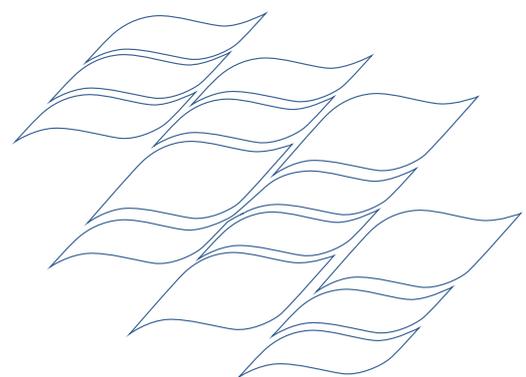


Appendix 1

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Planning Period Demand
(Nera Economic Consulting)



30 November 2009

**QCA 2010 Price Review -
Planning Period Demand
Forecasts**
Gladstone Area Water Board

NERA

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1. Introduction

This report has been prepared in response to a number of matters that you have asked me to consider in relation to Gladstone Area Water Board's (GAWB's) planning period demand forecast and its implications for the time profile and level of water supply prices arising in the context of the Queensland Competition Authority's (QCA's) 2010 review of GAWB's pricing practices.

The principal question you have asked me to address is the most appropriate way for GAWB to set its demand forecast (particularly in years outside the five year regulatory period) in order:

- § to achieve the reduction in the risk of under-recovery of target revenue achieved by adopting a conservative demand forecast in the first 5 years of the planning period; and
- § to balance the interests of current and future customers.

You have identified 'an economic basis' for achieving this latter objective (ie, balancing the interests of current and future customers) as being the most important deliverable.

I have structured this report by first setting out in section 2 a short summary of the context in which the questions you have posed arises. This is followed in section 3 by a discussion of the original objectives that guided the adoption of a 20 year planning period and then a suggested approach to planning period demand for the period 1 July 2010 through to 30 June 2030 that will now best meet those objectives. A final section 4 concludes.

2. Relevant Context

GAWB is in the process of having its pricing principles and practices reviewed by the QCA, in a process ('the 2010 price review') that will determine the prices to be applied by it for the five year period from 1 July 2010 through to 30 June 2015. This is the third review of GAWB's pricing practices that has been conducted by the QCA, with the most recent review having determined prices to apply for the period 1 July 2005 through to 30 June 2010 ('the 2006-2010 regulatory period').

2.1. Twenty year planning period

Notwithstanding that GAWB's prices are determined for periods of five years at a time, the QCA has conducted its last two reviews by establishing cost building blocks and corresponding annual revenue requirements over a 20 year forecast period. The basic mechanics of this process involve:

- § establishing building block cost forecasts (at the level of each source and network segment) over a 20 year 'planning period';
- § determining a target revenue for each source and network segment that matches the applicable 20 year building block cost forecasts in net present value (NPV) terms; and
- § setting a unit price for each source and network segment that is constant in real terms, and which delivers expected revenue that is equal in NPV terms to the 20 year building block cost forecasts identified above.

The significance of the 'constant real price' constraint in determining GAWB's annual revenue profile over the 20 year planning period is that:

- § GAWB's revenues over the period grow in line with its forecast demand; and
- § providing forecast water demand can be met from the existing capacity of GAWB's supply system, its building block costs are essentially flat in real terms over the period; and so
- § GAWB's achieved rate of return in the early years of the planning period is well below that which is required by its estimated cost of capital.

In order to ensure that GAWB's sub-normal rate of profit ('rate of return deficit') in the early years is made up later in the 20 year planning period, when the price determination process is repeated at the subsequent price review (ie, to determine prices in year six of the 20 year period), the accumulated rate of return deficit is added to the forward looking revenue requirement from that year six (and year 11, etc, as the case may be).

