydney Water's recoverable costs relate to measures that influence consumer demand for water and polluting behaviour, where these measures are demonstrated to be the most cost-effective available
- include a risk premium in the retail water tariff to protect Sydney Water Corporation from financial instability
- allow demand management investments to be depreciated over a time frame that reflects the physical life of the investment.

Price determination must be integrated with operating licence requirements

DEC considers that the price determination cannot be considered in isolation from the operating licence reviews for the water agencies. DEC considers that the following points from its submission on Sydney Water Corporation's operating licence review are relevant to the pricing review:

- Sydney Water Corporation's demand forecasts should be subject to regular independent review, assessing consumption forecasts against actual consumption to inform whether the forecasting method is appropriate and robust. (Forecasting should incorporate climate change impacts and the effects of measures implemented as part of the MWP.)
- IPART require SWC to demonstrate annually how capital and operational expenditure relates to the price path allocation for asset management, whether funds were expended as intended, and if additional funds have been used in any reporting year (and the source of those funds).
- Program-specific demand management targets under SWC's operating licence be linked with approved demand management expenditures under the price path review, to assist IPART to assess whether SWC's investment decisions produce efficient outcomes in line with broader Government directives.

1. INTRODUCTION

This submission to IPART's 2005 Review of Metropolitan Water Agency Prices responds to issues raised in IPART's Review of Metropolitan Water Agency Prices Issues paper.

The context of this submission is DEC's obligations as the relevant authority for the (EPA) licences held by Sydney Water Corporation (SWC) under the Protection of the Environment Operations Act. DEC has also more general responsibilities defined in other legislation and contributes to Government decisions that can affect river flows and the environmental impact of the management of our water resources.

Section 1 outlines the background to the 2005 Pricing review. Section 2 discusses the role (or relevance) of water pricing to environmental issues. Section 3 discusses IPART's current approach to setting water prices, how this affects the outcomes of the determination and consequently environmental outcomes. Section 4 responds to specific issues raised in IPART's Issues paper. Sections 5-7 outline DEC's views on costs of water supply, water conservation, and re-use and recycling.

1.1 DEC'S interest in water prices

As the primary environmental regulator in NSW, DEC is concerned that SWC has sufficient funds available to ensure it can meet its environmental obligations. DEC advises IPART on the priority environmental outcomes required for SWC to comply with licence requirements under the *Protection of the Environment Operations Act 1997*. Efficient expenditures incurred by Sydney Water to ensure compliance with these licence requirements should be passed on to water users through prices.

In addition, DEC considers pricing should encourage efficient water use. The Metropolitan Water Plan addresses not only the imbalance between supply and demand for water in the Sydney Basin but also the measures needed to improve the health of the Hawkesbury Nepean river system. "Incorrect" pricing signals increase incentives for over-consumption, continue user demand for inefficient supply augmentation, provide either no or a limited incentive for recycling, and promote over-reliance on high-cost regulation. By using water prices to affect patterns of consumption, significant environmental benefits can be achieved.

DEC's preferred approach is where IPART's pricing determination supports the overarching framework provided by the Metropolitan Water Plan (MWP), ensures a robust assessment of supply and demand-side measures across the water cycle, and facilitates recovery (through water prices) of costs associated with the efficient supply of water.

1.2 Context of the Pricing Review

The 2005 Pricing Review is taking place within a wider Government agenda aimed at ensuring the provision of sustainable water supplies for Sydney. Other processes relating to urban water management in NSW will affect the pricing review. These include:

1.2.1 Metropolitan Water Plan

The Metropolitan Water Plan (MWP) provides the Government's long-term plan for Sydney's water supply and sets out actions over the next 25 years to ensure sustainable water supplies for Sydney and to protect the health of the region's rivers. The plan is being coordinated across Government and:

- responds to the recommendations of the Hawkesbury Nepean River Management Forum including the Forum's recommended environmental flow regimes. The environmental flow regime will be included in the Water Management Licence for SCA and will affect the secure yield available from the storages; and,
- drives demand management and supply augmentation actions across Government agencies and water agencies.

The MWP refers to water pricing reform and discusses the importance of smarter water pricing.¹ However, the implementation of measures under the MWP depends on the ability of the water agencies to earn sufficient revenue through water prices recommended by IPART.

The MWP includes both actions that will be effected immediately (such as accessing deep water in storage dams) as well as actions to set up and support measures into the future (such as the environmental assessment of increased transfers from the Shoalhaven River). Therefore the ongoing costs of the 25 year MWP will involve some uncertainty depending on the difference between the actual and estimated costs of the actions, the actual impact on consumption of proposed demand management measures and the costs of implementing new supply measures over time.

1.2.2 Operating Licence Review

IPART's End of Term Review for SWC and SCA Operating Licences commenced in October 2003 with the release of the first issues paper. This paper addressed the role of the operating licences in managing the agencies' impact on the environment, the need to improve the agencies' asset management practices, streamlining administration and the review of environmental indicators.

A second issues paper (on 'demand/supply' balance), released in January 2004, discussed the role of the operating licences in ensuring a sustainable water balance in Sydney. The timetables for the reviews of operating licences for SWC and SCA were subsequently extended and the new operating licences are expected to take effect from 1 July 2005 (for SWC) and 1 January 2006 (for SCA.)

The impending finalisation of the next Operating Licences for SWC and SCA will improve certainty about the regulatory framework within which they will be operating. The outcomes of the pricing review will significantly contribute to the successful implementation of measures in the MWP, and the ability of the Operating Licences to contribute to a sustainable water balance.

1.2.3 Review of Price Structures to Reduce the Demand for Water in the Sydney Basin

DEC understands that IPART will be using the results of its *Investigation into Price Structures to Reduce Demand for Water in the Sydney Basin* to inform changes to the price structure and levels under the 2005 price review.

As part of the investigation, IPART considered a range of alternative options for the tariff structure, including an inclining-block usage charge (IBT) (with the Tier 2 usage charge applied at both 300kL/pa and 400kL/pa) and a higher usage charge offset by the removal of a fixed access charge. IPART also considered a step price that would apply to water extracted in any year above the estimated safe yield of the catchment.

The final IPART report concluded the following:

¹ The Metropolitan Water Plan, *Meeting the challenges: Securing Sydney's water future*, is available on the NSW Department of Infrastructure and Natural Resources website at <http://www.dipnr.nsw.gov.au/waterplan/index.shtml>.

- the most suitable retail price structure would be an IBT structure, which includes a two-tiered variable usage charge with a relatively lower fixed access charge;
- the introduction of a wholesale step price would not be the most appropriate way to remove the financial incentive on Sydney Water to sell more water, enforce a cap on water extractions or assist with the development of a secondary market in alternative water sources; and,
- the next step towards wholesale water price reform would be to review the balance between the fixed access charge and the variable usage charge and, if possible, set the usage charge with reference to the SCA's long run marginal cost. (The use of LRMC in price reform is further discussed in section 3.1)

In its submission to the IPART investigation, DEC recommended that IPART consider a wholly variable retail charge, in conjunction with a wholesale step price (with the second tier applying for water sold above sustainable yield.) DEC's response to IPART's findings is discussed in section 6.1.

1.2.4 Water Sharing Plans

A Water Sharing Plan, currently being developed by DIPNR, will set out the rules for water sharing between the environment and extractive users in the Sydney catchment, and for determining how much water will be available for extraction in the catchment. The Plan will provide a benchmark for the level of allowable extractions for (urban) use.

1.2.5 Bulk water pricing review

IPART is currently reviewing prices charged by State Water Corporation for the provision of bulk water services for extraction by farmers, industrial users and town water suppliers.

The review may lead to increases in DIPNR's water management costs for these river systems (e.g. developing and implementing plans, monitoring flows / cap etc), which will be imposed on SCA (as its bulk water customer.)

1.2.6 Summary

In summary, water prices have an important role in helping to deliver overarching objectives for sustainable water balance, and ensuring the provision of water services in Sydney over the long term. The pricing review needs to be seen in the context of Government agreed measures for supply augmentation and demand management as well as broader water management reform. Water storage, delivery and transport are inextricably linked to environmental management. Water prices must support the wider government framework protecting the environment and ensuring its capacity to provide water services over the long term.

