QCA review of irrigation prices

Supplementary information
Water distribution entitlements

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1 Introduction

The Queensland Competition Authority (QCA) is currently investigating irrigation prices to apply in 22 bulk water schemes and 8 distribution systems owned by SunWater.

To date, tariffs for customers in distribution systems have incorporated both bulk water and distribution costs. That is, they were 'bundled' in respect of the two services.

PricewaterhouseCoopers (PWC) prepared an issues paper on tariff structures, published by the QCA[1]. While this issues paper did not address bundled tariffs specifically, in its response SunWater set out the rationale for unbundling tariffs so that separate charges apply for bulk water services and distribution.[2]

In its Network Service Plans, SunWater set out the water access entitlements (WAE) supplied in each distribution system, and proposed that these be translated to water delivery entitlements (WDE) for the purpose of tariff setting in distribution systems.

The QCA has sought additional information about WDEs.

The purpose of this supplementary submission is to provide this further information and set out the rationale in more detail.

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1 PricewaterhouseCoopers. *Pricing Principles and Tariff Structures for SunWater's Water Supply Schemes. Issues Paper prepared for the Queensland Competition Authority by PricewaterhouseCoopers* (September 2010).

2 SunWater. Review of Irrigation Prices Pricing principles and tariff structures. SunWater Submission (January 2011).

2 SunWater's approach

The process of unbundling requires separate specification of a right to a share of water resource, referred to as a water access entitlement (WAE) and a delivery right which typically represents a right to a share of the distribution system. SunWater has called this delivery right a water delivery entitlement (WDE).

These WDEs have never been separately specified for pricing purposes, as irrigators in distribution systems have historically been charged a bundled price, referenced to their WAE. That is, fixed (Part A) charges for customers in distribution systems were applied against their WAE.

SunWater has proposed that fixed costs be recovered from a fixed charge, levied against customers' WDE. Accordingly the fixed charge would be calculated by dividing the fixed costs of the distribution system by the WDE in that system.

SunWater's approach requires WDEs to be established for pricing purposes. SunWater has proposed to specify WDEs as an annual volume, with that volume determined as being the amount of WAE held by each customer and serviced within each distribution system, at the time of preparing its NSPs. In summary, this approach:

- provides continuity to past units applied for the fixed charge;
- is able to be implemented with relative ease, from available data; and
- achieves a reasonable representation of a customer's share of network capacity, although SunWater acknowledges that this approach has some shortcomings in systems where there have been significant transfers of WAE into the system.

For clarity, SunWater *does not* propose that existing operational arrangements for sharing channel capacity or managing peak flow rates should change as a result of the creation of WDEs. Rather, WDEs are a unit used for pricing purposes, although they are representative of a customer's share of capacity in the system as a whole, and therefore a reasonable basis upon which to allocate fixed costs to users.

SunWater's proposed approach for initialising WDEs is simple to implement and can be performed at little cost. For example, the WDE data is already specified for each customer and is captured in SunWater's billing systems. This data also already exists for tariff setting purposes. This contrasts to other approaches (eg using instanteous flow rate or ML/day), which would involve a far greater technical analysis. Moreover, the existing arrangements for managing congestion do not always lend themselves to an easy translation of customer share of capacity.

Furthermore, customers are already familiar with their WAE, but in some systems they may be less familiar with other aspects of their specific access rights to the distribution system particularly in systems with little or no congestion.

SunWater's approach will also provide a seamless transition to unbundled prices in so far as the fixed charges will continue to apply on the same basis (effectively the same number of units) as before. In some systems (eg Emerald) there has been significant movement of WAE into the system over time, but no change to access conditions/peak flow rates or any corresponding capacity upgrades. In theory, it would be more appropriate to adopt the original WAE as the basis for initialising WDE as this would be more representative of shares in capacity. However, there are

information constraints in doing this, as most 'additional' WAE entered the distribution system in the 1990s and SunWater's systems do not store data dating back to this time. Adopting a (lower), original WAE will also result in the costs of the distribution system being recovered from a smaller base. Nonetheless, SunWater acknowledges there are merits to adopting the original WAE (where this can be established at an individual customer level), as it means that customers' fixed charges are better aligned to their share of capacity.