The essential function of the 20 year planning period, in combination with the constant real price constraint, is to smooth GAWB's supply prices relative to what they would have been had a conventional five year building block process been adopted. The rationale for adopting this approach is that GAWB's supply system has a significant degree of spare capacity that is anticipated to be taken up by growth in large industrial customer demand later in the planning period. The adoption of the smoothing mechanism means that, provided no further large augmentations are anticipated within the 20 year planning period, a portion of the cost of

GAWB's current spare capacity is shifted from present to future customers. I discuss in more detail below that the principle of cost sharing between current and future customers was cited by the QCA as an explicit objective of the mechanism when it was first established.

Finally, it is worth noting that such a 20 year planning period approach to setting regulated prices is highly unusual, if not unique to GAWB. Equally, however, the circumstances of and outlook for demand growth from GAWB's customer base – that is, a relatively small number of very large customers with highly idiosyncratic factors governing the forecast customer demand – is also very unusual.

2.2. Implications of different demand forecasting approaches

One property of the 20 year planning period approach described above is that long term forecasts of demand growth (ie, those from year six and beyond) become critical for determining the level of prices (and so allowed revenues) that GAWB is allowed to set for the immediate five year period.¹ At one end of a spectrum, a conservative long term demand forecast implies higher prices, reflecting a reduced ability to spread the cost of spare capacity onto future customers (because there are forecast to be fewer such customers or quantities demanded).

At the other end, a higher demand growth forecast implies a greater ability to shift the costs of spare capacity towards those future customers, which implies lower prices throughout the period. However, there are limits to this process since, at some point, forecast demand begins to exceed current annual supply capacity and so GAWB's building block cost forecast needs also to accommodate the additional expenditure necessary to meet any demand above that threshold.

A sense of the orders of magnitude involved can be gained from the capacity-related parameters of GAWB's supply system. GAWB presently draws water from a single storage facility (Awoonga Dam), with an historic no failure yield (HNFY) of 70GL per annum, whereas its current estimated demand is 49GL per annum.

Water drawn from Awoonga Dam is supplied in either potable or non-potable form to a relatively small number of large customers. These customers principally comprise Gladstone Regional Council (which serves domestic consumers in the Gladstone area, but accounts for just 20 per cent of GAWB's total water demand) and a small number of large industrial concerns. Importantly, different tariffs are derived for each water supply zone, reflecting the different levels of service (eg, potable or non-potable) and the different average cost of supply for customers in each zone.

It should be noted that there is no suggestion that GAWB's present 'spare' capacity represents 'inefficiency'. Rather, because water supply capacity cannot be cost effectively provided in infinitely small (say, 1GL) increments, in combination with the agreed

¹ I note that a related but separable issue arises in the form of the risk that GAWB will under- (over-) recover its allowed revenue whenever its outturn current regulatory period demand is less (greater) than that originally forecast. This issue has been described and addressed in GAWB's September 2009 submission to the QCA, and is not discussed further here.

expectation that future demand in GAWB's supply region – particularly, the Gladstone State Development Area - is expected to grow, it is optimal for this spare capacity to exist.

The practical question that arises, therefore, is the extent to which prices should be smoothed forward using the 20 year planning period mechanism, so that a greater proportion of the cost of this spare capacity is pushed out in time, and so will be met by future customers (whom are amongst the beneficiaries).

2.3. GAWB's 2010 price review submission

In its 2010 price review submission to QCA, GAWB has prepared a demand forecast for the 20 year planning period that takes a conservative approach to future demand growth, both for the near term period from 1 July 2010 to 30 June 2015 ('the 2011-2015 regulatory period'), and then for the 'out years', being 1 July 2015 through to 30 June 2030. This approach has been given effect by including in forecast demand only that which is 'highly certain' and underpinned by customer contracts – referred to as "Base case" demand in Figure 7 of GAWB's Commercial Framework and Pricing Principles submission of September 2009.