2. WATER PRICING AND THE ENVIRONMENT

A producer of a good or service would be expected to seek a price to cover the full costs of its supply and to earn a profit. However, because of the essential nature of water services to human welfare and environment health, other factors such as the affordability and the cost of resource management affect how water prices have been determined.

Traditionally water pricing policies have focused on the financial objectives of achieving returns on invested capital and driving efficiency in service delivery. However, water supply is characterised by significant economic costs in addition to the financial costs to water utilities. In order to efficiently allocate water resources, prices should reflect the economic value of water including full costs of extraction, delivery and disposal, as well as the scarcity value and opportunity costs associated with water provision. While it may be difficult to precisely estimate these economic (including environmental) costs, the primary focus on the delivery costs of water supply has meant that water has been underpriced, to the probable detriment of the environment.

DEC has traditionally had an interest in water pricing due to the environmental impact of the water and sewerage system on water quality. Water quality issues arise from discharges from sewage treatment plants and planned overflow points in sewage collection systems as well as unplanned discharges which result from leakage and other system failures. It is now being recognized that the imbalance between supply and demand for water, particularly in the Sydney Basin, also has significant impacts on water quality and environmental health. This will be discussed further in sections 6 and 7.

While it may not be practical for IPART to pass through the full costs of water supply in this pricing determination, it should be the longer-term goal and guiding principle for IPART in this and future pricing determinations. This is consistent with the approach outlined in section 14 of the *Independent Pricing and Regulatory Tribunal Act 1992*.

2.1 Externalities and the role of regulation

Externalities have been defined as the 'costs and values that are not revealed and, hence, not taken fully into account in the production process.'² Externalities can be classified as tangible (where the value can be derived directly or indirectly from prices in the market), or intangible, where no market exists.³ Recovering these external impacts through pricing is one method of signalling the value of externalities to water users and providing them with incentives to change their behaviour.

Regulations can reduce externalities associated with water use but in general it is not economically efficient to eliminate them completely. However, regulations are essential in helping to define duty of care for the environment and establish minimum standards. Pricing may also be used to provide an incentive to deliver more than minimum standards and allows the market to guide the use of water in line with its value and the costs of its provision.

2.1.1 Water supply externalities

Generally, water pollution (as opposed to water flows per se) creates the majority of water [supply] externalities. The externalities associated with the provision of urban water services can be understood based on the stage in the water provision process at which they occur. The current

² CSIRO (2000) *Managing Externalities: Opportunities to Improve Urban Water Use*

³ CSIRO (1999) *Valuing Externalities: A Methodology for Urban Water*

underpricing of water resources [or the shift to full cost pricing] should be addressed with regard for the full costs of water supply corresponding to the entire water delivery chain:

1. *Urban water supply* – interaction with dams, streams, rivers and ecosystems. Examples of upstream supply externalities include both direct impacts at the storage site (particularly the construction of dams) and the corresponding effects that storage has on performance of river and groundwater systems. The irreversible effects of storage and delivery operations on the environment are considerable and therefore should be considered when assessing options for supply augmentation.

These externalities are defined in part by competing demands for water. For example, the diversion of water to an urban supply system means less water and different environmental flow regimes are available to support valuable environmental functions. The external cost generated would amount to the foregone value of the environmental functions that are no longer available because of a lack of water (for example, preventing algal blooms.) Conversely if agricultural water use reduced the amount of water available for environmental flows, the external cost would be the value associated with the loss of ecological functions that this water would have provided.

2. *Interaction with the built environment where water is consumed.* The external impact of water use for residential or commercial purposes depends partly on the full economic costs of its treatment, storage and delivery, as well as the impact this water use has on the immediate environment. For example, reusing wastewater for activities that do not require potable water (e.g. toilet flushing) confers a positive externality (or reduces negative externalities) to the extent that it avoids drawing on additional scarce potable water supplies and permits enhanced environmental flows.
3. *Impact of the return of contaminated wastewater to the environment.* Wastewater return externalities depend on the extent of treatment and the way that water is disposed of. That is, the external impact of disposing of untreated wastewater into a drinking water catchment would be much greater than if the same water was disposed into a less sensitive catchment or marine environment.

2.1.2 Valuation of water supply externalities

The determination of water prices needs to have regard for the competing use values of water. Competing uses for water include urban, agricultural and industrial needs, and water required to maintain river health.

Valuation methods must separate the different water quality requirements for different water uses. This has been done by defining water supply externalities against water quality requirements set by contemporary Water Quality Objectives (WQO). WQOs generally include the following human uses:⁴

- Potability: level of treatment required for water to meeting drinking water quality standards;
- Recreation: safe for immersion sports, non-immersion recreation or not suitable for recreation;
- Fishing: well stocked with fish safe enough to eat, well stocked but unsafe to eat, poorly stocked or cannot support fish.

⁴ WQO can also be classified and valued according to the number of species of biota they support, or by pollutant level targets or chemical and biochemical composition. These are the standard measures of sewage pollution and encompass other chemicals that are important to environmental health.

DEC participated in a Choice Modelling Survey in 2000 that aimed to estimate the environmental values for river regions throughout NSW, using the Georges River as representative of rivers in urban catchments.⁵ Environmental attributes describing health were chosen, and survey respondents' WTP and choices between different combinations of options were ranked and valued.

Whilst this is a limited study it did show values in order of magnitude estimates (rather than definitive valuations) and gave an indication of the sum of the amounts people in households within the urban catchment say they would be prepared to pay to achieve the various environmental improvements offered to them in the survey.⁶

Aggregating household willingness-to-pay values up to catchment level for the Hawkesbury-Nepean could be problematic. However, it can be observed that the NSW Government has committed to spend \$31m to ensure environmental releases that will lead to significant improvements in very similar attributes for the Upper Hawkesbury-Nepean. The Government considers that the environmental releases will lead to an increase in the number of native fish species present, and substantial increases in the lengths of river that are suitable for swimming and navigation⁷. The Government clearly considers that the value of these improvements justifies the proposed expenditure.

⁵ Environmental and Resource Economics (2001) *Valuing the environmental attributes of NSW Rivers: Draft Report* prepared for the NSW Environment Protection Authority

⁶ To estimate the environmental values for river regions throughout NSW, surveys were distributed to households within and outside the catchment area. These surveys provided an understanding of the values held by the immediate catchment community as well as the wider community. The Georges River was chosen, in consultation with river science and policy experts, to represent rivers in urban catchments. Around 6,000 households were sent surveys and around 38% returned usable responses. This response rate compares favourably with other mail surveys of this type indicating strong interest in the community. The sample and response size was sufficient to establish statistically valid results.

⁷ NSW Government, 2004. *Meeting the Challenges: securing Sydney's water future. The Metropolitan Water Plan 2004: a NSW Government initiative*. NSW Government, Sydney.

3. DEC's preferred approach to setting water prices

3.1 The theoretical basis for price setting

IPART's current price setting approach does not appear to take into account the nature of water as a scarce resource.

Water supply is characterised by large, irregular capital expenditures and increasing returns to size. Prices based on the cost of supplying an additional unit of water, or short run marginal cost (SRMC,) will not recover the economic costs of supplying water and will not be commercially viable. Full cost recovery requires water rates to reflect the long run marginal cost (the cost of supplying an additional unit of water including capital costs and the social cost of externalities).

3.1.1 Role of water pricing

The economic role of water pricing requires water rates to capture the scarcity value and to equalize the opportunity costs (the value of water in its next best use) of the resource across uses. Water prices should be determined according to agency supply costs, the external costs of water supply and the scarcity value of water resources.

3.1.2 IPART's current approach to water pricing

Section 14 of the *Independent Pricing and Regulatory Tribunal Act 1992* outlines the price determination methods available to IPART. Section 14 (2) 2 provides that the Tribunal may fix such a price by reference to:

- (a) a general price index (such as the Consumer Price Index), or
- (b) the government agency's economic cost of production, or
- (c) a rate of return on the assets of the government agency.

However, IPART's building block methodology is the main method used by economic regulators in Australia and abroad for determining prices for monopoly services and is uniformly applied by IPART across all commodities for which it has a price setting function. The costs or 'building blocks' of service provision have been outlined by the Council of Australian Governments and include the following categories: operations costs, maintenance and administration costs, provisions for the cost of asset consumption, provisions for the cost of capital, and externalities.

