WaterNSW Prices for Rural Bulk Water Services

Cost recovery scoping study

A Final Report prepared for the Independent Pricing and Regulatory Tribunal

Tuesday 29 November 2016

AITHER

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Abbreviations

ACCC	Australian Competition and Consumer Commission
BWCOP	Basin Water Charge Objectives and Principles
COAG	Council of Australian Governments
CSO	Community Service Obligation
DORC	Depreciated Optimised Replacement Cost
GS	General Security
HS	High Security
IPART	Independent Pricing and Regulatory Tribunal
LRMC	Long Run Marginal Cost
ML	Megalitre
MDB	Murray-Darling Basin
NPV	Net Present Value
NSW	New South Wales
NWI	National Water Initiative
RAB	Regulatory Asset Base
WACC	Weighted Average Cost of Capital
WAL	Water Access Licence
WCIR	Water Charge (Infrastructure) Rules 2010
WTP	Willingness to Pay

Executive summary

Background

The New South Wales Independent Pricing and Regulatory Tribunal (IPART) regulates prices levied by a range of public water utilities, including WaterNSW. In rural areas, WaterNSW delivers bulk water services to irrigators and other licence holders including local councils on fourteen regulated rivers in New South Wales (NSW). IPART has commenced a process to set prices for WaterNSW for the forthcoming price determination period for the period 1 July 2017 to 30 June 2021.

WaterNSW has proposed prices for the forthcoming determination period. If prices were set in accordance with the WaterNSW proposal, twelve of the fourteen regulated river systems are expected to recover the full, upper bound cost of services attributable to customers, as defined in the National Water initiative (NWI). Only the North Coast and South Coast valleys are forecast to require a subsidy over the 2017 determination period (WaterNSW, 2016).

In the Peel valley and in the North and South Coast valleys, WaterNSW's proposed fixed and variable charges are considerably higher than other valleys. This is primarily a result of comparatively lower average annual water use and lower customer numbers in these valleys. Historically, prices for these valleys have been increasing on a glide path, with a subsidy paid by the NSW Government to WaterNSW to recover the revenue shortfall.

IPART (2016) has estimated the subsidy to be $3.2 million in the North Coast valley and $1.4 million in the South Coast valley in Net Present Value (NPV) terms over the four year 2017 determination period. This assumes that WaterNSW's proposal for a 10 per cent per annum nominal price increase glide path continues in these valleys.

About this project

Aither, together with our project partners Oakley Greenwood, were engaged by IPART to undertake a review of cost recovery options for bulk water services provided by WaterNSW (referred to as the cost recovery review hereafter). The cost recovery review involved examining the advantages and disadvantages of a range of options that could be implemented to set prices in situations where full cost recovery is challenging. The options have been developed and assessed within the context of IPART's legislative obligations, policy commitments and first principles for economic efficiency and regulation.

The objectives of the cost recovery review are to:

- clearly articulate the issue of cost under-recovery in NSW valleys
- establish objectives and economic principles for setting prices in NSW valleys
- identify different options to set prices or manage schemes where full cost recovery is not practical in the long-term
- undertake a preliminary assessment of the advantages and disadvantages of each option, including with reference to the pricing objectives and principles (without undertaking detailed empirical analysis or recommending an option).

The review is intended to inform future decision-making by IPART, including identifying further empirical and other analysis that needs to be undertaken to inform a future approach to address the issue. Any approach to address under-recovery or comparatively high prices needs to be relevant for all NSW valleys both now and in the future; not just the valleys that are currently experiencing issues.

Project methodology

The approach to undertaking the cost recovery review included five phases and is summarised in Figure 1.

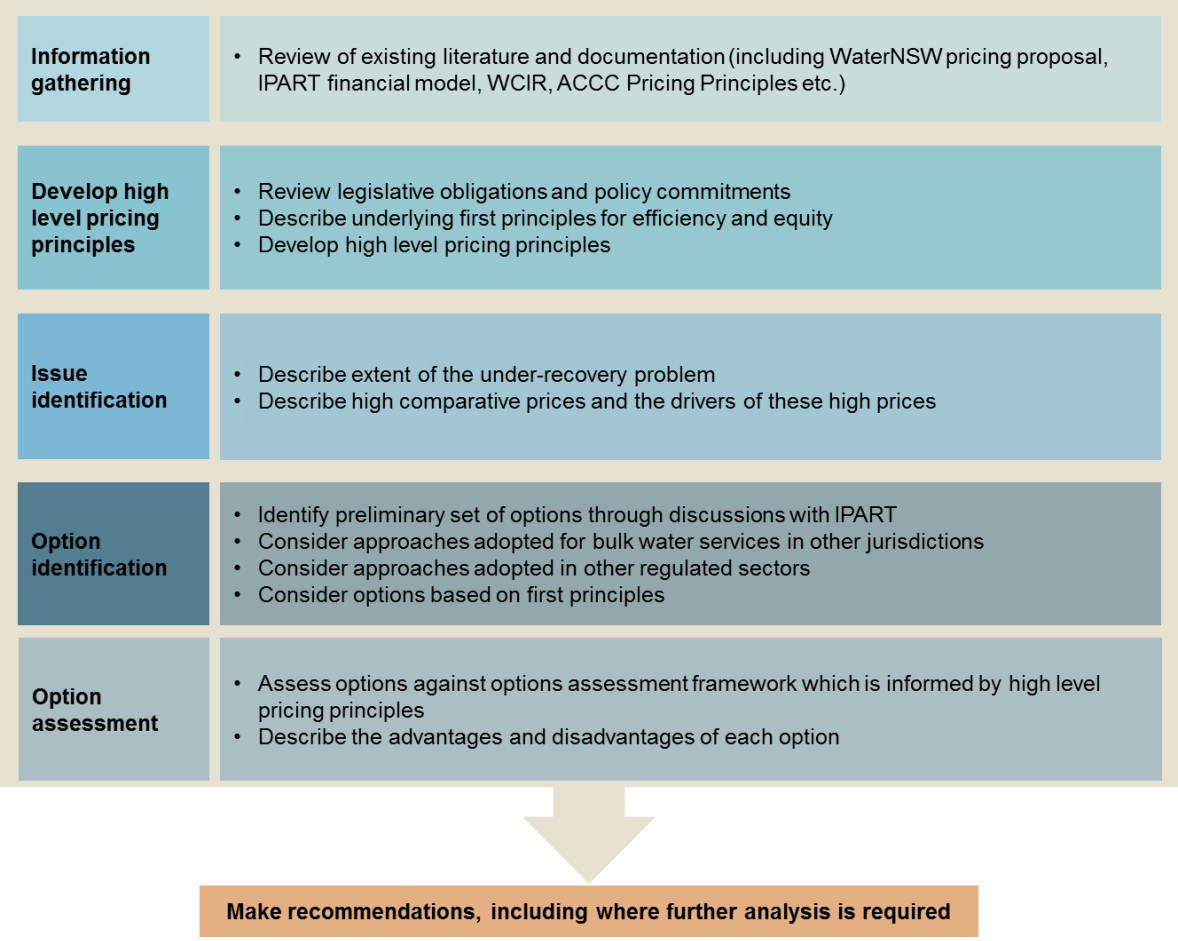


Figure 1 Project approach

Source: Aither, 2016

Profile of WaterNSW's costs

WaterNSW's business is capital intensive, and its revenue requirement is materially driven by the level of investments it has *historically* made in long-lived assets such as dams, weirs and regulators (i.e. 'sunk investments'). These assets typically have high fixed operating costs associated with managing and maintaining headworks as well as high revenue requirements driven by the return of and on previous capital investments (where these are attributed to customers). The corollary is that once these sunk investments have been made, the marginal cost of utilising the existing system to provide an additional Megalitre (ML) of water to an existing customer is typically very low. In these instances, economic efficiency is enhanced with pricing and revenue shortfall solutions that least distort future consumption and/or investment decisions.

A first principles approach

The legislative and policy framework that IPART operates within will shape and inform which options are feasible. However, before considering these issues, it is necessary to outline first principles for economically efficient pricing and addressing any revenue shortfall. In theory, to facilitate economically efficient outcomes, a regulator should:

- Consider what type of pricing and servicing arrangements may prevail in a reasonably competitive market.

- Set the variable prices (per ML used) for the services it provides, at levels that reflect the efficient costs to society of providing those services. This incentivises consumers to use or consume up to the point where the marginal benefit to them of consuming an additional unit equals the costs to society of providing them with that additional unit.

However, in many capital intensive industries, pricing at marginal cost of use leads to under-recovery of fixed costs. In these instances, unavoidable fixed charges in addition to variable charges are justified, although there are constraints on what prices would be considered efficient – known as the efficient pricing band. This efficient pricing band requires that the overall revenue that WaterNSW recovers from a customer lies between:

- customer willingness to pay (WTP) for WaterNSW's services

- the cost that WaterNSW would avoid if it did not have to supply those services to that customer (avoidable cost).[1]

A practical challenge with this approach is that customers' WTP may vary and be difficult to estimate. To deal with this, regulators often consider standalone cost (i.e. the cost for the customer to obtain an alternative water supply) as a substitute for WTP.

Setting prices at or just beneath the upper limit (WTP) does not result in monopoly profits so long as the total revenue in that valley does not exceed the maximum allowable revenue as defined by the NWI definition of upper bound pricing.

These economic principles are consistent with the idea of full cost recovery including a regulated rate of return on capital (i.e. with upper bound pricing under the NWI). For example, if customers' WTP is greater than WaterNSW's average cost, prices can be moved to full cost recovery levels without any negative implications for economic efficiency (assuming the structure of the charges is correct). This is likely to be the case in most of the NSW valleys where the costs of bulk water services are relatively small compared to the value they provide.

However, there is a concern in some of the smaller systems that customers' WTP is less than WaterNSW's average cost. If this is true, prices can only be transitioned to a maximum of WTP levels before customers discontinue the service resulting in reductions in overall cost recovery and potentially inefficient underutilisation of the asset (assuming that customers are able to readily terminate service provision).

In the instances above where prices cannot be moved to full cost recovery, it is necessary to price within the efficient band. As addressed later, this raises some practical issues: customers' WTP may vary and be hard to measure; avoidable costs for WaterNSW may be close to zero; the further prices are from full cost recovery, the greater the subsidy required from other parties. These issues are considered in our assessment of options and recommendations below.

Distributional and equity considerations

In instances where prices cannot be moved to recover average costs, any "residual" revenue requirement should be recovered in a way that least distorts future consumption and investment decisions. Whilst there are many ways to recover this residual revenue requirement, it essentially comes down to some combination of recovering it from other customers, government (community

[1] For the purposes of this analysis it is presumed that WTP is higher than avoidable cost.

service obligation (CSO)), or investors (e.g. WaterNSW, via a reduction in its Regulatory Asset Base (RAB)).

Decisions regarding who should fund any cost recovery gap can be informed by an assessment of who is best placed to manage the risk and the implications from an efficiency point of view associated with each option. For example, recovering it from customers in other systems may push prices above their own WTP which can cause underutilisation of sunk assets and revenue uncertainty for WaterNSW. If WaterNSW bear the revenue risk this may have implications for dynamic efficiency (distort future investment decisions) or have implications for existing assets (e.g. service standards are compromised in the pursuit of cost savings).

The use of economic first principles outlined above could result in outcomes that some stakeholders consider inequitable, or inconsistent with broader policy objectives. For example, it might be that WaterNSW could in fact increase the prices it imposes on the customers who are located in valleys that are currently at full cost recovery levels, in order to make up for the overall revenue shortfall. This might be done without distorting the future consumption or investment decisions of customers in those other valleys (i.e. it could do so without breaching the efficient pricing band and without distorting marginal price signals). However, the distributional implications may be considered inequitable or inconsistent with broader legislative requirements and policy objectives. Equity considerations will require a judgement to be made by WaterNSW, IPART and policymakers.

Importantly, this discussion highlights that solutions that least distort future consumption and/or investment decisions should be adopted, rather than imposing a solution or solutions that mechanistically require that the cost of sunk investments be recovered from current customers. The potential for ongoing subsidies also points to considering the future management of these small systems, particularly if large new capital expenditure is required at some point.

Legislative and policy context for setting prices for WaterNSW

Whilst the economic principles outlined above provide guidance, it is also important to recognise that IPART sets prices for WaterNSW within a complex legislative and policy framework. For eleven of the fourteen valleys which are in the Murray-Darling Basin (MDB), IPART sets prices within legislative obligations prescribed under the *Water Act 2007* (Commonwealth) (Water Act) and the Water Charge (Infrastructure) Rules 2010 (WCIR). Both the Water Act and the WCIR reflect pricing obligations agreed under the NWI. Conditions on IPART's accreditation by the Australian Competition and Consumer Commission (ACCC) are also relevant and include adherence to the ACCC's 2011 Pricing Principles. IPART maintains responsibility for setting the maximum prices in the North Coast, Hunter and South Coast valleys which are outside the MDB and does so under the *Independent Pricing and Regulatory Tribunal Act 1992*.