The effect of applying this conservative demand forecast assumption is to give rise to a substantial indicated increase in the 20 year prices for the 2011-2015 regulatory period and beyond, as compared with those applying in the 2006-2010 regulatory period. An important reason for the increase is the conservative out-years' demand forecast, ie, since the demand growth projection adopted for 2016-2030 is slower than would be implied by a best or central estimate of future demand, there is less volume and fewer customers over which to spread the cost of GAWB's spare capacity, and so the near term indicated prices are higher.

Separate from the base case demand forecast used for determining GAWB's capital works expenditure and revenue forecast (and so the 2011-2015 regulatory period prices derived from its 20 year planning period), GAWB has also identified two other scenarios for 'uncertain demand', which it refers to as 'Upper bound' and 'Potential demand'. Upper bound demand is described as including, over and above that which is 'certain', demand that is:

"...considered to be sufficiently credible to ensure that capacity exists to meet these additional requirements upon the demand becoming certain."

Potential demand is described as including, over and above that represented by the upper bound, demand where:

"....the proponent has either made direct contact (or indirect contact via government) with GAWB, seeking an indication that it could meet the proponent's water requirements."

GAWB proposes to use these two alternative bases for forecasts of demand, respectively:

- § to define the parameters of capacity that is capable of deployment with certainty within a defined time frame as part of its Contingent Supply Strategy; and
- § to be monitored for the purpose of long term planning.

The following section discusses the original objectives that guided the adoption of a 20 year planning period, and then develops a suggested approach to planning period demand for the period 1 July 2010 through to 30 June 2030 that will now best meet those objectives.

3. Objectives and How Best to Meet Them

3.1. QCA's guiding principles

The QCA first developed and applied the concept of using a twenty year planning period for the setting of prices in the context of its 2002 investigation of GAWB's pricing practices. At that time, QCA's stated rationale² for the adoption of a 20 year planning period involved a range of considerations, ie:

- § the structure and level of prices over time should reflect both the long run marginal cost of supply and the objective of achieving revenue adequacy for GAWB;
- § given GAWB's infrastructure layout and its clearly defined (but different) activities and off-take points, its price structure should be segmented by reference to water supplied at the direct off-take point from Awoonga Dam (and so supplied without use of its delivery network), its four raw water off-take points (each with varying use of GAWB's delivery networks), and its principal potable water network (used to supply both municipal and industrial customers);
- § GAWB's operating environment is characterised by uncertain demand and capital augmentations that are typically lumpy and indivisible, which may result in 'excess capacity' being present for significant periods of time;
- § the then current raising of Awoonga Dam was appropriate in terms of long term least cost supply; and
- § the costs of this 'optimised excess capacity' should be built into the price for all GAWB's current and future anticipated customers.

In my opinion, these guiding principles were sound at the time, and remain so today. The latter principle is also consistent with GAWB's stated intention to balance the interests of current and future customers. However, in applying these principles in the context of the 2010 price review, there is opportunity to learn from the practical experience gained over the past seven or eight years, as well as the need to take into account the particular market circumstances in which GAWB operates.

3.2. Market context

A strong distinguishing feature of the market context in which GAWB's operates is not only capacity augmentation options that - as for most water supply entities - are typically 'lumpy' and 'indivisible', but also the potential for a relatively small number of substantial industrial development projects to proceed, thereby giving rise to a similarly lumpy and so highly uncertain demand outlook.

In addition to the more typical requirement to meet gradually changing water demand arising from its existing domestic customer base, GAWB must also meet the very substantial expected demands of a number of existing and potential industrial customers. For example,

² QCA, *Gladstone Area Water Board: Investigation of Pricing Practices*, Draft Report, November 2001, Executive Summary, pp2-3

GAWB's industrial and power station demand (82 per cent of total demand) exceeds that for domestic customers (18 per cent of total) by more than four to one. Further large, lumpy demand increments can also be expected from industrial concerns expected to locate in the Gladstone State Development Area.

The idiosyncratic nature of the vast proportion of GAWB's future demand means that long term demand forecasting largely amounts to a case-by-case assessment of a small number of individual projects. In such circumstances, there are severe limits on the extent to which the inherent uncertainty of future demand can be reduced.