Section 14A(2)(g) also enables IPART to consider for the purpose of price determination:

the need to maintain ecologically sustainable development (within the meaning of section 6 of the *Protection of the Environment Administration Act 1991*) by appropriate pricing policies that take account of all the feasible options available to protect the environment.

DEC is concerned that the building block methodology does not take into account the nature of water as a scarce resource and overlooks consideration of ecologically sustainable development as provided in Section 14A of its Act.

3.1.3 Long Run Marginal Cost

IPART has recently suggested that long run marginal costs (LRMC) should guide price setting.⁸ To date, IPART has not included LRMC in prices for Sydney Water or Sydney Catchment Authority, citing difficulty in its estimation and the potential for 'inefficiency' where revenue is collected based on 'intangible' environmental costs and costs that will be incurred in the future.⁹ DEC supports IPART's recent interest in using LRMC in price setting and DEC would be interested in participating in any further investigation of this issue. IPART's concern that this revenue should not be retained as profit by water agencies is discussed in Section 4.

Economic theory suggests that LRMC should be used over SRMC where the supply system is close to full capacity and new capacity is imminent. LRMC prices have implicit in them a rationing device to ensure that consumers are fully aware of the long run costs of capacity augmentation. Price setting based on long run marginal cost (LRMC) includes both SRMC, environmental and social costs, and costs needed to increase capacity cost in the future.

LRMC is more economically efficient than IPART's current pricing approach, because it:

- provides for the inclusion of the capital costs associated with increasing supply or the cost of demand management programs designed to reduce current water consumption levels in the marginal water price;
- provides an appropriate price signal to consumers that capacity (and therefore water) is scarce;
- avoids large price fluctuations in the short term (given the capital intensive nature of water and sewerage activities and lumpiness of investment); and,
- automatically encourages supply augmentation through increased use of recycled water, reuse, stormwater harvesting.

There are several different definitions of LRMC in dealing with water supply. DEC's submission to IPART's price structure investigation noted that the LRMC needs to be identified for each agency so that it can be incorporated into prices. This will allow LRMC to be aligned with the objective of developing a least-cost strategy for balancing supply and demand across both agencies. DEC supports further work to be done to generate reliable estimates of the LRMC of water for each of the businesses.

The MWP estimates of LRMC are a starting point. The MWP estimated the LRMC of a long-term sustainable water plan using available long-term demand forecasts. It compared various strategies available according to least-cost criteria (qualitative and quantitative) and estimated LRMC as the present value (PV) of the expected extra costs of the optimal strategy divided by the PV of the changes in the supply/demand balance (in terms of additional volumes of water supplied through additional supply schemes and/or saved through additional demand management options). The economic evaluation for the MWP used a least-cost planning methodology, consistent with IPART's requirements under its Act, to determine the order of implementation of measures according to levelised cost and other relevant criteria.

In the future, IPART may have to consider that system constraints define the volume available in the system, therefore price may have to be determined within this (changing) supply constraint.

⁸ IPART (2004) *Investigation into Price Structures to Reduce the Demand for Water in the Sydney Basin: Final Report*.

⁹ IPART (2004) *Investigation into Price Structures to Reduce the Demand for Water in the Sydney Basin: Final Report*. Pp8

3.2 Pricing Principles

The following issues should be incorporated in a consideration of efficient water prices:

- *Full cost recovery, including the incorporation of environmental costs and scarcity values*

In 1994, the Council of Australian Governments (COAG) developed a water reform agenda recommending that all Australian states and territories begin a transition to full cost recovery from water use. COAG recommended the removal of cross subsidies and the separation of water rights from land title. Full cost recovery was defined to include environmental costs and is generally assumed to equate with long run marginal cost.¹⁰

While it is difficult to define the full cost of water supply, DEC considers that it should include the costs of delivery, storage and treatment, and incorporate environmental impacts of providing water and sewerage services, and scarcity values. Inclusion of these costs will allow the community to make better choices between consumption of water and sewerage services and alternatives.

Through discouraging the use of water for low-value purposes, full cost recovery creates more efficient water pricing. This would have automatic flow-on effects for water service providers and consumers. For example, efficient pricing will substantially increase the cost of water leakages to SWC, providing it with a strong incentive to invest in better infrastructure. Similarly, efficient water pricing and increased profitability of water recycling will substantially increase the value of SWC's waste stream so that, rather than considering sewage as a waste, SWC will treat it as a resource.

- *Use of revenue to deliver committed environmental programs*

IPART should ensure that water authorities have adequately budgeted for their environmental commitments over the price determination period. IPART also needs to be satisfied that utilities' management processes are adequate to ensure delivery of these commitments.

SWC will be required to continue to improve the performance of its sewer system. However, as the details of regulatory requirements are not complete, there is necessarily a level of uncertainty regarding these requirements.

DEC encourages IPART to monitor expenditure on environmental programs to ensure priority environmental outcomes are met through agreed expenditure.

- *Water as a naturally-determined resource*

Historically, the response to drought and population growth in Sydney has been to find a new source of water supply. The NSW Government has committed to not building the proposed Welcome Reef Dam because of its environmental impact and community resistance. The construction of a new dam would be extremely costly, environmentally damaging, and may not succeed in view of the effects of climate change.¹¹ This means that there is a very real constraint on water supply in Sydney and consequently, the incremental costs of sustainably providing water services to a growing customer base will increase over time.

While water is a renewable resource, the capacity of SWC and SCA to harvest and store water at any point in time is finite and is a function of existing infrastructure. Water supply is determined by the volume of rainfall and inflows into catchments, which varies significantly according to climate. Water supply can only be increased above the volume supplied naturally through new storages or

¹⁰ The Council of Australian Governments Water Reform Framework (COAG) (1995) 'Guidelines for the Application of Section 3 of the COAG Water Reform Agreement'

¹¹ Final Report to the Expert Water Panel 2004

by using existing supply more intensively, such as through reuse, recycling or stormwater harvesting. Water supply is potentially exhaustible and capacity limitations represent a supply constraint expressed as the sustainable yield of the supply system.¹²

The effects of climate change in Sydney's water catchment appear to be warmer conditions and less rainfall. This means that even when the current drought breaks, the long-term security of Sydney's future water supply will still need to be managed carefully. DEC suggests that in the long-term, IPART will need to consider an approach that determines water prices based on an estimated supply constraint.

- *Encourage alternative sources of supply*

Pricing is probably the most significant incentive for encouraging alternative sources of supply. Alternative sources of supply conserve valuable drinking water resources and can reduce sewage and stormwater pollution through collection, treatment and onsite beneficial reuse of water.

It is extremely difficult to encourage use of alternative sources of supply where the cost of providing recycled water is substantially greater than the price of reticulated potable water.

Efficient water pricing will increase the profitability of water recycling, especially for large-scale users who generally do not require potable water. Pricing options for recycled water are discussed in section 7.

- *Compliance or consistency with broader Government reforms*

The ability of a range of Government water reform processes to achieve their objectives substantially depends on water pricing. Water prices should support the overarching framework provided by the MWP, recognising the MWP's assessment of supply and demand-side measures across the water cycle, while encouraging SWC and private sector participants to pursue cost-effective management and supply augmentation measures over time.

While pricing is only one component of reform, it can improve the effectiveness of other components. For example, efficient water pricing and increased profitability of water recycling will substantially increase the value of Sydney Water's waste stream so that sewage is considered as a resource. For example, sewage discharges could be a valuable resource that could be reclaimed and sold. A similar argument applies to stormwater management, where efficient pricing could encourage Sydney Water and/or councils with stormwater assets to further investigate and implement stormwater harvesting, as is currently being trialled in Adelaide.

The Metropolitan Water Plan details the Government's commitment to release environmental flows for the Upper Nepean river system initially from Avon Dam and then after 2010 progressively from Cataract, Cordeaux and Nepean Dams. A final decision on a flow regime for Warragamba Dam will be made after 2015, with increases in current interim flows from 2009 if there is sufficient water. In order to provide water for population growth and meet this commitment to increase the share of water allocated to the environment, a suite of action has been outlined for supply augmentation and demand management. Pricing reform is necessary to support these actions.

¹² Warner R. (1996) *Water Pricing and the Marginal Cost of Water*. p 14.

