Pricing Principles and Tariff Structures for SunWater's Water Supply Schemes

Issues Paper prepared for the Queensland Competition Authority by PricewaterhouseCoopers

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PRICEWATERHOUSECOOPERS

Contents

1 Introduction

1.1 Background

The Queensland Competition Authority ('the Authority' or 'QCA') is an independent statutory body responsible for assisting with the implementation of competition policy for government owned business entities in Queensland. As specified under the *Queensland Competition Authority Act 1997* (QCA Act), the QCA at the direction of the Premier and the Treasurer (the Ministers) may investigate and report on pricing practices of certain business activities of State and local governments.

SunWater, a Queensland Government-owned Corporation (GOC), owns and operates bulk water supply and distribution infrastructure throughout the state. SunWater supplies about 40 per cent of the water used commercially in Queensland. Twenty-two Water Supply Schemes (WSS) provide irrigation water.

On 19 March 2010 the Ministers, pursuant to Section 23 of the *QCA Act* directed the Authority to recommend irrigation prices to apply to 22 SunWater WSSs from 1 July 2011 through to 30 June 2016. The Authority must provide the draft recommendations by no later than 31 January 2011 and final recommendations by no later than 30 April 2011.

The Ministers' Referral Notice outlines a number of matters which the Authority must take into consideration in setting prices. These relate to requirements for the recovery of costs, including the return on and of capital expenditure, the approach to the valuation of assets, limits on price increases for schemes facing hardship and approaches for the pricing of other services, amongst other matters.

The Ministerial Direction also specifically requires the authority to review drainage costs.

1.2 Purpose and approach

The purpose of this paper is to investigate key issues associated with the setting of prices and tariff structure for SunWater's WSS. This paper considers:

- the appropriate basis for setting prices for SunWater's WSSs having regard to:
    - (i) agreed and proposed national pricing principles for the irrigation sector;
    - (ii) pricing practices in the two previous reviews;
    - (iii) alternative tariff structures including the appropriate basis for the components of tariff structures.
- escalating prices during the price path (possible methods could include the Consumer Price Index or a composite industry index);
- estimating demand for water and use of water entitlements;
- the current methods used to recover drainage costs;
- the implications of free allocations (once discerned from relevant agencies);

- the current method of calculating the recovery of recreational costs from customers, and the extent to which those costs are required in providing water supply services (and if not, alternative means for doing so); and

- the current method of calculating channel water harvesting charges and alternative means for doing so.

1.3 Structure of paper

This paper is structured as follows:

- Chapter 2 discusses the relevant state and national pricing principles which guide tariff structures, including the National Water Initiative (2004) and QCA's *Statement of Regulatory Pricing Principles for the Water Sector (2000)*;

- Chapter 3 provides an overview of the approaches to setting water tariffs, including tariff structures, the application of marginal cost pricing, the application of differential pricing and the form of price control;

- Chapter 4 reviews SunWater's approach to setting drainage and channel water harvesting charges;

- Chapter 5 assesses the approach to recovering recreational costs incurred by dam operators. This section considers SunWater's approach for allocating recreational costs to customers and the extent to which these costs are required in providing water supply services;

- Chapter 6 discusses SunWater's approach to estimating demand for water. This chapter also identifies alternative approaches applied in other jurisdictions and looks at some of the assessments undertaken by the Independent Pricing and Regulatory Tribunal (IPART) in determining the most appropriate approach for estimated demand over the determination period;

- Chapter 7 discusses approaches for indexing water tariffs over the determination period. This chapter identifies approaches used in other jurisdictions, and also other regulated industries, such as electricity, gas, and transport; and

- Chapter 8 discusses the matter of free allocations and how these have been treated by SunWater for pricing purpose. It also discusses the treatment of similar arrangement in other jurisdictions.

2 Relevant pricing principles

A number of pricing principles have been developed both by the Council of Australian Governments (COAG) and the QCA which provide guidance and direction regarding pricing structures for rural water service providers. These principles are described broadly, below, and are considered further in each chapter as relevant.

Appendix B describes all regulatory principles and requirements relating to rural water pricing.

2.1 National Water Initiative (2004)

The *National Water Initiative* (NWI), agreed in 2004 by state, territory and Commonwealth Governments, is the national blueprint for water reform. Under this agreement, governments made a number of commitments related to water reform and to best practice water pricing. These are summarised in Box 1, below.

Box 1. Actions under the National Water Initiative

- *Paragraph 65* – In accordance with National Competition Policy (NCP) commitments, the States and Territories agree to bring into effect pricing policies for water storage and delivery in rural and urban systems that facilitate efficient water use and trade in water entitlements, including through the use of :
  - consumption based pricing;
  - full cost recovery for water services to ensure business viability and avoid monopoly rents, including the recovery of environmental externalities, where feasible and practical; and
  - consistency in pricing policies across sectors and jurisdictions where entitlements are able to be traded.
- *Paragraph 66* – In particular, States and Territories agree to the following pricing actions:
  - full cost recovery for all rural surface and groundwater based systems, recognising that there will be some small community service that will never be economically viable but need to be maintained to meet social and public health obligations:
    - achievement of *lower bound pricing* for all rural systems in line with existing NCP commitments;
    - continued movement towards *upper bound pricing* for all rural systems, where practicable; and
  - where full cost recovery is unlikely to be achieved in the long term and a Community Service Obligation (CSO) is deemed necessary, the size of the subsidy is to be reported publicly and, where practicable, jurisdictions to consider alternative management

More practically, the NWI actions were to:

- give effect to the principle of user-pays and achieve pricing transparency in respect of water storage and delivery in irrigation systems;
- support movement to consumptive based pricing with the explicit linking of water pricing to the volume of water used, with tariffs set to reflect the actual costs of supplying water; and
- support the removal of cross-subsidies in the allocation of costs and pricing of services from water supply schemes.

Further discussion of the NWI requirements is provided at Appendix B.

2.2 Queensland Competition Authority

The QCA's *Statement of Regulatory Pricing Principles for the Water Sector* (2000) includes a number of pricing principles for achieving the objectives of monopoly price regulation. These principles require that prices:

- be *cost reflective* - that is, reflect the costs of providing the service and, usually where the demand for water exceeds its supply, potentially incorporate a value for the resource;
- be *forward looking* - in that they represent the least cost which would now be incurred in providing the requisite level of service over the relevant period;
- ensure *revenue adequacy* - the revenue needs of the business must be addressed where possible;
- promote *sustainable investment* - where the services are to be maintained into the future, the investor must be given the opportunity to enjoy an appropriate return on investment;
- ensure *regulatory efficiency* - the pricing method which minimises regulatory intrusion and compliance costs relevant to a particular circumstance should be adopted; and
- take into account matters relevant to the *public interest* (many such matters are identified in the QCA Act).

With respect to pricing structures, the *Statement of Regulatory Pricing Principles for the Water Sector* found that many of the principles applying to the pricing of urban water also apply to rural water, but with some scope for variations in their application:

- two part tariffs will best meet the objectives of efficient pricing, cost recovery and equity for most urban water businesses. In the irrigation sector, it is likely that two-part tariffs will need to be adjusted to reflect water supply risk and environmental variables;
- volumetric charges in a two-part tariff generally should be set to reflect the long run marginal cost. In practice this would involve the estimation of an average incremental cost. In the rural sector, it was recognised there would be some complexity in the application of long run marginal cost, and its application would be dependent on circumstances;
- the fixed component of a two part tariff should be set to recover any revenue shortfall (after the application of volumetric charges). However, where water use is highly variable, two-part tariffs may need to be structured in a way that generates a higher proportion of revenue from fixed charges;
- postage stamp tariffs may be appropriate in some circumstances, but where costs of supply differ substantially between areas or consumer classes, efficiency would be enhanced where prices reflect the underlying cost differentials. The administrative efficiency and social impact of such a change would also need to be considered;
- seasonal pricing options and nodal pricing can lead to efficient outcomes. These pricing options may be more readily applied to the irrigation sector because of the relatively small number of customers.

These represent the general principles and methods that the Authority considered relevant to its responsibilities. The nature of a particular issue and the relevant circumstances will determine the appropriate methods to be applied. Accordingly, any particular approach cannot be considered to be definitive or binding on the Authority in a specific instance.

3 Approach to setting tariff structures

3.1 Issue definition

This section introduces a number of issues associated with the structuring of water prices, including potential tariff structures, marginal cost pricing and differential pricing.

There is significant variation in the characteristics of SunWater's individual water supply schemes due to differences in network characteristics, services provided, customer base and entitlement mix, and infrastructure types and operating requirements. These characteristics will be considered in examining different options for pricing structures as variations in pricing structures across schemes may be appropriate.

Appropriately structured water prices perform a number of important functions:

- For users, water prices act as a signal on what it costs to provide the required services, allowing them to make informed decisions about whether use will generate benefits in excess of costs. In this way, prices are a key factor in encouraging a level of water use that is economically efficient.[1]

- For water service providers, prices recover the costs of producing and delivering their products and/or services and provide an appropriate return on capital invested in the business.

The appropriate structuring of water prices is necessary to send correct price signals which allow the appropriate valuation, consumption and conservation of water resources. It can also support the removal of any cross subsidies in the provision of water to different users.

Economic efficiency is achieved where consumers use services only where the value they derive from doing so is at least sufficient to justify the cost of providing that service. A pricing structure that closely reflects the cost of the service will encourage users to make efficient decisions relating to the use of water systems. Importantly, pricing structures should be forward looking to reflect the future cost of providing water services and to aid users' decisions as to whether to consume water in the future.

Prices that are insufficient to cover costs will both fail to provide sufficient revenue to assure the commercial viability of the business and may encourage inefficient consumption by consumers. Further without appropriate price signals to customers, water businesses are forced to rely on less-effective and potentially inefficient non-price mechanisms to encourage appropriate resource use (e.g. quotas or water restrictions).

Achieving economic efficiency of resource use and ensuring revenue sufficiency for businesses are only two potential objectives for water pricing. Water prices may also be designed to achieve other objectives, such as equity[2], transparency and administrative simplicity. Prices structures may also be set in such a way as to manage price impacts on

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1 Economic efficiency is achieved where scare resources are allocated to the uses that consumers value most highly. In this way, economic efficiency implies that resources are being applied in a way which maximises returns to the community.

2 Equity has a number of dimensions. Horizontal equity is concerned with the implications of alternative pricing approaches for different customer groups in similar income circumstances. Vertical equity is concerned with ability to pay between customers in different income groups. Equity may also include consideration of how costs are allocated between current and future customers.

customers or customer groups. These objectives may often compete and it is then necessary for price structures to balance these objectives, or tradeoffs may otherwise be required.

There are a number of issues which need to be considered in setting appropriate price structures, as described in the sections below.

3.1.1 Tariff structures

In setting the pricing arrangements, it is necessary to consider both the structure of tariffs (i.e. characteristics of any fixed and variable charge components) and the level of tariffs. In the context of this paper, it is not possible to comment on the level of tariffs until relevant costs have been identified.

For the regulation of water prices, a number of tariff structures may be considered:

Fixed charges or variable charges

A fixed charge (with no usage charge) involves the application of a single fixed charge which is unrelated to the amount of water used. The fixed charge may be levied on a number of basis, although in the rural sector it is commonly applied as a charge per connection, per account (where a customer may have a number of connections for a service), per property or per megalitre of entitlement. If the same fixed charge applies to all customers, then it must be set at the average costs of supplying a customer, in order the recover the business' costs.

A variable charge typically involves the application of variable charge based on actual usage, but no fixed charge. In the rural water sector, the variable charge is applied to each megalitre of water extracted or supplied. If the same usage charge is applied to all customers, then it must be set at the average costs of supplying a unit of water, in order to recover the business' costs;

The decision as to an appropriate tariff structure (or combination of structures as described below) is often influenced by an assessment of where the risks, and the ability of different parties to bear such risks, lies. In the rural sector, these risks typically arise from low water availability.

- Where a greater proportion of revenue (or all revenue) is recovered through fixed charges, this places greater volumetric risk on users as charges are incurred irrespective of use. Higher fixed charges, however, may not provide appropriate price signals to users of the costs of their decision to consume an extra unit of water, and therefore may encourage consumption above the efficient level.

- Where a greater proportion of revenue (or all revenue) is recovered through variable charges, this places greater revenue risk on the water business. In particular, where water availability is low, or demand for water decreases, this may result in a revenue shortfall for the business. Increasing the volumetric component of water charges, however, may encourage water conservation, and may increase the control customers have over their total charges (however the impact of this may be limited to each customer's responsiveness to water prices).

Two-part or multi-part tariffs

A two-part tariff involves the application of both fixed charge and variable charge components. A number of approaches may be taken to setting the charge components. In the rural water sector, the fixed charge is typically based on the volume of water entitlement held by a customer, while the variable charge is based on actual use.

Two-part tariffs are often applied in the pricing of regulated services as they can be used to balance the risks described above between the utility business and users. However, the structure of prices (i.e. the proportion of the costs recovered through the fixed charge as opposed to the variable charge) can vary. For example, some businesses recover 40 per cent of target revenue from fixed charges, and 60 per cent from variable charges, while other businesses apply alternative ratios (e.g. 75:25)

Multi-part tariffs are tiered tariff structures where each different rate can be tied to a relevant cost driver or asset. For example, a three-part tariff could have one part linked to the recovery of fixed costs, a second part linked to variable costs excluding electricity and the third part linked to the isolated electricity costs. Alternatively, multi-part tariffs are also applied where the variable component differentiates charges by the use of particular assets.

Inclining or declining block tariffs

Water supply concerns driven by drought, climate change and other factors, particularly in the urban sector, have increased the interest in using price to influence demand. One method that has been adopted is the use of inclining block tariffs (IBTs). IBTs are a form of multi-part tariffs where the volumetric charge increases in a stepped manner as consumption increases. The rationale given for adopting IBTs (apart from the recovery of efficient costs) centres around the contention that IBTs encourage water conservation because they allow for the price of water to increase as consumption increases. The number of rate blocks and the size and pricing of each block can vary.

Declining block tariffs (DBTs) are a form of multi-part tariffs where is a tariff structure in which the unit price of each succeeding block of usage is charged at a lower rate than the previous blocks. Similar to IBT, the number of rate blocks and the size and pricing of each block can vary under a DBT.

DBTs are often used where there are high fixed costs of providing a service, and it is therefore cheaper to service subsequent users. DBTs recognise these cost differences. However, where costs do not decline with quantity, DBTs depart from economic efficiency and will send incorrect price signals to users. Further, DBTs may not take into account the high investment costs that might be required to add capacity to a system and deliver larger quantities to consumers.

There are a number of practical difficulties in applying IBTs and DBTs in the rural sector, primarily in the setting of appropriate tariffs thresholds where water usage volumes can vary significantly between users (unlike the urban sector where domestic use volumes are more homogenous). For this reason, IBTs and DBTs are not widely applied in the rural water sector.

Peak and/or seasonal pricing

Peak flow pricing involves applying differential tariffs to reflect the different costs associated with providing services during peak and off-peak periods. This reflects that the costs to supply water at these different times may vary.

The principal objective of such a tariff structure is to recover the long-term capital costs associated with provision of water supply infrastructure and the operating costs of water delivery during peak periods. The intention of peak flow pricing is to smooth demand peaks, reducing consumption at peak periods, and thereby deferring the need for additional capital expenditure for increased infrastructure capacity during peak periods.

In practice, peak pricing may involve varying prices at different durations. For example, hourly, daily or weekly, depending on the system operations and when peak demand occur. Alternatively, prices may vary on a seasonal basis, for example, high prices may be introduced in summer when demand is higher.

3.1.2 Application of marginal cost principles

Tariff structures are often set in reference to the underlying cost structure of a business. In its simplest form, the fixed and variable components of a two-part tariff may be set to recover the fixed and variable costs incurred in providing the service. However, there is growing acceptance in regulatory pricing of the application of marginal cost principles to the setting of tariff structures.

Economic theory suggests that to achieve the most efficient price signal, price should be set equal to marginal cost. Marginal cost is the cost of producing an additional unit of a good or service. Pricing at marginal cost (for the final unit produced) provides for consumption up to the point where the marginal cost of producing an additional unit is equal to the marginal benefit gained from its consumption.

Marginal cost can be estimated in either a long-run or a short-run perspective. The fundamental difference between short run marginal cost (SRMC) and long run marginal cost (LRMC) is the time frame under consideration and the implications for a firm's ability to adjust its production process to minimise costs for a given level of demand.[3] In calculating SRMC, capital costs are typically excluded as these are fixed in the short run. In contrast, LRMC includes capital costs as productive capacity can be varied over the long run.

Setting price equal to SRMC would result in the entities recovering only the marginal costs of water supply (e.g. electricity, chemicals for a specific volume of output) except when capacity constraints applied.[4] When capacity constraints apply prices should be set to ensure that the market was cleared, and the revenue that was generated could be used to fund augmentation of supply. However, with SRMC based pricing, there can be considerable variability in prices with prices being very low most of the time and very high when capacity constraints apply.

LRMC incorporates the cost of future infrastructure investment and increases as the time of the next augmentation nears. This provides for more stable pricing while also providing a price signal of increasing costs as the need for system augmentation approaches. Concerns about the high variability of prices under SRMC based pricing has led to a preference for pricing based on LRMC. Of course where no future investment is considered necessary then the LRMC is equal to the SRMC.

It is acknowledged, that LRMC can be of limited application in the context of water businesses as not all factors of production can be altered by marginal amounts to produce a least cost outcome. In these situations, the use of an incremental cost approach, which relates to larger increments of output, may be more appropriate. Incremental cost is the increase in a business's total cost attributable to the production of a good/service, rather than just the cost of producing the marginal unit of that good/service.

There are two broad approaches that can be adopted as a proxy for LRMC – marginal incremental cost (MIC) and average incremental costs (AIC).[5] The MIC is defined as the difference in the present value of investment programs with and without an incremental increase in demand. The AIC is the present value of the stream of capital expanded needed to satisfy the projected demand divided by the present value of the stream of demand itself. MIC and AIC provide an alternative methodology for determining for the price of water.

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3 The distinction between the short and long run in economics is purely conceptual – it does not correspond to any particular time period. In economics the long run is defined as the time horizon where all costs are variable.

4 Except when capacity is reached and short run marginal cost then includes the costs of not serving demand (the value of water to the customers who are not served) given the capacity constraint, rather than being defined by production costs.

5 The concepts of marginal incremental cost and average incremental cost, including their theoretical underpinning and practical application, are discussed extensively in the following report: Marsden Jacob Associates, *Estimation of long run marginal cost: a report prepared for the Queensland Competition Authority*, November 2004.

3.1.3 Differential pricing

Differential pricing – location

In setting pricing structures, it is necessary to consider whether prices should vary depending on the location of water use within the scheme. This reflects that if the cost of storing and delivering water varies across different parts of a scheme, then consideration should be given to differentiating tariffs to reflect these relative cost differences.

Two broad categories of differential pricing (by location) exist:

- Postage stamp pricing – applies uniform charges to all customers regardless of their use of the system and where they receive the same service type. Postage stamp pricing would apply across a common supply scheme, irrespective of the use of infrastructure within the scheme or distance from infrastructure. This approach assumes that the costs to supply all users within the scheme are equal; and

- Location based pricing – applies charges to users of a scheme (who receive the same service) on the basis of the costs associated with their location within the scheme. For example, different prices for water delivery from different infrastructure (e.g. headworks, channel, regulated river, and groundwater) or the distance from infrastructure (e.g. distance from bulk supply source, or intake point for network infrastructure). This approach assumes that the costs to supply users vary between infrastructure types and locations, and these variations should be reflected in prices.

In the regulation of prices, the implementation of location based pricing, where practicable, is preferred for a number of reasons. Firstly, it reduces the potential for cross-subsidisation between services provided by the regulated businesses. It also provides for pricing signals that are consistent with principles of user pays and economic efficiency.

Regulators do acknowledge, however, that postage-stamp pricing may be more appropriate where costs are considered to benefit all users of a service reasonably equally, there are equity concerns regarding location based pricing and/or there are difficulties in reliably and cost-effectively measuring cost differences between providing services.

Differential pricing – customer groups or entitlement holders

Price differentiation may also refer to the charging of different prices for the supply of water to different customer groups or entitlement holders (linked to entitlement reliability). In this situation, these user groups receive a different level of service and the associated costs with supplying each of these groups varies. It could be argued that prices should therefore reflect the different levels of cost or associated 'benefit' that each group receives from the supply system.

Like location based pricing, this form of price differentiation reduces the potential for cross-subsidisation between services provided to different customers groups and also provides for outcomes which are consistent with principles of user pays and economic efficiency.

The differentiation of prices by user groups should not be confused with 'price discrimination' whereby each user group receives the same level of service, but prices are varied depending on a users' willingness-to-pay for the service.[6]

[6] Ramsey pricing is a pricing principle that involves setting pricing for different customer groups based on each customer group's responsiveness to changes in price. Essentially, adoption of Ramsey pricing involves increasing the price to those customers who are prepared to pay a higher price. Ramsey pricing may be acceptable in situations where a customer is undertaking an activity in which consumption can be considered discretionary .

3.1.4 Form of price control

Under the Minister's Referral Notice, the QCA is required to determine prices that allow the recovery of efficient operating costs and prudent capital costs. The actual limiting of price levels may be achieved using a revenue cap or price cap[7]:

- Price cap – Under a price cap, the maximum prices that can be charged are fixed, either by individual tariff parameters for specific items or by reference to a weighted basket of tariff parameters. The price cap is designed to ensure recovery of efficient costs expected to be incurred given an expected level of demand. Prices are usually indexed to reflect escalation of component costs over time.

- Revenue cap – specifies the total amount of revenue that a business can recover in a specified timeframe. Prices adjust, over time, such that the revenue requirement is exactly recovered.

The choice of price control typically depends on a range of factors including the likely accuracy of future usage forecasts, the level of revenue stability sought by the regulated business, the level of price certainty sought by customers and the scope for the different forms to influence various aspects of economic efficiency.

While the form of price control is relevant to tariff structure and levels, this matter is the subject of a separate Issues Paper and is therefore not explored further.[8]

3.2 Approach taken in previous price reviews

SunWater's previous price review involved setting irrigation prices for a five-year period from 2006/07. This review was based on a two tiered negotiation process with the first stage (Tier 1) involving consideration of common issues across the schemes, while the second stage (Tier 2) involved consideration of scheme specific issues.

The Queensland Government applied a number of policy conditions on the setting of prices. In particular, it required that most SunWater water supply schemes achieve lower bound pricing[9] by the end of the price path period, and that irrigation tariffs currently above lower bound costs should not be reduced over the price path.

It was acknowledged that some existing schemes, or scheme segments, would not achieve lower bound costs within the price path period. It was agreed that these schemes or scheme segments (termed Category 3 schemes) would receive a customer service obligation (CSO) support during the price path period.

The government policy also stated that there was to be no additional rate of return and no customer funding of priority spillway upgrades for the duration of the new price path.

However, where a consumer has limited discretion or option to change their level of water use by changing their behaviour, Ramsey pricing is often considered to be a form of inequitable and unfair discriminatory pricing.

7 Price and revenue caps may also incorporate incentives for businesses to increase efficiency with gains made being kept by the business through the determination period and possibly for a limited time into the next determination period.

8 NERA Economic Consulting, Form of Price Control: SunWater Water Supply Schemes, Issues Paper prepared for the Queensland Competition Authority, August 2010.

9 The concept of lower bound pricing involves setting the minimum efficient price required to recover the cost of providing the level of service demanded by customers, using the existing service capacity of the existing assets. Only the efficient costs associated with the delivery of a particular service(s) being priced are used in the determination of lower bound pricing.

3.2.1 Tariff structures

At the time of the previous review, SunWater owned and operated 27 water supply schemes throughout the state. Each individual scheme has different supply characteristics, including different network characteristics (e.g. regulated river flows, channel supplies), customer composition, water supply reliability (i.e. mix of entitlement types) and infrastructure types.

These different characteristics have resulted in variations in both the type and magnitude of tariffs applied across the individual schemes. The predominant tariff structure applied to bulk water and network services in all but one scheme is a two part tariff, subject to a minimum charge. These tariffs are labelled Part A and Part B and are applied as follows:

- Part A – Fixed charge based on the customer entitlement (applies per megalitre of entitlement); and
- Part B – Volumetric charge based on the actual water used as per meter readings (applies per megalitre taken).

In general Part A and Part B charges were set in an attempt to recover a nominated portion of the relevant schemes lower bound costs, with Part A charges typically set to recover around 70 per cent of cost and Part B set to recover the remaining 30 per cent of costs. This split, labelled as 'reference tariffs' for the purposes of consultation with Tier 2 groups, was consistent with the approach adopted in the original 2000/01 to 2005/06 price paths.

Where the sum of Part A and Part B charges did not reach a specified amount, a minimum charge was to apply. This usually applied to small users (less than 10ML) who are then required to pay the difference between the total charges paid and the minimum charge in any year. Different minimum charges apply for bulk water and network services, and these are set for each scheme.

Variations to the above arrangements are shown in Table 3.1, below.

Table 3.1 – Summary of variations to standard tariff structures for SunWater water supply schemes (2006/07 to 2010/11)

Scheme	Variation to tariff structure
Bowen Broken Rivers Lower Fitzroy Scheme Maranoa Scheme	A higher Part A was adopted due to a low water use forecast.
Eton Scheme Macintyre Brook Upper Mary Schemes	A higher Part A was adopted due to a mid range water use forecast. The purpose of this was to reduce the headline tariff.
Central Lockyer Scheme	A lower Part A tariff was adopted for schemes with systemic low water availability.
Bundaberg (river tariff) Burdekin Haughton (all tariffs) Chincilla Weir Dawson Valley (river tariff) Logan River	Where a scheme is above lower bound costs, the above lower bound revenue component was only included in the Part B (variable charge) so that users pay only the above lower bound revenue if water is delivered.

Scheme	Variation to tariff structure
Lower Mary River (Mary Barrage) Mareeba-Dimbulah (river tariffs and some channel tariffs) Nogoa Mackenzie (all tariffs) Proserpine River Upper Burnett (John Goleby Weir tariff) Upper Condamine (Sandy Creek or Condamine River Tariff) Warrill Valley	
Burdekin Haughton (scheme) Dawson Valley (scheme)	Inclusion of the drainage rate in the channel Part A charge also influenced the tariff structure.
Mareeba-Dimbulah	The Mareeba-Dimbulah WSS operates under a slightly different arrangement where an annual access charge applies in addition to the Part A and Part B charges. There is no minimum charge in this scheme. Furthermore, the Mareeba-Dimbulah tariff for network services is a declining block tariff for both the Part A and Part B charges.

