Submission to

# Inquiry on Urban Water and Wastewater Pricing

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29th April 2005


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# Submission to ERA Inquiry on Urban Water and Wastewater Pricing Comments on the draft Report released on 18th March 2005

The ERA reviewed urban water and wastewater pricing as a result the National Competition Council's finding that the current arrangements lack transparency and do not conform to CoAG principles of full cost recovery and consumption-based pricing. The review considered a number of issues within the mandate of the Authority, which included, in addition to pricing practices, source development planning, the balance between supply augmentation and demand management, customer satisfaction with utility services, and cost recovery.

Our comments are presented in two sections. In the first section we deal with the question of pricing, which cover steps 4, 5, 7 & 8 of the assessment methodology. In general we agree with the ERA's recommendation of the need for tariff rebalancing, but suggest that the potential benefits of tariff rebalancing are underemphasized in the report, and we present some analyses which suggest that tariff rebalancing is a win-win strategy for all stakeholders in the water sector. In the subsequent section we deal with the other issues that were addressed in the review.

## 1. PRICING PRINCIPLES AND OPTIONS

### Tariff rebalancing in urban water pricing

We believe that a rebalancing of current water tariffs is highly desirable as it will encourage greater adoption of water saving consumption habits, thus reducing current demand, whilst also providing the correct signals for long term supply augmentation, including reuse. We suggest that customers may have sufficient flexibility in water consumption that they can minimise potential impacts of tariff rebalancing on their water bills by reducing use, which across the metropolitan area could result in a demand reduction of about 20 GL. This in turn will have wider benefits in terms of deferred capital expenditure, less damage to the environment from building new water sources, and less disruption to regional communities from where water may be sourced. If the cost of additional source development is of the order of $10m per GL, the potential saving from tariff reform could be $200m for the state budget. These savings could be used to fund expenditure on targeted retrofit programs to reduce the impact on certain consumers (as illustrated further below), while at the same time freeing up funds for other public expenditure such as hospitals and schools.

We prefer the ERA's Option 1, which sets all use related charges to long run marginal cost (LRMC), over Option 2, which applies a higher tariff for consumption about 600 kL per household. Pricing above LRMC goes against economic principles and will encourage inefficient investment choices by those affected. In the analysis shown in this section we consider pricing option 1 when comparing against current tariff rebalancing. We have been advised that the Option 2 is aimed at providing for an additional short term price rationing incentive, which might be regarded by many as an equitable price strategy, by way of "penalizing" large users.

*Equity vs. efficiency in price setting*

We agree with the ERA view that the use of price policy to deliver equity goals is inefficient because it distorts incentives for water saving. We also argue that it is impossible to deliver truly equitable welfare transfers using price policy because of the large heterogeneity in demand between households. Since much of the concern over adoption of LRMC pricing is based on "equity" arguments, it is important to emphasize this point, and we offer the following comments:

One of the main justifications for complex increasing block tariff structures is to ensure that all consumers have access to non-discretionary water at a low cost. The provision of the first 150 kL of water at a substantially discounted rate of $0.40 per kilolitre is usually justified on this basis. However, since the major determinant of non-discretionary water demand is the number of individuals per household, the use of a rigid increasing block tariff structure cannot achieve the stated social objective, and instead provides distorted incentives for water savings to different households.

The principle behind increasing block tariffs is illustrated in Figure 1. The demand curve illustrated in this figure shows a relatively inelastic portion (associated with 'non-discretionary' demand) and a more elastic portion (associated with 'discretionary' demand, the water that can be saved by changing water consumption habits). A lower tariff on discretionary consumption could, in principle, provide a net welfare transfer to consumers, making 'water for life' available at a low cost, whilst if the higher block tariff ($P_1$) were set at LRMC it would provide the correct price signal at the margin, resulting in the same resource allocation outcome as long run marginal cost pricing.

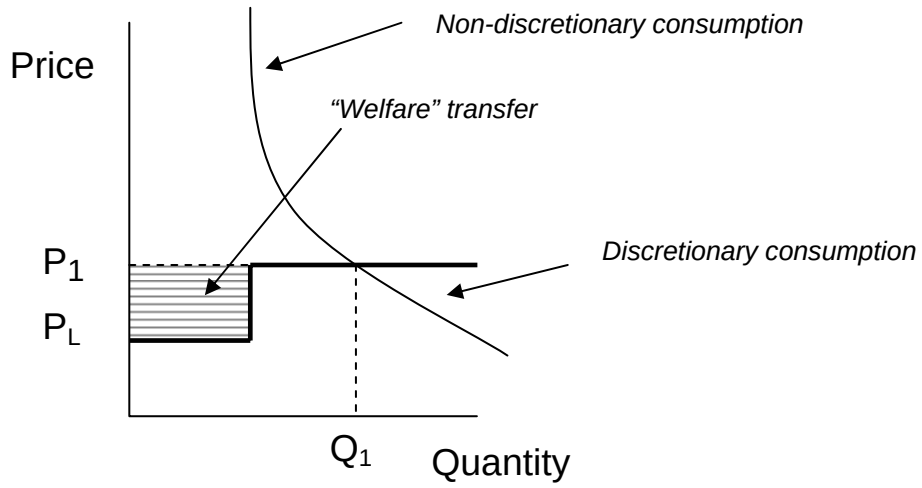



Figure 1: Principle behind increasing block tariffs

There are a number of problems with this principle, which makes it ineffective in practice. Most importantly, household demand for water varies significantly between households, and this means it is impossible to set a tariff schedule that makes welfare transfers for non-discretionary consumption without impacting upon marginal price incentives. Households differ both in non-discretionary requirements (largely dependent on household size) and discretionary requirements, which depend for

example, on dwelling characteristics, lifestyle choices and income. These differences between households usually lead in practice to a more complex tariff structure which attempts to provide discretionary water at low cost whilst also attempting to provide demand management signals at higher levels of consumption. The net effect as shown in Figure 2, is that different households receive different incentives to reduce water consumption, as determined by the intersection of their demand curve with the tariff schedule.