4. IPART'S APPROACH TO PRICE SETTING

This section discusses IPART's current approach to setting water prices. It outlines DEC's position with respect to each of the cost components used to determine water prices, and discusses how this approach should be applied given IPART's responsibility to consider environmental, commercial and equity issues.

4.1 SWC's revenue determination

The determination of the revenue required by the regulated businesses using a building block revenue methodology is a critical element of the price setting process. The calculation is based on analysis of the efficient operating and capital costs a business should incur to provide appropriate levels of service during the price path period.

SWC estimates its revenue requirements on an assumed level of demand it must satisfy over the price determination period. SWC's revenue requirement must incorporate the costs of complying with other regulatory instruments, such as its operating licence and discharge standards set by the DEC.

Historically the Tribunal has relied on forecasts of water sales provided by the businesses. This has given SWC significant influence over IPART's price determination through their demand forecasts.¹³ Problems arise if demand is underestimated.

In preparation of this price review, IPART has been considering how to address forecast risk and revenue volatility of the water businesses. This issue is increasingly important given that price structure reform supported in IPART's final report into its recent price structure investigation (i.e. the introduction of a retail IBT) may increase forecast uncertainty. The greater the discrepancy between forecast demand and actual consumption, the greater the difference between agreed revenue requirements and actual revenue.

DEC considers it important that demand forecasts are subject to regular independent review. These reviews should assess actual consumption against consumption forecasts and inform whether the forecasting method is appropriate and robust. Consumption forecasting should incorporate climate change impacts and the effect of measures implemented as part of the MWP.

4.1.1 Sydney Water's proposed revenue adjustment mechanism

SWC's submission to the price review has proposed an annual revenue adjustment mechanism, for a component of any excess/shortfall revenue arising due to differences between forecast and actual consumption.¹⁴ The proposed annual consumption variations would be subject to a tolerance band (of under 10%) before any adjustment mechanism is triggered. Where the tolerance band was not triggered annually, SWC has proposed to carry over any over- or under-recovery for distribution at the end of the regulatory period.

¹³ In the 2003 determination the Tribunal decided to use revised forecasts based on long term historical trends with adjustments for other factors likely to affect underlying demand. For the 2005 determination, the Tribunal's preferred approach is to seek detailed forecasts from the businesses. This is likely to imply that each agency will provide a range of forecast outcomes reflecting different assumptions about the duration of water restrictions. The Tribunal will then employ an independent consultant to review each agency's modelling and forecast assumptions.

¹⁴ Sydney Water (2004) Submission to IPART's Review of Metropolitan Water Agency Prices

DEC understands that IPART is currently considering how to address the potential differences between forecast and actual demand. DEC's primary concern is that price adjustments in subsequent years (where revenue exceeds forecast) do not erode price signals. Under SWC's proposal, if sales go outside the band, the fixed charge is reduced in the subsequent year (increasing the strength of the 'usage' signal).

Where actual revenue is less than forecast revenue (for example, due to water restrictions or effective demand management), actual revenue may fall below the level required for SWC to both cover costs and obtain an adequate return on assets. In these circumstances, IPART should consider mechanisms to compensate SWC for revenues foregone (for example, through rolling demand management investments into the asset base or compensating for demonstrated sales foregone). DEC's submission to the price structure investigation included a recommendation to include in the retail tariff a risk premium to protect SWC from financial instability.¹⁵

4.1.2 Sydney Water's proposed trigger events allowance for cost impacts outside the price path determination

SWC's submission has proposed a 'trigger events allowance' approach to managing the cost impacts of events that occur during the term of the price path but which were not foreseeable during the price path determination. Its submission has outlined the principles that should determine the scope of allowable price adjustments and the process for their application and identified specific trigger events.

DEC supports the principle that IPART should consider a mechanism for SWC to pass through to prices those costs incurred in response to issues that were unforeseeable during the price path determination. However, DEC does not support automatic pass-through of costs but considers that SWC should have to demonstrate a strong case for pass-through. In particular, the potential for pass through should not allow poor planning in the first instance.

SWC has identified "amendments to environmental standards or legislative or regulatory obligations" as a possible trigger event. DEC would only support the inclusion of an environmental standards 'trigger' if SWC were required to demonstrate that either the relevant environmental standards were unforeseeable, or there were acute impacts that were unforeseeable, which warrant immediate correction and which cannot be dealt with through its existing price structure. DEC submits that SWC should be required to demonstrate clearly the effect of the unforeseen costs on its financial position and why an immediate pass-through to prices is necessary rather than alternatives such as internal productivity improvements or consideration through the subsequent price determination.

4.1.3 Excess revenue concerns

IPART has expressed concern that given the low price elasticity of demand, any price increase will flow directly through to revenue (all other things being equal). DEC considers that any increase in revenue due to price rises is not cause for concern per se, and should be considered by IPART as a potential funding stream for the demand management fund (under the MWP).

¹⁵ DEC (2004) *Submission to IPART's Investigation into Price Structures to Reduce the Demand for Water in the Sydney Basin*. A risk premium would also mitigate any risk associated with underestimating the cost of implementing the Sustainable Water Plan.

4.2 Capital expenditure and Demand Management

The asset depreciation framework applied as part of the building block methodology should provide an incentive for SWC (as well as potential private sector participants) to undertake cost competitive demand side projects. IPART includes capital expenditure in the Regulatory Asset Base (RAB) if it is assessed to be prudent (for past expenditure) and efficient (for future expenditure). SWC must earn a commercial return (or return on assets 'ROA') on the RAB, which affects the relative attractiveness of different investment options.

To ensure that the commercial framework supports demand management where it is economically attractive, IPART should allow demand management investments to be depreciated over a time frame that reflects the physical life of the investment. Otherwise SWC will be unable to recover its costs within the life of the asset. (It should be noted, however, that many demand management initiatives are behaviour-based.)

The proposed approach to the treatment of demand management by Electricity Network Service Providers could be used to ensure that SWC is able to appropriately recoup the cost of demand management options. IPART's recent final report on electricity distribution pricing supports equitable treatment of demand management assets by giving special consideration to Distributed Network Service Providers (DNSPs).¹⁶ There may be potential lessons from this experience relevant to water demand management. Further, IPART could consider alternative approaches outlined by Sinclair Knight Merz as part of its analysis on reducing the regulatory barriers to demand management.¹⁷

4.3 Incentive Regulation and efficiency gains

It is generally considered that the strength of the building block approach is its ability to provide an incentive to the business to pursue efficiencies. This is because the business retains the benefits in full (through higher profits) of any efficiency gains during the regulatory period.

4.3.1 IPART's definition of efficiency

DEC has previously expressed concerns about the limitations of requiring efficiency to be demonstrably linked to consumer willingness to pay.¹⁸ Consistent with this approach, IPART only allows SWC to recover the costs of environmental projects that SWC can demonstrate are driven by the need to meet minimum regulatory requirements. As SWC notes in its submission, SWC may commit resources to a project not directly driven by a specific regulatory standard because it believes it is consistent with community's expectations, or because delivering additional standards may be the by-product of undertaking a project assessed as economically beneficial.

If IPART's excess revenue concerns could be managed, IPART may have more flexibility to allow costs above minimum standards (in the short to medium term) to be passed through to prices. Expenditure that caused standards to be exceeded in the short to medium term could be weighted and recovered through prices based on the contribution of this expenditure to ensuring compliance with longer-term standards.

¹⁶ IPART (2004) *NSW Electricity Distribution Pricing 2004/05 to 2008/09. Final Report*

¹⁷ Sinclair Knight Merz (2004) *Reducing Regulatory Barriers to Demand Management: Avoided Distribution Costs and Congestion Pricing for Distribution Networks in NSW*. Prepared for IPART.

¹⁸ DEC (2004) *Submission to IPART's End of Term Review of Sydney Water and Sydney Catchment Authority Operating Licences*. Pp10

4.4 SCA's revenue requirement

The primary function of the Sydney Catchment Authority is to protect the quality of water within the catchment areas in order to provide safe drinking water to people in the Greater Sydney region. Regardless of changes to the tariff structure, SCA's costs are likely to increase during the next price path (and beyond) for the following reasons:

- Bulk water prices are likely to increase as a result of rising costs of managing extraction (aside from any improvement in reflecting resource costs in bulk water prices);
- Implementing environmental flow regimes will involve significant capital and operating expenditures by SCA to allow the release of water from and more efficient use of the dams, and to undertake supply-side measures to accommodate flow volumes;
- The infrastructure base is ageing. Some assets will need to be upgraded or replaced in the near to mid term.

