

South Gippsland Water

Review and Analysis of Inclining Block Tariffs and Volumetric Sewerage Charges

FINAL

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Executive Summary

PricewaterhouseCoopers (PwC) was engaged to undertake a review and analysis of the likely need for, and effectiveness of, Inclining Block Tariffs (IBTs) and Volumetric Sewerage Charges (VSCs). The review also considers alternative demand management approaches that could meet the goals and objectives of IBTs and VSCs.

IBTs and VSCs have been used by other water authorities predominantly as an instrument to manage demand in the residential sector by placing a higher emphasis on the 'user pays' method of charging.

PwC conducted research into IBTs, VSCs and several alternative demand management strategies to inform this analysis. These strategies have been discussed and their respective benefits and disadvantages assessed in light of SGW's pricing principles.

Based on 2005/06 consumption data provided by SGW, a quantitative analysis of the likely impact that IBTs and VSCs would have had on SGW customers' annual 2005/06 bills was performed. Under the scenarios tested (with inclining block volumes as per the Melbourne retailers), SGW's customer profile did not appear to suit the implementation of either IBTs or VSCs, with average annual bills in most localities falling.

SGW's customer base is somewhat unique in that in some localities the population is quite seasonal, due to the region's popularity as a summer holiday destination. Average consumption across SGW's jurisdiction in general, and in these seasonal locations in particular, is low compared to the state and regional average. Setting IBTs or VSCs that account for this low and diverse consumption is problematic and would require significant research before implementation.

SGW's customer base also contains a rather significant non-residential component, including a number of major users. It is unlikely that the implementation of IBTs or VSCs alone would result in the desired impact on overall consumption. The other strategies presented in this review, such as schemes to reduce major user consumption, behavioural change campaigns, analysis of long run marginal cost and water savings rebates, would ideally form part of a multi-faceted demand management strategy.

This review has raised a number of areas that South Gippsland Water is likely to need to consider to support decision making for pricing policies and principles. Other issues identified in the review may or may not require further consideration depending on the direction of pricing policies and principles. For those areas that require further consideration specific research and analysis should be undertaken in order to adequately inform decisions related to these issues.

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Introduction

Background

Prolonged dry conditions in Victoria have brought water demand management strategies into the political and public spotlight in recent years.

The Victorian Government's *Our Water Our Future: The White Paper* action plan was released in 2004. One of the key aims of The White Paper was to set a framework to secure water for homes, farms, businesses and the environment. The White Paper noted the key challenges for water management:

- Achieving reliable water supplies for our homes, our farms and industry while meeting the needs of the environment.
- Achieving sustainable water management.

The White Paper outlined the need for smarter urban water use across Victoria through a range of initiatives including education and incentive programs, regulations and legislation, and smarter water pricing to reduce demand and increase recycling.

Many demand management initiatives are already in place. However, with drought conditions in Victoria becoming even more severe since 2004, the need for water industry stakeholders to carefully consider further actions to reduce consumer demand for water has become more urgent. With the ESC due to commence reviewing the prices for all water businesses for the 2009-2013 regulatory period by the end of this year, it is also timely for water businesses to assess the preferred pricing approach for their region.

It is against this background that South Gippsland Water (SGW) has engaged PricewaterhouseCoopers to assess the advantages and disadvantages of changing SGW's pricing structure to an Inclining Block Tariff (IBT) and/or Volumetric Sewerage Charge (VSC) structure, and to also consider other demand management strategies (both price and non-price approaches).

Two part tariffs have become the standard tariff structure for Victorian water authorities, in an attempt to send price signals to customers by placing more emphasis on a 'user pays' system. SGW adopted a two part tariff structure for its customers in 1994/95.

All Victorian water authorities have some form of two part tariff structure in place, although the majority implement a standard two part tariff for water and a fixed tariff for sewerage services. Some authorities have gone beyond the two part structure and implemented IBTs and/or VSCs in a bid to send stronger price signals to customers and manage demand to secure future water supplies.

Purpose and approach of this paper

Purpose

The primary purpose of this review is to assess IBTs and VSCs in relation to SGW's customer demographic profile and to discuss the impacts these tariffs would have on SGW's operating environment. It will also consider alternative approaches SGW could take to ensure (a) SGW's business objectives are achieved and (b) prices reflect current regulatory and policy decisions.

Methodology and approach

In order to inform the analysis of IBTs and VSCs, a desktop review of current approaches to those tariffs has been conducted. Reports and papers that informed the analysis undertaken by PwC are included in the bibliography. The review revealed a number of sources analysing the role and effectiveness of IBTs, but found relatively less work on VSCs.

Based on 2005/06 consumption data provided by SGW, an analysis was performed of the impact that IBTs and VSCs would have had on 2005/06 annual bills. A number of key actions and assumptions were required as part of the analysis:

- The consumption data was disaggregated into SGW's tariff types and the Domestic and Non-Domestic tariff types were selected for analysis.
- All consumption data was assumed to be correctly classified by SGW, that is, all accounts listed as domestic were, in fact, domestic customers and consumption data was accurate.
- Each Property ID was counted as a separate account.
- IBTs and VSCs were applied to each property's total 2005/06 consumption and fixed service charges were added to each account to generate an estimate of the impact on annual bills.
- Demand was assumed to be unchanged under the hypothetical tariff structures due to the difficulty in estimating the price elasticity of demand.

Structure of report

This report is structured into three related parts.

1. Discussion of IBTs and VSCs

- Background to IBTs and VSCs, jurisdictions with IBTs and/or VSCs in place, government and regulatory approach.
- Setting prices under IBTs and VSCs and information required in order to move to these tariff structures.

- Proposed advantages and disadvantages/costs of implementing IBTs and VSCs.
- Effectiveness of IBTs and VSCs on pricing principles.

2. Assessment of IBTs and VSCs for SGW

- SGW's pricing objectives and customer demographics.
- Current tariff structures.
- Modelled impact of IBTs and VSCs on SGW's customer base.

3. Alternative approaches to managing demand

- Pricing Approaches.
- Direct demand management approaches.
- Current demand management practises.
- Comparative analysis of alternatives.

**Discussion of Inclining Block Tariffs and
Volumetric Sewerage Charges**

Background to IBTs and Volumetric Sewerage Charges

What are Inclining Block Tariffs and Volumetric Sewerage Charges?

With increased media and government focus on the state of Victoria's water resources, attention has turned to how government and its water authorities can manage demand for water. One obvious way currently being implemented state (and Australia) wide is water use restrictions imposed on consumers. A different form of constraining demand can also be evidenced in a water authority's pricing structure.

Inclining Block Tariffs (IBTs) and Volumetric Sewerage Charges (VSCs) are two ways in which an authority may attempt to manage (generally, reduce) the consumption patterns of its customers.

An IBT attempts to send price signals through charging relatively more when consumption exceeds certain levels (or blocks). Basic economic theory suggests that as a commodity's price increases, the demand for the commodity will decrease. Since the water authority is targeting those consumers who use a high discretionary amount, increasing the price at which the water is supplied should lead to less water being used.

VSCs represent a move to the two-part tariffs currently in place across Victoria for potable water supplies. The consumer would pay an annual fixed service charge (which may attempt to recover the fixed costs of the sewerage treatment assets) and a per kilolitre charge based on the amount of effluent discharged from the residence. VSCs attempt to create 'user pays' principles embodied in current water two-part tariffs.

Where are IBTs and VSCs currently in place?

Inclining Block Tariffs

Inclining block tariffs are currently used in every state and territory in Australia except the Northern Territory, although not every water service provider in every jurisdiction uses them.

The recent national stocktake of approaches to charging undertaken by the National Water Commission (NWC) includes an analysis of the charging methodologies of a number of water authorities in Australia. Summarising the results of the national stocktake:

- The first tier was set between 100kL per annum (ACTEW, in the ACT) and 550kL (Dubbo City Council in NSW).
- The first tier charge ranged between \$0.26 (Lower Murray Water in Victoria; for <600kL in summer and <200kL in winter) and \$1.45 (Queanbeyan in the ACT; for <176kL).

- The price in tier two ranged between 103% of the tier one price (Brisbane Water; third (top) tier was 130% of tier one) and 311% of the tier one price (Country Energy in far west NSW; no third tier).
- The top tier price ranged between \$0.45 (Launceston City Council in Tasmania; >365kL) and \$2.36 (Country Energy; >400kL).

Hunter Water in NSW by contrast, has a Declining Block Tariff, that is, as more water is used, the consumer pays a relatively smaller amount. It should be noted, however, that the first block is up to 1,000kL per annum which would capture the overwhelming majority of residential customers. It is therefore, in effect, a notional two-part water tariff.

IBTs for non-residential customers are not as common as in the residential sector. The NWC stocktake included nine water authorities that used IBTs for non-residential customers and prices and volumes varied significantly.

Appendix A includes a detailed summary of those authorities that use IBTs and the block levels and associated charges.

Volumetric Sewerage Charges

VSCs are not as widely implemented as IBTs. The national stocktake of charging by the NWC did not undertake an analysis of national sewerage charges, however Melbourne is the only capital city in Australia that includes a volumetric component in its residential sewerage charges.

Two other Victorian water authorities (Wannon Water and Barwon Water) have also implemented VSCs in the first regulatory period.

Of the five Victorian authorities who employ VSCs, four have a volumetric charge of approximately \$1.00/kL and their discharge factor (i.e. the percentage of water assumed to be returned as sewerage) is approximately 90%. Wannon Water is somewhat different, with a VSC of around \$0.34 and a discharge factor of 80%.

A number of water authorities around Australia charge a VSC to non-residential customers with various pricing principles associated with determining the volume of sewerage discharged.