'Drought Tariff'

Two schemes adopted a 'drought tariff' arrangement to assist irrigators to manage their water bills during periods of low or no water availability. These schemes included the Morton Vale section of Central Lockyer and the Warrill Valley. The drought tariff was discontinued when the Queensland Government provided a drought subsidy and agreed to refund Part A charges for irrigators in drought affected schemes.

The 'drought tariff' is not a permanent rebate of charges, rather it provides for a temporary reduction in the Part A charge during periods of low or no water availability and in turn involves a higher Part A charge during periods of high water availability.

The 'drought tariff' also includes a mechanism to carry forward to the next price path any under or over payments of Part A charges compared to the target revenue as well as a cumulative balance threshold so that the scheme does not end the price path with an unmanageable balance.

3.2.2 Differential pricing

Differential pricing - location

For the previous price review, SunWater developed a number of methodologies for the allocation of direct and indirect costs[10] amongst and within SunWater's water supply schemes.

[10] Indirect costs include all head office and regional business centres. The basic methodology was that all head office costs are allocated across all of SunWater's WSS in accordance with the most appropriate cost allocation methodology (number of customers, asset values, nominal allocations etc). Where specific office activities could be readily identifiable as material and being undertaken for the benefit of a particular WSS or segment, the associated costs should be allocated to that scheme or segment only.

This provided for 'segment pricing' within schemes where different prices were developed for water supplied from headworks, channel systems, groundwater areas and regulated streams/rivers within each scheme.

These cost allocation methodologies are described below.

Allocation of direct costs to segments

SunWater allocated the direct costs of operation and maintenance of each segment within a scheme at the lowest material level of disaggregation (e.g. headworks, channel systems, groundwater areas and regulated river). The assessment of the materiality of cost differences was based on:

i. identifying areas where the impact of cost changes is likely to be significant, particularly over the period of the next price path; and

ii. allowing identification of separate segments where direct cost drivers enable costs to be causally allocated to each segment. For example, where possible, relift systems utilising pump stations and therefore causing higher electricity costs are recognised as individual segments.

This method of cost identification and data collection meant that there was no requirement for a subsequent methodology to allocate scheme costs to segments.

Inter-segment allocation of scheme costs

SunWater also allocated the costs of some schemes segments across other segments within the same scheme (i.e. intersegment cost allocation). The intersegment allocation of costs applies to costs that are initially attributed to one segment in a scheme but relate to services provided to other segments. As such these costs are required to be proportioned across the other downstream dependent segments within that scheme in relation to the services they receive.

This primarily occurs when a headworks segment has significant infrastructure that benefits customers in numerous segments. Alternatively a channel structure in one segment may be distributing water to customers in one segment as well as diverting additional water into a different channel system for distribution of water to customers in other segments. All customers who have received benefits associated with any specific infrastructure (channel, headworks, etc) should share in the costs associated with that infrastructure on a proportionate basis.

Differential pricing – customer groups or entitlement holders

During the last pricing determination, SunWater sought to further differentiate prices by customer sector (urban, rural and industrial) and on the basis of priority classes (medium priority and high priority)

Price differentiation on the basis of customer sector reflected a past government decision.

This differentiation of prices on the basis of priority classes of entitlements reflected that different priority water allocations pay for different proportions of the lower bound costs associated with the supply infrastructure. Principles of equitable pricing require that the proportion of costs allocated to each allocation group should reflect the costs incurred to supply that allocation, or the 'benefit' they receive from the supply infrastructure. On this basis, it was determined that holders of higher priority allocations should incur a higher portion of the lower bound costs associated with the storage infrastructure.

For the last price determination, this was achieved by using a 'conversion factor' to inflate the valuation of nominal allocations of high priority users such that a megalitre of high priority allocation is worth more than a megalitre of medium priority allocation. In effect, as high priority results in a higher reliability of receiving water, one unit of high priority water has more hydrologic value, and is usually worth more, than one unit of medium priority water.

SunWater allocated efficient lower bound costs on the basis of customers' share of converted nominal allocations. The approach was considered to best reflect the costs incurred in delivering each customers water entitlement and the benefits received by each customer group.

3.3 Regulatory precedents and principles

3.3.1 National pricing principles

SunWater's existing price paths were originally determined in accordance with the *National Water Reform Policy Framework* endorsed by COAG in 1994, and the subsequent requirements of the *National Water Initiative* which was agreed in 2004.

The central theme of these frameworks related to the principles of consumption-based pricing and full-cost recovery, the reduction or elimination of cross-subsidies and making subsidies transparent. This framework also applied the concept of lower and upper bound limits for water prices and is referred to as lower and upper bound pricing.

A discussion of the principles and concepts underlying these frameworks is provided at Appendix B.

3.3.2 Approach taken by other water businesses

The approaches adopted in the setting of price structures for a number of rural water businesses are provided in the table below.

- This summary shows that the majority of water businesses apply a two-part tariff structure, often with the fixed/variable components set in reference to the underlying cost structure of the business. In some instances, the tariff structure is not reflective of costs, notably for State Water in New South Wales where the tariff ratio was set as 40% fixed and 60% variable.

- With the exception of State Water, all water businesses apply a higher fixed charge ratio or one which is 50% fixed. There are instances where a full fixed tariff structure applies (i.e. some districts within Southern Rural Water, and charges for infrastructure assets in the Harvey Water irrigation area).

- Of the water businesses examined, none were found to have set tariff structures in explicit reference to marginal cost (SRMC or LRMC).

- A number of water businesses apply price differentiation on the distinct scheme segments (or valleys in the case of State Water), with this extending to differential prices for different customer groups or entitlement groups (where relevant). These differential prices are set in reference to actual costs for servicing these segments and/or customer groups.

Table 3.1 – Summary of approaches to price structuring adopted by other water businesses

Water business	Scheme description	Tariff structures	Differential pricing
State Water (NSW)	Provision of water to irrigation customers via regulated river systems.	Prices, in most systems, are structured to recover 40 per cent of the target revenue through a fixed entitlement charge with the remaining 60 per cent to be recovered through a variable usage charge. This decision was released in the 2006 IPART Determination paper on bulk water charges. In setting the 40:60 ratio IPART stated that it considered the following: • State Water's operating licence requirements; • the conservation signal of ratio; • State Water's revenue variability and financial viability; and • the potential impact on customers.	Charges differentiated on the basis of valleys and entitlement groupings (high and general security).
Murrumbidgee Irrigation Limited (NSW)	Provision of water to irrigation customers largely via channel systems. Some customers receive water from the Integrated Horticultural Supply system which is a high pressure piped system.	In 2008 MIL reviewed the split of fixed and variable charges and subsequently changed the split to be more reflective of the underlying fixed and variable costs. MIL estimates that their costs are roughly 75 per cent fixed and 25 per cent variable in a normal year. The majority of costs relate to infrastructure and other resources they have in place to provide water to its customers. In the 2008 review of its pricing structure MIL stated that it would not consider moving to a full variable cost as this would result in an increase in the average water charges due to the requirement to build capital reserves necessary to manage assets during low allocation years. On this basis the fixed	MIL has also developed a differential pricing structure based on pricing groups – there are eight different pricing groups with these reflecting: • the location of supply (supply to Wah Wah is charged separately); • the type of use (towns versus other use); and • specific infrastructure (separate cost-reflective charges are applied for the Integrated Horticultural Supply system components of the scheme). These groups have been determined based on the

Water business	Scheme description	Tariff structures	Differential pricing
		and variable charge split is around 75:25.	cost of service provision and resulting charges. Within the Murrumbidgee Irrigation Area (MIA) the cost of provision varies. The pricing groups have been developed to minimise any cross-subsidisation within the MIA.
Southern Rural Water (VIC)	Southern Rural Water is the manager of rural water for southern Victoria. It delivers water to irrigators, harvest bulk water for rural and urban use and licence and monitor extractions from most surface and groundwater systems south of the Great Divide. It also licences the construction of farm dams and groundwater bores across the region.	SRW estimates that their costs are approximately 90 percent fixed and 10 percent variable, in a normal year. In two of the three pricing districts all costs are recovered through a fixed charge. In the third district these costs are recovered by SRW using a combination of fixed and variable charges. Its tariff structure is made up of a fixed charge which recovers approximately 80 percent of its costs where the remaining 20 percent is recovered through a variable charge.	SRW has adopted a differential pricing structure which varies charges across its three irrigation districts. These districts have been determined based on the cost of service provision and resulting charges and have been developed to minimise any cross-subsidisation within the SRW's across the three districts. These charges are further differentiated on the basis of scheme segments, customer types and entitlement types.
Central Irrigation Trust (CIT) (SA)	Central Irrigation Trust (CIT) is situated in Barmera, it pumps water from the River Murray to 1,600 growers who irrigate 13,000 hectares of horticultural crops in nine private irrigation districts in the riverland region of South Australia. The trust is operated by and for the benefit of the irrigators in the region.	Tariffs are set at levels which aim to achieve full cost recovery. CIT faces both fixed and variable costs and they recover these through cost reflective fixed and variable charges. Its fixed costs account for approximately 50 percent of overall costs. The fixed costs are recovered through the fixed service charges and the variable charges are recovered through the delivery charges.	Delivery charges vary between three districts in order to avoid cross-subsidisation between users. CIT's differential pricing reflects its underlying cost structure. The districts are divided according to the level of service they receive which includes high, medium and low pressure irrigation. Peak demand charges also apply for irrigation water use. Different price structures also exist for domestic supplies, parks and ovals and industrial customers.
Renmark Irrigation Trust (RIT) (SA)	The Renmark Irrigation Trust (RIT) was constituted by a Statute of the South Australian Parliament which was assented to on 23 December 1893. The	Access, delivery and other charges are set to meet the requirements of the budgeted administration and maintenance expenditure and allow for a	RIT does not apply any form of differential pricing.

Water business	Scheme description	Tariff structures	Differential pricing
	main purpose of the Trust was to facilitate the putting into operation of the water rights to which the ratepayers were entitled under the terms of the *Chaffey Bros. Irrigation Works Act of 1887*.	reasonable sum to be put into an asset replacement reserve fund. This is to ensure that charges are fully cost reflective in the long term. RIT charges both a fixed and variable charge to recover its costs. Access charges are calculated using a per rated area method and delivery charges are charged per kilolitre of water supplied. The split between fixed and variable charges is set to approximately 50 per cent fixed and 50 per cent variable based on a normal year's usage. This does not reflect their underlying costs which are approximately 85 to 90 per cent fixed and 10 to 15 per cent variable. The tariff levels are set according to an annual budget with half yearly reviews.	
Harvey Water (WA)	Harvey Water is a private irrigators' cooperative (formerly known as South West Irrigation) which delivers water to irrigators via a gravity pipe and channel system which it operates, maintains and improves. It is located about 100 km south of Perth in Western Australia.	Harvey Water has a tariff structure with fixed and variable charges. Harvey Water comprises two private irrigator cooperatives: SWIAC, which is responsible for infrastructure assets, and SWIMCO which manages the irrigation business. There are different charges for each cooperative: SWIAC has two fixed charges, and no variable charge. The fixed charges include an asset levy – which forms a sinking fund to be used for the renewal and maintenance of the delivery system (charge per share); and an access contribution – paid by customers connected to the piped delivery system in recognition of the higher level of service this provides (charge per connection). SWIMCO has fixed and variable charges. The fixed charges include an asset levy, a Water Storage	Harvey Water applies postage stamp pricing and does not differentiate prices across its schemes.

Water business	Scheme description	Tariff structures	Differential pricing
		charge, a dam safety charge, and a development. The variable charges include a delivery charge and an irrigation consumption charge.	

3.4 Analysis of key issues/options assessment

This section provides an analysis of the key issues and options which must be considered in determining price structures specifically for SunWater's water supply schemes.

In undertaking this analysis, it is acknowledged that there is significant variation in the characteristics of SunWater's individual water supply schemes. These variations arise primarily from differences in network characteristics (e.g. regulated river flows, channel supplies, groundwater resources) and services provided, the customer base and mix of entitlement types, and infrastructure types and operating requirements.

The different characteristics of the schemes will be considered in examining different options for pricing structures as variations in pricing structures across schemes may be appropriate. The QCA has requested that alternative options be assessed with consideration of the following:

- efficiency (including price signals to the holders of water entitlements);
- suitability for application in variable climatic conditions and demand conditions;
- financial viability and the revenue stability for SunWater;
- administrative simplicity; and
- the benefits of further price differentiation (e.g. between channel and bulk charges within a water supply scheme, other scheme segments and between customer groups).

3.4.1 Tariff structures

For future price paths, a range of tariff structures may be considered as outlined below.

Two-part tariffs

As outlined in Section 3.1.1, the decision to apply a fixed or variable charge is influenced by considerations of efficiency incentives and revenue adequacy for the regulated business. In the event of low water availability and/or demand, a fixed charge provides greater revenue security to the business (placing volumetric risk on customers), but may not encourage efficient use. In contrast, a variable charge results in revenue risk for the regulated business, but may send price signals to users to encourage efficient use.

In practice, two-part tariffs, consisting of fixed and variable charge components, are widely applied in the pricing of regulated services. This structure can be used to adequately balance the risks of low water availability between the regulated business and users, while encouraging efficient water use. Two-part tariffs are advocated in relevant national pricing principles for both rural and urban supply.

In setting two-part tariffs, a critical issue is how to set the fixed and variable charge levels. Typically, tariff levels are set in reference to the underlying cost structure of the business, with the revenue received from the fixed/variable components of charges ideally mirroring the fixed/variable cost proportions of the business. However, other proportions may be adopted with this often reflecting a business' desire to reduce revenue risk, or reflecting customers' capacity-to-pay charges, in the event of low water availability or regulatory requirements to provide signals about expansion costs.

For SunWater schemes where water availability/supply is more stable and demand is high relative to entitlements volume on issue, it may be appropriate to recover a higher proportion of costs through the variable charge component. This reflects that the revenue risk to SunWater is less critical, and variable charges can be applied to send demand conservation signals to users. Conversely, in schemes where water availability is low or variable, a higher proportion of costs may be recovered through the fixed charge component to provide revenue stability for SunWater.

It is acknowledged that structures which depart from the underlying fixed/variable costs structures may not be efficient. For example, a volumetric structure where the charge exceeds the actual variable cost of supply will result in underutilisation of the service, since the price for the delivery of an additional unit (ML) of water exceeds the marginal cost of delivery. This may impact upon existing market based mechanisms, in this case the trade of water within schemes, which would otherwise achieve a level of resource efficiency. It should also be considered whether it is appropriate for SunWater to bear additional risk where variable charges are set higher than the cost of supply.

Application of marginal cost pricing

Marginal cost pricing has been advocated as a means of setting efficient regulated prices. In the context of two-part tariffs, the volumetric charge is often set at the marginal cost of supply, while the fixed charge is determined on the basis of recovering the remaining revenue. LRMC is generally deemed as the appropriate measure by water regulators in Australia based on the rationale that it provides signals to water users as to the cost of future infrastructure augmentations.

In theory, the volumetric charge should be adjusted over time to account for the change in the marginal cost of water. In turn, the fixed component could be adjusted to ensure that the revenue requirement of the business is still satisfied. This adjustment process can be used as a mechanism to alter prices where prevailing variable costs change as a result of factors, such as drought and changed regulatory requirements.

There are significant practical difficulties associated with the application of LRMC, in particular, in the collection of sufficient information to accurately calculate LRMC. This is due to the unpredictability of future supply and demand, and consequently uncertainty regarding the need and timing of future augmentations (or even the feasibility of augmentations in environmentally constrained catchments). This may constrain the application of LRMC in these circumstances.

In practice, the application of pricing based on LRMC may be more difficult and costly to administer, and less transparent where it is not adequately understood by customers. Given the convergence of LRMC and SRMC in many SunWater schemes, it may be more appropriate to use the proportion of variable costs as a proxy for LRMC.

Regulators around Australia have expressed a preference for two-part tariffs set with reference to LRMC, particularly in the urban water sector. However, each regulator acknowledges that there is a range of matters that it must consider in using LRMC, and care must be taken to ensure that price signals are correct and pricing is efficient. These complexities associated with applying are typically more pronounced in the rural water sector. As such, LRMC is generally used as a guide only in making pricing decisions.

Inclining and declining block tariffs

IBTs

Under an IBT, the volumetric rate increases in a stepped manner as consumption increases. The rationale given by regulators for adopting IBTs (apart from the recovery of efficient costs) centres around the assumption that IBTs encourage water conservation because they allow for the price of water to increase as consumption increases.

IBTs have largely been applied in the urban sector as there are a number of practical difficulties in applying this structure (and DBTs) in the rural sector. Primarily, this relates to the difficulties in setting of appropriate tariff volume thresholds where water usage volumes can vary significantly between users, and where this variance may have little or anything to do with use-efficiency.

In the urban sector, domestic water use per household does not vary as significantly and there are a large number of households where use approximates the average. High tariffs might therefore seek to reduce consumption by households which have usage above the average. A significant criticism of IBTs is that the structure may be inequitable for large households, where they are deemed 'inefficient' by virtue of having above average total water use, while water use on a per person basis could be at or below average.

In the rural sector, usage volumes can vary significantly without natural 'groupings' toward the average with this being a consequence of water being used for 'productive' rather than domestic purposes. As such, it is more difficult to set appropriate tariffs levels and there is greater potential for inefficiencies to arise.

Further, the purpose of inclining block tariffs is to reduce usage, particularly of large users on the basis that the additional water use is not efficient. This does not necessarily follow in the rural sector as large users might use greater quantities of water (possible even more efficiently than smaller users) because they are profitable. An IBT would create an incentive for large users to break down their operations into smaller sizes but this may not be the most efficient outcome.

For these reasons, IBTs are not widely applied in the rural water sector.

Application of marginal cost pricing

An issue which must be considered is the potential application of LRMC to determine the variable components of IBTs. By definition, an IBT has more than one variable charge. Where this is the case, at least one of the volumetric charges must be set at a level other than the calculated marginal cost. Where an IBT (e.g. two-tiered) is implemented, it would not be possible to set both the tier 1 and tier 2 usage prices to reflect this cost.[11]

Criticism of IBTs therefore follows from the idea that economic (allocative) efficiency can be attained only through a single marginal price of water. If two customers are paying for water at different marginal prices due to different levels of consumption, one of the two prices cannot achieve allocative efficiency. The volumetric price for water should be set equal to the marginal cost of water to achieve efficiency.

[11] IPART considered this issue in an investigation of price structures it undertook in 2004 for urban water prices and concluded that it would be more appropriate for the tier 1 price to be set with reference to the LRMC, as this would send an appropriate signal to all customers about the scarcity value of water, and allow them to make purchasing decisions accordingly. The tier 2 usage charge would not be chosen for economic efficiency reasons with the IPART using it to send an additional signal to those residential customers who use a high volume of water, to encourage them to reduce their discretionary use of water.

For this reason, IBTs are considered to be inefficient, but this needs to be qualified. If prices are set in advance by the regulator without knowing the precise demand and cost conditions, a simple two-part tariff will only be efficient in the rare cases where the regulator perfectly forecasts cost and demand conditions.

For urban water pricing, the NWC advocates the use of a two-part tariff for water pricing using only one tier based on long run marginal cost. It recommends against the use of IBTs, citing concerns around:

- the delay in the customer receiving the implied consumption message;
- the complexity of the pricing signal resulting from multiple tiers; and
- breaking the relationship between prices and marginal costs.

Again, these concerns could be equally applied to the rural water sector.

DBTs

DBTs involve the application of a progressively lower volumetric rate to each succeeding block of usage. DBTs are often used where there are high fixed costs of providing a service, and it is cheaper to service subsequent users. However, where costs do not decline with quantity, DBTs depart from economic efficiency and will send incorrect price signals to users. Further, DBTs will not take into account the high investment costs that might be required to add capacity to a system and deliver larger quantities to consumers.

DBTs are not usually favoured by regulators in setting prices for water businesses as their cost profile generally does not support their application, and they fare poorly in terms of efficiency outcomes. Further, usage volumes can vary significantly without natural 'groupings' toward the average and consequently it is more difficult to set appropriate tariffs levels.

DBTs are currently applied in the Mareeba-Dimbulah scheme (network services) for both the Part A and Part B charges. The declining block structure in this region is largely the result of historical pricing arrangements which, prior to 2000, were based mainly on crop type. The water-intensive rice industry was the dominant crop at the time using far more water than the alternative less water-intensive tobacco industry. No sizable sugarcane farming existed in the region at that time. Different pricing arrangements were in place to reflect the high volume of usage by rice growers relative to tobacco growers.

The use of the DBT also reflected concerns in the area regarding the loss of major (industrial) users, which may impact on the future viability of the scheme. It will need to be further considered whether DBTs remain an appropriate tariff for the Mareeba-Dimbulah scheme given changes in the cropping/water use profile.

Peak and/or seasonal pricing

Peak flow pricing involves applying differential tariffs to reflect the different costs associated with providing services during peak and off-peak periods (including across seasons).

The principal objective of such a tariff structure is to recover the long-term capital costs associated with provision of water supply infrastructure and the operating costs of water delivery during peak periods. The intention of peak flow pricing is to smooth demand peaks, reducing consumption at peak periods, and thereby deferring the need for additional capital expenditure for increased infrastructure capacity during peak periods.

Peak prices should reflect the differences in marginal costs of water supply at different times. Peak pricing could be applied in the form of a two-part tariff with the variable component set in

reference to LRMC, and the fixed component set to recover any shortfall in revenue. In practice, however, the calculation of LRMC at different times is likely to be complex due to the high information requirements and this may preclude the application of peak pricing.

A key consideration in the application of peak pricing is that it is largely only appropriate where there are capacity constraints emerging that would otherwise require future investment to address it. That is, the application of peak pricing in the situation where LRMC and SRMC equate would not result in price signals which reflect the long term costs of supply. Notwithstanding, setting peak prices to reflect SRMC may result in more cost-reflective pricing of supply.

For SunWater, peak flow pricing may be relevant in channel systems (or segments of systems) where capacity constraints arising from infrastructure would most likely exist. It is noted, however, that such constraints may also exist in regulated river systems.[12] During the last price review, SunWater noted:

> *Historically, SunWater's channel delivery systems were designed to deliver customers' nominal allocations over 90 to 100 days of the year and were based on assumed rates at which customers would take water through an off-take (i.e. the flow rate). However, changing demands for and usage of channel water often require that allocated volumes be delivered in more compact 'peak' periods with higher flow rates which can exceed the delivery capacity of the channel.*
>
> *Much higher flow rates mean that although annual water deliveries may remain unchanged, there is greater demand for channel delivery capacity during peak periods and there is a need to rationalise access to that capacity during peak periods (i.e. peak flow entitlements). A 'market-based' tariff structure which effectively charges a premium for the demand of higher flow rates in peak periods is seen as an effective means of rationalising limited channel capacity.*[13]

This suggests that there may be some need for peak demand pricing within SunWater schemes. However, in implementing such a pricing structure, it should be noted that:

- customers who have high peaks in demand may not necessarily drive network cost increases as their peaks may correspond with low demands of the majority of customers;
- a peak flow pricing regime will lead to price variability and add complexity;
- appropriate metering is required (i.e. ability to read meters at relevant times) to support the administration of peak pricing; and
- there may be high costs associated with collecting relevant information to design and administer a peak pricing regime.

Ultimately, the extent to which time-dependent pricing promotes efficiency will depend on whether prices accurately reflect the differences in marginal cost of supply at different times. Regulators who have investigated peak pricing (in an urban context) have found that there are practical difficulties with peak pricing and uncertainty as to the magnitude of its effects on

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[12] In the Murray-Darling Basin, there are constraints on regulated river system capacity due to the physical characteristics of the system (e.g. the Barmah Choke), or due to high demand for volumes downstream. For example, an embargo was placed on the trade of water from the Murrumbidgee river system last year due to system capacity constraints preventing the delivery of water downstream at peak times.

[13] SunWater. *Tier 1 Working Paper No. 13 – Tariff Principles & Structures*. Available at: http://www.sunwater.com.au/irrigationpricing_tier1report_workingpapers.htm

demand.[14] These regulators concluded that peak pricing is not a cost-reflective method of managing demand and the benefits do not appear to outweigh the costs of implementing such a regime.

This is not to say that peak pricing does not warrant further consideration for SunWater schemes. Rather, an understanding of the costs and benefits of such a pricing regime would be necessary, including in the context of other options to manage peak demands (e.g. changes to storage operations, efficiency improvements by users or the implementation of tradeable delivery rights, where practicable).

3.4.2 Differential pricing

Differential pricing – location

In previous price reviews, SunWater has applied a number of cost allocation methodologies which have provided for an implementation of 'segment pricing' within water supply schemes. Segment prices were developed for water supplied from headworks, channel systems, groundwater areas and regulated streams/rivers within each scheme.

For future price paths, prices may be set on the basis of postage stamp pricing, locational pricing or a combination of both.

Postage stamp pricing

Postage stamp pricing would involve the application of an average price for all customers regardless of their use of the system. For example, a single fixed/variable charge across all users within a scheme, but differentiated across customer groups / entitlement holders. In considering this option, it is noted that:

- postage stamp pricing is often advocated for reasons of administrative simplicity. In this situation, postage stamp pricing would likely be easier to implement and administer, although frameworks/systems would be designed for locational pricing and any associated savings may not be significant;

- postage stamp pricing may be considered equitable by users as they would all be paying the same price for water. In practice, the aggregation of costs across schemes may also not result in the application of cost reflective pricing and there is potential for cross-subsidisation of scheme costs. For this reason, it may not be viewed as equitable by all customers as any reallocation of costs would result in prices increasing for some customers and decreasing for others without reference to previous tariffs; and

- post stamp pricing may support improved cost recovery for SunWater where it results in a lower 'average' price for water which is more consistent with the capacity-to-pay of all users within a scheme. This benefit would need to be weighed against implications for cost reflectivity and removal of cross-subsidies between user groups.

For the reasons outlined above, there would not necessarily be a strong rationale for moving to postage stamp pricing, where locational pricing currently exists, other than the potential for improved cost recovery. Where postage stamp pricing is currently in place, and the differences in cost to supply different users are not material, then there may be an argument for maintaining existing postage stamp pricing arrangements.

[14] The Independent Competition and Regulatory Commission (April 2008) and Economic Regulation Authority (November 2005)

Location based pricing

An alternative option is for the application of location based pricing, either on the basis of existing scheme segments or with a greater level of disaggregation. This would be subject to the review of existing costs for scheme segments and the assessment of the materiality of cost differences.

Location based pricing is premised on the grounds of economic efficiency and user pays. There are two parts to this concept: firstly the customer only pays for the level of service they receive, and secondly, it provides a price signal that may alter customers' behaviour. Location based pricing also allows for the removal of any cross subsidies which may exist between scheme segments.