Under SunWater's proposed approach the amount of WDE in each scheme would be as follows:

Table 1. Summary of WDE by distribution tariff group

Distribution system	Tariff group(s)	WDE (ML/annum)
Bundaberg	Channel/Supplemented Watercourse	151,303
Burdekin-Haughton	Channel	290,001
	Gladys Lagoon	800
Eton	Channel(See Note 1)	53,879
Emerald	Channel	87,317
Lower Mary	Channel	9,952
Mareeba Dimbulah	Channel outside relift to 100ML	17,162
	Channel outside relift 100MLto 500ML	37,841
	Channel outside relift over 500ML	55,722
	Channel (relift)	8355
	Supplemented Streams and Walsh River	28,069
St George	Channel	50,788
Theodore	Channel	15,952

Note 1. This includes WAEs sourced from the Pioneer River scheme, and distributed to an industrial customer in the Eton Distribution System. Accordingly, costs will be apportioned to the WDE that relates to this industrial customer.

In the future, WDEs would not change with any changes to WAE owned by a customer, and would be maintained independently for tariff setting purposes.

Furthermore, a customer's WDE would apply regardless of the type of access to water, including whether they sourced water via a WAE, channel harvesting, temporary trade or other means. That is, fixed distribution charges would not change depending on how a customer sourced water.

The following section examines the relationship between the existing WAEs and a customer's share of distribution network capacity in more detail.

3 Distribution system design, management and water entitlements

Ideally, fixed charges (expressed in terms of WDEs) would relate to a customer's share of system capacity. It is therefore important to understand the basis upon which distribution capacity was determined and assigned. The table below provides a summary of the design basis for each system (where technical information is available) and a high-level summary of the current arrangements for managing access during times of peak demand through rosters or restrictions.

Table 2. Summary of distribution design assumptions and rationing arrangements

Distribution system	Basis of original farm flow rate	Rostering or restriction arrangement
Bundaberg	Supplying 100mm of irrigation water on-farm to 80% of the 1970 Total Gross Assigned area in 15 days. A 5 days on out of a 15 day roster was assumed.	0.95% of water access entitlement per day during peak demand, for WAEs that have been assigned a peak flow rate.
Burdekin	Old area (Clare, Millaroo and Dalbeg): Supply 3ML/day per 10ha of effective irrigable farm area with a minimum of 4.9ML/day per farm supplied under a 3 phase roster system (where effective irrigable area is 90% of total irrigable area). Each 3 consecutive farms formed a group requiring a minimum supply equal to the largest single demand in that group. Channel capacity was designed to meet the sum of minimum downstream group demand sand the largest of any farm within the immediate group.	Working supply rates have been established to distribute the flow rate capacity during peak demand, in proportion to the design flow rate for each farm. The Nominal Outlet Capacity is 1.42 litres/second/ha.
	New area: Supply a 75mm irrigation applied continuously over 12 days to 80% of the suitable soils of each farm at 90% efficiency. This is equivalent to approximately 8.3mm/ha./day. Barratta customers funded a system capacity upgrade from 8.3 to 10mm/ha/day in the mid 1990s Flow rates do not apply to areas of soils classified as unsuitable for irrigation.	
Emerald	Original criteria was to deliver 'Water Right' of 3ML per ha in 105 days. An additional 1ML /ha of Sales Allocation also applied. This was implemented as a supply rate of 25ML per day to each 200ha farm on a 1 in 3 roster system at 65% distribution efficiency.	Working supply rates have been established to distribute the available channel capacity during peak demand, in proportion to the original design flow rate for each farm
Eton	Provide water to customers on a 24-hour basis on a 1 in 3 roster, to 80% of the total area under production in 1987, in a 5-day period.	The roster system has been translated to a flow rate for each farm. During peak times, flow rates are reduced proportionally.
Lower Mary	Supply 100mm of irrigation water on-farm to 80% of the 1975 Total Gross Area assigned in 15 days. This translated to a 1 in 3 roster system.	Currently due to the pattern and level of demand, there has been no need to implement restriction arrangements nor specify peak flow rates.
Mareeba-Dimbulah	Supply 75mm of irrigation water to 50% of the tobacco suitable soils in 12 days. This translated to a flow rate of 1.1l/s/ha. A 1 in 3 roster system was assumed during design and implemented in distribution system. The Arriga section of the system was upgraded to 1.6l/s/ha in 1990s to meet the greater demands for water from the sugar industry as it developed in the area.	Working supply flow rates have been determined for each farm, and apply during peak times. A roster system is also applied.
St George	St George Main Channel - Supply of 'water right' in 105 days, equating to an application rate of 5.1mm/day for the irrigable area serviced by each channel. Thuraggi and Buckinbah Main Channel supply of	Peak flow rates have been determined for individual parcels of land, and apply during peak periods.

