Stakeholder Comment

Comments regarding GAWB's initial submission (attached) are due on 12 October.

The Authority will provide advice regarding the timelines associate with stakeholder comment on GAWB's subsequent submissions.

Commercial Framework and Pricing Principles

for the 2010 price review

A submission to the Queensland Competition Authority

September 2009

Gladstone Area
Water Board

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Executive summary

The 2010 price review is the third review conducted on the Gladstone Area Water Board's (GAWB) pricing practices by the Queensland Competition Authority (the Authority).

This submission, *Commercial Framework and Pricing Principles*, is the first of three major submissions GAWB will make as part of this review. A second public submission will provide detailed capital and operating expenditure forecasts, expenditure justifications and demand forecasts. Finally, GAWB will provide the Authority with a pricing model (which will not be publically released) and provide customers with indicative prices based on GAWB's expenditure and demand proposals.

GAWB's commercial framework must achieve a balance between the different needs and preferences of GAWB's customers, efficient use of the water resources managed, community expectations and the interests of GAWB.

GAWB supports the important role the Authority plays in providing regulatory oversight and sees this price review as an opportunity to review, refine and improve current pricing principles and practices.

GAWB's commercial framework has developed over time being cognisant of the differing value that customers place their water supply and the importance to the community of planning for drought and demand growth.

Important developments over the five years of this regulatory control period include:

- further experience of the volatility of regional water demand (and, in particular, difficulties in forecasting the timing of water demand from future industrial customer developments or current customer expansions)
- formal articulation and regulatory review of the Contingent Supply Strategy (CSS) that, in turn, provides customers with more certainty over:
    - the level of service provided by GAWB and
    - the triggers and process for augmenting the system
- modifications to GAWB's standard supply contracts that provide customers with a formal process for communicating the impact that a preferred augmentation option will have on water prices and providing the opportunity for customers to propose supply projects or demand management alternatives.

In this submission, GAWB is proposing only minor changes in the regulatory arrangements, consistent with the evolution of the commercial framework. The most significant proposed changes to the regulatory arrangements for the five years of this regulatory control period are:

- adopting a demand forecast for pricing purposes that includes demand that is highly certain and underpinned by customer contracts
- changing the form of regulation from a price cap to a revenue cap
- differentiating prices based on the duration of contracts.

Adopting a demand forecast based on demand that is highly certain and underpinned by customer contracts:

- allows the costs of demand-triggered augmentation to be properly signalled to all customers at the time new demand emerges (and allows demand management proposals to be considered on a consistent basis with supply augmentations)
- ensures that customers do not see in their current prices the forecast cost of augmentations that they may never use and, indeed, may never be the actual augmentation option chosen.

A revenue cap form of regulation:

- provides an appropriate allocation of demand risk to customers and
- ensures that GAWB is not perceived to be proposing a conservative demand forecast for its own financial advantage (under a revenue cap, customers will be better off if demand in excess of that forecast emerges).

Price differentiation based on contract duration provides incentives for customers to enter into long-term contracts for supply. Long-term demand certainty provides revenue certainty for GAWB and facilitates better planning for the regional water supply.

GAWB has also submitted proposals on a principle-based framework to be used when evaluating and analysing demand management measures. This framework will be used when assessing the appropriate response to drought or unexpected additional demand.

GAWB is also proposing the following changes to the regulatory arrangements for the 2015 to 2020 regulatory control period:

- changing the period over which prices are averaged from 20 years to five years and
- introducing Instantaneous Flow Rate (IFR) pricing for delivery services.

GAWB is providing details of the proposed IFR pricing methodology with five years' notice to ensure that customers have an opportunity to understand the implications of IFR and make any changes to their processes or on-site storage necessary to optimise their commercial outcomes.

GAWB is not proposing any changes to how the maximum revenue requirement is determined. Similarly, GAWB is not seeking to revalue assets in this submission and is proposing a roll-forward of the 2005 depreciated optimised replacement cost valuation. GAWB is also proposing to retain the straight-line depreciation method for determining the return of capital component of prices.

GAWB also engaged Synergies Economic Consulting to undertake a review of the Weighted Average Cost of Capital (WACC) parameters partly due to the impact that the global financial crisis has had on the financial markets. The WACC plays an important role when determining prices 'because regulators almost universally set regulated businesses' allowed rate of return on investment equal to WACC. GAWB's proposal has submitted changes to the WACC parameters on:

- how the debt margin is calculated
- the value used for the debt beta
- the market risk premium and
- the value adopted for gamma.

Based on GAWB's proposal and the financial parameters observed in the 20 days to 30 June 2009 (the final WACC will be a function of the actual setting period directed by the Authority), GAWB's post-tax nominal WACC for the regulatory control period commencing 1 July 2010 would be 10.05%.

GAWB has also submitted proposals on changes to zonal boundaries, price transition, a capital contribution framework, and the averaging of multiple connection prices for Gladstone Regional Council.

A summary of GAWB's proposals is included as section 7. GAWB requests that the Authority makes recommendations as to whether it approves, rejects or requires alterations to the proposals contained in this submission.

1 Introduction

1.1 Overview

The 2010 price review will be the third review conducted on the pricing practices of the Gladstone Area Water Board (GAWB).

Since the first review was initiated by the Queensland Competition Authority (QCA, the Authority) Ministers back in 2000, GAWB's business and understanding of the regulatory pricing framework has considerably developed, which in turn has facilitated the evolution of GAWB's commercial framework.

GAWB's current pricing practices incorporate recommendations previously made by the Authority as part of the price reviews and accepted by the QCA Ministers. GAWB understands the important role the Authority plays in providing regulatory oversight and sees this price review as an opportunity to review, refine and improve current pricing principles and practices.

1.2 Approach to 2010 price review

GAWB is developing detailed expenditure forecasts, expenditure justifications, demand forecasts and a pricing model for submission to the Authority. The submissions being made have been separated into three distinct components:

- Submission 1 (this submission) – *Commercial Framework and Pricing Principles*
- Submission 2 – 20-year forecasts, regulated asset base and appropriate expenditure justifications (target date 16 October 2009)
- Submission 3 – Pricing model (target date 16 October 2009). This will be a confidential submission to the Authority as it contains individual customer pricing, consumption and capital contribution details.

1.3 Commercial framework

1.3.1 GAWB's role

Since commercialisation of GAWB's activities in 2000, GAWB has continued to evolve as an organisation. In particular, it has developed an understanding of the engineering and commercial capability necessary to provide a safe and secure water supply to customers. Detailed planning functions allow it to ensure that the long and short-term water needs of current and future customers are met in ways that are environmentally, socially and commercially sustainable.

GAWB's actions and initiatives must achieve and support a viable balance between the needs and differing aspirations of its customers, efficient use of the water resources managed, community expectations and its commercial interests. Each of GAWB's customers places a different value on the water that is supplied to them. GAWB has developed its framework to be mindful of these differing views.

In summary, GAWB's commercial framework includes the following elements:

- a central-planning role to provide a secure water supply for current and future customers
- a regular planning cycle involving customers and other stakeholders
- supply of a contracted volume (a 'reservation volume'), with customers able to adjust this volume from time to time, and use over and above this contracted volume in certain circumstances
- allowance of the trading of reservations to facilitate best use of available water
- managing the demand-supply balance through a mixture of demand-side strategies including restrictions and customer curtailment, and supply-side strategies such as augmentation and customer-led initiatives that defer or avoid the need for an augmentation.

- inter-relationship with statutory mechanisms such as the Strategic Asset Management Plan, Drinking Water Quality Management Plan, System Leakage Management Plan and the Drought Management Plan
- a common level of service to customers whilst providing flexibility for customers to elect for lower supply security through commercially-negotiated 'curtailment' arrangements – for example further restrictions to supply when faced with low storage levels
- information provided to customers on the cost and other impacts from possible future source augmentations, to enable them to make informed assessment about their future demands from GAWB, and any substitute or bypass options that may be available to them and
- the allowance for contract terminations or reductions to water reservations in certain events that would allow customers to pursue alternative supplies, demand reduction or bypass opportunities.

1.3.2 Contingent Supply Strategy

Since the 2005 price review, the key influence for the continual development of the commercial framework has come from the importance of planning for drought and\or unexpected additional demand[1]. GAWB has addressed this through the development of the Contingent Supply Strategy (CSS).

The CSS was developed by GAWB to allow it to respond, in a timely manner, to the water needs of current and future customers in the event of drought or requirements for additional water use. The strategy involves the identification and investigation of available source augmentation options allowing the least-cost solution to be identified. It also includes undertaking necessary preparatory work and planning allowing for an overall increase in system reliability and security to ensure that:

- the imposition of emergency restrictions is avoided under the Drought Management Plan and
- the possibility of supply failure is deferred by at least two years.

To ensure that customers and GAWB get the full benefit from the CSS, it is important that the CSS integrates with other aspects of GAWB's operations, in particular adopted pricing practices. GAWB has detailed proposed changes in this submission to the current pricing practices that are required to ensure that customers benefit from the development of the CSS namely:

- Source augmentation costs or other demand management measures (other than efficient preparatory expenditure[2]) should not be included in customer prices until such time as the augmentation or other measure is certain. The benefit of this approach is that customers are not paying for the costs of source augmentation or other measures in current prices, and it allows a 'pure' price signal to be provided to customers at the time an augmentation decision is required. Further discussion on this topic can be found at section 3.2.1.1.
- GAWB's process, that has been subject to a review by the Authority[3], allows it to respond within a defined timeframe (currently two years) when faced with an augmentation trigger due to drought or unexpected additional demand. Furthermore, it allows GAWB to more adequately deal with uncertain demand. Further discussion on this topic can be found at section 3.1.

1.4 Customer service standards

1.4.1 Level of service

1.4.1.1 Overview

In broad terms, level of service refers to the sufficiency and availability of GAWB's water supply to meet customer requirements. GAWB has adopted a single level of service objective for water supply that reflects customer requirements for a highly reliable supply.

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1   As defined in GAWB's submissions to the Queensland Competition Authority, Fitzroy River Contingency Infrastructure, Part (B) – Augmentation Triggers, 21 December 2007

2   GAWB has proposed in its May 2009 submissions to the Authority (page 41) in relation to the Part (c) investigation that "*in the case the physical infrastructure is not anticipated to be commissioned within the 20 year planning horizon, efficient preparatory costs be included in the RAB and priced and depreciated over the economic life of the preparatory works.*"

3   Queensland Competition Authority Final Report – Gladstone Area Water Board: Investigation of Contingent Water Supply Strategy Pricing Practices Part B (December 2008)

GAWB's commercial framework includes the use of standard customer contracts that allow customers to tailor their exposure to supply risk. This effectively allows customers to set their own desired level of service and appetite for risk through the ability to:

- trade their reservations with other customers facilitating the best use of available water
- propose demand management measures in times of low storage levels including the potential to sell back a portion or all of their demand to GAWB
- participate in the process prior to a source augmentation whereby alternative supply solutions and\or demand management measures can be proposed and
- reduce reservation levels or terminate supply altogether where a source augmentation option or alternative will result in greater than 50 per cent (%) price increase to the standard reservation price.

These mechanisms have been designed to ensure GAWB can deliver the high reliability level of service to customers at the lowest economic cost.

1.4.1.2 Defining the base level of service

The level of service of GAWB's base product, which can be tailored to individual customer requirements through the commercial framework, has the following characteristics:

- Imposition of uniform 10% restrictions (supply restrictions) four years from supply failure. Current modelling indicates that at a commitment level equal to the currently assessed Historical No Failure Yield (HNFY) supply restrictions would only have been triggered three times in the last 110 years.[4] In the absence of any demand reductions or supply augmentations, supply restrictions would have persisted for around six years on two occasions and three years on the third occasion.[5]
- Conditional upon the receipt of ex ante regulatory approval, the use of the CSS to avoid the imposition of emergency restrictions. In the absence of such approval, at six months from supply failure the declaration of emergency restrictions imposing 50% supply restrictions for Local Government Authority customers and complete cessation of supply for industrial customers.

1.4.2 Continuity of supply

Reliability of supply is an important issue to customers given the:

- low levels of customer on-site storage
- social impacts and
- crucial role that water plays in industrial customer processes.

GAWB has outlined its reliability of supply benchmarks in its standard customer contracts. In the absence of such contracts, benchmarks are outlined in GAWB's Strategic Asset Management Plan.

1.4.3 Quality

It is important that the water supplied by GAWB is suitable for customer requirements – whether raw or potable supplies. GAWB has outlined its water quality benchmarks in its standard customer contracts. In the absence of such contracts, benchmarks are outlined in GAWB's Strategic Asset Management Plan.

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4   Estimates of future supply reliability based on historic inflow data must be treated with care. The data set is relatively short (110 years) and rainfall characteristics may have changed over the period. The simulation shows that no supply restrictions would be triggered in the first 70 years of the historical record. Each of the supply restriction triggers would have occurred in the last 40 years. If the future Awoonga Dam catchment rainfall and inflows are expected to be significantly different from those that occurred throughout the historical record, then a different frequency of supply restrictions is also expected.

5   The frequencies and durations quoted are simulated based on GAWB supplying the full HNFY in every year. Because GAWB currently supplies less than the HNFY supply restrictions have been required less frequently. In practice, supply restrictions have only been triggered once (in 2002) and persisted for less than one year – having a major impact on GAWB's industrial customers:
   – 8 April 2002 – 10% restrictions to industrial customers, 35% to Local Government Authority customers
   – 5 November 2002 – 25% restrictions to industrial customers, 50% to Local Government Authority customers, and
   – 12 February 2003 – lifting of restrictions.

2 Proposed changes to regulatory framework

2.1 Form of regulation

GAWB currently operates under a price cap regime whereby prices are determined for the five-year regulatory control period, subject to annual movements in the consumer price index.[6]

Under this form of regulation, GAWB bears the risks and benefits from variances between actual demand achieved in the regulatory control period and forecast demand used to set prices such that:

- if the volume of water actually delivered in the regulatory control period is greater than forecast, GAWB will receive higher-than-expected revenue (and make higher-than-target return on investment) and
- if the actual volume of water delivered is lower-than-forecast, GAWB will receive a lower-than-expected revenue (and make lower-than-target return on investment).

In the current regulatory control period, GAWB has experienced a significant variance between the forecast demand that was used to set GAWB's prices under a price cap regime and the actual levels of demand achieved. The result is that GAWB expects to under-recover forecast revenue in the order of $5.3m over the regulatory control period. The lower-than-forecast demand can be attributed to the following factors:

- Forecast demand growth for the Gladstone region has not eventuated. Demand growth is extremely difficult to predict in the Gladstone region given its proximity to the Gladstone State Development Area and that demand growth is largely driven by a small number of large industrial projects.
- Lower-than-forecast demand from established industrial customers is due to changes in their respective market conditions.
- There has been lower-than-forecast demand from Local Government Authority customers.

GAWB contends that the uncertainty surrounding not only demand growth but demand from existing operations will continue into the foreseeable future due to the impact that the Emission Trading Scheme and the global financial crisis will have on current and prospective customers. GAWB has little ability, if any, to mitigate this demand risk. Further discussion on demand forecasting in an uncertain environment has been included at section 3.1.

In GAWB's 2004 submission to the Authority, GAWB proposed a revenue cap form of regulation and put forward a detailed rationale to the Authority as to why this form of regulation was appropriate for GAWB's circumstances.[7]

While the Authority did not agree to the revenue cap form of regulation, it did acknowledge the reasoning behind GAWB's proposal:[8]

> *"While the Authority understands the reasons behind GAWB's proposal to adopt a revenue cap approach, a price cap approach provides the best means of ensuring that GAWB manages its key risks, especially demand risk as it relates to future expansion.*

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6   GAWB's regime is different in legal structure than typical price cap regimes under a regulatory framework established by statute. GAWB imports a price cap framework into contracts by agreeing to be bound to the Pricing Principles. In practice, pricing outcomes are identical to the outcomes of a more conventional regulatory framework (e.g. Victorian water, electricity networks regulated under the National Electricity Regulations, gas networks regulated under the National Gas Regulations).

7   Queensland Competition Authority (QCA) – 2004 review of GAWB's pricing practices, Response to the QCA's Issues Paper 2 July 2004, p25 – 34.

8   Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p31

Price caps will ensure that GAWB will not expand its infrastructure unless there is corresponding demand and/or unless there are contracted arrangements in place to offset the risks. In addition, once price caps are in place, they also provide an incentive for GAWB to sell any excess capacity available after major augmentations and should thus improve GAWB's financial viability...

In terms of supply risks, pricing efficiency, regulatory consistency, transparency and complexity, there is no overwhelming argument in favour of any of the proposed approaches."

GAWB proposes that the form of regulation to apply from 1 July 2010 regulatory control period is a revenue cap where:

- GAWB determines the annual reference tariffs during the regulatory control period by taking into account any under or over adjustment from the previous year.
- Side constraints are used to limit annual price increases on any tariff component to CPI +5%.
- Any balance of the unders and over account that is greater than the side constraint of CPI +5% in any one year is carried forward and included in prices at the next annual adjustment if possible, subject to that year's side constraint. Any balance of the unders and overs account at the end of the regulatory control period will be adjusted fully at the beginning of the subsequent regulatory control period.

GAWB acknowledges the unique regulatory regime it operates in and submits that the proposal put forward by GAWB should not require the Authority to determine price paths during the course of a regulatory control period, which it could only conduct after receiving the relevant referral from the QCA Ministers. If the Authority was of the view that this would impair GAWB's ability to adopt a revenue cap form of regulation, GAWB would suggest an alternative revenue cap proposal to apply from 1 July 2010 whereby:

- prices to be determined in real terms (i.e. subject to annual movements in the consumer price index) for the entire regulatory control period and
- any under or over adjustment is only made at the beginning of the subsequent regulatory control period.

GAWB submits that the proposed revenue cap is the most appropriate form of regulation because it:

- appropriately shields GAWB from demand forecast risk (particularly given the inherent uncertainty associated with forecasts for the Gladstone region (refer section 2.1.1)
- is consistent with the supply risk management arrangements of GAWB's contingent supply strategy (refer section 2.1.2)
- is consistent with the demand management arrangements set out in standard contracts (refer section 2.1.3)
- facilitates pricing efficiency equally as well as the current price cap (refer section 2.1.4)
- provides customers with either reasonable price certainty, in the case of GAWB's preferred annual revenue cap, or absolute five-year real price certainty, in the case of GAWB's alternative proposal (refer section 2.1.5)
- ensures that GAWB is not perceived to be adopting a conservative demand forecast to increase expected revenue (refer section 2.1.6)
- has the same transparency as a price cap with minimal additional administrative complexity (refer section 2.1.7) and
- is consistent with GAWB's wider commercial framework (refer section 2.1.8).

2.1.1 Demand risk management

Previously the Authority's recommended position was that a revenue cap would not appropriately allocate volume risk associated with new users:[9]

"A primary focus in arriving at the appropriate form of regulation is ensuring risks are borne by the parties best able to manage them…

Revenue caps allocate the full volume risk to existing customers. However, the Authority does not consider it appropriate that existing users should bear the costs of managing the risks associated with uncontracted demand (predominantly relating to new users) unless they choose to do so. This could occur, for example, where new augmentations result in lower costs."

9   Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p27

It appears from the Authority's analysis that:

- if forecast demand included in tariffs did not materialise, then GAWB should bear the downside risk
- if additional demand occurred that improved utilisation of assets, then lower prices should be passed on to customers in the form of lower prices (presumably at the next price review because there was no mechanism to adjust prices within the regulatory control period) and
- if additional demand occurred that resulted in an unforecasted augmentation (that didn't trigger a further price review), then higher prices should not be passed on to customers.

GAWB does not believe that this represents an appropriate risk allocation, nor does the regulatory framework compensate GAWB for bearing these risks.

The economically efficient allocation of volume risk is a contentious issue. GAWB contends however that where the regulated business has little or no control over customers' consumption decisions then isolating the regulated business from this risk is consistent with the lowest long-run sustainable prices. Examples of risks that GAWB has no control over include:

- risk that a potential customer will not become a new customer or that the timing of their project is delayed and
- risk that responses to volatile market or trading conditions will result in lower-than-forecast consumption.

This principle was expressed by the Office of the Regulator General of Victoria.[10]

> *"The fundamental risks associated with providing [services] (e.g., demand variability and asset stranding) will ultimately be borne by customers, in the price of the service. The role of regulation is not artificially to introduce additional risks, which inflate prices for consumers more than is necessary.*
>
> *The form of [regulation] can have a direct impact on the income volatility of the regulated… businesses, and has implications for the financial risk borne by them. An increase in financial risk generally increases the cost of capital for the regulated business. Where this volatility arises from factors largely outside the control of the regulated business, such an allocation of financial risk may not be optimal, and other businesses (e.g., the retail business) or customers, may be better placed to bear the income risk."*

In the 2005 review, the Authority recommended that the price cap be retained and adopted a 20-year demand forecast including demand growth. A comparison between the demand adopted for the regulatory control period commencing 1 July 2005 and actual demand achieved can be seen at Figure 1. These differences in demand are not only attributed to uncertain demand (refer section 2.1.2), but variations or reductions in existing customer contracted demand.

Figure 1 — Comparison of forecast demand

	2005/06 (ML)	2006/07 (ML)	2007/08 (ML)	2008/09 (ML)	2009/10 (ML)
Demand used to determine prices	47,606	48,807	49,906	52,764	58,177
Actual demand	48,204	53,313	46,970	45,867	49,662*
Additional/(shortfall) in demand	**598**	**4506**	**(2936)**	**(6897)**	**(8515)**

This is graphically depicted over the page.

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10   Office of the Regulator General of Victoria, 2001 Electricity Distribution Price Review – Consultation Paper No 3: The Form of Price Control, December 1998, p8

Actuals versus forecasted demand
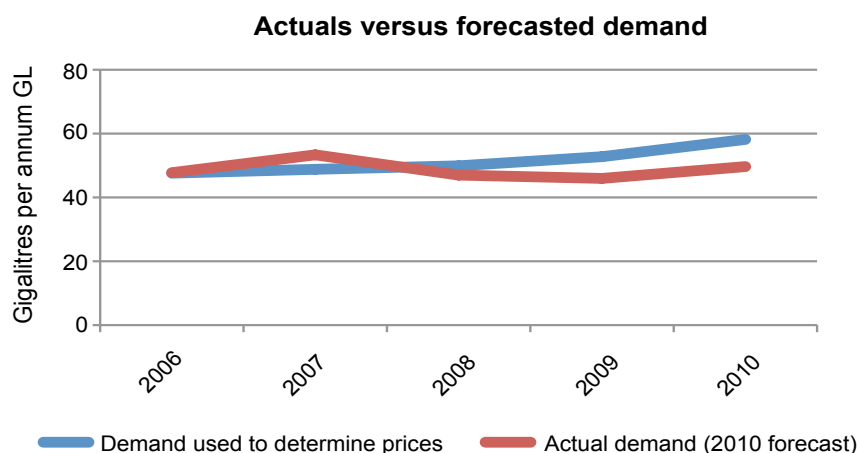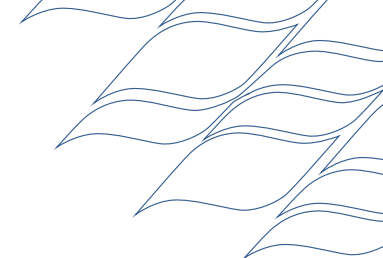
* Based on customer provided forecasts for 2009/10

2.1.1.1 Contractual arrangements

Previously the Authority's recommended position was that while a price cap imposed volume risk on GAWB, this volume risk could be mitigated by contractual arrangements:[11]

> "A revenue cap may not provide GAWB with sufficient incentive to put in place relevant contractual arrangements as prices can be varied to achieve allowable revenues within the regulatory control period. Nor would it necessarily provide customers with an incentive to correctly estimate demand unless they are bound by their forecasts. History in Gladstone indicates that estimates of demand are not achieved…"

GAWB agrees that while a price cap provides it with a significant incentive to enter into contracts with customers (because contracts contain a 'take-or-pay' access component), there must also be incentives for customers to enter into such contracts, otherwise GAWB is unable to mitigate volume risk. In the current regulatory control period, there are minimal incentives for customers to enter into new standard form long-term contracts. The majority of customers have had long standing supply arrangements with GAWB and some have entered into short-term supply arrangements. This can be contrasted with 'Greenfield' projects where commitments are required by customers prior to obtaining supply. GAWB is proposing to apply a price differentiation mechanism (refer section 5.2) to short-term contracts which should improve the ability of long-term demand to be supported by appropriate contractual arrangements.

2.1.1.2 Uncertain demand

The inclusion of uncertain demand in forecasts poses a significant volume risk to GAWB given it is not supported by contractual arrangements at the time forecasts are developed. Uncertain demand includes not only demand from new customers but additional demand from major projects or expansions undertaken by existing customers. This demand may not eventuate or may be considerably delayed.

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11 Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p27

GAWB's revenue cap proposal mitigates this component of volume risk. Figure 2 below shows the impact on revenue that the inclusion of uncontracted demand from new customers and uncontracted demand due to major expansions from existing customers has had in the current regulatory period.

Figure 2 – Impact of uncertain demand (ML)

	2005/06 (ML)	2006/07 (ML)	2007/08 (ML)	2008/09 (ML)	2009/10 (ML)
Uncertain demand included when determining prices	0	0	0	3076	6251
Specific uncertain demand actually achieved (included when determining prices)	0	0	0	0	0*
Demand achieved from new customers	111	125	450	617	653
Additional/(shortfall) in uncertain demand	111	125	450	(2459)	(5598)
Additional/(shortfall) in revenue from uncertain demand	$0.064m	$0.051m	$0.355m	($1.589m)	($3.653m)

* Based on customer provided forecasts for 2009/10

Under the current price cap form of regulation, GAWB has no ability to recover this shortfall in revenue in current or future prices. The inclusion of this uncertain demand has meant that:

- customers have benefited from lower prices in the current regulatory control period and
- GAWB has borne all the risk of the uncertain demand – which has had a significant detrimental impact on GAWB's financial results.

2.1.2 Supply risk management

Previously the Authority's recommended position was that supply and environmental risks could be equally well managed under either a price cap or revenue cap:[12]

> *"Supply risks relating to system failure and resource risks such as water quality are best managed by GAWB as owner and manager of infrastructure and as service provider. The costs of managing these risks would be incorporated in either a revenue or price cap. Under both forms of regulation, GAWB has an incentive to put in place the most appropriate least cost relevant infrastructure. That is, either revenue or price caps will address supply risks of this type.*

> *With no party effectively able to manage risks of changes to hydrology, relevant costs should be borne by customers. A similar approach applies to changes in environmental releases that may be required by relevant agencies. This is best addressed through cost pass-through arrangements. Either price or revenue caps would require adjustment for this purpose."*

GAWB contends that its revenue cap proposal will allow supply and environmental risks to be well managed and that the development of the contingent supply strategy has further enhanced the transparency of managing this risk.

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12 Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p28
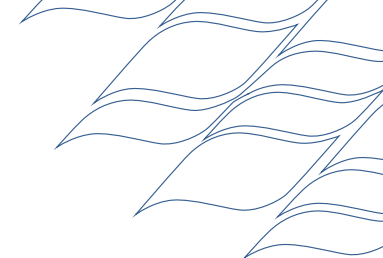
2.1.3 Demand management

A price cap regime is generally considered to provide disincentives for demand management, in the absence of a counteracting regulatory mechanism. Revenue caps provide less of a disincentive but many regulatory frameworks using revenue caps also include a demand management incentive scheme or similar arrangement to specifically encourage demand management responses from regulated businesses.[13]

GAWB believes that the process it has developed as part of the contingent supply strategy, including refinements to the Drought Management Plan and standard customer contracts, ensures demand management responses are considered when assessing the appropriate response when faced with a source augmentation trigger due to drought or unexpected additional demand. This process was subject to a previous review by the Authority.[14]

2.1.4 Pricing efficiency

Previously the Authority's recommended position was that price caps provided superior pricing efficiency:[15]

> "Pricing efficiency relates to whether prices are cost reflective, and whether there is flexibility in pricing design and the pricing certainty provided to customers. Price caps explicitly provide for such arrangements."

GAWB contends that there is no difference in pricing efficiency between the current price cap and the proposed revenue cap because, under either form of regulation, variable prices are set identically (i.e. based on a modelled estimate of the Long Run Marginal Cost of supply).

2.1.5 Price certainty

Under GAWB's preferred approach to a revenue cap form of regulation, GAWB proposes to impose a side constraint of CPI +5% on annual price increases resulting from the 'unders and overs' account. This side constraint provides customers with:

- certainty as to the maximum quantum of potential price rises during the regulatory control period and
- annual benefits if GAWB's revenue exceeds its forecast revenue requirement.

GAWB's alternative revenue cap proposal incorporates the carry-over of the 'unders and overs' account until the start of the subsequent regulatory control period. This will provide customers with price certainty during the regulatory control period by providing prices that are fixed in real terms for five years (that is, provides customers with price certainty for the regulatory control period identical to the current price cap).

2.1.6 Regulatory consistency

The Authority has previously noted the requirement to balance the benefits of regulatory consistency with the necessity to make change in response to concerns with actual outcomes:

> "While the Authority notes that the form of regulation should remain as consistent as possible over time to minimise regulatory compliance costs, it may change over time subject to developments in regulatory practice and actual outcomes."

GAWB contends that a change in the form of regulation is necessary to ensure that GAWB:

- is not continuously exposed to revenue volatility that is outside its control and
- is not perceived to have an incentive to adopt a conservative demand forecast (refer section 2.1.8).

The proposed change to the regulatory framework is the minimum change consistent with achieving these outcomes.

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13 For example, see section 6.6.3 of the National Electricity Rules (which specifically require the Australian Electricity Regulator (AER) to consider the difference in incentives created by the form of regulation in designing the scheme)

14 Queensland Competition Authority Final Report – Gladstone Area Water Board: Investigation of Contingent Water Supply Strategy Pricing Practices Part B (December 2008)

15 Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p30

2.1.7 Transparency and administrative complexity

GAWB contends that there is little difference between the complexity of applying the current price cap and the proposed revenue cap for the 2010–2015 regulatory control period.

2.1.8 Consistency with GAWB's commercial framework

The adoption of a revenue cap form of regulation is consistent with GAWB's developed commercial framework that has been outlined at section 1.3 and proposed changes to the demand forecasting methodology outlined at section 3.2.

Under GAWB's framework, costs of major augmentations are only included in prices when they occur. Consistent with this arrangement, GAWB has adopted a conservative demand forecast using base case demand (refer section 3.2) allowing the true cost of additional capacity to be signalled at the time of augmentation.

However, adoption of a conservative demand forecast can be viewed as skewing the demand risk in GAWB's favour. GAWB wishes to avoid the perception that adoption of a conservative demand forecast is a strategy to increase expected revenue. By adopting a revenue cap, GAWB ensures that it has no financial interest in forecasting outcomes: any gains from exceeding the forecast demand are passed to customers.

2.2 Planning period

GAWB has previously made submissions to the Authority on the merits of reducing the planning period[16] from 20 years to five years, however the Authority maintained the 20-year period on the basis that:

- current customers would be forced to pay for excess capacity inherent in lumpy capacity expansion, albeit optimal to meet long term demand
- significant price shocks may result if a price smoothing period is adopted which is shorter than that required to utilise the capacity of major infrastructure and
- future additional demand, once the asset is utilised, could be priced at a relatively lower amount and would not signal the correct marginal cost to new consumers.[17]

GAWB accepts that the change from a 20-year to five year planning period will significantly reduce the timeframe for recovering the 'price smoothing' carryover accumulated since the adoption of s36 pricing practices under the *Queensland Competition Authority Act 1997*. This will likely have an impact on prices in the first regulatory control period after adoption. GAWB however still contends that a five-year planning period is appropriate and proposes to adopt this planning period for the regulatory control period commencing 1 July 2015. The commencement date of 1 July 2015 will provide GAWB an opportunity to evaluate the full impact on customers, including whether any transitional arrangements or other changes to the regulatory framework will be required to give effect to the change, prior to its implementation.