For future price paths, there would be an argument for maintaining location based pricing as it currently exists for scheme segments, provided that the materiality of cost differences remained significant enough to justify a relevant price differential. The maintenance of this approach would provide for a level of price differentiation consistent with the different costs associated with delivering water services across scheme segments. This approach is also familiar to SunWater customers and has been agreed through past price reviews.

A question remains as to whether there should be further disaggregation of scheme costs and greater levels of price differentiation; for example, within scheme segments. This would be dependent on the extent to which these cost differentials are material, as well as any practical challenges (e.g. capacity to collect necessary cost information) of a more disaggregated charging approach. While location based pricing has a number of benefits, these need to be balanced against the costs of achieving further cost disaggregation.

A consideration in the application of greater levels of price disaggregation is the potential revenue implications for SunWater. Under a locational pricing approach, costs would reflect differentials in scheme costs with the potential for significantly higher or lower prices. Where capacity-to-pay limitations exist, users may not be able to pay prices in higher cost scheme segments with this impacting on the level of revenue able to be collected by SunWater.

Differential pricing – customer groups / entitlement holders

For the previous price path, SunWater also differentiated prices by customer sector and on the basis of priority classes (medium priority and high priority). Where prices were differentiated by customer sector, this was a result of past Government policy. SunWater introduced differential pricing across priority groups to reflect that different priority entitlements holders should pay for the costs incurred in supplying that entitlement. On this basis, holders of higher priority allocations typically incurred a higher portion of the lower bound costs associated with supply infrastructure.[15]

In principle, prices should reflect the actual costs of providing a service and cross subsidies between customer classes should be removed. However, the decision to adopt differential pricing for customer groups / entitlement holders will also depend on whether the actual costs of supplying to different customers are sufficiently different. Where cost differences are considered material, within the context of overall costs for water supply, there may be justification for further price differentiation.

For the next price path, price differentiation may be applied on the basis of existing customer groups, or on the basis of a greater level of disaggregation where there are 'sub-classes' of customers, or other factors which may differentiate the costs of supplying of certain

[15] SunWater has advised that an irrigator could hold a high priority water access entitlement yet be subject to the current Government policy for subsidised irrigation charges. Conversely, a non-irrigator could hold medium priority water access entitlements yet pay unsubsidised charges.

customers.[16] This would be appropriate, subject to the materiality of these cost differences. Further, any decision to move to more disaggregated differential pricing for within customer classes should be weighed against potential difficulties in collecting the relevant information, at least in the short-term.

3.5 Summary

A summary of the pricing options, with reference to each of the QCA's key considerations, is provided below.

[16] For the previous price path, prices were differentiated by tariff group with prices within the tariff group being the same for each user irrespective of nominal allocation, water use or demand distribution. There were some irrigators who considered that the tariff group should be further differentiated and for the tariff group to be split to reflect cost differentiation within the tariff group.

Table 3.1 – Summary of approaches to price structuring adopted by other water businesses

Water business	**Economic efficiency** (allocative efficiency)	**Revenue adequacy**	**Administrative simplicity**	**Application during variable climatic conditions**	**Price differentiation** (scheme segments or customer groups)
Tariff structures					
Fixed versus variable charges	Fixed charges do not encourage economic efficiency as prices do not vary according to use. Variable charges send prices signals to users to reduce use and may therefore support efficient water use.	Recovering revenue through fixed charges typically places greater volumetric risk on users as charges are incurred irrespective of use. Greater revenue risk is placed on water businesses where a greater proportion of revenue is recovered through variable charges. The overall effect is dependent on the variability of water supply.	Both tariff structures are relatively easy to implement and administer when compared to other tariff options.	Variable charges can send price signals to users to reduce supply and can manage the quantum of costs incurred by users where water availability is low. Fixed charges can be used to manage revenue risks to the business but do not send price signals regarding use. The suitability of application during variable climatic conditions therefore depends on the pricing objectives.	Both structures can be applied where further price differentiation is sought.
Two-part tariffs	The extent to which two-part tariffs support efficient pricing depends on the combination of fixed and variable charges. The variable charge would need to be set at to reflect marginal cost of supply, and would need to be set at an adequate level to influence water use.	Two-part tariffs can be used to reduce the revenue risks facing the business. Where water supply is variable or uncertain, a higher fixed charge may be applied to reduce the revenue impacts of lower water availability.	A two-part tariff is relatively easy to administer, although greater complexity would exist where it was coupled with marginal cost pricing.	Two-part tariffs can be used to balance the risks of low water availability between the utility business and users. The optimal balance of the fixed/variable charge components will depend on the nature of scheme costs and the objectives of the regulator and regulated business.	This structure can be applied where further price differentiation is sought.
Inclining and declining block tariffs	IBTs can result in a departure from economic efficiency where variable pricing tiers do not align to the marginal cost of supply (i.e. typically only one tier aligns with marginal	Where a greater proportion of the charge in applied through variable components, IBTs increase the water supply risks for water businesses. This may make achievement of revenue adequacy more	There are a number of practical difficulties in applying IBTs and DBTs in the rural sector, primarily in the setting of appropriate tariffs thresholds where water usage volumes can vary significantly	The rationale given for adopting IBTs (apart from the recovery of efficient costs) centres around the contention that IBTs encourage water conservation because they allow for the price of water to	This structure can be applied where further price differentiation is sought, although its application is likely to be more complex.

Water business	Economic efficiency (allocative efficiency)	Revenue adequacy	Administrative simplicity	Application during variable climatic conditions	Price differentiation (scheme segments or customer groups)
	cost). DBTs do not encourage efficiency as tiers typically do not align with marginal costs (which typically increase in the water sector). Prices would therefore not send correct price signals to users.	challenging. DBTs can encourage greater water use which may support objectives for revenue adequacy.	between users. For this reason, IBTs and DBTs are not widely applied in the rural water sector.	increase as consumption increases.	
Peak flow pricing	Peak flow pricing involves applying differential tariffs to reflect the different marginal costs associated with providing services during peak and off-peak times. This may promote economic efficiency by ensuring that these costs are signalled to customers, thereby influencing their decisions to use water.	To send price signals, peak pricing should be applied in the form of a two-part tariff with the variable component set in reference to LRMC, and the fixed component set to recover any shortfall in revenue. This structure can be used to manage the revenue risk to the business of low water availability.	The calculation of LRMC at different times is likely to be complex due to the high information requirements. This has precluded the application of peak pricing in the urban sector.	Peak flow pricing, applied as a two-part tariff with the variable component set to LRMC, may be used to manage the revenue risks of low water availability. In general, LRMC does not support allocative efficiency in terms of short-term scarcity.	This structure can be applied where further price differentiation is sought, although its application is likely to be more complex.
Marginal cost pricing					
Short run versus long run marginal cost	Economic efficiency occurs where prices are set to marginal cost of supply. LRMC is often preferred as it provides a price signal for increasing costs as the need for system augmentation approaches.	Marginal cost pricing would typically be applied to calculate the variable component of a two-part tariff. This structure can be used to manage the revenue risk to the business of low water availability.	Calculating LRMC in the rural water sector is difficult due to the unpredictability of future supply and demand, and consequently uncertainty regarding the need and timing of future augmentations. In practice, the application of	Pricing at LRMC provides for efficient allocation of resources over the longer-term but does not support allocative efficiency in times of short-term scarcity. The application of SRMC may be more appropriate in this	This structure can be applied where further price differentiation is sought, although its application is likely to be complex.

Water business	**Economic efficiency** (allocative efficiency)	**Revenue adequacy**	**Administrative simplicity**	**Application during variable climatic conditions**	**Price differentiation** (scheme segments or customer groups)
	Given the convergence of LRMC and SRMC in many SunWater schemes, it may be more appropriate to use the proportion of variable costs as a proxy for LRMC.		pricing based on LRMC may be more difficult and costly to administer, and less transparent where it is not adequately understood by customers.	instance but care needs to be taken to ensure prices remain stable.	
Differential pricing					
Postage stamp versus locational pricing	Location based pricing improves cost reflectivity and removes cross subsidies, providing greater price signals to users regarding the cost of supply. This cannot be achieved with postage stamp pricing where cost differentials for supply at different locations are material.	Location based pricing may have implications for revenue adequacy where capacity-to-pay constraints do not allow the recovery of prices in high cost scheme elements. A postage stamp pricing approach may result in an overall lower 'average' price'.	Postage stamp pricing is often advocated for reasons of administrative simplicity, although locational pricing already exists in SunWater schemes and systems may therefore support further price differentiation.	Per the structures outlined above.	N/A
Customer groups or entitlement holders	Locational pricing improves cost reflectivity and removes cross subsidies, providing greater price signals to users regarding the cost of supply.	As above – price differentiation on the basis of customer groups may result in significantly higher prices for some customers. Where there are capacity to pay constraints, this may impact on the level of revenue that can be recovered.	As above – a single price for all customers would be administratively simple, although price differentiation by customer group already exists in SunWater schemes and systems may therefore support further price differentiation.	Per the structures outlined above.	N/A

4 Approach to setting other charges

4.1 Issue definition

Beyond standard water tariffs for water storage and delivery, there are a range of other charges set by water businesses. For the purposes of this issues paper, the other SunWater charges under consideration include:

- water drainage charges; and
- channel water harvesting charges.

4.1.1 Drainage costs

SunWater provides drainage services in five irrigation districts. Drainage costs include costs associated with the removal of water from irrigation properties (both farm run-off and stormwater) and the disposal of such water via a drainage network. SunWater also allows customers to divert water from drains for a drainage diversion charge.

Five schemes[17] have drainage charges. Specifically they are provided to the WSS identified below:

- Burdekin – Haughton;
- Dawson Valley;
- Mareeba – Dimbulah;
- Nogoa – Mackenzie; and
- St George.

The Mareeba-Dimbulah drainage charges are included in the irrigation channel tariffs. The other schemes have a separate drainage charge levied on a per hectare basis.

4.1.2 Channel water harvesting

Channel harvesting is the consumption of water taken from a channel (or pipeline) during authorised or announced high flow periods (e.g. flooding). Channel harvesting allows consumers the option to take additional (non-allocation) water from a channel or pipeline distribution system. This option however is only available upon the announcement of a period of authorised water harvesting by DERM. Channel harvesting entitlements is over and above the water available to a customer under their water access entitlement.

Where water channel harvesting services are available (e.g. SunWater has a river harvesting entitlement and a water harvesting period has been determined by DERM), SunWater may divert/harvest water from a river into a SunWater channel/pipeline distribution system and offer

[17] Synergies Economic Consulting. 2010. *Rural Water Pricing Business and Scheme Overview*. January 2010

it for sale to consumers (in addition to any announced allocation[18]). Currently SunWater holds water harvesting entitlements in two WSS:

- Burdekin – Haughton, which operations under the Burdekin ROP; and
- St George, which operates under the Condamine and Balonne ROP.

The costs associated with channel harvesting water include the value of the entitlement and the charges associated with the delivery of the entitlement. This report considers the treatment of the delivery or infrastructure related charges only.

DERM determines the trigger point for licensees, including SunWater, to commence water harvesting based on a predetermined flow condition in a river. For example, in the Lower Balonne River the trigger flow condition is 8000ML/day. In the Lower Burdekin Water Management Area the flow in the Burdekin River is to be greater than 5000ML/day at Clare.

4.2 Approach taken in previous price reviews

4.2.1 Drainage costs

For the 2000/01 to 2005/06 price paths, separate drainage rates were set on a per hectare basis in all the WSSs serviced; with the exception of Mareeba-Dimbulah where drainage costs were recovered in the Network Service Charge (NSC).

During the 2005/06 pricing review, drainage rates were reviewed, and three options were provided to SunWater's customers for the recovery of drainage costs:

- increasing the existing per hectare drainage rate to a level to recover the efficient lower bound drainage costs;
- replacing the existing per hectare rate with a per ML rate on all water allocations in each channel system to recover the efficient lower bound drainage costs; or
- introducing a new hybrid charge to recover the efficient lower bound drainage costs that combines the existing per hectare drainage rate with an additional per ML rate on all water allocations in each channel system.

On the basis of these three alternatives, the following arrangements were made:

- a per hectare rate was adopted in Nogoa-Mackenzie and St George to recover lower bound costs;
- a hybrid approach was adopted in Burdekin-Haughton and Dawson Valley, where the previous per hectare rate was preserved, but the fixed network service charge increased to recover the shortfall between the per hectare rate and lower bound costs; and
- no separate drainage rate was introduced in Mareeba-Dimbulah scheme.[19]

[18] Although channel harvesting is a chargeable event-based product, the volume of water taken is not taken into account by SunWater as usage of a Customer's Water Allocation (SunWater Price Review 2005-06: Working Paper 2: Glossary of Terms and Definitions, August 2005) That is, SunWater makes additional water available to customers in the Burdekin Haughton and St George schemes under its water harvesting (unsupplemented) entitlements issued by DERM. It is over and above water available under a Water Allocation. Each recipient has a cap on the amount that can be supplied under a Channel Harvest Diversion Contract.

The drainage charges for 2009/10 are provided in Table 4.1 below. These charges are based on a charge per hectare basis. Charges are generally common between schemes, although they apply to different classifications of land. Charges did not increase over the price path period, however, would be indexed at CPI 2009/10 onwards.[20]

Table 4.1 – SunWater's drainage charges (2009-10)[21]

WSS	Drainage Rate ($/ha)
Burdekin – Haughton	20.80 of land
Nogoa Mackenzie	20.85 of irrigable land / 5.20 of non-irrigable land
St George	20.85 of irrigable land
Dawson Valley	20.85 of irrigable land

Across these four schemes, drainage services are only provided to channel distribution networks and not all customers may receive drainage services. Hence, only those customers receiving drainage services are required to pay drainage charges.

The last price review foreshadowed a review of drainage charges as some schemes indicated they would prefer to move away from a per hectare rate to a per ML rate, however there was insufficient time to analyse and discuss alternatives.[22]

4.2.2 Channel water harvesting

For the 2005/06 price review, SunWater considered that the costs associated with supplying 'harvested water' to consumers are generally not in the form of fixed costs of channel infrastructure. SunWater's underlying logic was that the primary purpose of the channel is to provide allocated water under water entitlements, and hence the costs associated with channel infrastructure do not relate to opportunistic water entitlements. Channel harvesting does however result in (marginal) incremental variable costs of operation.

On this basis, SunWater decided to apply a rate for channel harvesting that is equivalent to the relevant scheme's Part B (usage) charge for allocation water. This is achieved by including the additional forecast volume for harvested water in the scheme's volumetric usage assumptions and allocating the portion of forecast lower bound costs across that total volumetric usage assumed for the scheme (including channel water harvesting entitlements).

The Part B channel charge for the St George WSS was $9.38/ML in 2006/07, $10.04/ML in 2007/08 and a constant $10.05/ML for the remaining 3 years (in 2005-06 dollars and subject to cumulative annual indexation). The 2009/10 Part B Tariff was $11.50/ML. SunWater pays DERM $3.62/ML for water harvested.

For the Burdekin-Haughton WSS, the Burdekin Channel part of the Burdekin-Haughton WSS had a water harvesting entitlement of 22,999 ML per year. The charge for taking this water was the relevant Part B tariff, initially set at $15.61/ML in 2005-06 dollars for the ensuing 5 year price path and subject to cumulative annual indexation. The 2009/10 charge is $17.87/ML. SunWater pays DERM $3.62/ML for water harvested.

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[19] Synergies Economic Consulting. 2010. *Rural Water Pricing Business and Scheme Overview*. January 2010 (Section 6.3 & 6.5)

[20] Synergies Economic Consulting. 2010. *Rural Water Pricing Business and Scheme Overview*. January 2010 (Section 6.3 & 6.5)

[21] SunWater published fee and charges schedule for 2009/10 - https://www.sunwateronline.com.au/sis/SISSchemeSummaryAllView

[22] SunWater.2006. *SunWater Irrigation Price Paths 2006/07 – 2010/11 Final Report*. September 2006. Pg. 14.

Revenue generated from channel harvesting is uncertain as the availability of the underlying 'product' is subject to extreme flood events.

4.3 Regulatory precedents

The approaches applied in other jurisdictions regarding charges for drainage and channel harvesting are discussed below.

4.3.1 Drainage Charges

Table 4.2 – Drainage charges in other jurisdictions

Water Business	Drainage Charges
Gladstone Area Water Board (GAWB) (Qld)	• No drainage charges, as GAWB does not provide drainage services.
State Water (NSW)	• No drainage charges, as State Water does not provide drainage services.
Murrumbidgee Irrigation (NSW)	• MIL provides drainage services; however, there are no separate charges for drainage. These costs are recovered through fixed and variable charges for conventional water supply services.
Southern Rural Water (Vic)	• Drainage costs are recovered through a separate fixed drainage charge which is based on per ML of water entitlement.
Central Irrigation Trust (SA)	• Drainage costs are recovered through a drainage charge. • This charge is levied on a per hectare basis for costumers without an irrigation connection. • For those customers with an irrigation connection these costs are recovered through the water supply charges.
Renmark Irrigation Trust (SA)	• Drainage costs are recovered through irrigation access and delivery charges. • There is a special charge for those who do not irrigate but wish to have access to the drainage system and this is worked out on a per rated area basis.
Harvey Water (WA)	• Harvey Water does not provide drainage services. • In Western Australia, drainage services are provided by Water Corporation and there are no charges associated with this service. This decision was based on a Government policy.

Where drainage services are provided, the costs of these services are recovered through direct or indirect charges. These charges take the form of a per ML charge (based on per ML of water entitlement), a per hectare charge, or these costs are incorporated into fixed and variable charges for a specific scheme.

4.3.2 Channel Harvesting Charges

Table 4.3 – Channel harvesting charges in other jurisdictions

Water Business	Channel Harvesting Charges
State Water (NSW)	• Where uncontrolled flows exceed any immediate water needs and any specific environmental flow rules they may be made available to licence holders on regulated rivers. These events are known as supplementary or off-allocation events. • Where a supplementary event is announced by the NSW Office of Water, water users may extract water over and above their allocation. Charges for extracting water during a supplementary event are captured through the standard variable charges applying to a particular valley (volume extracted is captured through a customer's meter and charged on the basis of usage). • There is no fixed charge applied for extracting water during a supplementary event.
Murrumbidgee Irrigation (NSW)	• Supplementary water access licences allow general security water access entitlement holders to access water when there is excess water available. • Water available though supplementary water access licences are subject to water charges, set by MIL and also State Water. These charges are calculated on the basis of the relevant variable charge applying within a particular basin.
Southern Rural Water (Vic)	• In Victoria, in the past, irrigators in regulated rivers were able to take 'off quota' water in times of surplus flow (i.e. where excess water down a river cannot be harvested in public storages). • In that event irrigators are entitled to withdraw as much water as they wish until the water level has come back down to the full supply level. There is no charge associated with extracting off-quota water. • Off-quota water entitlements are generally no longer available in Victoria.
Central Irrigation Trust (SA)	• n/a
Renmark Irrigation Trust (SA)	• n/a
Harvey Water (WA)	• n/a

This assessment found that channel harvesting is only available in NSW. Charges for extracting this water are based on the relevant variable (usage) charge for a particular scheme/valley.

4.4 Analysis of key issues / options assessment

4.4.1 Drainage charges

Drainage charges provide a means for the business to recover the costs associated with drainage infrastructure. Drainage costs are typically fixed in nature, and do not vary on the

basis on usage. On this basis, fixed charges are used for recovering drainage costs. The key issue then is the basis on which the fixed charge is determined, and whether it varies according to any customer-specific (but not volumetric consumption) factor.

There are two approaches used by SunWater to recover drainage charges:

- Fixed charge per hectare, as discussed in section 4.3.1 - this approach is applied in four SunWater's WSSs, and is only levied on those users receiving drainage services. This charge assumes that the benefit received by these users do not vary with the volume of water which goes through drainage infrastructure.

- Fixed charge incorporated into the Part A network service charge – this approach is applied in Mareeba-Dimbulah, and is based on a charge per ML of entitlement. Similar to the charge per hectare, this charge does not vary with the volume of water which goes through the drainage infrastructure.

These approach and other options are discussed below.

Application of charges

Depending on a scheme's cost characteristics, and the practicality and costs of administering a more sophisticated alternative, the use of a proxy such as a fixed charge per hectare or per ML or a constant access change (fixed charge) may provide a more suitable charging method for recovering the fixed costs of providing the drainage services.

Fixed charge per hectare

The use of a charge per hectare seeks to allocate drainage costs on the basis of irrigated land as this may influence the amount of run-off from a property (i.e. a large property is likely to have higher run-off than a smaller property, particularly with respect to stormwater run-off). However, it could be argued that the majority of water run-off would be generated by water supply and hence a charge per hectare does not capture differences in actual water use and therefore run-off (e.g. one customer may have a large property, but is highly water efficient, while another customer may have a smaller property, but is highly water intensive).

This tariff structure also allows users who do not receive drainage services to be exempt from paying this charge.

Fixed charge per ML (specific drainage charge)

The use of a specific drainage charge levied as a charge per ML is used by Murrumbidgee Irrigation to recover drainage costs. This approach has not been applied by SunWater (it is noted that SunWater's Part A is a charge per ML, this is discussed further below). The use of per ML charge for drainage services may better reflect the benefits received by users from drainage infrastructure, as it reflects on-farm water use and hence the potential drainage volumes. This tariff structure also allows users who do not receive drainage services to be exempt from paying this charge.

Fixed charge per ML (network service charge)

Sunwater has incorporated drainage costs into the Part A charge for the Mareeba-Dimbulah WSS. This charge is levied on a per ML basis and is not specified separately. On this basis all scheme customers are seen to benefit from drainage services. However, SunWater has indicated that drainage infrastructure only exists for channel distribution assets. Hence there

may be some customers who do not receive direct drainage services but are required to pay drainage charges.

Further, the separation of drainage charges from standard channel charges may also provide an additional degree of information for customers. Indeed during the previous 2005/06 SunWater Price Review, some customers were concerned with how drainage charges were set and preferred a form of separate drainage charge.[23] In other jurisdictions, drainage charges are generally included in channel charges where an irrigation water supply arrangement exists, and not separately identified. Where drainage charges from part of a network service charge this may reduce transparency regarding drainage costs.

Discharge factors

During SunWater's previous price review, SunWater's stakeholders raised concerns regarding the application of drainage charges. These concerns included the fact that drainage rates do not reflect changes in land use over the last decade and changes to irrigation practices.[24] Further concerns were that drainage charges do not necessarily reflect user pays as charges do not vary with the volume of drainage water released and therefore it may limit the financial incentive to minimise drainage volumes (i.e. through using more water efficient irrigation techniques). However, while this feature is acknowledged, costs associated with drainage services are largely fixed and there is little rationale for applying a variable charge.

In the urban water sector similar concerns have been raised regarding wastewater charges, as fixed wastewater charging does not distinguish between customers on the basis of how much wastewater is actually released. Further, the fixed charge framework does not provide a financial incentive for customers to limit their production of wastewater. To address these concerns, wastewater pricing in the urban sector, is sometimes based on a discharge factor, which estimates the implied volume of wastewater discharge from gross metered water consumption. Such discharge factors can vary according to the type of customer and is more commonly used for non-residential wastewater charging.

A similar approach could be applied in the rural water sector, through the creation of drainage 'discharge factors', which would estimate drainage volumes based on aspects such as topography, the type of irrigation system used, crop type, and soil type (sand, clay etc). These factors may be applied to a charge per ML of total allocation and may better represent actual drainage volumes. However the decision to develop these factors would need to be weighed against the costs of doing so and the benefit received from more accurate drainage rates, as there would be additional costs associated with designing and administering such a scheme. Further, as the costs of drainage infrastructure are fixed, usage related charges may not be appropriate.

4.4.2 Channel water harvesting

It is desirable that channel water harvesting charges should be set in a manner that recovers at least the incremental costs associated with providing the service. In setting channel water harvesting charges, consideration needs to be given to the nature of costs of providing this water 'product'.

To date, SunWater has based channel harvesting charges on the relevant Part B (variable) charge applied for schemes where channel harvesting is available. As channel harvesting is

[23] Synergies Economic Consulting. 2010. *Report to the Queensland Competition Authority – Rural Water Pricing: Business and Scheme Overview*. January 2010.

[24] Submission to QCA Review: Irrigation Prices for SunWater Schemes: 2011-2016. Emerald 28 April 2010. pg. 4

an opportunistic water entitlement or event based, and it is offered as a secondary product to allocation water, water harvesting volumes are not included in the assignment of Part A (fixed) channel costs. This approach is applied on the basis that channel already existed to meet standard water entitlement service requirements and the costs of providing channel harvesting water only result in variable operation costs and not fixed infrastructure costs.

Hence, where channel water harvesting only results in marginal variable costs, the use of the relevant supply schemes Part B on which to calculate the variable charge is appropriate and consistent with the approach used by State Water in NSW. However, it should be noted that the Part B charge may not directly account for variable costs (i.e. subject to the tariff structure, the Part B charge may also recover some portion of fixed cost). Further, while DERM levies a per ML charge for harvested water, this charge is currently specified separately on customer water bills, and is not included in the calculation of Part B charge. This decision to specify charges separately reflected a government ruling during the previous SunWater price review.[25]

However, where channel water harvesting does contribute to the capital (fixed) costs of a particular scheme (where these entitlements exist), there may be grounds for applying a fixed charge where channel harvesting is available, or alternatively setting a variable charge for channel water harvesting at a higher rate that the standard Part B charge for a particular scheme. For example, if SunWater had upgraded some channels to facilitate the delivery of water during channel harvesting events, there may be grounds for SunWater to recover these costs. Applying a fixed charge or higher variable charge would therefore, seek to recover both the fixed and variable costs associated with providing these water entitlements.

Box 4.1 – Summary of approaches to setting pricing structures

Drainage charges

- SunWater provides drainage services in five irrigation districts. Drainage costs include costs associated with the removal of water from irrigation properties (both farm run-off and stormwater) and the disposal of such water via a drainage network.
- For the 2000/01 to 2005/06 price paths, separate drainage rates were set on a per hectare basis in all the WSSs serviced; with the exception of Mareeba-Dimbulah where drainage costs were recovered in the Network Service Charge (NSC).
- In other jurisdictions where drainage services are provided, the costs of these services are recovered through direct or indirect charges. These charges take the form of a per ML charge (based on per ML of water entitlement), a per hectare charge, or these costs are incorporated into fixed and variable charges for a specific scheme.
- The use of a fixed charge per hectare or a fixed charge per ML provides a proxy for allocating drainage costs on the basis of land volume and volume of entitlement which may both relate the volume of farm run-off. This tariff structure also allows users who do not receive drainage services to be exempt from paying this charge.
- Sunwater has incorporated drainage costs into the Part A charge for the Mareeba-Dimbulah WSS. On this basis all scheme customers are seen to benefit from drainage services. However, SunWater has indicated that drainage infrastructure only exists for channel distribution assets. Hence there may be some customers who do not receive

[25] SunWater. 2006. *Tier 1 Working Paper No. 15 - Channel Water Harvesting*. March 2006.

direct drainage services but are required to pay drainage charges.