This means that, according to IPART's pricing methodology, the revenue requirement for SCA and the wholesale water price will increase.

5. DEC CONCERNS – COSTS OF WATER SUPPLY

This section discusses pricing review issues in relation to SWC's environmental commitments under the *Protection of the Environment Operations Act 1997* and the role of water pricing to ensure compliance with these commitments over time. It also responds to specific issues raised in IPART's issues paper and SWC's submission to the pricing review.

5.1 Service quality standards, performance indicators and asset management

IPART allows SWC to recover capital and operating expenditure required to meet its Operating Licence and other regulatory requirements, which includes capital expenditure required to comply with EPA licences. DEC regulates the environmental performance of Sydney Water's 27 Sewage Treatment Systems in the Sydney, Blue Mountains and Illawarra regions using Environment Protection Licences issued under the Protection of the Environment Operations Act (POEO Act). DEC sets on-going performance standards and environmental improvement programs for the sewage treatment plant and the sewerage reticulation system in these licences.

DEC's role as a regulator is to set performance based outcomes in its regulatory frameworks, rather than mandating prescriptive works to achieve these outcomes. That is, DEC sets environmental outcomes or benchmarks where possible, and SWC designs and costs the options for meeting those outcomes. DEC is cognisant of overall costs and where the options could be argued to involve unreasonable investment, DEC is willing to negotiate benchmarks and/or timing for achieving benchmarks to some extent (eg the sewer overflow licensing discussions about the wet weather abatement for sewage treatment systems discussed below).

5.1.1 Licensing and sewer overflow requirements (in Sewage Treatment System Licences)

SWC applied for licences in 1994 to legally enable overflows from its sewer reticulation system. DEC subsequently required SWC to prepare EISs to support the licence applications. SWC submitted EISs for each of its 27 systems in 1998. The EISs outlined the system performance levels at 1994, and proposed a 20-year, \$2 billion Sewerfix program to improve the systems to meet targets set in the EISs. DEC was the determining authority for the EISs under the EP&A Act, and issued licences under the POEO Act in 2000, including:

- requirements for no deterioration and continuous improvement of the systems from existing performance levels, using the 1994 EIS data as a benchmark;
- requirements for no water pollution from dry weather overflows, except from specified pumping stations;
- permission for wet weather overflows from specified points;
- requirements for prompt clean-up of overflows;
- pollution reduction programs (PRPs) to:
 - o improve system and water quality modelling and monitoring;
 - o develop operation and maintenance plans for all systems; and
 - o implement an interim program of works and activities over 5 years, namely dry weather upgrades in most systems by June 2004, and wet weather upgrades in the Blue Mountains by June 2005.

DEC is currently negotiating with Sydney Water on the requirements for sewer overflow abatement from 2005 to 2010. DEC's approach is to set outcomes for 2010 that are linear progress toward 2021 EIS targets where possible, so that Sydney Water has more flexibility to select cost effective options to meet the benchmarks. DEC is negotiating requirements for:

- i) dry weather overflow abatement, which focuses abatement on overflows reaching waterways; and,

ii) a wet weather program that requires works in those systems that are currently not achieving linear progress toward the 2021 EIS targets, and further investigation into the options for large engineering and capital intensive works to meet the 2021 EIS targets for larger systems.

DEC is attempting to finalise this regulatory framework as a matter of urgency, to coincide with IPART price determination processes. While DEC is attempting to provide Sydney Water with a regulatory framework that allows it to take cost effective decisions for sewer overflow abatement, DEC is cognisant of previous Government and Sydney Water commitments to a Sewerfix program in the order of \$2 billion over 20 years, or approximately \$100 million per annum. DEC will therefore limit its requirements to an upper threshold of \$100 million per annum. This is consistent with previous allocations by IPART to Sewerfix.

Response to Sydney Water submission

The section below responds to areas in Sydney Water's submission to the pricing review that are relevant to either DEC's submission or DEC's role in regulating SWC.

Drivers for Capital Expenditure

The SWC submission refers to "New Mandatory Standards" requiring additional capital expenditure. DEC does not consider that sewer overflow abatement and the Illawarra Waste Water Strategy (IWWS) are new mandatory standards as sewer overflow abatement is a continuation of existing requirements.

Specifically for the IWWS, the Pollution Reduction Program (PRP) has been in place for nearly a decade, and so is a continuation of existing requirements, and much of the remaining cost is not specifically driven by the PRP.

Sewer Overflow Abatement

SWC has raised concerns about uncertainties in Appendix C of its submission. DEC disagrees with a number of the uncertainties about sewer overflows as listed below:

Uncertainty about costs during the price path for four STSs (Bondi, Cronulla, Malabar and North Head)

DEC has stated in previous correspondence to SWC during 2003/4 that the overflow benchmark would be commensurate with what can be achieved from catchment rehabilitation only.

Uncertainty about long term goals for sewer overflow abatement.

These goals were set out clearly in the EISs for STSs as 2021 expectations.

Appropriateness of setting 2010 targets for the Illawarra system at this stage, where significant capital programs are underway and the outcomes are not yet verifiable.

The DEC/SWC Strategic Liaison Group has agreed that the 2021 EIS goals will be achieved for Bellambi, Port Kembla and Wollongong systems by 2012.

Uncertainty about the practical application of the licence requirement that there be no deterioration in system performance.

The requirement for "no deterioration" has been clearly set out in licences, and was further clarified in a letter dated 2 August 2004.

Uncertainty about DEC's intention to set sewer choke frequency targets and limits from 2010.

DEC's intention to set dry weather overflow limits from 2010 has no inherent uncertainty for the price path to 2009.

Sydney Water's acceptance of the regulatory risk associated with a requirement for zero dry weather overflows from sewage pumping stations.

A requirement for zero dry weather discharges from pumping stations is to be set by DEC on the basis of advice from SWC about what is achievable; and that this can be achieved for sewage pumping stations that have not been upgraded between 2000-2005 using low cost methods such as improving its monitoring and response to these STSs.

The need to address the existing Diamond Bay/Vaucluse outfalls ahead of addressing the longer-term wet weather overflow issues in the Bondi system.

The issues of Diamond Bay/Vaucluse should not be confused with the objectives of the Sewer Overflow Abatement Program. DEC has clarified the position on Diamond Bay/Vaucluse in a letter to SWC Managing Director on 3 December 2004. DEC ultimately expects the elimination of raw sewage discharges at Diamond Bay and Vaucluse. DEC understands that SWC is intending to undertake catchment rehabilitation in the Bondi system from 2005 to 2010 as part of the Sewerfix program, and that this would allow SWC to design and efficiently size further rehabilitation or transfer works to eliminate raw sewage discharges at Diamond Bay and Vaucluse after 2010. DEC considers this to be a reasonable approach that ensures progressive environmental improvement to 2010 and permits a cost-effective solution to be developed for the elimination of raw sewage discharges at Diamond Bay and Vaucluse.

5.1.2 Accountability to committed projects

DEC is concerned that the link between expenditure and efficiency gains is not transparent as it is not clear when SWC has made expenditure on Sewerfix items or other general asset management.

SWC has to detail its expenditure on infrastructure as part of the price review. However, there is no requirement for it to demonstrate or report on the progress of capital projects to which SWC has committed as a condition of price adjustments granted during the IPART Pricing Review. As a result, there is no system to demonstrate that approved capital allocations have been applied for the purpose intended by the Price Path.

To increase transparency, DEC has recommended that the Operating Licence require SWC to demonstrate annually how capital and operational expenditure relates to the price path allocation for asset management, and whether funds were not expended as intended, or if additional funds have been used in any reporting year (and if so, reporting the source of these funds).