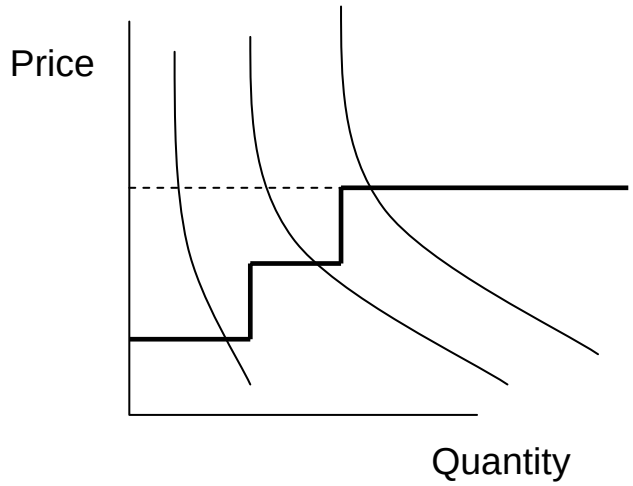



Figure 2: Heterogenous households and increasing block tariffs in practice

*Equity implications of the current tariff arrangements*

The tariff concessions provided to low volume users under the current pricing arrangements require fixed charges in order achieve cost recovery, and these fixed charges actually result in low volume users paying a disproportionate share of water delivery costs. This is demonstrated in Figure 3, where the average price of water is plotted against total household consumption, under current pricing arrangements and the rebalanced tariff (ERA Option 1). The average price of water paid is a good indicator of equity because it reflects the share of costs being paid per unit of consumption. If low levels of consumption indicate 'water for life' consumption, then Figure 3 demonstrates that this is the most expensive water of all.

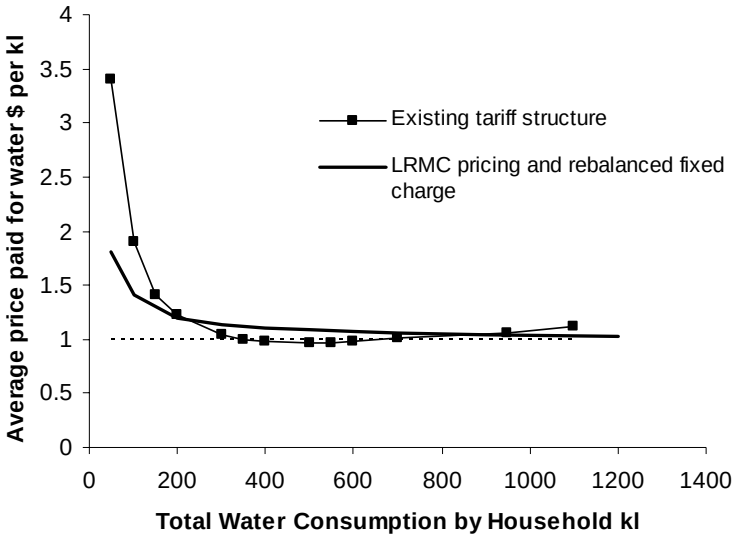



*Figure 3: Average price paid for water under existing and rebalanced tariffs (Option 1)*

Whilst a comparison of average prices is illustrative from the point of view of equity, it is the marginal price that is important from an efficiency perspective. The marginal price is the amount paid per extra unit of consumption, which is the amount of money that the consumer can save by reducing consumption. When a large proportion of cost recovery is achieved through fixed charges, the consumer has less to gain from reducing consumption since the fixed charges are independent of use.

The impact of the Water Corporation's current tariff structure on households' incentive to save water is illustrated in Figure 4. In this figure, the saving in water bill per kilolitre of water saved is illustrated for households with different consumption levels. Moving from left to right, the figure shows the additional incentive to save water, based on a reduced water bill, as the household reduces consumption from its existing level. For each household, the perceived benefit of saving water varies significantly for the first 100 kilolitre saved. Those with relatively high consumption, pay a marginal rate of more than the long run average cost of water, so actually have an incentive to spend more on water saving technologies than the opportunity cost of the water they save. All of the other households represented here receive an incentive to save water that is less than the value of water in society. Households using 250kL currently (which represents average household use) only save 67c per kilolitre of water saved. The ERA reports that 29% of households have consumption less than 150 kilolitres, these users face an opportunity cost of water use of only 40 cents per kilolitre.