2.2.1 Excess capacity

GAWB acknowledges that augmentation of water supply assets involves lumpy increments in capacity – this is quite often the most efficient augmentation response. While efficient spare capacity does exist, GAWB has limited ability to influence the take-up of this capacity through actively marketing the sale of a scarce resource. Actual utilisation is dependent on broader economic conditions. In a number of regulatory decisions, including those made by the Authority[18], pricing to existing users has incorporated the costs of efficient surplus capacity. One of the unintended consequences of adopting a planning period greater than the regulatory control period is that GAWB's prices rely upon forecast demand growth, which itself is subject to significant uncertainty, to recover expenditure that benefits existing users. Given the potential for uncertain rapid growth in demand in the Gladstone region, demand forecasts have a much greater margin for error than other predominately residential centres, exacerbating this uncertainty.

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16 The Authority's previous reports have used the term 'planning period' or 'planning horizon' to mean the period over which expected revenue recovers economic costs or, more simply, the period over which prices are averaged. For the avoidance of doubt, GAWB's proposal relates only to the period of price averaging as GAWB will still undertake long–term planning for the system.

17 Queensland Competition Authority Final Report – Investigation of Pricing Practices: Gladstone Area Water Board. March 2005, p33

18 For example, Queensland Competition Authority – Final Decision: Dalrymple Bay Coal Terminal Draft Access Undertaking, April 2005, p51
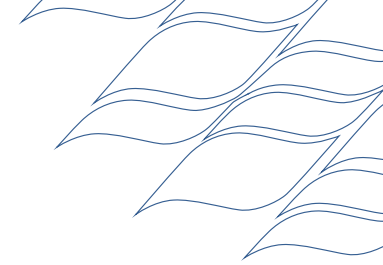
2.2.2 Price shocks

GAWB acknowledges that adopting a five-year planning period may result in significant price changes between regulatory control periods. However, it is not certain that continuation of the 20-year period would not also have a significant effect on the variability of price changes between regulatory control periods. Adopting a five-year planning period allows more accurate price signals to be provided to customers due to the cost reflectivity of the approach.

It should also be noted that:

- Approximately 80% of water supplied by GAWB is to customers who are large industrial producers. For most producers, water will make up a low proportion of total input costs. These customers face volatility in other input costs, including raw materials, which are likely to have equal or greater impact on changes to their cost base.
- GAWB's customers are substantial corporate or government entities and are therefore well placed to deal effectively with information regarding potential water price movements.

2.2.3 Price signals

A further benefit of GAWB's proposal is the removal of the inherent uncertainty surrounding long-term forecasts and the supply-demand conditions that are currently used to determine prices. This is consistent with GAWB's source augmentation process which removes speculation of forecasts and provides appropriate price signals to customers when faced with an augmentation – please refer to section 3.2.1.1 for further discussion on this topic. The Authority's concern about providing incorrect pricing signals to new customers would no longer be relevant.

2.2.4 Intergenerational equity

GAWB submits that intergenerational equity should be considered in setting the price averaging period.
The Authority points out that a 20-year planning period means that current customers do not pay for excess capacity that may be utilised by future customers.

However, the corollary of this position is that current customers may be required to pre-pay for augmentations that they will never use and, indeed, may never be built.

These effects can be quite significant. We note that in the eight years from 2002/03 to 2009/10 the prices recommended by the Authority have (by design) under-recovered the economic costs of supply in every year. All this planned under-recovery (some $35m) is being rolled forward, with interest, for future customers to bear.

2.2.5 Other regulatory practice

GAWB understands that the 20-year planning period previously adopted by the Authority is unique within regulatory practice in Australia and is considered inconsistent with the Authority's approach for other regulated businesses. GAWB contends that the planning period for pricing purposes should be aligned with the regulatory control period, as is the common regulatory practice – refer to figures 3 and 4 over the page.

Figure 3 – Pricing periods approved by the Queensland Competition Authority

Regulated entity	Year of decision	Regulatory control period	Planning period
Electricity distribution			
Ergon Energy/Energex	2001	4 years	4 years
Ergon Energy/Energex	2005	5 years	5 years
Gas distribution			
Allgas Energy/Envestra	2001	5 years	5 years
Allgas Energy/Envestra	2006	5 years	5 years
Ports			
Dalrymple Bay Coal Terminal Management	2006	5 years	5 years
Rail			
Queensland Rail	2001	4 years[a]	4 years[a]
Queensland Rail	2005	4 years[a]	4 years[a]
Water			
Gladstone Area Water Board	2002	5 years	20 years
Gladstone Area Water Board	2005	5 years	20 years

a This four-year regulatory control period is indicative. There is often the potential for Queensland Rail's Access Undertaking to be reviewed or extended at periods other than every four years, however a four-year regulatory control period is seen as the most reasonable measure for the purpose of this assessment.

Sources: Various.

Figure 4 – Pricing periods set by other regulators

Regulator	Decision/determination	Year	Regulatory/ determination period	Planning period
AER	New South Wales distribution determination	2009	5 years	5 years
	ACT distribution determination	2009	5 years	5 years
	New South Wales and ACT transmission network revenue cap	2005	5 years	5 years
	Powerlink Queensland transmission network revenue cap	2007	5 years	5 years
	ElectraNet transmission determination	2008	5 years	5 years
	SP AusNet and VENCorp transmission determinations	2008	5 years	5 years
	Transend transmission determination	2009	5 years	5 years
	Directlink Interconnector revenue cap	2006	10 years	10 years
ESC	Urban Water Price Review	2005	3 years	3 years
	Rural Water Price Review	2006	2 years	2 years
	Water Price Review	2008	5 years	5 years
	Metropolitan Melbourne Water Price Review	2009	4 years	4 years

Regulator	Decision/determination	Year	Regulatory/ determination period	Planning period
IPART	Prices of water supply, wastewater and stormwater services	2006	3 years	3 years
	Bulk Water Price Review	2006	3.75 years	3.75 years
	Pricing arrangements for recycled water and sewer mining	2006	30 years	30 years
	Review of prices for Sydney Water Corporation's water, sewerage, stormwater and other services	2008	4 years	4 years
	Review of prices for the Sydney Catchment Authority	2009	3 years	3 years
ACCC	Murraylink Interconnector revenue cap	2003	10 years[a]	10 years[a]
	Water Infrastructure Charge Rules – Draft Advice	2009	5 years	5 years

a The ACCC noted in its Final Decision on Murraylink's 2003-2012 revenue cap that the actual length of the regulatory control period was slightly under 10 years.

Sources: Australian Competition & Consumer Commission (ACCC), Australian Energy Regulator (AER), Essential Services Commission (ESC), Independent Pricing and Regulatory Tribunal of New South Wales (IPART).

2.3 Demand management measures

2.3.1 Background

GAWB is responsible for managing the demand-supply balance in the Gladstone region. Where there is a shortfall between supply and demand over a planning period, due to additional demand and/or drought, this imbalance can be addressed by either increasing supply (i.e. source augmentation), reducing demand (demand management measures) or a combination of both.

GAWB has previously made submissions to the Authority[19] on the general process to be applied when assessing the appropriate response to drought or unexpected additional demand. Demand management measures need to be considered as part of this assessment and evaluation process.

Demand management measures (similar to a 'curtailment' contract) should be considered in two contexts:

- Drought – where negotiated reductions to contracted volumes (beyond any restriction imposed) are negotiated bi-laterally with customers. This is also described in GAWB's Drought Management Plan.
- Additional demand – where negotiated demand reduction by one customer can be used to supply a new customer. Alternatively, customers can trade water to the new entrant.

In both cases, reductions to demand may enable augmentation to be deferred, or in the case of drought, avoided altogether (e.g. if inflows subsequently occur). This in turn can promote the efficient use of, and investment in infrastructure, provided the costs of securing an agreement to curtail demand are less than the benefits of deferral. These outcomes should translate to lower water costs to other customers than would otherwise have applied if an augmentation had occurred.

2.3.2 Principles

Demand management measures can take the form of:

- Short-term reductions – where the commercial arrangements enable the customer to return to the prior contracted levels at a defined future time and
- Permanent reductions – where a customer seeks an enduring reduction to contracted volume, or a termination of the contract itself.

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19 Queensland Competition Authority Final Report – Gladstone Area Water Board: Investigation of Contingent Water Supply Strategy Pricing Practices Part B (December 2008)

Short-term reductions are likely to emerge from customers who can abate demand through, for example, reducing production or undertaking temporary on-site measures.

Permanent reductions may arise from capital expenditure by a customer to reduce water use.

GAWB proposes to apply the following principles when evaluating demand management measures:

- In order for a demand management option to be considered, negotiated arrangements with customers to curtail demand should generate reductions in contractual reservations.
- Any consideration provided to customers to curtail demand should be recovered from the customer base, provided it was reasonably expected that customers would be better off as a result.
- Demand forecasts incorporate the reductions that arise.

2.3.3 Alignment with other regulatory practices

In the electricity industry, Distribution Network Service Providers (DNSPs) may recover capital and operating costs incurred in the implementation of non-network alternatives, such as demand management initiatives, where it can be proven that they achieve the same outcomes as additional infrastructure investment but at a lower cost. The expenditure is considered by the regulator at the relevant pricing determination and (if approved) included in the forecast capital and operating costs.[20]

For example, both EnergyAustralia and Integral Energy have included allowances for demand management expenditure in their proposed operating cost allowances that were submitted to the AER in June 2008.[21]

DNSPs are also provided with a Demand Management Innovation Allowance (DMIA) to recover the costs of implementing innovative demand management projects. Depending on their nature, these costs can be recovered through either the opex or capex allowances subject to Australian Energy Regulator (AER) approval. The DMIA is not designed to replace demand management initiatives that are undertaken by DNSPs as part of their normal operations.[22]

2.3.4 Defining cost and benefits

The types of costs and benefits will depend upon the specific situation and the circumstances of the demand management measure proposed. For example, a permanent reduction to demand in response to drought will produce a different benefit than in response to increases in demand. Conversely, a short-term reduction may yield little or no benefit outside a drought situation.

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20   AER (2008). Final framework and approach paper – Application of schemes. Energex and Ergon Energy 2010–15
21   EnergyAustralia (2008). Regulatory Proposal
22   AER (2009). Final Decision. New South Wales distribution determination 2009–10 to 2013–14
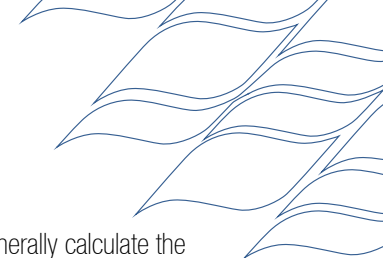
While GAWB will consider the specific circumstances of the demand management proposal, it will generally calculate the costs and benefits in accordance with Figure 5 below:

Figure 5 – Demand management – costs and benefits

Situation	Period of reduction	Potential benefits	Potential costs
Drought	Short-term	• Deferral of restrictions (depending on timing) • Time value of deferral for augmentation • Real option value of augmentation deferral, given uncertainty of inflows	• Any cash consideration made • Any fixed water charges waived • Foregone volumetric charges, net of savings in variable costs
	Permanent	• As per short-term above	• Any cash consideration made • Permanent reduction to the customer base, requiring a re-allocation of fixed costs among remaining customers
Additional demand	Short-term	• Time value of deferral of augmentation • Real option value, given uncertainty of future demand • Reduced risk of restrictions being imposed in the future	• Any cash consideration made • Any fixed water charges waived, net of additional demand • Foregone volumetric charge, net of charges from additional demand and savings in variable costs
	Permanent	• As per short-term above • Smaller capacity augmentation	• Any cash consideration made • Permanent reduction to the customer base, requiring a re-allocation of fixed costs among remaining customers (net of additional demand)

2.3.5 Analysis of options

The analysis of demand management measures will require GAWB to make assumptions and forecasts on uncertain key factors such as future demand, costs and inflows. Given this uncertainty, GAWB intends to incorporate a real options analysis technique when evaluating major demand management measures as part of a broader cost benefit analysis. This will allow the proposed demand management measure(s) to be evaluated against other available alternatives given a range of uncertainties and probabilities.

In a recent paper published by the Water Services Association of Australia (WSAA)[23], real options theory is discussed in detail including the benefits of this analysis technique for the water industry:

> *"Real options theory provides a means of integrating uncertainty into project evaluation. It can be seen as an extension of discounted cash flow analysis and in the urban water sector appears to be most appropriate where:*
>
> – *the benefits of one project over others is uncertain;*
> – *information can be gathered in future that helps make better decisions;*
> – *there is flexibility in a project, in some of its components or in a portfolio of projects – for example the ability to delay, or to choose a staged or modular design; and*
> – *there are adjustment costs in reversing the project or its components."*

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23   WSAA Occasional Paper No.20 (April 2008), p6 – Real Options and Urban Water Resource Planning in Australia

GAWB proposes that any analysis performed be conducted against the following framework:

- Use a consistent timeframe to assess the price and cost impacts for customers – for example, the remaining period in the 20-year forecasts used to determine existing prices.
- Adopt assumptions equivalent to those used in determining existing prices (e.g. for demand, capital expenditure, operating expenditure, discount rate etc).
- Adopt inflow assumptions (for drought-related decisions) that are assumed for source augmentation in accordance with GAWB's Drought Management Plan.
- Adopt augmentation capital and operating costs that are based on the most recent information, gathered in accordance with GAWB's planning cycle.
- Consider broader social and environmental benefits where options generated provide similar cost outcomes to customers.

The recent inquiry by the Economic Regulation Authority (ERA) into tariffs for water businesses in Western Australia is relevant in terms of approach adopted, and to illustrate potential outcomes.

This inquiry considered the efficiency of various demand management measures, and rebates in particular for water efficient appliances. The ERA compared the costs of the water saved against the cost of source augmentation – assuming a new desalination plant at a cost of $2/kL.

Figure 6 – costs to society per kL of water saved for rebate products, 2004–2008.[24]
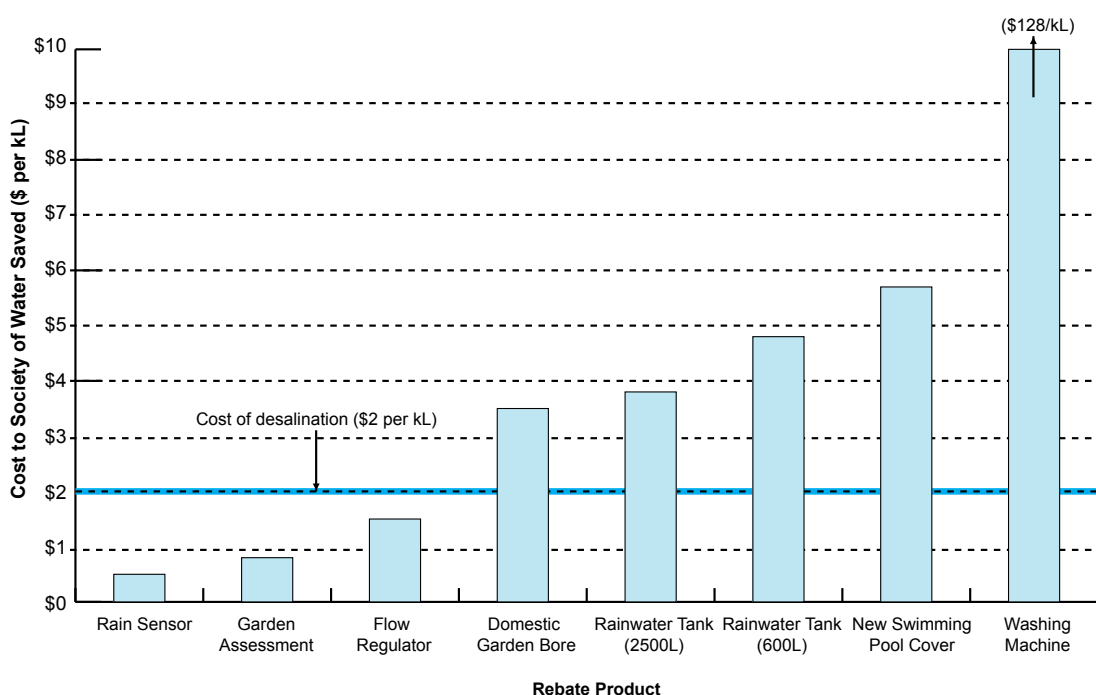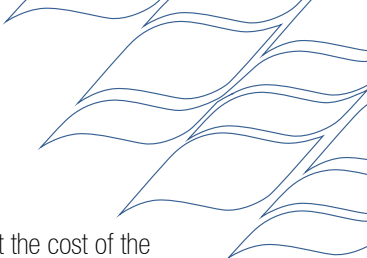
Source: From Department of Treasury and Finance and Economic Regulation Authority analysis

*Notes:
- Greywater re-use systems, upgrading existing swimming pool covers (to water-wise ones endorsed by the Smart Approved Watermark Scheme) and sub-surface irrigation are not shown, as these products have been assumed to increase water consumption, based on a recent survey of household water consumption (i.e. there are no water savings).
- Rainwater tank (2,500L) assumes 61kL of water saved per year.
- New swimming pool covers assumes the purchase of a new water-wise pool cover rather than an upgrade from an existing (non-water-wise) pool cover.
- Costs per kL for washing machines reflect incremental water savings that would be achieved by customers switching from 4-star rated washing machines to 4.5-star washing machines.

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24   Economic Regulation Authority. Draft Report. Inquiry into Tariffs of the Water Corporation, Aqwest and Busselton Water. 18 March 2009. pp38–144, and Figure 10.1 in particular

Importantly, this analysis incorporated the total costs of purchasing and installing the appliances, not just the cost of the rebate program. It is expected that a similar analysis – dealing with the relevant options and scope of costs – would be performed in assessing demand-side options and customer proposals against source augmentation.

2.3.6 Including demand management costs in prices

GAWB proposes that if a demand management measure is undertaken to either defer or replace an augmentation, then efficient costs of the demand management measure are recovered from customers that benefit from the measure – as if they were augmentation costs.

Where an augmentation is deferred by one or more customers reducing their demand, efficient demand management costs include both the direct costs (if any) of paying the customer(s) to reduce demand and foregone revenue from reduced reservation and storage charges and delivery charges.

If a demand management measure defers or replaces a:

- source augmentation – the cost to GAWB of foregone water reservation and storage charges and delivery charges will be recovered as if it were a source asset, through the reservation and storage price[25] and
- delivery augmentation – the cost to GAWB of foregone water reservation and storage charges and delivery charges will be recovered as if it were a delivery asset, through the delivery price.

2.4 Transitioning of prices

Consistent with GAWB's previous proposals to the Authority[26], GAWB proposes that it should not bear the financial costs associated with price transition arrangements, and any such arrangements should be Net Present Value neutral to GAWB.

As outlined in section 1.2, GAWB will submit its pricing model to the Authority in its third submission – indicative prices will also be provided individually to customers at this time (refer section 5.6). GAWB submits that any transition path must be based upon the following principles:

- price transition must be implemented in such a way as to be revenue-neutral for GAWB (that is, preserve the present value of expected revenue over the transitioning period)
- the price transitioning period must occur within a single five-year regulatory control period and
- the price transitioning period for each customer cannot exceed the remaining term of their water supply contract with GAWB.

2.5 Scarcity pricing

GAWB does not propose to introduce scarcity pricing. GAWB has previously provided a detailed paper to the Authority on this matter – a copy of which has been included at Appendix A.

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25   As proposed in GAWB's May 2009 submission to the Authority relating to the QCA's part (c) investigation into the Gladstone to Fitzroy Pipeline, p41
26   GAWB's May 2009 submission to the Authority relating to the QCA's part (c) investigation into the Gladstone to Fitzroy Pipeline, p40

3 Demand forecasting

3.1 Forecasting in an uncertain environment

The Authority has previously highlighted the uncertainties associated with long-term forecasting in the Gladstone region:

> *"Expected new customers are typically large industrials with identifiable projected demand, albeit with some uncertainty surrounding their establishment and the timing and staging of demand. Their demand may be driven by national or global macro-economic variable and trends outside GAWB's control."* [27]

These forecasts also have significant consequences, given the nature of augmentations to water supply infrastructure:

> *"Estimates of future demand have in the past been subject to significant uncertainty and have usually been overestimated. Augmentation options are typically large and lumpy. The costs of any errors to GAWB and its customers are potentially significant."* [28]

This uncertainty also applies to existing customers. For example, power station demands may be difficult to predict over the long term given the uncertainty of the impacts that the Emission Trading Scheme will have on the electricity market. For example, the electricity supply sector has highlighted the implications for past and future investments:

> *"The scheme will fundamentally change the risk profile of electricity investments. The financial success of electricity investments will be highly dependent on the form and operation of rules and regulations of the scheme, which will be subject to change over time. In particular, there is likely to be significant and ongoing uncertainty over future targets and abatement pathways.[29]"*

In turn, the output from existing generators under the scheme is also uncertain in terms of any changes to the merit order of dispatch arising from the scheme, as well as the long-term composition of the generation sector.

Furthermore, the current global financial crisis is affecting demand from existing industrial customers, some of whom are reducing production or delaying investment decisions in response to global events.
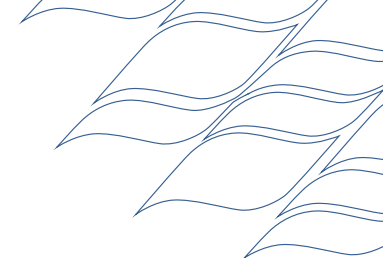
This uncertainty gives rise to a wide range of potential and credible forecasts over the 20-year forecast horizon. Indeed, there has been much contention about these forecasts with a wide variance in views. In its 2005 report, the Authority concluded that "customers are best placed to assess their own demand for water from GAWB".[30] GAWB continues in its support for this conclusion and considers that a regulatory environment that is neutral in terms of service provider demand forecasts is desirable.

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27   Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p19
28   Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p22
29   Energy Supply Association of Australia, National Generators Forum, Energy Retailers Association of Australia – Joint Submission to the CPRS Exposure Draft Team, Department of Climate Change (April 2009), p5
30   Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p21

3.2 Forecasting methodology

In light of this uncertain forecasting environment and the development of the contingent supply strategy, GAWB has adopted a demand forecasting methodology that utilises distinct classifications of demand forecasts for specific purposes:

Figure 7 – Demand forecasting methodology

Type of Demand	Purpose
Base case	Base case demand is that demand which is highly certain and underpinned by customer contracts. In the unusual case that supply is not underpinned by an appropriate customer contract, GAWB will undertake a detailed analysis to incorporate any additional uncontracted demand. This analysis will have reference to current customer demand, customer sourced forecasts, historical demand, and external information. Uncertain demand is excluded from base case demand. GAWB proposes to utilise base case demand forecasts for determining capital works expenditure (including source augmentation), revenue forecast and price setting.
Uncertain demand — Upper bound	Upper bound demand includes both base case demand and demand that is not considered certain, but which is considered to be sufficiently credible to ensure that capacity exists to meet these additional demand requirements within a defined timeframe upon the demand becoming certain. GAWB's objective is for this demand to be secured by forward supply contracts under its forward supply policy, but currently includes demand for industrial projects that have been the subject of substantial pre-feasibility expenditure (in excess of $10m) and are also well progressed towards receiving all necessary government approvals. GAWB proposes to utilise upper bound demand forecasts to define the parameters of capacity that is capable of deployment with certainty within a defined timeframe (presently two years) in accordance with GAWB's Contingent Supply Strategy.
Uncertain demand — Potential demand	Potential demand includes upper bound demand and demand for projects where the proponent has either made direct contact (or indirect contact via government) with GAWB, seeking an indication from GAWB that it could meet the proponent's water requirements. GAWB proposes to monitor potential demand for the purpose of long-term planning.

3.2.1 Setting of prices

As outlined in Figure 7 above, GAWB proposes to use base case demand forecasts to determine prices, removing the uncertain demand that was included in previous forecasts. While uncertain demand is appropriate for ensuring GAWB makes the right long-term infrastructure investment decisions (refer 3.2.1.1 over the page), GAWB believes that uncertain demand should not be included in forecasts used to determine customer prices. This is because:

• Pricing decisions should not be based on customer or prospective customer nominated demand profiles which can vary from contracted demand. In GAWB's view, the best indication of a customer's demand is the volume for which they are contractually bound to pay.

- The incentives for GAWB are a further consideration. The Authority has previously noted these incentives and the implications for the pricing framework[31]:

> "Where demand differs from that originally anticipated, there are consequences for GAWB and its customers, particularly for infrastructure planning and associated costs. From a regulatory perspective, GAWB may have an incentive to overstate demand if the regulatory framework permits it to pass excess costs to customers. Alternatively, GAWB may have an incentive to underestimate demand if it anticipates that this will result in higher per unit prices under the regulatory framework. The desired framework should promote a neutral stance by GAWB."

- GAWB agrees with the need for it to be neutral in terms of demand forecasts and contends that its commercial framework derives the best estimate for demand forecasts through the use of customer contracts. Setting forecast demand on the basis of contracted volumes will:
  - foster a 'neutral' position in so far as the assumptions underpinning prices will align with its contracted position,
  - allow the risk of uncertain demand to be positioned with customers and prospective customers who are better placed to manage this risk and
  - provide an objective and measurable reference point (contracted demand) for the future.

- The Authority has already examined and made recommendations about GAWB's proposed framework when faced with a source augmentation trigger in response to additional demand.[32]

3.2.1.1 Augmentation resulting from additional demand

Under GAWB's source augmentation process framework, augmentation resulting from additional demand is triggered when contracted demand exceeds supply. GAWB believes that utilising this framework allows the:

- most appropriate response to be determined – be it source augmentation, demand management measure or otherwise and
- correct pricing signals to be provided to customers – rather than the inclusion of augmentation costs in prices prior to an actual augmentation response being determined.

GAWB contends that prices should incorporate augmentation costs (excluding efficient preparatory costs[33]) following the completion of the expansion. This is consistent with other approaches as set out by the Authority in its review of Dalrymple Bay Coal Terminal's (DBCT) draft access undertaking[34]:

> "The approach adopted by the Authority and other Australian regulators for approving capital expenditure generally reflects a two stage process. First, the regulator conducts an upfront assessment of the reasonableness of the proposed capital expenditure program for tariff setting purposes. Second, at the end of the regulatory or undertaking period, the regulator assesses the prudency and efficiency of actual capital expenditure undertaken for inclusion into the asset base."

In applying this approach to other assets, the Authority has not sought to include uncertain demands and associated expansion costs into prices, but rather has included only 'approved' costs or expansions that are made in accordance with prescribed criteria (subject to some ex-post review). For example, for:

- QR – The Authority has formally pre-approved capital expenditure on coal transport related infrastructure (in accordance with a master plan) to 2012.[35]
- DBCT – Where capital expenditures for capacity expansions are assessed following completion, in accordance with a prescribed set of criteria.[36]

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31 Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p19
32 Queensland Competition Authority Final Report – Gladstone Area Water Board: Investigation of Contingent Water Supply Strategy Pricing Practices Part B (December 2008)
33 GAWB has proposed in its May 2009 submissions to the Authority (page 41) in relation to the Part (c) investigation that "*in the case the physical infrastructure is not anticipated to be commissioned within the 20 year planning horizon, efficient preparatory costs be included in the RAB and priced and depreciated over the economic life of the preparatory works.*"
34 Queensland Competition Authority. *Dalrymple Bay Coal Terminal. 2006 Draft Access Undertaking* (p18)
35 Refer to QR's 2008 Access Undertaking – http://www.qca.org.au/rail/2008DAUamend/coalmastplan.php
36 Queensland Competition Authority. Dalrymple Bay Coal Terminal. 2006 Draft Access Undertaking. (p18 – 22)

This approach may lead to a less-smooth price path to customers than currently exists. However, it should be noted that:

- GAWB's planning process will see customers informed about the likely price and cost implications of various future scenarios. This will provide customers with the opportunity to evaluate and analyse the potential impact that any source augmentation decision will have on them prior to an augmentation trigger being reached.
- The source augmentation process itself will see indicative post-augmentation prices published at least two years prior to the completion of construction, giving significant forward notice of actual price increases. The decision to construct (and therefore require the price increase) follows a process of informing customers of indicative impacts, and formally inviting alternative proposals – allowing time for customers to consider the impacts and respond accordingly.
- GAWB is a registered bulk water supplier with a customer base that comprises substantial corporate or government entities, which are able to deal with information about potential price movements, and incorporate it into their own business planning.

The same situation will inevitably arise from any drought-response augmentation, given these augmentations cannot be sensibly predicted until the actual need arises.

GAWB submits that prices to customers should not be driven by uncertain demand forecasts and possible augmentation responses. Rather, prices should be adjusted at the time that any augmentation is completed, following the prescribed augmentation trigger. Customers should not be paying today for infrastructure development based on uncertain demand.

3.2.2 Augmentation decisions

As outlined in Figure 7, GAWB proposes to utilise upper bound demand forecasts to define the parameters of capacity for an augmentation response that is capable of deployment with certainty within a defined timeframe (presently two years) in accordance with GAWB's CSS.

Water supply, like many other utility functions, exhibits strong economies of scale. The planning function, particularly when faced with an augmentation decision, is important to ensure that the most economically efficient method of delivering services to customers is achieved. It is often in all customers' interest to invest in large increments in capacity (with low per unit cost) even though this may result in under-utilised capacity for some time.

Selecting the least cost solution for each increment in demand is unlikely to result in the least overall long-run cost of supply. We cannot conclude that the solution that is least cost for the next tranche of demand (when considered in isolation) is necessarily optimal in the long term.

The Authority previously accepted the use of contracted demand as the basis for triggering augmentation. That is, augmentation is not triggered in response to uncertain future demand.[37] The determination of the capacity of any future augmentation will however need to consider a range of scenarios, including forecasted demands that are over and above that of the contracted volume (upper bound demand). This will allow the most appropriate size augmentation to be chosen, providing an economic efficient outcome to all customers.

3.2.3 Planning to meet the demand–supply balance in the region

As outlined in Figure 7, GAWB proposes to monitor potential demand for the purpose of long-term planning.

GAWB undertakes periodic planning to assess future demands and the most prudent supply-side responses. In this context, demand forecasts need to:

- be long term to identify an appropriate augmentation pathway(s) and
- consider a range of demand scenarios to ensure that appropriate responses can be made when required.

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37   This is separate to any prudent allowance for 'contingency', as previously proposed by GAWB and considered by the Authority.

The process of this planning also gives customers information on a range of cost profiles into the future under different scenarios. This cost/price information can be refined as new information is revealed as augmentation approaches.

Forecasting demand needs to incorporate uncertainty and consider appropriate responses. This is necessary to ensure that the demand-supply balance can be achieved under a variety of scenarios, and that the necessary measures are taken to adapt to conditions as they unfold.

However, forecasts used for planning purposes should not necessarily form the basis of forecasts used for pricing. In fact, there are many examples where an infrastructure business prepares long-term plans, but the forecasts in those plans do not translate directly to prices – the master plans adopted for QR and DBCT are two such examples, as well as the forecasting published for the National Electricity Market (NEM). Rather, these plans are a guide to decision making, and provide a reference point against which capacity expansions (including allowances for spare capacity) can be assessed.

4 Revenue requirement

4.1 Revenue components

GAWB is not proposing any changes to how the maximum revenue requirement is determined and prices should incorporate allowances for:

- efficient operating expenditure
- return on capital
- return of capital
- income tax and
- allowed revenue carryovers.

4.2 Operating expenditure

4.2.1 Cost allocation

4.2.1.1 Direct costs

GAWB assigns direct costs to particular pricing zones(s) allowing customer prices to be more cost reflective and equitable. Since the previous price review, GAWB has further refined the assignment of these direct costs to pricing zones through an incisive understanding and application of its commercial functions.

4.2.1.2 General administration allocation methodology

A general administration cost allocation methodology is required to allocate those costs that cannot be directly assigned to a pricing zone(s). GAWB has previously adopted the general administration cost allocation method recommended by the Authority that comprised[38]:

- 10% to customer service, allocated equally to each customer and
- 90% to demand based functions, allocated to storage, raw water delivery and treated water delivery according to relative administrative effort.

GAWB will provide details on its proposal to allocate general administration costs in its second submission to the Authority.

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38   Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p142

4.2.2 Self–insurance

In the 2005 price review, GAWB was unable to provide the Authority with cost estimates for self-insurance. GAWB recognises the importance of self-insurance costs not only due to the residual risk faced by its water business even in the presence of insurance and adopted risk mitigation mechanisms, but the inter-relationship with capital and operating expenditure forecasts.