Legislative obligations under the Water Act and conditions on IPART's accreditation to set charges in the MDB under the WCIR provide additional guidance for pricing principles. While these obligations relate only to valleys in the MDB, if approaches to pricing are to be consistent across all valleys, these obligations, by extension, are relevant for all valleys and require that:

- Water charges should be set to recover the full, efficient cost of service delivery, consistent with the NWI definition of upper bound pricing which includes a return on capital.
- Where full cost recovery is unlikely to be achieved in the long term, WaterNSW should be able to recover the revenue shortfall. A transparent CSO may be required in order to achieve revenue certainty for WaterNSW.
- Alternative management arrangements aimed at reducing or completely removing the need for a long-term CSO should be explored.

- Pricing policies (approaches to pricing) should be consistent across jurisdictions, where entitlements are able to be traded. This minimises distortions in the water market.
- Water charges are to include a consumption based component.
- Pricing policies should avoid perverse or unintended pricing outcomes.
- The RAB value must not be subject to revaluation. A condition of IPART's accreditation to set prices in the MDB is that it must align with the ACCC's 2011 Pricing Principles which preclude assets being revalued.

The principles that emerge from the first principles and the legislative obligations highlight an important tension for IPART. If full cost recovery is pursued without regard to the efficient pricing band, there is a risk of inefficient outcomes. Breaching the upper limit of the efficient price band (i.e. typically, customers' WTP) may result in that customer (or group of customers) being incentivised to either inefficiently bypass WaterNSW's existing system in order to avoid paying WaterNSW's tariffs, or to inefficiently cease their irrigation service. Both outcomes reduce WaterNSW's total level of cost recovery. This would seem to contravene the Water Act requirement for pricing policies to avoid perverse or unintended pricing outcomes.

Options identification and assessment

Options to address the issue of under-recovery combined with high comparative prices have been informed by approaches adopted for bulk water pricing in other jurisdictions, approaches used in other regulated sectors and approaches that align with a first principles approach. The options are summarised in Table 1. In addition to these pricing options, management based solutions including rationalising of the service or assets could be pursued alongside the preferred pricing solution. A summary of the advantages and disadvantages of each option is presented in Table 2.

Table 1 Options to set prices where cost recovery is not being achieved or prices are at full cost recovery but comparatively high

Option	Description	Sub-options/glide path
One – status quo	Continue to operate the schemes, with a price glide path to full cost recovery and a CSO paid to WaterNSW to make up the difference between the revenue requirement and actual revenue in the interim.	Prices increase either at: • a capped annual percentage increase (e.g. 10 per cent per annum real) or • a fixed dollar amount per annum on the fixed and variable charge.
Two – price freeze	Fix prices at a point in time and an ongoing CSO paid to WaterNSW to make up the difference between the revenue requirement and actual revenue.	• Prices increase at CPI to maintain prices in real terms. • Prices remain fixed, resulting in a decline in prices and revenue in real terms over time.
Three – adjust the value of the RAB	Revalue the RAB given prevailing market conditions (including entitlement volumes and customer numbers).[a]	Depends on the outcomes of the revaluation. Prices may still need to increase in the North and South Coast valleys as per the sub options outlined above.
Four – set prices to achieve lower bound pricing	Adjust the target revenue requirement to achieve lower bound cost recovery (i.e. excluding a return on capital) over a set period of time.	In the interim, prices increase either at: • a capped annual percentage increase (e.g. 10 per cent per annum real) or • a fixed dollar amount per annum on the fixed and variable charge.
Five – set prices to sit within the efficient pricing band (below customers' WTP, but above WaterNSW's avoidable cost of supply)	This approach aligns with economic first principles, as discussed above.	Whilst the final outcomes would depend on the assessment of existing prices against the pricing principles, in valleys where under-recovery currently occurs, customers' prices would be moved to within the efficient pricing band.
Six – implement state-wide pricing	Move away from valley-based pricing to smooth WaterNSW's total costs across its entire customer base.	Depends on the valley and the quantum of the price increase or decrease.

[a] For example, using the Optimised Deprival Value, which is the lesser of the Depreciated Optimised Replacement Cost (DORC) value and the present value of future revenue streams.

Table 2 Summary of advantages and disadvantages of each option

Option	Advantages	Disadvantages
One – status quo	• It is consistent with the legislative obligation under the Water Act to continue to seek full cost recovery and provide a CSO where full cost recovery cannot be achieved. • Provides for user certainty as the existing policy will be continued.	• Prices will continue to increase annually at 10 per cent in some valleys. There is therefore the potential that prices will exceed WTP, resulting in under-utilisation of sunk infrastructure investments – this is an important efficiency issue. There are also potential revenue implications for WaterNSW if this were to occur. • Related to the point above, these outcomes could contravene the Water Act requirement for pricing policies to avoid perverse or unintended pricing outcomes. • The annual increase (i.e. 10 per cent per annum) under the glide path is not underpinned by a policy principle or guideline and is therefore open to criticism as an arbitrary increase.
Two – price freeze at current levels	• Creates certainty with respect to future prices for customers in affected valleys and would ease the cost burden associated with high comparative prices. • Would be better supported if it was certain that prices were frozen within the efficient pricing band.	• It does not align with the requirement in the Water Act to reduce or completely remove the need for an ongoing subsidy. • It relies on the assumption that the NSW Government will continue to provide a subsidy. If the subsidy policy were to change, it would create revenue risk for WaterNSW.
Three – optimise the value of the RAB	• The main advantage with this approach is that a DORC valuation provides an opportunity to investigate how the value of the assets would change under an optimised scenario which takes into account observed demand for bulk water. • The user share of capital costs can then be adjusted based on the DORC valuation which, could result in reductions to the return on and of capital cost inputs to the revenue requirement.	• The main disadvantage with this approach is that it does not align with the requirement in the ACCC Pricing Principles which state that “once a RAB value is set it must not be subject to revaluation” (ACCC, 2011). IPART is required to develop prices in accordance with these principles as a condition of its accreditation to set prices for WaterNSW. • Would still require recovery of operational and maintenance costs and future capital costs so might still result in prices that exceed WTP.
Four – set prices to achieve lower bound	• The main advantage with this approach is that it would reduce prices and possibly help move to within the efficient price band if this was currently being breached.	• Inconsistent with requirements under the Water Act to continue to move to upper bound pricing.

Option	Advantages	Disadvantages
Five – set prices to sit within the efficient pricing band	• The major advantage of this approach is that, relative to other options, it should deliver efficient use of existing infrastructure. For example, pricing within the efficient band reduces the likelihood of users discontinuing to use the service which is a risk if cost recovery is pursued with no regard for customers' WTP. • It therefore could avoid perverse or unintended pricing outcomes which may emerge under the status quo option. • Could avoid the need for ongoing real price increases and subjective decisions on the appropriate glide path.	• It is potentially inconsistent with requirements under the Water Act to continue to move to upper bound pricing and may result in a rapid price and revenue reduction. However, this may be offset by avoiding perverse or unintended pricing outcomes which may emerge under the status quo option. • A key challenge in applying this approach is that the regulator has incomplete information regarding customers' WTP, which will tend to vary between customers within and between valleys and change over time. Additional work would be required on WTP and avoidable cost (see below). • May require under-recovery to be dealt with through other means (e.g. subsidy).
Six – implement state-wide pricing	• Would result in price reductions in valleys where prices at full cost recovery are above the state-wide weighted average. • Would meet obligations for upper bound pricing. • Would eliminate the need for an ongoing CSO. • Is administratively simple to set charges.	• The major disadvantage with this approach is that it is not consistent with the strict definition of user based pricing. Prices would be less cost reflective and the links between costs and outcomes for customers would be harder to communicate. • Introducing state-wide pricing could impact the water market and could be inconsistent with the NWI and BWCOP requirement to implement water pricing that facilitates the efficient functioning of water markets, including inter-jurisdictional water markets.

Findings and conclusions

- The forecast under-recovery over the 2017 determination period is restricted to only two valleys being the North Coast and South Coast valleys. The under-recovery is primarily driven by the comparatively low customer base and low average annual water usage in these systems.
- Cost drivers contributing to under-recovery relate primarily to operating costs (which range from 61.7 per cent of the average total share of user costs in the North Coast valley up to 73.7 per cent of the total average user costs in the South Coast valley over the 2017 determination period).
- The return of (8.8 per cent in the North Coast and 6.0 per cent in the South Coast) and on (29.8 per cent in the North Coast valley and 20.5 per cent in the South Coast valley) previous capital investments also makes a smaller contribution over the determination period.
- In total, under-recovery in 2017-18 is estimated at $0.93 million in the North Coast valley and $0.54 million in the South Coast valley compared to a total proposed user share revenue requirement of $86.2 million across the business. The quantum of under-recovery is therefore very small.
- Prices in the North Coast and South Coast valleys are considerably higher than other valleys. For example, the fixed and variable charge for a General Security (GS) Water Access Licence (WAL) in the Murray valley in 2016-17 is $0.97 and $2.31 per ML respectively. However in the South Coast valley, the fixed and variable charge for a GS WAL is $21.12 and $40.38 per ML respectively.
- Moving towards full cost recovery is an accepted pricing principle and it is likely to be efficient in the major regulated systems serviced by WaterNSW where positive water entitlement prices reflect the value of access to regulated water systems. However, in relation to the North and South Coast systems, there is potential that continuing to move to full cost recovery might lead to an inefficient outcome. This is because prices might, at some point, exceed customers' WTP thereby resulting in customers disconnecting from the system. This would have the effect of reducing the total level of cost recovery and could result in inefficient underutilisation of the system if the customers were willing to pay prices above the avoidable cost of supply by WaterNSW. On face value, this would appear to contravene the Water Act requirement for pricing policies to avoid perverse or unintended pricing outcomes. In general, and for all valleys, a significant increase in disconnection from the system would provide an indication that prices may exceed customer's WTP. Similarly, positive entitlement prices and customers remaining in the network would indicate that prices are below WTP.
- The proposal to continue to increase prices by 10 per cent per annum in systems below cost recovery requires further consideration. There are a number of alternative options that have been considered.
- Each option has advantages and disadvantages. In summary:
    - A price freeze would provide a degree of certainty for water users however it does not align with the requirement in the Water Act to reduce or completely remove the need for an ongoing subsidy and creates uncertainty for WaterNSW in recovering its revenue (i.e. it relies on an ongoing subsidy) and creates administrative issues as to where to set the price freeze.
    - A revaluation of the RAB has some benefits however it may not reduce charges to below WTP and the conditions of IPART's accreditation by the ACCC appear to preclude this option.
    - Pricing at the lower bound (NWI definition) may reduce prices however it is inconsistent with requirements under the Water Act to continue to move to upper bound pricing and

would result in revenue risk for WaterNSW, particularly if it was applied across all valleys, including valleys that are at upper bound pricing.

  - Setting prices within the efficient pricing band avoids the risk that customers either disconnect from the system or discontinue their water using activities. Each of these outcomes would not be desirable from an efficiency perspective and for WaterNSW's revenue certainty. However, it potentially contravenes the requirement in the Water Act to continue to move towards upper bound pricing, although this may be offset in that it avoids the potential to result in perverse or unintended pricing outcomes if upper bound pricing is pursued without reference to prices being within the efficient price band

  - A shift to state-wide pricing would address the revenue gap issue and would be relatively simple to administer. However, it is not consistent with the strict definition of user based pricing.

- There is little information currently available on customer WTP (which could be informed by analysis of the value of water entitlements) or on the avoidable costs of supply by WaterNSW in these small systems with high levels of under-recovery. Further analysis could help to inform whether the current WaterNSW proposal could result in inefficient disconnection. It could also help assess the merits of each of the alternative options and to set resultant prices.

- Even if systems are recovering their avoidable fixed costs and marginal costs associated with use, if they are not recovering full, upper bound costs through pricing, there are concerns about their long-term viability. In particular, concerns may arise when new capital investments are required (e.g. dam safety upgrades). In these instances, government and WaterNSW in conjunction with customers need to consider the broader costs and benefits of continuing to provide bulk water services. Importantly, the costs associated with decommissioning a dam can be substantial and need consideration.

Recommendations

Recommendation one: Undertake an assessment of what constitutes the efficient price band (with customers' WTP and stand alone cost as the upper limit and avoidable costs as the lower limit) in valleys below full cost recovery to determine whether WaterNSW's proposed prices for the forthcoming determination period will exceed the upper limit of the efficient pricing band for any customer groups.[2]

Recommendation two: If the analysis undertaken under recommendation one suggests that continued application of the 10 per cent glide path would breach the upper limit of the efficiency band, seek clarification from the ACCC as to whether this would constitute a perverse or unintended pricing outcome.