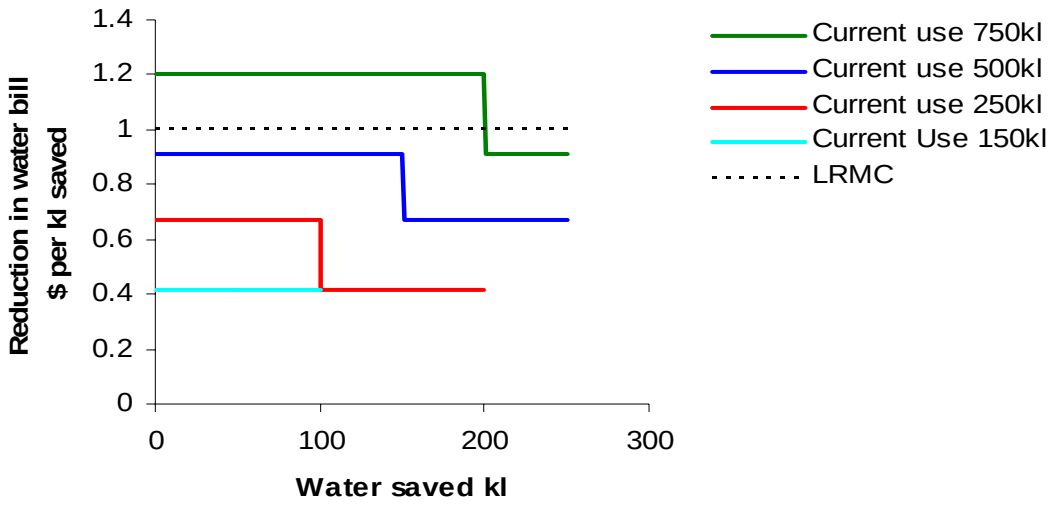



Figure 4: Incentives to saving water under existing Water Corporation tariffs

The potential impact of improved price incentives on water consumption will depend on the extent to which consumers can respond, determined by the elasticity of demand for water. It is generally accepted that demand for non-discretionary water use is very inelastic, whereas by definition, discretionary water use is likely to be more responsive. In a study of Perth consumers, Thomas *et al.* (1983) suggested that the price elasticity of demand was -0.04 for indoor water use, and -0.31 for outdoor water use. These values concur with estimates of demand responsiveness in other studies[1] and can be used to provide an estimate of the potential reduction in water demand associated with a price change. For example, based on an average household consumption of 250 kilolitres, the current marginal price of water is 0.671 cents, and the introduction of long run marginal cost pricing would increase prices by $\frac{1-0.671}{0.671} = 49\%$. The impact on consumption can be calculated by the elasticity formula ($elasticity = \frac{\%\Delta Q}{\%\Delta P}$):

Change in Q = $(-0.04 * 49\% * Q_{indoor}) + (-0.31 * 49\% * Q_{outdoor})$

If half of domestic scheme water is used outside the house, the calculated impact of the price change on demand is 21 kilolitres per household, or 8.6% for the average household.

There are many factors which will affect the responsiveness of individual households to price changes, including current consumption habits, the marginal price paid under the existing tariff structure, income, lifestyle and extent to which water efficient technologies have already been adopted. Whilst more research on the nature of

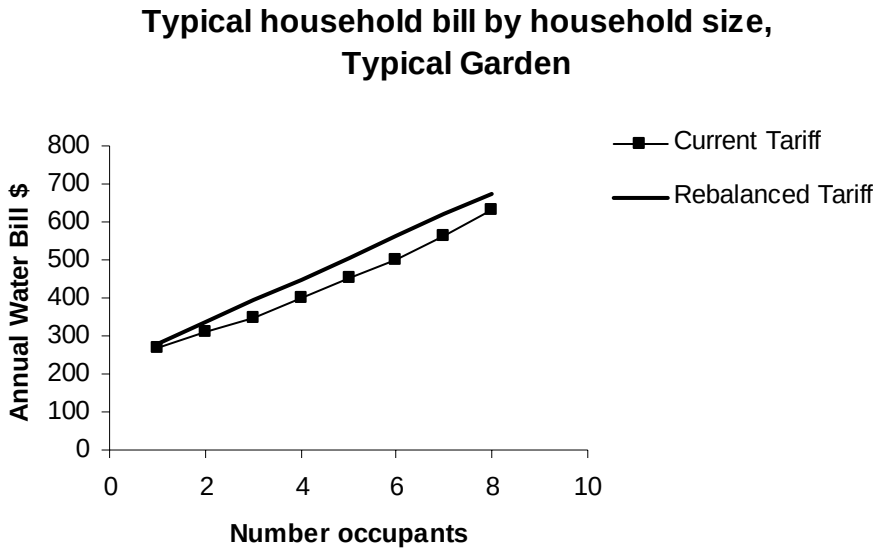
[1] These studies reviewed by NERA (2001) "A review of Melbourne's water tariffs" A report for the Department of Natural Resources and the Environment, Sydney, which quotes the Thomas, Syme and Goselink's (1983) study figures.

consumer demand for water should be undertaken to determine the nature of price response, calculations based on the "average consumers" response indicates a potential saving of the order of 20 GL at the aggregate level.

*Equity issues associated with rebalancing tariffs*

As was demonstrated in the ERA report, a tariff rebalancing will actually make low volume consumers (those consuming 150 kilolitres of less) financially better off. We suggest that their calculations actually underestimate the financial benefits because they do not account for the possibility that consumers will change there consumption habits under the new pricing scenario. Low volume consumers will experience a significant reduction in average prices, but marginal prices will more than double, resulting in financial incentives to reduce consumption.