GAWB has subsequently undertaken further work on the identification and quantification of self-insurance costs and will provide these to the Authority in its second submission.

4.2.3 20–year forecasts

GAWB is preparing detailed 20-year operating expenditure forecasts for this regulatory control period. These forecasts will be provided to the Authority in its second submission.

4.3 Capital expenditure

GAWB is preparing detailed 20-year capital expenditure forecasts for this regulatory control period. These forecasts will be provided to the Authority in its second submission.

4.4 Return on capital – Weighted Average Cost of Capital (WACC)

4.4.1 Review of WACC parameters

Given the unprecedented impact that the global financial crisis has had on the financial markets, GAWB has engaged Synergies Economic Consulting (Synergies) to undertake a review of the WACC parameters.

Synergies has undertaken a high level review of those parameters that are sensitive to changes in the economic environment except for the asset beta parameter where only a comparative analysis has been performed.

A copy of Synergies' report has been included at Appendix B.

4.4.2 Risk–free rate

GAWB proposes to retain the current methodology for calculating the risk-free rate. GAWB may however need to re-visit this proposal if there is a significant deterioration in financial markets between the lodgement of this submission and the end of the 20-day averaging period that is proposed to set the final risk-free rate.

In the 2005 price review, the Authority recommended that the risk-free rate is based on the 20-day average of the 10-year government bond rate[39].

A significant compression in Commonwealth Government bond yields has been observed since the onset of the global financial crisis, which reflects the premium that investors are willing to pay (or the reduction in yield that they are willing to accept) for the convenience of holding sovereign government debt when financial markets are particularly unstable and confidence is low. This is also referred to as the 'flight to quality'. The quantum of this impact, termed the 'convenience yield', can be estimated by comparing yields on Commonwealth Government bonds with other appropriate AAA-rated comparators, such as interest rate swaps.

Yields dipped to historical lows of less than 4% in late 2008 however they since gradually trended back upwards. The 20-day average of the 10-year government bond rate as at the end of June 2009 was 5.61%.

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39   Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p114

As outlined in the report by Synergies, these characteristics are not contemplated under the Capital Asset Pricing Model (CAPM), which raises questions about the appropriateness of Commonwealth Government bonds as a proxy for determining the risk-free rate in such extreme market conditions. Locking in a rate in such extreme market conditions is an issue for regulated businesses given this rate is set for the duration of the regulatory control period.

Given the significant recovery that has occurred in recent months, an adjustment for the convenience yield is currently not proposed. However, GAWB submits that the case for such an adjustment should be considered if a significant downturn occurs during or prior to the reset of the risk-free rate (for example, due to further economic shocks). The proposed basis for such an adjustment is outlined in Synergies' report.

It is important to note that any proposed adjustment would not be sought for the entire amount of the convenience yield (given this premium is typically always reflected in Commonwealth Government bond yields, even during more 'normal' market conditions). Any adjustment that would be proposed would be based on the difference between the observed convenience yield and its longer-term average.

GAWB further proposes that the actual reset date and averaging period that the Authority intends to use for determining the risk-free rate to apply in their final recommendations should be provided confidentially to GAWB at least two months prior to the start of the averaging period. This will provide GAWB with adequate time to structure its finances while ensuring that the risk-free rate is not unduly altered as a result of market expectations.

4.4.3 Capital structure

GAWB proposes to maintain the capital structure for GAWB at 50% debt and 50% equity, with an associated credit rating of BBB.[40]

4.4.4 Debt margin

Following the sub-prime crisis there has been a significant divergence between the long-term BBB bond yields estimated by Bloomberg and CBA Spectrum. As outlined in Synergies' report, it is possible that Bloomberg estimates are understating the yields on long-term BBB corporate debt, while CBA Spectrum estimates are overstating them (noting that both data providers exercise some discretion in determining indicative prices).

Synergies considers that a reasonable approach in these circumstances would be to take the mid-point of the two estimates. Once liquidity returns to the long-term BBB corporate bond market, more reliance could be placed on a single data source, such as Bloomberg.

GAWB therefore proposes that:

• an average of Bloomberg and CBA Spectrum be used to determine the debt margin. The mid-point of the 20-day average of the estimates provided by each service as at 30 June 2009 is 4.34%[41] and
• the additional allowance of 12.5 basis points for debt-issuing cost adopted in the previous price review[42] be retained.

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40 Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p127
41 As Bloomberg currently only publishes yields on BBB bonds out to an eight year maturity, the 10ten year yield has been estimated by adding the difference between the Bloomberg eight and 10ten year yields on A–rated bonds to the eight year BBB yield. This approach has been applied by the ACCC and the AER.
42 Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p130

4.4.5 Debt beta

GAWB proposes to adopt a value of zero for the debt beta. This is because:

- The CAPM-based method used to estimate the upper bound will always overstate the debt beta given the influence of non-systematic default risk on the debt margin.
- The application of the CAPM-based approach in the current market environment (where debt margins are high) will result in a significant increase in the debt beta and a significant consequent reduction in the equity beta (and the cost of equity). The impact of the increased debt margins on the cost of equity (via the debt beta) suggests that there has been a significant transfer of risk from shareholders to lenders. This is not plausible given that shareholders still rank below lenders in relation to a firm if it experiences financial distress.
- There is no alternative robust way of measuring the debt beta. In recognition of these problems and the absence of a generally accepted method to derive the debt beta, most regulators now adopt a value of zero.[43]

4.4.6 Beta

GAWB proposes to apply the same asset beta of 0.40 that was previously recommended by the Authority.[44] The utilisation of a debt beta of zero (as proposed in section 4.4.5) with an asset beta of 0.40 will provide an outcome more consistent with other regulatory decisions when converting the asset beta to an equity beta.

Synergies has undertaken a comparative analysis of the previously recommended asset beta against other regulatory decisions in the water industry. Given different gearing levels have been adopted in these decisions, the equity beta outcomes have been de-levered using the Conine formula to remove the effects of gearing and enable asset betas to be directly compared.

If a debt beta of zero is a used to de-lever the equity betas from the other decisions, Synergies concludes that GAWB's previous asset beta of 0.40 appears reasonable (the implied asset beta outcomes for other decisions range between 0.28 and 0.49). However, if a debt beta of 0.11 is assumed (which was the value adopted in the 2005 decision), GAWB's asset beta of 0.40 is below all other regulatory decisions with the exception of Victoria. The asset beta outcomes for the other decisions range from 0.45 to 0.59 (excluding Victoria, where the asset betas range between 0.38 and 0.42). Synergies is of the view that compared with their other regulated water businesses, a lower asset beta for GAWB is not justified given its exposure to industrial customers.

Synergies therefore concludes that it is appropriate to apply an asset beta of 0.4 with a debt beta of zero. Based on the assumptions proposed by GAWB, the resulting equity beta is 0.68. The equity beta previously determined by the Authority was 0.65.

4.4.7 Market risk premium

Synergies' report concludes that a value of between 6% and 7% is the most appropriate range for the Market Risk Premium (MRP). There is no clear reasons as to why the MRP should be selected from the bound of this range (which is the value that has been previously applied by the Authority). While the AER recently determined a value of 6.5% to apply to electricity transmission and distribution, which is largely driven by the impact of the global financial crisis, Synergies concludes that 6.5% remains the most appropriate estimate of the long-term value of the MRP. GAWB is therefore proposing a MRP of 6.5%.

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43 Synergies Review of WACC, Appendix B – page 17
44 Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p124

4.4.8 Gamma

Synergies' report concludes that the value of gamma is zero as:

• there are evident difficulties in estimating a reliable value for gamma (which may be because it has no value)
• it has a strong theoretical foundation, being that since the introduction of the 45-day rule, franking credits are now of no value to the marginal foreign investor and
• there is empirical evidence to support a value of zero, both from the recent literature and Synergies' own analysis which confirmed that it cannot be concluded that gamma has a value other than zero.

The AER's recent decision to increase the value of gamma to 0.65 has also been examined. Synergies considers that there are a number of problems with the AER's rationale for this decision, which have been outlined in its report.

GAWB therefore proposes to adopt Synergies' recommended value for gamma of zero.

4.4.9 WACC parameters

GAWB's proposed parameter estimates are presented in the following table, along with the recommended values proposed by Synergies. A lower and upper bound is presented for the Synergies' estimates in recognition of the uncertainty and imprecision underpinning a number of the parameters.

Parameter	Synergies – lower bound	Synergies – upper bound	GAWB's proposal
Risk-free rate[a]	5.61%	5.61%	5.61%
Debt to total value	50%	60%	50%
Equity to total value	50%	40%	50%
Debt margin[b]	3.11%	5.56%	4.34%
Debt raising costs	0.125%	0.125%	0.125%
Market risk premium	6%	7%	6.5%
Gamma	0	0	0
Tax rate	30%	30%	30%
Asset beta	0.4	0.4	0.4
Debt beta	0	0	0
Equity beta[c]	0.68	0.82	0.68
Cost of equity	9.69%	11.35%	10.03%
Cost of debt	8.85%	11.30%	10.07%
Post-tax nominal WACC	9.27%	11.32%	10.05%

a   Based on a 20-day average for the period ending 28 May 2009.
b   Lower bound of range based on Bloomberg 20-day average for eight year BBB bonds plus the margin between and A-rated eight and 10 year bonds, for the period ending 30 June 2009. Upper bound based on 20-day average of CBA Spectrum's fair value BBB yield curve over the same period. Before debt-raising costs.
c   Based on the Conine formula.
d   Values will be reset in accordance with directions provided by the Authority prior to 1 July 2010.

GAWB's proposed WACC is higher than WACC previously determined by the QCA in 2005. The main driver of this is the debt margin, given the blow-out in credit spreads that has occurred following the sub-prime crisis. Even the 'lower bound' estimates produced by Bloomberg, which are considered to underestimate the cost of raising long-term BBB debt, are well over twice the level observed in 2005.

It should also be noted that the resulting cost of debt is slightly higher than the cost of equity (by 0.04%). This is an anomalous result that is addressed by Synergies in its report.

Synergies identifies two possible reasons for this. First, the cost of debt reflects the impact of the global financial crisis (via the higher debt margin), whereas no specific adjustments have been made to the cost of equity to reflect this impact. To the extent that the required return on debt has increased following the crisis, it would be expected that the required return on equity has also increased (given shareholders rank behind lenders).

The cost of debt has been estimated using current market data, as this is seen to be most reflective of the forward-looking cost of debt, which is standard regulatory practice. With the exception of the risk-free rate, the cost of equity is not as sensitive to the current economic environment (given the equity beta and MRP are set based on long-term estimates). Synergies cites a 2009 paper by Officer and Bishop, which observed short-term forward-looking estimates of the MRP of between 16% and 18%. While this may reflect structural change (or an increase in the MRP) – which was acknowledged by the AER – it is not yet possible to reliably determine if that is the case, or what the 'new' long-term value of the MRP might be.

No specific adjustments have been proposed to the cost of equity to account for the impact of the crisis in this proposal – while GAWB has submitted a MRP of 6.5%, this is based on recommendations by Synergies as being a more appropriate long-term value for the MRP.

What this may therefore suggest is that the proposed return on equity understates the actual return that an equity investor would require to commit funds in the current uncertain market environment. However, it is not considered appropriate to make any ad hoc adjustments to the cost of equity, nor is it considered appropriate to make such adjustments to the cost of debt. GAWB therefore submits these parameters 'as is', with the market-sensitive parameters estimated in accordance with standard regulatory practice and based on current market data.

The second issue highlighted by Synergies is the sensitivity of this 'anomaly' to gearing. For example, is the gearing level was set at the mid-point of Synergies' recommended range (55%), the anomaly disappears. While it is reasonable to expect that the cost of equity will increase as gearing increases, the cost of equity should not be lower than the cost of debt at a reasonable level of gearing (50%). This may suggest a problem with the underlying methodology.

4.5 Return of capital

GAWB is proposing to retain the straight-line depreciation method for determining the return of capital component for GAWB's regulated asset base.

4.6 Capital contributions

GAWB has developed a principle-based capital contribution framework with the purpose of providing clarity to customers on the treatment of past and future capital contributions. GAWB's proposed framework has been included at Appendix C.

For past capital contributions, GAWB proposes no changes to the way in which pricing benefits are currently calculated. Detailed principles have been included in the framework on how GAWB will revise the pricing benefits for the original capital contributing customer to the extent it is required due to a change in circumstance (such as the asset being used by another customer). Irrespective of precisely how GAWB proceeds in this circumstance, it will ensure that:

- the value due to the original capital contributing party is preserved, with reference to the calculation methodology of the current pricing benefit and
- the rebate provided to a customer is no greater than the return on capital and, if appropriate, return of capital components of the price.

For new capital contributions, GAWB will use a pricing agreement to explicitly state:

- whether a pricing benefit is appropriate
- the quantum of the pricing benefit and how it will be calculated over the life of the contributed asset and
- the arrangements that will apply in the event a contributed asset is subsequently used by other customers.

4.7 Asset values

The Authority has previously recommended that GAWB's asset base be valued on the following basis[45]:

- land – valued at market value
- easements – valued at their historic cost indexed for inflation
- recreational facilities and fish hatchery assets – valued at depreciated optimized replacement cost (DORC)
- assets necessarily relocated in the process of creating new assets – valued at their cost of relocation and
- the source, delivery system and other physical assets – valued at DORC.

GAWB proposes that assets continue to be valued on the basis of DORC. GAWB also acknowledges that there have not been material changes in GAWB's circumstances that warrant a further DORC revaluation of its assets.

4.7.1 Regulated asset base

GAWB proposes that the opening regulated asset base (RAB) for the 2010–2015 regulatory control period be set as follows:

- roll-forward of the 2005 valuations (using actual Brisbane All Groups CPI and straight-line depreciation over the remaining lives estimated in 2005)
- addition of efficient capital expenditure and assets purchased or constructed during the 2005 – 2010 regulatory control period
- removal of redundant assets and assets sold during the 2005 – 2010 regulatory control period and
- changes to 2005 optimisation decisions (refer section 4.7.2) and such other adjustments where appropriate.

GAWB will provide details of the regulated asset base including justifications of the efficiency of 2005 – 2010 capital expenditure in its second submission to the Authority.

4.7.2 Optimisation

Yarwun Water Treatment Plant

The 2005 report concluded that:

> *"As treated water demand from the northern area increases, it is more economic to moth-ball the Yarwun Water Treatment Plant and supply water from Gladstone Water Treatment Plant through the converted Hanson Road main."[46]*

However, a review of the options for providing potable water to the north industrial area concluded that an upgrade of the Yarwun Water Treatment Plant (YWTP) was the least cost option. Furthermore, by maintaining the Hanson Road main as a raw water pipeline:

- Customers in that geographic area can access GAWB's raw water network. A customer now maintains a raw water connection on this pipeline with further raw water requirements likely by 2015. These additional demand requirements have been included in GAWB's upper bound demand.
- An alternative feed of raw water is to be provided to the northern industrial customers. GAWB contends that while this alternative feed is limited, it is required to reduce the risk of non-supply in the event of the failure or maintenance requirements of the Mount Miller Pipeline.

GAWB therefore submits that a review of the optimisation decisions pertaining to the water supply to the north industrial area is necessary. A full justification of the decision to upgrade YWTP will be included in GAWB's second submission.

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45   Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), pxiii
46   Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p105

Boat Creek Reservoir

The Boat Creek Reservoir has previously been classed as a redundant asset and excluded from the regulated asset base[47]. GAWB intends to reinstate this reservoir to provide additional raw water storage for customers in the proposed *North Industrial Raw* and *Fishermans Landing Raw* pricing zones. Details of the capital expenditure required to reinstate this reservoir will be included in GAWB's second submission to the Authority.

5 Pricing

5.1 Zonal pricing

GAWB proposes to retain geographical differential pricing for all customers based on their utilisation of specific components of its infrastructure network. Details of GAWB's proposed pricing zones to apply from 1 July 2010 have been included at Appendix D.

GAWB has reviewed the current pricing zones and proposes the following changes to zones from 1 July 2010 to ensure that the identified geographical segments still represent an equitable allocation to customers based on cost reflectivity.

5.1.1 Source zone

GAWB intends to maintain a single pricing zone for source assets comprising:

- the *Awoonga Dam* zone and
- efficient preparatory costs incurred for the purposes of GAWB's CSS.

Full details of GAWB's preparatory expenditure relating to the CSS will be included in GAWB's second submission to the Authority.

5.1.2 Raw water delivery zones

The previous *Awoonga to Toolooa* zone is proposed to be extended to the Fitzsimmons Street Reservoir making the new *Awoonga to Fitzsimmons Street Reservoir* zone. This zone now incorporates the previous *Toolooa to Mount Miller Junction* zone and *Mount Miller Junction to Gladstone* zone (Fitzsimmons Street Reservoir). This change is necessary for cost reflectivity purposes as all raw water delivery customers benefit from the Fitzsimmons Street Reservoir.

The *Hanson Road Pipeline* zone is proposed to be reinstated into the raw water pricing zones (previously optimised out by the Authority – refer section 4.7.2). This pipeline will form part of a larger raw water zone called the *North Industrial Raw* zone comprising:

- Hanson Road Pipeline
- Boat Creek Reservoir
- *Mount Miller Pipeline* zone and
- a portion of the previous *Boat Creek* zone.

This one raw water zone is appropriate because:

- customers being fed from the Hanson Road pipeline benefit from the security provided by the Mount Miller pipeline
- customers being fed from the Mount Miller pipeline benefit from the security, although limited, provided by the Hanson Road pipeline and
- it ensures that customers within the similar geographical proximity, benefiting from the same infrastructure, are within the one pricing zone.

Water entering the *Yarwun* zone and the *Yarwun Water Treatment Plant* zone will now be sourced from the *North Industrial Raw* zone.

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47   Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p104

5.1.3 Potable water delivery zones

The Yarwun Water Treatment Plant (YWTP) will be separated into its own zone. The outlet from the YWTP and pipe work will now be included in the *North Industrial Potable* zone because no customers can connect to the pipeline between YWTP and the Mount Miller Reservoir (part of the *North Industrial Potable* zone).

The *Mount Larcom* zone is proposed to be renamed the *Boat Creek Pump Station to East End Reservoir* zone.

The *Cement Australia Potable* zone is proposed to be renamed the *Fisherman's Landing Potable* zone.

The end point of the *North Industrial Potable* zone is now the intake to Boat Creek Pump Station and the *Fisherman's Landing Potable* zone will commence at the junction before the pump station.

The *Gladstone Water Treatment Plant (GWTP)* zone is proposed to be separated into two zones — a zone for the GWTP only and the *GWTP to South Gladstone* zone.

The *GWTP to Toolooa* zone is proposed to be renamed the *South Gladstone to Toolooa* zone with some small end point adjustments to the *GWTP to South Gladstone* zone.

5.2 Price differentiation

5.2.1 Background

The Authority has previously supported GAWB's in principle proposal to differentiate prices on the basis of length of contract, credit risk and quality of service:[48]

> "The Authority recommends that price differentiation on the basis of credit risk, length of contract and for other differences is appropriate to the extent that the proposed response is commensurate with the cost/risk of service provision and that any such arrangements should be subject to regulatory oversight."

GAWB has not previously proposed any specific approaches for calculating price differentials. Consequently, the Authority has not made any specific recommendations on this issue other than the requirement that the price differentials be cost reflective and subject to regulatory oversight. GAWB now submits it proposals for quantum of the price differentiation surcharges with implementation proposed from 1 July 2010.

5.2.2 Contract length

Customers who sign long-term contracts (a term of 20 years or more) for their reservation and storage and delivery products support GAWB's ability to plan and finance the water supply system. It is equitable for such customers to pay a lower price than short-term customers.

Accordingly, GAWB proposes to apply a price differentiation surcharge to short-term contracts for the supply of its reservation and storage and delivery products. A short-term contract is one which has an original term from less than two years to 20 years. GAWB proposes that the quantum of the surcharge progressively diminish as the length of the contract (commitment) approaches the 20-year mark. This approach sends the greatest price signal to customers with shortest commitment, supporting GAWB's ability to efficiently conduct its long-run operations.

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48   Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p67
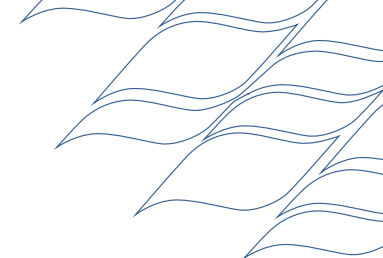
GAWB proposes to apply the following surcharges to prices from 1 July 2010:

	Less than 2 years (incl. uncontracted)	2 to < 5 Years	5 to < 10 Years	10 to < 15 Years	15 to < 20 Years
Price surcharge	25%	20%	10%	5%	3%

5.2.2.1 Benefits to customers

It is not GAWB's intention to benefit financially from price differentiation based on contract length. Under GAWB's proposed revenue cap, any over-recovery of target revenue would be returned to customers through lower prices in future years.

Over a long period, the economic regulation framework will allow GAWB to recover its economic costs (whether they be higher because a significant proportion of customers prefer short-duration contracts, or lower because customers have migrated to long-term contracts).

The proposed mechanism will provide an incentive for customers to sign long-term contracts promoting greater alignment with GAWB's objective of sustaining long-term revenue security.

5.2.2.2 Rationale

If a single customer required a short-duration contract, then it would be difficult to measure the cost differential for GAWB. However, if all customers were supplied under very short-run contracts, GAWB would incur higher costs associated with:

- sub-optimal network capacity expenditure (in the absence of longer-term demand signals, GAWB may over or under-develop parts of its network, leading to poor asset utilisation and/or the need for expensive 'catch-up' investments)
- financing (debt and equity providers would require higher returns if future demand/revenue was uncertain)
- contracting costs (contract service providers would require higher compensation if the fixed costs of establishing the operation were likely to only be recoverable over a short timeframe)
- inefficient resource allocation (for example, there may be higher staff churn if there were heightened uncertainty concerning security of future operations) and
- hazard of opportunistic counterparty behaviour (where once infrastructure is established, the customer attempts to negotiate subsequent supply at lower than the average cost of supply).

5.2.2.3 Setting the surcharge

GAWB acknowledges the difficulty in quantifying the exact costs associated with short-term contracts and the additional risk placed on GAWB's business. Costs may vary from customer to customer and over time. However, for reasons of customer certainty, equity and administrative simplicity, a single schedule surcharge is required.

GAWB has set the proposed schedule of surcharges to support its ability to efficiently conduct its long-run operations by reference to several factors, including:

- GAWB's desire to provide incentives to customers to sign long-term contracts (providing customers with reasonable incentives to enter long-term contracts benefits all customers by ensuring that GAWB is best able to plan to meet customers' needs at least cost)
- the security of GAWB's long-run operations, recognising the high concentration of GAWB's demand in a relatively small number of non-municipal customers with the attendant risk that they may cease operations (and terminate their demand) at short notice in response to the prevailing condition of domestic and international markets
- matching the duration of price averaging with the contract term (using the 2005 – 2010 regulatory control period model) and
- quantum of price-duration relationship observed in other markets.

GAWB is not aware of any market or infrastructure service in which it is possible to observe the precise relationship between wholesale price and contract duration. However, in retail markets there are many instances where customers receive a discount if they lock-in to a future contract for a product or service. Common examples include:

- electricity and gas retailing (on beginning of retail competition in the NEM, retail customers could achieve 5% to 20% savings on the default tariff by signing a multi-year contract)
- telecommunications contracts (toll, data and mobile services are typically offered at a higher price for casual use than for long-duration contracts).

There is no difference between the energy and telecommunications products sold casually (at spot) or on long-duration contracts. The service provider's benefits from long-duration contracts arise because certainty of demand helps the service provider plan – operationally, financially, and strategically – and purchase more effectively.

5.2.3 Counterparty risk

GAWB divides counterparty risk into three components:

- credit risk and
- contract default risk.

Each of these aspects of counterparty risk is discussed below.

5.2.3.1 Credit risk

Counterparty credit risk is the risk that GAWB will not recover payment for water already supplied to a customer.

Where a GAWB customer has a Standard and Poors or Moodys long-term credit rating of BBB or better, or is the subsidiary of a company with credit rating BBB or better, GAWB will not require security to mitigate counterparty credit risk.

However, if a customer does not have a credit rating of BBB or better and is not the subsidiary of a company with credit rating BBB or better, then the customer must provide GAWB with:

- a guarantee of payment from a related company with credit rating BBB or better, or
- a bank guarantee for payment of three months' water charges.

GAWB therefore does not propose to introduce price differentiation surcharges for counterparty credit risk.

5.2.3.2 Default risk

If a customer defaults or prematurely terminates a contract, there are mechanisms contained in the standard contract to recover lost revenue.

However if a counterparty was to become insolvent, then it is unlikely that GAWB could recover monies through the contract. GAWB would therefore lose the revenue expected from that customer until the beginning of the next regulatory control period[49].

Under GAWB's proposed revenue cap (refer section 2.1), the lost revenue from an insolvent customer would be recovered from remaining customers and GAWB would suffer no economic loss. GAWB therefore proposes that it would not introduce price differentiation surcharges for counterparty contract default risk under a revenue cap form of regulation.

If the current price cap form of regulation was maintained, GAWB would permanently forgo the revenue expected from an insolvent customer until the beginning of the next regulatory control period unless some other mechanism is put in place.[50]

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49 A price review could be triggered if there is, or expected to be, a sustained variation of 15% or more in GAWB's aggregate revenue subject to a referral notice being provided to the Authority from the QCA Ministers.

50 Following a price review (and assuming the reduction in demand did not trigger asset write downs), GAWB would reset prices such that it once again recovered its target return on investment from the remaining customers. However GAWB would not be compensated for the revenue lost in the previous regulatory control period.
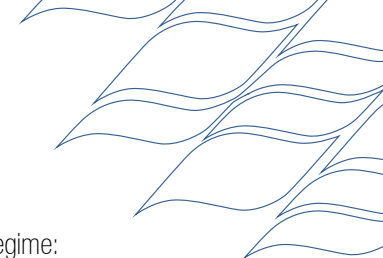
GAWB therefore proposes that, if the Authority recommends a continuation of the current price cap regime:

- a price differentiation surcharge is not introduced for counterparty contract default risk and
- a self-insurance premium is added to the building block calculation to cover the risk of counterparty insolvency and loss of revenue unable to be recovered through the regulatory framework – the quantum of this premium will be provided in the confidential section of GAWB's second submission to the Authority.

5.3 Over-run charges

GAWB proposes to retain the current methodology for determining over-run charges namely:

- Where actual demand exceeds the contracted\reservation volume for industrial customers, unless otherwise negotiated with GAWB, a surcharge of:

  - 25% applies to the total charge for incremental volumes where actual consumption is between 110% and 125% of the contracted amount (first over-run charge) and
  - 50% applies to the total charge for incremental volumes where actual consumption is higher than 125% of the contracted amount (second over-run charge).

- Where actual demand exceeds the contracted/reservation volume for Local Government Authority customers, unless otherwise negotiated with GAWB, a surcharge of 10% will apply to the total charge for incremental volumes where actual consumption exceeds 125% of the contracted volume.

GAWB also proposes to retain its sole discretion to waive or reduce over-run charges in exceptional circumstances or where there are no consequential costs incurred by GAWB.[51]

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51   As outlined in GAWB's response to the Authority's 2004 draft report investigating GAWB's pricing practices, p13

5.4 Prices for Gladstone Regional Council

In its 2005 final report the Authority recommended that Calliope Shire Council (now part of the amalgamated Gladstone Regional Council (GRC) also incorporating the former Gladstone City and Miriam Vale Shire Councils) be charged only one price for potable water[52], even though off-take connections were across several pricing zones.

To ensure GAWB's prices are cost reflective and equitable for all customers, GAWB proposes that GRC prices are not averaged between connections and that charges are based on the zonal based price for each respective connection, similar to the treatment of other customers that maintain multiple connections. GAWB further contends that the responsibility for averaging potable water prices across multiple connections should be the responsibility of GRC, not GAWB.

5.5 Instantaneous flow rate pricing

5.5.1 Background

Current pricing for both water reservation and storage services and delivery services is based on the annual volume of water delivered. GAWB proposes to change the basis of pricing for delivery services to instantaneous flow rate (IFR) pricing for the regulatory control period commencing 1 July 2015.

IFR pricing means that customer bills for the delivery service will be related to the maximum flow rate of use of water rather than the total volume used. For network based industries, cost is more closely related to the rate of consumption rather than total consumption. IFR is analogous to demand (kW or kVA) or maximum hourly quantity pricing used in the electricity and gas network industries.

In 2005, the Authority approved GAWB's proposal for IFR based pricing in principle. The QCA stated:[53]

> "GAWB's proposal for delivery system charges is based upon the maximum instantaneous flow rates required to service each customer.
>
> GAWB's proposal to adopt this may result in significant permanent increases in access charges for customers with low levels of 'normal' demand but high peak demand relative to other customers in the network segment. However, given that their usage patterns require such capacity, such an outcome would be consistent with cost reflectivity…
>
> The Authority is aware that peak flow rate pricing will emerge as an increasing focus in the water industry. Appropriately applied, such arrangements have the potential to provide substantial benefits. Accordingly, the Authority accepts that GAWB's proposal for charges to be based on maximum instantaneous flow rates has merit, but that it is a matter for GAWB to assess the net benefits."

The Authority recognised that the major impediment to introducing IFR pricing was installation of appropriate metering.[54] During the current regulatory control period, GAWB has installed appropriate metering and telemetry capable of recording flow rates.

GAWB has also since developed the following specific pricing practices for IFR pricing which it proposes to use after its implementation – refer section 5.5.3.

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52   Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p60
53   Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p47
54   Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p47

5.5.2 No change in total revenue recovered

Under either GAWB's proposed revenue cap or the current price cap form of regulation, the change to IFR pricing will not result in GAWB recovering any more revenue (the same maximum revenue requirement will still apply). Under either IFR pricing or volume based pricing, prices would be set based on forecast quantities (contract volume or contract maximum IFR), and the expected revenue under the current annual volume and proposed IFR arrangements would be identical.

The purpose of the change is to better reflect economic costs of capacity to customers.

5.5.3 Proposed IFR pricing framework

Customer delivery contracts will include a contracted maximum instantaneous flow rate (CIFR) for each connection (supply point). GAWB will record the metered maximum instantaneous flow rate (MIFR) in each calendar month.

GAWB proposes to continue the current two part tariff structure to determine the delivery price (access and volumetric). Individual components will be calculated with reference to:

- IFR access charge – will be charged monthly based on the greater of the customer's CIFR and MIFR
- IFR volumetric charge – will be charged monthly based on the MIFR and
- GAWB also proposes that over-run charges will apply in months that the MIFR exceeds the CIFR. The over-run charge will be based on the difference between MIFR and CIFR – refer section 5.5.4.

5.5.4 Setting the quantum of IFR price components

GAWB proposes to retain the current methodology for setting price components, but with the denominator in price calculations being the sum of customers' CIFRs rather than base case demand (refer section 3.2) volume quantities. That is, GAWB proposes to set the IFR volumetric price based on an estimate of LRMC of capacity in the particular zone. Similarly, GAWB proposes to set the IFR access price to recover that part of the average economic cost of supply over the planning horizon not recovered by the IFR volumetric price.

GAWB proposes to retain the methodology for setting customer over-run charges (outlined at section 5.3) namely:

- Where MIFR exceeds the CIFR rate for industrial customers, unless otherwise negotiated with GAWB, a surcharge of:
    - 25% applies to the sum of the IFR access and volumetric price where the MIFR is between 110% and 125% of the CIFR (first over-run charge) and
    - 50% applies to the sum of the IFR access and volumetric price where the MIFR is higher than 125% of the CIFR (second over-run charge).

- Where MIFR exceeds the CIFR for Local Government Authority customers, unless otherwise negotiated with GAWB, a surcharge of 10% will apply to the IFR access and volumetric price where MIFR exceeds 125% of the CIFR.

GAWB also proposes to retain its sole discretion to waive or reduce over-run charges in exceptional circumstances or where there are no consequential costs incurred by GAWB.[55]

5.5.5 IFR pricing examples

Consider a customer with:

- CIFR = 100 Litres per second (Ls^{-1})
- IFR access price = $50/$Ls^{-1}$
- IFR volumetric price = $10/$Ls^{-1}$

This customer would have:

- first over-run charge threshold (refer section 5.5.4) = 110% x 100 Ls^{-1} = 110 Ls^{-1}
- second over-run charge threshold = 125% x 100 Ls^{-1} = 125 Ls^{-1}

Example 1 – MIFR for the month is less than the CIFR.