3.3. Actions by GAWB to address demand uncertainty

GAWB's proposed response to the high intrinsic uncertainty surrounding its demand outlook has a number of dimensions. First, for the 2011-2015 regulatory period GAWB proposes to adopt a conservative approach to its demand forecast, based on commercial and industrial demand that is highly certain and underpinned by way of contract.

This is designed to avoid a repeat of the situation that developed in the current period, where a significant proportion of forecast demand did not materialise and GAWB suffered a revenue shortfall that it is now not able to make up. Such an approach is also consistent with the 'revenue adequacy' objective identified by the QCA in the context of its 2002 price review.

Second, GAWB has adopted an augmentation process framework³ that requires demand management options (as identified following canvassing from customers) to be explicitly considered before future any augmentations are committed. The principal purpose of this framework is to promote the efficient use of and investment in infrastructure.

Third, where capacity augmentations are identified as being necessary to meet any step increase in commercial and industrial demand, GAWB proposes⁴ that these will need to be contracted for, prior to final commitment of the substantive capital expenditure.

The combination of these options is apparently designed to minimise the risk of GAWB committing to future water supply capacity augmentations ahead of these being necessary. This minimisation of risk arises through ensuring that:

- § all viable demand management options that may substitute for additional supply capacity are explored before an augmentation decision is taken; and
- § all material increments to future industrial water demand are secured by way of long term contract, so that augmentation decisions can be made with a high degree of certainty.

The consequence of these arrangements is that there is no pressing need for near term water prices to signal the cost of future augmentations, until such time as there is a reasonable

³ GAWB, *Commercial Framework and Pricing Principles for the 2010 pricing review, A Submission to the QCA*, September 2009, pp17-21

⁴ GAWB, *Commercial Framework and Pricing Principles for the 2010 pricing review, A Submission to the QCA*, September 2009, p24

degree of certainty that those augmentations will be needed, as determined by the augmentation decision-making process identified above. Rather, for so long as the scale and scope of GAWB's next augmentation cannot be determined with a reasonable degree of certainty, a more appropriate priority for prices in the 2011-2015 regulatory period is to signal the desirability of making use of GAWB's current surplus water supply capacity.

3.4. Implications for planning period demand

The implication of these arrangements for GAWB's planning period demand forecast, and particularly for that element of the forecast for the period from 1 July 2015 through to 30 June 2030, are discussed below.

3.4.1. Relative importance of different objectives

Of the various potential objectives cited by the QCA in adopting a 20 year planning period, in my opinion the most important for taking account of the price effects of different potential options for the demand forecast over that period is that relating to the price smoothing of the cost of GAWB's current excess capacity, so that current customers do not bear that cost to a disproportionate extent.

GAWB's current surplus capacity has been put in place as a means of efficiently supplying expected future demand, and an explicit objective of the 20 year planning period is that those future customers bear some of the costs that would otherwise arise now. This is consistent with the fact that, were some adjustment not to be made, the conventional application of a five year building blocks approach to determining prices would mean that, as the utilisation of GAWB's existing spare capacity increases, the unit cost of supply will otherwise fall.

Such a time-profile of prices would not be consistent with the economic benefits of signalling the increased cost of capacity augmentations as they draw near (through relatively higher prices towards the end of the 20 year planning period), and of signalling the availability of spare capacity in the near terms (and so relatively lower prices towards the beginning of the 20 year planning period).

The corollary of this observation is that it is not a priority for GAWB's demand forecast and any associated expenditure projections to capture the cost of any potential further augmentation in the prices to be determined for the 2011-2015 regulatory period. This is because:

- § GAWB's demand projections are highly uncertain, which reflects the lumpy, idiosyncratic nature of the outlook for industrial development in the Gladstone State Development area in particular; and
- § GAWB also has in place comprehensive arrangements to ensure that all appropriate steps are taken (demand management options, contracts) to ensure that the right augmentation is made at the right time.