- The separation of drainage charges from standard channel charges may also provide an additional degree of information for customers, hence where drainage charges from part of a network service charge this may reduce transparency regarding drainage costs.

- It may be possible to use drainage 'discharge factors' in the rural water sector to estimate drainage volumes based on aspects such as topography, the type of irrigation system used, crop type, and soil type (sand, clay etc). However the decision to develop these factors would need to be weighed against the costs of doing so and the benefit received from more accurate drainage rates, as there would be additional costs associated with designing and administering such a scheme. Further, as the costs of drainage infrastructure are fixed, usage related charges may not be appropriate.

Channel harvesting charges

- Channel harvesting is the consumption of water taken from a channel (or pipeline) during authorised or announced high flow periods (e.g. flooding). Channel harvesting allows consumers the option to take additional (non-allocation) water from a channel or pipeline distribution system.

- For the 2005/06 price review, SunWater applied a rate for channel harvesting that is equivalent to the relevant scheme's Part B (usage) on the basis that the costs associated with supplying 'harvested water' to consumers are generally not in the form of fixed costs of channel infrastructure.

- It is desirable that channel water harvesting charges should be set in a manner that recovers at least the incremental costs associated with providing the service. In setting channel water harvesting charges, consideration needs to be given to the nature of costs of providing this water 'product'.

- Hence, where channel water harvesting only results in marginal variable costs, the use of the relevant supply schemes Part B on which to calculate the variable charge is appropriate and consistent with the approach used by State Water in NSW.

- However, where channel water harvesting does contribute to the capital (fixed) costs of a particular scheme (where these entitlements exist), there may be grounds for applying a fixed charge where channel harvesting is available, or alternatively setting a variable charge for channel water harvesting at a higher rate that the standard Part B charge for a particular scheme in order to capture the fixed costs.

5 Approach to recovering recreational costs

5.1 Issue definition

Areas surrounding dams are often accessed by recreational users for a range of different purposes. For non-potable water supply dams, the provision of recreational facilities may be a requirement imposed on dam operators either specified in government policy or a pre-existing requirement (in the case of older dams), or in environmental approval processes (applicable to recently constructed and new dams).

The types of recreational facilities provided by dam operators can include:

- access roads and boat ramps for access to water based activities including water skiing, canoeing, sailing, swimming and fishing;
- picnic and barbeque areas;
- playgrounds;
- disabled access;
- potable water and toilet amenities; and
- paths and walking trails.

Recreational facilities around some dams also include camping facilities, and fish hatcheries to create viable recreational fishing.

5.2 Approach taken in previous price reviews

For the 2005/06 SunWater Pricing Decision, the Queensland Government's policy stated that recreational facilities at SunWater's storages should continue to be provided and included in SunWater's lower bound costs base. At this time the average irrigation customer's share of recreational costs included in the lower bound costs for the calculation of the new irrigation price path was 37 cents per megalitre.[26]

There have been some instances where SunWater has transferred recreational land and facilities which surround dams to local Councils for on-going maintenance and up-keep. SunWater has advised that the decision for these types of transfers are subject to the willingness of local councils to take on this responsibility and the costs and benefits of doing so (e.g. SunWater may have to provide some payment in light of the on-going nature of the costs for maintenance and up-keep).

[26] SunWater. 2006. *SunWater Irrigation Price Paths 2006/09-2010/11: Final Report*. September 2006.

5.3 Regulator precedents and principles

5.3.1 Recreational cost recovery by other water businesses

Table 5.1 below provides a summary of how recreational costs are treated by other water businesses.

Figure 5.1 – Treatment of recreational costs

Business	Treatment of recreational costs
GAWB (QLD)	• GAWB provides recreational facilities to meet its obligations under the EIS and its goal to be a good corporate citizen. The primary objective is to maintain safe and attractive facilities for the community.[27] • In the QCA's 2010 Investigation of Pricing Practices of GAWB, GAWB proposed $880,000 for recreational area upgrades, including a walkway pontoon, road resurfacing, residential house renovations, new and upgraded facilities and a new shelter • The QCA recommended that these costs should be included in the estimated capital expenditure over 2010-2015 for pricing purposes.[28] This is consistent with the Authority's view stated in its 2002 Final Report that recreational use of these facilities was incidental to their water catchment and site management services. The minor revenues received from recreational use are offset against the total revenue requirement assessed for GAWB.
State Water (NSW)	• The costs of recreational facilities for State Water's dams are passed through to State Water's customers. • State Water's does not have a mandate to charge individuals other than direct customers (it can only levy charges to those with which they have an established business relationship via the ownership of a water access entitlement). There has been no decision to seek to recover the cost of recreational facilities from recreational users. • IPART's Review of Bulk Water Charges for State Water is limited to setting water charges for State Water's customers.[29] IPART has not provided any recommendations on treatment of recreational costs.
Southern Rural Water (VIC)	• SRW has indicated that the recovery of costs associated with the provision of recreational facilities will be reviewed in the future. • Currently the costs are recovered through urban pricing (which is used as a proxy for the broader community). In the upcoming review some of these charges may be allocated to irrigators as well.
Harvey Water / Water Corporation (WA)	• The Water Corporation owns and operates Harvey Water's water storages, and incurs costs for the provision of recreational services. • In setting the Bulk Water Supply Agreement between Harvey Water and Water Corporation, 85 per of recreational costs were recovered from Harvey Water and other direct users, and the remaining 15 per cent of costs were attributed to the broader community (e.g. recreational users), paid for by Government (on the basis that benefits accrue to other users).[30] Third party benefits (recreational user benefits etc) were to be funded by CSOs from the Western Australian Government.

[27] GAWB. 2010. *Appendix 24 – Activities Excluded from benchmarking – Land and catchment management, hatchery and Recreational Area.* December 2009.

[28] QCA. 2010. *Final Report – Gladstone Area Water Board – Investigation of Pricing Practice*. June 2010.

[29] Independent Pricing and Regulatory Tribunal, 2010. *Review of Bulk Water Charges for State Water Corporation,* June 2010

[30] ERA. 2007. Final Report – Inquiry on Harvey Water Bulk Water Pricing. 12 April 2007. Pg. 9

Water businesses recover recreational costs via charges to their customers or, in the case of Harvey Water in Western Australia; these costs are potentially passed through to government on the basis that some benefits accrue to other groups. Further in the case of SRW, these costs are recovered through urban water charges, which are used as a proxy for the broader community.

There are no examples where recreational costs are recovered directly from recreational users by dam operators. It is likely that this outcome reflects a requirement, such as a government decision, that these costs should not be recovered from recreational users; the fact that no charging mechanism is available for imposing charges on recreational users (including legal mechanism, or physical mechanism for recovering costs); or that the costs of imposing charges on recreational users exceeds the benefits in doing so.

5.3.2 Entrance fees for national parks and other recreational areas

While there are no examples of recreational users contributing to the costs of recreational facilities surrounding dams, there is a precedent for 'user-pay' approaches in recreational areas such as national parks and reserves. For example, a number of national parks across Australia charge entrance fees. These entrance fees generally relate to motor vehicle access (i.e. charge is levied on each motor vehicle you bring into the park), though camping fees may also be charged.

Parks charging entry fees are generally those which receive very high levels of visitation, hence entry fees seek to recover the costs of maintaining roads, visitor facilities and other infrastructure. Example of entrance fees for entry to national park areas are provided below:

- In NSW, charges can vary from $3 per vehicle (for Burragorang State Conservation Area) to up to $27 per vehicle (for Kosciusko National Park (from June to October)).

- In Queensland there are monthly or annual fees payable to take vehicles into certain areas such as Fraser Island, Bribie Island and Moreton Island. These fees range from $38.25 for a month pass to any of the islands, to $191.50 on an annual pass (for Fraser Island). Further, before camping in a park, forest or similar reserve, it is necessary to obtain a camping permit and pay a camping fee. Fees are $5 per person or $20 per family per night.[31]

Entrance fee arrangements also exist in Western Australia, Tasmania (for national parks only), South Australia and the Northern Territory (camping fees and entrance fees). Victorian national parks are the only exception, following a Victorian Government ruling that from 1 July 2010 entry to all Victorian national and metropolitan parks would be made free of charge to encourage people to get active in the great outdoors.[32]

It is noted that while 'user pays' approaches are applied in a number of national parks and some other reserves, SunWater does not have the mandate to levy these charges on recreational users. Entrance fees and similar charges could be imposed where a Local Council has assumed responsibility for recreational areas surrounding dams. However, where Local Council has assumed responsible for recreation areas, it may consider the appropriate mechanism for recovery these costs. This could include imposing entrance or via other means (e.g. rates).

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[31] http://www.derm.qld.gov.au/parks_and_forests/activities_in_parks_and_forests/camping/camping_fees.html

[32] Parks Victoria. 2010. *Free entry to Victoria's healthy parks from 1 July will help make Victorians healthier*. Media Release. 11 Apr 2010 (http://www.parkweb.vic.gov.au/1ministory.cfm?story=401).

5.4 Analysis of key issues/options assessment

How cost recovery of recreational costs should be treated is subject to a number of considerations.

5.4.1 Recovering recreational costs from customers

Recreational facilities may be a direct requirement associated with operating dam infrastructure (based on either a pre-existing requirement, or EIS processes). The provision of recreational facilities around dams might otherwise be thought of as consistent with the principles of good corporate citizenship, and similar commitments are often undertaken in areas surrounding other large infrastructure projects which may have a direct impact on local communities (such as ports). The provision of these facilities provides a degree of compensation to the local community for any perceived or actual impacts the construction of a dam may have on social or natural values. Operating as a 'good corporate citizen' may also provide benefits to customers of the dam, as the dam operator may have greater operational flexibility due to good relations with the Local Council and the community.

The provision of recreational facilities may also allow the dam operator to control the access of recreational users to areas surrounding dams and better enable a dam operator to manage maintenance requirements. If recreational facilities were not provided, the business may still incur costs in maintaining dam areas, managing unauthorised access by recreational users, or in seeking to prevent access by recreational users (e.g. fences, security patrols). The costs associated with recreational facilities, therefore, are similar to other regulatory requirements (safety, operational, etc) and hence there may be grounds for the recovery of these costs through customer charges.

5.4.2 Alternative treatment of recreational costs

While a dam operator may be required to provide some form of recreational services, this is not a core business activity and there may be a limit to the extent of recreational services necessary. Indeed, there may be circumstances where the full costs of recreational capital and operating expenditure should not be passed through to customers.

For example, where a dam operator has chosen to install recreational facilities beyond that required to adequately meet 'good corporate citizen' standards it may not be justifiable for the business to pass *all* these costs through to customers. In such a situation, it may only be reasonable for a proportion of these costs to be passed through to customers, with the business taking responsibility for the remaining costs. A regulator may therefore seek to determine an appropriate level of expenditure for recreational facilities, and only include these costs when setting prices. Similarly, as with any form of capital expenditure, it will be necessary to ensure that where costs are passed through to customers, this should only include *efficient* costs, with any cost inefficiency to borne by the monopoly business.

There may also be some situations, where Local Council or community demands may be the driver of the standard of recreational facilities provided. In such situations, it may not be warranted for the dam operator to pass all costs through to its customers, and the business should negotiate financial contributions from the relevant Local Council or consider alternative arrangements, such as the transfer of responsibility to the Local Council (where this is possible). In the case of the SunWater's Connors River Dam, for instance, the EIS stated that 'recreational amenities [will] be determined through consultation with the Isaac regional Council' and further that 'it is proposed that responsibility for maintenance and management of

the recreational area will be vested in Isaac Regional Council'.[33] Local Councils may then consider the mechanism for recovering these costs (e.g. via rates, or though levying entrance fees[34]).

Box 5.1 – Summary of approaches to setting pricing structures

- Areas surrounding dams are often accessed by recreational users for a range of different purposes. For non-potable water supply dams, the provision of recreational facilities may be a requirement imposed on dam operators either specified in government policy or a pre-existing requirement (in the case of older dams), or in environmental approval processes (applicable to recently constructed and new dams).
- For the 2005/06 SunWater Pricing Decision, the Queensland Government's policy stated that recreational facilities at SunWater's storages should continue to be provided and included in SunWater's lower bound costs base.
- The provision of recreational facilities by dam operators, on the basis of a policy decision, EIS requirement, or other requirement may provide benefits to customers of the dam, as the dam operator may have greater operational flexibility due to good relations with the Local Council and the community. Further, if recreational facilities were not provided the dam operator may still incur costs in maintaining dam areas, managing unauthorised access by recreational users, or in seeking to prevent access by recreational users (e.g. fences, security patrols).
- The costs associated with recreational facilities are similar in nature to other regulatory requirements (safety, operational, etc) and hence there may be grounds for the recovery of these costs through customer charges.
- However, there may be situations where the full costs of recreational capital and operating expenditure should not be passed through to customers, such as where the operator has installed recreational facilities beyond that required to adequately meet 'good corporate citizen', or where Local Council or local communities driver recreational facility upgrades.
- In this instance, there may be grounds for the business taking responsibility for a portion of the costs, or alternatively seeking a cost recovery arrangement with the Local Government. Local Council may then consider the appropriate mechanism for recovering these costs (e.g. via rates or through levying entrance fees).

[33] Sinclair Knight Mertz and SunWater. 2010. *Connors River Dam and Pipeline EIS*.

[34] Where Local Councils decide to impose entrance fees would need to be considered in line with the practicality of imposing these fees.

6 Approach to forecasting water demand

6.1 Issue definition

Forecasting regarding how water demand or usage will vary over the determination period is a significant consideration when setting price paths.

Forecasts of water extraction play a significant role in the price determination process. If water demand (or usage) forecasts are either too high or too low, this will impact on the ability of a water business to recover its revenue requirement, particularly where a large proportion of revenue is generated through variable (volumetric) charges. Furthermore, certain cost components, such as pumping energy costs, can vary significantly with the level of water used. Water demand forecasts may also impact on risk management arrangements, supply continuity and service standards, and capital expenditure.

In general water demand forecasting involves analysing historical demand including, considering:

- customer base;
- consumption shares;
- trends in rainfall, and how rainfall impacts on both supply and demand factors (reduced rainfall may limit water availability (supply and therefore demand), while high rainfall may improve supply but reduce demand as irrigators require less supplemented water);
- trends in usage patterns; and
- an examination of the factors that have influenced and will continue to influence usage and the characteristics (level, variability) of consumption.

There may also be broader factors that will influence demand over the forecast periods, such as government-, customer-, or business- initiated water efficiency measures which might change consumption patterns, the responsiveness of demand to prices (i.e. price elasticity of demand), and growth in customer numbers.

However, unlike urban water demand forecasting, there are a number of factors unique to rural water demand forecasts which need to be considered, including:

- the availability of water in many schemes is supply constrained, and is subject to weather conditions/climatic trends;
- demand does not vary significantly with changes in charges, as charges represent a relatively small component of the overall cost of water (further, where demand does fall in response to changes in charges, water may be traded (temporarily/permanently) to a higher value use, and therefore demand/usage is unchanged). Hence the price elasticity of demand for rural water is typically assumed to be zero;
- customer numbers tend to be more fixed – water volumes available for extraction are fully allocated in most systems (however, there may be schemes where water is still available, and hence customer growth is possible); and

- information and data availability to inform extractions/usage (e.g. metered extraction levels) is limited in some instance (i.e. data may only be available over a short periods of time (less than 10 years)).

6.2 Approach taken in previous price reviews

In SunWater's 2005/06 to 2010/11 pricing process, Tier 1 provided a preliminary set of scheme based water use forecasts which were then reviewed by the Tier 2 group.[35]

In developing these preliminary forecasts for the 2005/06 to 2010/11 pricing process, the following information was considered[36]:

- summary information on the approach and assumptions used to derive the water usage forecasts underlying the current irrigation price paths;
- historical data on actual volumes of nominal irrigation water allocations, announced allocations and water delivered to irrigators in each scheme; and
- direct input and feedback from consultation with peak industry representatives.

In most cases the water usage forecasts were based on the pattern of actual irrigation usage volumes over the five years leading up to the price path period (2000/01 to 2004/05), assuming that there would be consistent availability of supply over the following 5 years. However, longer terms trends were also examined as the basis for forecasting future water usage by irrigators. Subject to the availability of historical data, long-term trends of 10, 15, 20 and 25 years were also examined, taking into account known scheme, industry or climatic developments over the relevant period.[37]

In considering historical nominal water allocations, SunWater made some adjustments on the basis that in the past it was possible for announced allocations and volume of actual water usages to exceed the total volume of nominal water allocations for a particular river. Therefore adjustments were made to cap the volume of irrigated water usage at 100 per cent of the nominal volume.

A full description of the approach used by SunWater to develop preliminary forecasts regarding water usage is provided in Appendix E.

In general, while the approach applied considered long-term trends, the forecast tended to reflect actual irrigation usage volumes over the 5 years leading up to 2004/05. These volumes were then presented to SunWater's customers for feedback and subsequently revised where necessary.

For the 2010/11 to 2015/16 pricing determination, SunWater has indicated it will be applying a similar approach, looking at water usage patterns over the last seven years and comparing with this forecasts used for the previous pricing decision. In general, where no new information has arisen about the level or patterns of use, and supply conditions are the same, Sunwater

[35] SunWater's 2005/06 to 2010/11 pricing process was based on a two tiered negotiation process. This involved a Statewide Irrigation Pricing Working Group, referred to as Tier 1, and comprising Sunwater senior management and a cross section of SunWater's customers base. Tier 2 included working groups for each scheme which consistent of customers from the scheme and SunWater representatives.

[36] SunWater. 2006. *Tier 1 Working Paper No. 14 – Preliminary Irrigation Water Use Forecasts.* 9 February 2006. Pg. 1

[37] SunWater. 2006. *Tier 1 Working Paper No. 14 – Preliminary Irrigation Water Use Forecasts.* 9 February 2006. Pg. 2

proposes to adopt the same use forecasts. Where this is not the case Sunwater will propose redefined forecasts.[38]

6.3 Regulatory precedents and principles

Some approaches applied in forecasting water demand are discussed below:

Table 6.1 Approaches to forecasting water demand – rural

Jurisdiction	Business	Methodology
Queensland	GAWB	• GAWB's approach to demand forecasting was reviewed by the QCA as part of GAWB's investigation of pricing practices in 2010. • The QCA recommended that for pricing purposes, demand should reflect existing contracted volumes, anticipated contracted volumes and a component to reflect expected long term growth. [39]
NSW	State Water	• Demand forecasts for State Water are assessed by IPART as part of its review of State Water's bulk water charges in 2010. • The forecasting approach set by IPART is determined using a 20-year moving average of historical Integrated Quantity and Quality Model (IQQM) and actual extractions. Only actual extraction may be used in some instances, if there is sufficient data available. • IPART believes a 20-year moving average approach strikes a balance between maintaining price stability over consecutive determinations and using current, updated data that incorporates recent trends to forecast future extractions.[40]
	Murrumbidgee Irrigation	• No formal demand or water use forecasting in undertaken by MIL. Prices for each year are set on the basis of water usage over the past year. • To respond to changes in demand/ manage the impact of drought, MIL has a 'reserve' account system. In years with high water availability a proportion of the revenue from charges is placed in a reserve account. This reserve is used to offset again years water volume are low. • Prices are typically reduced in low water years (to reflect less water availability).

[38] SunWater. 2010. Written advice provided by SunWater.

[39] QCA. 2010. *Final Report – Gladstone Area Water Board – Investigation of Pricing Practice*. June 2010. Pg. 72.

[40] Independent Pricing and Regulatory Tribunal, 2010. *Review of Bulk Water Charges for State Water Corporation,* June 2010

Jurisdiction	Business	Methodology
Victoria	Southern Rural Water	• SRW does not undertake formal demand or water use forecasting, on the basis that their charges are not significantly influenced by changes in demand across its three water districts. o For two of SRW's water districts there are no variable charges (fixed charges only), hence there is no need for any forecast modelling. o In the one district where there are variable charges, as supply volumes are not subject to much variation. Hence, SRW does not undertake formal demand forecasting. Further, SRW take a medium term view to cost recovery and under-recovery one year will be reflected in the following years pricing decision.
South Australia	Central Irrigation Trust	• No formal demand or water use forecasting is undertaken by CIT. • CIT has indicated that demand does not tend to fluctuate greatly from one year to the next and hence there is little need for demand forecasting within the serviced districts (due to the crops grown, limited rainfall and the efficient water trading market within the serviced districts). • Further, as the fixed costs are fully recovered by the fixed charges there is little risk of under/over recovery due to fluctuations in the demand for water.
	Renmark Irrigation Trust	• Demand estimate are prepared as part of the annual budget. • Estimates are based on historical information but can vary considerably due to the weather (rainfall, evapotranspiration, etc.) and other factors such as water restrictions, and commodity demand and prices.
Western Australia	Harvey Water	• There is no formal methodology applied regarding demand or water use forecasting. • In setting prices, Harvey Water considers historical demand patterns/changes in demand.

In its 2006 and 2010 bulk pricing review for State Water, IPART reviewed the matter of demand forecasting extensively, and this analysis provide some useful insight in considering alternative approaches to forecasting water demand.

For the 2006 pricing determination process, State Water proposed a forecasting approach using Long Run Average (LRA) usage, less one standard deviation. The LRA approach was based on output from the then Department of Natural Resource's Integrated Quantity and Quality Model (IQQM).[41] The adjustment of one standard deviation was required to account for

[41] IQQM does not forecast consumption, rather as a hydrological model, it captures water availability in a system and makes it possible to estimate extraction levels that could have occurred over a series of years if the data inputs and scenario definitions were applied in the past. An alternative to using IQQM output for forecasting is the use of actual sales or extraction data(Centre for International Economics. 2006. *Review consumption forecasts – Analysis to support 2006 Bulk Water Price Determination* (Prepared for IPART). February 2006).

the increased risk of increasing the usage component of tariffs and the potential reduction in water resulting from global warming.[42]

In assessing State Water's proposed approach, IPART engaged a consultant to review the LRA approach against the alternative autoregressive integrated moving average (ARIMA). The ARIMA approach discerns patterns in consumption from the modelled historical data and postulates that a pattern is based on some statistical correlation (relationship) between current and past consumption. By comparison, under the LRA approach, consumption in any given year is independent of past consumption. Outputs from the ARIMA approach can vary from year to year, while the LRA approach derives a constant demand level.

Data and assumptions used to generate the agency forecasts, along with the implications for forecasting changes to water management rules, particularly those caused by the recently implemented water sharing plans were also assessed.[43]

Overall, IPART found that the ARIMA approach performed slightly better than the LRA approach when forecasting consumption; however the accuracy gains of using ARIMA for price setting may be limited, since prices are set using a smoothed approach, rather than assuming annual fluctuations in consumption. Further, the adjustment LRA downwards by one standard deviation was found to be inappropriate and would result in a substantial over-recovery of costs over most five-year periods.[44] On the basis of this advice IPART ruled that LRA, based on IQQM modelling was appropriate, however, it should not be adjusted downwards by one standard deviation.

State Water's approach for the 2006 determination resulted in an under-recovery of revenue over the 5 year determination period. On this basis IPART recommended an alternative approach be used for the 2010 State Water Bulk Water Price Determination, as detailed in Table 6.1 above. This approach applies a 20-year moving average of historical IQQM and actual extractions (with IQQM output used where actual extraction data is not available).[45] The new approach incorporates actual extraction where possible, instead of using modelling on the basis that this would reflect more recent water extraction conditions and would minimise the difference between forecast and actual water extractions.

As 20 years of reliable actual extraction data available was not available (as State Water's metered water data does not go back that far), State Water's approach incorporates[46]:

- 5 years of modelled IQQM extractions for the years prior to the availability of reliable actual extraction data (1990/01 to 1994/95);
- 14 years of actual extraction data (1995/96 to 2008/09); and
- a forecast for the most recent year provided by State Water (2009/10).

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[42] IPART. 2006. *Bulk Water Prices for State Water Corporation and Water Administration Ministerial Corporation from 1 August 2006 to 30 June 2010. Draft Determination and Draft Report.* May 2006.

[43] IPART. 2006. *Bulk Water Prices for State Water Corporation and Water Administration Ministerial Corporation from 1 August 2006 to 30 June 2010. Draft Determination and Draft Report.* May 2006.

[44] IPART. 2006. *Bulk Water Prices for State Water Corporation and Water Administration Ministerial Corporation from 1 August 2006 to 30 June 2010. Draft Determination and Draft Report.* May 2006.

[45] A 20-year moving average discards the oldest 4 years of consumption data and incorporates the four most recent years of data. In the draft determination a 15 year moving average proposed by State Water, however IPART selected 20-years on the basis that a 20-year moving average approach strikes a good balance between maintaining price stability over consecutive determinations and using current, updated data that incorporates recent trends to forecast future extractions.

[46] Independent Pricing and Regulatory Tribunal, 2010. *Review of Bulk Water Charges for State Water Corporation,* June 2010

IPART has indicated that it intends to add more recent actual extractions data at future price review which will see the total removal of IQQM data.[47] Hence, IPART is of the view that the use of actual extraction data provides a reliable measure of forecast demand for water.

6.4 Analysis of key issues / options assessment

6.4.1 Demand/usage forecasting and supply constraints

In considering the treatment of demand forecasting for rural water providers, there are a number of differences when compared to similar forecasting done in the urban water sector. In particular, demand tends to be constrained more from a supply perspective - limited by the total volume of water entitlements in a particular scheme and by the water available or announced allocation in a given water year (due to climate variability). Hence if an irrigator seeks to expand its farm, or move towards a more water intensive crop, the options for this user are either to improve their water use efficiency or purchase additional water entitlements from willing sellers.

Given this supply constraint in the rural water sector, historical demand or usage generally provides a reasonable approach for forecasting future water demand. Indeed, in most of the businesses discussed above, forecasts were based on historical trends. However, the sophistication of the methodology differed across the businesses – ranging from detailed modelling of a 20-year moving average of modelled and actual extraction, as applied by State Water, to a less complex assessment of the previous water year's water demand, as applied by MIL.

While historical trends do provide a reasonable methodology, there may be a lag effect, which may impact on revenue recovery. For example, during the recent drought, some water businesses suffered losses (under-recovery of revenue) on the basis that actual demand was substantially less than forecasts, due to limited or no water availability. Conversely, this lag effect could now result in a situation where changes to actual demand (or usage) result in an over-recovery of revenue, where actual water demand (or usage) is higher than forecast.