Assume the customer's MIFR for January is 90 Ls^{-1}. The customer's delivery charge for January would be $5900, calculated as:

- IFR access charge = 100 Ls^{-1} x $50/$Ls^{-1}$ = $5000
- IFR volumetric charge = 90 Ls^{-1} x $10/$Ls^{-1}$ = $900

Example 2 – MIFR for the month is greater than the CIFR but does not trigger over-run charges.

Assume the customer's MIFR for February is 105 Ls^{-1}. The customer's delivery charge for February would be $6300, calculated as:

- IFR access charge = 105 Ls^{-1} x $50/$Ls^{-1}$ = $5250
- IFR volumetric charge = 105 Ls^{-1} x $10/$Ls^{-1}$ = $1050

Example 3 – MIFR for the month is greater than the CIFR and triggers over run charges.

Assume the customer's MIFR for March is 130 Ls^{-1}. The customer's delivery charge for March would be $8175, calculated as:

- IFR access charge = 130 Ls^{-1} x $50/$Ls^{-1}$ = $6500
- IFR volumetric charge = 130 Ls^{-1} x $10/$Ls^{-1}$ = $1300
- IFR first over-run charge = (125 Ls^{-1} - 110 Ls^{-1}) x ($50/$Ls^{-1}$ + $10/$Ls^{-1}$) x 25% = = $225
- IFR second over-run charge = (130 Ls^{-1} - 125 Ls^{-1}) x ($50/$Ls^{-1}$ + $10/$Ls^{-1}$) x 50% = $150

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55   As outlined in GAWB's response to the Authority's 2004 draft report investigating GAWB's pricing practices, p13

5.5.6 Process for introducing IFR pricing

As detailed in section 5.5.1, GAWB proposes to introduce IFR pricing for delivery services from the beginning of the regulatory control period commencing 1 July 2015. GAWB believes that an appropriate lead time prior to introduction is necessary to ensure that:

- customers have sufficient data to enable them to understand their flow rate characteristics
- GAWB can actively engage with customers on the impacts that IFR pricing will have on their business and
- customers and GAWB have sufficient time to make sound business decisions resulting from IFR pricing signals, especially where capacity constraints are identified within the delivery network.

The general process for the introduction of IFR pricing will involve:

- recording IFR data for all customers for a period of time (likely to be more than a year to capture any customer seasonality) to ensure that indicative prices set are realistic
- producing 'dummy' bills for customers to allow them to assess the costs and benefits of changing the processes and/or their quantity of on-site storage to optimise commercial outcomes under IFR pricing
- working with customers to make sure any proposed customer investments are efficient (see example below)
- reassessing forecast customer CIFRs based on customer responses and
- setting prices based on revised forecasts and initial customer responses.

This process would allow customers to:

- contract for the correct CIFR and
- make any economic changes to their process and/or on-site storage arrangements necessary to optimise their commercial outcomes.

Working with customers to model the impact of any IFR reduction is important because while IFR will provide a more efficient price signal to customers when faced with a delivery system constraint, reducing IFR may not result in expected bill savings. Consider the following simplified example of a customer notionally paying $300 for a CIFR of 10 Ls^{-1}.

Zone target revenue = $500

50 Ls^{-1} → → 40 Ls^{-1}

Customer spur target revenue = $200

10 Ls^{-1}

Zone price = $500/50 Ls^{-1} = $10/ Ls^{-1}
Spur price = $200/10 Ls^{-1} = $20/ Ls^{-1}
Customer bill = $30/ Ls^{-1} x 10 Ls^{-1} = $300
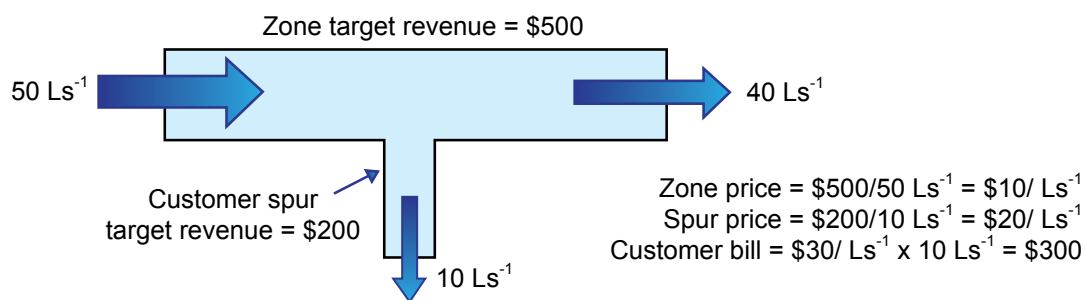
If this customer was able to halve its maximum IFR, then provided GAWB allowed the reduction in CIFR, its delivery charge would approximately halve until the next price review. At the price review, prices would be recalculated based on the new demand estimates. If nothing else has changed then the price would rise to $51/Ls-1 so the customer's bill would be $255 or only 15% below the original bill.

Zone target revenue = $500

45 Ls^{-1}

35 Ls^{-1}

Customer spur
target revenue = $200

5 Ls^{-1}

Zone price = $500/45 Ls^{-1} = $11/ Ls^{-1}
Spur price = $200/5 Ls^{-1} = $40/ Ls^{-1}
Customer bill = $51/ Ls^{-1} x 5 Ls^{-1} = $255
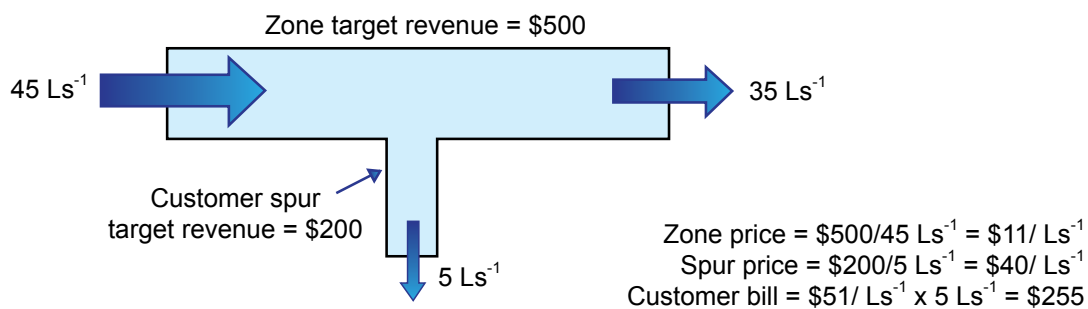
The ability of customers to change their bill by changing their CIFR will be a function of:

• the proportion of the customer's bill related to the cost of dedicated assets (which cannot be avoided in the long run)
• GAWB's policy for allowing CIFR changes
• demand growth and
• other customers' CIFR reduction rates.

5.6 Indicative prices

GAWB intends to provide customers with indicative zonal prices upon forwarding the developed pricing model to the Authority in its third submission. The pricing model will be based upon the methodology and data inputs provided to the Authority in the current (first) and second submissions.

5.7 Working capital

GAWB proposes to include in the asset base an allowance for working capital based on the following formula:

debtors less creditors plus inventories[56]

Details of GAWB's calculations will be provided in its second submission to the Authority.

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56   Queensland Competition Authority, Gladstone Area Water Board: Investigation of Pricing Practices (2005), p110

6 Endorsement of pricing principles and practices

6.1 Background

GAWB operates under an unusual regulatory framework whereby the Authority can only undertake a price review in response to a specific referral from the QCA Ministers. GAWB continues to support the introduction of formal regulatory arrangements.

6.2 Previous investigations of pricing practices

GAWB has developed a set of pricing principles that accord with the recommendations made by the Authority following its investigations (completed in 2002 and 2005) into the pricing practices of GAWB, to the extent that these recommendations have been accepted by the QCA Ministers.

Due to the absence of a formal regulatory regime outside of the accepted Authority recommendations, the pricing principles and practices have been included as an integral component to standard customer contracts. It is therefore essential that GAWB's interpretation and implementation of recommended pricing principles and practices align with the specific intentions of the Authority.

GAWB proposes to update these principles following the Authority's draft report and provide them to the Authority for endorsement in GAWB's response to the draft report. GAWB understands that the endorsement will be subject to:

- QCA Ministers' approval of the Authority's recommendations and
- any unresolved pricing issues identified in GAWB's response to the Authority's draft report.

The current pricing principles adopted by GAWB as part of its standard contracts have been included for information purposes in Appendix E.

6.3 Investigation of contingent water supply strategy pricing practices

The Authority has issued its final reports for the Part (A) and Part (B) investigations into GAWB's contingent water supply strategy pricing practices. GAWB wishes to seek further clarity around the regulatory process by which GAWB can obtain ex-ante approval from the Authority prior to the final investment decision being made. GAWB will provide these issues to the Authority for clarification in GAWB's response to the draft report.

7 Summary of proposals

GAWB requests that the Authority make recommendations regarding each of the following proposed pricing principles and practices, indicating if the Authority approves, rejects or wishes to alter the proposals.

	Proposal	Section
1	**Form of regulation** GAWB proposes that the form of regulation to apply from 1 July 2010 regulatory control period is a revenue cap with: • GAWB determining the annual reference tariffs during the regulatory control period by taking into account any under or over adjustment from the previous year • side constraints are used to limit annual price increases on any tariff component to CPI +5%, and • any balance of the 'unders and overs' account that is greater than the side constraint of CPI +5% in any one year, is carried forward and included in prices at the next annual adjustment if possible, subject to that year's side constraint. Any balance of the 'unders and overs' account at the end of the regulatory control period will be adjusted fully at the beginning of the subsequent regulatory control period. GAWB further proposes that if the Authority cannot support GAWB's preferred annual revenue cap proposal, GAWB proposes an alternative revenue cap proposal to apply from 1 July 2010 whereby: • prices would be determined in real terms (i.e. subject to annual movements in the consumer price index) for the entire regulatory control period, and • any under or over adjustment is only made at the beginning of the subsequent regulatory control period.	2.1
2	**Planning period** GAWB proposes to adopt a five-year planning period from the regulatory control period commencing 1 July 2015.	2.2

	Proposal	Section
3	**Demand management measures**	2.3.2
	GAWB proposes to apply the following principles when evaluating demand management measures:	
	• In order for a demand management option to be considered, negotiated arrangements with customers to curtail demand should generate reductions in contractual reservations. • Any consideration provided to customers to curtail demand should be recovered from the customer base, provided it was reasonably expected that customers would be better off as a result. • Demand forecasts incorporate the reductions that arise.	
	Analysis of options	2.3.5
	GAWB further proposes that any analysis performed will be conducted against the following framework:	
	• Use consistent timeframe to assess the price and cost impacts for customers – for example, the remaining period in the 20-year forecasts used to determine existing prices. • Adopt assumptions equivalent to those used in determining existing prices (e.g. for demand, capital expenditure, operating expenditure, discount rate etc). • Adopt inflow assumptions (for drought-related decisions) that are assumed for source augmentation in accordance with GAWB's Drought Management Plan. • Adopt augmentation capital and operating costs that are based on the most recent information, gathered in accordance with GAWB's planning cycle. • Consider broader social and environmental benefits where options generated provide similar cost outcomes to customers.	2.3.6
	Including demand management costs in prices	
	GAWB proposes that if a demand management measure is undertaken to either defer or replace an augmentation, then efficient costs of the demand management measure are recovered from customers that benefit from the measure – as if they were augmentation costs.	

		Proposal	Section
4	**Price transition**		2.4
	GAWB proposes that it should not bear the financial costs associated with price transition arrangements and any such arrangements should be Net Present Value (NPV) neutral to GAWB.		
	GAWB submits that any transition path must be based upon the following principles:		
	• Price transition must be implemented in such a way as to be revenue-neutral for GAWB (that is, preserve the present value of expected revenue over the transitioning period). • The price transitioning period must occur within a single five-year regulatory control period. • The price transitioning period for each customer cannot exceed the remaining term of their water supply contract with GAWB.		
5	**Scarcity pricing**		2.5
	GAWB does not propose to introduce scarcity pricing		
6	**Demand forecasting methodology**		3.2
	GAWB proposes to:		
	• utilise base case demand forecasts for determining capital works expenditure (including source augmentation), revenue forecast and price setting • utilise upper bound demand forecasts to define the parameters of capacity that is capable of deployment with certainty within a defined timeframe (presently two years) in accordance with GAWB's contingent supply strategy and • monitor potential demand for the purpose of long-term planning.		
7	**Revenue components**		4.1
	GAWB is not proposing any changes to how the maximum revenue requirement is determined and prices should incorporate allowances for:		
	• efficient operating expenditure • return on capital • return of capital • income tax and • allowed revenue carryovers.		

	Proposal	Section
8	**WACC parameters**	4.4.2
	Risk–free rate	
	GAWB proposes to retain the current methodology for calculating the risk-free rate. GAWB may however need to re-visit this proposal if there is a significant deterioration in financial markets between the lodgement of this submission and the end of the 20-day averaging period that is proposed to set the final risk-free rate. GAWB further proposes that the actual reset date and averaging period that the Authority intends to use for determining the risk-free rate to apply in their final recommendations should be provided confidentially to GAWB at least two months prior to the start of the averaging period. This will provide GAWB with adequate time to structure its finances while ensuring that the risk-free rate is not unduly altered as a result of market expectations.	
	Capital structure	4.4.3
	GAWB proposes to maintain the capital structure for GAWB at 50% debt and 50% equity, with an associated credit rating of BBB.	
	Debt margin	4.4.4
	GAWB proposes that: • an average of Bloomberg and CBA Spectrum be used to determine the debt margin. The mid-point of the 20-day average of the estimates provided by each service as at 30 June 2009 is 4.34% and • the additional allowance of 12.5 basis points allowed in the previous price review for debt raising costs be included for determining the total debt margin above the risk-free rate.	
	Debt beta	4.4.5
	GAWB proposes to adopt a value of zero for the debt beta.	
	Beta	4.4.6
	GAWB proposes to apply the same asset beta of 0.40 that was previously recommended by the Authority.	
	Market risk premium	4.4.7
	GAWB proposes to adopt a market risk premium of 6.5%.	
	Gamma	4.4.8
	GAWB proposes to adopt a value of 0 for gamma.	

	Proposal	Section
9	**Return of capital**	4.5
	GAWB is proposing to retain the straight-line depreciation method for determining the return of capital component for GAWB's RAB.	
10	**Capital contributions**	4.6
	GAWB proposes to treat capital contributions in accordance with the framework included at Appendix C.	
11	**Asset values**	4.7
	GAWB proposes that its assets continue to be valued on the basis DORC.	
	GAWB further proposes that the opening RAB for the 2010 – 2015 regulated asset base be set as follows:	4.7.1
	- roll-forward of the 2005 valuations (using actual Brisbane All Groups CPI and straight-line depreciation over the remaining lives estimated in 2005) - addition of efficient capital expenditure and assets purchased or constructed during the 2005 – 2010 regulatory control period - removal of redundant assets and assets sold during the 2005 – 2010 regulatory control period and - changes to 2005 optimisation decisions and such other adjustments where appropriate.	

	Proposal	Section
12	**Zonal pricing**	5.1
	GAWB proposes to retain geographical differential pricing for all customers based on their utilisation of specific components of GAWB's infrastructure network.	
	GAWB also proposes the following changes to the current pricing zones:	
	Source Zone GAWB intends to maintain a single pricing zone for source assets comprising:	5.1.1
	• the *Awoonga Dam* zone and • efficient preparatory costs incurred for the purposes of GAWB's CSS (reference 5.1.1)	

	Raw Water Delivery Network
	• The previous *Awoonga to Toolooa* zone is proposed to be extended to the Fitzsimmons St Reservoir making the new *Awoonga to Fitzsimmons St Reservoir* zone. This zone now incorporates the previous *Toolooa to Mt Miller Junction* zone and *Mount Miller Junction to Gladstone* zone (Fitzsimmons St Reservoir).
	• The *Hanson Road Pipeline* zone is proposed to be reinstated into the raw water pricing forming part of a larger raw water zone called the *North Industrial Raw* zone comprising:
	  - Hanson Road Pipeline
	  - Boat Creek Reservoir
	  - *Mt Miller Pipeline* zone and
	  - a portion of the previous *Boat Creek* zone.
		5.1.2

	Water entering the *Yarwun* zone and the *Yarwun Water Treatment Plant* zone will now be sourced from the North Industrial Raw zone.	
	Potable Water Delivery Network • The Yarwun Water Treatment Plant (YWTP) will be separated into its own zone. The outlet from the YWTP and pipe work will now be included in the *North Industrial Potable* zone. • The *Mt Larcom* zone is proposed to be renamed the *Boat Creek Pump Station to East End Reservoir* zone. • The *Cement Australia Potable* zone is proposed to be renamed the *Fisherman's Landing Potable* zone. • The end point of the *North Industrial Potable* zone is now the intake to Boat Creek Pump Station and the *Fisherman's Landing Potable* zone will commence at the junction before the pump station. • The *Gladstone Water Treatment Plant (GWTP)* zone is proposed to be separated into two zones – a zone for the GWTP only and the *GWTP to South Gladstone* zone. • The *GWTP to Toolooa* zone is proposed to be renamed the *South Gladstone to Toolooa* zone with some small end point adjustments to the *GWTP to South Gladstone* zone.	5.1.3

	Proposal	Section
13	**Price differentiation** Contract length GAWB proposes to apply a price differentiation surcharge to all reservation and storage and delivery contracts that are defined as short-term contracts from 1 July 2010. A short-term contract is one which has an original term from less than two years to 20 years.	5.2.2

	Less than 2 years (incl. uncontracted)	2 to < 5 Years	5 to < 10 Years	10 to < 15 Years	15 to < 20 Years
Price surcharge	25%	20%	10%	5%	3%

	Proposal	Section
	Counterparty risk GAWB does not propose to introduce a price differentiation surcharge for credit risk as it will obtain adequate security from customers that do not have a credit rating of BBB or better (reference 5.2.3.1).	5.2.3.1
	GAWB does not propose to introduce a price differentiation surcharge for default risk as: • under a revenue cap form of regulation, the lost revenue from a customer would be recovered through the regulatory framework and • under a price cap form of regulation, the lost revenue that could not be recovered through the regulatory framework would be incorporated into prices using a self insurance premium (reference 5.2.3.2).	5.2.3.2
14	**Over-run charges** GAWB proposes to retain the current methodology for determining over-run charges. GAWB also proposes to retain its sole discretion to waive or reduce over-run charges in exceptional circumstances or where there are no consequential costs incurred by GAWB.	5.3
15	**Prices for GRC** GAWB proposes that GRC prices are not averaged between connections and that charges are based on the zonal based price for each respective connection.	5.4

	Proposal	Section
16	**IFR pricing** Introduction of IFR pricing GAWB proposes to introduce IFR pricing for delivery services from the beginning of the regulatory control period commencing 1 July 2015.	5.5.1
	Pricing framework GAWB proposes to continue the current two part tariff structure to determine the delivery price (access and volumetric).	5.5.3
	Setting the quantum of IFR price components GAWB proposes to retain the current methodology for setting price components, but with the denominator in price calculations being the sum of customers' CIFRs rather than base case demand volume quantities. GAWB further proposes to retain the methodology for setting customer over-run charges.	5.5.4
17	**Pricing principles** GAWB proposes to update pricing principles following the Authority's draft report and provide them to the Authority for endorsement in GAWB's response to the draft report.	6

Glossary

ACCC	Australian Competition & Consumer Commission
AER	Australian Energy Regulator
BBB	Credit rating
CAPM	Capital Asset Pricing Model
CIFR	Contracted Instantaneous Flow Rate
CPI	Consumer Price Index
CSS	Contingent Supply Strategy
DBCT	Dalrymple Bay Coal Terminal
DMIA	Demand Management Innovation Allowance (electricity industry)
DMP	Drought Management Plan (GAWB publication)
DNSPs	Distribution Network Service Providers (electricity industry)
DORC	Depreciated Optimised Replacement Cost
ERA	Economic Regulation Authority (Western Australia)
ESC	Essential Services Commission
GAWB	Gladstone Area Water Board
GRC	Gladstone Regional Council
GWTP	Gladstone Water Treatment Plant
HNFY	Historic No Failure Yield
IFR	Instantaneous Flow Rate
IPART	Independent Pricing and Regulatory Tribunal of New South Wales
LRMC	Long Run Marginal Cost
MIFR	Maximum Instantaneous Flow Rate
MRP	Market Risk Premium
NEM	National Electricity Market
NPV	Net Present Value
NWC	National Water Commission
QCA	Queensland Competition Authority
QR	Queensland Rail
RAB	Regulated Asset Base
SAMP	Strategic Asset Management Plan (GAWB publication)
Synergies	Synergies Economic Consulting
WSAA	Water Services Association of Australia
YWTP	Yarwun Water Treatment Plant

Appendices

Appendix A – Scarcity pricing

Scarcity pricing is proposed as an option for urban water businesses by the National Water Commission (NWC)[1]. Under scarcity pricing, a utility would seek to balance supply and demand by increasing (or decreasing) the price of water. In times of scarcity, the price of water would exceed the long-run marginal cost of supply and may reach several times the 'normal' price.

Scarcity pricing is defined in the NWC paper as follows:[2]

> *"A scarcity-based pricing approach is one that seeks to set urban water prices that reflect the scarcity value expected during the relevant period. In the current context, this could entail varying the price of water inversely with the level of water available, such that available supply would be rationed on the basis of the willingness to pay its scarcity value (rather than through use-based restrictions as discussed above). The lower the level of available supplies relative to demand, the higher will be the scarcity price, as increasingly valuable uses of water get curtailed. In this situation, the opportunity cost of a unit of water is driven predominantly by the values placed on the foregone consumption by others – and the increased likelihood of running out of water in the future – rather than just the marginal costs associated with the infrastructure used to supply the water by the water authority."*

Scarcity pricing is a solution to urban market deficiencies

The main value of scarcity pricing is that it reduces inefficiencies associated with restriction regimes.[3]

> *"In principle, and assuming that it is possible to administratively set a scarcity price that clears the market, this approach can be seen as having some strong efficiency properties.*
>
> *In particular, rationing available supply through a pricing mechanism is likely to result in a more efficient allocation of scarce water resources vis-à-vis the current regulatory imposition of use-based restrictions that rely on the government's implicit valuations of alternative uses."*

A secondary benefit identified in the NWC paper is that scarcity pricing can assist in providing signals as to the necessity of augmentation.

However the bulk water supply in Gladstone has significantly different characteristics.

Firstly, GAWB's commercial framework allows customers to trade water reservations at any time, including when supply restrictions are in force. That is, there exists a mechanism to overcome the potential inefficiency caused by uniform mandatory restrictions.

Indeed, the NWC specifically compares the urban pricing practice with rural models:[4]

> *"Where the resource can be freely traded, its scarcity value will be reflected in the market price at which supply and demand are brought into balance. This is observed, for example, in rural water markets where the price at which water entitlements are traded can vary significantly, depending on prevailing climatic conditions."*

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1   National Water Commission / Frontier Economics, "Approaches to urban water pricing", July 2008
2   National Water Commission / Frontier Economics, "Approaches to urban water pricing", July 2008, p30
3   National Water Commission / Frontier Economics, "Approaches to urban water pricing", July 2008, p31
4   National Water Commission / Frontier Economics, "Approaches to urban water pricing", July 2008, p30
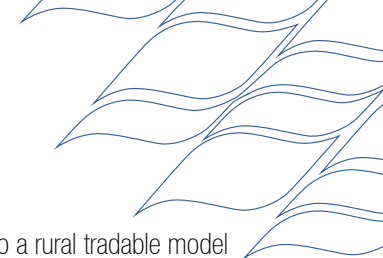
In this respect, GAWB's commercial framework, which allows trading of reservations, is more similar to a rural tradable model than a typical urban model.

Secondly, GAWB's commercial framework includes a detailed mechanism to ensure that augmentations are necessary and efficient when triggered. The important elements of GAWB's augmentation process are:

- when an augmentation trigger is reached customers are notified of our proposed response and the expected price impacts;
- customers can propose alternative supply and demand reduction projects, and
- where significant post-augmentation price increases are expected, the customer can issue a contingent termination notice.

When an augmentation goes ahead, GAWB will have reasonable grounds for confidence that customers:

- do not have lower cost alternative supplies, and
- are willing to pay the post-augmentation price of water.

Moreover, scarcity pricing is proposed for urban utilities. Urban water providers typically have tens of thousands of customers. Communication to these customers is very limited. A certain amount of information can be communicated in price and by mass media. Customers can generally only communicate information about the value they put on their supply and the cost of restrictions by their consumption decisions.

GAWB is very different being able to communicate directly with customers regarding:

- the level of service they prefer
- the value the customer places on reliability
- willingness to pay for supply augmentation, and
- opportunities for demand reduction and alternative supply solutions.

The restrictions imposed during the 1996 to 2003 drought caused customers to assess the cost of water saving measures to their businesses. This event means that customers:

- have undertaken some demand reduction projects (sometimes referred to as the "low hanging fruit")
- understand the cost of future demand management
- understand the cost to their business of water restrictions, and
- can communicate their preferences for, and value of, future supply security in a sophisticated way to GAWB.

That is, GAWB can directly communicate with sophisticated customers regarding the value of demand reduction and capacity augmentation, and doesn't suffer from either of the problems scarcity pricing sets out to remedy.

Scarcity pricing may cause harm

There is also potential for scarcity pricing to do real harm in the Gladstone region. More than 80% of water supplied by GAWB is used by industrial customers. These customers have a relatively uniformly inelastic demand and most customers tell us that they prefer supply augmentation to a reduction in demand. Water forms a small part of the cost of supply for these customers. All other things being equal, GAWB would need to increase the price of water by a very significant amount (perhaps 10 to 20 times the current price) to obtain a significant short-run demand response from industry. Such prices would be a significant burden on the community.

Droughts in the Awoonga catchment may last for several years. If customers expected very high prices to persist for several years, they could individually or collectively bypass GAWB's supply by investing in supply alternatives.

An outcome where customers bypass GAWB and build their own water supply alternatives is likely to be an inefficient outcome. Bulk water is likely to be delivered at least cost by a regulated monopoly than can access the economies of scale associated with supplying all regional demand.

That is, implementation of scarcity pricing for Gladstone's industrial customers will, at best, tell us what most customers already tell us: that they prefer a supply augmentation (at the range of likely augmentation costs) than to reduce demand. At worst, it could result in inefficient bypass.

In both cases, both industrial and municipal customers would face water prices many times higher than the current price, potentially for an extended period of time, with little identifiable benefit.

Scarcity pricing unpredictable and unprecedented

Finally, GAWB notes that the NWC paper proposes separating source and delivery pricing. Pricing for water (equivalent to GAWB's reservation and storage charge) could be scarcity based. Pricing for infrastructure would have a separate arrangement.[5]

> *"There would also appear to be merit in unbundling the price signal for new water sources from the cost of the delivery infrastructure. Separating the pricing of infrastructure (such as bulk transfer pipes, treatment plants, distribution system) from the pricing of the water resource would provide a more transparent signal of the value of the water itself. Such unbundling would provide a clearer signal to both users and current and potential suppliers of the value of system augmentation."*

GAWB also identified the benefits of separate source and delivery pricing and introduced separate source and delivery pricing in 2005. GAWB now separately communicate the cost of capacity in different parts of the supply infrastructure.

GAWB plans to introduce instantaneous flow rate (IFR) pricing for the delivery network to further improve the cost reflectivity of price signals to customers. This development was first signalled to customers in 2004 and will not be introduced until the price review following the 2010 review (likely to be in 2015). Customers make significant investments in their processes based on expectations of water pricing, and changes to these processes have long lead-times, therefore changes to pricing arrangements must be well signalled and subject to appropriate consultation.

GAWB believes its commercial framework (of which pricing is one part) is appropriately tailored to our customers and supply environment. Separation of source and delivery charging and adoption of IFR-based delivery pricing are innovative for the Australian water industry but well understood from other regulated industries and appropriate for our environment.

GAWB's customers tell us that they value stability and predictability in pricing. For example, in its July 2007 submission to Part (a) of the Contingent Supply Strategy investigation, Queensland Alumina Limited (QAL) stated:

> *"QAL requires a water supply that is:*
> – *uninterruptible;*
> – *of appropriate minimum quality; and*
> – *priced appropriately, transparently and predictably."*

GAWB believes that the Contingent Supply Strategy, which provides a 'historical no fail' supply at the least cost (with the costs of each increment of capacity notified to customers at each step), best meets this criteria.
Scarcity pricing may deliver some customers uninterrupted supply but only at very high prices. It is not clear that scarcity pricing could ever be sufficiently predictable (in the sense that the price of water in two years time could be reasonably certain) in GAWB's circumstances (a very thin market of less than 20 customers).

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5   National Water Commission / Frontier Economics, "Approaches to urban water pricing", July 2008, p34

To the best of GAWB's knowledge, scarcity pricing has not been implemented anywhere in Australia or anywhere world-wide for a bulk water provider similar to GAWB. We believe it would be imprudent to adopt an experimental arrangement without significant consultation with customers. Any move to scarcity-based pricing, even if considered desirable, would therefore be at least five years away in practice.

Summary

Table 1 highlights the differences between GAWB's pricing arrangements and commercial environment from that of a typical urban water authority.

GAWB does not exhibit the problems that scarcity pricing is designed to mitigate. Even if those problems did exist, GAWB customers' collective inelasticity and ability to bypass GAWB's supply are likely to cause scarcity pricing to have limited positive effect.

Accordingly, GAWB 's position is that scarcity pricing is not an appropriate option for bulk water supply in the Gladstone region at this time.

Table 1 – Differences between GAWB and urban water authorities

Characteristics	Typical Urban Water Supplier	GAWB
Number of customers	10,000 to 1,000,000	<20
Ability to trade restrictions to achieve allocative efficiency	No	Yes
Expected price increase required to generate short-run demand response	2x to 4x	10x to 20x
Primary mechanism for communication with customers	Prices, mass media	One-on-one meetings with customer representatives. Drought management plan process. Strategic water plan process. Price review process.
Community demand management projects and willingness to pay for capacity augmentation	Largely unknown	Projects known from recent drought. GAWB discusses demand management opportunities and willingness to pay for augmentations with every customer.
Customer demand elasticity	Largely unknown, expected to vary considerably from customer to customer and for different water uses of each customer	Better known than a typical urban utility. Other than the GRC, essentially uniformly highly inelastic in the short run.
Customer ability to bypass utility	None	Many customers have total (sea-water desalination) and partial (conversion to sea-water cooling, air cooling) opportunities to bypass and appropriate skills and resources to undertake such projects.

Appendix B – Review of Weighted Average Cost of Capital

(A report commissioned from Synergies Economic Consulting)

Gladstone Area Water Board

Review of Weighted Average Cost of Capital

Disclaimer

Synergies Economic Consulting (Synergies) has prepared this advice exclusively for the use of the party or parties specified in the report (the client) and for the purposes specified in the report. The report is supplied in good faith and reflects the knowledge, expertise and experience of the consultants involved. Synergies accepts no responsibility whatsoever for any loss suffered by any person taking action or refraining from taking action as a result of reliance on the report, other than the client.

In conducting the analysis in the report Synergies has used information available at the date of publication, noting that the intention of this work is to provide material relevant to the development of policy rather than definitive guidance as to the appropriate level of pricing to be specified for particular circumstance.

Mark Christensen

Mark Christensen, a Member and Deputy Chairperson of the Queensland Competition Authority, is also an Associate of Synergies. We can confirm that Mark has had no involvement in the development of this report.

Executive Summary

Gladstone Area Water Board (GAWB) has requested Synergies Economic Consulting (Synergies) to undertake a review of its Weighted Average Cost of Capital (WACC) as part of its forthcoming price review by the Queensland Competition Authority (the Authority).

We have only been asked to undertake a high level review at this stage, as GAWB expects that the Authority will not undertake a detailed review of the WACC methodology and parameters from its past investigations (2002 and 2005). Hence, the focus of our review will be to examine the reasonableness of the WACC in GAWB's current business and market environment, having particular regard to:

- any material change in GAWB's business environment since the previous review;

- conditions in financial markets; and

- any relevant developments in regulatory precedent.