Recommendation three: Consult with stakeholders on the advantages and disadvantages of a short-list of options following consideration by the Tribunal and undertake more detailed assessment.

Next steps

Given that avoided cost is likely to be very low (close to zero), the next step should be to undertake a small piece of additional work to assess customers' WTP to ensure that prices do not exceed WTP which could result in inefficient disconnection from the network. This analysis should:

[2] While it is likely that prices in other valleys are within the efficient price band given that they are at full cost recovery, there is a chance that prices may exceed WTP. A simple study which considers market prices or gross margins would clarify this and reduce the risk of inefficient disconnection from the network.

- Use revealed water entitlement market prices and indicative gross margin analysis to establish a likely range for the major, lower-value crop types.
- Compare WTP for major irrigated crop types in each valley (and the dryland alternative) to WaterNSW's proposed prices for the 2017 determination period to determine the risk of prices exceeding WTP.
- Acknowledge that WTP is a medium-term concept as on-farm cash flow varies depending on on-farm revenue which is affected by growing conditions, rainfall and commodity prices. The analysis should therefore consider a series of scenarios for these variables.

This analysis will be helpful in determining the efficient price band for Option 5. However it will also be useful in considering the efficiency implications of other options such as the mechanistic pursuit of cost recovery under the status quo (option 1).

1. Project background

1.1. Project overview

The Independent Pricing and Regulatory Tribunal (IPART) engaged Aither, together with our project partners Oakley Greenwood, to undertake a review of cost recovery under the charges proposed by WaterNSW for its rural bulk water services from 1 July 2017 (henceforth referred to as the cost recovery review).

The cost recovery review will support IPART's broader work associated with the next pricing determination for WaterNSW's bulk water services. The cost recovery review involves examining the current proposal for cost recovery put forward by WaterNSW, as well as additional or alternative options that may be possible, for setting prices in valleys that are currently below full cost recovery or where full cost recovery based pricing results in high charges compared to other valleys. Any approach to address under-recovery or comparatively high prices needs to be relevant for all NSW valleys both now and in the future; not just the valleys that are currently experiencing issues.

1.2. Project objectives and scope

The key objectives of this report are to:

- clearly articulate the issue of cost under-recovery in New South Wales (NSW) valleys
- establish objectives and economic principles for setting prices in NSW valleys
- identify different options to set prices or operate schemes where full cost recovery is not practical in the long-term
- undertake a preliminary assessment of the advantages and disadvantages of each option, including with reference to the pricing objectives and principles (without undertaking detailed empirical analysis or recommending an option).

1.3. Project methodology

The approach to undertaking the cost recovery review included five phases. The approach is shown in Figure 2.

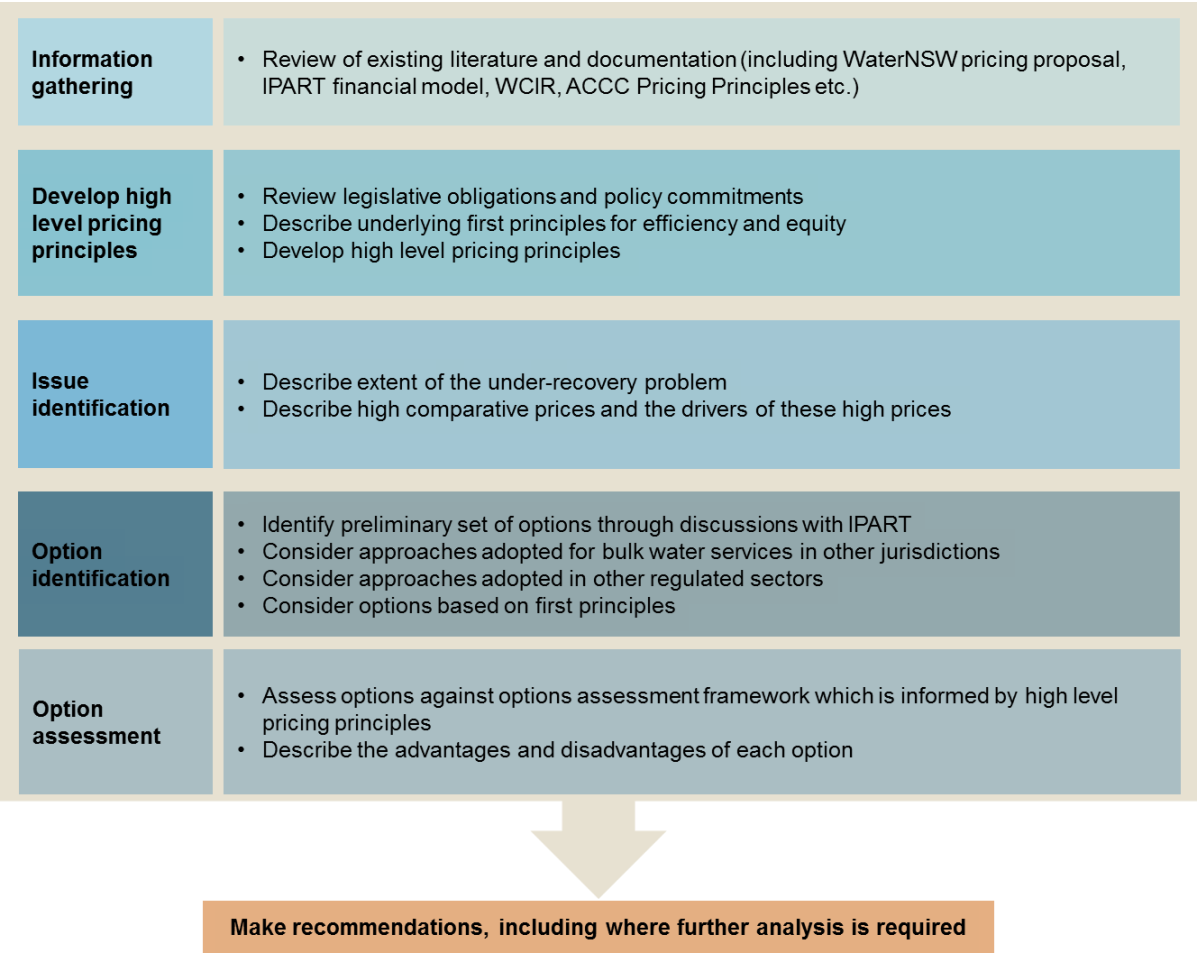


Figure 2 Project approach

Source: Aither, 2016

1.4. Report outline

The remainder of this report is set out as follows:

- **Section 2** discusses WaterNSW's cost profile and presents the quantum of expected under-recovery in relevant valleys over the forthcoming pricing period and presents prices proposed by WaterNSW for all NSW valleys.
- **Section 3** summarises the legislative obligations, policy commitments and economic principles upon which a set of high-level pricing objectives and principles are established. The objectives and principles inform the range of options and assessment of the options that could be implemented to set prices in situations where full cost recovery is challenging or unobtainable under current settings.
- **Section 4** identifies options that could be implemented to set prices in situations where full cost recovery is challenging or unobtainable under current settings.
- **Section 5** presents the assessment framework and the assessment of each option identified in chapter four.
- **Section 6** presents findings, recommendations and next steps.

2. Cost recovery for WaterNSW's rural water services

2.1. WaterNSW's services

WaterNSW is the bulk supplier of raw water in rural NSW and in the Greater Sydney area. In the rural sector, WaterNSW owns and operates twenty dams and in excess of two hundred and eighty weirs and regulators. Raw water is supplied to urban, irrigation and industrial customers and the infrastructure also provides water for stock and domestic use, riparian use and to deliver water for environmental flows (WaterNSW 2016).

2.1.1. High-level profile of WaterNSW's costs of services

WaterNSW's business is capital intensive, and its revenue requirement is materially driven by the level of investments it has historically made in long-lived assets such as dams, weirs and regulators ('sunk investments'). These assets typically have high fixed operating costs associated with managing and maintaining headworks as well as high revenue requirements driven by the return of and on previous capital investments (where these are attributed to customers). The corollary is that once these sunk investments have been made, the marginal cost of providing an additional Megalitre (ML) of water to an existing customer is typically very low. These features are common across various regulated utility businesses, including electricity and gas transmission and distribution networks, as well as other water businesses.

Before discussing how any under-recovery within a valley may be recovered, it is worthwhile considering the proto-typical types of costs WaterNSW will incur. These are:

- **Costs that are sunk** – these are costs that have already been incurred, and cannot be influenced by WaterNSW's customers' changing their *future* consumption or investment behaviour. A good example of this is the sunk investments that WaterNSW have already incurred in constructing its twenty dams and in excess of two hundred and eighty regulators. These costs are sunk – they cannot be reversed – therefore, from an economic perspective, we are concerned with ensuring that WaterNSW's prices are structured to recover these costs in a way that does not distort its customers' future consumption or investment behaviour, quite simply, because that future consumption or investment behaviour will have no effect on these sunk costs.
- **Costs that are fixed** – these are costs that are fixed in nature, meaning that they are invariant (at least over a reasonable range of demand) to WaterNSW's customers' level of demand. A good example of this would be WaterNSW's finance department's costs. Whether a customer consumes slightly more or less water in the future (or whether they remain connected to their system or not), will not influence the future costs that WaterNSW will incur in its finance department. These costs are (predominately) fixed – they cannot be influenced by a customer's future consumption or investment behaviour – therefore, from an economic perspective, we are primarily concerned with ensuring that WaterNSW recovers these costs from its customers in a way that does not distort its customers' future consumption or investment behaviour, again, because that behaviour will have no effect on these fixed costs.
- **Costs that are incremental** – these costs, which are commonly known as "marginal costs", are the costs that WaterNSW will incur *in the future* as a result of changes in the level of demand its customers have for its services *in the future*. For example, as a customer consumes additional water in the future, WaterNSW is likely to incur more electricity costs in order to pump that water

to that customer's outlet. This is an example of a 'marginal cost', or a cost that will vary with a customer's future level of demand - in this case, for water. Extending this concept, there may be costs that will vary in the "long-run" (e.g. capital augmentation costs) as WaterNSW's customers change their future levels of demand. From an economic perspective, we are primarily concerned with ensuring that WaterNSW's prices signal these marginal costs to customers in a way that incentivises efficient consumption and/or investment behaviour. This is because WaterNSW's customers' future consumption or investment behaviour *will* have an effect on these marginal costs.

- **Costs that are avoidable** – these are costs that WaterNSW may be able to avoid *in the future* if a customer, or group of customers, were to disconnect from WaterNSW's system, thus allowing WaterNSW to cease supplying that customer, or that group of customers. For example, if, within a particular valley, WaterNSW was forecasting to have to replace a significant portion of its system due to its current (dilapidated) condition, then ceasing supply to those customers in the future would allow WaterNSW to avoid having to incur those costs in the future (i.e. they are "avoidable", contingent on the customer or group of customers not being connected to the grid). The reason this concept is important from an economic perspective is that for efficient outcomes to ensue, a customer should only stay connected to WaterNSW's system if their willingness to pay (WTP) for WaterNSW's future water services (in totality – being both fixed and variation charges) exceeds WaterNSW's avoidable cost; where this is not the case, efficiency would be improved by ceasing to supply those customers, and avoiding those future costs.