6.4.2 Demand/usage forecasting and spare capacity

In the case of GAWB, the demand forecasting methodology also included consideration of expected long-term growth. This was done on the basis that GAWB has significant spare capacity in Awoonga Dam, and it was necessary that water demand forecasts would capture any growth in demand for these schemes as new customers come on-line. SunWater has indicated that generally, it does not have any growth in customer numbers, with fully allocated water access entitlements in most schemes and on this basis SunWater's forecasts only include historical water usage, and do not include estimates regarding future growth in customer demand.

However, there are some schemes where there are available water entitlements (owned by SunWater). For example 'Water for Bowen' is a SunWater project which seeks to provide water for urban, industrial and agricultural user via a new water transport system extending from the Burdekin River and the existing Elliot Main Channel. The project is expected to provide up to 60,000ML of water per annum from water allocation from Burdekin Falls Dam. On this basis, some consideration of future growth in customer numbers may be warranted for certain schemes.

[47] Independent Pricing and Regulatory Tribunal, 2010. *Review of Bulk Water Charges for State Water Corporation,* June 2010

6.4.3 Demand/usage forecasting and allocation variability

Accurately forecasting water usage/demand is fraught with difficulty, and any approach is likely to either over- or under-estimate usage/demand in a given year due to the natural unpredictability of rainfall and climate. However, while noting that it is difficult to estimate climate over a five year price path, it may be the case that some schemes, such as those with greater water availability, allow for more accurate demand forecasting. For example, in the Burdekin WSS, where forecast usage for the previous determination was around 90 per cent, even during drought year actual water availability would allow for this level of demand/usage. Hence in these instances, demand forecasting may be more reliable.

By comparison there may be other schemes, which experienced a significant reduction in water availability during the drought, receiving no or significantly reduced allocations, thereby reducing demand and water usage. In these instances, the use of demand forecast may be less reliable, and tariff may need to be structured in a manner which can manage this additional variability.

Box 6.1 – Summary of approaches forecasting water demand

- Forecasting regarding how water demand or usage will vary over the determination period is a significant consideration when setting price paths.

- Forecasts of water extraction play a significant role in the price determination process, and where demand (or usage) forecasts are either too high or too low this will impact on the ability of a water business to recover its revenue requirement, particularly where a large proportion of revenue is generated through variable (volumetric) charges.

- In general water demand forecasting involve analysing historical demand including, considering factors such as customer base, consumption shares, trends in rainfall, trends in usage patterns; and an examination of the factors that have influenced and will continue to influence usage and the characteristics (level, variability) of consumption. However, unlike urban water demand forecasting, there are a number of factors unique to rural water demand forecasts which need to be considered, including water availability, a zero price elasticity of demand, fixed customer volumes and limited historical extraction data.

- SunWater's past approach to forecasting water demand/usage, was based on the pattern of actual irrigation usage volumes over the five years leading up to the price path period (2000/01 to 2004/05), assuming that there would be consistent availability of supply over the following 5 years. However, longer terms trends were also examined as the basis for forecasting future water usage by irrigators.

- For the 2010/11 to 2015/16 pricing determination, SunWater has indicated it will be applying a similar approach, looking at water usage patterns over the last 7 years and comparing this with the forecast levels of water usage used for the previous pricing decision. Noting the impact of the drought over this period, SunWater will be making adjustments to account for this. SunWater was not able to describe how these adjustments would be made.

- Given the nature of rural water demand, which is supply constrained and typically not subject to significant variation in demand due to changes in water charges, the use of historical demand or usage provides a reasonable approach for forecasting water demand. The use of historical data was adopted by other water businesses, and IPART, following its review of alternative demand forecasting approaches for State Water, is of the view that actual extraction (rather than modelling) better reflects actual usage patterns. Hence, schemes where customer numbers are fixed (i.e. water entitlements are fully allocated), historical averages of actual extractions are an appropriate means of

forecasting demand. However, it may be necessary to adjust forecasts where averages include atypical demand events (e.g. drought).

- For schemes with spare capacity (i.e. unallocated water allocations) it may be necessary to consider growth in customer numbers, with the approach dependent on the level of spare supply capacity and the nature of prospective future demand.

7 Cost escalation and price indexation

7.1 Issue definition

Water prices perform a number of important functions. Properly structured, they signal to customers the costs associated with providing particular products or services. For water businesses, prices are designed to recover the cost of delivering water products and services (including an appropriate return on capital invested).

Future costs are commonly forecast by projecting today's costs to the expected date of outlay using appropriate cost escalation factors. Although this process helps reduce uncertainty by expressing future costs in terms of current market rates, it also emphasises the importance of choosing cost escalation factors that reflect anticipated changes in costs as closely as possible. The present value of these forecast costs are obtained by discounting them to the present using an appropriate discount factor or cost of capital.

To establish cost-reflective prices, the present value of revenues needs to be set equal to the present value of costs over the regulatory period. Because of this, and the fact that future revenues are a function of the quantity of water sold and the indexed price at the date of sale, the choice of the price index will affect how prices recover costs through time.

Therefore, price indexation is not the same as cost escalation. Cost escalation refers to increases over time in the costs of the physical works, labour and other costs associated with water storage and delivery. Price indexation reflects how a given pattern of costs is recovered through time. The important issue for consistent valuation is that the present values of costs and revenues are the same for the price path period in question.

Some commonly used methods for cost escalation and price indexation are discussed below.

7.1.1 Cost escalation

The cost escalation factor should reflect anticipated increases in costs as reliably as possible. Some common methods to escalate costs include:

- Consumer Price Index (CPI) – CPI is regarded as Australia's key measure of inflation. It is designed to provide a general measure of price inflation for the Australian household sector as a whole. CPI measures changes over time in the prices of a wide range of consumer goods and services acquired by Australian metropolitan households and it is published quarterly by the Australian Bureau of Statistics (ABS);

- Labour price index (LPI) and Wage price index (WPI) – LPI broadly measures annual changes in the price of labour in the Australian labour market, while the WPI broadly measures changes in the wages paid by Australian businesses to employees. Both are compiled and published quarterly by the ABS;

- Producer price index (PPI) – several PPIs are produced and published, including a set of indexes relating to specific industries (selected manufacturing, construction, mining and service industries). PPIs can be constructed as either output measures or input measures. PPI's are published quarterly by the ABS;

- Composite indices – composite indices are typically a weighted combination of published indices. A composite price index can be tailored to the particular cost profile of a given business or industry by selecting individual indices (or component indices) from published

sources and combining them with a weight appropriate to the particular business or industry; and

- Industry or commodity-specific indices – industry or commodity-specific indices are similar to composite indices and usually comprise of a basket of different indices which may or may not be from published sources. Commodity specific indices may include an inflator based on the actual growth in a particular cost (e.g. it may monitor the growth in a specific cost item such as fuel).

7.1.2 Price indexation

Several options are available for indexing prices, including:

- fixed prices – prices remain constant in nominal terms over time;
- inflation-adjusted prices (e.g. CPI) – prices increase at the rate of general inflation, and thus remain constant in real terms;
- cost-adjusted prices – prices increase by a suitable cost escalation factor; and
- discount rate-adjusted prices – prices increase by the nominal discount rate, and thus remain constant in present value terms.

There are several issues that need to be taken into account in selecting a price index from among these alternatives, including economic efficiency, intergenerational equity, debt exposure considerations, and stakeholder perceptions. Although the 'best' policy choice often requires the weighting of a number of different issues, inflation-adjusted charges are likely to be acceptable to most stakeholders as they conform to general expectations that prices will increase at the rate of inflation as do many other goods and services.

7.1.3 Other considerations

The application of a particular index however, does not present the complete picture when considering how prices should change over the price path.

Existing prices or prices at the commencement of the price path are a key factor in considering how prices should be indexed. For example, where existing prices are below full cost recovery level, but there is a need to move towards full cost recovery over the next price period, it may be necessary to establish a glide path ('smoothing') of prices that ensures that prices are indexed in such a way that the present value of total revenue is equal to the present value of the desired level of total costs.

Moreover, there may be other factors which affect how prices should change over time, such as:

- the nature of capital expenditure – where capital investment is lumpy, prices could be set using a growth annuity approach, which would smooth prices over the price path to avoid significant price variations;
- spare capacity and changes in demand – revenue is a function of price and quantity, hence where changes to demand are anticipated this may impact on how prices should be set, and hence how prices are indexed; and
- efficiency incentive considerations, which may incorporate a measure such as CPI-X which captures efficiency improvements over the price path.

7.2 Approach taken in previous price reviews

In the previous SunWater pricing decision, SunWater received two sets of advice regarding the indexation of water charges. Both pieces of advice suggested that there was merit in considering a composite index, particularly in the instance where CPI was not an adequate proxy for SunWater's costs.

The irrigator's representatives on Tier 1 preferred no indexation, and argued instead for CPI indexation on lower bound costs only and not the irrigated tariff.

During the water pricing process, SunWater decided to apply CPI (Brisbane – All groups) as a compromise position. As the annual CPI data is not released until the end of the financial year, the annual indexation of tariffs was based on the annual March to March CPI result for the period immediately prior to the date of indexation, which occurs in 1 July of each year.

7.3 Regulatory precedents and principles

Table 7.1 (rural water sector) and Table 7.2 (other sectors) provide a summary of the different indices used to index prices, and also the underlying rationale for applying this methodology. A detailed summary of these approaches is provided in Appendix F.

Table 7.1 – Price indexation in the rural water sector

Jurisdiction	Business	Index	Rationale
Queensland	GAWB	CPI (Brisbane All Groups)	• Ruling was made by an independent regulator (QCA) • CPI is readily available, timely and not subject to revision and is commonly used in commercial contracts for the purpose of price escalation.
NSW	State Water	CPI (All capital cities)	• Ruling was made by an independent regulator (IPART). • This approach was adopted on the basis that 'no individual inflation measure satisfies all the criteria of an ideal inflation factor for industry price determinations, though CPI is, for most applications, considered to be the simplest option with the advantages of relative timeliness and a high level of credibility and familiarity to the public'.[48] • IPART's regulatory price path for State Water does not increase on the basis of inflation alone. In many instances, prices will escalate at a higher rate due to other factors (e.g. starting prices, degree of cost recovery, etc).
	Murrumbidgee Irrigation	n/a	• Prices are set by business, and are not subject to regulatory review. • MIL does not apply any indexation for its prices.

[48] Independent Pricing and Regulatory Tribunal. 2009. *Measuring inflation for industry price determination – Charge in calculation method.* July 2009.

Jurisdiction	Business	Index	Rationale
			Prices are set annually by MIL's Board of Directors, taking into consideration relevant costs.
Victoria	Southern Rural Water	n/a	• SRW does not apply any indexation for its prices. Prices are set annually by SRW.
South Australia	Central Irrigation Trust	n/a	• Prices are set by business, and are not subject to regulatory review. • Prices are not indexed rather they are set based on forecasted costs. CIT signs 3 year contracts with their supplier which sets prices over that period. Renegotiation of contracts will usually result in an increase in costs which is passed onto customers. Recovery also allows for the periodic replacement of assets as required.
	Renmark Irrigation Trust	N/a	• Prices are set by business, and are not subject to regulatory review • Prices are set according to the needs of the budget. Recent changes in legislation and jumps in electricity prices have meant that above CPI increases were necessary in during the 2008-09 and 2009-10 years. Prices were not raised at all during the 2006-07 and 2007-08 years in order to assist irrigators through tough times.RIT seek to restrict price rises to CPI in coming years and in order to provide assistance to irrigators making plans for the future.
Western Australia	Harvey Water	CPI	• Prices are set by business, and are not subject to regulatory review. • CPI is used for indexation purposes by Harvey Water on the basis that this index is easily identifiable and their members are familiar with index as a measure of underlying inflation.

Table 7.2 – Application of indexation of other sectors

Industry	Index	Summary
Urban Water Sector	• CPI • Composite index (LGAQ Cost Index)	• IPART (NSW) adopted CPI on the basis CPI is considered to be the simplest option with the advantages of relative timeliness and a high level of credibility and familiarity to the public. • Independent Competition and Regulatory Commission (ICRC) (ACT) use an Australia wide CPI rate to index regulated water tariffs. However, ICRC also escalates prices by an additional 1 per cent and 4.76 per cent annually for water and wastewater prices respectively. This reflects a decision by the ICRC to ensure the recovery of the total revenue

Industry	Index	Summary
		requirement while ensuring more even price increases on consumers. • Economic Regulatory Authority (ERA) (Western Australia) – CPI (Australia wide measure) was deemed to be most appropriate by ERA on the basis that Perth water utilities are influences by Australia wide factors and national inflationary trends. • Essential Services Commission (Victoria) use CPI to index annual tariff increases, on the basis that the input costs would escalate in line with CPI. • Local Government water retailers (e.g. Brisbane City Council and Gold Coast City Council) apply the Local Government Association of Queensland Cost Index (LGAQ Cost index) for indexing urban water tariffs, which is a composite of the general construction index and CPI.[49,50] This approach was selected on the basis that it was consistent with the methodology outlined in the Council of Mayors South East Queensland Memorandum of Understanding.
Taxi Sector	• Taxi Cost Index (TCI) – NSW • Composite Input Price Index (CIPI) - Vic	• IPART has developed an industry specific index, the Taxi Cost Index (TCI) which applies to the fares charged by the taxi sector in NSW. This is used on the basis that building up costs on an industry wide basis (i.e. transport index) basis is not appropriate. Further IPART believes its approach is consistent with regulators in other states which use an index to determine increases in taxi fares. • ESC has developed an industry specific index, the composite input price index (CIPI) which incorporates a productivity adjustment. This index applies to the taxi sector in Victoria. • The ESC uses a specifically constructed composite index of input prices, using several published price indices which are relevant to Victorian taxi industry costs including LPG price indices.
Non-metropolitan private buses	• Industry specific index	• IPART has developed a Bus Industry Cost Index (BICI) is used to calculate recommended changes in maximum fares for non-metropolitan private buses operating under commercial contracts. • IPART has maintained an industry specific index on the basis that an alternative form of price regulation (such as the building block approach) would come at significant costs to the industry. IPART also

[49] This index, however, this did not apply to the bulk component, which increased in line with the increase in the Water Grid charges. (QCA. 2009. *Retail Price Monitoring in SEQ Urban Water Sector – Brisbane City Council.* September 2009)

[50] Note in 2009, the LGAQ council cost index was 5.3 per cent, however Brisbane City Council chose to adopt a rate of 4.8 per cent. No reason was given for selecting a rate below the LGAQ level.

Industry	Index	Summary
		considers that the structure of the industry makes more intrusive and costly regulation inappropriate.[51]
Electricity – Distribution	• CPI – X (as part of a revenue cap)	• Tariffs are set using a revenue cap which is indexed using a CPI-X index. • Any increase to the distribution tariffs must comply with constraints outlined in the National Electricity Rules (NER). • The NER limits any increases (from the previous year) in the expected weighted average revenue to be raised from a tariff to the greater of CPI – X which is calculated as (1+CPI)(1-X)(1+2%) and CPI plus 2%, • The X factor is determined by AER and is designed to equalise (in terms of net present value) the revenue to be earned by the Distribution Network Service Provider from the provision of standard control services over the regulatory control period with the provider's total revenue requirement for the regulatory control period.[52]
Electricity Sector – Transmission	• CPI – X (as part of a revenue cap)	• Tariffs are set using a revenue cap which is indexed using a CPI-X index. • The X factor for each regulatory year must be such that the net present value of the expected maximum allowed revenue for the relevant Transmission Network Service Provider for each regulatory year is equal to the net present value of the annual building block revenue requirement for the provider for each regulatory year and the expected maximum allowed revenue for the provider for the last regulatory year is as close as reasonably possible to the annual building block revenue requirement for the provider for that regulatory year.
Electricity – Retail	• No indexation (NSW) • Industry specific index (VIC) • Benchmark Retail Cost Index (BRCI) (QLD)	• IPART (NSW) assesses each tariff annually throughout and determines the maximum percentage by which each standard retailer can increase its regulated tariffs in that year. • The ESC (VIC) uses an industry specific index to determine the maximum allowable percentage increase in tariffs. This index contains four inputs: o X Factor – which accounts for productivity

[51] IPART. 2007. *Review of cost indices for non-metropolitan buses and private ferries – Alternative approaches to calculating the Bus Industry Cost Index and Commercial Vessel Association Cost Index*. August 2007. Pg. 5

[52] Australian Energy Market Commission, 2010. *The National Electricity Rules Version 38*. July 2010. Pages 569, 570, 602

Industry	Index	Summary
		gains; o S factor – which provides incentives to meet service obligations; o L factor – which ensures tariffs reflect license fees; and o CPI – tariffs are indexed to account for inflation. • Under the *Electricity Act 1994* (Qld), the notified price of electricity is to be adjusted annually according to changes in the cost of providing electricity. • The BRCI is to be used to adjust notified electricity prices each year, and the Electricity Act specifies three main costs components (cost of energy, network costs and retail costs).

CPI is commonly used in the rural water sector to index prices over time, where relevant. This approach is typically applied on the basis that it is a transparent, readily accessible and familiar measure of inflation. However, there may be other factors beyond inflation which drive prices higher over the price path. For example, IPART applies CPI to grow nominal prices over the price path, however they also apply a glide path to move prices towards cost reflectivity (hence overall prices are growing at a higher rate than CPI).

Outside the rural water sector, CPI is also commonly applied for the purpose of indexing prices, though there are instances where other composite or industry specific indices are applied. The use of industry specific indices or composite indices tends to reflect the fact that costs were not able to be readily identified. For example, in the case of the non-metropolitan private buses in NSW, IPART determined that alternative forms of prices regulation, such as a building block approach, was too costly for the industry and hence identifying the cost base and using a composite industry index approach to grow prices was deemed as more appropriate.

The use of industry specific or composite indices may also reflect a specific decision by government or a regulator. For example, the application of the LGAQ index by Queensland Councils, reflects a decision made by government prior to the transformation of the SEQ rural water sector, and was a means of ensuring that all Council water businesses grew prices at the same rate. Similarly, in the case of retail electricity prices in Queensland, the use of an industry specific index reflects legislative requirement.

7.4 Analysis of key issues / options assessment

Price indexation is different to cost escalation, and it is not necessary for the same index to be used to increase both costs and prices.

Fixed prices (that is, no indexation) will provide relatively higher up-front cash flows for SunWater but will require the initial starting price to be relatively higher.

Inflation-adjusted prices (e.g. CPI) are often used on the basis that they are well understood and administratively simple to apply. CPI also maintains the real value of prices over time, and is typically accepted by the broader community as the level by which most prices increase

over time. Applying CPI, however, may result in prices increasing at a different rate to costs with some implications for allocative efficiency.

In some cases, it may be appropriate to apply an index that reflects movements in costs. For example, industry composite indices are sometimes applied for the purpose of indexing prices where there are no formal means to identify actual costs, or the ability to identify underlying cost would impose significant costs on industry (e.g. taxi industry, non-metropolitan bus industry in NSW). Indeed, in the case of the non-metropolitan private buses, IPART determined that alternative forms of price regulation, such as a building block approach, was too costly for the industry and hence using a composite industry index approach to increase prices was deemed to be more appropriate.

Using discount rate-adjusted prices are likely to result in large price increases over the period and may impact on irrigator's capacity to pay towards the end of the regulatory period. However, this method will conversely result in a relatively low starting price.

It may also be necessary to use alternative price indices where:

- it is necessary to establish a glide path of prices in order to meet certain policy objectives such as movement towards upper-bound prices;
- lumpy capital outlays or anticipated demand changes make price path 'smoothing' desirable; and
- efficiency incentive mechanisms are warranted.

Box 7.1 – Summary of approaches to indexation

- Price indexation is not the same as cost escalation. Costs should be escalated according to the best forecasts available while prices should be indexed such that the present values of revenues and costs are equal over the regulatory period.
- When setting prices over a price path a number of factors should be considered, including price indexation – the rate at which prices should increase over the price path. Selection of an appropriate index for pricing is important particularly where regulators or businesses seek to maintain (or achieve) full cost recovery over the price path.
- In its previous price review, SunWater decided to apply CPI (Brisbane – All groups) for indexing prices over the price path.
- When considering an appropriate way to increase prices over time it may not be appropriate to choose a price index that directly reflects the growth in costs. It is more important to select an index that generates revenues sufficient to recover the relevant costs over the regulatory period, in present value terms.

8 Approach to the treatment of free allocations

8.1 Issue definition

'Free allocations' are water entitlements granted to customers which are delivered to customers free of charge or at a discounted rate. They reflect historical arrangements or a condition where customers had 'rights' or 'entitlements' to take water from a river prior to the construction of water storages.

In some instances, resource operations licences (ROLs), interim resource operation licences (IROLs) and certain legislation include provisions that require SunWater to continue to meet the water supply responsibilities and agreements in place, and on this basis provide 'free' (or discounted) water allocations to certain customers.

SunWater has advised that free allocations are provided in two schemes:

- Barker Barambah WSS; and
- Burdekin-Haughton WSS.

The arrangements or requirements for free allocations vary across these two schemes. In some instances, these arrangements were due to Order in Councils (OICs) which were agreed in the past, due to legislative rulings, or due to a private agreement between SunWater and the customer.

For example, in the Burdekin-Haughton WSS, free allocations are provided to the North Burdekin Water Board (NBWB) and the South Burdekin Water Board (SBWB). The arrangements for supplying water to the NBWB and SBWB are based on Order in Councils (OICs) for each water board which were first agreed on 13 May 1965 and 31 March 1966 respectively.[53] These OICs were subsequently amended in 1992, and the 2009 ROP for the Burdekin Basin set the total supplemented Water Allocation for the boards at 250,000ML per annum (however the free allocation under the latest OIC is for less than 250,000ML).

In the Barker Barambah WSS, SunWater is required to provide a free allocation entitlement of 1,038ML per annum to the South Burnett Regional Council (SBRC). SBRC is the amalgamation of the Murgon and Wondai Shire Councils, however this free allocation is in relation to the township of Murgon only (referred to as Interim Water Allocation 102944 in the *Water Regulation 2002*. The free allocation requirement for the township of Murgon is based on Section 1117A of the *Water Act 2000*. This particular entitlement held by the SBRC is the only entitlement to date to be legislatively excluded from payment under Section 1117A.[54]

There are a limited number of other situations where free allocations are provided due to a decision by the business. Some free allocations were provided as a result of the negotiation process used for the current SunWater price path. Additional information regarding free allocations is provided in Appendix G.

[53] The OICs granted the water boards an authority to divert water from the Burdekin River.

[54] DERM. 2010. Written advice provided by DERM

8.2 Approach taken in previous price reviews

Queensland Government policy stated that certain 'free' water allocations represent pre-existing entitlements and are a condition precedent to the establishment of the schemes in which they occur. Therefore, lower bound costs could not be allocated to these water allocations.[55]

SunWater does not receive community service obligation (CSO) payments or any other form of subsidy for providing free allocation and therefore, these costs are shared across the paying customers of a relevant scheme.

8.3 Regulatory precedents

8.3.1 Free Allocations – Seqwater

Free allocations have been provided by Seqwater to irrigators in the mid-Brisbane area, downstream of the Wivenhoe Dam. These customers accessed the flows of the Brisbane River prior to the construction of the Wivenhoe Dam and a Government decision in 1986 ruled that 7,000ML should be provided to these irrigators for irrigation purposes free of charge. These conditions for delivering free allocations existed under Seqwater's company allocation.

However, following the release of the Moreton Water Resource Plan March 2007 and the Moreton ROP in December 2009, mid-Brisbane irrigators were issued new individual entitlements, which do not include conditions regarding 'free allocations'. Further the Moreton ROP extinguished Seqwater's company allocation, which included conditions for providing water to these users free of charge. On this basis, Seqwater has indicated it has received advice that the business is now able to charge for the total volume of water previously delivered free of charge.

8.3.2 Other arrangements

While no clear example of 'free allocation' arrangements exists for other rural water service providers outside of Queensland (with respect to the recognition of a pre-existing right, or the magnitude of free allocation volumes), there are similar arrangements whereby:

- a right to extract water without charge may exist through a form of riparian right for landholders;
- a government decision has been made for water to be provided to certain users/customers for free or at subsidised rates; and
- the business under-recovers the costs of supplying a particular water access entitlement holder due to a legacy business agreement.

These arrangements are discussed below.

[55] SunWater. 2006. *SunWater Irrigation Price Paths – 2006/07 – 2010/11*. September 2006.

Riparian rights to water

Riparian rights relating to water are rights which allow landowners whose property adjoins a watercourse the right to make reasonable use of it, including extracting water without charge. These rights are attached to the land to which they relate, cannot be sold or transferred other than through a land sale and this right is not altered by water resource planning processes although reasonable use provisions may be applied. Riparian rights to water exist in a number of Australian jurisdictions, and for illustration purposes this issues paper considers the application of riparian rights in NSW and Western Australia. In NSW there are Basic Landholder Rights which allow rural landholders in NSW, with water frontage, the right to access water for some basic purposes – such as domestic and stock rights, harvestable rights in farm dams and native title rights. There are limitations on what this water can be used for, however water usage is not metered and there are no charges associated with these rights.

Basic Landholder Rights have created some issues in NSW, particularly in light of recent low water flows/drought conditions, where despite restriction on water extraction, individuals with Basic Landholder Rights were still able to access water. Further, the extraction of water by individuals with Basic Landholder Rights in regulated systems can impact on State Water's ability to deliver water to paying customers.

There are no formal rules for extractions volumes, though the NSW Government has been investigating the application of 'reasonable usage' guidelines which may address the issues discussed above. To date the guidelines have not been released. There are, however, a number of provisions under the *Water Management Act 2000* (NSW), which can reduce the volume of water which may be extracted by individuals under Basic Landholder Rights (e.g. Section 324 of the *Water Management Act 2000* can limit water extraction where water restrictions are in place).

In Western Australia, riparian rights to extract water exist under the *Rights in Water and Irrigation Act 1914* (WA). Section 9 of the Act, states that:

> *..the owner or occupier of any land alienated from the Crown through or contiguous to which runs any watercourse, or contiguous to which, or partly within which, is situate any wetland, has the right, as such owner or occupier, to take water in that watercourse or wetland free of charge —*
>
> *(a) for the domestic and ordinary use of himself and of his family and servants; and*
>
> *(b) for watering cattle or other stock, other than those being raised under intensive conditions as defined in section 21(4),*
>
> *and every owner of land alienated from the Crown before the relevant day has a further right to take such water for the irrigation of a garden not exceeding 2 hectares in extent and from which no produce is sold, being part of that land and used in connection with a dwelling.*

These riparian rights have been extinguished in some instances. For example, where a riparian right is attached to a piece of land and that land is sold, the Government may purchase a reserve area (the area of land abutting the watercourse and extending around 20 metres into the property). By purchasing this reserve area of land the Government extinguishes this riparian right. There are, however, some instances where an individual can seek to maintain their riparian right. While this mechanism has extinguished riparian rights in some instances, it is not the intention of the policy to extinguish all rights (in general, it targets only certain significant water courses, where the extraction of riparian right could interfere with town water supply or other water service arrangements).