Our conclusions in relation to each of the parameters are summarised below.

Risk free rate

The global financial crisis saw the ten year Commonwealth Government bond rate fall to historical lows, falling below 4% in December 2008/January 2009. This reflects the increased demand for sovereign government bonds in what have been unprecedented market conditions, as investors seek a 'safe haven' in low risk assets. This is an issue for a regulated business such as GAWB because:

- the risk free rate is being set in accordance with the Capital Asset Pricing Model (CAPM), and these types of characteristics are not contemplated by that framework. This raises questions regarding the suitability of the Commonwealth Government bond yield as a proxy for the risk-free rate in times of crisis; and

- the risk-free rate that is being set is locked in for the duration of the regulatory period. If this rate is set at a time when yields are unusually compressed (which is what we have seen with the global financial crisis), the risk that the business is undercompensated materially increases.

Given the increase in the ten year Commonwealth Government bond yield that has occurred since the historical low was reached, an adjustment is not being sought at this time. However, as the path to economy recovery remains highly uncertain, this should

continue to be monitored between now and the Final Decision. If a significant downturn occurs as a result of further economic shocks, an adjustment for the convenience yield may be warranted. This adjustment would be based on the difference between the actual convenience yield (measured with reference to the difference between ten year Commonwealth Government bond yields and an appropriate AAA proxy, such as the ten year swap rate) and the historical convenience yield.

The twenty day average of the ten year Commonwealth Government bond rate to the 30th of June, 2009 was 5.61%.

Capital structure

A capital structure of between 50% and 60% is considered appropriate for GAWB (debt to total value). This remains consistent with a notional credit rating of BBB. Given the impacts of the global financial crisis on the ability of BBB-rated firms to raise debt, we are of the view that an estimate from the lower bound of this range remains appropriate for GAWB at the current time.

Debt margin

The key issue in estimating the debt margin with the onset of the global financial crisis has been sourcing a reliable and robust estimate of the BBB bond yield. Significant issues have emerged with using Bloomberg data given the lack of liquidity in the BBB corporate bond market, particularly for ten year terms. As a consequence, Bloomberg data is likely to under-estimate the benchmark cost of debt at the current time.

Regulators have sourced both Bloomberg and CBA Spectrum estimates and a significant divergence between the two has been observed since the crisis. We would therefore recommend that the mid-point between the ten year BBB bond yields provided by Bloomberg and CBA Spectrum is used (acknowledging that issues have been identified with both data sources). Once liquidity returns to the long term BBB corporate bond market, it may be appropriate to revert to using a single data source, such as Bloomberg.

Based on twenty day averages for the period ending 30 June 2009, the Bloomberg estimate is 3.11% (lower bound), the CBA Spectrum estimate is 5.56% (upper bound) and the mid-point is 4.34%.

An additional allowance also needs to be included for ongoing debt raising costs, noting the difficulties that firms are experiencing in raising funds in the current

environment (which will influence both the availability and cost of funds). In our view, an allowance of 12.5 basis points per annum remains appropriate.

Debt beta

Given the difficulties in ascribing a reliable and robust estimate of the debt beta, most regulators now apply a value of zero. The Authority has historically set the upper bound for its range based on an estimate derived from the CAPM. It has recognised that this is likely to overstate the debt beta given the debt premium also reflects non-systematic default risk (which is why it applies a mid-point).

If the debt beta is re-estimated using this approach in the current environment when debt margins are high, this results in a significant increase in the debt beta and a material reduction in the equity beta (and hence the cost of equity). This in turn implies that there has been a transfer of risk from shareholders to lenders. Such an outcome is neither reasonable nor plausible.

In our view, this highlights the difficulties in placing any reliance on the CAPM-derived estimate. Unless a more robust way of estimating the debt beta of zero can be found – and it is clear that this is not yet the case – the value should be set at zero.

Asset beta

We have not undertaken a detailed review of GAWB's asset beta however have done a high level comparison against other regulated water decisions. Given the differences in gearing that have been applied, we have delevered the equity beta outcomes using the Conine formula to arrive at the implied asset beta. This shows that if a debt beta of zero is applied, an asset beta of 0.4 remains appropriate. There have been no material changes in GAWB's business environment since the previous review that would otherwise warrant a change. If a gearing level of between 50% and 60% is adopted, this results in an equity beta of between 0.68 and 0.82.

Market risk premium

Unless evidence of a permanent structural change emerges (noting that this will be very difficult to assess with any certainty in the short-term), long-term historical estimates remain the most appropriate benchmark for the MRP. These estimates suggest that a value of between 6% and 7% is a reasonable range for the MRP.

There is considerable evidence to suggest that the true value exceeds the regulatory precedent of 6%. This value has been well entrenched in regulatory precedent, although we note the AER's recent decision to apply a MRP of 6.5% in recognition of

the potential impact of the global financial crisis. In our view, 6.5% (being the mid-point of our recommended range) is a more appropriate long-term value for the MRP.

Gamma

The value of gamma should be set at zero. We have significant concerns with the recent decision reached by the Australian Energy Regulator (AER) to apply a value of 0.65, which are set out in this report.

Inflation

We have also provided an updated estimate of inflation. Given the absence of liquidity in the Commonwealth Government indexed bond markets, most regulators no longer estimate implied inflation from this data. We have applied the approach that has been adopted by the ACCC and AER, which is to produce a long-term forward-looking estimate based on Reserve Bank forecasts. These forecasts are used for the horizon they are available (which is usually two years) and then the mid-point of the Reserve Bank's target range is assumed after that.

Using the forecasts contained in the Reserve Bank's August 2009 *Statement of Monetary Policy*, the resulting estimate for inflation is 2.43%.

WACC estimates

Based on our recommendations provided above, a 'lower' and 'upper' bound for GAWB's WACC is as follows. We have also presented the results from the previous decision.

Recommended WACC Estimate

Parameter	2005 Decision	Recommended lower bound	Recommended upper bound
Risk-free rate[a]	5.45%	5.61%	5.61%
Debt to total value	50%	50%	60%
Equity to total value	50%	50%	40%
Debt margin[b]	1.32%	3.11%	5.56%
Debt raising costs[c]	0.125%	0.125%	0.125%
Market risk premium	6%	6%	7%
Gamma	0.5	0	0
Tax rate	30%	30%	30%
Asset beta	0.4	0.4	0.4
Debt beta	0.11	0	0
Equity beta[d]	0.65	0.68	0.82
Cost of equity	9.33%	9.69%	11.35%
Cost of debt	6.77%	8.85%	11.30%
Post-tax nominal WACC	8.05%	9.27%	11.32%

a Our range based on a 20 day average for the period ending 30 June 2009.

b Lower bound of range based on Bloomberg 20 day average for 8 year BBB bonds plus the margin between and A-rated 8 and 10 year bond, for the period ending 30 June 2009. Upper bound based on 20 day average of CBA Spectrum's fair value BBB yield curve over the same period. Before debt-raising costs.

c The estimate from the Authority's 2005 decision is already reflected in the debt margin.

d Based on the Conine formula.

The lower bound applies similar values to the Authority's 2005 decision, with the exception of:

• the debt margin, which is the key driver of the higher WACC. This simply reflects current market rates (and more specifically, the blow out in credit spreads following the sub-prime crisis);

• an assumed debt beta of zero; and

• a gamma of zero (which has a relatively minor impact on the WACC but a more material impact on the cashflows).

Where we have specified ranges, the point estimates we would recommend for each parameter are as follows:

- debt risk premium: 4.34% (mid-point);

- market risk premium: 6.5% (mid-point).

We have not specified a point estimate for gearing as we are of the view that GAWB should be able to sustain a level of debt within this range. However, particularly given the impacts of the global financial crisis on the ability of BBB-rated firms to raise debt, we are of the view that an estimate from the lower bound of this range remains appropriate for GAWB at the current time.

There is an anomalous result in relation to the upper bound estimates that needs to be highlighted here, which is that the cost of equity is only slightly higher than the cost of debt. Such an outcome is not consistent with finance theory (or market realities).

There are two possible reasons for this. First, the cost of debt reflects the impact of the global financial crisis (via the higher debt margin), whereas no specific adjustments have been made to the cost of equity to reflect this impact. While there are some issues in accurately estimating the cost of long-term BBB debt that we have highlighted here, the fact that it is significantly more difficult, and expensive, for a BBB rated borrower to raise funds for such terms (particularly compared to 2005) should not be in dispute.

Our cost of equity has not been specifically adjusted to reflect the impact of the crisis, with our recommendations reflecting our assessment of the appropriate long-term values for each parameter. It is possible that the actual return on equity that may be required by investors in the current environment is considerably higher than what is reflected here. For example, in making its recent decision to increase the value of the MRP, the Australian Energy Regulator hypothesised that the conditions following the global financial crisis may (or may not) reflect a structural change, however it is difficult to determine if this is the case.

In the absence of any robust evidence of structural change, we have not sought to make any adjustment to correct for this possibility here, nor do we consider it appropriate to make any form of ad hoc adjustment to correct for the potential anomaly that is evident in our upper bound estimates.

The second issue that is evident is that the extent of the 'anomaly' is very sensitive to the gearing assumption. If we retain all of our other upper bound assumptions but reduced the level of gearing to 55%, the cost of equity falls below the cost of debt. While we would naturally expect that the cost of equity will increase at a higher level of gearing, it should not hold that the cost of equity will be lower than the cost of debt at a reasonable level of gearing. This results in an outcome that is inconsistent with accepted theory (and logic). This may suggest there is a problem with the underlying methodology. We have not sought to investigate this issue in any more detail at this stage.

Contents

Introduction

Gladstone Area Water Board (GAWB) has requested Synergies Economic Consulting (Synergies) to undertake a review of its Weighted Average Cost of Capital (WACC) as part of its forthcoming price review by the Queensland Competition Authority (the Authority).

We have only been asked to undertake a high level review at this stage, as GAWB expects that the Authority will not undertake a detailed review of the WACC methodology and parameters from its past investigations (2002 and 2005). Hence, the focus of our review will be to examine the reasonableness of the WACC in GAWB's current business and market environment, having particular regard to:

• any material change in GAWB's business environment since the previous review;

• conditions in financial markets; and

• any relevant developments in regulatory precedent.

It is understood that GAWB reserves the right to undertake a more detailed analysis of individual parameters, such as beta, if considered necessary by the Authority.

Methodology

The Authority continues to apply a post-tax nominal framework, based on the following equation, which is most commonly referred to as the 'vanilla' WACC:[1]

$$WACC = R_e \frac{E}{E + D} + R_d \frac{D}{E + D}$$

This is consistent with the approach commonly used by regulators in Australia. This formulation adjusts for inflation, taxation and dividend imputation in the cash flows, rather than the cost of capital.[2]

Another issue to be considered in relation to methodology is the formula used to convert between asset and equity betas. We note that the Authority applied the Conine

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[1] This formulation is often referred to as "WACC 3" – see Officer, R.(1994), "The Cost of Capital under an Imputation Tax System" in Accounting and Finance, vol. 34(1), pp 1- 18.

[2] For example, expected tax payable (and expected values of imputation credits) is captured in the modelling as a cash flow in each year of the analysis. In addition, the cash flows represent the nominal (rather than real) cash flows for each year of the analysis.

approach in GAWB's previous review and has also applied this to other businesses.[3] We have therefore used this approach for the purpose of this assessment.

The key issue with the Conine formula is the assumption of a debt beta. This is addressed in more detail below.

Debt beta

Estimation of the debt beta

The debt beta is a measure of the systematic risk borne by debt holders. Notwithstanding that the Capital Asset Pricing Model (CAPM) was developed in the context of equity markets, not debt markets, a common approach to estimate the debt beta has been to use the structure of the CAPM:

$$\beta_d = (R_d - R_f)/(E(R_m) - R_f)$$

This has the appeal of using a familiar relationship between beta and the market risk premium $(E(R_m) - R_f)$. The approach attributes the promised debt risk premium $(R_d - R_f)$ to systematic risk.   However, given it is recognised that a substantial determinant of the cost of debt is non-systematic default risk, this approach will significantly over-estimate the value of the debt beta.

An alternative approach is to assume the debt beta is zero. In a report prepared for the Authority in 2004, Lally recommends the application of a debt beta of zero in a regulatory context:[4]

> …on account of the difficulties in estimating the debt beta, the slightness of the error in treating it as zero, the likelihood that the resulting errors are less than those arising from the Authority's current approach, and the likelihood that the errors will be of the less serious type than those arising from the Authority's current approach.

The Authority had previously applied the former approach. However this was revised in its Draft Decision in relation to the Dalrymple Bay Coal Terminal's draft Access Undertaking[5], in recognition of the influence of non-systematic default risk on the debt margin. The estimate derived from the above equation was therefore considered an

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[3] The Conine formula is as follows: $\beta e = \beta a + (\beta a + \beta d)*(1-T)*D/E$

[4] Lally, M. (2004), The Cost of Capital for Regulated Entities, Report prepared for the Queensland Competition Authority, p.75.

[5] Queensland Competition Authority (2004), Draft Decision, Dalrymple Bay Coal Terminal: Draft Access Undertaking, October.

'upper bound' for the likely value the debt beta, although we would question the extent to which it serves as an 'upper bound' given it will, of necessity, overstate the systematic risk of debt (and that upper and lower bounds should still remain plausible estimates in a reasonable range).

The Authority considered that it is not appropriate to assume the debt beta is zero (which implies that debt has no systematic risk). It therefore determined that a mid-point between zero and the upper bound was appropriate. This was subsequently also applied to other decisions, including GAWB's 2005 decision (where a debt beta of 0.11 was applied).

The ACCC considered this issue in the development of its *Statement of Principles for the Regulation of Electricity Transmission Revenues* (Statement of Principles), which was published in 2004.[6] It noted the uncertainty surrounding the estimate of the debt beta, particularly given that it was not generally used by investors, and that different approaches yield different outcomes. It determined that it would apply a value of between 0 and 0.2. Importantly:

> …the ACCC considers that the debt beta is immaterial as long as the same value is used in the de-levering and re-levering process.[7]

In its recent *Statement of Regulatory Intent* in relation to the determination of WACC parameters to apply to electricity transmission and distribution, the Australian Energy Regulator (AER) noted that the preferred approach of both the AER and the ACCC was to apply a debt beta of zero.[8]

Presumably for this reason, the issues surrounding estimation of the debt beta have received little if any attention in recent regulatory reviews. A number of the state-based regulators (with the exception of the Authority) have applied a value of zero and in many decisions the assumption is not stated at all (this may or may not imply that a value of zero has been adopted).

Debt beta outcomes from a cross section of regulatory decisions are provided below (reflecting those decisions where the debt beta assumption is known). Limited examples from water decisions are available.

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[6] Australian Competition and Consumer Commission (2004), Decision: Statement of Principles for the Regulation of Electricity Transmission Revenues – Background Paper, December.

[7] ibid.

[8] Australian Energy Regulator (2009), Electricity Transmission and Distribution Network Service Providers – Review of the Weighted Average Cost of Capital (WACC) Parameters, May, footnote 595.

Table 1 Regulatory Precedent: Debt Beta

Decision	Debt Beta Applied
ACCC	
Moomba to Adelaide gas pipeline (2001)	0.06
Amadeus Basin to Darwin gas pipeline (2002)	0.15
Moomba to Sydney gas pipeline (2003)	0.06
Electricity transmission – Powerlink, ElectraNet, VenCorp, SPI PowerNet (2002)	0
Energy Australia (2005)	0
Transgrid (2005)	0
Roma to Brisbane Gas Pipeline (2006)	0
Telstra's PSTN and LLS (2006)	0
Telstra's ULLS (2006)	0
ARTC's interstate network (2008)	0
ESCOSA	
Electricity distribution (2005)	0
Economic Regulation Authority	
Freight and Urban rail networks –(2008)[a]	0
IPART	
Rail – Draft (2009)	0
Electricity distribution (2004)	0 to 0.06
QCA	
Dalrymple Bay Coal Terminal (2005)	0.11
QR (2005)	0.12
Electricity distribution (2005)	0.1
Gas distribution (2006)	0.12

a This was not explicitly stated in the Final Decision, however the ERA noted that this assumption had been applied in the Draft Decision. It is also implied by the final parameter assumptions adopted by the ERA based on the application of the Brealey-Myers formula.

Implications for this review

The fundamental deficiency of using the CAPM-based approach to derive the debt beta is that it will always overstate the debt beta given the debt margin is largely driven by non-systematic risk factors. This situation is exacerbated at the current time given the blow-out in credit spreads that has occurred due to conditions in global financial markets.

For example, if the debt margin is estimated using Bloomberg, which produces a lower result than CBA Spectrum (refer below), the current estimate of the debt margin is 311 basis points (as at 30 June 2009). If this is applied to a Market Risk Premium (MRP) of 6%, the 'upper bound' value of the debt beta is 0.52. The Authority's mid-point is therefore 0.26.

The impact of a higher debt beta estimate on the calculated equity beta is significant. For example, assuming 50% gearing, a gamma of 0.5 and an asset beta of 0.4:

- a debt beta of zero results in an equity beta of 0.74;

- a debt beta of 0.11 (applied in 2005) results in an equity beta of 0.65; and

- a debt beta of 0.26 results in an equity beta of 0.52.

This shows that the debt beta assumption can have a material impact on the equity beta. This in turn will have a significant impact on the WACC. The increase in credit spreads implies a higher value for debt beta, which in turn implies that the systematic risk of debt has increased. Given it results in a lower value for the equity beta, this also implies that the systematic risk borne by shareholders has fallen, or, there has been a transfer of risk between lenders and shareholders.

There is no evidence to suggest that the global financial crisis has resulted in a sudden and worldwide transfer of risk from shareholders to lenders. Given shareholders will always rank after lenders if a firm experiences financial distress, such an outcome is not plausible. The more realistic scenario is that the systematic risk of debt has not changed and the movements in credit spreads are based on changes in perceived default risk.

This highlights the significant issues associated with deriving the debt beta using the CAPM (which, as noted above, was not designed for application to debt markets). The sensitivity of the debt beta estimate to changes in the debt margin assumes that these changes are solely driven by systematic risk. However, given debt margins are largely driven by (non-systematic) default risk, any such assumption is fallacious and can actually produce an outcome which has no theoretical support and in fact may contradict what is more likely to be the case in practice.

There is currently no robust, accepted methodology of deriving a reliable estimate for the debt beta. Given any CAPM-derived estimate will always overstate the value of the debt beta given the extent to which the debt margin is driven by non-systematic risks, we question how it can be considered to be within the bounds of a reasonable range (even if it is used to form the upper bound of that range). While we acknowledge that the debt beta may have some positive value, in the absence of any reliable methodology to measure it, we are of the view that it should be set at zero.

Our interpretation of the ACCC's previous discussions on debt beta is that to the extent that the debt beta is assumed to have a positive value, it should not exhibit significant volatility or be the key driver of changes in the equity beta that is used to set the WACC. We do not consider that assuming a debt beta of zero is in any way

controversial given that the weight of recent regulatory precedent is to set it to zero. An assumption of zero has therefore been recommended for GAWB and we have applied this in our calculations.

We now turn to the parameter values that comprise the balance of the WACC calculation.

Parameters

Risk-free rate

The key issue for the risk-free rate is the appropriate bond maturity to adopt. Standard commercial practice is for companies to match average asset lives with bond maturity, or for long life assets, the longest dated traded bond. This allows the company to service its debt from the revenue generated by the assets without being exposed to interest rate risk. Accordingly, the ten year (nominal) Commonwealth Government bond is typically considered the longest dated liquid bond and represents the most relevant benchmark to apply.

The next issue is the appropriate period over which the rate should be assessed. Given the CAPM is intended to reflect expectations as of the day of analysis, it is theoretically correct to base the risk-free rate on the prevailing yield on the date of the valuation. However, problems may occur if there is a spike in yields on the day that the rate is applied. To overcome this possibility, an average yield calculated over a relatively short averaging period is applied (twenty days is commonly used).

The twenty day average to 30 June, 2009 was 5.61%. We understand that this rate will be reset prior to the Final Decision. We also endorse the provision of sufficient confidential notice of that averaging period to GAWB to enable it to implement any hedging strategies in relation to its borrowings.

Implications of the global financial crisis

The global financial crisis has had a significant and dramatic effect on world financial markets. This reflects a systemic 'crisis in confidence' and a significant slowdown in economic growth in the major developed economies. This has resulted in unprecedented Government policy responses, including bank guarantees and the provision of liquidity.

Ongoing volatility reflects extreme nervousness in the market, with considerable uncertainty surrounding when markets will 'bottom out' and at what level. Notwithstanding some recent signs of improvement in sharemarkets, in a media

release made on the 11th of June 2009 the President of the World Bank stated that the world economy is now set to contract this year by more than estimated:

> Even with the stabilisation of financial markets in many developed economies, unemployment and under-utilisation of capacity continue to rise, putting downward pressure on the global economy. According to the latest Bank estimates, the global economy will decline this year by close to 3 percent, a significant revision from a previous estimate of 1.7 percent. Most developing country economies will contract this year and face increasingly bleak prospects unless the slump in their exports, remittances, and foreign direct investment is reversed by the end of 2010.[9]

During periods of economic downturn and low market confidence, there will always be a 'flight to quality' as investors seek a haven in less risky assets, such as gold and sovereign government bonds. As a consequence, the yields on risky assets will increase (as their prices fall) while the yields on risk-free (or low risk) assets will decline (as their prices rise). Such behaviour will always be observed as part of the 'normal' swings and roundabouts of economic cycles.

The reduction in the yield on risk-free assets reflects the premium that investors are willing to pay to hold these assets, for factors such as liquidity, transparency, simplicity and relative certainty of returns.[10] This has been referred to as the 'uniqueness premium' or 'convenience yield'. Having to pay a premium (or accept a lower yield) for non-risk factors to hold the risk-free asset is not contemplated by CAPM.

The impact of the global financial crisis on financial markets has seen unprecedented volatility and a possible reassessment in the way that investors assess and price risk. There is considerable evidence to suggest that this premium 'spiked' following the global financial crisis, represented by a significant compression in the ten year Commonwealth Government bond yield.[11] The practical consequence of this is that regulated businesses whose rates are being reset during this period, risk having a risk-free rate locked in that understates the reasonable return on a risk-free asset that an investor would normally require under the CAPM.

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[9] World Bank (2009), "As Global Slump is Expected to Continue, Poor Countries Need More Help", Press Release No:2009/394/EXC, 11 June 2009, http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:22209360~pagePK:34370~piPK:34424~theSitePK:4607,00.html.

[10] Competition Economics Group (2008), Establishing a Proxy for the Risk-free Rate, A Report for the APIA, ENA and Grid Australia, September.

[11] ibid.

The following chart shows the ten year Commonwealth Government bond rate from January 1995 to the end of June 2009.

Figure 1 **10 Year Commonwealth Government Bond Yields to 30 June 2009**
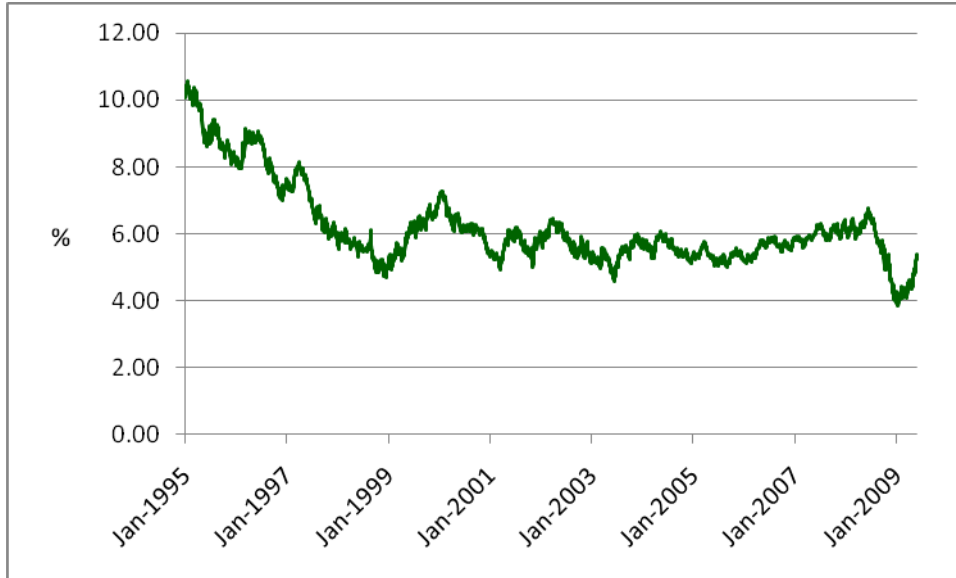
Data source: Reserve Bank of Australia

Ten year Commonwealth Government bond yields reached a historical low in December 2008/January 2009, when they fell below 4%. They have continued to trend upwards since then. As noted above, the twenty day average ten year Commonwealth Government bond yield to the end of June 2009 was 5.61%.

The convenience yield can be measured by comparing the yield on ten year Commonwealth Government bonds with the yields on other AAA-rated instruments that have similarly low risk of default. Such instruments include State Government bonds, Credit Defaults Swaps and fixed for floating interest rate swaps (as there is no principal exchanged).

Given investors will always pay a premium for the convenience of holding Commonwealth Government bonds (relative to other securities), the convenience yield will generally always be present. For example, a report by the Competition Economists Group showed that the average spread between ten year Commonwealth Government bond yields and the swap rate averaged around forty basis points between 2002 and 2007.[12] This spread then blew out considerably, particularly in 2008. However, following the recent recovery the convenience yield has reverted to more 'normal' levels.

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[12] ibid.

A convenience yield adjustment is only proposed where abnormal market conditions result in an increase in the convenience yield above the long-term average (of forty basis points). For example, if the current estimate of the convenience yield was eighty basis points, an adjustment of forty basis points would be proposed. This would then be added to the risk-free rate, to compensate for the compression in the Commonwealth Government bond yields that results from the 'flight to quality' that is observed during times of crisis.

The key reason we consider that an adjustment would be warranted in these circumstances is because the risk-free rate is being locked in for the term of the regulatory period. While different businesses that are set at different points in the economic cycle will invariably be subject to a different risk-free rate, if the reset happens to occur during a period of economic crisis, the business will be at a relative disadvantage. Measuring any significant change in the convenience yield (relative to its longer term average) provides an independent and readily measurable 'trigger point' for such an adjustment.

As noted above, Commonwealth Government bond yields have increased from the historical lows that were reached at the end of last year. However, the path of any economic recovery remains highly uncertain. We are not proposing an adjustment to the risk-free rate at the current time. However, we would recommend that this issue is revisited prior to the Final Decision if there is a reversal in the more recent trend (such as further major economic shocks), resulting in a material increase in the convenience yield above the longer term average of forty basis points.

Capital structure

The assessment of capital structure for the purpose of WACC is based on an assessment of an 'optimal' long-term target capital structure for the firm given its risk profile and the business within which it operates. For the purpose of this analysis, capital structure (or gearing) is measured in terms of debt to total value.[13] Capital structure analysis is a particularly imprecise science. For this reason it is often specified as a range rather than a point estimate.

The Authority determined a gearing level of 50% for GAWB, assuming a notional benchmark credit rating of BBB. We observe that a 60% gearing level is the most commonly applied assumption by Australian regulators across businesses (refer the table on page 28 below). In saying this, we are of the view that there are differences in

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[13] It should also be expressed in market value terms, rather than book values, however this cannot necessarily be readily observed for all firms, particularly for debt.

risk between different regulated industries and this may in turn support differences in the assumed benchmark gearing level. We also note that the particular difficulties facing firms raising capital in the current market environment, although this does not necessarily require a change to the long-term capital structure assumption (what it may require, however, is ensuring that appropriate compensation is provided for debt and equity raising costs).

We have not undertaken a detailed review of GAWB's capital structure at this time. However, particularly as its business risk profile has not materially changed we would expect that a gearing level of between 50% and 60% would remain appropriate. We have not specified a point estimate for gearing as we are of the view that GAWB should be able to sustain a level of debt within this range. However, particularly given the impacts of the global financial crisis on the ability of BBB-rated firms to raise debt, we are of the view that an estimate from the lower bound of this range remains appropriate for GAWB at the current time.

Cost of debt

Debt margin

The cost of debt capital is normally calculated as the risk-free rate plus a margin for credit or default risk. The typical approach to determining the debt margin involves:

- if the firm is unrated, assuming an appropriate 'notional' credit rating, which reflects the risk of default; and

- estimating an appropriate margin based on the difference between the current cost of debt for a firm of that credit rating, and the risk-free rate. This should be estimated over the same time period as the risk-free rate.

The Authority determined a notional credit rating of BBB for GAWB in 2005 and we have no reason to believe that a change in that assumption is warranted.

The debt margin would normally be estimated based on the difference between the yield on ten year BBB corporate bonds and the risk-free rate (averaged over the same twenty day period).   Prior to the sub-prime crisis in 2007, there were a small number of debt issues in the BBB market for terms of ten years or greater. This enabled the ten year yield for BBB rated securities to be calculated. Regulators have used both Bloomberg and CBA Spectrum data although the use of the former has been more common.

For the purpose of publishing its BBB bond yields, Bloomberg calculates the yield based upon observed prices for a small number of BBB rated issues. The prices they

quote may be either actual traded prices or indicative prices. In the case of indicative prices, actual trades have not occurred.

Bloomberg exercises discretion regarding the inclusion of the bond in the yield calculation for issues with indicative prices. If Bloomberg considers the bond to be liquid, indicative prices are considered by Bloomberg to be reasonable approximations of market prices. Bloomberg has indicated that up to 90% of prices[14] used in the estimation of the yield are indicative prices.

CBA Spectrum's yield curves are 'fair value' curves. This means that CBA Spectrum yields are indicative prices and do not necessarily reflect actual trades. This also means that a degree of discretion will be applied in constructing the yield curves.

Since the sub-prime crisis (and the global financial crisis that followed it), it has been extremely difficult for BBB rated businesses to issue securities with a ten year maturity. This in turn has made it difficult to estimate a yield on ten year BBB rated securities.

Bloomberg has therefore not been able to publish yields for ten year BBB bonds given the difficult financial market conditions. The alternative approach that has been employed by the Australian Energy Regulator (AER) and also accepted by the ACCC, is to observe the yield on the longest-dated BBB bond (which is currently eight years) and add the margin between an A-rated ten year and eight year bond, as this is considered an appropriate proxy for the difference in yield between a BBB rated ten year and eight year bond.

Table 3 details the bonds included in the calculation of the eight year BBB yield on June 10 2009. It can be seen that there were only a small number of issues (seven) included and importantly, the longest dated bond was February 2013, four years short of the period for which the yield is being estimated – eight years.

Table 2   Bonds included in the 8 year BBB yield calculation

Ticker	Coupon	Maturity	Price	Fair Value	Yield
FBG	6.25	3/17/2010	100.83	100.55	5.12
BQDAU	6.00	12/02/2010	99.86	99.76	6.10
DXSAU	6.75	2/08/2011	100.08	100.6	6.69
ORGAU	6.50	10/06/2011	99.38	99.03	6.79
TABAU	6.50	10/13/2011	98.59	98.99	7.16
WESAU	6.00	7/25/2012	96.48	95.69	7.28
SNOWY	6.50	2/25/2013	94.44	95.62	8.27

Source: Bloomberg

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[14]   Bloomberg Fair Value Curves, International Bond Market Conference, Taipei, 2007

Apart from the issues associated with a small sample size, given the term structure of interest rates is normally upward sloping the use of shorter term instruments to estimate eight year BBB yields risks materially understating them.

The question then becomes one of whether there is a better alternative. Since the crisis there has been a significant divergence between the yields reported by Bloomberg and the yields quoted by CBA Spectrum. Where Bloomberg's estimates may be understating the yields on 10 year BBB bonds, there are concerns that CBA Spectrum's estimates may be overstating them.

We have not undertaken a detailed assessment of the methodology employed by each data service and which might provide the better estimate at the current time. As noted above, particularly in the absence of sufficient data on actual trades, both providers need to apply discretion. There are potentially issues with both and the significant divergence between the two is itself a cause of concern.