6. DEC'S CONCERNS – WATER CONSERVATION

While the review of water prices must consider a wide range of issues, demand/supply balance has recently become an increasingly significant issue for Sydney. Sydney's main water storages can supply 600 Gigalitres (GL) each year over the long term.¹⁹ Over the last several years, water consumption has exceeded the safe yield partly due to dry conditions, the increase in population and increases in per capita consumption. The rising demand for water is expected to continue into the future given population growth and climate change. At the same time, there is a need to make water increasingly available for environmental flows to address declining river health and avoid significant ecological impairment. Over time, climate change is expected to result in increasingly frequent prolonged dry periods and higher temperatures and evaporation rates, thus placing further pressure on water supplies. Extraction in excess of safe yield is possible in the short-run. However, extraction in excess of safe yield is simply borrowing water from increasingly uncertain future water availability.

While the Government's recently developed Metropolitan Water Plan aims to ensure sustainable water supplies over the long-term, the IPART pricing determination has an important role in supporting the implementation of measures under the Plan, and ensuring the shift towards sustainable water balance over time. If water supplied is to remain within the sustainable yield, there is a clear need for pricing to help drive demand management.

This section discusses the role of water pricing as an economic instrument for influencing consumers' demand for water, and how demand management requirements for SWC should be treated in the pricing determination.

6.1 Response to IPART's Price Structure Investigation

The effectiveness of price as a demand management tool is linked to the structure of water tariffs. IPART's investigation assessed a range of tariff structures in terms of their ability to reduce the demand for water in the Sydney Basin. The final IPART report concluded:

- the most suitable retail price structure would be an IBT structure, which includes a two-tiered variable usage charge with a relatively lower fixed access charge;
- the introduction of a wholesale step price would not be the most appropriate way to remove the financial incentive on Sydney Water to sell more water, enforce a cap on water extractions or assist with the development of a secondary market in alternative water sources; and,
- the next step towards wholesale water price reform would be to review the balance between the fixed access charge and the variable usage charge and, if possible, set the usage charge with reference to the SCA's long run marginal cost.

6.1.1 DEC's submission to the price structure investigation

DEC's submission to the investigation recommended that water pricing be supported by an overarching framework based on a:

- clear definition of the supply constraint;²⁰

¹⁹ IPART (2004) *End of Term Review of the Operating Licences for Sydney Water Corporation and the Sydney Catchment Authority: Water Demand and Supply Balance: Issues Paper*. p.13. This figure is based on modelling information provided by the Expert Panel on Environmental Flows at the time of the mid-term review. It is expected to be revised downwards following implementation of the Government's regime to restore environmental flows and other climatic factors.

²⁰ The supply constraint will be defined following the outcomes of the Metropolitan Water Plan and included in Water Sharing Plans developed by DIPNR.

- pricing framework to support sustainable water management; and,
- Sustainable Water Plan (SWP.)

The Government's Metropolitan Water Plan provides actions for a Sustainable Water Plan as it has:

- been developed across agencies;
- identified and evaluated measures to facilitate the shift to sustainable water use. Individual measures have been ranked according to cost-effectiveness, including quantifiable environmental and social costs;
- identified the type of measures for achieving a sustainable water balance that should be attributed to SCA and SWC²¹; and,
- included an implementation program (including an investment path) to ensure that Sydney's demand for water is below the sustainable rate of use.

Second-tier wholesale price

DEC's submission to the price structure investigation recommended the conversion of the wholesale water price to an inclining block tariff, with:

- The first-tier volume set at sustainable yield with the price of the first-tier (including any fixed component) set to recover the SCA's revenue requirement.
- The second-tier price (paid for extractions above sustainable yield) set at a level based on LRMC.²² If SCA could recover its costs via the first-tier price, the second-tier price would act as an effective incentive for SWC to implement demand management. Revenue from the second-tier price would not be retained by SCA but rather be used for investment in additional measures to reduce demand on potable water supplies.

As part of the price structure investigation, IPART commissioned the Centre for International Economics to report on water price restructuring and the role of Sydney's wholesale water price. CIE's final report recommended against the introduction of a second-tier wholesale price. DEC's response to CIE's report is outlined in Appendix 1.

6.1.2 DEC's submission updated

Under IPART's current pricing approach, SWC can pass on to consumers all costs of purchasing water from SCA. DEC has previously recommended that the cost to SWC of purchasing water above the cap should not be recovered through retail prices. The integrated approach proposed here is designed so that only costs that promote sustainable water delivery can be recovered from SCA and SWC. To give effect to this, SWC's revenue requirement should be constrained by the volumetric cap. Only water purchases up to this level should be passed directly into retail prices.

For the purpose of this pricing determination, the framework outlined in DEC's submission to the price structure investigation continues to be DEC's preferred approach to water price structure reform. DEC submits that IPART should consider a price structure that recognizes that water supply is limited and harnesses prices to move water consumption and water supply investment towards a more socially efficient level.

²¹ As the supply function (SCA) was separated from the delivery function in Sydney (SWC,) the LRMC needs to be identified for each agency so it could be incorporated into prices.

²² Setting the retail price based on LRMC is consistent with economic theory. For markets where there is no constraint on natural resource availability, marginal cost water prices may result in revenues that are higher than those required to cover short-term costs, however, there are several policy options that can be implemented to overcome this issue.

Wholesale price: fixed and variable components

The high fixed component of current water prices means that consumers who use water sparingly are not adequately rewarded for their efforts. By giving water users greater control over their bills, pricing structures with a greater focus on water usage may be fairer and more cost reflective.

For example, reducing or removing the fixed charge component and increasing the usage charge rewards users for improving water use efficiency and creates an ongoing incentive to reduce water use where cost effective. While high variable charges may be perceived to put revenue stability at risk, DEC has not seen evidence that this is incontrovertibly the case.

DEC therefore supports increasing the variable component of the wholesale price.

Retail Prices: Inclining Block Tariff

Where a retail inclining block tariff is used to reduce demand, the degree to which the second-tier price affects consumption (and how to set the second tier at the appropriate level) is uncertain.

There is much debate on the measurement and magnitude of price elasticity of residential demand for water. There is general support for the proposition that demand for water is relatively insensitive to price, however there is large variation in estimates of elasticity in the literature.²³ IPART's discussion paper suggests that in Sydney it is in the order of -0.13 , which means that for a price increase of 10%, water demand would fall by 1.3%. It is generally agreed that the variables that affect water demand and thus the determination of price elasticity include climate, water prices, income, household size, lot size, non-price demand management strategies and consumers' understanding of price structures.

To understand the impacts of price reform on demand, it is important to have data that is as detailed, consistent and disaggregated as possible in order to most accurately determine the effect of demand management strategies on water consumption. Greater certainty regarding the price elasticity of demand for water would allow an inclining block tariff structure where it would have the greatest effect on demand. [DEC also notes this analysis of the individual components of water demand (indoor vs outdoor residential, industrial, commerce and agricultural) may not be complete within the timeframe of this price review but encourages IPART to further consider this issue in the longer term].

IPART's recent household survey, which sought to further understand the determinants of water demand in Sydney, found that the distribution of water use within income groups is highly variable and not all high water-using households have high incomes.²⁴ DEC notes that, to the extent that consumers did not change their consumption in response to the second-tier price, excess revenue would be created and further water conservation strategies would still need to be pursued. IPART would have to consider the uncertainty about whether consumers responded to average or marginal cost.

DEC supported the use of an inclining block tariff at the wholesale level in its submission to the demand management inquiry. As this appears unlikely to be adopted, DEC supports the use of a retail inclining block tariff provided that IPART gives a clear message about the purpose of the inclining block tariff and the rationale for the location of the step price (eg by relating the step price to a benchmark sustainable yield from the catchments).

²³ Hewitt and Hanemann (1995) showed that, for a particular data set, a correct theoretical specification of residential demand could change estimates from inelastic to elastic.

²⁴ IPART (2004) *Residential water use in Sydney, the Blue Mountains and Illawarra: Results from the 2003 household survey*. Pp18

6.1.3 Integrated Water Pricing Model

SWC's submission to the price structure investigation discussed replacing the current variable and fixed water charges and the current fixed sewerage charge with:

- one variable usage charge for both water and sewerage; and,
- one fixed charge for both water and sewerage

SWC noted that this would help manage revenue volatility. Because the current sewerage charge is quite high, introducing combined water and sewerage charges would provide much more scope to increase the level of the variable component than other options while still being revenue neutral. SWC argues that this would offer a significant potential to reduce demand, would be easy to implement and administer.