Government rulings on the provision of water services

There are a number of situations in the urban water sector where government (Federal, State or local) has ruled that water businesses provide water for free or at a discounted rate to certain customers. These decisions are usually warranted by the community nature of the customer (e.g. recreational or sporting clubs) or factors such as equity (e.g. low income earners, pensioners, etc). However, where these directives exist, the costs associated with meeting these requirements are typically funded through CSO arrangements.

For example, the Singleton Council in NSW has stated in its Water Service Charges Policy[56] that it wishes to assist and encourage the provision of charitable and non-profit organisation based services in its local community. As such they provide subsidies to eligible entities. The amount of the subsidy varies from between 75 per cent and 25 per cent and is determined based on the nature of the service, the degree of funding and the type of organisation. The funding for these services is provided by the Singleton Council via a CSO arrangement.

While noting that these situations represent a ruling by government to provide water to certain customers, it is acknowledged this ruling is based on a government policy to achieve a particular outcome, and does not relate to any pre-existing right that may have existed.

Under-recovery of costs due to legacy customer agreements

There are examples where regulated businesses have pre-existing 'legacy' agreements with certain customers, which specify certain charging arrangements which are below full cost. Where these legacy arrangements are not able to be adjusted (such as where they are codified in legally-enforceable contracts with a significant term to expiry) the general approach is that any cost under-recovery is carried by the regulated business; as opposed to this cost shortfall being recovered from other users.

Examples of these arrangements are present in both regulated and non-regulated sectors, though generally the terms of historical agreements are commercially-sensitive and so little public detail is available.

8.4 Analysis of key issues / options assessment

Free allocations are provided by SunWater to certain customers due to legislative rulings or business agreements by SunWater. In light of these difference, this section seeks to consider two alternative scenarios, based on the whether the provision of free allocations reflects an identified government decision or an alternative arrangement.

8.4.1 Free allocations – Government decision

Government can impose a number of operational requirements on business. These requirements may relate to safety standards, or service levels that a business must meet in order to operate. In meeting these operational requirements, the costs incurred generally should be able to be recovered appropriately through user charges.

Some free allocations reflect a Government decision which creates an operational requirement on SunWater; based on OICs or other legislative rulings. The requirement to provide these allocations for free is little different from any other type of operational requirement, and the costs incurred should be recovered by the services provider through user charges levied on paying customers.

[56] Singleton Council, 2008. *Community Service Obligations: Water Service Charges Policy – Policy No: 26029.1*

A further issue, however, is the degree to which 'free allocations' impose costs on SunWater, and whether this may have different implications on how free allocations should be treated.

For example, if SunWater does not incur any additional capital costs, and the costs for the provision of free water allocations are negligible (i.e. small variable costs), total dam capital and operating expenditure would simply be allocated to SunWater's other customers in accordance with an appropriate cost allocation methodology.

If however, there are more significant costs associated with the delivery of free allocations (such as capital related costs to ensure the dam had sufficient capacity to provide the free allocations) this may have implications on the treatment of free allocations. The existence of additional costs to SunWater, of itself, is not necessarily justification for passing through these costs to the holders of a free water allocation, as the decision to provide this water without charge is on the basis of a government decision. However, the provision of free allocations (where there are significant operating and capital costs), may result in a situation where the costs of water delivery to some customers are subsidised by water charges levied on other users.

While the existence of a cross-subsidisation may be deemed to be acceptable, the provision of free allocations may be considered to be a situation where a CSO could be applied – where a CSO is defined as an obligation to provide a service, whose provision is not in the commercial interests of the business entity but which is required by government. At present, free allocations are not considered to meet the criteria of a CSO under the *Government Owned Corporation Act 1993*. Changes to this current arrangement would require a decision by Government to change the status of OIC rulings and a subsequent decision to provide a CSO.

8.4.2 Free allocations – No government decision

There are some instances where the provision of free allocations is based on a legacy business arrangement between SunWater and the customer.[57]

Where free allocations represent a legacy business agreement to provide water to certain customers without charge (or below full costs) it may not be appropriate to pass these costs through to paying customers. The concern here is that if cost under-recovery for a particular customer group – in this case, holders of free allocations – might universally be allowed to be recovered from the residual customer base, this might lessen the discipline on SunWater to negotiate and agree proper commercial terms with these customers, given that any cost recovery shortfall is simply transferred to other customers.

On this basis, if there are no legislative requirement for free allocations to be provided by SunWater, then these costs should not be cross-subsidised by other users, and SunWater should either absorb the under-recovery or begin charging these customers.

However, noting that the provision of free allocations was in recognition of a pre-existing right to access water, SunWater may need to seek legal advice on this matter.

Box 8.1 – Summary regarding the treatment of free allocations

- 'Free allocations' are water entitlements, granted to customers, which are delivered free of charge or at a discounted rate. They reflect historical arrangements or a condition where customers had 'rights' or 'entitlements' to take water from a river prior to the construction of water storages.

[57] DERM. 2010. Written advice provided by DERM.

- SunWater has advised there are two schemes where free allocations exist – Barker Barambah WSS and Burdekin-Haughton WSS.

- The arrangements or requirements for free allocations vary across these two schemes. In some instances, free allocation are provided at the direction of government (OICs or legislation), or due to a private agreement between SunWater and the customer. Some free allocations are provided as a result of the negotiation process used for the current SunWater price path, however the underlying decision (whether by legislation or SunWater policy) is not clearly defined.

- For the 2005/06 SunWater Price Review Queensland Government policy stated that 'free' water allocations represent a pre-existing entitlement and are a condition precedent to the establishment of the schemes in which they occur. Therefore, lower bound costs could not be allocated to these water allocations. The costs of delivering these services are then shared across paying customers.

- Where free allocations reflect an explicit government ruling, the requirement to provide these allocations for free is little different from any other type of operational requirement, and the costs incurred should be recovered by SunWater through user charges levied on paying customers.

- However, where there is significant costs (e.g. capital costs) associated with the provision of free allocations, this may result in a situation where the costs of water delivery to some customers are subsidised by charges levied on other users. While the existence of cross-subsidisation may be deemed to be acceptable, the provision of free allocations may be considered as a situation where a CSO could be applied.

- Where free allocations represent a legacy business agreement to provide water to certain customers without charge (or below full costs) it would not be appropriate to pass these costs through to paying customers.

- On this basis, if there are no legislative requirement for free allocations to be provided by SunWater, then these costs should not be cross-subsidised by other users, and SunWater should either absorb the under-recovery or begin charging these customers. However, noting that the provision of free allocations was in recognition of a pre-existing right to access water, SunWater may need to seek legal advice on this matter.

Appendices

Appendix A Terms of Reference

Proposed Scope of Issues Paper

Tariff Structure

Background

The Ministers' Referral Notice requires that bulk water supply and channel prices/tariff structures are set so as to provide a revenue stream that allows SunWater to recover:

- its efficient operational, maintenance and administrative costs;
- its expenditure on renewing and rehabilitating existing assets, whether through a renewals annuity or a regulatory depreciation allowance;
- a rate of return on assets valued at 1 July 2011 (the initial regulated asset base (RAB)); and
- after 1 July 2011, a return of, and on, prudent capital expenditure to augment existing assets or construct new assets.

The Ministerial Direction also specifically requires the Authority to review drainage costs.

Tariff Structure

In setting prices for the 2006-11 price path, a two part tariff consisting of a variable and a fixed charge was implemented. Typically 70% of SunWater's fixed costs are collected through the fixed charge and 30% through the variable charge, though in some circumstances schemes were able to negotiate how much revenue would be collected from the variable and fixed charge. In Mareeba-Dimbulah, a three-part, declining block tariff applies.

Differential Pricing (postage stamp pricing)

For the 2006-11 Price Path, prices were differentiated by tariff group with prices within the tariff group being the same for each user irrespective of nominal allocation, water use or demand distribution. There were some irrigators who considered that the tariff group should be further differentiated and for the tariff group to be split to reflect cost differentiation within the tariff group.

Indexation

During the negotiated process that preceded the 2006-11 price path, independent consultants were engaged to review the appropriate method of indexation. The consultants found that there was some merit in a composite index that was weighted to account for SunWater's actual cost structure. Irrigators preferred that no indexation be applied. It was decided that the Consumer Price Index (CPI) would be used as the escalation factor and that this issue would be reconsidered during the 2011-16 price review.

Water Use Forecasts

SunWater's forecast revenue requirement is reliant on water use forecasts. For the 2006-11 price path, the water use forecasts were referenced against historic use.

Drainage Rates

Prior to 2005, a number of schemes had drainage rates charged separately from irrigation price path tariffs, whereas in others the irrigation price path tariff was inclusive of all drainage charges. During the last price review, the Mareeba-Dimbulah scheme elected to have 100% of the drainage costs recovered through channel charges. For Burdekin Haughton and Dawson Valley, increases in drainage charges were recovered in the Part A of the tariff on a per mega litre basis, while the per hectare charge remained the same. The Nogoa-Mackenzie and St George Schemes elected to have drainage charges, where applicable, recovered through a per hectare charge.

Free Water Allocations

In some cases, SunWater is obliged to deliver water to certain customers at no charge. This reflects the historical circumstances or a condition precedent to the scheme being developed where existing

customers had 'rights' or 'entitlements' to take water from a river prior to the construction of SunWater's water infrastructure storages.

Recreational Costs

For the 2006-11 price review, it was determined that the average irrigation customers' share of recreational costs included in the lower bound costs for the calculation of the new irrigation price path was 37 cents per mega litre.

Purpose of Issues Paper

The purpose of the Issues Paper is to identify the key issues associated with:

a) the appropriate basis for setting prices for SunWater's WSSs having regard to:

   (i) agreed and proposed national pricing principles for the irrigation sector;

   (ii) pricing practices adopted in the two previous reviews;

   (iii) alternative tariff structures (nodal pricing versus the postage stamp pricing) including the appropriate basis for the components of the tariff structure.

      (i) If relevant, in the context of the LRMC-based two-part tariffs, comment on what other factors may be relevant to tariff structures where the volumetric component of a two-part tariff is very low relative to the total charge.

      (ii) Also, identify how the tariff structure is to provide appropriate price signals where users hold entitlements and manage their supply risks individually (rather than the service provider managing the demand-supply balance and augmenting supply as necessary) and the relevance of LRMC in such circumstances.

   Each of the alternatives should also be assessed against a consideration of:

   (i) efficiency (including price signals to the holders of water entitlements);

   (ii) suitability for application in variable climatic and demand conditions;

   (iii) financial viability and revenue stability for SunWater;

   (iv) administrative simplicity;

   (v) the need for consistency across all schemes (is there such a need);

   (vi) the benefits of disaggregation between channel and bulk charges within a water supply scheme;

   (vii) the current specification of tariff groups;

   (viii) the implications of further price differentiation on the basis of system segments;

b) escalating prices during the price path (possible methods could include the Consumer Price Index or a composite industry index);

c) estimating demand for water and use of water entitlements. For example, whether sufficient certainty of usage forecasts (after a consideration of alternative forecasting methods) can be achieved over the pricing period or whether it is more appropriate to continue to use the same method to determine water use forecasts that was used for the 2006-11 review for each water supply scheme;

d) the current methods used to recover drainage costs;

e) the implications of the free allocations (once discerned from relevant agencies);

f) the current method of calculating the recovery of recreational costs from customers, and the extent to which those costs are required in providing water supply services (and if not, alternative means for doing so); and

g) the current method of calculating channel water harvesting charges and alternative means for doing so.

Appendix B Relevant pricing frameworks

QCA Principles

Under the Section 26 of the *QCA Act* there are a number of matters which the Authority must consider in conducting pricing investigations. With respect to monopoly businesses these matters include, but are not limited to, the costs of providing the goods and services in an efficient way, having regard to relevant interstate and international benchmarks, the actual cost of providing the goods or services, and the standard of the goods or services, including quality, reliability and safety.[58]

The QCA's *Statement of Regulatory Pricing Principles for the Water Sector* includes a number of pricing principles for achieving the objectives of monopoly price regulation. These principles require that prices:

- be *cost reflective* - that is, reflect the costs of providing the service and, usually where the demand for water exceeds its supply, potentially incorporate a value for the resource;
- be *forward looking* - in that they represent the least cost which would now be incurred in providing the requisite level of service over the relevant period;
- ensure *revenue adequacy* - the revenue needs of the business must be addressed where possible;
- promote *sustainable investment* - where the services are to be maintained into the future, the investor must be given the opportunity to enjoy an appropriate return on investment;
- ensure *regulatory efficiency* - the pricing method which minimises regulatory intrusion and compliance costs relevant to a particular circumstance should be adopted; and,
- take into account matters relevant to the *public interest* (many such matters are identified in the QCA Act).

COAG Principles

National Water Initiative (2004)

The National Water Initiative (NWI), agreed in 2004 by state, territory and Commonwealth Governments, is the national blueprint for water reform. Under this agreement, governments have made a number of commitments related to water reform, including commitments to best practice water pricing including to:

- promote economically efficient and sustainable use of:
  - water resources;
  - water infrastructure assets; and
  - government resources devoted to the management of water.
- ensure sufficient revenue streams to allow efficient delivery of the required services;
- facilitate the efficient functioning of water markets, including inter-jurisdictional water markets, and in both rural and urban settings;

[58] A list of the all the matters to be considered by the Authority in conducting an investigation, as specified in Section 26 of the QCA Act is provided in Appendix B.

- give effect to the principle of user-pays and achieve pricing transparency in respect of water storage and delivery in irrigation systems and cost recovery for water planning and management; and

- avoid perverse or unintended pricing outcomes.

NWI actions relating to water storage and delivery pricing is described in paragraphs 65 and 66 of the NWI, as shown in Box 1. In July 2008, additional areas for policy reform for improving urban water pricing were identified. These extend beyond the actions originally specified under the NWI. The original actions and outcomes of the NWI and a description of the principles underlying these are provided below.

Box B.1 – Actions under the NWI

Actions under the National Water Initiative

- *Paragraph 65* – In accordance with National Competition Policy (NCP) commitments, the States and Territories agree to bring into effect pricing policies for water storage and delivery in rural and urban systems that facilitate efficient water use and trade in water entitlements, including through the use of :
    - consumption based pricing;
    - full cost recovery for water services to ensure business viability and avoid monopoly rents, including the recovery of environmental externalities, where feasible and practical; and
    - consistency in pricing policies across sectors and jurisdictions where entitlements are able to be traded.
- *Paragraph 66* – In particular, States and Territories agree to the following pricing actions:
- *Metropolitan*
    - continued movement towards *upper bound pricing* by 2008;
- *Rural and regional*
    - full cost recovery for all rural surface and groundwater based systems, recognising that there will be some small community service that will never be economically viable but need to be maintained to meet social and public health obligations:
        - achievement of *lower bound pricing* for all rural systems in line with existing NCP commitments;
        - continued movement towards *upper bound pricing* for all rural systems, where practicable; and
        - where full cost recovery is unlikely to be achieved in the long term and a Community Service Obligation (CSO) is deemed necessary, the size of the subsidy is to be reported publicly and, where practicable, jurisdictions to consider alternative management arrangements aimed at removing the need for an ongoing CSO.

Consumption-based pricing

Consumption-based pricing explicitly links water pricing to the volume of water used, with tariffs set to reflect the actual costs of supplying water. This can provide water users with signals as to the true cost associated with water use with promotes appropriate investment in water using activities. It also provides water users with economic incentives for improved use efficiency and water conservation. As part of broader water management initiatives, consumption-based pricing can promote water transferring and trading, and greater efficiency in water allocation.

Consumption-based pricing requires a move away from fixed (non volume-based) charges. In practice, many water businesses are hesitant to move to fully volume based charges as this creates revenue variability and uncertainty. As such, two-part tariffs, including both fixed and variable components, are often applied. The variable volumetric component typically reflects the long-run marginal cost (LRMC) of additional supply. Inclining block tariffs are commonly applied in urban water pricing. An inclining block tariff involves multiple tiers of variable charges which are set in reference to different consumption levels.

In its position statement on urban water pricing[59], the Commission concluded that inclining block tariffs are inequitable as they disadvantage households with larger numbers. They are also not always effective in influencing consumption as the cost impact of reaching higher tiers is often not evident until well after the event, particularly where billing is infrequent. Inclining block tariffs also often by definition result in a departure from marginal cost pricing.

The Commission therefore considers a two part tariff, with the variable component set as a flat rate per kilolitre consumed, to be a more efficient and equitable tariff structure. This tariff structure is also simpler for customers to understand and respond to.

Full cost recovery

Under the NWI, jurisdictions have agreed to full cost recovery for all rural surface and groundwater based systems through cost recovery for water services to ensure business viability and avoid monopoly rents, including the recovery of environmental externalities, where feasible and practical.

This framework is intended to generate the financial resources to maintain supply systems (where lower bound prices are achieved) and provides the incentive to the service provider to invest and innovate (where a rate of return is provided for).

Paragraphs 65 and 66 require that jurisdictions achieve full cost pricing for water systems. Any assessment of full cost recovery needs to start with a definition of what constitutes the 'full cost' of providing water and wastewater services.

It is instructive to think of full cost recovery in terms of a continuum of revenue levels – bounded by a maximum price above which monopoly rents are present, and a minimum level below which the commercial sustainability of the water business is threatened.

The approaches to calculating revenue requirements for all water storage and delivery agencies throughout Australia are largely based on 'bottom up' methods. More specifically, the term 'building block approach' is used to describe the process of adding up of efficient cost components that are to be recovered through prices over the regulatory period.

The 'building blocks' approach is forward-looking and considers estimates of the future costs associated with providing the service. There is usually a clear link between the definition or level of the service (such as service standards and regulatory obligations), cost drivers (such as the number of customers, and number of connections) and the forecast costs.

Upper and lower bound pricing

The concepts 'lower bound pricing' and 'upper bound pricing' are used to describe the different levels of cost recovery as it relates to full cost pricing. Broadly, the lower bound provides for the recovery of direct financing costs only, while the upper bound provides for the recovery of these costs, including a rate of return on capital, without earning monopoly rents.

The Council of Australian Governments (COAG) has developed specific definitions of lower and upper bound pricing as it relates to water businesses.

Lower bound pricing is when prices are set to recover the minimum revenue (lower bound) required for maintaining a financially sustainable water storage and delivery business. Lower bound pricing is set to recover the following costs:

- recurrent expenditure requirements (operations, maintenance and administration);

[59] National Water Commission, position statement on urban water pricing, a foreword to the *Waterlines report: Approaches to Urban Water Pricing*. Prepared by Frontier Economics. July 2008

- the costs of any externalities;
- the interest costs on any debt, dividends and tax or tax equivalent payments (if any); and
- capital expenditure for replacement of existing assets and expanding the stock of assets to meet increases in demand, meet required service standards, and any increases in regulatory obligations.

Upper bound pricing is setting water charges that are above lower bound charges but avoid monopoly rents. The COAG definition of upper bound charging states that a water business should not recover more than the costs associated with:

- recurrent expenditure requirements (operations, maintenance and administration), including the costs of any externalities;
- a return of capital (provision for the cost of asset consumption – via depreciation); and
- a return on capital.

In upper bound pricing, dividends are provided for through the return on capital. Dividends are paid out of profits (or accumulated profits). This practice is considered to mirror commercial reality and is competitively neutral as required by the NWI.

NWI pricing principles (2010)

Beyond the overarching objectives for best practice water pricing specified in the NWI, on 23 April 2010 the Natural Resource Management Ministerial Council endorsed the *NWI pricing principles* which seek to assist jurisdiction in meeting the best practice water pricing requirements.

The NWI pricing principles cover four main areas, including:

- principles for the recovery of capital expenditure;
- principles for setting urban water tariffs;
- principles for recovering the costs of water planning and management; and
- the principles for recycled water and stormwater use.

These principals do have direct relevance to the matters considered in this issues paper and are not discussed further.

ACCC requirements

The *Water Act 2007* (Cth) (the Water Act), which came into effect on 3 March 2008, creates new institutional and governance arrangements to address the sustainability and management of water resources in the Basin.[60] The Water Act gives the Minister for Climate Change and Water (the Minister) the role of making water charge rules, including rules for charges payable to irrigation infrastructure providers. These water charge rules will apply to basin water sources, including SunWater schemes which fall within the Basin area[61].

[60] The Water Act builds on earlier reform initiatives, including the National Water Initiative (NWI) and the Murray–Darling Basin Agreement (MDB Agreement). The Water Act creates new functions for the Australian Competition and Consumer Commission (ACCC).

[61] Under Section 91(2) of the Water Act, the water charge rules apply to water charges as they relate to:
- Basin water resources;
- water service infrastructure that carries Basin water resources;
- water service infrastructure that carries water that has been taken from a Basin water resource; and
- water access rights, irrigation rights or water delivery rights in relation to Basin water resources.

Basin jurisdictions may also elect to make water charges outside the Basin subject to the water charge rules.[62]

Under the Water Act, the ACCC's role is to advise the Minister on those rules and to monitor and enforce compliance with the rules.[63] In its draft advice to the Minister[64], the ACCC has recommended a three-tiered approach for the regulation of the various types of operators. The three tiers are to apply to operators depending on the type of market failure and the materiality of any resulting inefficiencies. With respect to SunWater, it is expected that the business will be subject to tier 2 rules[65].

Tier 2 rules – network service plans

The proposed rules will require operators to:

- develop and consult on a network consultation paper (NCP) that details options for the operator's network over a five-year period;
- develop and provide to customers a network service plan (NSP), based on the outcomes of the NCP consultation process, which details major capital works and associated expenditure and provides estimates of charges over a five-year period;
- provide their NSP[66] to the ACCC for review by an external engineering consultant and provide this review to customers;
- publish a schedule of fees and charges before they come into effect; and
- develop and provide customers with a copy of an information statement that outlines and explains any changes from those anticipated in the NSP each time charges are to change.

Under the rules, operators may change charges (even where changes do not completely align with those proposed in the NSP) without revising the NSP. In such circumstances, tier 2 operators will be required to publish the new schedule of fees/charges in line with the tier 1 requirements, and provide to customers an information statement. This statement must explain any changes and the reasons for those changes, including reasons for differences between the published fees/charges and those proposed in the NSP.

Box B.2 - Network service plans

The purpose of the NSP is to outline the outcomes the operator expects to achieve for the network, the proposed service delivery standards and the maintenance and investment program necessary to meet those outcomes over the period of the NSP. It should include details of longer term outcomes, particularly which may have a material impact on service standards and prices. As operators commonly reset prices annually, the NSP should extend beyond the horizon of the charging period. Further the NSP should contain:

- details of the expected network and service outcomes over the five-year period (including

SunWater has six WSS which fall within the Basin.

[62] This was provided for under Part 4A of the Water Act. As yet, no Basin jurisdiction has endeavoured to pass legislation to allow implementation of the rules outside the Basin.

[63] Sections 93(2), 94, 100A and 100D of the Water Act

[64] ACCC. 2009. *Water Infrastructure charge rules: Advice to the Minister for Climate Change and Water*. June 2009.

[65] ACCC. 2009. *Water Infrastructure charge rules: Advice to the Minister for Climate Change and Water*. June 2009.

[66] The development of an NCP and NSP should occur at least every five years but may occur more often at the discretion of the operator—for example, if there are unexpected changes in expenditure that require the NSP to be completely revised

any regulatory obligations);

- details of the proposed expenditure program, including capital and operating expenditure for maintenance and investment over the period;
- details of the required revenue for each year of the five-year period for which the NSP has been developed; and
- estimates of the regulated charges during each year of the NSP.

The NSP is also required to be reviewed by an external engineering consultant.

The material contained in the NSP should be provided in a manner which informs consumers. It should clearly specify the service standards and other deliverables planned for the network and identify the change in the revenue required to meet these service standards and regulatory obligations. Under the draft rules, an NSP is required to be prepared by the 1 July 2010.

Appendix C QCA Act – Section 170ZI

170ZI Matters to be considered by authority in making water pricing determination

1. In making a water pricing determination, the authority must have regard to the following matters—
   - (a) the need for efficient resource allocation;
   - (b) the need to promote competition;
   - (c) the protection of consumers from abuses of monopoly power;
   - (d) decisions by the Ministers and local governments under part 3 about pricing practices of monopoly business activities involving the supply of water;
   - (e) the legitimate business interests of the water supplier carrying on the monopoly water supply activity to which the investigation relates;
   - (f) the legitimate business interests of persons who have, or may acquire, rights to have the monopoly water supply activity provided to them by the water supplier;
   - (g) in relation to the monopoly water supply activity—
     - (i) the cost of providing the activity in an efficient way, having regard to relevant interstate and international benchmarks; and
     - (ii) the actual cost of providing the activity; and
     - (iii) the quality of the activities constituting the water supply activity; and
     - (iv) the quality of the water being supplied;
   - (h) the appropriate rate of return on water suppliers' assets;
   - (i) the effect of inflation;
   - (j) the impact on the environment of prices charged by the water supplier;
   - (k) considerations of demand management;
   - (l) social welfare and equity considerations, including community service obligations, the availability of goods and services to consumers and the social impact of pricing practices;
   - (m) the need for pricing practices not to discourage socially desirable investment or innovation by water suppliers;
   - (n) legislation and government policies relating to ecologically sustainable development;
   - (o) legislation and government policies relating to occupational health and safety and industrial relations;
   - (p) economic and regional development issues, including employment and investment growth.

2. The authority may have regard to any other matters related to the matters mentioned in subsection (1) it considers are appropriate

Appendix D Summary of tariff structures and pricing principles in other jurisdictions

Gladstone Area Water Board (Qld)

Regulatory Arrangements

Under the QCA Act, the QCA's roles in relation to the water industry include, at the direction of the Premier and Treasurer (the Ministers), investigating and reporting on the pricing practices of certain declared monopoly or near monopoly business activities of State and local governments.

Under Section 23 of the QCA Act, the Premier and Treasurer have referred the declared monopoly business activities of the GAWB to the Authority for an investigation about the pricing activities related to those activities.

Tariff structure

The QCA has developed a recommended pricing framework that should be applied by GAWB in response to the regulatory objective required under the QCA Act.

In summary this framework is as follows[67]:

- prices are required to be based on long-run marginal costs, with two-part tariffs applied separately for storage and delivery services and to incorporate take-or-pay access charges on contracted volumes;
- tariffs are to be differentiated between users according to their use of specific components of GAWB's infrastructure;
- penalty load factors are considered appropriate to apply to the total charge to provide the incentive for customers to accurately estimate their consumption;
- common infrastructure costs should be allocated to all existing and expected new customers provided the costs represent the least cost to meet projected demand;
- contributed assets, where recognised, should be included in the asset base for the purpose of determining the revenue requirement and prices;
- Unless otherwise specified, rebates for future contributed assets should include the return on capital and return on capital components, provided their contribution is intended to reduce pricing in this manner; and
- In general, drought risk is best managed by GAWB and GAWB is entitled to pass on the costs of managing this risk to customers.