ESC approach to Inclining Block Tariffs and Volumetric Sewerage Charges

Inclining Block Tariffs

In its recent consultation paper and subsequent guidance paper for the 2008 Water Price Review, the ESC outlined what water businesses should consider when setting IBTs. These considerations included:

- The number of blocks to be established and how they are applied over different customer classes.
- The level of usage at which the first block should be set, such that non-discretionary water use is affordable for vulnerable households.
- The level of usage at which subsequent blocks are set.
- The price relativities between the blocks.

- The impacts of inclining blocks on large households.
- The complexity of an inclining block tariff structure.

In its discussion, the ESC expands on a number of potentially adverse issues associated with IBTs.

For residential customers, it points out that setting the first block too high and/or the price below long run marginal cost would result in incentives for customers to use more water. Setting the block too low and the price above long run marginal cost could inadvertently target non-discretionary use.

Another concern the ESC raises with respect to IBTs is that they do not necessarily “reflect the relationship between water usage and household composition”. This issue has been raised by many commentators and relates to the observation that a household with more residents will use more water than one with relatively fewer residents. An IBT may unfairly target the larger household whilst benefiting smaller households.

The ESC also discusses the potential issues for non-residential IBTs. These include the difficulty in determining what non-discretionary use is in the commercial sector and the potential for some industries that use less water as a business input to be favoured under an IBT. These issues are further discussed in this report. For non-residential customers, the ESC writes “it may be more appropriate to pursue water use efficiency ... through voluntary demand management programs such as the Government’s Pathways to Sustainability Program.”

Volumetric Sewerage Charges

In its Final Decision for the 2005 Water Price Review, the ESC commented “The Commission considers that sewerage charges for residential and non-residential customers in future should include both fixed and volumetric components.”

To date in its consultation process for the 2008 Water Price Review, the ESC has remained silent on what views, if any, it currently holds with respect to VSCs. Gippsland Water sought clarification of the ESC’s position on VSCs in its submission to the ESC’s consultation paper, but no further guidance was presented in its subsequent guidance paper. At this stage it is unclear whether the ESC is still supportive of VSCs.

Government approach to Inclining Block Tariffs and Volumetric Sewerage Charges

IBTs for Melbourne residents were announced in the Victorian Government’s 2004 action plan *Our Water Our Future: The White Paper*. In the White Paper, “rising” blocks were referred to as being “widely regarded as the fairest and most effective way to price water for conservation.” The government felt that IBTs would “clearly demonstrate to customers the need to conserve water and to consider alternative, sustainable sources that can be supplied efficiently.”

No information has been found on the government’s position regarding VSCs.

Since the White Paper, the Victorian Government has remained largely silent on the issue of tariff structures. This could be an attempt to not be seen to be unduly influencing the ESC as pricing regulator, since the ESC began this role subsequent to the release of the White Paper.

Setting Prices using IBTs and Volumetric Sewerage Charges

How are water prices set using IBTs?

When setting an IBT, a business must consider both the level at which each block is set and the associated price that is charged. Given IBTs are designed to target discretionary use and, as a direct result, reduce per capita demand, the first block is typically set at a level that would allow a customer to cover their day to day essential water needs.

Determining a volume that meets this principle is not a simple task. There are a number of ways in which an authority may attempt to define what an acceptable volume to cover non-discretionary use is. The volume will vary depending on property type, date of construction, household composition and location to name just some variables.

Some of the methods that could be employed to define how the 'non-discretionary' block and subsequent blocks are set are discussed below.

World Health Organization

The World Health Organization's "Optimal Access" to water, which ensures consumption for hydration, cooking and hygiene is in the range of 100 to 200 litres per capita per day.

It may reasonably be expected, then, that the first block should not be set at a level which would be less than 100 litres per capita per day.

Average historical consumption

In its recent submission to the Essential Services Commission's consultation paper on the framework and approach for the upcoming price review, Alinta Limited suggested that block sizes could be determined on a customer by customer basis, reflecting each customer's historical consumption patterns over some defined rolling period. Each year would result in a new block being set based on average consumption and the authority's demand strategy.

Alinta Limited point out that this approach may best suit larger industrial customers rather than residents, but even so, the benefits of setting block sizes under this approach would need to be carefully weighed against the administrative costs involved in such a process.

Percentage of households within each block

Assessing the impact on affordability (particularly for vulnerable customers) can be informed by the percentage of households which have annual consumption levels between the defined blocks.

When the *Our Water Our Future* action plan first foreshadowed IBTs for Melbourne's retailers, the second block was set at 80kL per quarter (320kL per annum). This level was deemed to ensure that 80% of customers would not reach the third tier of pricing.

The ACT's Independent Competition and Regulatory Commission (ICRC) considered a three block inclining tariff in its December 2003 *Draft Report: prices for water and wastewater services in the ACT*. Under one proposal (option A, which was later adopted in an amended form for prices in the ACT from July 2004), the ICRC noted that setting the second block up to a maximum of 300kL per annum would ensure 97% of households would not be subject to the third block and the associated higher price. This was in response to the ACT Council of Social Services' concern about the impact of inclining blocks on large households.

Non residential customers

Determining the blocks and prices to apply to non-residential customers is arguably more difficult than doing so for domestic customers. Domestic customers are more generic in their composition and may have little incentives without a change in tariff structures to save water. Commercial operations and their water requirements are incredibly diverse and have sound business reasons for attempting to lower any inputs that add to expenditure.

Volumetric sewerage charges

There is significantly less research and literature available on VSCs than there is on IBTs. Typically, since most sewerage is not metered, the volumetric component is calculated based on the amount of water delivered to a property. It is assumed that a given percentage of the water that goes into a property returns via the sewerage system and gets treated in a wastewater treatment plant.

The water authorities that implement residential VSCs in Victoria use a 'discharge factor' (or similar) of around 90% and set the volumetric charge at around \$1.00/kL. That is, for every 100kL of water delivered to the property, the VSC would be $[100 \times 90\% \times \$1.00]$, or \$90. The VSC is part of a two part tariff with a fixed component added to the VSC.

Victorian authorities also implement seasonal factors that scale up or scale down the discharge factor based on the time of year and number of days in the quarter and the associated variances between the water delivered to the property and the proportion returned as sewerage.

Residents who feel disadvantaged by this pricing principle have the right to request that their sewerage be metered and must pay the associated costs for providing this extra service.

Non-residential customers generally face the same principles regarding the calculation of their volumetric component, but generally with some factor that increases the charge based on the size of the business (eg the number of cisterns).

Information requirements

IBTs and VSCs require significant amount of research and modelling before implementation. In order to make informed decisions about price, block levels and the expected impact on demand, water authorities must undertake an intensive and rigorous examination of a number of issues, outlined below.

Non-discretionary volume of water consumption (IBTs only)

This component of setting IBTs has been discussed previously, but in general, a water authority must be confident that customers are not being excessively charged for water consumption they have no ability to restrict. Three alternatives were discussed in the preceding section, other alternatives may be benchmarking against similar authorities or market research.

Price elasticity of demand

The price elasticity of demand is the percentage movement in demand as a result of a corresponding percentage movement in price (generally expressed as the change in demand due to a 1 per cent increase or decrease in price). Determining the price elasticity for water is a difficult task and there have been a range of estimates of Australian elasticities ranging from -0.7 to zero.

Demand forecasting

In order to ensure that the price structures are sustainable and meet the pricing principles governing a water authority, future demand must be accurately forecasted. IBTs (and to a lesser extent, VSCs) require a more intensive level of detail than standard water demand forecasting. The projected demand for each block, the impact increasing prices has on demand and the how the VSC discharge factor relates to water demand must all be considered.

Why adopt IBTs and Volumetric Sewerage Charges?

IBTs and VSCs are usually adopted on the assumption that increasing the price paid for each unit of water will result in downward pressure on demand. There is much commentary on the purported pros and cons of IBTs, less so on VSCs. In some cases, the points made in favour (or against) IBTs apply equally to VSCs, as they refer to the impact of higher usage charges on consumption.

Proposed advantages of IBTs and VSCs

IPART investigated four options to reduce the demand for water in Sydney and concluded that an IBT was "...the most appropriate retail price structure for Sydney at this time because:

- it sends a stronger conservation signal to very large water users than the current price structure
- it is relatively simple and easy for customers to understand and for Sydney Water to administer
- it targets water used for discretionary purposes in the residential sector with higher prices
- it allows for the step quantity to be set high enough to avoid capturing very much efficient or non-discretionary water usage by larger households
- it minimises the number of vulnerable customers who are exposed to higher prices and therefore partly addresses the affordability issues that exist in other price structures."

IPART's conclusion crystallises the main points that are generally made in favour of IBTs.

The ICRC also suggested that a three tier block "is more likely to help achieve the reductions in per capita consumption proposed by the ACT government." The Victorian Government's view in favour of IBTs has already been covered.

Counter-arguments

Not all commentators are in favour of IBTs or support their proposed benefits. Some of the arguments against IBTs or VSCs are:

- If the justification of IBTs is that water is scarce and hence consumption needs to be managed by price, the amount charged to reflect water's scarcity should be the same for every unit used. A single apartment resident should face the same price signals to save water as a large family on a quarter-acre block.
- Larger households can be unduly punished for water use that is not necessarily discretionary. Since there is a negative correlation between household income and household size, vulnerable customers are particularly at risk of either paying more for water use they are unable to control or reducing non-discretionary consumption and the associated negative health impacts.

- VSCs, based as most are on a defined percentage of water use, disadvantage customers who may use relatively more discretionary water. A single person tending to a garden or lawn will have higher water use than a 2 person apartment, but sewerage treatment costs for the former are likely to be lower. It is true that customers can challenge their VSC if they feel it is unfair, but they must incur a fee to have their application investigated and in some instances may not know they have the right of appeal.
- One school of reasoning suggests that, since centralised wastewater systems are highly capital intensive, pricing should actually be designed to maximise use. VSCs are designed to do the opposite.