Distribution system	Basis of original farm flow rate	Rostering or restriction arrangement
	water right in 95 days, equating to an application rate of 6.1mm/day for the irrigable area. The channel system was upgraded in the late 1990s to achieve a minimum supply standard of 10mm/day to the cumulative irrigable area. This corresponded with the release of further WAE into the distribution at auction in 1989.	
Theodore	The distribution system was first developed in 1927. Because of the age of the scheme, SunWater has not been able to find the original basis for the design.	Working supply rates have been established to distribute the flow rate capacity during peak demand, in proportion to the design flow rate for each farm.

It is important to note from the table above that the original design capacity of distribution systems were referenced to an area to be irrigated, and a volume and rate at which irrigation would occur. The volume of water to be irrigated was set having regard to the need for irrigation water (eg surplus to rainfall), soil conditions, types of crops expected to be grown etc .While this drove the design parameters for the system, it also was used as the basis for granting water entitlements to farms. That is, water entitlements were originally issued to farms on a ML/ha basis that was consistent with the design assumptions for the distribution system. For example:

- in Bundaberg, entitlements were originally assigned to land at a rate ranging from 3ML/ha to 6ML/ha for various parts of the network, depending on whether the land was subject to a cane assignment or used for tobacco or other vegetable production.
- in Eton, entitlements were originally assigned at between 2.7ML/ha to 3.6ML/ha of land under production at 1990, depending on location in the network;
- in St George, entitlements were originally assigned at 4ML/ha, which increased to 5ML/ha of irrigable land.

The aggregate entitlements allocated to land have generally remained stable over time in most distribution systems. However, in some systems, additional WAE were granted or sold and entered the distribution system in later years. Where this occurred, capacity issues were dealt with in either one of the following three ways:

- Capacity upgrades to the system – for example, as occurred in the Arriga section of the Mareeba-Dimbulah system in response to the development of the sugar industry in that area. The upgrade in the St George system is another example (refer Table 2);
- changes to the roster or flow rate arrangements – under these arrangements, additional WAEs were made available for delivery into the distribution system on the basis of a change to peak flow rates. For example, additional WAE to be made available for delivery in the Bundaberg system from Paradise Dam was done so by reducing the peak flow restrictions from 1% of WAE to 0.95% of WAE. This was preferred to funding capacity upgrades (refer also to Box 1 below);
- no corresponding change to flow rates – in some cases, additional WAE was made available without any corresponding changes to flow rates or access. For example, in Emerald additional WAE was made available into the system during the 1990s.

However, restrictions during times of peak demand continue to based on the original WAE.

SunWater acknowledges that in the final case, the aggregate amount of WAE in a system could be considered materially higher than the actual WAE against which customers' access conditions and peak flow rates were originally referenced. Accordingly, it can be argued that current-day WAEs do not accurately reflect a customer's share of capacity in the distribution network. SunWater does not disagree with this argument.

It should be noted, though that if the original WAE were used as the basis for initialising WDEs, then the costs of the distribution network would be recovered over a smaller base. Accordingly, prices would increase with some irrigators paying more, and some paying less, depending on whether they have acquired additional WAE over the past 20 years or not.

In proposing WDEs SunWater has favoured preserving the historic arrangements and maintaining continuity with the charging units previously applied for pricing purposes. SunWater is also mindful that it does not have information about the original WAEs in all distribution systems, nor data at an individual customer level of their holdings of 'original' WAEs and changes over time. Indeed most additional WAE entered distribution systems in the 1990s, and SunWater's information systems do not extend back to this time.[3]

At the same time, SunWater accepts that the Authority may favour using the original WAE or a more precise approach as the basis for setting WDEs for pricing purposes. If the Authority was to consider recommending an alternative approach, it should consider the information constraints and the administrative effort required, compared to the benefits. It may be more workable for the QCA to recommend a review of the WDE specification (for tariff setting purposes) at the next regulatory review, although this would involve significant costs which have not been included in the NSP forecasts.

Finally, it should be noted that the WDEs proposed for the Bundaberg Distribution System exclude WAEs recently purchased from Paradise Dam, in accordance with the specific pricing arrangements developed during the current price path period. (refer Box 1 below).