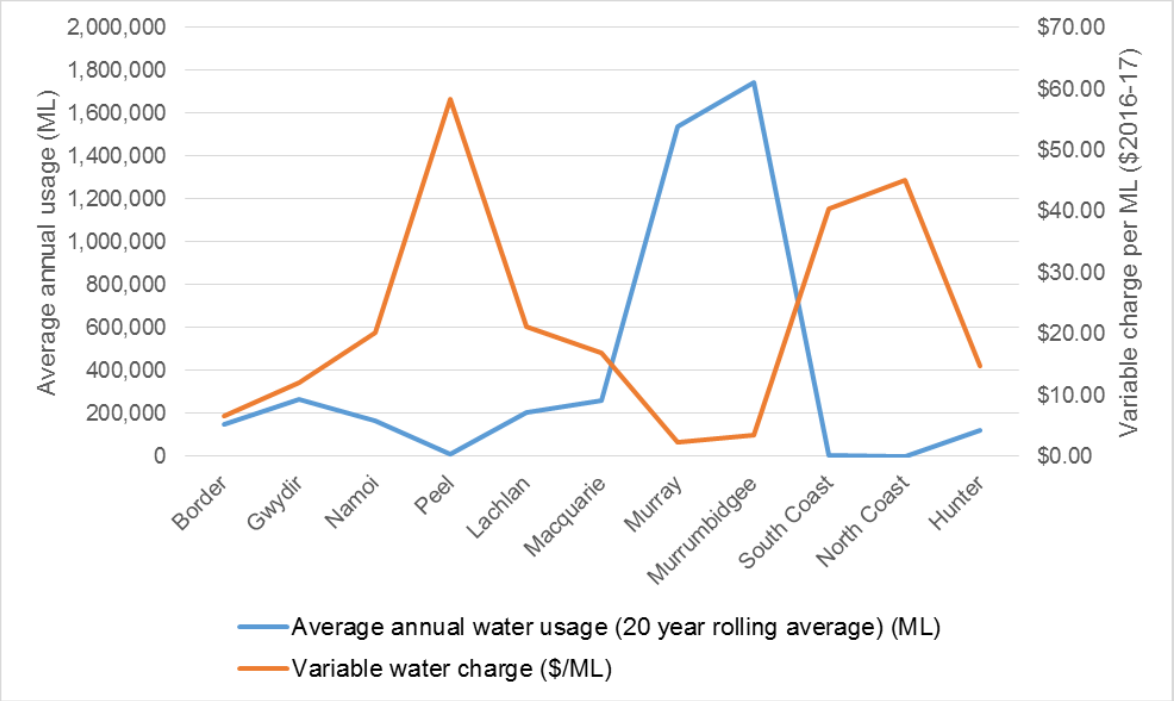
2.2. Issue identification

While the approach to pricing is consistent across the valleys, the prices WaterNSW proposes to charge in the 2017 determination period are not. The key drivers for prices are:

- The volume of Water Access Licences (WAL's) on issue and the demand for water use in each system
- Proposed capital and operating expenditure over the determination period
- The value of the Regulatory Asset Base (RAB) in each valley.

Figure 3 shows average annual water use and the 2016-17 variable charge by valley. The Peel, North Coast and South Coast valleys have the lowest average annual water use and highest variable charges; clearly showing that the low level of water usage is a key driver of price. Conversely, the Murray and Murrumbidgee valleys have high average annual water use and low variable prices.

Table 3 shows WaterNSW's current fixed and variable charges by value and the percentage change in fixed and variable charges between the current charges and WaterNSW's proposed charges for 2017-18. It can be seen from Table 3 that there are significant differences in prices between valleys. For example, the fixed and variable charge for a General Security (GS) WAL in the Murray valley in 2016-17 is $0.97 and $2.31 per ML respectively. However in the Peel valley, the fixed and variable charge for a GS WAL is $3.88 and $58.26 per ML respectively. Charges are also significantly higher in the North Coast and South Coast valleys. The key determinant of these higher prices is the smaller number of WAL's on issue and the lower volumes of water use in these valleys. Table 4 shows the volumes of High Security (HS) and GS WAL on issue in each valley and the twenty year rolling average water use.



Notes: Average annual usage based on 20 year rolling average, except for North Coast and South Coast figures, which are based on the rolling average from the previous 8 years, due to data quality issues.

Source: Aither, derived from WaterNSW, 2016.

Figure 3 Average annual water use and variable charges (2016-17) by valley

Table 3 WaterNSW fixed and variable charges by valley and percentage change (2016-17 to 2017-18)

	Scheme												
	Border	Gwydir	Namoi	Peel	Lachlan	Macquarie	Murray	M'bidgee	Lowbidgee	South Coast	North Coast	Hunter	Fish River***
Fixed charge (HS) ($/ML) (2016-17)	$6.90	$14.13	$17.29	$35.27	$16.48	$16.17	$1.79	$3.08	$0.84** Increasing -0.2% 2016-17 to 2017-18	$21.12	$9.54	$26.0	$0.36 /$71.27
Fixed charge HS % change (2016-17, 2017-18)	-19.9%	-7.5%	-6.8%	-39.3%	-10.2	-22.8%	-15.0%	-5.7%		10.0%*	10.0%*	-20.3	5.6% / 6.5%
Fixed charge (GS) ($/ML)	$2.43	$3.47	$8.25	$3.88	$3.28	$3.62	$0.97	$1.26		$10.09	$7.25	$8.86	$0.36 / $71.27
Fixed charge GS % change (2016-17, 2017-18)	-5.3%	18.3%	14.9%	23.1%	21.6%	-0.1%	0.5%	8.3%		10.0%*	10.0%*	-17.4%	5.6% / 6.5%
Variable charge ($/ML)	$6.60	$12.13	$20.26	$58.26	$21.12	$16.97	$2.31	$3.53	N/A	$40.38	$45.04	$14.77	$0.42
Variable charge % change (2016-17, 2017-18)	-16.2	-8.0	-9.0	-1.2	-11.9	-24.7	-14.7	-6.1	N/A	10.0%*	10.0%*	-12.5	-31.0

Source WaterNSW, 2016

Notes * Subject to 10% nominal glide path

** Supplementary Licence Fixed Charge

*** Fish River does not have the same entitlement arrangements (i.e. there are no statutory water access entitlements) as other schemes and also supplies filtered water. The figures used in the table are for raw water and show prices for major customers (first) and minor customers (second). Note prices are the same for GS and HS, there is no distinction between HS and GS in this scheme. Additionally, the variable charge has an excessive usage charge of $0.78 per ML.

Table 4 Water Allocation Licences on issue and historic average water usage by scheme (20 year rolling average)

	Scheme												
	Border	Gwydir	Namoi	Peel	Lachlan	Macquarie	Murray	Murrumbidgee	Lowbidgee	South Coast	North Coast	Hunter	Fish River
HS WAL's on issue (ML)	3,122	26,840	8,874	17,367	57,514	42,707	261,883	438,331	N/A	1,175	137	70,408	N/A
GS WAL's on issue (ML)	263,238	511,609	256,212	30,428	633,256	632,466	2,081,716	2,267,963	747,000	13,946	9,681	138,109	
Average annual water usage (ML)	147,829	264,774	168,133	11,291	205,079	258,621	1,537,145	1,743,637	N/A	3,781*	619*	123,211	N/A

Source WaterNSW, 2016

Notes *North and South Coast valleys figures have used the rolling average of actual water usage from the previous 8 years due to data quality issues.

2.3. Scale and scope of under-recovery (North and South Coast valleys)

Twelve of the fourteen regulated river systems in which WaterNSW provides bulk water storage and delivery services are expected to recover the full, upper bound cost of services attributable to customers, as defined in the National Water initiative (NWI).[3] Only the North Coast and South Coast valleys (refer to section 2.3) are forecast to require a subsidy over the 2017 determination period (WaterNSW, 2016).

In IPART's 2010 determination it was considered that the price increases required to recover the full efficient costs from users in the North Coast and South Coast valleys would have been excessive over the four years of the determination. As such, real price increases were capped at 10 per cent per year.

For the next determination period, WaterNSW has proposed to continue to apply the same annual cap on price increases of 10 per cent per year. Despite the proposed increases, this would maintain under-recovery of costs in both valleys, with only 12 per cent of costs being recovered in the North Coast valley and 44 per cent of costs recovered in the South Coast valley.

Under-recovery of costs in these valleys is not due to low bulk water prices relative to other valleys – prices in these valleys are the highest and second highest in NSW. Rather it is largely a consequence of the smaller customer base in these valleys, which contributes towards higher average costs. This is because fixed operating and capital costs, partly associated with previous government investments dating back many decades ago, are spread over fewer users. The notional revenue requirement, expected revenue from WaterNSW's proposed prices and the quantum of the cost recovery gap (Government subsidy) is presented in Table 5.

Table 5 WaterNSW proposed user share of notional revenue requirement and target revenue for 2017 determination period ($'000/year, $2016-17)

	North Coast	South Coast
Notional revenue requirement	3,636	3,098
Target revenue	423	1,355
Government subsidy	3,213	1,743
Cost recovery %	12%	44%

Source IPART, 2016a

Note Figures are expressed in NPV terms over the 4-year determination period.

2.4. Cost drivers

WaterNSW's proposed costs that make up the user share of costs (and therefore influence prices over the 2017 determination period) are made up of five key building blocks. Table 6 shows that across all valleys, operating costs comprise 62 per cent of the total user share of costs. The return on and of capital are the next largest contributors at 23 per cent and 13 per cent respectively. These

[3] Any reference to upper and lower bound pricing in this report is consistent with the NWI definitions of upper and lower bound pricing.

distributions are noteworthy as they provide an indication of the extent to which some options (e.g. revaluing assets) is likely to reduce costs and prices.

Table 6 Average contribution (%) of each cost element to WaterNSW's total costs over the 2017 determination period (user share - all valleys)

Cost element (user share)	Percentage of total share of user costs (average of all valleys over the 2017 determination period)
Operating costs (including debt raising costs)	62.3%
Return of capital (depreciation)	13.0%
Return on capital (RAB)	23.1%
Return on working capital	0.2%
Tax allowance	1.4%
Total	100%

Source IPART, 2016b

Note Figures are user share of costs over the 4-year determination period for all valleys as proposed by WaterNSW. May not add to 100 per cent due to rounding

In the North Coast and South Coast valleys, where under-recovery is forecast for the 2017 determination period, operating costs again make the major contribution to the user share of costs. The return on capital and return of capital are the next biggest drivers (Table 7).

Table 7 Average contribution (%) of each cost element to WaterNSW's total costs over the 2017 determination period (user share - North Coast and South Coast valleys)

Cost element (user share)	Percentage of total share of user costs (over the 2017 determination period)	
	North Coast	South Coast
Operating costs (including debt raising costs)	61.7%	73.7%
Return of capital (depreciation)	8.8%	6.0%
Return on capital (RAB)	29.8%	20.5%
Return on working capital	-0.3%	-0.2%
Tax allowance	0.0%	0.0%
Total	100%	100%

Source IPART, 2016b

Note Figures are user share of costs over the 4-year determination period for all valleys as proposed by WaterNSW. May not add to 100 per cent due to rounding

3. Establishing pricing principles

3.1. First principles for regulated pricing

The legislative and policy framework that IPART operates within will shape and inform which options are available and the practicality of these options. However, before considering these issues, it is necessary to outline the first principles for economically efficient pricing and addressing any revenue shortfall. In particular, it is worthwhile outlining:

- Why, from an economic perspective, the under-recovery problem (described in section 2) raises important and complex economic issues.
- The key economic principles that should be used support to the development of economically efficient tariffs.
- How broader equity and policy issues should be considered, in light of those economic principles.

3.1.1. Why is under-recovery of revenue within certain valleys a problem?

Under-recovery raises an important economic issue of how the residual (shortfall) revenue should be recovered. Absent any regulatory or legislative barriers, there are four routes that WaterNSW could pursue:

- Recovering the residual by simply increasing the prices it charges to customers in those areas where under-recovery is currently occurring (i.e. mechanistically moving towards full cost recovery in those areas).
- Recovering the residual from customers in other valleys (i.e. other customers pay higher prices to recover the shortfall).
- Recovering the residual from government via some form of subsidy.
- Recovering the residual from its investors (e.g. via a reduction in WaterNSW's RAB).

Each of these approaches has potential implications for economic efficiency and equity. For example, simply recovering the residual by levying higher prices to customers in areas where under-recovery is currently occurring may potentially lead to prices that exceed customers' WTP for water services, thus leading them to disconnect as a WaterNSW customer. If these customers were, however, still willing to pay at least WaterNSW's avoidable cost of supply, then WaterNSW, its existing customers and the economy more broadly would have been better served had they continued to provide water services to those customers, at a price that (a) did not achieve full cost recovery, but which (b) did not exceed their WTP (while remaining above avoidable cost).

If, instead, WaterNSW choose to recover these residual costs from other customers (e.g. other customer groups within a valley or from customers in valleys that are currently at full cost recovery), then it may potentially result in those customers facing prices that exceed their WTP for water services, thus leading them to disconnect from WaterNSW's system, with all of the same implications for efficiency as described above.

If, instead, government was asked to subsidise the residual (shortfall), then theoretically, the subsidy may, in and of itself, distort future water consumers' future investment behaviour. For example, if existing recovery levels in the valleys where under-recovery is occurring are simply maintained (with

the balance recovered via the subsidy), yet those existing recovery levels are materially below customers' WTP for WaterNSW's services in those valleys, then it may incentivise customers to move into those regions where under-recovery is occurring, simply as a result of the existence of the subsidy, as opposed to the underlying economics of providing water to that region in the future.