As was also shown by the ERA analysis, households who currently consume between 250 and 750 kL per annum would receive a larger water bill as a result of the tariff rebalancing under Option 1, but again, this is based on the assumption that they don't make changes to their consumption habits. However, if water saving technologies (or habits) were adopted as a result of improved financial incentives, it is possible that the net impact could be reduced substantially. This is illustrated in the Figure 5, in which water consumption is compared for different household sizes, to illustrate the potential (and incentives) for saving water through adoption of water efficient technologies. The water consumption parameters used to calculate the following graphs are based on Water Corporations "Water Efficiency Calculator"[2], and assuming a standard sized garden, and conventional technology for the base case. The typical household water bill under the current and proposed tariff structure are demonstrated as a function of family size. Clearly, without a change in the consumption habits of the household, the water bill would increase under a rebalanced tariff, for households with a garden. Households without a garden would experience a reduction in their water bill.




[2] http://www.watercorporation.com.au/savingwater/calculator/calculator.asp

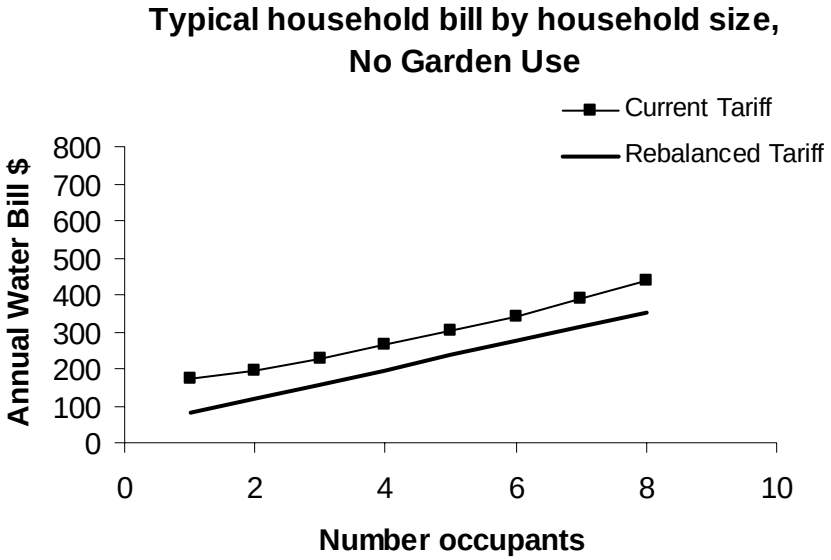



Figure 5: Impact of tariff changes on annual water bill, according to family size

The potential for mitigating hardship imposed by a tariff rebalancing by adopting water saving technologies is demonstrated in Figure 6, where water consumption under water efficient technologies are used to the potential calculate water bill under the rebalanced tariff structure. The range of values shown here illustrates a range of potential technologies from modest (Technology A: water efficient taps, washing machines, showerheads, spray to drip irrigation) to substantial (Technology B: in-house efficient technologies plus a garden bore). These results indicate that even a modest level of technology adoption would reduce total household consumption and consequently the water bill to below the bill paid under the current tariff structure for all levels of consumption, including those consuming between 250 and 750 kL per annum.

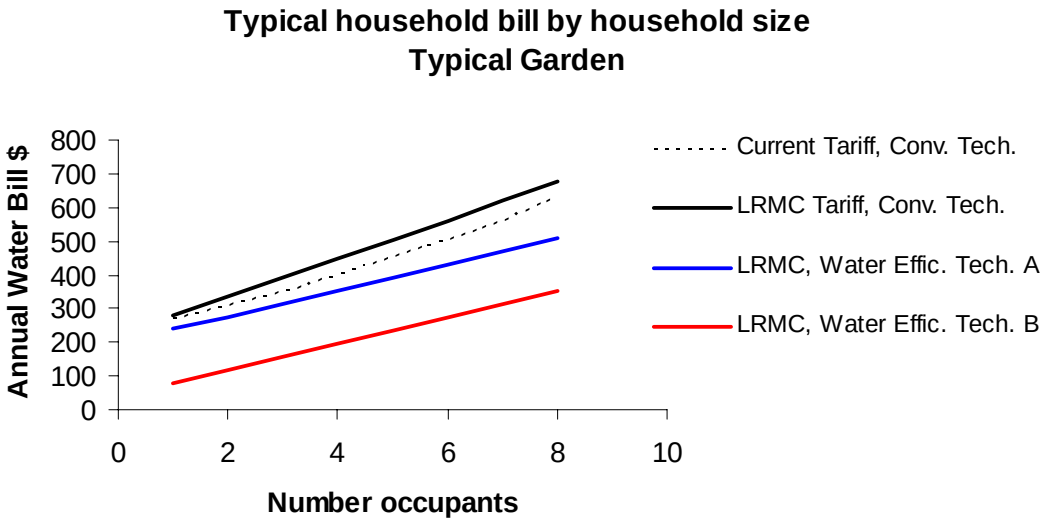
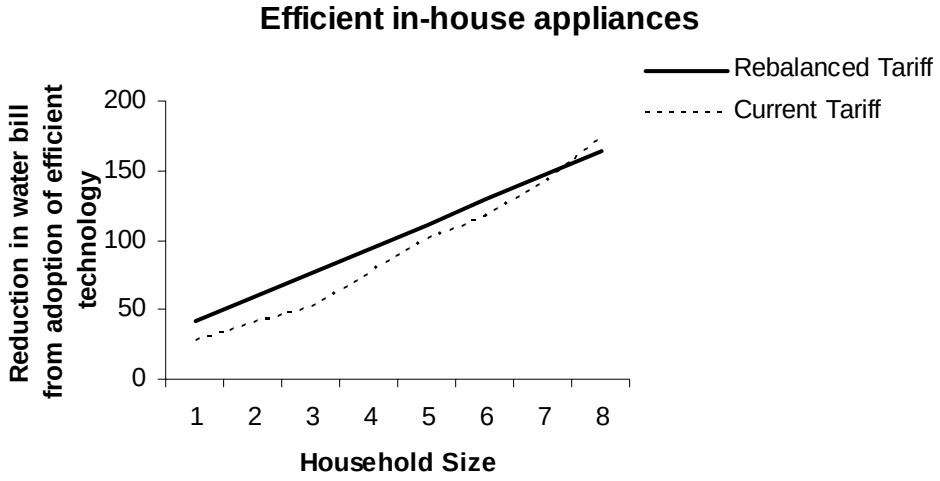



Figure 6: Impact on total water bill of a change in tariff when water efficient technologies are adopted.