Box 1. WDE in the Bundaberg Distribution System, and Paradise Dam

The Bundaberg Distribution System can take and transport customer WAEs sourced from SunWater's bulk water scheme, or Paradise Dam (owned by Burnett Water, a SunWater subsidiary).

The arrangements for supplying WAE sourced from Paradise Dam in the distribution system were discussed at length with irrigator representatives in Bundaberg. There was a general desire to avoid or defer capacity upgrades to the distribution system to supply any additional WAE. Instead, distribution capacity was generated by altering the peak flow arrangements, with restrictions based on 0.95% of WAE instead of 1% of WAE[4].

[3] Indeed, SunWater was only corporatized in 2000.

[4] 105% for Woongarra.

The WAE sourced from Paradise Dam has been accounted for separately and excluded from the WDE figures in Table 1 above. Around 2,500ML of Paradise Dam WAE is currently supplied in the system, which comprises only around 1.6% of all WAE supplied.

The pricing arrangements developed for the distribution system were such that existing customers would continue to meet the lower bound costs, with separate charges being set under contractual arrangements for the supply WAE sourced from Paradise Dam Accordingly, SunWater has presented the WDE that relate to the pre-existing (non-Paradise Dam) WAEs in its NSPs, on the basis that the fixed costs of the distribution system will be recovered from those 'pre existing' WDEs.

SunWater understands that prices relating to Paradise Dam, including in relation to the distribution of WAE sourced from the Dam, are outside the scope of the QCA's review.

4 Alternatives

An alternative approach to establishing WDEs is to specify each customer's share of capacity in terms of a more precise flow rate (eg litres/second), rather than in terms of an annual volume. For example, Goulburn-Murray Water sets its distribution charges with reference to a ML/day flow rate, rather than an annual volume.

While there is merit in this approach, there is considerable complexity and administrative effort involved in initialising these flow rates and applying them for tariff purposes.

A change to peak flow rate will represent a significant change to the tariff arrangements that have applied in this past. While this is not, of itself, a reason to retain the status quo, adopting SunWater's proposed WDEs preserves consistency with past pricing arrangements, and can operate seamlessly and without any significant transitional costs.

Such a change would require significant customer consultation and extensive analysis of the price impacts. It would also require extensive technical analysis and data gathering, and in some cases the translation of existing peak flow management arrangements and system design into a common base (eg ML/day). Given the complexity of the issues involved, it is likely that this analysis and subsequent consultation would take some time to complete.

Furthermore, the benefits of such a change are not apparent to SunWater at this stage, and many of the concerns raised in relation to the QCA's review of the Gladstone Area Water Board's proposed move to instantaneous flow rate pricing are also relevant in SunWater's distribution systems.[5]

It is also notable that the ACCC has accepted than an annual volume is acceptable for initialising delivery rights, and has not required distribution system owners in the Murray-Darling Basin to implement more complex arrangements.[6]

SunWater accepts that more precise measures of WDE potentially exist, and could be implemented over time. However, it does not believe there is an immediate need to pursue or implement such arrangements. However, SunWater is willing to consider

[5] Queensland Competition Authority. *Final Report. Gladstone Area Water Board: Investigation of Pricing Practices* (June 2010).

[6] Australian Competition and Consumer Commission. Water Trading Rules. Final Advice (March 2010). P221.

customer views on this matter over the regulatory period, and if required examine the costs and benefits of any change.

5 Conclusion

Recent water reforms have highlighted the need to separate the rights of access to water from the delivery of that water.

To date, irrigation prices in distribution systems have been bundled, with fixed charges based on WAEs. As WAEs are traded, this is no longer a sustainable basis for pricing.

SunWater proposes that fixed charges in the distribution system should be based on WDEs, and as such WDEs should be reflect (to the extent it is practicable to do so) a customer's share of distribution system capacity.

SunWater's approach is to specify WDEs as an annual volume, with that volume determined as being the amount of WAE held by each customer and serviced within each distribution system, at the time of preparing its NSPs. This approach initialises WDE in each distribution system for pricing purposes, and also:

- provides continuity to past charging arrangements, thereby avoiding unnecessary price shocks to customers as a result of unbundling;
- is able to be implemented with relative ease; and
- achieves a reasonable representation of a customer's share of network capacity.

SunWater acknowledges that this approach has some shortcomings in systems where there have been significant transfers of WAE into the system. Over time, there may be a case to refine or change the specification of WDEs however this should occur in consultation with customers, and over a timeframe that enables a full analysis of the impacts and the practical implications, and only to the extent that reliable information exists.