Finally, if this under-recovery is recouped from investors, for example, via a reduction in WaterNSW's RAB, then this may impact upon efficiency in the longer term (i.e. dynamic efficiency). In particular, if an *ex post* adjustment is made to WaterNSW's RAB, and this then affects its willingness to make *future*, otherwise economic investments, or if affects the risk appetite of potential investors in WaterNSW,[4] then this approach is likely to be counter to the achievement of economic efficiency in the longer-term. It is for this reason that the regulatory frameworks that have been adopted in other regulated industries in Australia such as the electricity industry codify starting asset values, as well as approaches for rolling forward asset values. This protects the sunk investments that investors have made, whilst creating a more certain climate for future investment.

3.1.2. Efficient pricing

Given that the means by which any residual (shortfall) is recovered could affect economic efficiency, it is worthwhile outlining a set of first principles that may assist in analysing any potential pricing option. In theory, to facilitate economically efficient outcomes, a regulator should:

- Consider what type of pricing and servicing arrangements may prevail in a reasonably competitive market (refer below).

- Set the marginal (variable) prices that it charges customers for the services it provides, at levels that reflect the forward looking costs to society of providing those services to those customers. This incentivises those consumers to consume up to the point where the marginal benefit to them of consuming an additional unit equals the future costs to society of providing them with that additional unit. Assuming that demand for the service is not perfectly inelastic, when prices deviate from the forward looking marginal cost of supply, customers will consume either:

  - Too much of the service, which will occur if the marginal price is less than its true marginal cost (i.e. some customers will consume a WaterNSW service, despite the fact that the marginal cost of providing them with an additional unit of that service exceeds the marginal benefit that they receive from consuming that service).

  or

  - Not enough of the service, which will occur if the marginal price is greater than its marginal cost of supply (i.e. some customers will not consume water services, despite the fact that the marginal cost of providing them with an incremental unit of that service is less than the incremental benefit that they would receive from consuming that additional unit).

However, in many capital intensive industries, pricing at marginal cost of use leads to under-recovery of fixed costs. In these instances, unavoidable fixed charges in addition to variable charges are justified, although there are constraints on what prices would be considered efficient – known as the efficient pricing band. This efficient pricing band requires that overall revenue that WaterNSW recovers from a customer or group of like customers lies between:

- customer WTP for WaterNSW's services (upper limit)

[4] Obviously, this unlikely to be a material risk for a Government owned business.

- the cost that WaterNSW would avoid if it did not have to supply those services to that customer (avoidable cost or lower limit).[5]

Having prices lie within this 'band' is deemed to be efficient for two reasons:

- **Greater than the avoidable cost:** If the revenue expected to be recovered from a customer or group of customers (as a proxy) does not as a minimum reflect the cost that WaterNSW would avoid if it did not have to provide them with water services in the future, then the price signal may incentivise customers to stay connected to WaterNSW's system, despite the fact that their WTP for WaterNSW's future services could be less than the costs WaterNSW would avoid if it did not have to provide those services. In this situation, those customers (a) would be over-consuming WaterNSW's water services, relative to efficient levels (assuming that the customer or customer class' demand curve is not perfectly inelastic), as well as (b) being subsidised by WaterNSW's remaining customer base.

- **Less than the customer's WTP:** Breaching this upper limit may result in that customer (or group of customers) being incentivised to either inefficiently by-pass WaterNSW's existing system in order to avoid paying WaterNSW's tariffs, or to inefficiently cease their irrigation service (e.g. by closing down a facility that produces a product that uses water as a production input). In both cases, the total revenue (i.e. fixed plus variable charge revenue) that is generated from that customer exceeds the customer's WTP – in the case of the former, their WTP for a system service is capped at the stand-alone cost of an alternative water supply solution (e.g. a non-reticulated water solution), whereas in the case of the latter, their WTP is capped at the value that they place on that water.

Setting prices within the efficient pricing band effectively mimics what would happen in a reasonably competitive market. In this operating environment, a firm cannot charge above a customer's WTP as a customer will buy elsewhere or cease buying altogether. A practical challenge with this approach is that customers' WTP may vary and be difficult to estimate. To deal with this, regulators often consider standalone cost (i.e. the cost for the customer to obtain an alternative water supply) as a substitute for WTP.

Estimating standalone costs and avoided costs requires an engineering-based cost assessment. In the case of standalone cost, an engineering-based assessment is required to determine the cost for a customer or group of customers to be supplied with the same service from an alternative source (e.g. on farm storage capable of providing the same level of reliability). As the upper limit in the efficient pricing band is defined as the lessor of standalone cost and willingness to pay, the latter will often be the lessor and would therefore be the more appropriate estimate in this case. Similarly, estimating avoided costs requires an engineering based estimate of the costs that WaterNSW would avoid if a customer or group of customers disconnected from the network. Given the high proportion of fixed costs that prevail in WaterNSW's networks, it is reasonable to assume that the avoided cost is low and close to zero. In the case of WaterNSW's networks, standalone cost and avoided cost can be considered theoretical limits only and the more practical upper limit of the efficient pricing band is customer's WTP which can be estimated through a simple study which considers the capitalised value of access to bulk water services (which may be reflected in market values for water entitlements) or differences in gross margins between irrigated and dryland production in valleys that are below cost recovery.

Setting prices at or just beneath the upper limit (WTP) does not result in monopoly profits so long as the total revenue in that valley does not exceed the maximum allowable revenue as defined by the NWI definition of upper bound pricing.

[5] For the purposes of this analysis it is presumed that WTP is higher than avoidable cost.

Importantly, this discussion highlights that solutions that least distort future consumption and/or investment decisions be adopted, rather than imposing a solution or solutions that mechanistically require that the cost of sunk investments be recovered from current customers. The potential for ongoing subsidies also points to considering the future management of these small systems, particularly if large new capital expenditure is required at some point.

3.1.3. Efficiently addressing under-recovery of costs

The principles outlined in the previous section provide a framework that can be used when developing solutions to the under-recovery problem. More specifically, absent any consideration of other "non-economic" objectives, these principles would require WaterNSW to first develop prices for each valley such that:

- The marginal (variable) price it charges for each of its services in that valley equals the marginal cost to society of supplying each of those services in that valley.

- The revenue that is generated from each customer (or a group of customers as a proxy) within that valley sits within the efficient pricing band (which has been described above).

If, after determining prices for each valley using these principles, WaterNSW is still under-recovering revenue from one or more valleys (relative to "full cost recovery levels"), the decision-making framework should facilitate solutions that:

- Do not distort the future consumption or investment decisions of customers in the valleys where under-recovery occurs, relative to efficient levels.

- Do not distort the future consumption or investment decisions of customers in valleys where under-recovery does not occur, relative to efficient levels.

- Do not distort the future investment decisions of WaterNSW, relative to efficient levels.

Again, the tests are around setting marginal prices equal to marginal costs and setting prices so that they are within the efficient pricing band are important.

A summary of the combination of the first principles approach to pricing and addressing under-recovery is provided in Figure 4.

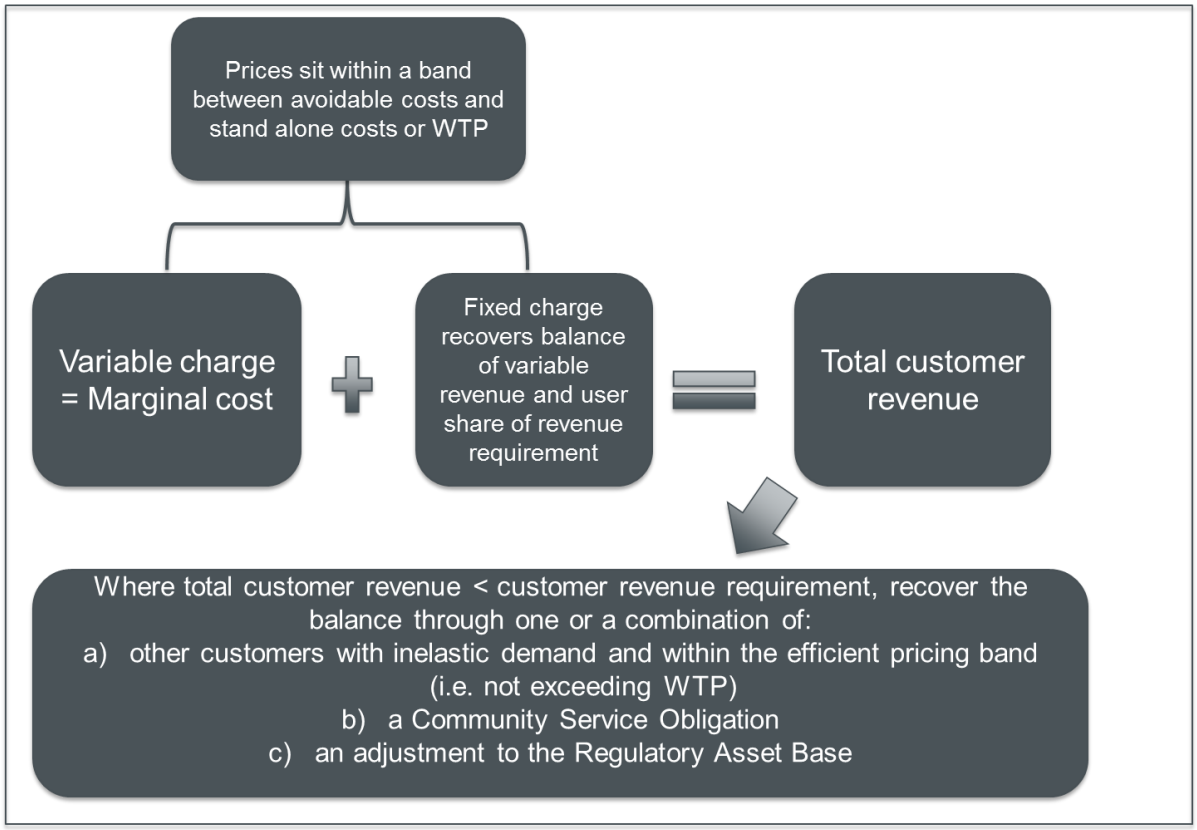


Figure 4 A first principles approach to pricing and addressing under-recovery

Source: Aither, 2016

3.1.4. Addressing equity considerations and broader policy objectives

Notwithstanding the above, the use of the economic principles outlined in the previous sections could result in the adoption of a solution/s that some stakeholders consider inequitable, or inconsistent with broader policy objectives. For example, in theory, WaterNSW could increase prices for customers in other valleys that are at full cost recovery in order to make up for the residual (shortfall) without distorting the future consumption or investment decisions of customers in those other valleys (i.e. it could do so without breaching the efficient pricing band, and without distorting marginal price signals). However, the distributional implications may be considered inequitable and this would be inconsistent with broader policy objectives.

Equity considerations are likely to require a value judgement to be made by WaterNSW, IPART and policymakers. It is not the purpose of this report to provide commentary on how these value judgements (trade-offs) should be made; that said, if economic efficiency is the primary objective to be considered when developing WaterNSW's prices, any move away from economically efficient pricing signals to account for equity considerations and other broader policy objectives should, in theory, be undertaken in a way that minimises distortions to economic efficiency (e.g. minimises distortions to future consumption and investment behaviour).

3.2. Brief history of water pricing policy in Australia

Prior to the mid-1990s, water supply schemes in NSW and other jurisdictions were constructed to promote regional economic development. The costs of constructing and operating these schemes were often heavily subsidised by government. At the time, it was not the policy intent of governments to recover these costs from irrigators and other water users.

However, in 1994, governments agreed to the Council of Australian Governments (COAG) Water Reform Framework which, amongst other things, saw a significant policy shift in relation to pricing and delivery of monopoly infrastructure services including bulk rural water provision.[6]

Since 1994, a number of water policy agreements and legislative instruments have been implemented which shape how IPART determines water prices. These agreements and legislative instruments, which are summarised in Figure 5, are relevant for establishing the high-level objectives and pricing principles which IPART adheres to. They are therefore relevant in establishing principles and shaping options for valleys that are not recovering costs or where prices are comparatively high.

[6] The Water Reform Framework also provided the impetus for structural separation of rural water service delivery through the corporatisation of bulk water service provision and privatisation of retail service provision in some areas. Separation payments were provided to five Irrigation Corporations to fund deferred maintenance programs.