If we adopt the Bloomberg methodology that has been employed by the AER (which is more comparable with the approach that has previously been applied by the Authority) and estimate a twenty day average as at 30 June 2009, the resulting debt margin is 3.11%. Over the same period, the debt margin based on CBA Spectrum's ten year BBB fair value estimate was 5.56%.

At the current time, we consider that a reasonable and prudent approach is to take an average of the two. The resulting debt margin is 4.34%.

If Bloomberg estimates continue to be relied upon by the Authority while there remains limited liquidity in the BBB bond market, it is important to recognise that there is a more significant risk that the actual cost of long-term BBB debt is being understated. A Bloomberg-based estimate should therefore be regarded as conservative.

Debt raising costs

The debt margin reflects a premium for credit and liquidity risk, however does not include any allowance for the actual costs of raising debt. In practice, an efficient benchmark firm will incur transaction and administration costs in raising and managing debt. It is therefore now increasingly common practice to include a separate allowance for these costs, either as an increment to the debt margin or as an allowance in the cashflows. We note that an allowance of 12.5 basis points per annum was included in GAWB's debt margin in 2005.

Unlike the debt margin, these costs are less specific to the business, although may vary depending on the volume of debt raised and the manner in which it is raised, noting

that there are some economies of scale in raising and managing debt. Referencing previous regulatory decisions (which have sourced estimates of these costs from financial institutions) is therefore considered appropriate. Allowances approved in recent regulatory decisions are included in the following table.

Table 3 Debt margin: recent regulatory decisions

Regulator (year)	Industry	Allowance
AER (2009)	Electricity distribution	8 – 8.1 basis points
ACCC (2008)	Rail	12.5 basis points
ERA (2008)	Rail	12.5 basis points
QCA (2006)	Electricity distribution	12.5 basis points
ESCOA (2005)	Electricity distribution	12.5 basis points
ICRC (2004)	Water	12.5 basis points
IPART (2005)	Gas	12.5 basis points
QCA (2005)	Rail and electricity distribution	12.5 basis points
ESC (2005 - draft)	Electricity distribution	12.5 basis points
IPART (2005)	Rail	12.5 basis points
IPART (2004)	Electricity distribution	12.5 basis points
QCA (2004)	Ports	12.5 basis points
ICRC (2004)	Rail and electricity distribution	12.5 basis points

An assumption of 12.5 basis points has consistently been applied in regulatory decisions, with the recent exception being the AER.

The AER's decision is based on a report prepared for the ACCC in 2004 by the Allen Consulting Group (ACG)[15]. The estimates in this report have since been updated by the AER.

The data referenced in this decision is based on the costs of a firm issuing its own debt (based on Medium Term Note issues). The analysis included underwriting fees, legal and roadshow costs, the fixed costs of obtaining an issuer credit rating, registry fees and paying fees. It was not evident that these costs included the (substantial) costs associated with establishing and running a treasury operation. These costs include staffing, compliance costs, data subscription services (such as Bloomberg and Reuters) and information technology costs. If these costs have not been included, this estimate will understate the costs of a firm issuing its own debt.

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[15]   The Allen Consulting Group (2004), Debt and Equity Raising Transaction Costs, Report prepared for the Australian Competition and Consumer Commission, December.

In our view, the data provided in the ACG report does not provide sufficiently compelling evidence to move from the established precedent of 12.5 basis points. Our first concern with the analysis is that the estimates do not necessarily cover all of the relevant costs that would be incurred in establishing and maintaining a debt issuance facility.

A second and more important concern is the assumption that the costs of issuing Medium Term Notes is an appropriate benchmark for debt raising costs for a regulated business and that this will continue to be the case through time. In reality, firms will access different markets at different times, depending on market conditions and investor appetite. This includes accessing more expensive bank debt if conditions are difficult in corporate bond markets (such as the current environment).

We would therefore consider that 12.5 basis points remains reasonable and indeed is likely to be conservative given the difficulties being experienced by firms in the current market environment. Given the limited activity in the corporate bond market it is difficult to confirm if, and by how much, these costs may have increased.

Beta

The Authority determined an asset beta of 0.4 for GAWB in 2005. We have not been asked to undertake an updated analysis of GAWB's beta based on current market data. While there is a tendency for beta estimates to vary through time, we also observe that regulatory precedent is a key driver of regulator's decisions.

In this regard, an initial question is whether the business risks have changed materially since the previous review, noting that the relevant 'risks' for the purpose of beta estimation are limited to systematic or non-diversifiable risks. We are not aware of any material change since the previous review. A starting point of 'no change' also presumes that the assessment made in 2005 was appropriate given the risk profile of the business. We note that this was informed by a report from the Allen Consulting Group which we have reviewed at a high level but not in any detail.

We have undertaken a review of other relevant regulatory decisions for the water industry. Regulators are more likely to publish equity betas rather than asset betas (some publish both, but not all have done this). A key driver of the differences in equity betas will be gearing, as well as the debt beta (which in most cases we have assumed is zero, unless it is clear that a positive value has been applied). We have therefore estimated the implied asset beta for each decision applying the Conine formula that is used by the Authority, assuming a zero debt beta and a gamma of 0.5. We have also included the implied asset betas if a debt beta of 0.11 is assumed.

The outcomes are summarised in the following table.

Table 4   Regulatory decisions: beta values

Company	Decision	Debt to total value	Equity beta	Implied asset beta (debt beta =0)	Implied asset beta (debt beta =0.11)
Queensland					
GAWB	2004 Pricing Investigation. Final report delivered in March 2005.	50%	0.65	0.35	0.4
Burdekin-Haughton Water Supply Scheme	Assessment of Certain Pricing Matters. Final Report delivered April 2003.	50%	0.4[a]	0.22	0.27
New South Wales					
State Water Corporation and Water Admin. Ministerial Corporation	Determination to apply from 1 Oct 2006 to 30 Jun 2010. Final report delivered in Sep 2006.	60%	0.8 - 1.0	0.35-0.44	0.41-0.5
Metropolitan water businesses	Determination to apply from Oct 2005 to Jun 2009 for SWC and SCA to Jun 2009 for HWC. Final report delivered in June 2005.	60%	0.8 - 1.0	0.35-0.44	0.41-0.5
Gosford City Council and Wyong Shire Council	Determination to apply from Jul 2006 to Jun 2009. Final report delivered in May 2006.	60%	0.8 - 1.0	0.35-0.44	0.41-0.5
Gosford City Council and Wyong Shire Council	Determination to apply from July 2009 to 30 June 2013. Final report delivered May 2009.	60%	0.8-1.0	0.35-0.44	0.41-0.5
Sydney Catchment Authority	Determination to apply from 1 July 2009 to June 2012	60%	0.8-1.0	0.35-0.44	0.41-0.5
Sydney Water Corporation	Determination to apply from 1 July 2008. Final report delivered in June 2008.	60%	0.8 - 1.0	0.35-0.44	0.41-0.5
Victoria					
Metropolitan ESC and regional water businesses	Determination to apply to businesses 2005/06 to 2007/08 water plans. Final report delivered in June 2005.	60%	0.75	0.33	0.39
Rural water businesses	Determination to apply from July 2006 to Jun 2008. Final report delivered in June 2006.	60%	0.75	0.33	0.39
Regional and Rural Water Businesses and Melbourne Water	Determination to apply to regional and rural businesses' water plans for 2008-2013 and Melbourne Water's	60%	0.65	0.29	0.35

Company	Decision	Debt to total value	Equity beta	Implied asset beta (debt beta =0)	Implied asset beta (debt beta =0.11)
	Drainage and Waterways Plan for 2008-2013. Final report delivered in June 2008.				
Western Australia					
Water Corporation	Determination to apply from 1 July 2006. Final report delivered in November 2005.	60%	0.8	0.35	0.41
AQWEST and Busselton Water	Determination to apply from 1 July 2006. Final report delivered in November 2005.	40%	0.6	0.51	0.55
South Australia					
SA Water	Inquiry into the 2007-08 water pricing process. Final report delivered in June 2007.	55%	0.8	0.39	0.45
SA Water	Inquiry into the 2008-09 water pricing process. Final report delivered in June 2008.	55%	0.8	0.39	0.45
Tasmania					
Bulk water supply entities	Final report delivered in June 2007.	50%	0.7725	0.42	0.47
United Kingdom					
All water and sewerage companies in England and Wales	Final determination for 2005 until 2010. Final determination delivered 2004.	55%.	1	0.49	0.55

a Based on a debt beta of 0.3, which is materially higher than other decisions.

If a debt beta of zero is assumed, GAWB's previous asset beta estimate does not appear unreasonable compared to these other decisions. If a debt beta of 0.11 is assumed, GAWB's asset beta is below the outcomes determined in all other regulatory decisions with the exception of Victoria (and the Burdekin-Haughton scheme).

The other difference between GAWB and these other businesses is the high proportion of demand that is accounted for by industrial customers, particularly compared to the metropolitan bulk water suppliers. Hence, an outcome that is lower than the outcomes determined for other regulated water businesses is not considered reasonable or justifiable.

These industrial customers will be more sensitive to changes in domestic economic activity, particularly compared to residential customers. We also refute ACG's assumption that the returns of export-oriented businesses such as QAL will have less correlation with the domestic economy. This is because of the importance of

commodities (including aluminium and alumina) to Australia's export performance. This also implies that export-oriented businesses, such as mining companies, will have low betas. This is the opposite to what we observe in practice.

We also undertook a high level analysis of possible movements in betas in the water utility industry in recent years. Standard and Poor's publishes an index of returns for global water utilities. This index consists of fifty firms and spans a number of jurisdictions and firm types, and hence we are not asserting that they are all comparable to GAWB. We have also not adjusted for gearing. However, we are of the view that they can provide us with at least an initial indication as to whether betas in this sector have changed materially in recent years. As this is a global index, we calculated a rolling beta[16] against Morgan Stanley's global sharemarket index.

The results are shown in Figure 2.

Figure 2 Global Water Utilities: rolling equity betas January 2007 to Mar 2009
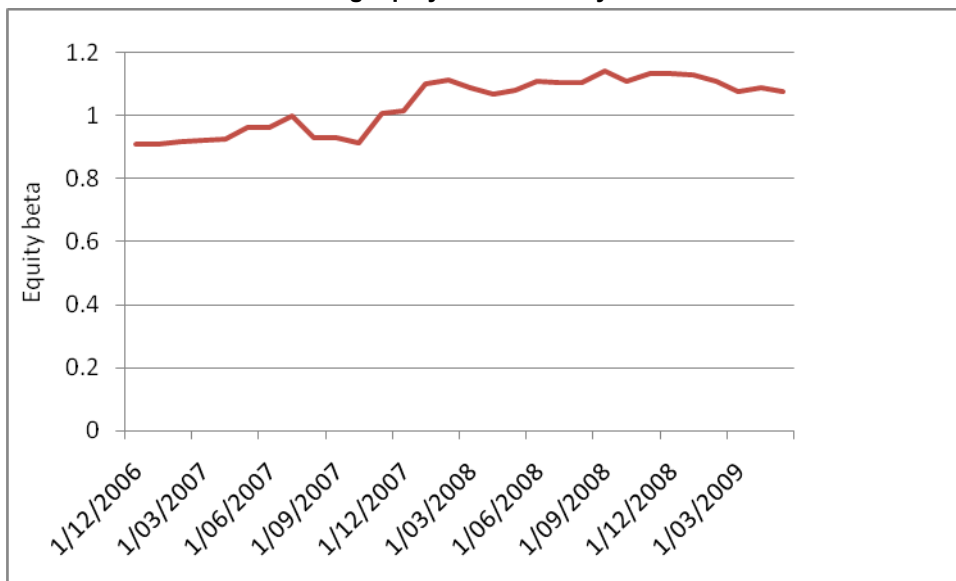
Data source: Bloomberg

The average is also materially higher than our recommended range for GAWB (refer below), noting that there will be differences in gearing. Because caution needs to be exercised given potential differences in business risks and gearing levels, only limited conclusions can be drawn from this for GAWB, although at minimum, it would suggest to us that GAWB's beta should not be any lower than the previously determined value. If a detailed review of GAWB's beta was to be undertaken it would

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[16] The betas are calculated using 60 months of data. The first beta is calculated for the five years ending December 2006. A beta is then calculated each month for the five years ending that month.

be necessary to construct a sample of relevant firms with appropriate business risks (and if foreign firms are to be referenced, from appropriately comparable jurisdictions).

Without having undertaken a detailed analysis, an asset beta of 0.4 does not appear unreasonable. However, when converting this to an equity beta we recommend the assumption of a debt beta of zero, for the reasons outlined above.

Market risk premium

The Market Risk Premium (MRP) is the amount an investor expects to earn from a diversified portfolio of investments (reflecting the market as a whole) that is above the return earned on a risk-free investment. The key difficulty in estimating the MRP arises from it being an expectation and therefore not being directly observable.

There are two key methods that are used to estimate the MRP: surveys and historical averaging. On face value, surveys have a substantial advantage over historical estimates of the MRP because they are forward-looking. Properly constructed, they should provide actual forward-looking opinions. However, there are a number of key limitations, including:

- they are likely to be more heavily influenced by recent events;

- they tend to reflect short-term expectations;

- estimates are based largely on opinion, which may not necessarily be founded on sound fundamentals; and

- some respondents may have incentives to produce certain outcomes, which can lead to biased results.

There is no reason to believe that surveys are any more efficient in estimating the MRP than historical averaging. Of most concern is the fact that the studies can produce estimates of the MRP that contradict economic and financial theory.

While acknowledging the conceptual correctness of a forward-looking method to estimate MRP, we are not of the view that survey results should be used to derive estimates of MRP. We have therefore focussed on estimates produced using historical averaging.

Evidence from recent Australian studies

Historical averaging has been the most popularly employed method for estimating the MRP. Historical averaging involves observing the measured difference between the risk-free rate (based on the return on government bonds) and the return on the market

portfolio[17] (based on the return on the share market index) over a period of time and averaging the rate. While data is readily available for this method it does rely on the assumption that the past is the best indicator of future risk and return expectations. Estimates from several Australia studies are listed below.

Table 5   Selected Australian estimates of market risk premium

Author	Year	Period	MRP (%)
Officer	1985	1882-1987	7.9
Australian Graduate School of Management	1989	1974-1983	6.3
		1977-1983	11.7
Australian Graduate School of Management	1998	1964-1995 (incl Oct 1987)	6.2
		1964-1995 (excl Oct 1987)	8.1
Hathaway	1995	na	6.6
Davis	1998	na	4.5-7.0
Dimson et al	2002	1900-2000	7.5
Hancock	2005	1974-2003	4.5-5
Hathaway	2005	1875-2005	1 year arithmetic: 7
			10 year arithmetic: 7.2
Gray & Officer	2005	1975-2004	7.7
		1955-2004	6.43
		1930-2004	6.58
		1905-2004	7.15
		1885-2004	7.17
Brailsford, Handley and Maheswaran (arithmetic mean, relative to bonds)	2006	1883-2005	6.2%
		1883-1957	6.1%
		1883-1987	6.4%
		1900-2000	6.2%
		1937-2005	5.8%
		1958-2005	6.3%
		1980-2005	6.0%
		1988-2005	5.1%

Source: QCA (2000), Draft decision on QR's Draft Undertaking, Working Paper Number 4; Lally, M. (2004), Estimating the Cost of Capital for Regulated Firms; S. Gray & R. Officer (2005), A Review of the Market Risk Premium and Commentary on Two Recent Papers, A Report Prepared for the Energy Networks Association; J. Hancock (2005), The Market Risk Premium for Australian Regulatory Decisions, The South Australian Centre for Economic Studies; T. Brailsford, J. Handley & K. Maheswaran (2006), A Re-examination of the Historical Equity Risk Premium in Australia, unpublished working paper, p.28.

Recognising the problems inherent in individual estimates, it is common practice to refer to a range for MRP of between 6% and 8%, with the longest horizon studies, with the exception of Brailsford et al, estimating the MRP at above 7%.[18]

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[17]   In the case of the return of the market, it represents the universe of investments available in the marketplace.

[18]   For example see: Lally, M. (2004), Estimating the Cost of Capital for Regulated Firms and QCA (2000), Draft decision on QR's Draft Undertaking, Working Paper Number 4.

It is therefore possible that the true value of the MRP has been well above 6%. What is clear is that there is considerable uncertainty surrounding the estimation of the MRP. In the short-term, the MRP is volatile and caution should therefore be exercised in attributing trends based on estimates produced over short horizons.

Impact of the global financial crisis

One of the issues in using a long-term average is the impact of recent fall in the sharemarket following the global financial crisis. In its recently finalised *Statement of Regulatory Intent*, the AER determined a value for the MRP of 6.5%. They interpreted two possible explanations for the current market conditions, being that:

- that the prevailing medium term MRP is above the long-term MRP, but will return to the long term MRP over time; or

- that there has been a structural break in the MRP and the forward looking long term MRP (and consequently also the prevailing) MRP is above the long term MRP that previously prevailed.[19]

The following figure tracks the value of the All Ordinaries Accumulation Index between 1941 (which is consistent with the starting point we have used for the MRP analysis we have provided below) and February 2009.

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[19]   Australian Energy Regulatory (2009), op.cit., p.238.

Figure 3 All Ordinaries Index: 1941 to 2008
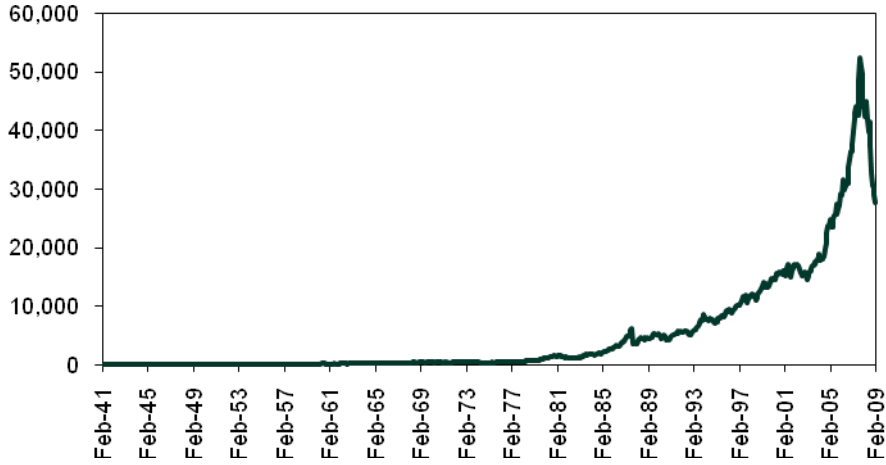
Data source: Bloomberg, RBA

Given the ex post MRP is measured with reference to actual returns, the significant drop in returns will be reflected in a lower estimate for the MRP. This directly contradicts the forward-looking estimates of the MRP which typically follow a market crash, which is an expectation of substantially higher returns going forward. For example, a paper submitted to the AER by Officer and Bishop in January 2009 suggests that the short-term MRP is between 16% and 18%.[20]

In our view the best way to deal with this is to put the most recent data in the context of history. We have estimated the MRP over a number of different periods. Each period begins in June 1941 and ends in December in each year of the current decade. The results are shown in the following table.

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[20] Professor B. Officer and Dr. S. Bishop (2009), Market Risk Premium: Further Comments, Prepared for Energy Networks Association, Australian Pipeline Industry Association and Grid Australia, January, p.7.

Table 6 MRP: Periods commencing June 1941 and ending December 2000 to 2008

Averaging period	MRP
June 1941 to December 2000	6.5%
June 1941 to December 2001	6.4%
June 1941 to December 2002	6.1%
June 1941 to December 2003	6.1%
June 1941 to December 2004	6.3%
June 1941 to December 2005	6.5%
June 1941 to December 2006	6.6%
June 1941 to December 2007	6.7%
June 1941 to December 2008	5.8%

The fact that one year of data (being 2008) can have such a significant impact on a long-term average (sampled over at least 60 years), highlights how unique this period is. Indeed, the outcome is in excess of three standard deviations from the mean. In our view, there is a strong case for excluding 2008 from the dataset. This is particularly the case given long-term averages ending in each other year of this decade have yielded estimates of between 6.1% and 6.7%. This provides clear evidence to suggest that an estimate of between 6% and 7% remains the most appropriate long-term forward-looking estimate for the MRP.

Recommendation

We are of the view that unless evidence of a permanent structural change emerges (noting that this will be very difficult to assess with any certainty in the short-term), long-term historical estimates remain the most appropriate benchmark for the MRP. These estimates suggest that a value of between 6% and 7% is a reasonable range for the MRP.

There is considerable evidence to suggest that the true value exceeds the regulatory precedent of 6%. This value has been well entrenched in regulatory precedent, although we note the AER's recent decision to apply a MRP of 6.5% in recognition of the potential impact of the global financial crisis. In our view, 6.5% (being the mid-point of our recommended range) is a more appropriate long-term value for the MRP.

Gamma

Overview

Gamma is the product of two inputs which must be estimated, being the proportion of tax paid that has been distributed to shareholders as franking credits (the distribution rate) and the value the marginal investor places on $1 of franking credits, referred to as the value of franking credits.

While the distribution rate can be generally observed from taxation statistics, the value of franking credits cannot be directly observed. The value of franking credits is determined at the level of the investor and is influenced by the investor's tax circumstances. The value of gamma is between zero (no value from franking credits) and one (full value of franking credits).

Determining an appropriate value for gamma has proven reasonably contentious. Regulators are now consistently adopting a value of 0.5, with the exception of the Australian Energy Regulator's (AER's) recent decision to adopt an estimate of 0.65 (which we will address below). In our view, strong evidence is accumulating to suggest that the value of gamma has fallen significantly, and in fact zero is now the best estimate.

An overview of dividend imputation

As noted above, there are two key inputs into the estimation of gamma, which are related by the equation:

gamma = V x D

where V is the value of franking credits[21] and D is the distribution rate.

Based on statistics supplied by the Australian Taxation Office, Hathaway and Officer estimate that approximately 71% of franking credits are distributed to shareholders.[22] However, only 32% of the distributed franking credits were redeemed.[23] This suggests that a significant number of shareholders did not utilise, or were unable to utilise, their franking credits.

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[21] $\square$ is used instead of V in a number of studies.

[22]   Hathaway, N. and Officer, R. (2004), The Value of Imputation Tax Credits: Update 2004, Unpublished Working Paper, Capital Research Pty Ltd.

[23]   Australian Taxation Office (2005), "Taxation Statistics 2002-03", Australian Government.

Imputation credits are only available in respect of company tax paid on income subject to Australian taxation. For gamma to equal one all income must be domestically taxable. What is clear is that different shareholders value franking credits differently, as their tax status determines whether their credits are able to be redeemed.

If the shareholder is an Australian taxpayer, then they are subject to Australian personal income tax and can offset the prepayment of this tax at the corporate level against their own personal liabilities. If they are not subject to Australian personal income tax, such as non-residents and tax-exempt individuals or entities, then the company tax paid cannot be offset, and no additional value is therefore derived.

In relation to the redemption of credits, the major issue in the literature is therefore whose ability to redeem imputation credits is relevant for the assessment of the value of gamma. This is considered in the following section.

The identity of the marginal investor

Marginal investor is a foreign investor

Officer's seminal work on dividend imputation specified that gamma is the proportion of the *marginal* shareholder's personal income tax on dividend income that had been prepaid at the corporate level (rather than the average shareholder's). The marginal shareholder is the price-setting investor. The price at which this shareholder transacts becomes the market clearing price, or the price equating the demand for capital by the firm with supply that will determine the firm's cost of capital.

A key question is therefore the identity of the marginal investor. In open capital markets such as Australia, which have large capital requirements but an insufficient internal capital source, external capital must be drawn upon. In the context of imputation credits this means that both foreign and domestic investors will hold shares in Australian companies.

As noted above, non-resident shareholders are unable to derive any direct benefit from franking credits. Previously this could be indirectly derived via the trading of shares around dividend dates. Schemes were established by investment banks to allow foreign investors to extract value from franking credits, which relied on these investors selling their shares to domestic investors in the period leading up to the payment of the dividend (that is, before the shares go 'ex dividend', which is when the holder is no longer entitled to receive that dividend). The domestic purchasers would receive the cash dividend and franking credit, and subsequently sell the share back to the foreign investor at a small premium.

Some twelve years after becoming aware of these schemes the Commonwealth Government changed the Australian taxation law to introduce a minimum period of holding, requiring that shareholders have to be 'at risk' for a period of time in order to obtain the benefit of franking credits. This amendment, called the 45-day rule, was effective from 1 July 1997, although was not introduced until some time later (July 1999).

Under this law, investors are required to hold shares for a period of 45 days during a qualification period around the dividend event (without substantial hedging) in order to be eligible to rebate franking credits against their tax liabilities. This therefore significantly extended the window over which the previous trades between foreign and domestic investors could be made, to the extent that the extra price risk borne by the parties meant that such transactions were no longer worthwhile.

As a consequence, the return to a foreign investor comprises dividends and capital gain only, whereas the return to a domestic investor comprises dividends, capital gain and franking credits. If both foreign and domestic investors had the same expectations about the future earnings of the firm, which is a well-established tenet of economic theory, then the foreign investor would demand a lower price than the domestic investor, as the foreign investor receives a relatively lower return.

Therefore, in the presence of insufficient domestic capital it is expected that foreign investors will be the marginal investors. As outlined above, even if the clear majority of the shareholders are domestic but there is some reasonable presence of foreign investors, then economic theory dictates that the marginal investor will be foreign because this investor will set the market-clearing price that determines the cost of capital.

In Australia, one can therefore conclude that as the price-setting investor in the 'average' firm is most likely to be foreign, franking credits will not be accorded a value in the pricing of shares.[24] They may have value to domestic investors, but they are not the marginal investor that sets share prices. While they may have had some value prior to the introduction of the 45-day rule, there is no longer any basis for foreign investors to derive any benefit from these credits and their value in setting share prices will therefore be zero.

There is established empirical support for this proposition. For example, the results of a 2004 study by Cannavan, Finn and Gray:

…are consistent with the notion that nonresidents are the marginal price-setting investors in large Australian firms.[25]

A recent study by Feuerherdt, Gray and Hall (2008), which was based on an analysis of the value of imputation tax credits on hybrid securities, drew similar conclusions:

> Our results are consistent with the notion that security prices are set by a marginal investor who does not value franking credits. However, it should be emphasised that our discussion of the marginal investor hypothesis does not form the basis for an assumption leading to the result. Simply, the empirical evidence is that security prices do not incorporate any value for imputation credits. Even if a theory were proposed in which security prices were set by the average investor base, the empirical result would be unchanged.[26]

It is noted that the notion that the marginal investor is foreign has not necessarily been accepted by regulators. There are two arguments that have been made here. Firstly, many regulated businesses have a 'unique' domestic shareholder base (for example, they are government owned businesses) and hence the marginal investor won't be a foreign investor. However, this argument is erroneous as WACC parameters are determined with reference to an 'efficient' benchmark firm. For the reasons outlined above, it is appropriate to conclude that such a firm would have at least some of its shares held by foreign investors. The other difficulty with this argument is that assuming that some companies have domestic marginal investors and others have foreign marginal investors would require segmentation of the Australian sharemarket, which is not feasible.

Secondly, it has been proposed that if we are to consider the presence of foreign investors, we should be using an international CAPM to determine the WACC, not a domestic CAPM (and hence, all parameters would need to be respecified in a global market context). For example, the QCA submitted this argument in two recent final decisions, being Queensland Rail and the Dalrymple Bay Coal Terminal, stating that if a choice is to be made, the domestic CAPM should be used as an international CAPM will produce a lower WACC and hence disadvantage the infrastructure owner. This issue will be addressed below.

In any case, we are not proposing that franking credits do not have value to some investors – the key, as stated by Officer, is the value to the marginal investor.

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[25] Cannavan, D., Finn, F. and Gray, S. (2004), "The Valuation of Dividend Imputation Tax Credits in Australia", Journal of Financial Economics, p.168.

[26] Feuerherdt, C., Gray, S. and Hall, J. (2008), "The Value of Imputation Tax Credits on Australian Hybrid Securities", Working Paper (forthcoming publication in the International Review of Finance), p.3.

Furthermore, the study by Feuerherdt, Gray and Hall referred to above refutes the notion that security prices incorporate a value for franking credits, even if these prices are set by the average investor.

A paper by Gray and Hall[27] (2006) finds that setting gamma to zero does not, unlike the values of gamma maintained by regulators, violate the deterministic relationship between the value of franking credits, the market risk premium and the corporate tax rate. Thus, taking gamma of zero is both agreed to by the theory and empirical bulk, and also is robust to the applicability of this assumption.

International versus domestic versions of the CAPM

The CAPM is normally specified as a domestic version, which means that its key parameters (being the risk-free rate, beta and the market risk premium) are specified based on Australian market data. Some suggestions have been made that an international CAPM should be used, recognising the increasing integration of world capital markets and the presence (and hence influence) of foreign investors in the Australian market. It assumes that capital markets are fully integrated, with international capital flows unrestricted, and investors exhibiting no home country bias.[28]

A number of versions of the model have been developed and typically require specification of the key parameters in a global market context (for example, using a global share price index instead of the All Ordinaries index).[29] As noted by the Strategic Finance Group, this is not practical:[30]

> Clearly, re-estimating all WACC parameters as they would be in the absence of foreign investment is an impossible task and this approach must be rejected. That is, all WACC parameters should be estimated as they are, not as they would be if a particular theoretical assumption were to hold.

In any case, Feuerherdt, Gray and Hall argue that exclusion of the foreign investor from the consideration of gamma but not other WACC parameters is inconsistent. That is, the conclusion that foreign ownership is not applicable:

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[27] Gray S. and Hall, J. (2006), "The Relationship Between Franking Credits and the Market Risk Premium", Unpublished Working Paper, University of Queensland.

[28] Lally, M. (2004), op.cit., p.28.

[29] The model was originally developed by Solnik. Refer: Solnik, B. (1974), "The International Pricing of Risk: An Empirical Investigation of the World Capital Market Structure", in The Journal of Finance, vol.29, no.2.

[30] Strategic Finance Group (2004), The Value of Imputation Franking Credits: Gamma, Report for AGL in Relation to ESC Electricity Distribution Review, p.9.

…has been criticised on a number of grounds, not least of which is the fact that every other parameter used to estimate the cost of capital *is* affected by the trading of foreign investors (e.g. the yield on Australian government bonds would likely be quite different if foreign capital were not allowed into Australia).[31]

In practice, the international CAPM has not been widely used. This is for a number of reasons:

- there are a number of alternative models that have been specified, however there remains no consensus view on which one should be used;

- the model is relatively complex to apply and its parameters are difficult to estimate, particularly the exchange rate covariances; and

- there is no empirical evidence to suggest that it provides a better estimate of the expected cost of equity. For example, a study by Koedijk et al found that the domestic CAPM only yielded a significantly different estimate from the international CAPM for three percent of firms in their sample.[32] They attribute this to a dominance of country factors in individual stock returns.

One of the key reasons that the international CAPM may not provide a superior estimate of the expected cost of equity is because of the continued existence of home country bias. That is, despite the globalisation of world capital markets, investors continue to favour domestic stocks.[33] This may be partly due to the information asymmetries faced by domestic investors considering investments in overseas firms. A survey by Strong and Xu also revealed that fund managers' recommendations were biased towards their home market.[34]

The fact that home bias still exists does not mean that substantial integration of world capital markets has not occurred, nor does it mean that the marginal investor could not be a foreign investor. What is evident is that the markets are not *fully* integrated. Certainly, it has not proven a superior model, and until such evidence becomes available (if and when it does), there is no basis for rejecting the domestic CAPM in favour of such an alternative. After considering the estimation difficulties and lack of

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[31] Feuerherdt, C., Gray, S. and Hall, J. (2008), op.cit.

[32] Koedijk, K., Kool, C., Shotman, P. and van Dijk, M. (2002), "The Cost of Capital in International Financial Markets: Local or Global?", in Journal of International Money and Finance, vol.21 (6).

[33] For example, see: Stulz, R. (1999), Globalisation of Equity Markets and the Cost of Capital, National Bureau of Economic Research, NBER Working Papers, 7021.