Other charges

The GAWB does not apply charges for drainage or for channel harvesting.

Free water allocations

The GAWB does not have any free allocation arrangements.

[67] QCA. 2010. *Final Report – Gladstone Area Water Board – Investigation of Pricing Practice*. June 2010.

Cost recovery for recreational costs

Recreational expenditure is included in the asset base for pricing purposes and passed through to users via water charges.

Indexation

In the 2005 prices investigation, the Authority recommended that the Brisbane All Groups CPI be used for the purpose of annual price adjustments between price reviews. The CPI was considered to be readily available, timely and not subject to revision and is commonly used in commercial contracts for price escalation. This decision was upheld for the 2010 GAWB Investigation of Pricing Practices.

Water use forecasts

For the 2010-15 regulatory period GAWB proposed a demand forecasting regime that uses different demand forecasts for specific purposes. With respect to pricing, GAWB's forecasts are based on demand from existing customers which is highly certain and underpinned by customer contracts (referred to by GAWB as the 'base case' demand approach). For existing customers not signed to long term contract, the approach proposes to use current and historical demand, customer sourced forecasts and external information to derive a forecast of demand.

GAWB's approach was determined to be appropriate by the QCA, however, GAWB's estimates resulted in very flat demand over the initial 5 year period, on the basis that GAWB has used conservative estimates of forward demand. QCA believed that GAWB's demand forecast had excluded high probability new demand growth that could be expected to be contracted over the next five years and therefore provided alternative forward demand estimates which took into consideration two developments which were expected to come on board within the 5 year period.[68] This anticipated demand was included in QCA estimates regarding demand over the period from 2010 to 2015 (demand was smoothed over this period to avoid significant price movement). Forecast demand after 2015 was calculated on the basis of a trend line reflective of historic demand trends.

The QCA's pricing principles require customers to bear the risks of their own demand forecasts for GAWB to bear risks of uncontracted demand. In a sense, the Authority's main role is to ensure that the forecasts on which GAWB seeks to base its maximum allowable revenue are not excessive as the forecasts do affect individual customers' prices even if GAWB bears the revenue risk associated with uncontracted new demand.

Overall the Authority recommended that for pricing purposes, demand should reflect existing contracted volumes, anticipated contracted volumes and a component to reflect expected long term growth.

State Water (NSW)

Regulatory arrangements

In NSW the Independent Pricing and Regulatory Tribunal (IPART) determines the maximum price that State Water and the Water Administration Ministerial Corporation (administered by the NSW Office of Water) may levy for services related to bulk water services including water resource management. These services are provided to farmers, irrigators, industrial users and town water suppliers

As part of its 1996 determination, the Tribunal established a set of principles for setting bulk water prices to balance competing claims within the community. These principles have guided the Tribunal's subsequent determinations, including the 2006 and 2010 determination.

The pricing principles that IPART used to set the bulk water prices include:

- water charges should be based on the efficient economic costs of providing water services;

[68] QCA. 2010. *Final Report – Gladstone Area Water Board – Investigation of Pricing Practice*. June 2010.

- the administrator of water resources should receive sufficient funds to achieve financial stability and deliver an appropriate level of water services;
- pricing policy should encourage the best overall outcome for the community from the use of water and the other resources used to store, manage and deliver that water;
- the cost of water services should be paid by those who use the services. Those who cause more services to be required should pay more;
- pricing policies should promote the ecologically sustainable use of water and of the resources used to store, manage and deliver that water; and
- water access entitlement holders are to bear the risks of any reduction or less reliable water allocation.

Tariff structure

Prices, in most systems, are structured to recover 40 per cent of the target revenue through a fixed entitlement charge with the remaining 60 per cent to be recovered through a variable usage charge. This decision was released in the 2006 IPART Determination paper on bulk water charges[69]. In setting the 40:60 ratio IPART stated that it considered the following:

- State Water's operating license requirements;
- conservation signal of ratio;
- State Water revenue variability and financial viability; and
- impact on customers.

The actual 40:60 ratio was set in State Water's operating license (2005-08), which states "State Water must to ensure that…the usage based component of charges is not lower than 60 per cent by 1 July 2008"[70]. This decision has been made ensure consistency between the pricing policies and practices of State Water and the COAG Strategic Framework for Water Reform and other COAG initiatives relating water. The COAG framework supports the adoption of pricing regimes based on the principles of consumption-based pricing, full-cost recovery and desirably the removal of, cross-subsidies which are not consistent with efficient and effective service, use and provision.

In setting the above fixed to variable price ratio IPART made two exceptions. The North Coast and Hunter valleys have been structured with higher fixed charge. The decision was made on the basis that a higher fixed charge was needed to provide disincentives for "sleeper and dozer"[71] licences. Irrigators argued that holders of sleeper and dozer licences reduce the effective availability of water in their valley. Therefore, they proposed that charges be set based on 60 per cent fixed and 40 per cent usage; noting that this would still represent a greater emphasis on usage charges compared to current tariffs. IPART agreed with these arguments given that usage in these valleys is low compared to the level of entitlements. It also notes that these sleepers and dozers should contribute an equitable contribution to the largely fixed costs of maintaining State Water's infrastructure.

Within each valley entitlement charges are paid by water license entitlement holders according to their entitlement, regardless of usage. The usage charges are paid according to the volume of water used by the entitlement holder. The 40:60 entitlement structure is viewed by IPART as the appropriate balance between

[69] Independent Pricing and Regulatory Tribunal, 2006. *Review of Bulk Water Charges for State Water Corporation and Water Administration Ministerial Corporation,* September 2006

[70] New South Wales, 2005. *State Water Corporation Act 2004 – Operating License issued under Section 11(1) of the State Water Corporation Act 2004,* June 2005

[71] This term is used by irrigators to describe customers that hold irrigation licences but rarely make use of their entitlement.

fixed and variable charge and is supported by State Water's customers and stakeholders (subject to the two exceptions noted above). This decision was made in the 2006 IPART Determination paper[72].

Other charges

Drainage charges

State Water is a bulk water supplier. Irrigation services are provided by privately owned irrigation businesses, hence State Water does not apply drainage charges.

Channel harvesting (Supplementary Event)

State Water applies a two part tariff for water charges, comprising of a fixed and variable charge. Where a supplementary event is announced by the NSW Department of Water, which is similar to an event which activates channel harvesting arrangements for SunWater, water access entitlements holders are able to extract additional water. Charges for extracting water during a supplementary event are captured through the standard variable charges applying to a particular valley (volume extracted is captured through a customer's meter and charged on the basis of usage). There is no fixed charge applied for extracting water during a supplementary event.

Free water allocations

In NSW there are Landholder Rights which allow landholders access to water which runs past their property. These rights are similar to a riparian right, as there is no charge associated with extracting water and volumes extracted are not metered. Landholder Rights can exist in regulated river systems, and situations have occurred in the past where entitlements holders (which face charges) have been unable to extract water due to low announced allocations, however, there have been some landholders who have extracted water on the basis of their Landholder Right. It is understood that the NSW Government is currently reviewing the treatment of Landholder Rights.

Cost recovery for recreational costs

In the IPART determination process for State Water, there has been no consideration of cost recovery of recreational costs.

State Water does incur costs related to maintaining recreational areas, which it covers on the basis of being a good corporate citizen. Further these costs are covered to some extent through Government funding provided to State Water.

Further, State Water is only able to charge customers for which there is a legal relationship, such as in the form of a customer contract, or a water access entitlement arrangement. On this basis State Water is unable to recover costs for recreational services from recreational users. In the instance that State Water was required to recover costs for recreational services, these costs would be allocated to the NSW Government, which could then consider appropriate cost recovery arrangements to apply.

Indexation

IPART applies through-the-year CPI (8 cities) for the purpose of indexation of prices. This choice was selected on the basis that no individual inflation measure satisfies all the criteria of an ideal inflation factor for industry price determinations, though the through-the-year CPI measure is, for most applications considered

[72] New South Wales Independent Pricing and Regulatory Tribunal, 2006. *Review of Bulk Water Charges for State Water Corporation and Water Administration Ministerial Corporation,* September 2006

to be the simplest options with the advantages of relative timeliness and a high level of credibility and familiarity to the public.[73]

Water use forecasts

If the water extractions forecasts are inaccurate then State Water will under- or over-recover its revenue requirement. This occurred following the 2006 determination paper, water extraction forecasts where too low which resulted in a considerable revenue under-recovery for State Water.

Following this IPART adopted a new approach for the 2010 determination paper. The forecasting approach set by IPART is determined using a 20-year moving average of historical Integrated Quantity and Quality Model (IQQM) and actual extractions. IPART stated that the 20-year moving average of historical and actual extractions is superior to the previous IQQM approach because:

- it focuses on more recent information and reflects current extraction conditions;
- the use of actual extractions for each valley is relatively easy to identify and verify;
- a 20-year moving average will allow State Water to recover its revenue, with a lag, because the actual extractions that occur over the 2010 Determination will be used to calculate prices at the next price review and so on;
- it relies on actual extractions (where possible) rather than modelled data from the IQQM and so does not rely on having to update the IQQM at the commencement of each regulatory period (the current version of the IQQM model was last updated in 2005);
- it provides State Water with an incentive to minimise water theft (where actual extractions are used) as any additional water sales that are captured are chargeable which provides State Water with additional revenue.

IPART believes a 20-year moving average approach strikes a balance between maintaining price stability over consecutive determinations and using current, updated data that incorporates recent trends to forecast future extractions. By using a 20-year moving average approach IPART has provided a compromise that provides balance between the competing interests of State Water which proposed a 15-year moving average and Irrigators who requested to maintain the use of the IQQM under the long-run average approach.[74]

Murrumbidgee Irrigation Limited (NSW)

Regulatory arrangements

Since 1999 Murrumbidgee Irrigation Limited MIL has been a public company with its customers as shareholders. It operates under licences issued by the NSW Office of Water that regulate the distribution and management of water from State Water.

Water is diverted from the river at Berembed Weir upstream of Narrandera and Gogeldrie Weir near Leeton. Flows continue through a network of supply channels to each farm where it is measured onto the property.

Company employees adjust the channel flows to meet the changing needs of customers. Drainage channels collect storm run-off from farms and take it to Barren Box Storage and Wetland just west of Griffith which serves as an en route storage for customers further down the system

[73] Independent Pricing and Regulatory Tribunal. 2009. *Measuring inflation for industry price determination – Charge in calculation method.* July 2009.

[74] Independent Pricing and Regulatory Tribunal, 2010. *Review of Bulk Water Charges for State Water Corporation,* June 2010

Tariff structure

MIL uses a two part tariff structure.

In 2008 MIL reviewed the split of fixed and variable charges and subsequently changed the split to be more reflective of the underlying fixed and variable costs. MIL estimates that their costs are roughly 75 per cent fixed and 25 per cent variable in a normal year. The majority of costs relate to infrastructure other resources they have in place to provide water to its customers. In the 2008 review of its pricing structure MIL stated that it would not consider moving to a full variable cost as this would result in an increase in the average water charges due to the requirement to build capital reserves necessary to manage assets during low allocation years. On this basis the fixed and variable charge split is around 75:25.

MIL has also developed a differential pricing structure based on pricing groups – there are eight different pricing groups. These groups have been determined based on the cost of service provision and resulting charges. Within the Murrumbidgee Irrigation Area (MIA) the cost of provision varies. The pricing groups have been developed to minimise any cross-subsidisation within the MIA.

Other charges

Drainage charges

Drainage costs are included as part of the fixed and variable charge components set by Murrumbidgee Irrigation. There are no separate charges for this service.

Channel harvesting

On-allocation allows general security water access entitlement holders to access water when there is excess water available.

Supplementary water access licences (supplementary groundwater licences) are issued to groundwater licence holders that have a history of extraction greater than their new aquifer access licence share and their 'history of extraction' volume[75]. They are issued for the 10 year period of the water sharing plan and are not tradeable (unless exchanges as part of a property sale). The volume of water available under the supplementary licence is gradually reduced each year. When water volumes reach a certain level, these supplementary water access licences are activated.

Water available though on-allocation or through supplementary water access licences are subject to water charges, set by MIL and also State Water. These charges are calculated on the basis of the relevant variable charge applying within a particular basin.

Free water allocations

There are no free allocation arrangements or any similar arrangements where water is provided for free.

Cost recovery for recreational costs

There are no recreational costs associated with operating MIL's water infrastructure.

Indexation

MIL does not apply any indexation for its prices. Prices are set annually by MIL's Board of Directors, taking into consideration relevant costs.

[75] National Water Commission. 2009. *Australian Water Markets Report 2008-09*. December 2009.

Water use / water demand forecasts

No formal demand or water use forecasting in undertaken by MIL. Prices for each year are set on the basis of water usage over the past year.

To respond to changes in demand, or more specifically, to manage the impact of drought, MIL has a 'reserve' account system. In water years with high allocation announcements (e.g. 80 per cent of general security entitlements), a proportion of the revenue from charges is placed in a reserve account. This reserve is used to offset years where announced allocations are low (e.g. around 20 per cent of the general security entitlement), and therefore cost recovery is low. Prices can also be adjusted downwards during water years where there is low water availability.

Southern Rural Water (VIC)

Regulatory arrangements

The ESC regulates the prices and service standards of businesses supplying water, sewerage and related services to residential, industrial and commercial, and irrigation customers throughout Victoria. This includes Southern Rural Water (SRW).

Tariff structure

SRW estimates that their costs are approximately 90 percent fixed and 10 percent variable, in a normal year. The majority of costs relate to infrastructure other resources they have in place to provide water to its customers. In two of the three irrigation districts SRW has adopted a fully fixed tariff structure. This has been adopted in response to the low levels of water available for allocation due to draught conditions within the region. Within the third district SRW uses a combination of fixed and variable charges to recover its costs. Its tariff structure is made up of a fixed charge which recovers approximately 80 percent of its costs where the remaining 20 percent is recovered through variable charge.

SRW uses a combination of fixed and variable charges to recover its costs. SRW has adopted a differential pricing structure which varies charges across its three irrigation districts. These districts have been determined based on the cost of service provision and resulting charges and have been developed to minimise any cross-subsidisation within the SRW's across the three districts.

Other charges

Drainage charges

SRW recovers its drainage costs are through a separate fixed charge which is based on water entitlements.

Channel harvesting (Supplementary Event)

The closest thing SRW has to channel harvesting is 'off quota' water entitlements. These entitlements are triggered if there water levels are above full supply levels. In that event irrigators are entitled to withdraw as much water as they wish until the water level has come back down to the full supply level.

Free water allocations

There are no free allocation arrangements or any similar arrangements where water is provided for free.

Cost recovery for recreational costs

The recovery of costs associated with the provision of recreational facilities has been earmark for future review. Currently the costs are recovered through urban pricing (which is used as a proxy for the broader community. In the upcoming review some of these charges may be allocated to irrigators as well.

Indexation

As SRW sets its prices annually there is no requirement of indexation of tariffs.

Water use forecasts

Of the three districts only one recovers part of its cost through a variable charge. For the other two districts there is no need for any forecast modelling as the revenue is not dependent on supply levels. In the district which does recover part of its costs through a variable charge supply level are not subject to much variation. Even under draught conditions it was still able to allocate 70 percent of water entitlements. This limits the risk of under recovery of costs through the variable charge. SRW take a medium term view to cost recovery and under-recovery one year will be reflected in the following years pricing decision.

Central Irrigation Trust (SA)

Regulatory arrangements

Central Irrigation Trust (CIT) is situated in Barmera, it pumps water from the River Murray to 1,600 growers who irrigate 13,000 hectares of horticultural crops in nine private irrigation districts in the riverland region of South Australia. The trust is operated by and for the benefit of the irrigators in the region. Prices are set at the CIT annual general meetings.

Tariff structure

Tariffs are set at levels which aim to achieve full cost recovery. CIT faces both fixed and variable costs and they recover these through cost reflective fixed and variable charges. Its fixed costs account for approximately 50 percent of their overall costs and variable costs make up the remaining 50 percent. The fixed costs are recovered through the fixed service charges and the variable charges are recovered through the delivery charges which vary between districts in order to avoid cross-subsidisation between users.

Other charges

Drainage charges

CIT recovers its costs in relation to drainage through a drainage charge. This charge is levied on a per hectare basis for costumers without an irrigation connection. For those customers with an irrigation charge these costs are recovered through the water supply charges.

Channel harvesting

CIT does not engage in channel harvesting as all water has been allocated and there is no situation where allocations will increase.

Natural Resource Management Levy

This levy is collected by CIT on behalf of the South Australian Murray-Darling Basin Natural Resource Management Board. It is collected on a per megalitre basis.

Free water allocations

There are no free allocation arrangements or any similar arrangements where water is provided for free.

Cost recovery for recreational costs

There are no recreational costs associated with operating CIT's water infrastructure.

Indexation

Prices are not indexed rather they are set based on forecasted costs. CIT signs 3 year contracts with its suppliers so that over that period the prices are fixed. Renegotiation of contracts will usually result in an increase in costs which is passed onto customers. Recovery also allows for the periodic replacement of assets as required. The requirements for replacement are set out in CIT's 120 year business model. By using a long term view CIT can smooth its fixed costs over time.

Water use forecasts

CIT has indicated that demand does not tend to fluctuate greatly from one year to the next and hence there is little need for demand forecasting within the serviced districts. This is due to the types of crops grown, the limited rainfall and the efficient water trading market within the serviced districts.

As the fixed costs are fully recovered by the fixed charges there is little risk of under/over recovery due to fluctuations in the demand for water.

Renmark Irrigation Trust (SA)

Regulatory arrangements

The Renmark Irrigation Trust (RIT) was constituted by a Statute of the South Australian Parliament which was assented to on 23 December 1893. The main purpose of the Trust was to facilitate the putting into operation of the water rights to which the ratepayers were entitled under the terms of the *Chaffey Bros. Irrigation Works Act of 1887*.

Tariff structure

Access, delivery and other charges are set to meet the requirements of the budgeted administration and maintenance expenditure and allow for a reasonable sum to be put into an asset replacement reserve fund. The amount of money required to be set aside for future infrastructure and other asset replacements is calculated using a model that RIT developed as part of a recent business options study. The model takes into account the cost, life expectancy and time taken to replace long term and short term assets. This is to ensure that charges are fully cost reflective in the long term.

RIT charges both a fixed and variable charge to recover its costs. Access charges are calculated using a per rated area method and delivery charges are charged per kilolitre of water supplied. The split between fixed and variable charges is set to approximately 50 per cent fixed and 50 per cent variable based on a normal year's usage. This does not reflect their underlying costs which are approximately 85 to 90 per cent fixed and 10 to 15 per cent variable. The tariff levels are set according to an annual budget with half yearly reviews.

Other charges

Drainage

Drainage costs are recovered through the normal irrigation access and delivery charges. There is a special charge for those who do not irrigate but wish to have access to the drainage system and this is worked out on a per rated area basis.

Channel Harvesting

RIT does not engage in channel harvesting as all water has been allocated and there is no situation where allocations will increase.

Free water allocations

There are no free allocation arrangements or any similar arrangements where water is provided for free.

Cost recovery for recreational costs

There are no recreational costs associated with operating RIT's water infrastructure.

Indexation

Prices are set according to the needs of the budget. Recent changes in legislation (which do not allow the leasing of water) and jumps in electricity prices have meant that above CPI increases were necessary in during the 2008-09 and 2009-10 years. Prior to that prices were not raised at all during the 2006-07 and 2007-08 years in order to assist irrigators through tough times. It is hoped that subject to other outside forces the Trust can restrict price rises to CPI in coming years and give some assistance to irrigators making plans for the future.

Water use forecasts

A demand estimate is done for the annual budget. This estimate is based on historical information but can vary considerably due to the weather (rainfall, evapotranspiration, etc.) and other factors such as water restrictions, and commodity demand and prices.

Harvey Water (WA)

Regulatory arrangements

Harvey Water is a private irrigators' cooperative (formerly known as South West Irrigation) which delivers water to irrigators via a gravity pipe and channel system which it operates, maintains and improves. It is located about 100 km south of Perth in Western Australia.

In October 1996, the Water Corporation transferred its South West irrigation distribution business to the South West Irrigation Management Co-operative (now trading as Harvey Water) and entered into a ten-year water storage agreement with the irrigation water supplier. The Water Corporation owns and operates the eight dams in the South West that are used to provide water to the three groups of customers – farmers (via the distribution network owned and operated by Harvey Water), private industry, which is supplied by Harvey Water (although the Water Corporation recoups some of the revenue); and customers in Perth and areas within the integrated water supply system (IWSS).

While the Water Corporation owns and operates the dams, it does not have the rights to all of the water in the dams. Harvey Water was granted water access entitlement under the *Rights in Water and Irrigation Act 1914* to the majority of water in the dams. The Water Corporation does not charge for the water itself, but on the costs associated with storing the water. Harvey Water owns and manages three separate irrigation systems (Waroona, Harvey and Collie), supplied by water from eight dams. Harvey Water comprises two private irrigator cooperatives: the first owns and manages the infrastructure assets (South West Irrigation Asset Cooperative Limited (SWIAC)) while the second manages the irrigation business (South West Irrigation Management Cooperative Limited (SWIMCO)). The cooperatives determine the water charges it passes onto

its member customers. These charges are reviewed annually. The intention is to increase water charges by no more than CPI, while returning at least a break-even budget and making an allowance for future costs.[76]

The water storage charges levied to Harvey Water by the Water Corporation are currently set as part of the Bulk Water Supply Agreement (BWSA). The agreement specifies the terms and conditions under which the Corporation provides the water storage services for Harvey Water.

In 2007 the Economic Regulation Authority (ERA) undertook an inquiry into the most appropriate level and structure of water storage charges for Harvey Water, at the request of the Treasurer and in accordance with Section 32(1) of the *Economic Regulation Authority Act 2003*. The inquiry considers the charges which Harvey Water should pay to the Water Corporation, the owner and operator of the bulk storage infrastructure in Harvey Water schemes. The inquiry did not review prices or tariff structures being charged by Harvey Water.

Tariff structure

Harvey Water imposes tariff structure comprises of fixed and variable charges. As discussed above, Harvey Water comprises two private irrigator cooperatives: SWIAC, which is responsible for infrastructure assets, and SWIMCO which manages the irrigation business. There are different charges for each cooperative:

- SWIAC – two fixed charges, and no variable charge:
    - an asset levy – which forms a sinking fund to be used for the renewal and maintenance of the delivery system (charge per share); and
    - an access contribution – paid by customers connected to the piped delivery system in recognition of the higher level of service this provides (charge per connection).
- SWIMCO – fixed and variable charges:
    - an asset levy – which forms a sinking fund to be used for the renewal and maintenance of the delivery system (charge per share); and
    - SWIMCO Water Storage charge – covers the costs of storing water in dams owned by Water Corporation;
    - dam safety charge – contributing to the costs of keeping dams in a safe operating condition (charge per share); and
    - development levy – which is used to fund research and development.
    - delivery charge - irrigation consumption (with the transferable water entitlement) (charge per ML – variable); and
    - irrigation consumption charge (above the transferable water entitlement) (charge per ML - variable).

Harvey Water applies postage stamp pricing and does not differentiate prices across its schemes.

Other charges

Harvey Water does not provide drainage services. In Western Australia, drainage services are provided by Water Corporation and there are no charges associated with this service. This decision was based on a Government decision.

[76] NWI Steering Group on Water Charges, 2007, *Water Storage and delivery charges in the rural water sector in Australia*, National Water Commission, Canberra, February 2007.

There are no channel harvesting arrangements (or similar arrangements) in the Harvey Water schemes.

Free water allocations

Harvey Water is not required to any free allocation. In the past there were riparian rights for landholders who had water frontage, but these rights have mostly disappeared, except for a

Cost recovery for recreational costs

Harvey Water does provide any recreational services (e.g. paths, amenities etc), hence there are no measures regarding cost recovery.

The Water Corporation incurs costs for recreational users. In setting the BWSA, 85 per of costs were recovered from Harvey Water and other direct users, and the remaining 15 per cent of costs were attributed to other beneficiaries such as recreational users, paid for by Government (on the basis that benefits accrue to other users). Third party benefits (recreational user benefits etc) were to be funded by CSOs from the Western Australian Government.

Indexation

CPI is used for indexation purposes by Harvey Water on the basis that this index is easily identifiable and their members are familiar with index as a measure of underlying inflation.

Water use forecasts

In setting prices, Harvey Water considers historical changes in demand. There is no specific methodology applied regarding demand or water use forecasting.

Appendix E SunWater's approach to forecasting water usage

Approach to forecasting water usage

The approach used by SunWater to forecast water usage was based on the following[77]:

Step 1 – Collection of data for forecasting water usage

This step involved collecting the historical data of actual volumes of nominal irrigation water allocations, announced allocations and water delivery to irrigators in each scheme. This process involved:

- collating 25 years of actual historical data with respect to the volume of nominal irrigation allocations, the volume of announced allocations and the volume of water delivered to irrigators in each scheme (where available):
    - in most cases the maximum period of consistent data available was limited to 19 years, but in other cases the available data was limited to the period for which the scheme has been operating (for example, data for the Barker Barambah WSS was limited to the 15 years since this scheme commenced operations in 1989/90);
    - data up to 2001/02 was sourced from official data which was published annually by relevant government entities. This included data sourced from the annual reports published by the Queensland Water Resources Commission and Queensland Department of Primary Industries between 1980/81 and 1991/92 and the Annual Water Statistics published by the Queensland Department of Primary Industries and the Queensland Department of Natural Resources (Mines and Water) between 1992/93 and 2001/02;
    - data for the more recent years (2002/03 to 2004/05) was sourced from SunWater's own SunWater Water Information Management System (SWIMS);
- historical water usage ratios for each scheme were calculated as the volume of water delivered or diverted to customers as a proportion of the nominal volumes associated with the water entitlements held by SunWater's irrigation customers in each scheme;
- river harvesting and channel harvesting volume, riparian allowance and relocation water (where it was able to be identified) were excluded on the basis that this water is not recorded as usage against the nominal volume of a relevant water entitlement; and
- historical data was separated into blocks of five years each, commencing in 1980/81 and continuing through to 2004/05. Water usage in each period was then calculated as the volume of water delivered as a percentage of both nominal allocations and announced allocations.