Whilst this analysis does not take into account the cost to the householder associated with investing in these alternative technologies, it is clear that the incentive for adoption is significantly changed under the new tariff structure. This is further illustrated in Figure 7, where the total reduction in the water bill associated with adoption of water efficient technology is compared for both tariff structures.

The comparison of water bills under the alternative tariff structures also indicates an opportunity for targeted assistance of those households adversely affected by a change to LRMC pricing. By retrofitting those households with water efficient appliances, they would actually be better off under the new tariff. As long as the introduction of these water efficient technologies is shown to be economic beneficial from a social perspective, subsidies (even gifting) of these appliances would provide an efficient means of providing compensation to those who would otherwise be adversely affected by the change in tariff structure, such as large families. Moreover, even if the cost of installing these devices is greater than the LRMC of water, the efficiency losses associated with a retrofitting program, targeted at a small sector of the community, are likely to be less costly than the efficiency losses associated with the current pricing arrangements which distort all consumers' incentives for water saving. Given the general increased incentive for adopting water saving devices the across the board subsidies that are currently applied could potentially be redirected to fund a targeted subsidy or retrofit program.



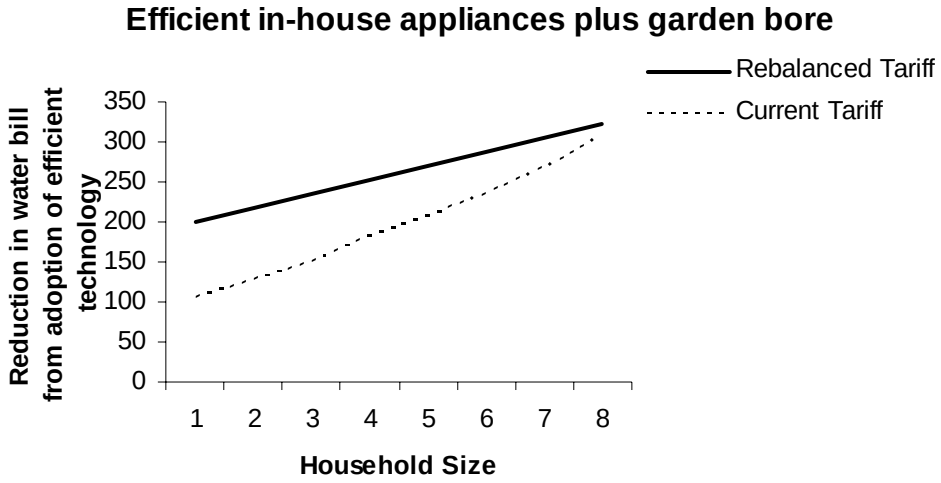



Figure 7: Demonstration of the improved incentive to adopted water efficient appliances as a result of tariff rebalancing

**Pricing of urban wastewater**

The ERA recommended that for wastewater, there may be "some merit" in decoupling charges from property values but distributional issues would need to be addressed. The main justification for moving to uniform property charges appears to be an equity concern. We suggest that the pricing approach used in Melbourne, in which wastewater charges are allocated in proportion to water consumption, may have more merit as it will provide additional incentive for water savings, which will in turn reduce the quantity of wastewater demand on the system. However, given the likely variation in water to wastewater ratios between households, the inaccuracies involved in such a simple pricing strategy could have some efficiency implications which should be investigated.

We also suggest that the distributional implications associated with moving away from the property tax approach are likely to work against the proposed reforms in water pricing. For example, the Authority points out that low-volume users generally coincide with low income households and hence the benefits of water tariff rebalancing (low volume users gain from reduced fixed tariffs) will help to offset the additional wastewater bill from adopting a uniform wastewater charge (which rebalances wastewater charges from the rich to the poor). On the other hand, if low income people (those with lower property values) are the low volume consumers, it could be argued that a use-based charge for wastewater (as proxied by water consumption as practiced in Melbourne) would be more consistent with the current property tax arrangement. Whilst this would need further investigation, it might be the case that the current wastewater pricing arrangement is not as inequitable as it seems.

## 2. OTHER ISSUES ADDRESSED IN THE REVIEW

**Service Levels and Customer Expectations**

We endorse the ERA's conclusion that more work should be done to assess its customer's expectations regarding improvements to unregulated services, and make the following comments.

We suggest that the framework used by the ERA for determining "customer service" is problematic because, unlike the regulation of other utilities, there are public good issues associated with water resources which are not necessarily managed well under the current institutional arrangements, and these issues are outside the control of both the ERA and the regulated utilities. If the customer's expectation is for water source development that is environmentally sound, for example, then the ERA needs to be concerned with the responsibilities of the Department of Environment and the Environmental Protection Authority as well.