Other Costs

There are a number of operating costs associated with setting IBTs or VSCs, outlined below.

Research

With IBTs and VSCs requiring intensive research and market knowledge before implementation, the cost of undertaking these assignments could be quite significant. There are also alternative ways of managing demand and these may be more (or less) cost effective than researching IBTs and VSCs.

In addition to the significant cost of research to be undertaken before setting IBTs or VSCs, there are a number of administrative costs incurred when implementing these tariff structures. These include:

Systems amendments

New tariff structures will require implementation of financial, operating and billing systems to account for the new charges. Systems will need to be able to record consumption in each block of an IBT and this will need to link to the billing system so that invoices can be as transparent as possible. These systems will, in turn, need to be fed into various financial and management reports for the Executive and Board, the shareholder and the general public.

Advertising and customer education

Customers will need to be made aware of any new tariff structures that are implemented and educated so that they are fully aware of their implications. Any changes in tariff structures may be treated with suspicion and scepticism, so a targeted and informative advertising campaign may be a necessity.

Training

Water authority staff will equally need to understand the new tariff structures and internal system changes that will result from the change. Training sessions will be required to convey this information.

Revenue uncertainty

Given the difficulties in determining the price elasticity of demand and forecasting likely consumption in the future, placing more revenue at risk through an increase in the proportion derived from the volume used may not be a desirable outcome. Water authorities, the government and the ESC would need to consider the implications of revenue shortfalls due to lower demand over a regulatory period.

Effectiveness of IBTs and Volumetric Sewerage Charges

There is little research available that adequately assesses the effectiveness or otherwise of IBTs and VSCs.

Since IBTs and VSCs have been introduced in Australia, there has been consistently dry conditions in most urban centres which has resulted in water restrictions being enforced across the nation. Although evidence exists that there has been a reduction in per capita consumption since the implementation of these tariff structures, causal links between restrictions, pricing and consumption have yet to be drawn.

The Independent Pricing and Regulatory Tribunal (IPART) of NSW attempted to model the impact of two hypothetical IBTs on Sydney Water's customers in its July 2004 *Investigation into price structures to reduce the demand for water in the Sydney Basin*. IPART considered two scenarios, each with a two block tariff with the 'step' at 400kL, only with different prices in each scenario. The scenarios are presented in Table 1.

Table 1 IPART IBT scenarios

Charge type	Scenario 1a	Scenario 1b
Block 1 (0-400kL pa)	\$1.20	\$1.10
Block 2 (400kL+ pa)	\$1.80	\$2.20
Service fee	\$16.50	\$32.65

Note: Sydney Water's then current pricing for water services was a fixed charge of \$76.55 per property and a flat volumetric rate of \$0.98/kL.

IPART's modelling suggested that under each scenario, water consumption would reduce by between 1.8% and 6.3%, depending on how consumers made their decisions regarding water consumption¹.

Anecdotal evidence from Spain suggests that a two-block IBT that was implemented in 1983 and later refined to a three-block tariff in 1988 (with a significantly higher price) has worked to reduce consumption. In the years between 1991 and 1996, household water consumption per capita reduced by 9 per cent. It is unclear whether additional environmental or social policies and conditions may have influenced this fall in demand.

If rainfall and inflows return to average levels and restrictions on use are lifted for a consistently long period of time, the effectiveness of IBTs and VSCs on water consumption may be better examined. Unfortunately the current climatic conditions do not allow for such an analysis.

¹ IPART's estimate of 1.8% was based on a customer's *average* price response – that is, they would make their decisions on water consumption in relation to the size of the quarterly water bill. The 6.3% reduction was based on a *marginal* price response – that is, a decision to consume more water will be dependent on the cost of each additional unit (e.g. kL) of water.

**Assessment of Inclining Block Tariffs
and Volumetric Sewerage Charges for
South Gippsland Water**

South Gippsland Water’s objectives for pricing

To review and assess different demand management tools for SGW requires a clear framework including the objectives that SGW is seeking to achieve and the specific criteria that an effective and efficient demand management program should meet.

The over-riding objective for SGW in setting prices is to ensure that customers are provided with efficient signals about the costs of providing services and incentives for sustainable water use. This is consistent with the approach of the Victorian Government and the Essential Services Commission. However, it is useful to outline a number of more specific criteria to assist in our evaluation of IBTs (and other demand management tools). These include:

- Sustainable use incentives: there are appropriate signals about the incentives for customers to use water resources sustainably.
- Cost reflectivity: SGW should be able to recover sufficient costs to sustain the business.
- Practical, credible and understandable: SGW should be able to easily explain the pricing approach and/or other demand management tools to consumers and other stakeholders.
- Pricing stability: the pricing approach should not result in dramatic price changes over time.
- Reliable: the approach should minimise potential for error in design and implementation.
- Fair and objective: All water demand management measures will impose costs somewhere in the community, A value judgement will need to be made about the fair distribution of these costs.

South Gippsland Water’s customer demographics

SGW serves approximately 18,000 assessments in 21 regional towns over an area of 4,000 square kilometres.

SGW’s customers are categorised in four broad categories:

Residential

A residential property is defined as a property that is provided for domestic purposes and includes houses, flats, units, townhouses, rural residences, police dwellings, retirement villages or any other properties that have similar water behaviour to a “House”

This includes vacant land serviced by a water main and receiving a bill.

Non-residential

Non-residential properties include all other buildings or vacant land not defined as “residential”. Generally, this would include properties that have been established for some commercial reason.

Concessional

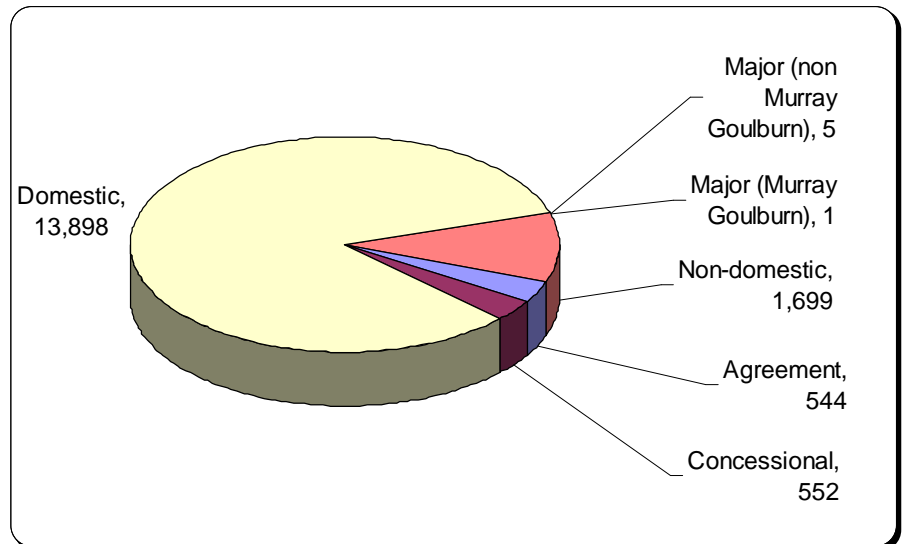
Concessional properties can be broadly defined as properties to which the public has free access and is not being operated for any private profit. This includes schools, community facilities, churches, sporting grounds and parks.

Agreement

A number of properties receive water from various sources where the quality or reliability of service is not guaranteed. SGW has agreements with these properties which specify the conditions under which the water is supplied and the charging that will occur.

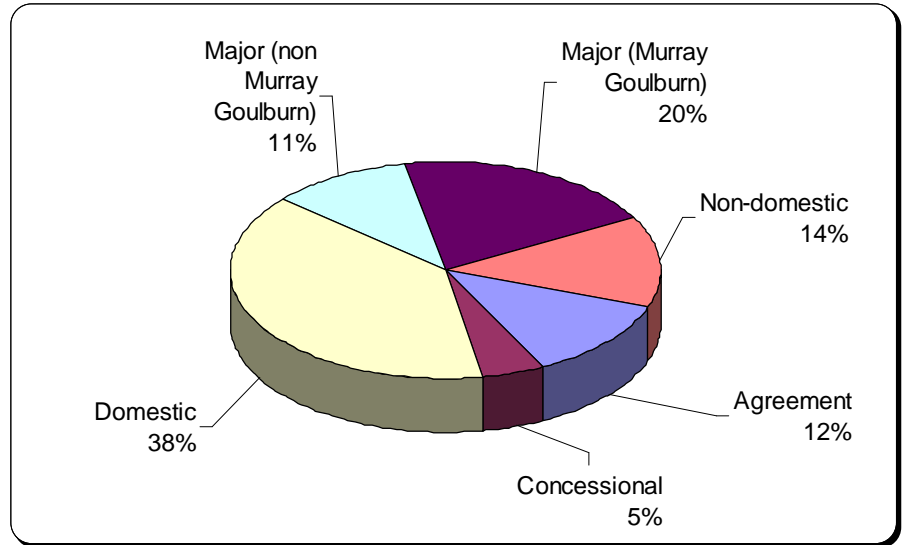
SGW has a number of major customers that account for a large amount of the water supplied. Figures 1 and 2 present the number of properties in each category² and the proportion of water used by each customer type.

Figure 1 South Gippsland Water properties by customer type



² Number of properties is sum of the number of unique Property IDs contained within the data provided by SGW

Figure 2 South Gippsland Water water consumption by customer type



As is evident, major and non-domestic customers, which comprise 10% of the total number of properties, account for 45% of total water use. IBTs and VSCs are typically used to influence residential demand. Whilst a large proportion of consumption is by residential customers, a larger proportion of water is consumed by non-residential and large customers. Other demand management initiatives may be required in order to target water use in the non-residential sector.

Current tariff structure

SGW currently charges customers a two part tariff for water and a fixed service charge for sewerage. The exact price charged depends on the classification of customers into the four categories discussed in the preceding section.