Step 2 – Developing forecasts

This step involved developing initial water usage forecasts based on the information collected in step 1. This process involved:

- developing initial water usage forecasts based on actual irrigation water usage over the past five years (2000/01 to 2004/05). A key assumption was that there will be consistent availability of supply over the next five year period. However, where it is evident that severe shortages of supply have clearly limited

[77] SunWater. 2006. *Tier 1 Working Paper No. 42 – Irrigation Water Use Forecast Principles*. 2 March 2006. Pg. 1

water usage over the past five years, longer-term trends of actual irrigation water usage were also examined as a basis for forecasting future water usage by irrigators;

- examining the long-term average water usages of 10, 15, 20 and up to 25 years, subject to the availability of historical data, and taking into account all known scheme and industry developments over the relevant periods; and

- preparing separate data tables and graphs covering each of the 5, 10, 15, 20 and 25 year periods for each channel, river or groundwater segment within a scheme. For each segment, the graphs were plotted to show usage as a percentage of both nominal allocations and announced allocations. Longer term trends were demonstrated by plotting the long-term average and the linear trend pattern. This helped provide a visual tool to ascertain whether there were any clear patterns of increasing, decreasing or relatively consistent usage over different time periods.

    - where volumes of water are traded from SunWater's allocation to irrigators, those volumes are excluded from the usage estimates. This is because the usage estimates are based on a percentage of irrigator's nominal volume. Any additional water usage from water traded from SunWater needs to be accounted against SunWater's allocation as SunWater is bearing the costs of that allocation.

In principle, the final water usage forecasts were based on the calculated long-term average actual usage level. However, where there was a clear trend away from the long-term average, the forecast was adjusted in the same direction as that trend. The amount of the adjustment was based on the magnitude of divergence from the long-term average at the end of the next five years if that trend pattern was expected to continue for the whole period. Moderating the size of the adjustment, if any, were considerations of future key impacts on water usage, such as changes in industry conditions (e.g. the five-year outlook for the sugar industry), expectations in relation to continuing drought conditions, and the impact of specific issues within each particular scheme (e.g. issues such as citrus canker in the Emerald region or increased development of the scheme).

8.4.3 Assumptions

SunWater's forecasts of nominal allocations and water usage were based on historical averages. In some cases, specific factors in each scheme were identified which led to an assumed change in either or both nominal allocations and water usage over the period of the irrigation price path. In this regard, the following four primary change factors were considered:

(i) Water allocation and management planning (WAMP) – it was accepted that future WAMP processes could lead to changes in the nature of existing water entitlements over the price path period, either in terms of the level of nominal allocations or in the reliability associated with different priority supply groups. However, it was assumed that these WAMP processes would affect neither nominal nor announced allocations;

(ii) Efficiency gains – it was recognised that efficiency gains were likely to be achieved in SunWater's water distribution system, however where efficiency gains were possible due to scheme delivery improvements, it was assumed that new allocations could be made available and the usage of new allocations would be consistent with existing usage in the scheme. It was also recognised there may be efficiency improvements in on-farm practices. However, it was assumed that there would generally be no impact on use of allocation in most schemes based on the principle that any likely gains will be absorbed over time within each scheme through expansion of cropping or by access to temporary or permanent trading markets.

(iii) Infrastructure developments and improvements – forecasts only considered infrastructure developments which were approved at the time the water usage forecasts were being developed.

(iv) Trading of entitlements – it was assumed that as the WAMP process in each scheme was finalised, permanent transfers could make available unused allocations for use by other irrigators and that over

the medium term, average water use as a percentage of both nominal and announced allocation may increase in some schemes. However, the potential for trading to increase water use would depend on the level of under-utilisation of water in the scheme and the volume of the likely trades. Ultimately, it was assumed that permanent trading may increase water usage for a number of years by between 0.25 per cent and 0.5 per cent per year in schemes where water was considered to be under-utilised.

Appendix F Indexation in other sectors

Urban Water Tariffs

Western Australia

The Economic and Regulation Authority (ERA) has adopted an Australian wide CPI rate for indexing urban water tariffs in Western Australia. This was outlined in the final report on the Inquiry to Tariffs of the Water Corporation conducted by the ERA. As specified in the report, water tariffs will be escalated on an annual basis in line with the most recent annual increase in the eight city average CPI.[78]

The ERA did not deem it appropriate to base the tariff escalation index on local factors or indexes such as the Perth based CPI. It was determined that Perth water utilities are influenced by Australia wide factors and national inflationary trends. Hence an Australia wide-CPI was selected on the basis that two thirds of water business costs relate to:

- a return on assets, whose cost is influenced by capital markets; and
- depreciation, which is the recovery of capital expenditure sourced more broadly than the local market.

NSW

IPART applies an Australian wide CPI index with respect to the escalation of water tariffs in New South Wales. The rate applied by IPART is the all groups' number for the weighted average of eight capital cities as published by the ABS.[79] This approach was adopted on the basis that 'no individual inflation measure satisfies all the criteria of an ideal inflation factor for industry price determinations, though CPI is, for most applications, considered to be the simplest option with the advantages of relative timeliness and a high level of credibility and familiarity to the public'.[80]

The CPI rate is determined on a 'through-the-year' basis by comparing the CPI index number for the latest quarter with the CPI index number for the corresponding quarter of the previous year.[81]

Australian Capital Territory (ACT)

The Independent Competition and Regulatory Commission (ICRC) use an Australia-wide CPI rate to index regulated water tariffs in the ACT. The ICRC has also determined that an additional 1 per cent and 4.76 per cent charge be applied annually to water and wastewater tariffs respectively, in addition to the change in CPI.[82] This was outlined in the ICRC's final report on the water and waste-water price review published in 2008.[83]

The report indicates that the additional annual charge of 1 per cent and 4.76 per cent for water and wastewater tariffs respectively arose from concern by several parties, including the ACT government, that the

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[78] Economic Regulation Authority. 2009. *Final Report – Inquiry into Tariffs of the Water Corporation, Aqwest and Busselton Water*. August 2009. Pg 98

[79] IPART. 2009. *Review of prices for the Sydney Catchment Authority*. June 2009 Pg 10

[80] Independent Pricing and Regulatory Tribunal. 2009. *Measuring inflation for industry price determination – Charge in calculation method.* July 2009.

[81] IPART. 2009. *Measuring inflation for industry price determinations*. July 2009 Pg 1

[82] IPART. 2008. *Final Report & Price Determination – Water & Wastewater Price Review*. April 2008. Pg 157

[83] Independent Competition & Regulatory Commission. 2008. *Final Report & Price Determination – Water & Wastewater Price Review*. April 2008. Pg 157

proposed full 'front-loading' of substantial price increases in the first year of the determination period (2008-09) would be difficult on consumers. The ICRC determined that a more gradual increase in the tariff price, via the addition of an annual escalation charge, would be more manageable for these consumers than 'front-loading' the full price increase in year one followed by more moderate yearly changes.[84]

The ICRC therefore determined to apply a modest real price increase in 2008-09 followed by gradual increases (1 per cent and 4.76 per cent for water and wastewater respectively) over the remaining determination period. This was determined in order to ensure the recovery of the total revenue requirement whilst ensuring more even price increases on consumers over time.

Victoria

The Essential Services Commission (ESC) use CPI to index annual tariff increases as outlined in the Metropolitan Melbourne Water Price Review. The ERC determined that in the current economic climate that it is reasonable to assume that input costs would escalate in line with CPI.[85] As a result the ESC determined to apply the Australia wide CPI rate for water tariff indexation in Victoria.

South-East Queensland Urban Water Tariffs

For the Brisbane City Council (BCC) 2009/10 budget, the Council has indicated that the water tariff components (fixed access and volumetric) were to be increased by 4.8 per cent (with some minor variation due to rounding).[86] The bulk charge component (which is a separate charge) was increased in line with Water Grid charges (31.2 per cent).

The BCC's rationale for increasing tariffs was based on the methodology outlined in the Council of Mayors South East Queensland (COMSEQ) Memorandum of Understanding. This agreement states that:

> '*retail prices for the 2009/10 period, will include, at least, a full pass through of bulk water prices and an increase in line with the Local Government Price Index'.*

On this basis, water tariff components which do not relate to bulk charges increased by 4.8 per cent in line with the increase in the appropriate Local Government Price (cost) index.

The Gold Coast City Council also used the Local Government price Index for increasing water tariff (excluding bulk water charge components). This approach was based requirements agreed by Gold Coast City Council in the COMSEQ Memorandum of Understanding.

Local Government Price Index

The Local Government Association of Queensland (LGAQ) cost index, released in 2009, is a composite index comprising the general construction index and CPI. The published LGAQ council cost index was 5.3 per cent in 2009. BCC chose to adopt a rate of 4.8 per cent which is below the actual LGAQ index. According to the QCA, no reason was given for selecting a rate below the index.[87] Gold Coast City Council increased water prices (excluding those charges which relate to bulk water) by 5.2 per cent. [88]

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[84] Independent Competition & Regulatory Commission. 2008. *Final Report & Price Determination – Water & Wastewater Price Review*. April 2008. Pg 135

[85] Essential Services Commission. 2009. *Metropolitan Melbourne Water Price Review*. June 2009. Pg 32

[86] QCA. 2009. *Final Report – Retail Price Monitoring in SEQ Urban Water Sector – Brisbane City Council*. October 2009. Pg. 5

[87] QCA. 2009. *Final Report – Retail Price Monitoring in SEQ Urban Water Sector – Brisbane City Council*. October 2009. Pg. 9

[88] QCA. 2009. *Final Report – Retail Price Monitoring in SEQ Urban Water Sector – Gold Coast City Council*. October 2009. Pg. 9

Taxi Industry

NSW

In NSW, IPART reviews fares for the State's taxi services, and recommends to the Minister of Transport how much maximum fares should increase (or decrease) compared to the previous year's maximum fares to ensure that customers do not pay more than the costs of providing the service. This is achieved by assessing the increase (or decrease) in costs of providing taxi services to passengers that have occurred over the previous twelve months using an industry specific cost index, known as the Taxi Cost Index (TCI)

The TCI is used on the basis that as there are around 5,000 taxis, applying an industry wide cost index is not appropriate. Hence the cost index measures in percentage terms how much the overall costs of providing taxi transport services has changed over a 12 month period.

The TCI incorporates major costs in providing taxi services in NSW. These costs are:

- labour costs (of drivers and operators);
- fuel costs;
- network fees;
- license plates lease costs;
- vehicle costs (including maintenance, insurance, vehicle lease costs); and
- other costs.

A separate TCI is developed for urban and country taxi, reflective of the different weighting applying to each cost category.

The weightings used for setting the TCI are based on an industry wide survey of costs carried out in 2007, supplemented by IPART where necessary. The inflators selected seek to reflect how the cost items change over time, and while IPART seeks to use inflators that are based on independent and publicly available information, this is not always possible. For example, the network fee costs item is based on the actual level of network fees paid. IPART inflates this cost item using data on actual network fees provided directly by urban taxi networks. While this provides advantages, by specifically measuring actual network cost, it is not publicly available and is provided by the network.

Victoria

In their 2007-08 taxi fare review[89] the ESC recommends the use of a specifically constructed composite index of input prices, using a several published price indices which are relevant to Victorian taxi industry costs including LPG price indices. This index comprises the following:

- WPI for the Transport sector is used as the input price index for driver incomes (ABS statistic);
- Performance of Manufacturing Index (PMI), a component of the CPI Melbourne, is used as the input price index for motor vehicles, repairs and maintenance, tyres and washing and other on-road costs, including a component of the fuel costs (ABS statistic);
- LPG retail prices are used for fuel (taking into account the fuel component in the PMI) (provided by FuelTrac);

[89] Essential Services Commission 2008, Taxi Fare Review 2007-08: Final Report, August 2008

- Insurance Index (as part of CPI Melbourne) is used as the price index for insurances such as comprehensive, income protection and WorkCover; and

- CPI – All Groups, Melbourne is used for network fees, office, uniform and other costs, including licence assignment fees, which are included in the index at an estimated 2002 amount.

Each index would be appropriately weighted to reflect relative importance of the inputs in total costs. In the paper ESC determines that a productivity adjustment is appropriate and is included in the constructed composite price index. It recommended that its composite index will require period re-weighting every 3-5 years to remain a reasonable accurate reflection of the taxi industry cost mix.

The proposed price path for the next 3-5 years is to be determined by the "CIPI-X formula", where CIPI is the composite input price index, and X is the productivity adjustment.

Non-metropolitan private buses

NSW

In NSW the Bus Industry Cost Index (BICI) is used to calculate recommended changes in maximum fares for non-metropolitan private buses operating under commercial contracts. The BICI is based off the cost items for the business including bus capital costs, people costs, bus insurance and registration, bus lubricants, bus repair and maintenance and other costs. An inflator for each cost has been created and this is typically based on publicly available indices, though some cost components are provided by industry (e.g. The Bus and Coach Association provides a quote received for a particular type of bus).

Electricity charges

In Australia the Australian Energy Regulator (AER) regulates the wholesale electricity market and is responsible for the economic regulation of the electricity transmission and distribution networks in the national electricity market (NEM). The development of the NEM was part of the broad energy reforms undertaken over the last decade.

The AER's current functions are focused on regulating the natural monopoly transmission and distribution sectors of the national electricity market, monitoring the wholesale electricity market and enforcing electricity market rules. The AER's regulatory functions and powers are conferred upon it by the national electricity law and the national electricity rules.

Under the national electricity law and national electricity rules, the AER's key responsibilities at the present time include regulating the revenues of transmission and distribution network service providers. The AER performs its regulatory functions under the national electricity law (NEL) and the national electricity rules (NER). Within the NER there is some comment on the indexation of distribution and transmission tariffs.

Distribution Tariffs

Any increase to the distribution tariffs must comply with the constraints outlined in the NER. The expected weighted average revenue to be raised from a tariff class for a particular regulatory year of a regulatory control period must not exceed the corresponding expected weighted average revenue for the preceding regulatory year in that regulatory control period by more than the permissible percentage.

Where the permissible percentage is the greater of:

- CPI-X limitation on any increase in the Distribution Network Service Provider's expected weighted average revenue between the two regulatory years plus 2 per cent. Note: The calculation is of the form (1 + CPI)(1 – X)(1 + 2%)

- CPI plus 2 per cent. Note: The calculation is of the form (1 + CPI)(1 + 2%)

Where the X factor must be set by the AER with regard to the Distribution Network Service Provider's total revenue requirement for the regulatory control period; and must be such as to minimise, as far as reasonably possible, variance between expected revenue for the last regulatory year of the regulatory control period and the annual revenue requirement for that last regulatory year.

Transmission Tariffs

Any increases to the transmission tariff must be consistent with the NER which state that:

- The net present value of the expected maximum allowed revenue for the provider for each regulatory year of the regulatory control period is equal to the net present value of the annual building block revenue requirement for the provider for each regulatory year;
- The maximum allowed revenue for the provider for the first regulatory year is expressed as a dollar amount;
- The maximum allowed revenue for the provider for each regulatory year (other than the first regulatory year) is calculated by escalating the maximum allowed revenue for the provider for the previous regulatory year using a CPI - X methodology; and
- The total revenue cap for the provider for a regulatory control period is calculated as the sum of the maximum allowed revenues for the provider for each regulatory year.

The X factor for each regulatory year must be such that:

- The net present value of the expected maximum allowed revenue for the relevant Transmission Network Service Provider for each regulatory year (as calculated in accordance with the post-tax revenue model) is equal to the net present value of the annual building block revenue requirement for the provider for each regulatory year (as calculated in accordance with the post-tax revenue model); and
- The expected maximum allowed revenue for the provider for the last regulatory year (as calculated in accordance with the post-tax revenue model) is as close as reasonably possible to the annual building block revenue requirement for the provider for that regulatory year (as calculated in accordance with the post-tax revenue model).

Retail Electricity Price Indexation - NSW

IPART have outlined their approach to electricity tariff escalation in the NSW's electricity retail sector in the final report on the review of electricity retail tariffs and charges for 2010 to 2013. This determination is applicable to standard retail electricity suppliers in NSW including Energy Australia, Integral Energy and Country Energy.

Retail electricity suppliers in NSW have the flexibility to adjust their tariffs in response to changes in their cost base, subject to a maximum annual percentage determined by IPART. IPART assesses each tariff annually throughout the determination period (2010 to 2013) and determines the maximum percentage by which each standard retailer can increase its regulated tariffs in that year. Each retailer can then adjust its level of tariffs as it sees fit, provided that they do not increase by more than the maximum percentage.[90] These tariffs therefore do not require annual indexation as they are reviewed annually by IPART.

IPART applies a weighted average price cap (WAPC) approach to regulate these retail electricity tariffs. This approach intends to allow retailers to set cost-reflective tariffs as determined under the price cap.

IPART calculates the WAPC based on the following parameters:

[90] Independent Pricing and Regulatory Tribunal. 2009 *Review of regulated retail tariffs and charges for electricity* 2010-2013. June 2009. Pg 61

- network Costs - based on actual network charges imposed by the distribution network service providers and approved by AER;
- retail costs - based on the efficient standard retailer cost allowances determined by IPART;
- the quantities used to weight prices are:
    - for fixed components, actual customer numbers as at 31 December in the previous year, and
    - for variable components, estimated consumption (in MWh) over the previous twelve months.[91]

In addition to adopting the WAPC to regulate retail tariff prices IPART decided to place the following constraints on retailers:

- retailers are not able to impose additional price limits on the retail component of the price cap, or change individual customer bills; and
- retailers are not allowed to set new tariffs without IPART approval.[92]

Retail Electricity Price Indexation - Victoria

The Essential Services Commission (ESC) is responsible for the economic regulation of electricity distribution services in Victoria. Electricity distribution services include those related to the connection to and use of the distribution system for the transfer of generated electricity from the transmission system to the final customer.

In Victoria, distribution tariffs must conform to price controls and rebalancing controls set out in the *Electricity Distribution Price Review 2006-10 Final Decision Volume 2 Price Determination*. The Determination provides a price control formula that specifies a maximum percentage change to annual tariffs. The maximum limit is based on four controls[93]:

- X-factor – the x-factor accounts for the expectation that distributors will achieve year-on-year efficiency gains and that these gains will be passed on to consumers. (e.g. for 2009, the Determination requires CitiPower to deliver an average real decrease in distribution tariffs of 2.5 per cent);
- S-factor – the s-factor provides an incentive for distributors to meet service obligations. Tariffs may be adjusted where service targets are exceeded and customers are compensated through reduced tariffs if service provision is not to the require standards;
- L-factor – the L-factor ensure tariffs accurately reflect licence fees. Distributors must pay a licence fee, which is recovered through distribution tariffs.
- CPI – tariffs are indexed to account for inflation.

Retail Electricity Price Indexation – Queensland

Under the *Electricity Act 1994*, the notified price of electricity is to be adjusted annually according to changes in the cost of providing electricity. Specifically, the rate of change in the benchmark retail costs index (BRCI) is to be used to adjust notified electricity prices each year.

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[91] Independent Pricing and Regulatory Tribunal. 2009 *Review of regulated retail tariffs and charges for electricity* 2010-2013. June 2009. Pg 68

[92] Independent Pricing and Regulatory Tribunal. 2009 *Review of regulated retail tariffs and charges for electricity* 2010-2013. June 2009. Pg 58

[93] CITIPOWER. 2009. *2009 Annual Tariff Report*. November 2008.

The BRCI approach to determining notified prices of electricity does not involve a calculation of the efficient retail price of electricity each year. Rather, existing notified electricity prices are escalated by the expected annual change in the underlying cost of supplying electricity to consumers, that is, by the change in the BRCI. The Electricity Act specifies three main cost components for the BRCI, namely: the cost of energy; network costs; and retail costs.

Under the Certificate of Delegation, under section 90 (3) of the *Electricity Act 1994* (Qld), the QCA is delegated the responsibility to calculate BRCI under Chapter 4, Part 2, Division 3 of the Act. This calculation is then required to be applied to the tariffs for the previous tariff year, and published by the QCA.

Appendix G Background on free allocations

Status of 'free allocations'

'Free allocations' are water entitlements granted to customers which are delivered to customers free of charge or at a discounted rate. This arrangement reflects an historical agreement or a condition where customers had 'rights' or 'entitlements' to take water from a river prior to the construction of water storages. SunWater has advised that free allocations were provided in two schemes:

- Barker Barambah WSS; and
- Burdekin-Haughton WSS.

Background of the status of free allocation in Burdekin-Haughton and Barker Barambah WSS is provided below.

Burdekin-Haughton WSS

North Burdekin Water Board and South Burdekin Water Board

Prior to the construction of the Burdekin Falls Dam, the North Burdekin Water Board (NBWB) and the South Burdekin Water Board (SBWB) were granted an authority to divert water from the Burdekin River under an Order in Council (OIC), dated 13 May 1965 and 31 March 1966 respectively. The OICs allowed the NBWB to extract up to 61,000 acre feet per annum and SBWB to extract 40,200 acre feet per annum.

Following the construction of the Burdekin Fall Dam, an agreement was made between the then Water Resources Commission and the Boards in 1991 regarding charging arrangements for water supplied from Burdekin Falls Dam. These arrangements allowed the Boards to receive at least 185,000ML per annum as a 'free' allowance. This agreement was ratified in the 1992 Amendment Orders to the original OICs. This agreement was in recognition of the capacity of the Boards to divert river flow prior to the Burdekin Dam being built and the water required to achieve the natural resource management objectives outlined in the OIC.

During the *Water Act 2000*, Water Resource Plan (WRP) and Resource Operation Plan (ROP) process the following decisions were made:

- Section 1089 of the *Water Act 2000* means that the authority to take or interfere with water granted by the OICs is replaced when a water allocation is granted.
- In December 2004, SunWater's Interim Resource Operations Licence (IROL) for the Burdekin-Haughton WSS deemed that SunWater had an existing responsibility to supply a total volume of 240,000ML per annum of medium priority water the NBWB and SBWB.
- Section 52 of the 2007 WRP for the Burdekin Basin stated that to Boards were to be granted a total Interim Water Allocation (IWA) of 210,000ML per annum under an authority to take water under the OICS (as amended in 1992). In addition the Boards were to be granted an additional 40,000ML per annum in IWAs under other supply obligations.
- The final ROP for the Burdekin Basin released in 2009, indicates that the Board's total supplemented Water Allocation was 250,000ML per annum, which is shared between NBWB and SBWB on the following basis[94]:

[94] Department of Environment and Resource Management. 2009. *Burdekin Basin – Resource Operations Plan*. December 2009. Pg. 105

- NBWB – 151,000 ML per annum (medium priority) for the purpose of supplementation of water supply scheme; and
- SBWB – 99,000 ML per annum (medium priority) for the purpose of supplementation of water supply scheme.

Under the Burdekin Basin ROP, the purpose of these entitlements cannot be changed, and therefore the entitlements are not tradeable. While the total volume of their entitlement is 250,000ML, their free allocation volume is less than this (based on the OIC as amended in 1992).

- The 2009 Burdekin Basin ROP also specified that the Chief Executive granted a distribution operations licence (DOL) to the NBWB and SBWB (to be held conjointly).

The Board areas comprise a raw water delivery system supplying surface water and groundwater recharge for irrigation to about 400 properties in the NWBB area and 370 properties in the SBWB area. The works of both dams also supplement Town Water Supplies for Ayr, Bardon and Home Hill as well as industrial water for three of the four CSR Mills located in the Burdekin Delta. Individual property owners are levied for the services provided by the Boards. All water infrastructure, except DERM's monitoring bores, in the Board's areas is owned by the respective boards.

Other 'free allocations' in the Burdekin-Haughton WSS

Apart from the water supplied to the NBWB and SBWB, the following 'free allocations' are provided:

- Giru Benefited Groundwater Area (GBGA) – discounted charges (50 per cent of Burdekin Channel Tariff) for 19,700ML per annum – GBGA zone is located either side of a section of the Haughton River. As part of DERM's water planning processes for the Burdekin-Haughton WSS, it was determined that irrigators in this area had access to 19,700ML per annum in yield prior to the construction of the Burdekin Falls Dam. For SunWater's 2005/06 pricing process, the tariff for the GBGA was set at 50 per cent of the Burdekin Channel Tariff, in recognition that 50 per cent of the allocations in this area reflect pre-existing natural yield; and

- Gladys Lagoon – Free allocation for volumes determined to be natural yield – Gladys Lagoon is a natural storage located in the vicinity of the Haughton Main Channel, and is periodically re-charged by flood events. It is also artificially topped up by SunWater. For the 2005-06 SunWater price path, supply from this storage has a separate tariff structure where volumes up to the natural yield are supplied free of charge by SunWater and volumes other than from natural yield incur Part A and Part B charges.[95]

These discounted arrangements are agreed in the tariff structures for the 2006-11 SunWater price path, but the historical circumstances surrounding the arrangements is unclear.

Barker Barambah WSS

Prior to the construction of the Bjelke-Peterson Dam in the Barker Barambah WSS, which commenced operation in 1987, the Wondai Council and the Murgon Council were authorised to take water for the supply of water to the townships of Wondai and Murgon respectively. This authorisation was made on the basis of an OIC for Wondai Council (granted in 1947) and Murgon Council (granted in 1948).

In 1985, a new OIC was granted to Wondai Council, rescinding the 1947 OIC, but providing an authorisation for Wondai Council to take a maximum of 400ML per annum in water from Barambah Creek for the supply of water to the Wondai Township. The OIC also stated that upon completion of the Bjelke-Peterson Dam, the Council shall enter into an agreement with the then Commissioner of Water Resources for the supply of water in excess of 250ML per annum.

[95] DERM. 2010. Written advice provided regarding the treatment of Free Allocations.

The Murgon Weir is within the geographical boundaries of the Barker Barmbah WSS but is not part of the scheme. The free allocation to Murgon Council is provided in accordance with Section 1117A of the *Water Act 2000* includes provisions regarding where conditions of a supply contract do not apply:

> ***1117A*** *When conditions of supply contract do not apply*
>
> *(1) This section applies if—*
>
> *(a) immediately before an interim water allocation was granted, its holder was authorised to take water under an agreement or order in council mentioned in section 1117; and*
>
> *(b) the interim water allocation was granted to replace the authorisation; and*
>
> *(c) the water is being taken under the interim water allocation from a weir owned by the holder.*
>
> *(2) A regulation may prescribe an interim water allocation holder and an interim water allocation, or the part of an interim water allocation, to which any condition about payment for the storage and supply of water, in the supply contract under which the interim water allocation is managed, does not apply.*
>
> *(3) The regulation applies only while the weir is maintained.*
>
> *(4) In this section—*
>
> *interim water allocation includes a water allocation to which the interim water allocation has been converted under section.*

An additional free allocation is provided to the SBRC which was previously provided to Wondai Council before council amalgamation. Another free allocation is held by Cherbourg Aboriginal Shire Council. This was determined during the 2006-11 price setting process, based on Government policy.

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