Our research indicates that these broader issues are central to customer expectations. We refer to recent research by ARCWIS in Perth and Melbourne as a part of the CSIRO Water for a Healthy Country Flagship program shows that the key variables in the acceptability of a water supply system are trust, risk and fairness [3]. An early part of this research involved identifying measures of the community's preferred outcomes from a water supply system. Despite asking people what they wanted from the water supply system, and suggesting things like a green lawn and neighbourhood, people did not want this kind of itemised shopping list. Rather, they wanted a synoptic picture of the whole system. They do not look at sources and levels of service in isolation. They want to be presented with a 'form of life' or an overall management picture and they want to know that the resources are being managed sustainably. Similar results were found in the study of the South West Yarragadee proposal [4]. Perth people said that under the circumstances which applied, they were prepared to pay more for water and take a total sprinkler ban rather than take the water from the South-west communities. There are considerations other than self interest which come into play, for example, fairness and efficiency, and whether there are substitutable resources such as grey water and storm water. People take all these things into account, that is, they use their reason to adjudicate between various values and costs, when making an overall judgement or a choice. Delivering on all of these outcomes either requires amendments to institutional arrangements or greater planning collaboration between the water utility and its regulator, and the DoE and the EPA.

We note the difficulty in assessing consumer's expectations and share the Authority's concern about valuation methods (p.28) that have been applied to date. The motivations for decisions precede the decision and need to be understood through

[3] Porter, N.B., Leviston, Z., Nancarrow, B.E., Po, M. and Syme, G.J. 2004. *Interpreting Householder Preferences to Evaluate Alternative Future Water Supply Systems: A Preliminary Analysis*. Water for a Healthy Country National Research Flagship CSIRO Land and Water: Perth

[4] Nancarrow, B. E., Kaercher, J., Po, M. and Syme, G.J. (2003) *Social Values and Impact Study: South West Yarragadee Blackwood Groundwater Area. The Results of the South West and Perth Community Surveys. CSIRO Land and Water Consultancy Report,*

modelling *before* willingness to pay type of methodologies such as choice modelling or contingent valuation, or other forms of trade off analysis are undertaken, or at least in parallel. Often trade-off judgements as represented in dollar terms so that they can be interpreted within an economic framework. It has been shown however that much of the variability in contingent valuation responses is motivated by essentially non economic variables such as trust, altruism or fairness considerations[5] [6]. The representation therefore of the willingness to pay figures in benefit cost calculations is prone to many discussions about validity. While the currently popular choice modelling may seem to be less vulnerable to such conjecture, it is not. Cost can be seen as one dimension in a trade-off judgement. However, levels of service, fairness of policy, and the payment vehicle may be others. Presenting the outcome of such trade-offs in the base dimension of cost has inherently the same problems as the contingent valuation methodology unless parallel modelling of motivations is undertaken. This is not to say that such survey techniques are not useful, but does indicate that high standards of validity and reliability in measurement are required.

The most recent independent survey [7] of consumers' opinions of their water service providers revealed that residential consumers valued availability of future resources (88% said 'very important'), and water quality (83%), reliability of supply (83%) and encouraging conservation of water (81%). For commercial consumers the most important were reliability of supply and availability of resources both at 82%. With regard to the cost of water, 51% of residential consumers (41% of commercial) said cost of water was 'very important'. This underscores the need for the utility to understand the relationship between price levels, provision of social water benefits for urban communities and acceptable levels of water efficiency and service within the urban community. This is a multifaceted question which requires investigations that provide excellence in the state's requirement of sustainability assessment.

## On the Strategy to Balance Supply and Demand

*Demand forecasting*

The ERA note some concern over the demand projections offered by the Water Corporation may be optimistic if they plan to remove current water restrictions. We share the ERA's concern that a lifting of restrictions will increase consumption, if there no other demand management strategies substituted for the current water restrictions. However, as our calculations have indicated, the tariff rebalancing proposed by the ERA may have an impact that is about the same order of magnitude as the current restrictions (the reduction in annual per capita demand from 175 to 155 kL per capita as a result of restrictions represents an 8% reduction in demand).

*Available sources of water*

[5] Jorgensen, B. S. and Syme, G.J., (1995) Market models, protest bids, and outliers in contingent valuation. *Journal of Water Resources Planning and Management, 121,* 400-401

[6] Jorgensen, B. S. and Syme, G.J., (2000) Protest responses and willingness to pay: Attitude toward paying for stormwater pollution abatement. *Ecological Economics, 14(1),* 131-150.

[7] Office of Water Regulation (2004) *Report on the 2003 Water and Sewerage Customer Satisfaction Survey,* Patterson Market Research

In terms of efficiency in allocation, there is clearly an imbalance in the current allocation of water between sectors. We suggest that the actual opportunities for trading with Harvey Water have been masked by the details regarding the recent trade, whereby water was sourced from reduced system losses that were achieved by investing in infrastructure to reduce these losses. The cost of this water purchase was reportedly around $0.60 per kL. In contrast, the price paid by irrigators within the South West Irrigation Scheme[8] is $0.04 per kL, which represents a lower limit on the value of water used in irrigation. The upper limit is defined by the productivity of the water as a factor of production, which in the case of irrigated pastures, the predominant use for water in the scheme, is likely to be less than $0.10 per kL[9].