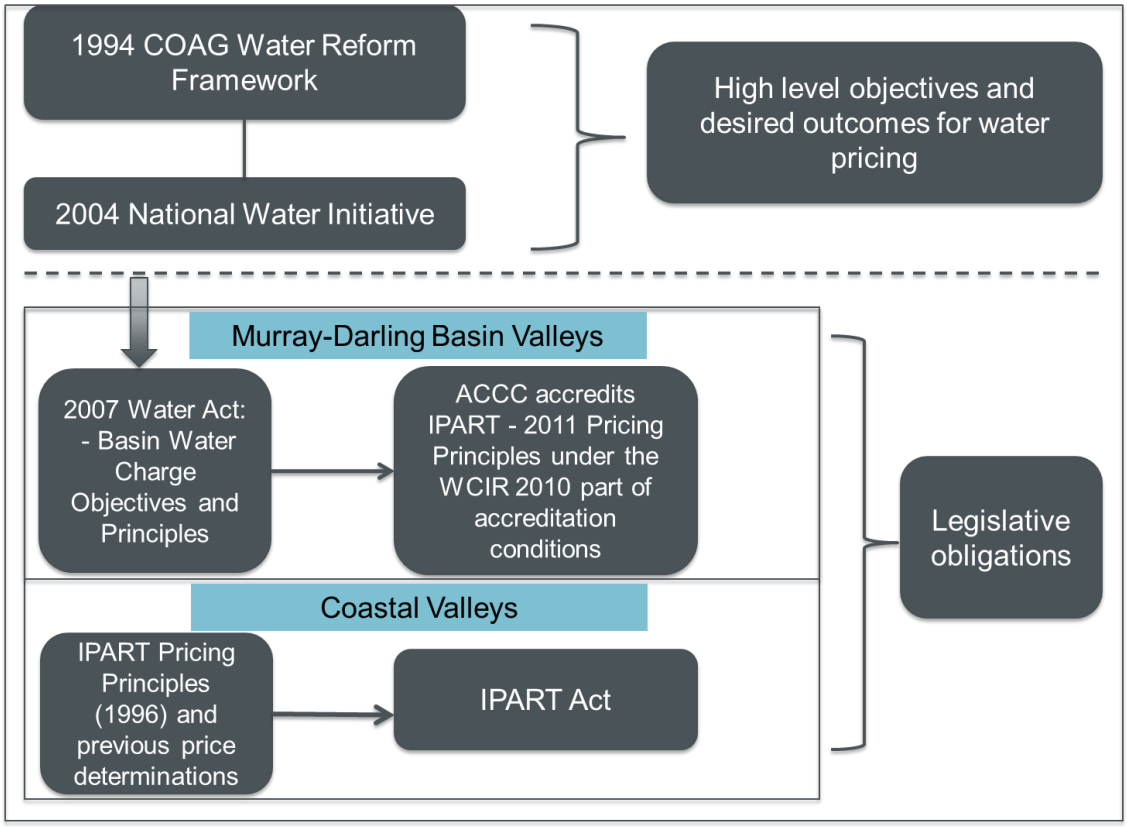


Figure 5 Legislative and policy framework applicable to pricing for WaterNSW services

Source: Aither, 2016

Note: The application of the Australian Competition and Consumer Commission's (ACCC) Pricing Principles as part of the accreditation process under the Water Act is currently subject to review. The ACCC's Draft Advice suggests this condition will be repealed.

In the Murray-Darling Basin (MDB), the *Independent Pricing and Regulatory Tribunal Amendment (Accredited State Water Regulator) Act 2015*, which was assented on 9 June 2015, means that the Commonwealth provisions under the Water Act, apply as a law of the state of NSW.

3.3. Policy objectives and desired outcomes for water pricing

The NWI built on the 1994 COAG Water Reform Framework is the most significant interjurisdictional policy agreement for water pricing. The high-level objectives and desired outcomes for water pricing as specified in the NWI are:

- to promote the economically efficient and sustainable use of:
  - water resources
  - water infrastructure assets
  - government resources devoted to the management of water resources
- to ensure sufficient revenue streams to allow efficient delivery of the required services
- to facilitate the efficient functioning of water markets (including inter-jurisdictional water markets, and in both rural and urban settings)
- to give effect to the principles of user-pays and achieve pricing transparency in respect of water storage and delivery in irrigation systems

- to avoid perverse or unintended pricing outcomes.

For pricing for water storage and delivery in rural and regional areas, states and territories agreed that these objectives would be achieved by:

- consumption based pricing
- achieving consistency in pricing policies that are applied across sectors and jurisdictions where entitlements are able to be traded
- achieve full-cost recovery for water services to ensure business viability and avoid monopoly rents through continued movement towards upper bound pricing where practical[7]
- where full cost recovery is unlikely to be achieved in the long term and a Community Service Obligation (CSO) is deemed necessary, the size of the subsidy is to be reported publicly and, where practicable, jurisdictions are to consider alternative management arrangements aimed at removing the need for an ongoing CSO.

3.4. Legislative framework for setting water prices in NSW

IPART sets prices for WaterNSW within a complex legislative and policy framework. Under the *Independent Pricing and Regulatory Tribunal Act 1992* (*IPART Act*), IPART regulates the prices for a number of government monopoly services in NSW. As part of this responsibility, IPART is required to review and set maximum prices that state government-owned water utilities may charge.

As part of its role, IPART regulates prices charged by WaterNSW, the rural component of which delivers bulk water services to irrigators and other licence holders on regulated rivers in NSW. The new price paths are due to begin on 1 July 2017.

In order to establish the objectives and high-level principles that IPART refers to in setting prices for bulk water, it is necessary to outline the legislative and policy environment in which IPART operates.

3.4.1. *IPART Act*

Under the *IPART Act*, in making determinations and recommendations, IPART is to have regard to:

- the effect on general price inflation over the medium term
- the need for greater efficiency in the supply of services so as to reduce costs for the benefit of consumers and taxpayers
- considerations of demand management (including levels of demand)
- the social impact of the determinations and recommendations.

3.4.2. *Water Act*

The *Water Act 2007 (Commonwealth)* (Water Act) assigned the Australian Competition and Consumer Commission (ACCC) a role in developing and enforcing water charge and water market rules that apply in the Murray-Darling Basin (MDB). These Rules are statutory instruments that

[7] The NWI notes that "there will be some small community services that will never be economically viable but need to be maintained to meet social and public health obligations".

facilitate a number of objectives and principles of the Water Act. Schedule 2 of the Water Act outlines Basin Water Charge Objectives and Principles (BWCOP) which essentially reflect the objectives and desired outcomes specified in the NWI. Principles to implement these objectives, which reiterate the NWI, are also outlined in schedule 2 of the Water Act.

Water Charge (Infrastructure) Rules 2010

The Water Charge (Infrastructure) Rules 2010 (WCIR) aim to address various issues that arise from the inherent market power of natural monopoly infrastructure operators and to ensure the approach to implementing infrastructure charges is consistent across MDB jurisdictions.[8] Consistency in the approach to setting charges is designed to ensure a level playing field so that water trade and investment decisions are free from material distortions.

The WCIR relate to charges for water storage, delivery and other infrastructure services in the MDB. There are three tiers to the WCIR which are based on the size and governance structure of the regulated entity. Large non-member owned infrastructure operators such as WaterNSW must comply with the Tier 3 requirements of the WCIR, which includes being subject to price determinations by the ACCC or an accredited state regulator under a building block approach. The ACCC set WaterNSW's maximum prices in valleys in the MDB from 1 July 2014. However, from 1 June 2016, IPART has been accredited to set prices for MDB valleys for the next ten years and will therefore determine water charges for WaterNSW for this period. As noted by the ACCC (2015a), IPART's accreditation is currently subject to two conditions:

1. IPART is to apply pricing principles developed by the ACCC (see Box 1 for a summary of these principles).

2. IPART is required, on request, to provide information to the ACCC to enable it to monitor and enforce the accreditation arrangements and the Water Charge Rules.

Box 1 Summary of ACCC Pricing Principles relevant to IPART's role in setting prices for WaterNSW under the Water Act

The ACCC Pricing Principles, which are a condition of IPART's accreditation, set out a number of principles to guide the development of regulated water charges. The most relevant principles for this paper are summarised below. A full transcript of the ACCC's Final accreditation decision and the full pricing principles can be found at: https://www.accc.gov.au/regulated-infrastructure/water/water-projects/ipart-application-for-accreditation-under-the-water-charge-infrastructure-rules/final-decision

Valuation of the initial RAB

Once a RAB value is set it must not be subject to revaluation. Revaluation creates uncertainty for the regulated business and its customers and can result in price shocks and windfall gains or losses to the business. For this reason, the WCIR require that any RAB value in place for a Part 6 operator at the time that Part 6 commences, must be retained. Schedule 2 of the WCIR provides that where a Part 6 operator has already had its RAB value set by an agency of a state under a law of the state, this is the value that must be used for the initial starting value under the Part 6 approval or determination process.

Tariff structures

In approving or determining regulated charges [including tariff structures], the regulator must have regard to the BWCOP which align with NWI commitments discussed in detail in section 3.3.

[8] This does not mean consistent charges across the MDB.

In summary, tariff structures should:

- promote the economically efficient use of water infrastructure assets
- ensure sufficient revenue streams to allow efficient delivery of the required services
- give effect to the principles of user pays in respect of water storage and delivery in irrigation systems
- achieve pricing transparency
- facilitate efficient water use and efficient functioning of water markets.

Source: ACCC, 2016

Water Charge Rules review

The ACCC is conducting a review of the Water Charge Rules in response to recommendation 11 of the Independent Review of the Water Act. The recommendation proposed that the Water Charge Rules be reviewed to assess opportunities to reduce cost to industry and government. In particular, the Independent Review of the Water Act found that the consistency of water charging regimes between MDB jurisdictions and the impact of different charging structures on water allocation and entitlement trade was a key concern amongst stakeholders.

In November 2015, the ACCC released Draft Advice in relation to its review of the Water Charge Rules. Relevant for this paper, the Draft Rules Advice proposes to:

1. Repeal the accreditation of Basin State regulators. This means that IPART would no longer be accredited under the WCIR and would not be bound by the ACCC Pricing Principles as a condition of accreditation (ACCC, 2015b).

2. Review its guidance materials and work with Basin State regulators and other industry stakeholders to develop more practical and detailed guidance on the interpretation of, and the interaction between, the BWCOP. This will include:

    a. interpretation of key terms such as “perverse or unintended pricing outcomes”

    b. improved identification of and links between the infrastructure services provided and how infrastructure charges are determined to recover the costs of service provision

    c. cost allocation and the basis for determining charging areas (for example, where charging areas are based on geographic areas) should be assessed (ACCC, 2015b).

The ACCC advice is expected to be delivered within the next eighteen months and therefore the existing accreditation rules will apply for the 2017 determination period.

3.5. IPART’s approach to setting prices for WaterNSW’s services

3.5.1. IPART’s 1996 Principles for bulk water pricing

In 1996, IPART undertook a major research project to review and reform charges for bulk water services. The principles, which have been further developed through price determinations, are still relevant and aim to set prices that encourage the efficient provision of bulk water services as well as to ensure that users are provided with price signals to efficiently manage resources.

The 1996 principles which were reproduced by IPART (2009) stated that:

- Water charges should be based on the efficient economic costs of providing water services.
- The administrator of water resources should receive sufficient funds to achieve financial stability and deliver an appropriate level of water services.
- Pricing policy should encourage the best overall outcome for the community from the use of water and the other resources used to store, manage and deliver that water.
- The cost of water services should be paid by those who use the services. Those who cause more services to be required should pay more.
- Pricing policy should promote ecologically sustainable use of water and of the resources used to store, manage and deliver that water.

3.5.2. Drawing a line in the sand

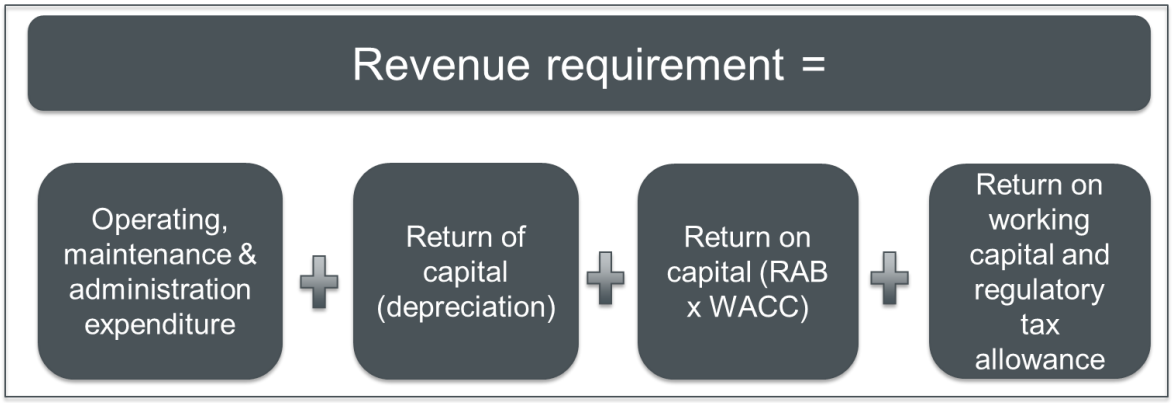
In 1997, IPART "decided to draw a 'line-in-the-sand' and determine that all water assets put in place prior to 1 July 1997 should not be included in the asset base for pricing purposes. This means that users will not be charged depreciation or a rate of return on pre-1997 expenditure" (IPART, 2001). In drawing a line in the sand, IPART acknowledged the fundamental change in policy brought about by agreement to the 1994 COAG Water Reform Framework where the costs of irrigation schemes should be borne by users. In making its decision, IPART also stated that "all new expenditure, including renewal and compliance expenditure, post 1997 that is attributed to users will attract commercial rates of return" (IPART, 2001).