However, this option has considerable limitations. Because of the practical limitations in measuring wastewater discharged to the sewer, SWC would need to base a combined water/sewerage usage charge on metered water usage. Customers who do not discharge to the sewerage system but who consume water would subsidise the cost of treating and transporting other consumers' waste.

A significant proportion of wastewater costs would be recovered through a charge based on the volume of water used. An assumption would need to be made about the proportion of water usage discharged as wastewater by a typical customer. Where this assumption is incorrect, signals will be distorted. This approach is inconsistent with COAG's pricing principles of full cost recovery and elimination of cross subsidies.

DEC therefore does not support these approaches to pricing.

6.1.4 Response to Sydney Water's submission

SWC's submission to the pricing review includes the following recommendations:

- increasing the proportion of monies raised through usage based charges (through an IBT or raising usage component) as long as revenue uncertainty considerations are managed.
- increasing the price per kilolitre from \$1.00 to \$1.40 over the next four years. This would be achieved through a price increase of 7 per cent in real terms in 2005/06 and 3.8 per cent for each of the following three years.
- if an IBT is implemented, the first tier price should be set above current usage prices, particularly in the period before measures intended to restore the supply/demand balance have taken effect.
- to set water prices with regard to the estimated long run marginal costs of water supply. Its preliminary estimates suggest the LRMC is likely to be above current variable charges, by a margin of approximately 40 per cent.

DEC notes in response to Sydney Water Corporation's submission:

- While the MWP represents a good start on the road to efficient water prices, further work is required.
- Efficient prices are required to increase the profitability of water recycling, increase the value of Sydney Water's waste stream (i.e. provide a financial incentive to minimise sewer overflows), increase the cost of water leakages to Sydney Water, increase the capacity of the Hawkesbury-Nepean and Shoalhaven systems to provide environmental flows and help meet the Government's objective of deferring - and perhaps even eliminating - the need for another large scale water storage system for Sydney.
- SWC's suggested price increase to \$1.40 per kilolitre seems to relate only to the base price of the first step in an inclining block tariff (IBT). Further investigation is needed as to the appropriate level of the second step of an IBT.

6.2 Demand Management Targets

The inclusion of a water conservation target in Sydney Water's operating licence since 1995 has led to significant benefits to the community through improved environments and to water consumers through avoided investment in supply augmentation.²⁵ However, while the inclusion of targets has led to per capita reductions, the targets themselves have not been met, and the reductions that have been achieved have not been able to keep pace with the rising demand and population growth.

6.2.1 SWC's Operating Licence

The operating licences include requirements for SWC to manage the effect of its operations on the environment. The review of wholesale and retail water prices must provide SWC with adequate funding to meet these requirements while also giving it the flexibility to achieve these outcomes efficiently over time. The operating licence framework should also ensure the public availability of information concerning the parameters of the water market (such as the costs of water supply, consumption patterns, and asset management strategies.). The availability of accurate and detailed data based on transparent and rigorous public reporting requirements and accountability supports the efficient determination of water prices.

DEC has recommended that per capita demand management targets in SWC's next operating licence be converted to program-specific targets, based on analysis undertaken as part of the MWP.²⁶ SWC should have demand management performance targets in areas where it can influence consumption levels. These areas include leakage, 'Every Drop Counts' (business and residential), and reuse and recycling. These targets should then be aggregated to give a range representing the total amount of demand reductions SWC should be required to achieve over the term of the Operating Licence. This approach to demand management targets provides a rationale for IPART to pass through to prices the efficient costs SWC incurs to comply with demand management requirements outlined in its operating licence.

As part of the Operating Licence review, IPART will decide on appropriate demand management reporting requirements to be included in SWC's operating licence. DEC has recommended that the Operating Licence require Sydney Water to demonstrate that, *within each program target*, it has comprehensively evaluated different investment options and invested in the least cost option where possible. This will facilitate efficient investment decisions and minimize costs (including economic, social and environmental) impacts on the community.

If SWC's Operating Licence links program-specific demand management targets with approved demand management expenditures under the price path review, this will assist IPART to assess (for the purpose of the Pricing Review) whether SWC's investment decisions produce efficient outcomes in line with broader Government directives.

6.2.2 Metering

DEC supports metering and directly billing all households. Due to the need to manage the rising demand for water and evidence of the effect of direct billing on residential consumption, direct billing has significant demand management potential.

²⁵ Montgomery Watson Harza (2002) *Mid-Term Review of Sydney Water's Demand Management Strategy. Final Report to IPART.*

²⁶ DEC (2005) *Submission to the End of Term Review of Sydney Water and Sydney Catchment Authority Operating Licences: Demand and Supply Balance.*

The IPART (2004) survey of Residential Water use found that not paying for water usage is strongly correlated with higher consumption.²⁷ IPART estimated that households not paying separate water usage charges (mostly apartments and Department of Housing properties) use nearly 20% more water than households that do, all other things being equal. IPART's report suggests that, if these households reduced their average water consumption to the average for the rest of the community (all other things being equal), up to 18 GL of water could be saved per annum.

While IPART notes that the reasons behind this difference are not clear, the higher-than-average water use in households that do not receive a water usage bill does indicate opportunities for demand management. Demand reductions could be achieved by installing individual meters in units and passing on water usage charges to tenants, or by installing water efficient devices in tenanted properties. Expanding the degree of water usage charges passed on in rented properties should also be considered.

Given Sydney Water's status as a monopoly water retailer, Sydney Water's billing system is an appropriate way to target (discretionary) residential water use. However, given the obvious costs associated with implementing direct billing across SWC's whole customer base, it may only be cost-effective to introduce direct billing for all new connections. In the case of liability for water usage charges between landlords and tenants, the advantages of directing charges at actual users needs to be weighed against the provision of incentives to landlords to install water efficient appliances. There are also equity questions that must be considered in regard to liability for water charges by tenants.

DEC supports further work to ascertain whether the higher water use in non-billed households is solely due to the lack of a price signal, or whether other factors contribute (such as income, size, number of people.)

6.3 Equity

Given increasing cost pressures facing water utilities, DEC recommends that IPART consider a variety of ways to mitigate the impact of pricing reform on low-income earners, such as complementary programs to retrofit homes. An overly cautious approach to managing affordability impacts (eg relying on the pricing structure alone rather than pursuing an integrated approach whereby complementary retrofit programs address affordability issues) may compromise the objective of promoting least cost planning, demand management and ecologically sustainable development.

Tariff structures that place primary emphasis on affordability and equity impacts may preclude opportunities to encourage much needed behaviour change (eg increased water efficiency.) Over the last decade, the real value of water bills has generally been in decline.

Equity considerations can be accommodated through the price structure. For example, an IBT could include a first-tier price set to ensure essential water needs were provided at an affordable rate to all residential users.

Furthermore, the concern to address short-term price impacts needs to be weighed against the longer-term objective of encouraging optimal investment in supply and demand side options. If pricing reform does not support optimal outcomes, then economic costs and therefore prices will be higher than necessary for all users, including low-income households.

²⁷ IPART (2004) *Residential water use in Sydney, the Blue Mountains and Illawarra: Results from the 2003 household survey.*

6.4 Demand management in industry, commerce and agriculture

DEC considers, on both equity and efficiency grounds, pricing mechanisms or other complementary mechanisms such as cap and trade schemes for water will be needed to reduce water demand and improve water efficiency amongst all user groups (residential, industrial, commercial, agricultural, government and recreational) and support the proposed water management plans under the MWP (eg Waterwise on the Farm).

7. DEC CONCERNS – REUSE AND RECYCLING

Pricing is probably the most significant incentive for increasing the use of recycled water. The role of pricing reform in reducing the demand for water has already been discussed in this submission. The aim of recycled water pricing should be consistent with potable pricing reform by aiming to replace, wherever economically feasible, reticulated potable water with water that is 'fit for use' and thus reduce pressures on additional water supplies.

The potential impact of restructured prices for potable and recycled on reducing potable water use is difficult to quantify. However, the relative prices of different grades of water should not be determined so that efficient non-potable alternatives are financially unviable and therefore remain undeveloped.

While the cost of providing recycled water services is determined by the type of storage, transport and/or level of treatment required, the supply of potable water below the efficient price means that providing recycled water services is invariably financially unviable for a proponent. Recycled water projects are therefore not being pursued or, where they are pursued, must be subsidized by the community (e.g. Rouse Hill).