We support the ERA's comments regarding the need to address these allocation imbalances (and we suggest that it should be completed before the current bulk water agreement between the government and Harvey Water expires in 2006) we note that there are issues that would need to be properly addressed in a review of current market arrangements. These include:

- There may be limitations on the tradability of water between the rural and urban sectors because of quality implications. Only three dams in the south west currently contain water of sufficient quality for drinking – Samson, Logue Brook and Stirling. Wellington Dam water could be used in future if salinity and other water quality problems can be addressed, and recreational use is controlled. Annual water flow into the Wellington Reservoir is about 60% of the combined flow of all other Water Corporation Dams and it represents a substantial water source if it can be recovered.
- Whilst there is a legal framework for trade between Harvey Water and the Water Corporation (as evidenced by recent transactions), the co-operative's Articles of Association do not allow any farmer to trade their water entitlement with an outside party unless this trade is approved by the co-operative. This legal structure was set up to avoid the problem of stranded assets that arises when irrigators sell outside the delivery infrastructure. It is likely that if farmers were given the option of selling water outside the cooperative they would choose to do so, given the low returns available to irrigated pasture production which is the dominant water use in the South West Irrigation Scheme. Investigation of the stranded assets problem and the opportunities for rationalising the delivery infrastructure, and developing more flexible policies for dealing with the stranded assets problem (such as exit taxes, as practiced by some irrigation districts in the lower Murray system) might assist in facilitating trade by willing parties whilst protecting those who wish to remain in agriculture.

- There are a number of social issues regarding water trading that will also need to be addressed, particularly with regard to the impact on rural communities from where net water sales occur. Numerous surveys (see [10] [11] [12] [13]) show that water

[8] Here we refer to a use charge of $22 per ML plus the annual entitlement charge of $20 per ML. In fact the marginal rate is thus only $0.02 per kL.

[9] Based on a study of pasture productivity and gross margins to dairy production from Brennan, D. (2004) 'Current and future demand for irrigation water in Western Australia', Report to the Department of Agriculture.

[10] Nancarrow, B.E., McCreddin, J.A. and Syme, G.J. (1998) Developing Fair Processes for the Re-Allocation of Groundwater for Long term Sustainability in the Namoi Valley. A report to the

trading is acceptable to people only after community values are reflected in setting the basis for trade which underpin the rules of the market. For example, the Owens Valley in California was once a thriving farming community and rural valley ecosystem. The water rights were purchased and the water was exported to the City of Los Angeles. Whilst the transfer allowed water to move to the highest value use, the farming community collapsed and cultural, social and ecosystem values were lost because their local significance was not recognised[14].

- These third party considerations will need to be taken into account, but at the same time, the rights of individual entitlement holders to sell water needs to be considered. The opportunity to sell water rights provides an opportunity for structural adjustment in an industry that has been undergoing particular hardship as a result of recent dairy market deregulation.

**On the Source Development Plan**

The ERA provides an analysis of the desalination plant that demonstrates the trade-off between reliability of supply and development cost. We agree that a longer term strategy of supply augmentation and demand management might have obviated the need for the desalination plant, but also point out that there are a number of constraints and uncertainties, some of which are outside the control of the Water Corporation, which have contributed to the current situation. Greater certainty and transparency in water resource management, and improved mechanisms to promote efficient water allocation and water source development decisions, are required. For example:

- Uncertainties in investment affect the attractiveness of alternative source developments. For example, even had there had been no delays in gaining environmental approval for the South West Yarragadee, the Water Corporation faces uncertainty regarding the sustainable yield of the aquifer and whether the resource is able to supply the required quantity and quality of water for a period that is long enough to pay back the substantial investment in wells, treatment plants, pumps and piping. They have recent experience where a major investment in wells in the Gnangara Mound have become stranded assets as environmental restrictions have resulted in wells being closed.
- The analysis presented by the Authority implies that the justification for the desalination plant was based on supply buffer considerations, and delay in

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Department of Land and Water Conservation, NSW. CSIRO Land and Water Consultancy Report No 98-40

[11] Nancarrow, B.E. (1999) Towards Groundwater Sustainability in the Northern Adelaide Plains: Perceptions of Fair Management and Re-allocation Options. CSIRO Land and Water Consultancy Report No. 99-73

[12] Nancarrow, B.E. and Syme, G.J. (2000) Towards Groundwater Sustainability in the Lower Gwydir Valley. Perceptions of Fair Management and Re-Allocation Options. CSIRO Land and Water Consultancy Report No. 9/00

[13] Nancarrow, B.E. and Syme, G.J.(2001) Challenges in Implementing Justice Research in the Allocation of Natural Resources. *Social Justice Research*, 14(4), 453-457

[14] Moss, Jack, Wolf G., Gladden G., and Gutierrez E., 2003 *Valuing Water for Better Governance: How to Promote Dialogue to Balance Social, Environmental and Economic Values*, www.pacinst.org/publications/ accessed 26/4/2005

obtaining environmental approval for the SW Yarragadee source (p3). However, one of the other justifications was that current extraction on the Gnangara Mound is unsustainable. Concern over climate change and the development of a water source which is independent of seasonal rainfall were an additional consideration.

**On Water Restrictions for Demand Management**

We agree that further investigation on consumer acceptance of water restrictions/willingness to pay for reliability will assist in planning both short term demand management strategies as well as allowing for better long term investment planning. The added uncertainties in Western Australia regarding climate change and its potential impact on the annual system yield mean that more emphasis on the question of reliability (and investment for mitigating supply risk) is required more than ever before.