[34] Strong, N. and Xu, X. (2003), "Understanding the Home Equity Bias: Evidence from Survey Data", in Review of Economics and Statistics, vol.85, pp.307-312.

empirical support to demonstrate the superiority of an international CAPM, over the domestic version, Lally concludes:[35]

> …in the face of an issue like this in which the truth lies somewhere between two models, a conservative approach is desirable, i.e., choosing the model yielding the higher estimate for the cost of capital, on the grounds that understating the cost of capital may lead to businesses failing to invest, and this is the more serious of the two possible errors… Taking account of all these points, I recommend the use of a domestic version of the CAPM.

It has also been suggested that if an international CAPM is not adopted, then all CAPM parameters would need to be respecified as if foreign investors had no influence on the Australian market. However, this suggests that the Australian market is completely segmented from the world market. Given that in reality foreign investors exert significant influence on all financial markets, this is not only virtually impossible to do, but would also abstract from the reality of the practical influences on asset pricing in today's domestic market.

This rate of return is being used to determine prices and will drive investment decisions that are made with regard to current and expected market conditions. It should therefore reflect the rate of return that an investor would require, rather than the theoretical return that an investor would command in either a fully segmented or fully integrated market. As noted above, these parameters should therefore be estimated "as they are".

This was recently recognised by the AER in its review of the WACC parameters to apply to electricity transmission and distribution service providers. It concluded:

> Under a domestic CAPM framework, foreign investors in the Australian market will be recognised in defining the representative investor, but only to the extent they invest in the domestic capital market. This has important implications for the estimation of the WACC parameters from domestic market data, in particular the MRP, the equity beta, the nominal risk-free rate, and the assumed utilisation of imputation credits (gamma).[36]

We have therefore applied the domestic CAPM to determine the cost of equity, including gamma, estimated using readily observable market data that may be influenced by the presence of foreign investors. Expectations of future returns will be formed based on the actual environment facing investors. Specified in this way, the

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[35] Lally, M. (2004), op.cit., p.31.

[36] Australian Energy Regulator (2009), op.cit., p.101.

domestic CAPM does not unrealistically assume complete separation from global markets. The domestic CAPM will therefore serve as a better proxy for the international CAPM, without assuming that the Australian market is fully integrated with world markets.

Empirical estimates

The introduction of the 45-day rule is a significant and permanent structural change to the Australian market. It is significant because prior to the introduction of this rule, foreign investors could derive some benefit from franking credits by trading their shares with domestic investors around dividend dates. Although this benefit may not necessarily have been equivalent to the full value, this suggests that these credits had at least some value to these investors.

Foreign investors were never able to directly benefit from franking credits - these credits were only valuable to them to the extent that they could be sold to resident tax-paying investors that could utilise them. As it is no longer possible for foreign investors to 'sell' these credits, they are now worthless to them.

In examining the literature, the main focus should therefore be on more recent studies, particularly those undertaken since the introduction of the 45-day rule (which, as noted above, was effective from 1997 yet only introduced in 1999). In 'dissecting' the literature in this way, it is important to note that the key issue is the time period over which gamma was valued.

Most of the later studies span both time periods. To the extent this is the case, and if it is accepted that the value of gamma has fallen significantly since the 45-day rule came into effect (perhaps to zero), this will produce an upward bias in the results of these studies. Before these studies are examined, a brief overview is provided of one of the most common methodologies that has been used to estimate the value of gamma.

Dividend Drop-Off Studies

One of the most commonly applied methodologies used in studies that have sought to estimate the value of gamma is the dividend drop-off approach. As a firm's share price will typically fall following the payment of a dividend (which is seen to be driven by the activities of short-term arbitrage traders), dividend drop-off studies examine the amount of the price change.

The difficulty here, however, is that it is extremely difficult to decompose this change into the value of the dividend itself and the value of the franking credits that are attached to that dividend. These variables are highly correlated, posing a number of

methodological challenges for these studies. The reason for this correlation is that franking credits are linearly determined by the value of the cash dividend, as shown by:

$$FC = \text{Div} \times f\left(\frac{t}{1-t}\right)$$

Where:

FC   = franking credit

Div   = cash dividend

f   = franking proportion (or proportion of personal tax pre-paid at the corporate level)

t   = the contemporaneous corporate tax rate.

This relationship will lead to a problem called multicollinearity and its presence will significantly reduce the ability to interpret the value of the estimates.

Regression analysis is used to test the existence and strength of the relationship between a dependent variable and one or more independent variables (in this case, our two independent variables are dividends and franking credits). The results of the regression will tell us the extent to which changes in the dependent variable are explained by the independent variables. If the independent variables are related, it will not be possible to isolate the impact of each of these variables in interpreting that relationship – this is multicollinearity.

It is therefore extremely important to keep this issue in mind when examining the results of dividend drop-off studies. We note, however, that regulators continue to place emphasis on dividend drop-off studies without addressing this very significant issue. As we have previously proposed, reliance on data that may not be statistically meaningful significantly increases the risk of error, where such error can have serious consequences for a regulated infrastructure owner.

It is also important to note that most studies (at least in the first instance) seek to establish a value for franking credits (V). As noted above, this must be multiplied by the distribution rate to obtain a value for gamma (□). Where we have done this below, we have assumed a distribution rate of 71%.

Overview of recent studies

Hathaway and Officer (2004)

Hathaway and Officer studied the relationship between the price change on the ex-dividend date and the cash dividend and franking credit paid, using data from 1988 to 2002.[37] Their methodology sought to isolate the additional drop-off in the share price that is attributable to the franking component from the drop-off that is due to the cash component.

They draw conclusions from the large firms for the purposes of reliability, and take credits to be priced at around 50% of their face value, giving an estimate of gamma of 0.355. In addition, they find that the market values cash dividends at around 80% of their face value.

There are a number of issues with this study. As noted previously, one of the main problems with studies of this nature is the collinearity between the two independent variables, being dividends and franking credits. Given the high degree of correlation between dividends and franking credits also means that a separation of their values is difficult. Further, there are no levels of significance reported. Given the increase in standard errors encountered in regressions with high collinearity, the significance of the results is reduced.

Beggs and Skeels (2005)

Beggs and Skeels used a similar approach to Hathaway and Officer, although producing different results.[38] Using data from the Commsec Share Portfolio database over the period from 1986 to 2004, they tested six tax regime changes on the value of franking credits. Some notable results include that:

- from 1987 to 1997, and for 2000, the value of franking credits was not shown to be significantly different from zero;

- since the last tax change (being the rebate on unused franking credits), the value of unused credits was seen to significantly increase. From 2001-2004, the value of the drop-off was 0.57. This translates to a value for gamma of 0.41; and

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[37] Hathaway, N. and Officer, R. (2004), op.cit.

[38] Beggs, D. and Skeels, C. (2006), "Market Arbitrage of Cash Dividends and Franking Credits", The Economic Record, Vol.82, No.258, September, pp.239-252.

- the majority of the sample failed to reject the hypothesis that cash dividends are fully valued.

Whilst these results were found to be statistically significant, they should be interpreted with caution as the independent variables are again perfectly collinear, except for changes in the franking proportion and the corporate tax rate.

Bellamy and Gray (2004)

The study by Bellamy and Gray uses a similar methodology to that of Hathaway and Officer, but makes a variety of econometric extensions with an aim of improving robustness.[39] Whilst the rationale of Hathaway and Officer was preserved insofar as the stock price change was decomposed into cash dividend, franking credit and in some instances market return, eight models in total were estimated. These eight models differed in terms of whether:

- the ex-date price was kept raw or adjusted for expected returns;

- the dependent variable was defined as the drop-off ratio or the stock return; and

- the estimation was performed by ordinary least squares or weighted least squares. Under the latter, observations were weighted by their "informativeness", specifically, a higher weighting was given to higher-yielding, low-volatility stocks.

Bellamy and Gray conclude that the market places no value on franking credits and fully values cash dividends. They believe that the most robust approach to use was to adjust the ex-date price for expected returns, and give a higher weighting to more "informative" stocks (ie, higher yield, low volatility).

Further, while some recommendations are made about research design, it is not possible to separately and reliably estimate the value of dividends and franking credits. That is, irrespective of the adjustments made in an attempt to address multicollinearity, it will always be a problem. The correlation between the two in this sample was 0.85.

Whilst this study specifically pertained to the estimation of the value of franking credits and not gamma, it is important to note that if franking credits have no value to the marginal investor then gamma must be zero, irrespective of the distribution rate.

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[39] Bellamy, D. and Gray, S. (2004), Using Stock Price Changes to Estimate the Value of Dividend Franking Credits, Working Paper, University of Queensland.

Cannavan, Finn and Gray (2004)

Cannavan, Finn and Gray seek to test whether the introduction of the 45-day rule has impacted the value of gamma.[40] Rather than use the dividend drop-off method, they sought to infer the value of cash dividends and franking credits from the relative prices of share futures and the underlying shares on which these contracts are written, based on a no-arbitrage framework.

The authors noted that the data behaved well in-line with the no-arbitrage relationship and as such the model is substantially reliable. This is a key benefit over estimation via the dividend drop-off technique. In terms of overall conclusions, it is again found that the market fully values cash dividends, consistent with the theory.

The most fundamental conclusion is that after the introduction of the 45-day rule, the market does not value franking credits. In a manner similar to that of Bellamy and Gray, a constraint is also imposed in which the franking credits are given zero value after 1 July 1997. The finding that this constraint cannot be rejected is further support of the hypothesis that gamma is no longer valued by the market.

This study did find that franking credits were potentially valued at up to 50% of their face value prior to the introduction of the 45-day rule (suggesting a value for gamma of up to 0.36). Since then, however:[41]

> …we find no evidence of any positive value at all in imputation credits after the introduction of the 45-day rule. The increased costs and risks involved in transferring imputation credits make it infeasible to engage in this strategy even for the highest-yielding stocks… This means that in a small open economy such as Australia, the company's cost of capital is not affected by the introduction of a dividend imputation system. The company must produce the same return for the marginal stockholder whether an imputation system exists or not if the marginal stockholder receives no value from imputation credits.

Feuerherdt, Gray and Hall (2008)

This paper tests the value of imputation credits based on the prices of hybrid securities.[42] A key reason for examining these securities is:

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[40]   Cannavan, D., Finn, F. and Gray, S. (2004), op.cit.

[41]   ibid., p.192.

[42]   Feuerherdt, C., Gray, S. & Hall, J. (2008), op.cit.

- the signal-to-noise ratio is considered higher than for ordinary shares, reducing the multicollinearity problem associated with the dividend drop-off methodology (which they have therefore applied here); and

- hybrid issues tend to be marketed exclusively to domestic investors. Hence, in order to address regulators' concerns regarding the relevance of foreign investors in setting the value of imputation credits, they have chosen an environment where trading is likely to be almost exclusively domestic-based.

The study examples three samples (ordinary shares, reset preference shares and convertible preference shares) over three different time periods, recognising the tax law changes relating to the introduction of the 45-day rule in 1997 and imputation credit rebateability in 2000.

The results found no evidence of mean drop-off ratios of greater than one. If cash dividends are fully valued, the franking credit has no value. This finding held across all three samples. The key conclusions from this study were cited above, being that the marginal investor is a foreign investor who does not value franking credits.

Summary of results

The results of these studies are summarised in the following table:

Table 7   Summary of Key Studies

Study	Methodology	Time Period for Estimation	Value of franking credits (V)	Value of gamma (γ)[a]
Studies pre-45 day rule				
Bruckner, Dews and White (1994)	Dividend drop-off	1987-1990	0.34	0.24
		1990-1993	0.69	0.49
Partington & Walker (1999)	Contemporaneous pricing of shares with and without franking credits	1995-1997	0.96 (average)	0.68
Recent studies				
Hathaway and Officer (2004)	Dividend drop-off	1988-2002	0.5	0.36
Beggs & Skeels (2005)	Dividend drop-off	1987-2000,2000	0	0
		2001-2004	0.57	0.41
Bellamy & Gray (2004)	Dividend drop-off (adjusted)	1995-2002	0	0
Cannavan, Finn & Gray (2004)	Analysis of futures and physical market (no arbitrage framework)	Pre- 45 day rule	Up to 0.5 (high-yielding stocks)	0.36
		Post- 45 day rule	0	0
Feuerherdt, Gray and Hall (2008)	Dividend drop-off, hybrid securities	Pre-1997 (45 day rule)	0	0
		Post-1997 to 2000		
		Post 2000		

Note: Assumes a distribution rate of 71%.

A number of studies have concluded that franking credits have some value, although the estimates vary considerably. More importantly:

- these studies include data from the period prior to the introduction of the 45 day-rule. This will produce an upward bias in the estimated value of gamma, given that franking credits would appear to have had some value prior to this change, and a zero value following the change; and

- a number of methodological issues have been identified. One of the most significant ones that is consistently encountered is the multicollinearity that will arise in dividend drop-off studies due to the strong relationship between the value of cash dividends and franking credits.

A number of studies have concluded that the value of franking credits is zero (or, we cannot reject the hypothesis that they have no value). One of the more notable recent works is the study by Cannavan, Finn and Gray, which, using an arguably more robust methodology than dividend drop-off studies, concluded that since the introduction of the 45-day rule, franking credits are of no value to the marginal investor.

We now summarise the results of a relatively simple diagnostic test we have undertaken as a further test of the hypothesis that the value of gamma is not different to zero.

Simple diagnostic

In order to circumvent the host of econometric and sampling issues involved with estimating gamma, a simple test can prove fruitful. The test aims to determine whether or not the market responds, on average, differently to franked dividends from how it responds to unfranked dividends.

In particular, it tests whether or not the ratio of the ex-date price change to cash dividends is significantly greater for franked dividends than unfranked dividends. If it is found that shares with franked dividends behave in a manner that is not significantly different from shares with unfranked dividends on the ex-dividend date, this would lead to the conclusion that franking credits are valued at zero (leading to a zero value of gamma).

If, on the other hand, shares with franked dividends do behave in a manner that is significantly different, it would be concluded that this difference is due to the market placing value on franking credits. If this were the case, gamma would not be zero and further empirical investigations would need to be undertaken to estimate its value.

The data used in this investigation was sourced from Bloomberg and contains observations on firms listed in the S&P ASX 200 from January 1996 to January 2006. Trusts and other entities which have a dissimilar tax structure to companies were excluded, resulting in 3188 observations in total. Whilst this sample only spanned the top 200 stocks, because ex-date behaviour is analysed it is important to exclude thinly-traded stocks from the dataset (otherwise large errors may be introduced due to lags).

There is still considerable thinness in trading in this sample: of the 3188 observations, 36% (1140) have a delay of more than one day in price observations about the ex-dividend date. However, only 96 observations have a delay of more than three days, which takes dividends paid on Mondays into consideration and these were excluded. Partially franked dividends were excluded from the examination as this avoids complications in selecting an appropriate level of franking as the cut-off point.

For the full period, there were 516 events with unfranked dividends and 2138 events with fully franked dividends. The sample standard deviations of the drop-offs ratios were such that a test for equality of variance would conclude that the standard

deviations of the samples were unequal[43]. As a consequence, the common parametric test for equality of means is invalid so the simple, non-parametric paired test is used instead.

The sample of fully franked events is substantially larger that that of unfranked events, so a random sample of it is taken to produce the same number of observations, which was then paired with the full set of unfranked observations. If the theoretical hypothesis is true (that is, the market value of franking credits is zero), it should be the case that half of the fully franked drop-off ratios are greater than the unfranked drop-off ratios.

There was found to be insufficient evidence to reject this hypothesis[44] and as such it is concluded that the market responds equally to fully franked and unfranked dividends. The same test is used for the sample of data from 1 July 1997 onwards as the parametric test is invalid[45] and the nonparametric test leads to the same conclusion[46]. This evidence that the market does, on average, respond equally to fully franked and unfranked dividends is further evidence that the market places no value upon franking credits.

This test can also be extended to see whether the drop-off for franked dividends behaves significantly differently from unfranked dividends if franking credits are valued at some proportion of their face value.[47] In this case, the proportional value will be 50% and 100%. In other words, rather than testing the hypothesis that the value of franking credits do not have a value other than zero, we are testing the hypothesis that these credits have some value, which in this case is either 0.5 or 1.

It has already been found that the market behaves the same way for franked and unfranked dividends on the ex-date, by only moving on average by the amount of the cash dividend. It is important to question, however, whether the data could perhaps disguise franking credits having a value of 50% and 100% of face value, yet still behaving as observed. If it is found that these new ratios (with franking credits assumed to be valued at 50% and 100% of face value) are significantly different across franked and unfranked dividends, this would be inconsistent with the actual market data. As such, this would imply that if franking credits had a significant nonzero value

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[43] F-test for variance equality: s_1 = 5.6736, s_2 = 1.9994, p-value < 0.0001

[44] Paired sample test: sample proportion = 0.527, theoretical proportion = 0.50, p-value = 0.11

[45] F-test for variance equality: s_1 = 6.0972, s_2 = 2.0996, p-value < 0.0001

[46] Paired sample test: sample proportion = 0.528, theoretical proportion = 0.50, p-value = 0.12

[47] That is, rather than consider the ratio of price decline to cash dividend, the ratio of price decline to cash dividend and some proportion of the face value of the franking credit is considered.

the data would not disguise this. Thus, this would provide further evidence that the market does not value franking credits.

The sample data was again restricted to observations after 1 July 1997 and to fully-franked and unfranked dividends. The same nonparametric test is used and it is found that the ratios are different across fully-franked and unfranked dividends with a half-valued franking credit[48] and with a fully-valued franking credit[49].

On this basis, we can reject the hypothesis that franking credits have a value of 0.5 or 1. In addition, we believe this is likely to be the finding irrespective of the value tested for the valuation of franking credits. This inconsistency with the result for the ratio of price decline to cash dividend only is further evidence that the market does not value franking credits.

Conclusion

A number of studies have sought to estimate the value of gamma and the results vary considerably. The key concerns we have with some of these studies are that:

- studies using the dividend drop-off methodology need to be treated with extreme caution given the collinearity between dividends and franking credits. While Bellamy and Gray's methodology sought to adjust for this, they concluded that it is not possible to separately value the two;

- the introduction of the 45-day rule resulted in a major structural change that has fundamentally impacted the value of franking credits. Studies that seek to estimate gamma using data prior to this date will over-estimate the value of gamma.

Recent robust empirical investigations have concluded that the value of franking credits is zero since the introduction of the 45-day rule (Bellamy and Gray, 2004; Cannavan, Finn and Gray, 2004; Feuerherdt, Gray and Hall, 2008). This is based on the key assumption that the marginal investor is foreign. It is appropriate to make this assumption under the standard domestic CAPM framework, as this acknowledges the practical and significant influence foreign investors have in the Australian market.

Additionally, a basic but informative test of the market's behaviour with regards to the ex-date price response finds that for fully-franked and unfranked dividends, the market responded equally to the cash dividend only, which is further evidence of the worthlessness of franking credits. As an extension to this model, it was tested whether

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[48] Paired sample test: sample proportion = 0.590, theoretical proportion = 0.50, p-value < 0.0001

[49] Paired sample test: sample proportion = 0.595, theoretical proportion = 0.50, p-value < 0.0001

or not franking credits were valued by the market at 50% and at 100% of their face value, which was emphatically rejected. All in all, there is insufficient evidence to reject the theoretical hypothesis that franking credits are worthless. Fundamentally, the implication of these findings is that gamma should be set to zero. This also means that there is no basis for adopting an assumption of 0.5.

On the basis of this evidence we believe that it is appropriate to assume a value of zero for gamma. This includes:

• evident difficulties in estimating a reliable value for gamma (which may be because it has no value);

• a strong theoretical foundation, being that since the introduction of the 45-day rule, franking credits are now of no value to the marginal foreign investor (whereas they may have had some value prior to this); and

• empirical evidence to support a value of zero, both from the recent literature and our own analysis which confirmed that we cannot conclude that gamma has a value other than zero.

A value of 0.5 was originally adopted in early regulatory decisions and has since become regulatory precedent. However, these decisions were made prior to the introduction of the 45-day rule, and were relying on studies that will not have assessed its potential effect on the value of gamma. We are of the view that there is sufficient evidence to now review the fundamental basis of this assumption.

The AER's recent decision in relation to gamma

The AER's recent decision in relation to electricity transmission and distribution network service providers determined a range for gamma of 0.57 to 0.74, with a point estimate of 0.65. The AER relied on two studies in coming up with its range. The lower bound of the AER's range is based on a single study, being the 2006 paper by Beggs and Skeels. The second is a 2008 study by Handley and Mahesawaran. We will deal with each of these in turn.

Handley and Mahesawaran's study seeks to ascribe a value to gamma by analysing tax statistics. The study has been instrumental in increasing the value of gamma to 0.65 (the other key assumption driving this was the assumed distribution rate of 100%, which is discussed further below). In our view, the reliance that is placed on this study is fundamentally flawed.

Taxation statistics measure the quantum of corporate taxation, the amount of credits distributed and the amount of credits claimed. The amount of credits claimed is not the

value of those credits. It does not take into consideration the risk that shareholders bear in earning the dividends and credits. Therefore it merely establishes a hypothetical upper bound for theta (as the value must then be $1 per $1 of credits) which is higher than the 'true' upper bound.

Tax statistics analysis cannot be used to provide a *value* for gamma. The only way it can be done is using market data, such as dividend drop-off studies (although they are also vulnerable to multicollinearity problems). It is therefore misleading to present results from tax statistics analysis along with the results of market-based studies where the objective is to ascribe a value to gamma.

We also have concerns with the reliability of Handley and Mahesawaran's results. While they have not presented the data they have relied upon in their paper, our interpretation of their results is that they may have only looked at the amount of credits distributed to shareholders. Not all distributed credits are redeemed by shareholders. It is the amount of credits redeemed that is the maximum possible amount of imputation credits that have been claimed by taxpayers, noting that this does not in itself provide a value for gamma, as outlined above.

Significant concerns have also been raised with the Beggs and Skeels (2006) study, which is the only other study that has been relied upon by the AER in its decision. Two consultants' reports submitted to the AER by the Joint Industry Associations identified problems with this study (one was prepared by SFG Consulting (SFG) and the other was by Synergies – Synergies' report was a peer review of the former)[50].

The Beggs and Skeels study sought to estimate a value for theta[51] over a number of different sub-periods or regimes. Different estimates were produced for each sub-period. In particular, the AER relies on evidence presented by Beggs and Skeels to suggest that there was a structural change following the tax law changes in 2000, which allowed a full cash rebate to resident investors for unutilised credits. Emphasis is therefore place on their estimate for the period 1 July 2000 to 10 May 2004, which was the end date of their study. The estimated value of theta over this period was 0.572.

The reports by SFG and Synergies both found that the supposed evidence of a structural break following the year 2000 tax law change was due to sampling error. Hence, there is no robust evidence to demonstrate that such a break has occurred (and accordingly, that the value of theta has increased since this time).

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[50] SFG Consulting (2009), The Value of Imputation Credits as Implied by the Methodology of Beggs and Skeels (2006), Report Prepared for ENA, APIA and Grid Australia, February; Synergies Economic Consulting (2009), Peer Review of SFG Consulting Reports on Gamma, A Report to the ENA, APIA and Grid Australia, January.

[51] The value of gamma is the product of theta and the assumed distribution rate.

SFG was able to replicate Beggs and Skeels' results over that same time period. However, when SFG excluded the 1% of most influential observations (being only eleven out of 1,389) to improve the consistency of estimates through time, the value of theta fell to 0.19. SFG also extended the sample period to 30 September 2006 but made no other adjustments to the sample or methodology used by Beggs and Skeels. This resulted in an estimate of theta of 0.37. In all cases, SFG found that the theta estimate only has a positive value if cash dividends are assumed to be less than fully valued.

The results of this analysis therefore cast significant doubt over the reasonableness of assuming that 0.572 is the most appropriate value for theta. In our view, apart from the issues that have been identified with this study, the exclusion of the results of other recent reputable Australian studies is not justified.

Another assumption that has proven particularly controversial is a 100% distribution rate, which differs from Hathaway and Officer's estimated market average of 71%[52]. A 71% distribution rate is most commonly applied in practice.

In arriving at its conclusions the AER has relied on a further paper by Handley, "Further Comments on the Valuation of Imputation Credits"[53]. We have a number of fundamental concerns with this report, including issues of fact. For example, in relation to the distribution rate of 100%, Handley assumes that:

- Officer's (1994) framework assumes a perpetuity and hence a 100% distribution rate. It is true that the framework is a perpetuity model however we dispute that this implies a 100% distribution rate – instead it implies a constant payout rate (that we observe is around 70%); and

- the assumption of 100% is also consistent with the Miller and Modigliani framework. While Miller and Modigliani allowed the payout ratio to vary to illustrate the irrelevance of dividends this is not an explicit assumption of their model.

In conclusion, we are not of the view that the evidence relied upon by the AER supports a value for gamma of 0.65. The AER suggests that while the valuation of gamma has been contentious in the past, this evidence is sufficiently robust to enable a more definitive estimate to be made.

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[52] N. Hathaway & B. Officer (2004), The Value of Imputation Credits – Update 2004, Capital Research Pty Ltd, November 2004.

[53] J. Handley, (2009), Further Comments on the Valuation of Imputation Credits, Report Prepared by the Australian Energy Regulator, 15 April.

In arriving at its final estimate the AER acknowledges the considerable complexities associated with valuing gamma that have been recognised by market practitioners (and have also been the source of contention in previous regulatory debates). However, it is now of the view that…it is indeed possible to arrive at a reasonable empirical estimate of the value of imputation credits taking into account all the available evidence.[54]

However, we also observe that Handley's most recent report to the AER concludes that a reasonable estimate for gamma is within the range of "0.3 to 0.7".[55] This clearly *does not* support the notion that a definitive value for gamma can now be determined. As noted above, a number of recent reputable studies suggest that the value of gamma is zero and this evidence has been dismissed by the AER in favour to two single studies, one of which cannot be used to estimate a value for gamma.

Recommendation

In conclusion, therefore, we are not of the view that the results of the AER's review should be relied upon by the Authority. In our view, the value of gamma should be set at zero.

Inflation

Recognition of bias in indexed bond yields

Until relatively recently most Australian regulators based the estimate for long-term inflation on the forecast implied by the difference between (ten year) nominal and indexed Commonwealth Government bond yields, using the Fisher equation[56]. While there has always been liquidity issues in the Australian indexed bond market (based on its relative size), the Government's decision to cease the issuance of indexed bonds in 2003 had a significant impact on the depth and liquidity in this market.

It is now generally recognised that a bias exists in indexed bond yields, with the significant reduction in supply relative to demand putting upward pressure on prices (and hence downward pressure on yields). This problem was acknowledged by the Commonwealth Government in a letter to the ACCC in 2007:

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[54] Australian Energy Regulator (2009), Final Decision: Electricity Transmission and Distribution Network Service Providers - Review of the Weighted Average Cost of Capital (WACC) Parameters, May, p.410.

[55] Handley, J. (2009), Further Comments on the Valuation of Imputation Credits, Report Prepared by the Australian Energy Regulator, 15 April, p.41.

[56] This specifies the following relationship: (1 + nominal rate) = (1 + real rate)(1+ inflation)

The Australian Government's suspension of issuance of these inflation-linked bonds, as well as increased demand for this asset class, is likely to cause market-implied inflation estimates to exceed consensus forecasts of inflation over the medium term.[57]

In its decision in relation to SP AusNet the AER set out its reasons for departing from estimating implied inflation based on the Fisher equation. While it confirmed that a market-based approach is preferable to any other method, at the current time it is "...not aware of a reliable market based alternative that can be mechanistically applied in a similar way to these measures."[58] In the absence of a reliable market-based estimate, a forecast of inflation needs to be used.

In its SP AusNet decision, the AER gave explicit consideration to the source and horizon of inflation forecasts and concluded that the RBA's forecasts should be given the most weight. It also acknowledged the difficulties in reliably forecasting inflation over a long horizon, with the RBA's forecasts only going out as far as two years. It therefore determined to estimate a long-term average based on the RBA's forecasts for the first two years (as published in its *Statement of Monetary Policy*), and then assuming 2.5%, being the mid-point of the RBA's target band for inflation, after that. In its letter to the ACCC the Commonwealth Government had recommended basing the forecast on this mid-point:

> We therefore recommend that the ACCC uses the mid-point of the RBA's target band for inflation (that is, 2.5 per cent per annum) as the best estimate of inflation. Since the independence of the Reserve Bank Board in conducting monetary policy was formalised in March 1996, annual inflation has averaged 2.5%.[59]

Recommended approach

In the absence of a reliable, forward-looking measure of the bias in indexed bond yields, market data cannot be applied to derive a reasonable estimate for long-term inflation, at least at the current time.

Most of the recent regulatory decisions in relation to inflation have departed from the Fisher approach in recognition of the bias in indexed bond yields. The most appropriate approach at the current time is the one that has been adopted by the AER,

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[57] Commonwealth Treasury (2007), The Treasury Bond Yield as a Proxy for the CAPM Risk-free Rate, Letter to the ACCC, 7 August, p.1.

[58] Australian Energy Regulator (2008), Final Decision: SP AusNet Transmission Determination 2008-09 to 2013-14, January, p.102.

[59] Commonwealth Treasury (2007), op.cit.

which estimates a long-term average based on the RBA's forecasts for the next two years and the mid-point of the target range for inflation after that.

The updated forecasts (based on the RBA's August 2009 *Statement of Monetary Policy*) are provided in the following table.

Table 8   Inflation Forecast (from 1 July 2009 to year ending 30 June 2019)

2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	Average
2. 5%	2%	2.25%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	**2.43%**

Source: Reserve Bank of Australia (2009), Statement on Monetary Policy, 7 August.

Based on an arithmetic average, the resulting forecast for inflation is 2.43%.

Conclusion: WACC calculations

Based on our recommendations provided above, a 'lower' and 'upper' bound for GAWB's WACC is as follows. We have also presented the results from the previous decision.

Table 9   Recommended WACC Estimate

Parameter	2005 Decision	Recommended lower bound	Recommended upper bound
Risk-free rate[a]	5.45%	5.61%	5.61%
Debt to total value	50%	50%	60%
Equity to total value	50%	50%	40%
Debt margin[b]	1.32%	3.11%	5.56%
Debt raising costs[c]	0.125%	0.125%	0.125%
Market risk premium	6%	6%	7%
Gamma	0.5	0	0
Tax rate	30%	30%	30%
Asset beta	0.4	0.4	0.4
Debt beta	0.11	0	0
Equity beta[d]	0.65	0.68	0.82
Cost of equity	9.33%	9.69%	11.35%
Cost of debt	6.77%	8.85%	11.30%
Post-tax nominal WACC	8.05%	9.27%	11.32%

a Our range based on a 20 day average for the period ending 30 June 2009.

b Lower bound of range based on Bloomberg 20 day average for 8 year BBB bonds plus the margin between and A-rated 8 and 10 year bond, for the period ending 30 June 2009. Upper bound based on 20 day average of CBA Spectrum's fair value BBB yield curve over the same period. Before debt-raising costs.

c The estimate from the Authority's 2005 decision is already reflected in the debt margin.

d Based on the Conine formula.

The lower bound applies similar values to the Authority's 2005 decision, with the exception of:

- the debt margin, which is the key driver of the higher WACC. This simply reflects current market rates (and more specifically, the blow out in credit spreads following the sub-prime crisis);

- an assumed debt beta of zero; and

- a gamma of zero (which has a relatively minor impact on the WACC but a more material impact on the cashflows).

Where we have specified ranges, the point estimates we would recommend for each parameter are as follows:

- debt risk premium: 4.34% (mid-point);

- market risk premium: 6.5% (mid-point).

We have not specified a point estimate for gearing as we are of the view that GAWB should be able to sustain a level of debt within this range. However, particularly given the impacts of the global financial crisis on the ability of BBB-rated firms to raise debt, we are of the view that an estimate from the lower bound of this range remains appropriate for GAWB at the current time.

There is an anomalous result in relation to the upper bound estimates that needs to be highlighted here, which is that the cost of equity is only slightly higher than the cost of debt. Such an outcome is not consistent with finance theory or market realities.

There are two possible reasons for this. First, the cost of debt reflects the impact of the global financial crisis (via the higher debt margin), whereas no specific adjustments have been made to the cost of equity to reflect this impact. While there are some issues in accurately estimating the cost of long-term BBB debt that we have highlighted here, the fact that it is significantly more difficult, and expensive, for a BBB rated borrower to raise funds for such terms (particularly compared to 2005) should not be in dispute.