Table 2 summarises the fixed and volumetric charges that were in place for SGW customers in 2005/06.

Table 2 South Gippsland Water charges – water and wastewater 2005/06

Service	Charge	East/West District	South District
Water access	Residential & Non-residential	\$160.35	\$262.05
	Agreement	\$145.80	\$235.50
	Concessional	\$135.30	\$135.30
Water usage	Murray Goulburn	\$0.96	n/a
	All other	\$0.78	\$0.78
Sewerage access	Developed	\$318.15	\$318.15
	Undeveloped	\$186.75	\$186.75

Note: some non-residential customers are charged for trade waste on a combined fixed/volumetric basis depending on the type of businesses and number of cisterns.

SGW's current tariff structure achieves a number of the pricing objectives discussed earlier. Prices are:

- Easily understandable and easy to administer.
- Subject to a relatively uniform price rise each year over the first regulatory period.
- Able to encourage sustainable water practises through the volumetric component of the water charge.
- Set such as to avoid pricing on an individual locality basis, which could be deemed as unfair by some customers, but still recognises the differences in each district through the service charge.

It could be argued that the current tariff structure could go further in promoting the sustainable use of water by placing less emphasis on the fixed component of the water charge and increasing the volumetric component, either at a flat rate or as an IBT. Based on the data received, water usage charges account for approximately 35% of the domestic annual water bill and 18% of the domestic combined water/sewerage bill. This proportion of revenue sourced from volumetric charges is quite low relative to other Victorian water authorities.

Although the current pricing arrangements avoid the potential customer dissatisfaction that could arise from pricing on an individual locality basis, it is possible that SGW's current prices result in unfair subsidies to some localities.

Although IBTs or VSCs cannot address the concern about subsidies without being applied at a local level, they may be able to further encourage water conservation through placing more emphasis on pay-for-use arrangements.

Expected impact of introducing IBTs and volumetric sewerage charges

Inclining Block Tariffs in South Gippsland Water's region

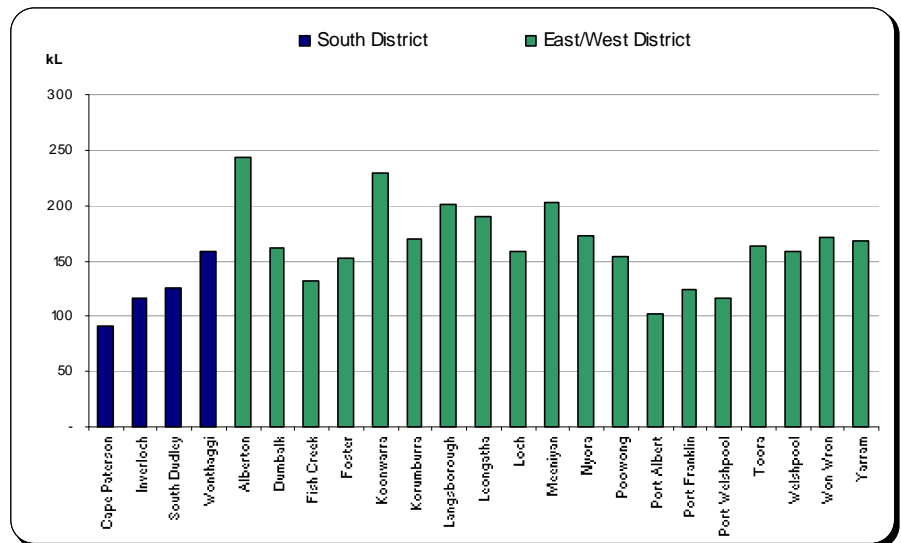
The implementation of IBTs for SGW's customer base would pose a number of challenges. The impacts on domestic and non-domestic customers are presented in the following sections, with particular emphasis on domestic customers, which account for an estimated 60-65% of SGW's revenue from water and sewerage supply³.

³ Whilst the data provided by SGW included water revenue, it did not include sewerage revenue. The 60-65% range is based on the data provided by SGW. The total VolumeCharge and ServiceCharge fields for domestic customers totalled \$4.66m, from 13,898 unique property codes. Applying SGW's fixed sewerage charge of \$318.19 to each of the localities that receives a sewerage service results in a total domestic revenue of \$8.75m, which is 65% of SGW's revenue from service charges and sale of water as reported in the 2005/06 Annual Report. It is understood that certain factors

Domestic customers

South Gippsland has a varied domestic customer base which in some localities is highly seasonal. As a consequence, setting an inclining block that targets discretionary use is difficult, since the water consumption profile in some towns is vastly different to others. Figure 3 presents average annual consumption for each of SGW's towns based on 2005/06 water consumption data provided by SGW.

Figure 3 Average domestic consumption by town



Average annual consumption across the region is 150kL, significantly lower than both the Victorian state average of 201kL and the Victorian regional average 240kL.

Setting blocks and prices

An analysis of the impact of IBTs on SGW customers has been undertaken based on the domestic data provided by SGW. Blocks were set as per the Melbourne metropolitan retailers:

- First block up to 160kL per annum.
- Second block between 160kL and 320kL per annum.
- Third block greater than 320kL per annum.

It should be noted that using the blocks from metropolitan Melbourne is not necessarily the most appropriate option for SGW's region, however it has been selected for a number of reasons. These are:

such as vacant properties and misclassifications may alter the 65%, however a range of 60-65% was considered reasonable.

1. Setting blocks as per the Melbourne retailers will allow for easier comparison with another region (ie Melbourne) with IBTs.
2. Undertaking the exercise to develop SGW-specific blocks would be time consuming and costly.
3. Setting the first block any lower than 160kL would put SGW's first block amongst the lowest in Australia, according to the national stocktake of water charging.

Tariffs in each of the blocks, and the annual service charge, were then set such that water revenue derived from SGW's domestic customers was equal to the actual revenue received. In other words, the tariff structures used in the analysis were revenue neutral.

As Figure 3 demonstrates, SGW's customers are classified (for pricing purposes) as residing in the South district or the East/West district. The variance in consumption levels between the two districts is clearly evident.

Currently, residents in both the South and East/West Districts pay the same flat volumetric charge (\$0.7818 in 2005/06). In order to preserve the amount of actual revenue earned from each district (i.e. to make each district's scenario revenue neutral), different volumetric charges have been applied to each district. The annual service charge has also been reduced in order to send a stronger price signal about increased water consumption.

The adopted blocks and charges for each district are set out in Table 3

Table 3 Inclining block tariffs – scenario 1

Charge type	East/West District	South District
Block 1 (0-160kL pa)	\$0.7820	\$0.8694
Block 2 (160-320kL pa)	\$0.9384	\$1.0432
Block 3 (320kL+ pa)	\$1.2903	\$1.4345
Service fee	\$150.00	\$247.00

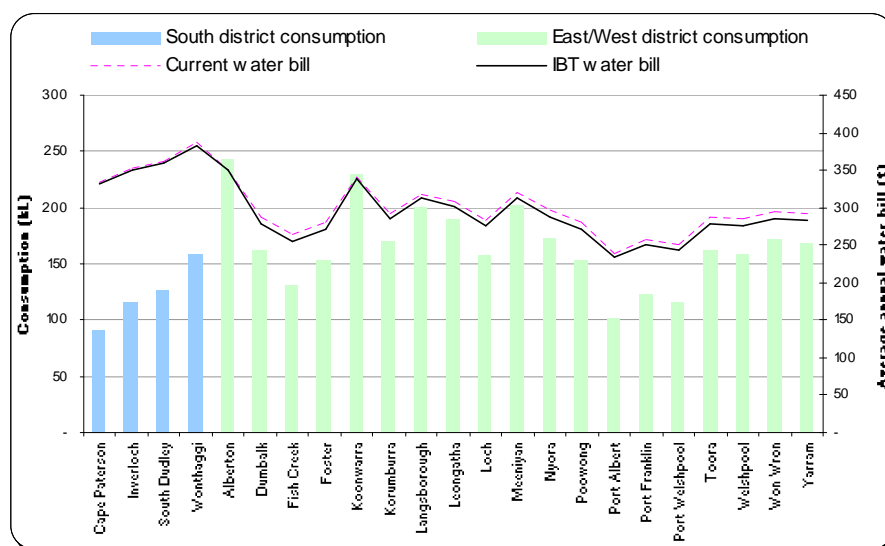
The above tariffs preserved the revenue generated from each region and kept the relationship between prices in each block consistent across the two districts (i.e. moving from \$0.7820 to \$0.9384 is equivalent in percentage terms with moving from \$0.8694 to \$1.0432). Each district's fixed service charge was approximately 6% less than the current (2005/06) charge.

Analysis undertaken and outcomes

Due to the difficulty in accurately determining a price elasticity of demand for SGW's water customers, the analysis assumed demand did not change in response to the new IBT structure.

When the new inclining tariffs were applied to SGW's 2005/06 consumption data, average annual water bills *decreased* by between 0.3% and 4.3% in all but two localities (Figure 4).

Figure 4 Impact on average bill (water only) of introducing IBT structure



At first glance, this annual bill reduction appears to be a function of the 6% fall in service charge under-compensating for the relatively higher volumetric charges. However, the analysis was re-performed with the service charge unchanged from the current actual price only with the volumetric components re-calibrated to achieve revenue neutrality. Revised prices in the second scenario are presented in Table 4.

Table 4 Inclining block tariffs – scenario 2

Charge type	East/West District	South District
Block 1 (0-160kL pa)	\$0.7266	\$0.7629
Block 2 (160-320kL pa)	\$0.8719	\$0.9155
Block 3 (320kL+ pa)	\$1.1989	\$1.2588
Service fee	\$160.42	\$262.14

The results of the second analysis were almost identical in nature to the first iteration. The only difference to note was that in the second analysis, *all* localities' average annual water bills decreased and the range was slightly less: 0.4% to 3.1%.