DEC notes there are several options for recycled water prices available for IPART's consideration.

1. *Set potable price at the efficient price (to achieve balance between supply and demand) and let recycled prices be determined by default*

IPART could allow recycled water prices to be set 'by default' in response to appropriately priced potable water. If prices for potable water are set sufficiently high, there will be a greater incentive in the market to develop water recycling schemes and customers will use recycled water, supporting water conservation or environmental outcomes.

2. *Subsidise recycled water schemes by the potable water price*

IPART could consider setting recycled water prices on a scheme-by-scheme basis so that the use of recycled water would return a net financial return to the operator. Recycled water prices could be set *below* financial costs by cross-subsidising across the total customer base where:

1. the alternatives to potable water use would be less costly than potable water supply in terms of total resource use but are currently under-utilised due to non-financial considerations (e.g. lack of information, underdeveloped market, etc.)
2. there are significant external benefits from encouraging recycling to achieve a socially optimal economic outcome; and/or
3. the future costs of water supply are expected to be higher than the current cost, and it is economically efficient to encourage recycling alternatives that might be more costly than present potable water costs, but are expected to be cheaper than anticipated future costs of potable water.

This approach could be used to: ensure new housing areas were designed based on integrated water management principles; support retrofitting existing residential areas on a large scale where cost-effective; and facilitate cost-effective sewer mining for large scale users.

3. *Use regulation to set an implied water price.*

Recycled water prices can be set by relying on regulation to specify the nature of water services for provision. For example, under the current Building and Sustainability Index Scheme (BASIX), new developments must achieve 40% water efficiency improvements by particular years depending on development type. Recycled water will be provided where developers assess it to be the most cost-effective means of complying with the BASIX requirements. Other regulatory schemes to encourage water recycling may also result in socially efficient economic outcomes.

DEC does not oppose the use of any of these options.

On pure economic efficiency grounds, the potable water price would be set at its efficient level (to achieve balance between supply and demand) and recycled water prices would automatically be set by the market (ie Option 1).

Option 1 is the first best approach to setting the recycled water price over the long-term. However, in practical terms, this is unlikely to occur in the short-term and DEC therefore supports the use of Options 2 and 3, to achieve levels of water reuse and recycling that are appropriate in terms of their social and economic efficiency.

Private sector involvement in the recycled water market: considerations

Recycled water prices should encourage private sector participation where it can provide cost-effective and appropriate delivery of recycling services. The MWP has provided an added impetus for considering third party access to support actions under the Plan. For example, under the proposed Demand Management Fund, funds will be available to enterprises for projects that improve water efficiency. This would effectively act as a subsidy for projects that would otherwise not be commercially viable e.g. effluent reuse schemes. DEC notes that if significant private sector involvement in recycling is to occur, as well as appropriate pricing, streamlined regulatory arrangements and clear standards (eg for third-party access) will be necessary.

STPs, effluent reuse and the potable water price

The rising demand for urban water is placing additional pressures on catchments in the Greater Metropolitan Region. Water use and demand management are important and related components of meeting the environmental obligations of water authorities. As discussed in section 2, water pricing based on integrated water management principles takes into account the interrelationships along the water supply chain, including storage, delivery, treatment, capacity for reuse, and environmental effects of (treated) wastewater discharge.

A scheme-based determination of recycled water prices should consider the potential advantages of using treated effluent for uses not requiring potable water quality, including improving environmental flows and river health.

While the main objective of DEC's regulation of STS licences is to reduce pollution, the current underpricing of water discourages recycling/reuse and contributes towards the costly augmentation of STPs. If SWC could treat and provide recycled water and thereby reduce STP loads and pressures on surrounding catchments, IPART should consider allowing these costs to be recovered (that is, subsidized) through the potable water price.

A reuse/recycling target

DEC has recommended that IPART include a condition in SWC's operating licence requiring SWC to meet a target for reuse and recycling. DEC's submission to the end of term review for SWC's operating licence ('demand/supply balance') notes that the reuse target would need to take into account the scale of potential reuse projects that would have a net economic benefit. This should be informed by an independent assessment of large-scale potential users of treated effluent (which tend to be more cost-effective) as well as the potential benefits of reducing nearby STP loads or providing other environmental benefits.

Appendix 1 DEC response to Centre for International Economics report

As part of IPART's investigation into price structures to reduce the demand for water in the Sydney basin, IPART commissioned the Centre for International Economics (CIE) to report on the role of Sydney's wholesale water price. CIE concluded that proposals to change the structure of the wholesale price of water sold by SCA – by introducing a step price – would not be the most efficient way to ensure a sustainable water balance in Sydney in the long run. The report cited DEC's submission to the price structure investigation.

In response to CIE's report, DEC notes that

- DEC's submission proposed that the second tier wholesale price be based on LRMSC, not that the retail price be set at LRMSC (as CIE report suggests). The costs of consumer-funded programs could be excluded from SWC's LRMSC.

The CIE report notes the risk that if wholesale prices are based on some calculation of LRMC, excess revenue may be raised because the costs are not incurred in the term of the price path.

- LRMC can be averaged out over an agreed time frame. Current consumers should not be paying for future water services but this also needs to be balanced against the risk that avoiding passing through current true costs now may mean future users must compensate for foregone investment opportunities.
- The concern that a 'high' wholesale price may be interpreted as the price at which water can be sold to SWC (resulting in premature and costly supply augmentation by third party providers) is unwarranted.
 - The market for third party providers is immature
 - It would be a business risk decision on the part of third party providers
 - Other measures available to SWC to reduce demand/source alternative supply at lower cost than the LRMC would be accessed before high-cost products from third parties.
 - Third party water provision will sell to or service customers – not necessarily SWC.
 - Regardless, private sector investment (for example, under the proposed DM fund) will be subject to transparent processes requiring it to meet criteria other than marginal cost within the broader water strategy for Sydney.

CIE argued that setting a second tier wholesale price at LRMSC might overstimulate demand management expenditure by SWC.

If the second tier wholesale price is set at the average incremental social cost (of all measures needed to ensure a demand-supply balance), then it is likely to be lower than the LRMC of the next supply augmentation (e.g. desalination) and thus overinvestment is unlikely.

Other comments in response to the CIE report:

- The wholesale water price should be set so that SCA can recovery its LRMC (including costs of meeting environmental flows) from sales up to the sustainable yield (cap.)
- The retail water price should reflect the LRMC of SCA (via water purchases) plus the LRMC of implementing SWC's contribution to a supply-demand balance.
- A second-tier wholesale price should be used to remove the incentive for SWC to sell water in excess of the cap and provide an incentive for SWC to implement water saving measures.
- Otherwise the composition of fixed and usage should be adjusted to signal SWC to invest in demand management/alternative supply projects that are cheaper per kilolitre than the wholesale usage charge; the strength of the signal would depend on the increase in total wholesale water price from implementing environmental flows and how much of the fixed charge was shifted into the usage charge.

If there is no consequence for water sales above the cap, then there is a risk that rising demand for water will continue into the future, imposing higher costs on Sydney in the long term.

The CIE report suggests a 'sales review – price adjustment approach' as an alternative to using a wholesale step price to implement a cap on extractions. Wholesale prices would be set using the current methodology but include SCA's future investment requirements. The fixed component of the retail price would then be adjusted (downwards) to neutralise profits from above cap sales in the current period.

DEC acknowledges the merit of such an approach, however has identified the following potential difficulties with it:

- There is no incentive for SWC to sell above the cap, however there is also no incentive to reduce demand if sales are above the cap, because only the profit from this volume is removed in the subsequent regulatory period and is not spent on DM as per the DEC submission.
- If there are consistent above-cap sales, retail fixed charges could be eroded considerably.
- Reducing retail fixed charges could send a perverse incentive for consumers because bills would be lower at the same level of consumption. Some research indicates that consumers respond to average rather than marginal water price and total bill is also thought to have an impact. Lower retail water prices where there is above-cap demand, is inconsistent with the objectives of pricing for demand management.
- The reduction in the fixed charge may not ultimately impact on SWC's revenue if price increases are needed in the subsequent period to cover costs associated with maintaining its asset base or there are regulatory or management changes.