Our cost of equity has not been specifically adjusted to reflect the impact of the crisis, with our recommendations reflecting our assessment of the appropriate long-term values for each parameter (the risk-free rate is based on current market data). It is possible that the actual return on equity that may be required by investors in the current environment is considerably higher than what is reflected here.

For example, in making its recent decision to increase the value of the MRP, the AER hypothesised that it is possible that the conditions following the global financial crisis reflect a structural change, however it is difficult to determine if this is the case. The paper previously cited by Officer and Bishop was noting short-term estimates of the MRP of between 16% and 18%, compared to our recommended estimate of 6.5%.[60] At the same time, it is not considered appropriate to put such numbers forward as an estimate of the long-term, forward-looking MRP (unless evidence of structural change had emerged), nor do we consider it appropriate to attempt to make some sort of ad hoc adjustment to correct for the anomaly we observe here.

The second issue that is evident is that the extent of the 'anomaly' is very sensitive to the gearing assumption. If we retain all of our other upper bound assumptions but reduced the level of gearing to 55%, the cost of equity falls below the cost of debt.

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[60]   Professor B. Officer and Dr. S. Bishop (2009), op.cit.

While we would naturally expect that the cost of equity will increase at a higher level of gearing, it should not hold that the cost of equity will be lower than the cost of debt at a reasonable level of gearing. This results in an outcome that is inconsistent with accepted theory (and logic). This may suggest there is a problem with the underlying methodology. We have not sought to investigate this issue in any more detail at this stage.

Appendix C – Capital contribution framework

A.1. Principles for treatment of past capital contributions

1.   Recognition of past capital contributions

The QCA's previous decision(s) regarding recognition of past capital contributions should be preserved.

2.   Derivation of corresponding pricing benefits

The QCA's current (2005) approach to the derivation of pricing benefits corresponding to past capital contributions should be continued.

- The QCA's current approach to the calculation of customer rebates (undertaken as part of the 2005 review) involves:

    – identification of the contributed asset
    – valuation of the contributed asset, based on a DORC approach and
    – calculation of the return on capital and return of capital components, as relevant.

- Where a contributed asset is *shared* amongst a group of water users, the corresponding customer rebate is apportioned between users based on contracted volumes.

- This approach should be continued for the purposes of determining any *future* pricing benefits corresponding to past capital contributions, except where the following circumstances apply:

    – the regulatory treatment of the contributed asset changes, i.e., if the QCA were to re-value, rather than roll-forward, the value of contributed assets at a future regulatory review, and/or
    – one or more users of a shared contributed asset elects to purchase less water from GAWB than initially agreed (i.e. reduce their water reservation).

- If either of these circumstances arise, GAWB may *revise* the quantum of future pricing benefits corresponding to past capital contributions, so that the amount rebated to customers better reflects these new circumstances.

3.   Accommodating new customers

To the extent that accommodating a new customer affects the original capital contributing customer, GAWB may elect to revise the pricing agreement in place with that customer, such that the rebate amount better reflects this change in circumstance.

Specifically, where a new customer begins using a contributed asset, GAWB would consider each of the following options (or any combination of these options) ahead of determining the most appropriate response to the change in use of the contributed asset:

Option 1

- GAWB may choose to refund the whole capital contribution amount, or any part thereof, to the original capital contributing customer.
- GAWB would *not* seek any capital contribution from the new customer(s).
- In deriving the refund amount, GAWB may consider any of the following matters:

  – the original capital contribution amount
  – the nature of the original capital contribution
  – the DORC value of the contributed asset at the time the change in use of the contributed asset occurs
  – the length of time that has lapsed between when the contributed asset was built (for the sole use of the original capital contributing party), and the asset being used by a new customer
  – how the original capital contributing party is impacted by the new customer using the contributed asset (if at all). This may involve considering:

    – the particular requirements of the new customer
    – the terms of the water supply agreement established with the new customer, including:

      · the contract duration, i.e. how long the new customer will use this asset
      · the volume of the contract (including relevant reservation clauses) and so on.

Option 2

- GAWB would seek a capital contribution from the new customer(s).
- GAWB would use some or all of this contribution to refund the whole capital contribution amount, or any part thereof, to the original capital contributing customer.
- In deriving the refund amount, GAWB may consider any of the following matters:

  – the original capital contribution amount
  – the nature of the original capital contribution
  – the DORC value of the contributed asset at the time the change in use of the contributed asset occurs
  – the length of time that has lapsed between when the contributed asset was built (for the sole use of the original capital contributing party), and the asset being used by a new customer
  – how the original capital contributing party is impacted by the new customer using the contributed asset (if at all). This may involve considering:

    – the particular requirements of the new customer
    – the terms of the water supply agreement established with the new customer, including:

      · the contract duration, ie, how long the new customer will use this asset
      · the volume of the contract (including relevant reservation clauses) and so on.

Option 3

- GAWB would elect not to return any amount to the original capital contributing customer.
- This option would only be pursued if it can be demonstrated that there was no detrimental impact to the agreed pricing benefit due to the original capital contributing customer.

Irrespective of precisely how GAWB proceeds in this circumstance, GAWB will ensure that:

- the value due to the original capital contributing party is preserved, with reference to the calculation methodology of the current pricing benefit and
- the rebate provided to a customer is no greater than the return on capital and, if appropriate, return of capital components of the price. This would be achieved by way of a lump sum payment to the original capital contributing customer consistent with Option 1.

A.2. Principles for treatment of new capital contributions

1.   Identification of the basis for the capital contribution

GAWB may seek a capital contribution from customers in order to manage the risks associated with construction of new significant infrastructure.

These risks include:

- changes in customer circumstances that would prevent GAWB recovering the full cost of the asset over its useful life, and
- the construction of customer specific infrastructure that may not be suitable for common customer requirements.

2.   Identification and classification of the contributed asset(s)

At the time a new capital contribution is made, contributed network assets must be identified by GAWB as one of the following:

- a dedicated connection asset or
- an extension asset or
- a shared network asset.

The pricing agreement that is established between GAWB and the capital contributing customer(s) must explicitly state how the asset has been classified, using the following definitions:

- a dedicated connection asset – an asset that is installed for the sole use of the connecting customer and is expected to remain for the sole use of that customer at all times over the life of the asset
- an extension asset – an asset that is installed to lengthen or otherwise extend the existing system to facilitate the connection – these assets may commence their lives as dedicated assets, i.e., in GAWB's case, linking a single customer to the relevant supply zone network, but later become shared as additional customers connect by means of that same spur line, and
- a shared network asset – an asset that constitutes part of the shared network.

3.   Establishing whether a pricing benefit is appropriate
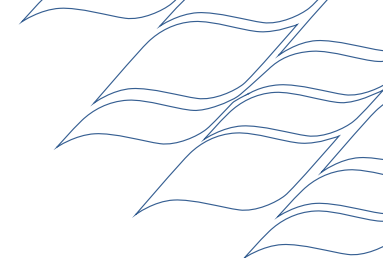
Where a new capital contribution is made, GAWB will determine whether a corresponding pricing benefit should apply and include an explicit statement in the pricing agreement to that effect.

In determining whether a pricing benefit is appropriate, GAWB may consider:

- whether the contributed asset is recognised in the firm's regulated asset base and the supply charges derived by reference to that asset base
- the intent and actions of the contracting parties at the time (as implied by the contract in place), and
- the nature of the risk-sharing arrangements between the contracting parties.

4.   Deriving the quantum of any pricing benefit amount

Where GAWB determines that a pricing benefit should apply, GAWB will include an explicit statement in the pricing agreement that sets out the quantum of that pricing benefit, and how it will be calculated over the life of the contributed asset.

In deriving the quantum of any pricing benefit amount, GAWB may consider:

- the s36 pricing practices
- the intention of the contracting parties at the time the capital contribution is made
- how the pricing benefit will evolve over time as the asset depreciates
- whether the pricing benefit provides appropriate investment signals (where investment decisions are effectively being driven by customers)
- whether future changes in the circumstances surrounding the use of contributed assets are provided for, i.e., if a dedicated asset were to become part of the shared network or, one or more users of a shared contributed asset reduce their water reservations, and
- the consequences of any future change in the regulatory treatment of the contributed assets, i.e., the asset valuation methodology.

If either of the latter two circumstances arise, GAWB may *revise* the quantum of future pricing benefits corresponding to past capital contributions so that the amount rebated to customers better reflects these new circumstances.

5.   Establishing arrangements for accommodating new customers

GAWB will include an explicit statement in the pricing agreement that sets out the arrangements that will apply in the event a contributed asset is subsequently used by other customers.

This statement will include, as relevant:

- the circumstances in which access to that asset will be provided to other customers
- GAWB's approach to re-classifying the contributed asset, based on the asset definitions set out in this framework, and
- how GAWB intends to revise (if at all) the quantum of pricing benefit that will apply in the event the contributed asset is subsequently used by other customers.

This will necessarily involve GAWB setting out the arrangements for allocating the cost of the contributed asset amongst users. Specifically, where a new customer begins using a contributed asset, GAWB would consider each of the following options (or any combination of these options) ahead of determining the most appropriate response to the change in use of the contributed asset:

Option 1

- GAWB may choose to refund the whole capital contribution amount, or any part thereof, to the original capital contributing customer.
- GAWB would *not* seek any capital contribution from the new customer(s).
- In deriving the refund amount, GAWB may consider any of the following matters:

    - the original capital contribution amount
    - the nature of the original capital contribution
    - the DORC value of the contributed asset at the time the change in use of the contributed asset occurs
    - the length of time that has lapsed between when the contributed asset was built (for the sole use of the original capital contributing party), and the asset being used by a new customer
    - how the original capital contributing party is impacted by the new customer using the contributed asset (if at all). This may involve considering:

        - the particular requirements of the new customer
        - the terms of the water supply agreement established with the new customer, including:

            · the contract duration, i.e., how long the new customer will use this asset, and
            · the volume of the contract (including relevant reservation clauses), and so on.

Option 2

- GAWB would seek a capital contribution from the new customer(s).
- GAWB would use some or all of this contribution to refund the whole capital contribution amount, or any part thereof, to the original capital contributing customer.
- In deriving the refund amount, GAWB may consider any of the following matters:

    - the original capital contribution amount
    - the nature of the original capital contribution
    - the DORC value of the contributed asset at the time the change in use of the contributed asset occurs
    - the length of time that has lapsed between when the contributed asset was built (for the sole use of the original capital contributing party), and the asset being used by a new customer
    - how the original capital contributing party is impacted by the new customer using the contributed asset (if at all). This may involve considering:

        - the particular requirements of the new customer
        - the terms of the water supply agreement established with the new customer, including:

            · the contract duration, i.e., how long the new customer will use this asset, and
            · the volume of the contract (including relevant reservation clauses), and so on.

Option 3

- GAWB would elect not to return any amount to the original capital contributing customer.
- This option would only be pursued if it can be demonstrated that there was no detrimental impact to the agreed pricing benefit due to the original capital contributing customer.

Irrespective of precisely how GAWB proceeds in this circumstance, GAWB will ensure that:

- the value due to the original capital contributing party is preserved, with reference to the calculation methodology of the current pricing benefit and
- the rebate provided to a customer is no greater than the return on capital and, if appropriate, return of capital components of the price. This would be achieved by way of a lump sum payment to the original capital contributing customer consistent with Option 1.

Appendix D – Pricing zones

Zone	Start of zone	End of zone
Source Zone		
Awoonga (including CSS preparatory expenditure)	Dam catchment	Inlet to Awoonga Dam Pump Station

Raw Delivery Network Zones

Awoonga to Fitzsimmons Street Reservoir	Awoonga Dam Pump Station	Fitzsimmons Street 50ML Reservoir
Boyne Raw	Toolooa Junction (Boyne Raw Spur Connection)	Customers
Fitzsimmons Street Reservoir to Gladstone Water Treatment Plant (GWTP)	Outlet from Fitzsimmons Street 50ML Reservoir & 16ML bypass line	450mm & 600mm inlets to GWTP
QAL Raw	Junction on 16ML bypass line & outlet from GWTP backwash recovery	Customers
North Industrial Raw	Mt Miller pipeline junction between Toolooa & Fitzsimmons Street Reservoirs Junction on Fitzsimmons Street Reservoir to GWTP 1200mm pipeline	RTAY connection (including connection) on 500mm pipeline Fisherman's Landing Raw
Yarwun	Junction to Yarwun Water Treatment Plant on Hanson Road Pipeline	Inlet to Yarwun Water Treatment Plant
Fishermans Landing Raw	After RTAY connection	Customers

Water Treatment Plants
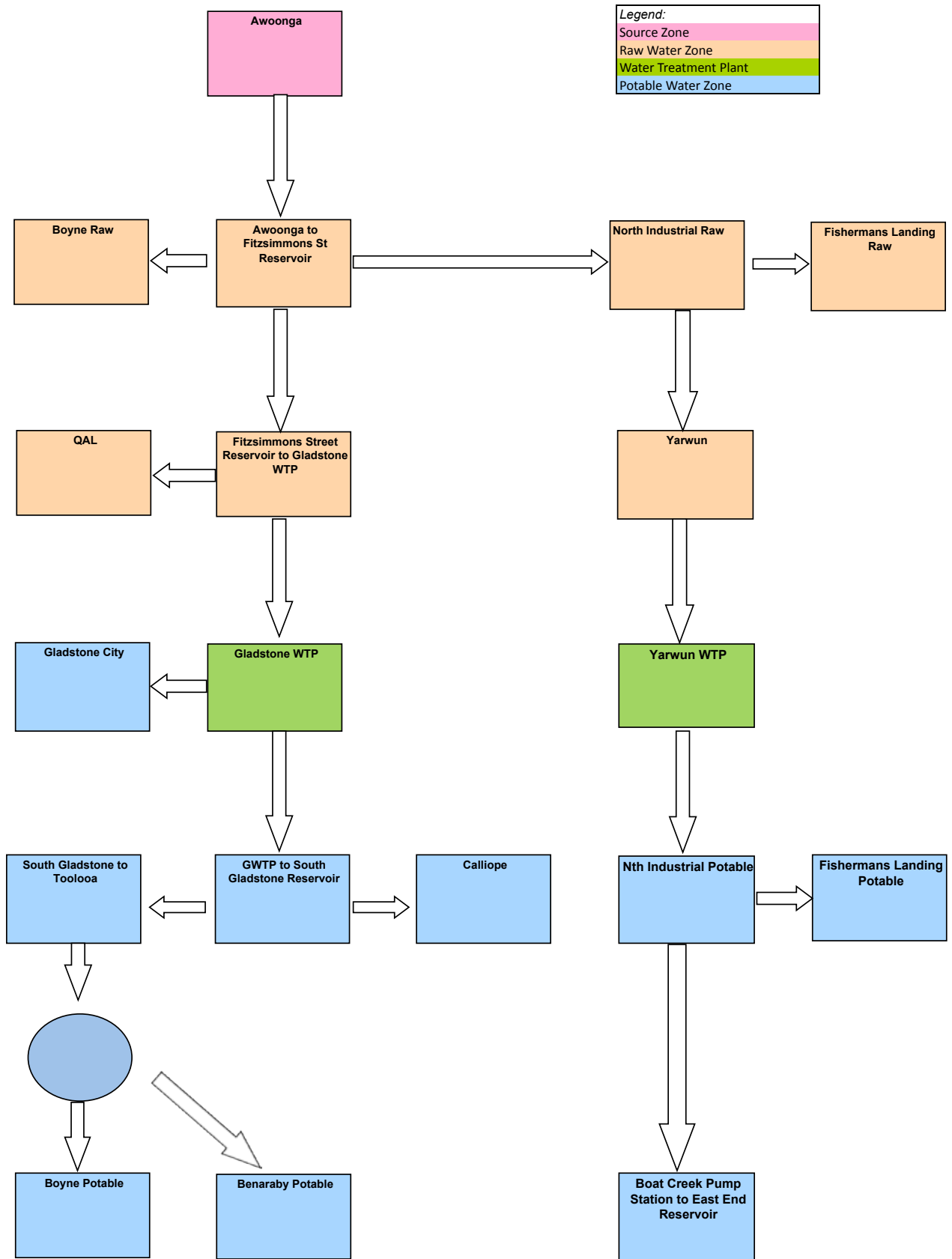
Yarwun Water Treatment Plant	Yarwun Water Treatment Plant - Inlet Isolation valve	Yarwun Water Treatment Plant
Gladstone Water Treatment Plant	Gladstone Water Treatment Plant - Manifold Inlet	Gladstone Water Treatment Plant

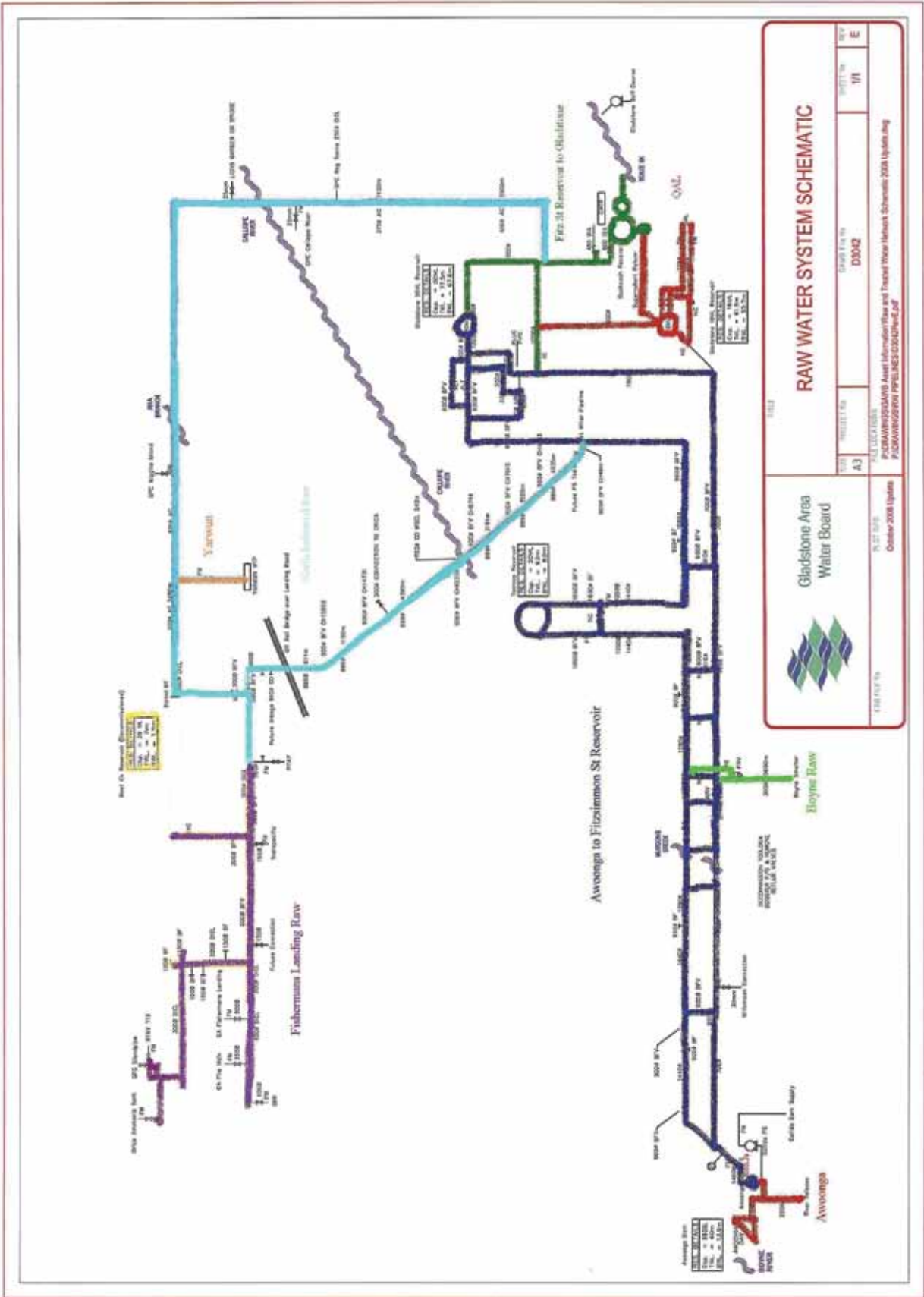| Zone	Start of zone	End of zone

Potable Delivery Zone

North Industrial Potable	Outlet from Yarwun Water Treatment Plant	Inlet to Boat Creek Pump Station
Fishermans Landing Potable	Junction at Boat Creek Pump Station	Customer
Boat Creek Pump Station to East End Reservoir	Boat Creek Pump Station	East End Reservoir outlet, Customers
Gladstone City	Low lift outlet from GWTP	Glenlyon Rd Junction, Customers
GWTP to South Gladstone	High lift outlet from GWTP	South Gladstone 9.1ML Reservoir, Round Hill/Glenlyon Rd Junction, Customer
South Gladstone to Toolooa	Outlets from South Gladstone Reservoir	Toolooa to Boyne Junction
Calliope	Outlet from South Gladstone 9.1 ML Reservoir	Mt Elizabeth Reservoir Junction, Customers
Boyne Potable	Toolooa to Boyne Junction	Boyne Island Reservoir, Customers
Benaraby Potable	Toolooa to Boyne Junction	Golegumma Reservoir, Customers

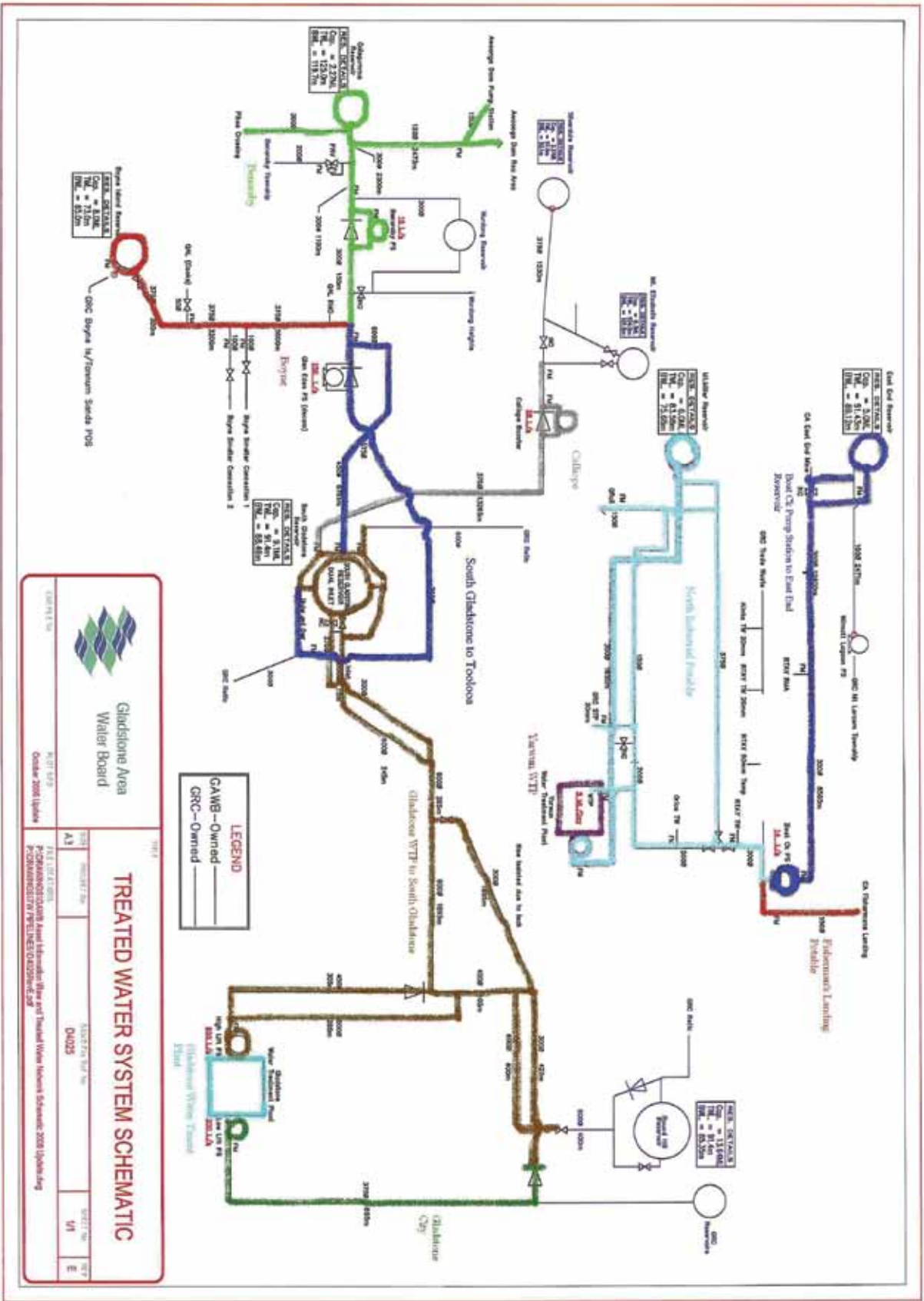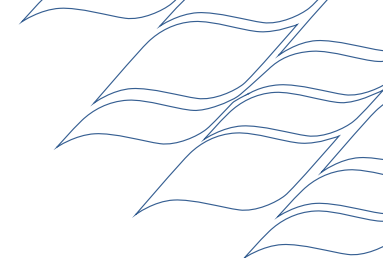# Gladstone Area Water Board
1/7/10 - 30/6/15 Pricing Cascade

Legend:
Source Zone	
Raw Water Zone	
Water Treatment Plant	
Potable Water Zone	

Awoonga

Boyne Raw

Awoonga to Fitzsimmons St Reservoir

North Industrial Raw

Fishermans Landing Raw

QAL

Fitzsimmons Street Reservoir to Gladstone WTP

Yarwun

Gladstone City

Gladstone WTP

Yarwun WTP

South Gladstone to Toolooa

GWTP to South Gladstone Reservoir

Calliope

Nth Industrial Potable

Fishermans Landing Potable

Boyne Potable

Benaraby Potable

Boat Creek Pump Station to East End Reservoir

RAW WATER SYSTEM SCHEMATIC

Gladstone Area
Water Board

TREATED WATER SYSTEM SCHEMATIC

Appendix E – Pricing principles (current)

Please note: This document represents the current pricing principles that have been adopted by GAWB from recommendations made by the Authority following its investigations (completed in 2002 and 2005), to the extent that these recommendations have been accepted by the QCA Ministers. These principles have not been updated to reflect any proposals made by GAWB in this submission. This document has been provided for information purposes only.

Purpose

The contents of this document are intended to accord with the recommendations that were made by the QCA following its investigations (completed in 2002 and 2005) into the pricing practices of GAWB to the extent that these recommendations have been accepted by the QCA Ministers.

The contents of this document are intended to describe GAWB's general pricing principles and not to distinguish between the application of these principles to different services (for example those detailed in a Water Reservation and Storage Contract and those detailed in a Water Delivery Contract).

Key principles

As detailed in GAWB's Commercial Water Supply Policy (dated 23 August 2004) the price paid for the reservation and storage of water should:

- be cost reflective, forward looking, ensure revenue adequacy, promote sustainable investment, ensure regulatory efficiency and take into account matters relevant to the public interest
- provide an appropriate signal for consumption and investment by reflecting the impact of current consumption on future augmentation, and
- thus should not exceed a level necessary to achieve economic efficiency and revenue adequacy, and promote the public interest.

Price differentiation on the basis of service quality, credit risk, length of contract and for other differences is appropriate to the extent that the proposed response is commensurate with the cost/risk of service provision.

The cost of common infrastructure should be allocated to all existing and expected new customers, provided the costs represent the least cost option to meet projected demand.

Pricing methodology

The first step in calculating prices is to determinate an Aggregate Revenue Requirement (ARR) for GAWB in each year of a 20-year planning period.

The ARR will include:

- return on capital (including working capital)
- return of capital
- operating and maintenance cost recovery
- tax expense cost recovery
- an amount to recover the cost of drought mitigation and management
- an amount to recover present value of the price smoothing effects from the previous regulatory period
- recovery of an appropriate level of efficient operating, maintenance and administration expenditure and will incorporate the impacts of drought and
- an amount to recover the present value of the price smoothing effects from the previous review period (the Price Smoothing Carry-over).

The return on capital is the value of the GAWB's asset base plus working capital multiplied by a nominal, post-tax rate of return.

GAWB's asset base includes:

- land valued at market value
- easements valued at their historic cost indexed for inflation
- recreational facilities and fish hatchery assets valued at depreciated optimized replacement cost (DORC) and assets necessarily relocated in the process of creating new assets, valued at their cost of relocation, and
- the source, delivery system and other physical assets valued at DORC, including the full DORC of assets that have been partially or fully funded by capital contributions or subsidies.

Optimised replacement cost is an estimate of the current cost of replacing the asset with one which can provide the required service potential in the most efficient way possible. Optimization decisions are based on a brownfields 'incremental' approach. That is, optimisation is based on the premise that the existing assets would be replaced using fundamentally the same configuration (and reflecting the pre-existing constraints) as used presently. Under such approach, costs associated with the staging of development of the assets are incorporated in the asset base if such staging is considered optimal.

The asset base will include an allowance for capital expenditure reasonably expected to be undertaken during the planning horizon. Any augmentation should provide the least cost solution for meeting reasonably envisaged demand with any resulting surplus of capacity incorporated into the asset base.

Recognised contributed assets (which have been accepted as a capital contribution) should be included in the asset base for the purpose of determining the revenue requirement and prices.

A working capital allowance should be determined on the basis of debtors less creditors, plus inventories.

The rate of return will be based on the Capital Asset Pricing Model and consistent with the rates of return decisions made for infrastructure businesses by Australian jurisdictional regulators.

GAWB's cost of tax will be included in the ARR using the statutory rate.

Return of capital (or depreciation) of assets will utilize the straight-line method for all assets that are subject to depreciation.

The Price Smoothing Carryover will be based on the difference between the smoothed price revenue and the annual revenue that would result from the use of the building block approach, with annual differences capitalized to the commencement of the next review period using the rate of return applicable for the previous review period. The sum of the capitalised amounts carried forward from the previous review period will be subject to price smoothing on a forward-looking basis.

Allocation of ARR to system components and off-takes

Where direct costs can be forecast for components of the source and/or delivery system (operating expenditure, planned maintenance, electricity, etc), these costs should be allocated to components of the source and/or delivery system based on the forecasts.

Other asset-related costs (unplanned maintenance, etc) should be allocated to components of the source and delivery system by share of direct costs.

The sum of costs allocated to each source and delivery system component is called a "cost pool". Cost pools are allocated to off-takes based on relevant cost drivers, which will be reviewed from time to time.

Administration costs will be allocated directly to customers on the basis of relevant cost-drivers, which will be reviewed from time to time. The current allocation assigns 10% of general administration costs (billing, customer contract administration, customer enquiries, pricing, etc) on a per customer basis. The remaining 90% is currently allocated on a weighted volumetric basis with weights selected to reflect the relative administrative effort of managing water sources, raw water delivery and treated water delivery.

Setting prices

Two-part tariffs will be developed for both storage and delivery services for each customer.

A constant real price will be set for each source and network segment so that the revenue recovered (assuming the preferred planning demand scenario volume) over the planning horizon will equal the present value of allocated ARR.

The real price will be divided into volumetric and access components. The volumetric component will be based on the estimated Long Run Marginal Cost (LRMC). LRMC will be estimated using the Average Incremental Cost method.

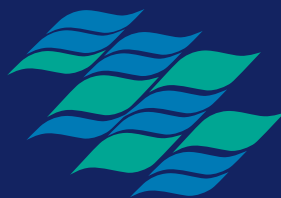The residual amount will be the access component.

Customers are entitled to price rebates where those customers have made capital contributions and where there is sufficient evidence (such as of a contractual nature) that the contribution was made with the intent of obtaining future price benefits provided that:

• the contribution is not a prepayment for services
• has not been fully repaid or rebated, and
• the associated assets have not expired or have been replaced at the service provider's expense.

The price rebate will generally only be available to the customer making the capital contribution. That is, unless otherwise agreed between GAWB and the customer making the original capital contribution, GAWB will set prices to cover the full return on and return of capital for any new customer connecting to, or using, the contributed asset.

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