Those customers that held one form of pension (health care card, social security card, veterans affairs) fared similar to non-pension customers. In some localities where average consumption for pension customers is lower, prices decreased by relatively more and vice versa.

Discussion of outcomes

The outcome of the analysis is explained by SGW's customer profile. Many SGW customers are not permanent residents due to the region's popularity as a summer holiday destination. Consumption is therefore highly seasonal and this results in the relatively low average annual consumption figures already discussed.

Setting the first block at 160kL, more than the average consumption for the region, has contributed to the decreases in annual bills. This is directly evident in the second scenario, where customers pay a lower rate up to

160kL, which is higher than the average customer's annual use. Although customers are paying a higher volumetric charge in the first scenario, it is not high enough to cover the decrease in the fixed component of the bill, because relatively few customers use much water at the second and third tier price.

The IBT approach in SGW's region transfers much of the burden for meeting SGW's revenue requirement to the highest water users. Although the aim of IBTs is to target non-discretionary use, research would have to be undertaken to ensure that high users were not being disadvantaged. The number of properties falling into each block and the associated variable revenue derived from them, is presented in Table 5. The high proportion of revenue received from those customers in the third block is clearly evident.

Table 5 Total customers and variable revenue by block

Block	No. properties	% of total properties	Revenue earned	% of total revenue
Block 1	8,636	62%	516,779	28%
Block 2	4,087	29%	796,694	43%
Block 3	1,175	8%	559,309	30%

As the Department of Human Services (amongst others) has pointed out in their submission the ESC's consultation paper, many of the most vulnerable customers (eg large families with relatively lower income) are amongst the higher users of water, although their discretionary use is low.

Figures 5 and 6 show the difference in annual bills for a range of consumption volumes in each of SGW's pricing districts.

Figure 5 East/West district annual bill (water only) v. consumption (current and IBT approaches [scenario 1])

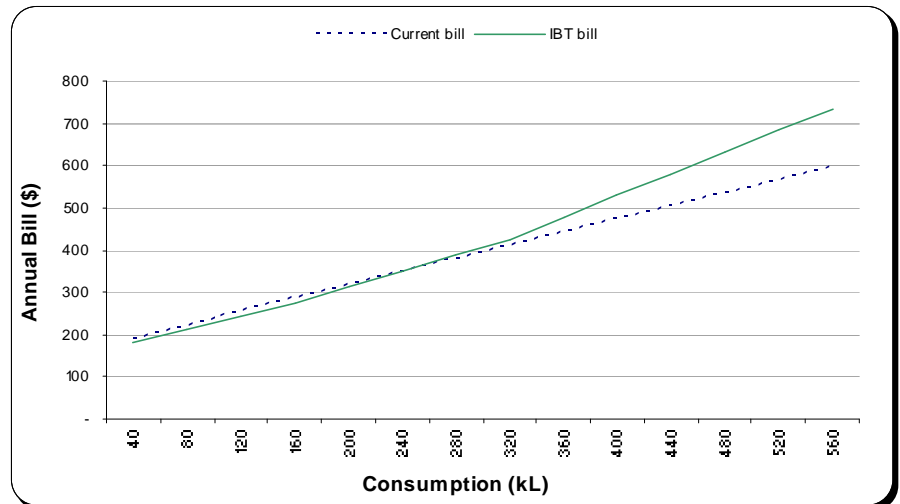
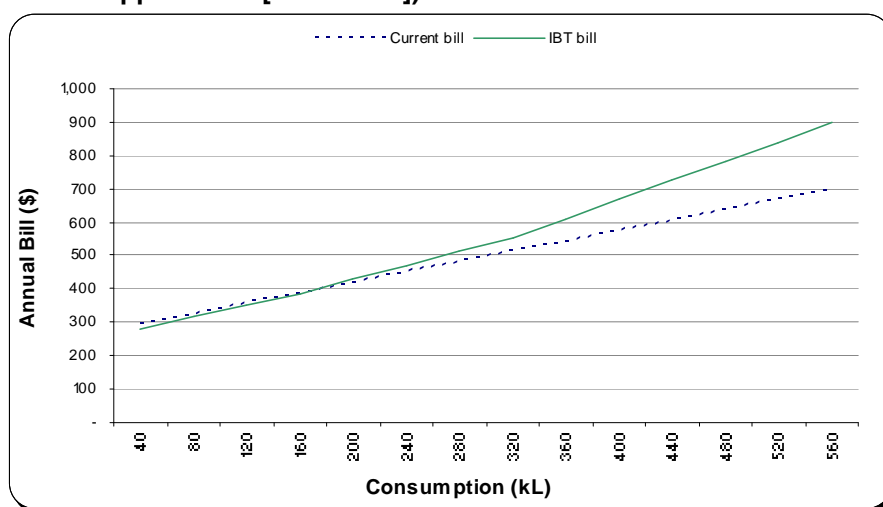


Figure 6 South district annual bill (water only) v. consumption (current and IBT approaches [scenario 1])



As demonstrated in Figures 5 and 6, customers who use below the first consumption block are always better off under the IBT, as would be expected. Depending upon the region, bills under the IBT structure become larger at about 240kL per annum (East/West) or 160kL per annum (South). Once consumption exceeds the third block, the difference in annual bills becomes increasingly significant.

Limitations to approach

There are two key limitations to the methodology used in our analysis.

Firstly, since SGW bills customers on a trimester basis, for billing purposes, each block would be divided by three and applied every four months. It is therefore likely that a number of 'seasonal' customers, whilst not exceeding 160kL over a 12 month period, would exceed the trimester block of 53kL (160kL divided by 3) and pay the associated higher prices. This would result in an increase in the annual bills observed in the analyses, but would likely not materially alter the outcome, except perhaps in the largest tourist localities (Cape Paterson and Inverloch, for example).

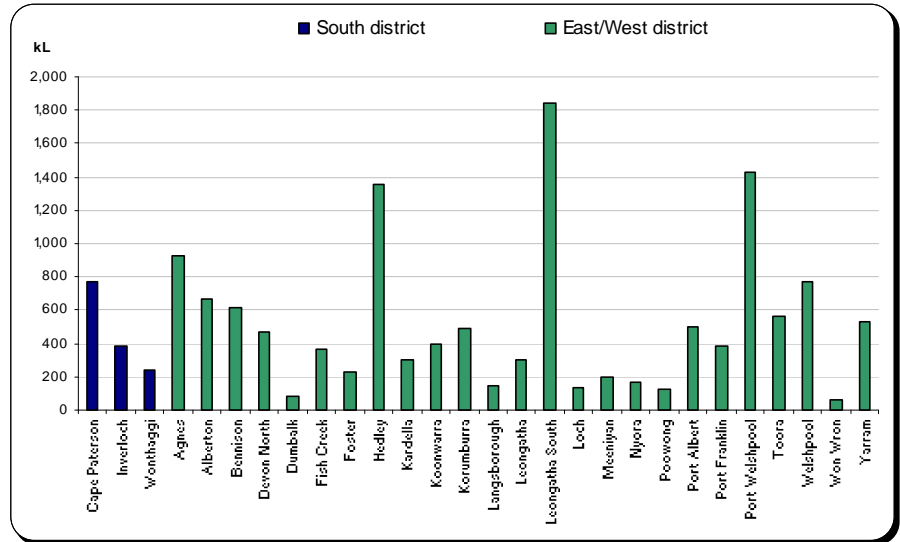
Secondly, the analysis used the Melbourne retailers' inclining block volumes, which may not be suited to SGW's customer profile. Lowering the block volumes to reflect SGW's lower consumption would alter the results of the analysis. It should be noted, however, that any reduction in the first tier block may have adverse impacts on permanent residents, whose annual bills may increase disproportionately to permanent residents around Victoria.

Non domestic customers

IBTs for non-domestic customers are not as prevalent in Australia as they are for domestic customers. From the water suppliers included in the NWC's stocktake on national water charging, just 9 used non-residential IBTs (including 4 from Western Australia and just one, Lower Murray Water, in Victoria). As a comparison, the NWC found 26 water authorities employing IBTs for domestic customers.

Discerning what is a suitable volume block for non-residential customers is perhaps even more difficult than it is for domestic customers, since commercial operations are so diverse. To illustrate, Figure 7 provides an overview of SGW's non-residential customers in each of SGW's towns.

Figure 7 Average annual consumption – SGW non residential customers



As demonstrated in Figure 7, the volume of water consumed will be largely dependent on the type of non-residential customer. Inclining block volumes and prices for the 9 water authorities that use non-residential IBTs are not consistent and will in many cases be location dependent.

Implementing a non-residential IBT in SGW's region would require a significant amount of research into the drivers of water consumption faced by SGW's non-residential customer base and how implementation of an IBT would impact consumption, if at all. It may be assumed that non-residential customers are already investigating ways to cut water use to gain a competitive advantage over their commercial rivals.

Volumetric sewerage tariffs in South Gippsland Water's region

As already indicated, SGW already applies a volumetric component to a number of non-residential customers. This section will focus on those domestic customers that receive a sewerage service and how a VSC would impact those customers.

As sewerage is not metered, water consumption is used as a proxy for the amount of sewerage discharged by an individual property. Assessing what the VSC and discharge factor should be for SGW was a difficult task without undertaking further research and analysis. For this reason, the discharge factor and the volumetric rate approximated the Melbourne retailers as was the case in the IBT analysis. Seasonal indices were not considered.