We also suggest that investigation of institutional innovations that might reduce the short term cost of adverse seasonal conditions should be undertaken. An alternative to short term rationing via water restrictions is the use of temporary supply augmentation measures such as opportunistic water trading with other water users (such as irrigators and South West water utilities) and these strategies, along with supply system risks, should be examined together when considering the cost of investing in long term supply augmentation.

There is some evidence to suggest that people support water restrictions as a means of conserving water (e.g. Nancarrow *et. al.* 2000 [15]). Furthermore, the research shows that the more people have an experience of restrictions, increasing in severity, the more they are willing to support them on a permanent basis, as long as they stop short of a total sprinkler ban, which would cause a significant loss in terms of the garden asset and associated lifestyle benefits. There clearly is a need to take these kinds of findings into account in pricing determinations in order to get a solution which matches local expectations.

**On Rebates for Demand Management**

As the ERA point out that most analyses of the rebate program to date have focused on the cost to the government (rather than the full social cost including the cost to the customer) when analysing rebate expenditure. Their calculations suggest that in house appliances are cost effective but they question outside rebates such as bores and rainwater tanks. We support the suggestion that further investigation be done on the rebate program, but consider that the analysis of the large outdoor technologies present in the review was overly simplistic. The economics of adopting the larger outside appliances will depend on the volume of use, which varies between households, and consumer preferences for taste (in the case of rainwater) and supply

[15] Nancarrow, B.E., Kaercher, J.D.and Po, M. (2002) Community Attitudes to Water Restrictions Policies and Alternative Sources. A Longitudinal Analysis, 1988-2000. CSIRO Land and Water Consultancy Report.

reliability (in the case of bore water). The consumer will compare these additional values against the cost (and characteristics) of the scheme water alternative.

We also note that since a tariff rebalancing will increase the incentive for adoption of these 'substitution' technologies because it makes scheme water more expensive (per unit of consumption), there will be a need to consider broader impacts of these technologies (and strategies for managing these impacts) on overall hydrological balance. Rainwater tanks reduce aquifer recharge under the urban area; and increased pumping by unlicensed backyard bores may not be sustainable in some cases without effective management.

**On the Efficient Revenue Requirement**

Comments made by the ERA regarding the cost of water supply and treatment, particularly with regard to comparisons with Eastern States systems, may not be well advised. For example, on page 28 (and elsewhere) the report indicates that groundwater requires less treatment (and is therefore cheaper to supply) than does surface water sources, and goes on to states that the low cost of treatment of groundwater relative to surface waters may be a reason for the Corporation's operating cost per serviced property being lower than elsewhere in Australia. Groundwater containing iron and other contaminants can require substantially more treatment than stream water, and the fact that groundwater has to be pumped adds to operating costs.

There may be potential for changes to regulatory rules in order to alleviate concerns expressed by the Water Corporation regarding revenue uncertainty that arises with use based pricing. Water utilities are not unique in facing variable demand volumes and in other utility regulation special rules have been created to deal with revenue variability. First, the regulated rate of return is supposed to account for risk, and second, the special revenue assessment rules can established which allow averaging of uncertain revenue. Such rules have been put in place by the ERA for the WA railway utilities, which allow for smoothing of revenue earned between years to account for traffic variability, when assessing revenue against costs. The same sort of mechanism could be developed for the water utility. Revenue uncertainty should not be used as a justification of fixed rather than use based charging, given the imperative for improved demand management in the water sector.

**The Question of Social Objectives in Pricing Reform**

The Inquiry was required to comment on social objectives in the context of pricing reform. It appears that these social objectives have been taken to be primarily concerned with 'water for life' that is, non discretionary use, mostly indoor, and the need to ensure that low income familles are not disadvantaged. While this is essential, we argue community welfare objectives should be interpreted more broadly.

In terms of low income people, this could include consideration of the purposes and benefits which water serves in urban life. This is analogous to contemporary

definitions of poverty where in relatively rich countries like Australia, poverty is conceived in relative rather than absolute terms [16]. It is defined not in terms of a lack of resources to meet basic needs, but rather as lacking the resources required to participate in lifestyle and consumption patterns enjoyed by other Australians. So while it is implicit rather than stated, it is worth contemplating not just 'non-discretionary use' but also some relief to enable some outdoor water use as well. This is consistent with what matters to people. Lifestyle has been shown to be very important in attitudinal surveys [17] and can be related to external water consumption.

There are other issues that should be considered under the 'social objectives' banner, which include setting supply reliability parameters, service targets, the assumption that people prefer cheaper water, conservation, and preservation of horticulturalist's jobs. Both the language of value neutrality and the narrowing of 'social objectives' to concern about low income people, serves to distance the concerns of society as a whole which also includes concern about the water needs of low income people.

## Adjusting for Externalities

We agree with the recommendation that the cost of water resource management costs should be passed on to water users.

There is no clear justification for charging for resource management based on fixed rather than volumetric charges, as recommended in the report. Given that potential environmental impacts - and hence the need for management of water allocation decisions - are positively correlated with total water use, it would appear reasonable to charge on a volumetric basis.

We agree that the use of externality charges to address issues that are not being dealt with through institutional arrangements is problematic, because of the uncertainty regarding the setting of such charges, and the likelihood that resource management can be better achieved through administrative arrangements that address property rights issues.

[16] Elster, J. and Roemer, J.E. 1991 (Editors) Interpersonal Comparisons of Wellbeing Cambridge University Press

[17] Nancarrow B, Kaercher J, and M Po (2002) *Community Attitudes to Water Restrictions Policies and Alternative Water Sources* Australian Research Centre for Water in Society, CSIRO