In its 2006 price determination, IPART shifted from a renewals annuity approach to a building blocks approach to set revenue requirements for each valley (IPART, 2009). A brief discussion of the building blocks approach and the approach to setting the initial RAB is outlined below to provide context for some of the options discussed in section 4.

3.5.3. Building blocks methodology

The term "building blocks" is commonly used to describe the approach used to calculate the efficient cost components that make up the revenue requirement to be recovered through water charges. The cost components or "building blocks" can vary but will generally include capital expenditure, operating expenditure and a return of and on capital.

The "building blocks" approach is forward-looking and considers estimates of the future costs associated with providing the service. There is usually a clear link between the definition or level of the service (such as service standards and regulatory obligations), cost drivers (such as the number of customers, and number of connections) and forecast costs. IPART uses it to derive forward estimates of the revenue needed to permit a defined service to be delivered over the "pricing or regulatory period". A summary of the building blocks approach is provided in Figure 6.



Source: Aither, based on IPART and NWI Steering Group on Water Charges, 2007

Figure 6 Summary of the building blocks approach

The return of capital (or depreciation of the RAB) and a return on capital, which reflects the opportunity cost of the investment, are both derived off the value of the RAB. A brief outline of the approach to set the initial RAB and how the RAB is rolled forward is described below.

Setting the initial RAB

In 2006, IPART set the value of the RAB for WaterNSW (then State Water) based on the economic value of the assets in each valley. The economic value reflects the Net Present Value (NPV) of future cash flows generated by the business, assuming that prices that prevailed at the time the valuation was undertaken are to continue. In setting the initial RAB, IPART removed all contributed assets (NWI Steering Group on Water Charges, 2007).[9]

RAB roll-forward

New investments and reinvestments made by WaterNSW are added to the RAB at efficient actual cost. Assets disposed of are deducted from the RAB, as is depreciation. Over time, as legacy assets are disposed of, the RAB increasingly reflects the replacement cost of assets.

Weighted average cost of capital on a RAB

Where a water business is on a path towards, or at, upper bound pricing, provision should be made for the cost of capital, which is reflected by the Weighted Average Cost of Capital (WACC). The WACC estimates the return on debt and equity and is "the rate that investors – both the providers of debt and of equity – require in order to be compensated for the non-diversifiable risks associated with the assets in which they invest" (NWI Steering Group on Water Charges, 2007). A return of, and on capital is earned over the expected life of the asset. The quantum of this return is derived by applying the WACC to the RAB.

3.5.4. Tariffs

WaterNSW applies a two-part tariff comprising a fixed and variable charge. Tariffs are applied at a valley level, where the border for each valley is defined "by reference to a water management area, or a specified water source under a Water Sharing Plan (WSP)" (WaterNSW, 2016). This valley-based postage stamp pricing approach means that fixed and variable charges do not vary depending on

[9] Contributed assets are those assets that are provided/funded by water users, or provided/funded on behalf of users by a third party (e.g. governments).

where the user is in the valley. This approach is consistent with the valley-based approach applied in Victoria and Queensland.[10]

In the majority of valleys, the user share of WaterNSW's revenue requirement is recovered through a 40:60 fixed to variable tariff ratio although this does vary and in some valleys a 60:40 fixed to variable tariff is applied. Higher fixed charges are levied on HS WAL's with a lower fixed charge levied on GS WAL's.

Although not a strict requirement of the ACCC's 2011 Pricing Principles, the ACCC principles do note that in practice, achieving economically efficient use of water infrastructure assets can best be achieved where the fixed and variable components of a charge recover the fixed and variable costs of providing services. However, in their 2014 price determination for State Water, the ACCC considered a proposal by State Water to move to an 80:20 fixed to variable tariff ratio. On balance, the ACCC (2014) stated that it

> *is concerned that State Water's proposal would reduce the cash-flow of water users in dry periods, which may limit their ability to finance their activities, with potentially detrimental economic impacts.* ***This could give rise to perverse or unintended pricing outcomes.*** *The ACCC does not consider that this transfer of risk to customers through an 80:20 tariff structure would contribute to the BWCOP (emphasis added).*

3.5.5. Procedural matters that have shaped prices and pricing policy

Prices for WaterNSW services have historically been set in consultation with customers. This occurs primarily through WaterNSW's Customer Service Committees which are consulted as WaterNSW prepares its initial pricing proposal for IPART. IPART also seeks customer and stakeholder feedback through a public submission process and via public hearings. The consultative nature of the price setting process has influenced the structure of prices that prevail today. For example, the current split of fixed and variable charges, which for most customers, is set at a 40/60 ratio of fixed to variable charges, reflects customer preferences related to cash flow.

3.6. Guiding principles for pricing

The legislative and policy objectives, together with economic first principles, allow a set of pricing principles, which are presented below, to be developed:

First economic principles suggest that:

- Prices should be set to align with those that would prevail in a reasonably competitive market and within the efficient pricing band such that the overall revenue that WaterNSW recovers from a customer (or on average from a group of 'like' customers, if this is more practical) lies between the lessor of customers' WTP for WaterNSW's services and the stand alone cost (upper limit) and the cost that WaterNSW would avoid if it did not have to supply those services to that customer (lower limit) (which in most cases will be close to zero). Therefore the lessor of WTP and stand alone cost becomes the critical determinant.
- Distributional or equity considerations need to be considered in recovering any revenue shortfalls after application of prices based on the efficient price band. Any "residual" revenue requirement should be recovered in a way that least distorts future consumption and investment decisions.

[10] Although in Victoria, there are various degrees of aggregation or postage stamp pricing applied.

Whilst there are many ways to recover this residual revenue requirement, a first principles approach suggests that it essentially comes down to some combination of:

- recovering it from other customers
- government (CSO)
- investors (e.g. WaterNSW, via a reduction in its RAB).

Legislative obligations under the Water Act and conditions on IPART's accreditation to set charges in the MDB under the WCIR provide additional guidance for pricing principles. While these obligations relate only to valleys in the MDB, if approaches to pricing are to be consistent across all valleys, these obligations, by extension, are relevant for all valleys and require that:

- Water charges should be set to recover the full, efficient cost of service delivery, consistent with the NWI definition of upper bound pricing which includes a return on capital.
- Where full cost recovery is unlikely to be achieved in the long term, WaterNSW should be able to recover the revenue shortfall. A transparent CSO may be required in order to achieve revenue certainty for WaterNSW.
- Alternative management arrangements aimed at reducing or completely removing the need for a long-term CSO should be explored.
- Pricing policies (approaches to pricing) should be consistent across jurisdictions, where entitlements are able to be traded. This minimises distortions in the water market.
- Water charges are to include a consumption based component.
- Pricing policies should avoid perverse or unintended pricing outcomes.
- The RAB value must not be subject to revaluation. A condition of IPART's accreditation to set prices in the MDB is that it must align with the ACCC's 2011 Pricing Principles which preclude assets being revalued.

4. Options identification

4.1. Overview

This section describes approaches to transition regulated prices to full cost recovery or to mitigate comparatively high prices that have been adopted in other jurisdictions and other industries. A summary of suggestions provided by stakeholders to IPART and the ACCC in submissions as part of previous bulk water pricing reviews is also presented. A list of potential options to address under-recovery of costs or high prices that can be applied in NSW valleys is then identified drawing from these data sources.

4.2. Approaches used in the bulk water sector in other jurisdictions in Australia

A review of cost recovery for raw water in rural areas reveals that Queensland is the only other jurisdiction in Australia that has irrigation schemes that are not recovering costs consistent with upper bound pricing. Irrigation schemes that are not recovering costs are subject to a glide path where fixed charges increase by $2 per ML plus CPI. A summary of approaches taken to set prices in other jurisdictions is presented in Table 8.

Table 8 Summary of approaches used in other jurisdictions

Jurisdiction	Approach
Queensland	Cost reflective prices for SunWater's irrigation schemes were determined by the Queensland Competition Authority on the basis of lower bound.[a] Historically, the Queensland Government has classified a small number of schemes that are below lower bound levels of cost recovery as 'hardship schemes'. In its 2012 recommendations to the Queensland Government, the Queensland Competition Authority increased the fixed charge in these schemes by $2/ML (plus CPI) and variable charges by CPI. The $2/ML increase extended a previous policy which deemed that level of increase 'reasonable' (QCA 2012). Under this arrangement, the Queensland Government provides a CSO payment to SunWater to cover the difference between forecast actual and cost reflective revenue. Some hardship schemes will take many decades to transition to lower bound cost recovery if this policy remains in place over the long-term. Other schemes not classified as hardship schemes, but also identified as being below lower bound, were subject to the same rate of increase (i.e. $2 per ML plus CPI) until they reached the lower bound revenue requirement (Queensland Competition Authority, 2012). In April 2016, the Queensland Government extended the price path period to cover the period 1 July 2017 to 30 June 2019. The policy to increase prices by $2 per ML plus CPI in schemes not recovering lower bound costs was also maintained (Department of Energy and Water Supply 2016).
Victoria	The major Victorian irrigation schemes largely achieve full cost recovery. Major providers (e.g. Goulburn Murray Water) are subject to economic regulation by the Essential Services Commission. Price determinations are given as a maximum tariff. To achieve full cost recovery an initial 'line in the sand' was drawn on the value of existing assets. This valuation approach see the value of assets set at a value which reflects the NPV of future revenue if charges that prevailed at the time the asset valuations were determined are assumed to continue. Future prudent capital costs are then rolled into the RAB at efficient actual cost under a RAB roll-forward approach. Over time, as legacy assets are disposed of, the RAB increasingly reflects the replacement cost of assets.
South Australia	In South Australia the bulk water supplier, SA Water supplies urban users predominantly. To a lesser extent, SA Water provides water for stock and domestic purposes across the state (24,000 customers in country areas). SA Water also provides services to some irrigators and an irrigation water supplier, by transporting their water via SA Water systems at a fee. Again the quantities involved are small in the state context (NWI Steering Group on Water Charges, 2007). South Australia does therefore not offer a like-for-like comparison with WaterNSW.
Western Australia	As the bulk water provider to urban and rural users, Water Corporation applies a state-wide pricing policy under direction from the Western Australian Government. Western Australia is therefore not a good comparator. Some irrigation schemes have been transferred to member-owned co-operatives (e.g. Gascoyne Water, Harvey Water) which set their own prices. These cooperatives are not regulated and are only subject to their own internal pricing principles. Being member owned means

Jurisdiction	Approach
	prices are typically set to break even, as the members receive benefit from lower prices rather than from maximising profits.
Tasmania	In Tasmania the Rivers and Water Supply Commission and Tasmanian Irrigation Schemes, was merged into Tasmanian Irrigation (TI) in 2011. TI is a state owned company with the primary aim to develop irrigation schemes in Tasmania. Recently, irrigation schemes in Tasmania have been funded through public private partnerships. Private contributions for the upfront purchase of entitlements have supplemented up-front capital grant contributions from the Australian and Tasmanian Governments. TI does not develop schemes that require ongoing subsidisation to support operating and renewal costs, with costs being met through annual charges levied on entitlement holders. Water for irrigation purpose is not subject to economic regulation in Tasmania. Prior to the formation of TI, the Rivers and Water Supply Commission supplied rural water to irrigation customers (as well as a handful of other private providers). The Rivers and Water Supply Commission did not have discrete pricing principles but where government owned infrastructure was used, charges were set to recover, at minimum, lower bound cost recovery (consistent with NWI principles).
Northern Territory	There is only one regulated system in the Northern Territory (the Darwin River Dam scheme) which supplies water to urban users. The Northern Territory is therefore not a good comparator.

Notes: [a] However, in some schemes, SunWater recovers revenue that exceeds the revenue that would be recovered from prices based on lower bound. The Queensland Competition Authority was directed by the Queensland Government to not reduce prices in real terms.

4.3. Lessons from the Peel valley

As outlined in Table 3, water prices in the Peel valley are significantly higher than other valleys where the customer base is greater. A number of proposed solutions have been suggested and trialled. These are discussed briefly below to inform the identification of options.