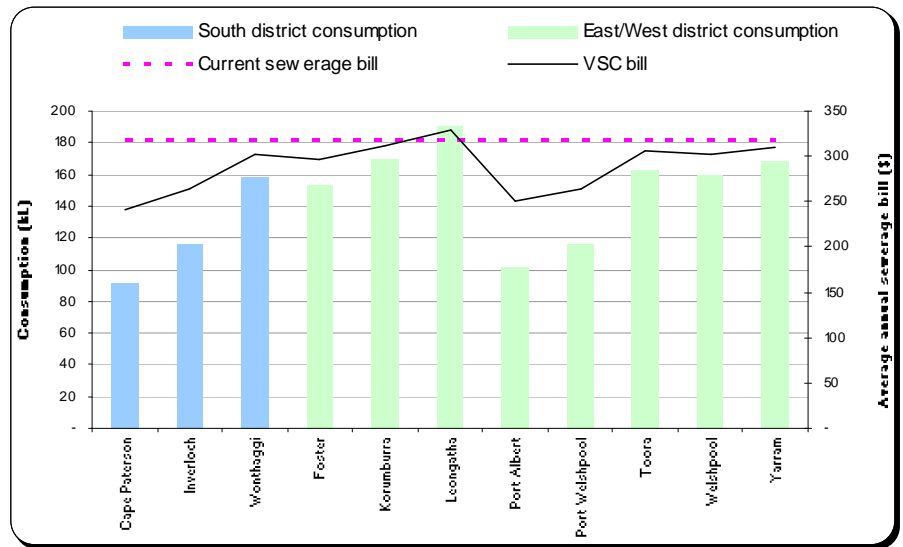
Ensuring that the VSC approach was revenue neutral compared to the current tariff structure (across both districts in total) meant that the fixed service charge was reduced for each district from the actual price of \$318.15. The VSC tariff structure adopted is presented in Table 6.

Table 6 Volumetric sewerage charge

Charge type	East/West District	South District
Volumetric rate	\$1.00	\$1.00
Discharge factor	0.9	0.9
Service fee	\$159.17	\$159.17

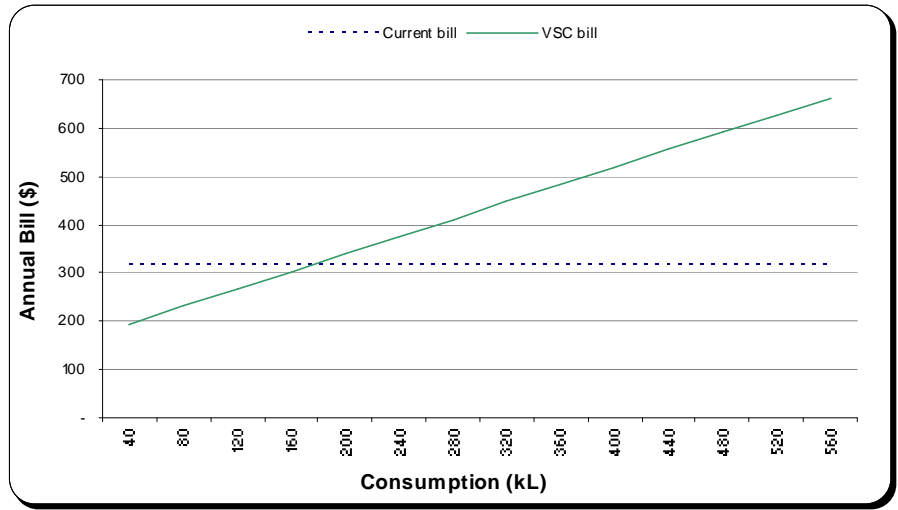
Due to the low average water consumption discussed in preceding sections, the average customer's sewerage bill reduced in all locations except Leongatha, because the lower service fee (to ensure revenue neutrality) worked in most customers' favour. Figure 8 presents the impact on average sewerage bills across those localities receiving sewerage services.

Figure 8 Impact of volumetric sewerage charge on annual bill (sewerage only)



Similar to IBTs, the burden for maintaining the sewerage revenue requirement is shifted to higher users. Figure 9 demonstrates the impact on annual sewerage bills for a range of consumption levels.

Figure 9 All districts annual bill (sewerage only) v. consumption (current and VSC approaches)



Further investigation would be required to assess if these higher water consumers impose a relatively higher cost on the sewerage treatment infrastructure. At this stage it is not conclusive that they do.

**Alternative demand management
approaches**

Alternative demand management approaches

As discussed in the previous section, IBTs are unlikely to be an effective tool for SGW in managing demand. There are a number of other demand management tools that could be used to address SGW's objectives. These include other pricing approaches and direct demand management strategies such as public education, incentives and regulation.

This section first provides a description of a range of different pricing and direct demand strategies that could be used to achieve SGW's objectives. Current observations on the use of demand management strategies in Victoria and other jurisdictions is then provided. Finally, an assessment of the potential costs, benefits and risks associated with each of these alternative strategies for SGW is provided.

Pricing Approaches

An IBT structure is just one of a number of different possible pricing structures that could be applied by SGW. Alternative pricing approaches considered in this analysis are:

- Long Run Marginal Cost - In contrast to prices based on IBTs, which is a consumption based approach to pricing, LRMCM pricing represents a cost based approach. As noted by the ESC in its LRMCM Information Paper, marginal cost essentially measures how total costs change as output is either increased or decreased. Basic economic theory suggests that prices should be set at the marginal cost of production because this maximises economic welfare. Under a LRMCM regime, prices would reflect the cost of meeting an incremental change in demand assuming all factors of production can be varied. The full cost should include environmental and social costs.
- Seasonal tariffs - Under seasonal tariffs, different prices are charged dependent on the time of year. Given higher usage of water in summer, water consumed in summer could be priced at a higher level than water consumed in winter, when demand is generally lower due to lower garden watering and recreational usage. SGW's experience of significant growth in water demand in the summer months due to temporary residents (ie holiday makers) is a common characteristic of businesses that introduce seasonal tariffs. If the tariff structure adopted by SGW was revenue neutral, prices for permanent customers would go down in winter and up in summer.
- Re-balancing of the two-part pricing structure – SGW currently applies a two part structure as set out in Table 7. Residential and non-residential customers (excluding agreement and concessional customers) pay a fixed charge of \$160.42 in the East/West District and \$262.14 in the South District, and usage charge of \$0.7818 in all districts except Murray Goulburn. An option for SGW is to re-balance the tariff structure so that, assuming revenue neutrality, the proportion of revenue derived from usage increases relative to the proportion derived from the fixed charge (or vice versa). Given SGW's water demand management objectives, the likely scenario is to increase SGW's usage charge from \$0.7818 to give consumers stronger signals to conserve water.

Direct demand management approaches

Various non-price demand management strategies are increasingly being considered and implemented in Victoria and elsewhere as the drought situation worsens and decision-makers seek practical and direct methods to reduce consumption.

In general, direct demand management strategies offer the following benefits:

- Where water is scarce and price signals are not sufficient to address a supply-demand imbalance, direct demand management strategies may be a sharper tool by which water use can be reduced.
- They are simple to design and implement – typically the design and implementation does not rely on a water authority having access to detailed information about demand (for example elasticity of demand) and long term capital works programs.
- Well designed and implemented properly, direct demand strategies can be carefully targeted at particular customer groups with high water use. For example, it may be cost effective to target particular high water use customers by undertaking water audits.

Typical costs and risks associated with direct demand management initiatives include the following:

- They have the potential to result in sub-optimal outcomes. For example, mandated water restrictions may not result in water being used where it is most valued or particular schemes may not be efficient.
- They may be based on consumption reduction targets that are too optimistic or that are not sustainable.
- They may result in consumer backlash if not credible or not explained properly. This may be avoided if the customer fully understands the problem and how the proposed initiative will help address the problem.

The following demand management strategies are considered in Table 7.

- Assistance schemes for large water users to reduce water consumption – This may include conducting water audits (ie accounting for water use), identifying water saving measures and assisting businesses in preparing a plan to implement the identified measures. The costs of implementing water efficiency and/or retro fit projects may also be rebated.
- Mandatory requirements for large water consumers – This may include requiring businesses to prepare plans demonstrating water efficiency or mandatory water reductions.
- Behavioural change campaigns – Advertising, visits to community groups, print publications and website information can be used to provide information to customers on ways to save water, improve efficiency and available assistance and incentive schemes.

- Incentives for reduced water use - rebates on water saving products such as three-star water efficient showerheads, upgrading to eligible dual flush toilets, garden products, rainwater tanks and systems for re-using household waste water can be provided.
- Water businesses can undertake increased monitoring of residential water use and direct follow up with high use consumers.

Observations on current demand management practice

Current initiatives by different governments appear to reflect an increasing focus on using direct demand strategies to achieve maximum opportunities for demand reduction.

In Victoria, observation of recent government initiatives on demand management indicate that there is strong focus on achieving demand reduction through restrictions on residential water use, public education and incentive programs (eg rebates on shower heads and rainwater tanks) for residential water users. While the Government's 2004 White Paper dedicates a full chapter to discussing the need for water pricing that supports sustainable water management, the emphasis of its most recent policy document - Central Region Sustainable Water Strategy - is on direct demand management. The Strategy stresses the need for conservation and efficiency through setting water conservation targets for the home and at work, including at least a 1 per cent per year reduction from current non-residential usage.

Most recently, the Victorian Government has placed increasing focus on water conservation by large water consumers. In March 2007, the Government implemented a new mandatory requirement for the top 1500 water users that would build on existing water savings made by industry and maximise future savings across different types of industry. The Government has noted that these water saving plans will require individual businesses to identify ways they can use water more efficiently through water efficient projects such as high pressure washing, on-site recycling and re-use of water from production processes.