It follows that it is neither an achievable nor necessary role for GAWB's demand forecast to give emphasis to the objective of signalling the cost of the next potential augmentation, at least for the 2011-2015 regulatory period. Rather, the primary objective should be for it to achieve price outcomes that recover the cost of existing capacity in an efficient and equitable

manner. Indeed, if signalling the availability (or otherwise) of supply capacity was a priority, this would suggest an emphasis on a planning period demand forecast that gave rise to lower prices in the 2011-2015 regulatory period.

3.4.2. Giving effect to the desired pricing objective

Having established these principles, the question arises as to how best for them to be given effect. My recommendation is that this be achieved using a two step process, as described below.

First, set an aggregate demand forecast for the 2016-2030 period that assumes the entirety of GAWB's existing spare capacity (ie, 70GL, as may be varied in accordance with expectations of near term inflows to Awoonga Dam) will be used up by the end of the 20 year planning period.

Second, this aggregate demand should be 'allocated' to GAWB's four main network regions in line with the following high level estimate as to the relative location of future demand, ie:

- § industrial raw water, with no network delivery component – my understanding is that there is no reason to expect this element of GAWB's demand outlook to change materially from its current level, and so demand over and above that already contacted can be assumed to be zero;
- § municipal potable water demand, with network delivery – for this component of demand, it would seem appropriate to adopt an assumption that long term residential demand growth will continue to be consistent with established population and household water demand trends. Further, I note that the relatively small size of this component of GAWB's total demand is likely to mean that the pricing outcome for supply from this zone is unlikely to be highly sensitive to any growth assumption that is within a reasonable range;
- § industrial potable water demand, with network delivery – GAWB's current industrial customers use water in the ratio of 94 per cent raw and 6 per cent potable. In the absence of better information regarding the demand characteristics of expected future customers, it would be reasonable to adopt the same raw to potable ratio for expected demand for industrial potable water;
- § industrial raw water demand, with network delivery – my understanding is that this component of GAWB's future demand is that to which the greatest degree of uncertainty is attached, but yet for which the expectation is that growth is most likely to occur because it encompasses the Gladstone State Development Area to the north of GAWB's principal raw water delivery network. For both these reasons, this component of planning period demand should be used to take up the remaining annual amount to be allocated, in accordance with the overarching principle established above.

This latter assumption is consistent with the State's objectives for the Gladstone region, and with my understanding of GAWB's own experience as to the nature and location of enquiries by potential new industrial customers, and with the additional capacity that has been designed into GAWB's supply network.

4. Conclusion

The question of the most appropriate planning period demand forecast to achieve the objective identified by GAWB of balancing the interests of current and future customers, as manifested in the time profile of prices paid by those customers, should be addressed by reference to the original objectives cited by the QCA in establishing a 20 year planning period. Those objectives included a number of potential roles for the pricing element of the 20 year planning period, ie:

- § revenue adequacy;
- § signalling the long run marginal cost of supply; and
- § incorporating the cost of ‘optimised excess capacity’ into the price for current and existing customers.

All of these objectives would be assisted by adopting a planning period demand forecast that, in aggregate, assumed that the entire amount of GAWB’s current surplus capacity was used up by the end of the planning period. Further, the allocation of that demand between GAWB’s four main network regions should be such as to allocate the bulk of this end-point determined demand forecast profile to its network-delivered industrial raw water demand. Such an approach would be consistent with:

- § the QCA’s original objectives for the 20-year planning period mechanism;
- § the desirability of spreading the cost of today’s excess capacity so that it is shared with future anticipated customers who will make use of that capacity, even if the specific customers and dates from which they will benefit is not yet certain;
- § the objective of signalling the costs of future capacity only where the need for and timing of such capacity is reasonably assured; and
- § the outcome of the approach that QCA adopted at its 2005 review.

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