In other Australian jurisdictions, the Queensland Government has been the pace-setter on implementing direct demand management strategies. As it responds to the worst drought on record in the south east of the state, the Queensland Government has focused its attentions on the introduction of direct demand strategies targeting large water users. These strategies include:

- The *Water Amendment Act (No. 6) 2006*: requires SEQWater (the bulk water manager) and 17 local councils (the water service providers) to progressively deliver the following regional water savings: 4.1ML/day by April 2007, 8.2 ML/day by September 2007 and 12 ML/day by April 2008.
- Business Water Efficiency Program (BWEP): In November 2006, the Queensland Water Commission (QWC) introduced water restrictions in 12 councils across South East Queensland requiring identified businesses to significantly reduce their water consumption. The primary objective of BWEP is to achieve the minimum savings as per the provisions of Water Amendment Regulation (No.6) 2006. The Government has allocated \$40 million for the BWEP, which is an

incentive scheme that provides financial and technical support to help businesses to save water. The program will:

- Assist businesses to reduce water consumption – either voluntarily or to meet regulatory requirements
 - Improve financial performance
 - Build a community profile as a water efficient business
- Queensland Water Commission business water restrictions: Imposes mandatory requirements as follows:
 - Major consumers using more than 10 megalitres a year must submit a Water Efficiency Management Plan to demonstrate their best practice in water efficiency:
 - Premises using 20 million litres of town water or more a year must submit a Water Efficiency Management Plan to their local council or achieve a 25 per cent reduction in water consumption by 30 April 2007.
 - Those using more than 10 million litres (and less than 20 million litres) must comply with these measures by 31 July 2007.
 - Any premises with a cooling tower for air conditioning must also submit a Water Efficiency Management Plan or show significant water savings by 30 April 2007.
 - All businesses using more than 1 million litres of town water a year must have water efficient taps, showerheads and trigger sprays by 30 June 2007.

In regard to residential use, the Queensland Government is moving to level 5 restrictions in South East Queensland, under which residents will be asked to make significant indoor water use savings. The objective is to achieve a regional average water use target of 140 litres per person per day. Heavy household users will be required to submit a self-assessment audit. The Queensland Government is also looking to increase the pressure on residential consumers that use large amounts of water compared to average. Recent media reports note that the Queensland Water Commission will be sending letters to households in South East Queensland that use more than a specific amount of water per day.

Assessment of direct demand management strategies for SGW

Table 7 provides a summary of possible direct demand management strategies, their potential benefits, costs and risks and an overall assessment of their benefits and costs against SGW's objectives.

Table 7 Comparative analysis of alternative demand management approaches

Benefits	Costs	Risks	Summary of costs and benefits against SGW's objectives
Inclining Block Tariffs and Volumetric Sewerage Charges			
<ul style="list-style-type: none"> • Conceptually they send a stronger conservation signal to very large water users than the current price structure. However, our preliminary analysis based on Melbourne block thresholds shows that most of SGW's consumers (61%) will not face stronger price signals because their expected consumption levels mean that they will not reach the second tariff block. • IBTs are relatively simple and easy for customers to understand and for SGW to administer • IBTs target water used for discretionary purposes in the residential sector with higher prices • IBTs allow for the step quantity to be set high enough to avoid capturing much efficient or non-discretionary water usage by larger households • IBTs minimise the number of vulnerable customers who are exposed to higher prices and therefore partly addresses the affordability issues that exist in other price structures. 	<ul style="list-style-type: none"> • Costs associated with changes to billing administration, customer education and SGW staff training will need to be recovered through higher revenue. • May lead to revenue uncertainty due to the difficulties in determining price elasticity of demand and forecasting likely future expected consumption. 	<ul style="list-style-type: none"> • Price and block levels may lead to inadvertent and/or inefficient outcomes. • They do not necessarily reflect the relationship between water usage and household composition which may lead to undesirable customer impacts • The analysis in section 3 shows that IBTs transfer much of the cost burden to SGW's highest water users (eg in 8% of SGW's customers are in the third tier and account for 30% of the volumetric revenue earned). There is a risk that IBTs may lead to high water users (including large families) being charged for water use that is not necessarily discretionary. • For non-residential customers it may be difficult to determine what non-discretionary use is and as a result the potential exists for some industries that use less water as a business input to be favoured under an IBT. 	<ul style="list-style-type: none"> • The strength of IBT structures is that they send a signal to high users about water conservation – however, our analysis shows that 61% are not likely to face stronger price signals as they are expected to fall within the first block. • For SGW, a weakness of IBTs is that they may disadvantage customers that have high water usage that is not necessarily non-discretionary.

Benefits	Costs	Risks	Summary of costs and benefits against SGW's objectives
Long Run Marginal Cost pricing			
<ul style="list-style-type: none"> • Marginal cost pricing is a more efficient pricing mechanism than IBTs because, in the absence of externalities, consumers are provided with true signals about the actual cost of providing the good or service for different levels of demand and are therefore able to choose an efficient level of use. 	<ul style="list-style-type: none"> • In the current period of drought, LRMIC pricing may not send the appropriate signals for water conservation (particularly if the LRMIC estimation does not include social and environmental costs). This may be the case for SGW in geographical areas where capital expenditure is expected to be low and prices therefore expected to decrease under a LRMIC price regime. As noted by the ESC in its LRMIC Information Paper, this may be grounds for considering departure from LRMIC pricing if there are security of supply issues. • Because of lumpy capital works programs, LRMIC can result in unstable price paths (eg a 'saw tooth' pattern) • Costs associated with continually calculating LRMIC, changes to billing administration, customer education and SGW staff training will need to be recovered through higher revenue. 	<ul style="list-style-type: none"> • LRMIC pricing relies on having accurate information about forecast demand, demand elasticity and the future capital costs. A potential risk is that a LRMIC strategy is based on inaccurate data. • Depending on future capital costs, LRMIC pricing could result in a rebalancing towards fixed charges that would be inappropriate in the current environment. • May lead to revenue uncertainty due to the difficulties in determining elasticity of demand and forecasting water use. • LRMIC pricing could result in socially inequitable outcomes because different geographical regions are served by separately identifiable systems that are at different stages of the fixed asset cycle. If SGW accurately reflected LRMIC and did not apply uniform prices, some customers may face a price reduction with volumetric prices actually approaching zero (where future capital expenditure is expected to be very low) while others may face large price increases (where a large capital works program is required). 	<ul style="list-style-type: none"> • LRMIC strengths are that it provides efficient use incentives and cost reflective prices. • On the other hand, LRMIC pricing may not be readily understandable by customers, may not provide for stable prices and may increase the potential for error based on inaccurate data.

Benefits	Costs	Risks	Summary of costs and benefits against SGW's objectives
Seasonal tariffs			
<ul style="list-style-type: none"> A higher tariff in summer can send price signals about the scarcity of water during summer periods and the cost of maintaining system capacity for the summer peak periods. 	<ul style="list-style-type: none"> Because seasonal tariffs are likely to lower winter tariffs, they do not encourage year-round water conservation. For this reason these tariffs have not been favoured by either the ESC or the Victorian Government. SGW would bear the costs of changes in billing administration, educating consumers about the new tariff structure (expected to be recovered from customers through higher revenue requirement). 	<ul style="list-style-type: none"> Close understanding of the customer base and demand is necessary to achieve demand management objectives. If increase in water usage by SGW's customer in the summer peak period is predominately non-discretionary, then higher prices may not result in reduced water demand. 	<ul style="list-style-type: none"> The strength of seasonal price is that it sends stronger signals to customers about the scarcity value of water in peak periods and the cost of providing infrastructure capacity. However, seasonal tariffs do not encourage year-round water conservation.
Re-balancing of two part tariff structure			
<ul style="list-style-type: none"> If the tariff structure is set such that the usage charge represents a higher proportion of the total charge, this may give stronger price signals about water conservation and reduce discretionary water use. This approach requires no change to the underlying pricing approach and therefore limited potential for customer confusion. 	<ul style="list-style-type: none"> Costs associated with researching and designing re-balanced tariff structure will need to be recovered. 	<ul style="list-style-type: none"> Re-balancing between fixed and volumetric charges relies on having an accurate understanding of marginal costs and demand. A potential risk is that the re-balanced tariff structure is based on inaccurate data. There is a risk that a tariff rebalancing will be inequitable if it results in vulnerable consumers such as large, low income families with high water paying more for non-discretionary use. 	<ul style="list-style-type: none"> A re-balanced tariff structure may provide sustainable use incentives. It is also likely to be readily understandable for customers. However the key risk is that re-balanced tariffs are based on inaccurate demand and cost information.

Benefits	Costs	Risks	Summary of costs and benefits against SGW's objectives
Assistance schemes for large water users to reduce water consumption			
<ul style="list-style-type: none"> Large customers account for a significant proportion of total water consumed by SGW's customer base and are therefore likely to deliver the greatest savings (eg 17 customers account for 29% of the total water consumed, 1868 customers account for 43% of water consumed) Collaborative approach with industry likely to result in stronger commitment to water conservation Readily understandable ie does not involve complex changes to pricing structures Retains flexibility of water consumers to determine the appropriate amount of water conservation. 	<ul style="list-style-type: none"> Depending on the design of the program, a proportion of the cost of water efficiency or retrofit projects will be borne by SGW and ultimately by customers – a possible issue is whether this cost is spread across the whole customer base Businesses will also bear some proportion of these costs – this could impact the viability of businesses in the region, although ultimately the water savings should reduce the costs of water to business High set up and ongoing administration costs will need to be recovered from customers through revenue requirement 	<ul style="list-style-type: none"> Potential for resources to be inefficiently allocated. 	<ul style="list-style-type: none"> The strengths of the strategy are that it can be easily targeted at large consumers which means it is likely to result in relatively large water savings. It is also easy to understand and practical. The key weakness of the strategy is that the cost of administering the scheme and providing assistance such as subsidies and Water Audits is likely to be high.
Mandatory requirements for large water consumers			
<ul style="list-style-type: none"> Mandatory restrictions for large water users can be easily targeted and enforced eg 17 customers account for 29% of the total water consumed by SGW's customers. Does not require explicit spending on programs or subsidies - costs of changes in practices borne by major users (eg new technology, sourcing alternative water supplies etc) would be incurred by the users rather than SGW. 	<ul style="list-style-type: none"> SGW (and ultimately its customers) would bear costs related to education and enforcement eg assisting large users find avenues to reduce demand. However, is easy to target given the small number of large customers Costs borne by SGW for ongoing education and enforcement would need to be recovered through the revenue requirement. 	<ul style="list-style-type: none"> Risk to SGW's reputation if the restrictions are perceived as draconian and unnecessary 	<ul style="list-style-type: none"> The key strength of the strategy is that it can be easily targeted at large consumers which means it is likely to result in relatively large water savings. It is also easy to understand and practical. Weaknesses are that, as a mandatory requirement, it restricts the ability of consumers to choose efficient

Benefits	Costs	Risks	Summary of costs and benefits against SGW's objectives
<ul style="list-style-type: none"> • Readily understandable ie does not involve complex changes to pricing structures. • Potential opportunity to leverage off Victorian Government's statewide initiatives for water reduction by large users. 	<ul style="list-style-type: none"> • Potential for efficient outcomes to be distorted because consumer choice based on price signals is removed. • Restrict flexibility of water consumers to determine the appropriate amount of water conservation. • Businesses will bear costs relating to water demand projects undertaken to meet requirements – this could impact the viability of businesses in the region, although ultimately the water savings should reduce the costs of water to business. 		<p>demand levels based on an individual assessment of cost versus value. It also imposes costs on businesses that may negatively impact the local economy.</p>
Behavioural change campaigns			
<ul style="list-style-type: none"> • Communication with the community is likely to result in improved understanding of challenges and stronger commitment to water conservation. • Retains flexibility of water consumers to determine the appropriate amount of water conservation. • Opportunity to leverage off Victorian Government's state-wide education and provide a more local focus. 	<ul style="list-style-type: none"> • Costs of education campaign borne by SGW and ultimately SGW customers through higher revenue requirement. 	<ul style="list-style-type: none"> • About 165 of SGW's customers (2.5% of the customer base) account for 10% of consumption while 433 customers (6.6% of the customer base) account for 20% of consumption. If the campaign is not properly targeted at these users reductions in water use may be limited. On the other hand, small gains spread across many customers may be significant in total. Design of a behavioural campaign should weigh these possible effects. • There has already been significant state-wide advertising on the need to conserve water. If there are diminishing returns of 	<ul style="list-style-type: none"> • The strength of this approach is that it is likely to result in a stronger community commitment to water conservation whilst not restricting the flexibility of consumers to determine efficient demand levels. It is also a practical and easy to understand approach. • A key weakness is that, if not properly targeted, the benefits may be marginal.

Benefits	Costs	Risks	Summary of costs and benefits against SGW's objectives
		levels of water conservation advertising, then additional advertising may produce fewer benefits.	
Incentives for reduced residential water use such as rebates for water saving devices			
<ul style="list-style-type: none"> Encourages consumers to actively reduce water consumption in the household. Scheme is already implemented by Victorian Government therefore few implementation costs for SGW 	<ul style="list-style-type: none"> With Victorian Government schemes currently in place, the costs of implementation and rebates are borne by Victorian Government therefore SGW's are limited to the cost of additional promotion (which will be passed to customers). 	<ul style="list-style-type: none"> Risks are minimal because responsibility lies with Victorian Government Potential for resources to be inefficiently allocated. 	<ul style="list-style-type: none"> The strategy offers strong upside because it is likely to result in benefits in reduced demand while key costs are borne by Victorian Government rather than SGW and its customers.
Increased monitoring of residential water use and direct follow up with high use customers			
<ul style="list-style-type: none"> Sends strong signal to community about importance of water conservation. Activity is concentrated on small number of high users instead of being spread across entire customer base. eg about 165 of SGW's customers (2.5% of the customer base) account for 10% of consumption while 433 customers (6.6% of the customer base) account for 20% of consumption. 	<ul style="list-style-type: none"> Costs of monitoring and communication (eg direct mail) borne by SGW – while likely to be small because customer use information is already available and it is likely that only a small number of customers will be targeted, SGW staff will need to be trained to ensure sensitive approach to managing customers. 	<ul style="list-style-type: none"> Risk of community backlash if unique circumstances of some users (eg large families) not taken into account or if initiative is perceived as reducing privacy rights. 	<ul style="list-style-type: none"> This approach targets water savings from the highest water users for a relatively low cost. It is also practical and easy to understand. A risk is that the approach may be perceived as unfair and inequitable if vulnerable customers are contacted – needs to be carefully managed.

Appendix A

Inclining block tariffs in Australia

Table A1 Summary of residential Inclining Block Tariffs implemented in Australia

State	Water authority	Service charge	Block 1		Block 2			Block 3			
			Vol (kL)	Price	Vol (kL)	Price	% B1	Vol (kL)	Price	% B1	% B2
NSW	Sydney Water	64	<400	1.26	>400	1.63	129%				
NSW	Shoalhaven	79	<450	0.80	>450	1.20	150%				
NSW	Albury City	84	<250	0.47	>250	0.94	200%				
NSW	Tamworth Regional	155	<450	0.83	450-900	0.88	106%	>900	0.90	108%	102%
NSW	Wingecarribee	99	<300	1.24	5000	1.85	149%				
NSW	Dubbo	110	<550	0.87	>550	1.31	151%				
NSW	Orange	102	<450	1.41	>450	2.12	150%				
NSW	Goulburn Mulwaree	208	<292	1.26	>292	1.81	144%				
NSW	Bathurst Regional	259	<300	0.43	>300	0.85	198%				
NSW	Ballina	95	<350	0.90	>350	1.20	133%				
NSW	Country Energy	185	<400	0.76	>400	2.36	311%				
ACT	Queanbeyan	247	<176	145.00	>176	195.00	134%				
ACT	ACTEW ¹	75	<100	1.21	100-300	1.84	152%	>300	2.29	189%	124%
Vic	South East Water	45	<160	0.81	160-320	0.96	119%	>320	1.55	191%	161%
Vic	Yarra Valley Water	61	<160	0.82	160-320	0.96	117%	>320	1.42	173%	148%
Vic	City West Water	101	<160	0.82	160-320	0.96	117%	>320	1.42	173%	148%
Vic	Western Water	132	<160	0.81	160-320	0.95	117%	>320	1.40	173%	147%
Vic	Coliban Water	115	<200	0.67	200-400	0.81	121%	>400	1.33	199%	164%
Vic	Lower Murray Water (summer)	129	<600	0.26	600-1200	0.47	181%	>1200	0.62	238%	132%
Vic	Lower Murray Water (winter)	129	<200	0.26	200-400	0.47	181%	>400	0.62	238%	132%
Qld	Brisbane Water ²	113	<200	0.96	200-300	0.99	103%	>300	1.25	130%	126%
SA	SA Water	148	<125	0.47	>125	1.09	232%				
Tas	Launceston City Council ³	75	<365	0.35	>365	0.45	129%				
WA	Water Corporation ⁴		<150	0.49	150-350	0.73	149%	350-550	0.95	194%	130%
WA	ACQWEST ⁵	93	<150	0.39	150-350	0.69	177%	350-500	1.00	256%	145%
WA	Busselton Water ⁶	108	<150	0.42	150-350	0.61	145%	350-550	0.67	160%	110%

Notes:

1. ACTEW includes the ACT Government's \$0.55/kL Water Abstraction Charge (WAC)
2. Brisbane Water includes South East Queensland Water's \$0.05/kL surcharge
3. Launceston City Council figures are for 05/06, as 06/07 prices were not reported
4. Water Corporation service charge is based on Gross Rental Values and therefore is not uniform for every customer. Water Corporation also has two additional blocks of 550-950kL (\$1.27) and >950kL (\$1.59)
5. AQWEST also has three additional blocks of 500-700kL (\$1.31), 700-1000 (\$1.57) and >1000kL (\$2.28)
6. Busselton Water also has five additional blocks of 550-750kL (\$0.80), 750-1150 (\$1.32), 1150-1550 (\$1.89), 1550-1950 (\$2.19) and >1950kL (\$2.53)

Table A2 Summary of non-residential Inclining Block Tariffs implemented in Australia

State	Water authority	Service charge ¹	Block 1		Block 2			Block 3			
			Vol (kL)	Price	Vol (kL)	Price	% B1	Vol (kL)	Price	% B1	% B2
ACT	ACTEW ²	75	<100	1.21	100-300	1.84	152%	>300	2.29	189%	124%
Vic	Lower Murray Water	125-2,170	<150	0.25	>150	0.45	180%				
Qld	Brisbane Water ³	113	<200	1.05	200-400	1.07	102%	>400	1.37	130%	128%
Qld	Ipswich Water	210-5,250	<320	0.88	320-480	1.24	141%	>480	1.39	158%	112%
SA	SA Water	Min 164	<125	0.47	>125	1.09	232%				
WA	Water Corporation (metro)	494-12,338	<600	0.76	600-1.1m	0.84	111%	>1.1m	0.82	108%	98%
WA	Water Corporation (non-metro) ⁴	494-12,338	<300	0.88-1.43	>300	1.53-2.96					
WA	ACQWEST	333-8,325	<1000	0.72	>1000	1.05	146%				
WA	Busselton Water	346-8,561	<1000	0.77	>1000	1.10	143%				

Notes:

1. Most sewerage service charges are based on meter size.
2. ACTEW includes the ACT Government's \$0.55/kL Water Abstraction Charge (WAC).
3. Brisbane Water includes South East Queensland Water's \$0.05/kL surcharge.
4. SA Water's service charge is set to 0.094% of property value with a minimum charge of \$164.00.
5. Water Corporation's non-metropolitan usage charges are location dependent.

Appendix B

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