4.3.1. Peel Valley Water Users Association submissions

In previous submissions on water pricing, the Peel Valley Water Users Association has raised concerns with the charges that apply to GS WAL's. For example, in its 2016 submission to the ACCC's Draft Advice on the review of the Water Charge Rules, it stated that the charges for GS water are:

- Excessive, inequitable and anti-competitive compared to other valleys in the MDB.
- Linked to a 'valley-based pricing' methodology, and do not reflect a 'user pays' methodology.
- Perverse, and therefore in breach of the Water Act.
- Inequitable "given that under the Peel Water Sharing Plan, the two major stakeholders in the Peel Valley can collectively only access 5 per cent of the average annual end of stream flow, it is highly inappropriate that the Peel Valley water users are charged 100 per cent of the user share of costs in return for access to only 5 per cent of the available water".

4.3.2. Tamworth City Council submissions

Tamworth City Council, which is the major urban customer in the Peel valley have called for state-wide pricing as a potential means to address the differences in prices being levied between valleys (Tamworth City Council, 2016).

4.3.3. Temporary trade trial between the Peel and Namoi valleys

The NSW Office of Water announced a temporary trade trial between the Peel and Namoi valleys in 2014/15. The trial was to last one year, with an option to extend it by a further two years. The stated objective of the trial was to:

> *assess the effectiveness of the market in improving cost recovery and reducing water charges in the Peel Valley, and will have the added benefits of increasing income for Peel licensees and making more water available for production in the Namoi Valley (NSW Office of Water, 2014).*

The logic behind the trial is that water allocations traded from the Peel to the Namoi valleys would generate additional revenue for WaterNSW of $32.95/ML that would be used to "maintain service delivery and reduce water usage charges in the Peel Valley" (NSW Office of Water, 2014).[11]

[11] There were a number of conditions including that water could only be traded from the Peel valley to the Namoi and not vice versa. For a more detailed description of the temporary trial refer to www.water.nsw.gov.au.

4.4. Approaches taken in other industries

4.4.1. Optimising the value of assets in the rail industry for pricing purposes

In 1998, the NSW Premier requested IPART to recommend a valuation method for calculating maximum ceiling prices for customers of the NSW Rail Access Regime. IPART recommended that "the most reasonable asset valuation method for the ceiling tests under the NSW Rail Access Regime is either indexed depreciated actual cost or Depreciated Optimised Replacement Cost (DORC)" (IPART, 1999). IPART went on to note that "in the absence of an indexed historical cost valuation, IPART considers that DORC is the most appropriate initial capital base for calculating ceiling test prices (including a maximum rate of return) for the NSW Rail Access Regime" (IPART, 1999).[12]

4.4.2. Application of the efficient pricing band in the electricity and gas sectors

Probably of more interest however is how electricity and gas businesses deal with cases where customers' WTP may be less than "full cost recovery" levels.

In the electricity transmission sector, where customers' WTP may be less than prices based on full cost recovery levels, businesses apply a 'prudent discount policy', which allows the transmission business to provide customers with discounts. The discount can be applied if the application of their "generalised" prices would have otherwise led that customer to inefficiently disconnect from the electricity transmission network. Furthermore, electricity and gas distribution businesses in Australia must comply with the National (Electricity and Gas) Rules that both refer to:

- setting marginal prices based on the Long Run Marginal Cost (LRMC)
- pricing between the stand-alone and avoidable cost of supply.

There is also a broader objective in the National Electricity Rules that requires businesses to recover their "residual costs" (i.e. the difference between their average cost of supply and their LRMC) in a way that least distorts future consumption and investment behaviour.

4.5. Options identification

Approaches to set prices in valleys where cost recovery is not being achieved or charges are high compared to other valleys in NSW have been identified in Table 9 below.

[12] An important distinction here is that IPART's role in this case was to establish the initial asset value for access purposes, as opposed to revaluing an asset, which is prohibited under the ACCC Pricing Principles.

Table 9 Options to set prices where cost recovery is not being achieved or prices are at full cost recovery but comparatively high

Option	Description	Sub-options/glide path
One – status quo	Continue to operate the schemes, with a price glide path to full cost recovery and a CSO paid to WaterNSW to make up the difference between the revenue requirement and actual revenue in the interim.	Prices increase either at: • a capped annual percentage increase (e.g. 10 per cent per annum real) or • a fixed dollar amount per annum on the fixed and variable charge.
Two – price freeze	Fix prices at a point in time and an ongoing CSO paid to WaterNSW to make up the difference between the revenue requirement and actual revenue.	• Prices increase at CPI to maintain prices in real terms. • Prices remain fixed, resulting in a decline in prices and revenue in real terms over time.
Three – adjust the value of the RAB	Revalue the RAB given prevailing market conditions (including entitlement volumes and customer numbers).[a]	Depends on the outcomes of the revaluation. Prices may still need to increase in the North and South Coast Valleys as per the sub options outlined above.
Four – set prices to achieve lower bound pricing	Adjust the target revenue requirement to achieve lower bound cost recovery (i.e. excluding a return on capital) over a set period of time.	In the interim, prices increase either at: • a capped annual percentage increase (e.g. 10 per cent per annum real) or • a fixed dollar amount per annum on the fixed and variable charge.
Five – set prices to sit within the efficient pricing band (below customers' WTP, but above WaterNSW's avoidable cost of supply)	This approach aligns with economic first principles, as discussed above.	Whilst the final outcomes would depend on the assessment of existing prices against the pricing principles, in valleys where under-recovery currently occurs, customers' prices would be moved to within the efficient pricing band.
Six – implement state-wide pricing	Move away from valley-based pricing to smooth WaterNSW's total costs across its entire customer base.	Depends on the valley and the quantum of the price increase or decrease.

[a] For example, using the Optimised Deprival Value, which is the lesser of the DORC value and the NPV of future revenue streams.

5. Options assessment

This section presents the advantages and disadvantages of each option, relative to the principles described in section 2. The advantages and disadvantages are described from the perspective of customers, WaterNSW, government and IPART (in relation to principles for economic regulation and pricing).

5.1. Options assessment overview

This section presents an assessment of the advantages and disadvantages of each of the options outlined in Table 9 against the assessment framework presented in Table 10.

5.2. Options assessment framework

Criteria for assessing the advantages and disadvantages and relative performance of options are presented in Table 10. The criteria are not listed in any deliberate hierarchy although alignment of the option with the pricing principles presented in section 3.6, which map closely to legislative requirements and first principles for pricing is critical.

Table 10 Options assessment framework

Criteria #	Objective/criteria
One	**Be consistent with the pricing principles** outlined in section 3.6
Two	Promote **efficient water use** and efficient investment in water infrastructure
Three	Facilitate the **efficient functioning of water markets**, including inter-jurisdictional water markets
Four	Provide **certainty for water users**
Five	**Promote equitable outcomes**
Six	**Be flexible enough to cater for longer-term demand forecasts** and the nature of that demand (e.g. the long-term mix of rural and urban users)
Seven	**Be relatively cost-effective** (i.e. relative to the size of the subsidy) and administratively simple and transparent to water users
Eight	**Be transparent to water users**
Nine	**Minimise regulatory risk** for WaterNSW

5.3. Options assessment

5.3.1. Option 1: Status quo

Option description

This option reflects the approach applied by the ACCC in its 2014 price determination for State Water and the approach proposed by WaterNSW in its 2016 pricing submission to IPART. It includes:

- continuing to apply the building blocks methodology to determine the total and notional revenue requirement
- continuing valley-based pricing
- continuing to operate schemes that are not achieving cost recovery, with a price glide path to achieve cost recovery over the long-term and a CSO paid to WaterNSW to make up the difference between the notional revenue requirement and actual revenue.

Option disadvantages

The main disadvantages with this approach are that:

- Prices will continue to increase annually at 10 per cent in some valleys. There is therefore the potential that prices will exceed WTP, resulting in under-utilisation of sunk infrastructure investments – this is a critical efficiency issue. There are also potential revenue implications for WaterNSW if this were to occur.
- Related to the point above, these outcomes could contravene the Water Act requirement for pricing policies to avoid perverse or unintended pricing outcomes.
- The annual increase (i.e.10 per cent per annum) under the glide path is not underpinned by a policy principle or guideline and is therefore an arbitrary increase.

Option advantages

Notwithstanding the disadvantages above, there are a range of advantages for this option including:

- Consistency with the legislative obligation under the Water Act to continue to seek full cost recovery and provide a CSO where full cost recovery cannot be achieved.
- The provision of user certainty as the existing policy will be continued.

A summary of the option against the assessment framework is presented in Table 11.

Table 11 Option assessment against assessment framework – Option 1: Status Quo

Criteria #	Objective/criteria	Assessment
One	**Be consistent with the pricing principles** outlined in section 3.6	In respect of continued movement to upper bound pricing yes. However, the BWCOP require options to reduce the requirement for an ongoing subsidy to be explored. If prices exceeded the efficient pricing band, this could contravene the BWCOP to avoid perverse or unintended pricing outcomes.
Two	Promote **efficient water use** and efficient investment in water infrastructure	Yes on the basis that the option includes valley-based pricing. However, if prices exceed the efficient price band (exceed WTP), then this option will result in inefficient outcomes.
Three	Facilitate the **efficient functioning of water markets**, including inter-jurisdictional water markets	Yes, the option includes valley-based pricing which is consistent with approaches taken in other jurisdictions.
Four	Provide **certainty for water users**	Yes, it is a continuation of the previous policy.
Five	**Promote equitable outcomes**	For the most part yes, although continuing to increase prices may result in prices exceeding WTP in some valleys in the future.
Six	Be flexible enough to cater for longer-term demand forecasts and the nature of that demand (e.g. the long-term mix of rural and urban users)	Yes
Seven	**Be relatively cost-effective** (i.e. relative to the size of the subsidy) and administratively simple and transparent to water users	Yes, it is a continuation of the previous policy.
Eight	**Be transparent to water users**	Yes, it is a continuation of the previous policy.
Nine	**Minimise regulatory risk** for WaterNSW	Yes, the combination of revenue through charges and CSO payments ensures revenue certainty for WaterNSW.

Summary Finding: So long as prices do not exceed the efficient price band, this option is sound. However, if cost recovery is pursued without consideration of WTP then there is potential for inefficient and potentially perverse outcomes to occur.

5.3.2. Option 2: Freeze prices at current levels in valleys where cost recovery is not being achieved or prices are comparatively high

Option description

This option involves continuing to operate the schemes with prices, in selected valleys where cost recovery is not being achieved or prices are comparatively high, fixed at current levels and a CSO paid to WaterNSW to make up the difference between the revenue requirement and actual revenue. Valley-based pricing remains in place and the building blocks methodology still applies to determine the total and notional revenue requirement. Unaffected schemes continue to operate and be prices as is currently the case. Sub-options for relevant schemes include:

- Prices increase at CPI to maintain prices in real terms.
- Prices remain fixed, resulting in a decline in prices and revenue in real terms over time.

Option disadvantages

The main disadvantages with this approach are that:

- It does not align with the requirement in the Water Act to reduce or completely remove the need for an ongoing subsidy. In fact, all things being equal, this approach would increase the size of the subsidy as legacy assets are disposed from the RAB and new assets are rolled into the RAB at actual cost.
- It relies on the assumption that the NSW Government will continue to provide a subsidy. If the subsidy policy were to change, it would create revenue risk for WaterNSW.

Option advantages

The only advantage with this approach is that it would create certainty with respect to future prices for customers in affected valleys and would ease the cost burden associated with high comparative prices.

A summary of the option against the assessment framework is presented in Table 12.

Table 12 Option assessment against assessment framework – Option 2: Freeze prices

Criteria #	Objective/criteria	Assessment
One	**Be consistent with the pricing principles** outlined in section 3.6	No. The option is not consistent with the principle of setting water charges should be set to recover the full, efficient cost of service delivery, consistent with the NWI definition of upper bound pricing which includes a return on capital. It is also inconsistent with the requirement to reduce or remove the need for an ongoing subsidy.
Two	Promote **efficient water use** and efficient investment in water infrastructure	No, freezing prices would create perverse incentives affecting demand and future investment.
Three	Facilitate the **efficient functioning of water markets**, including inter-jurisdictional water markets	No, this policy, would create inconsistencies between jurisdictions.
Four	Provide **certainty for water users**	Yes, in relevant valleys.
Five	**Promote equitable outcomes**	No from the point of view of water users in other valleys. Arguably yes, from the point of view of water users in relevant valleys.
Six	Be flexible enough to cater for longer-term demand forecasts and the nature of that demand (e.g. the long-term mix of rural and urban users)	No, freezing prices would not allow additional revenue to be collected from HS WAL holders as urban demand increased.
Seven	**Be relatively cost-effective** (i.e. relative to the size of the subsidy) and administratively simple and transparent to water users	Yes
Eight	**Be transparent to water users**	Arguably yes, from the point of view of water users in valleys where under-recovery and high price issues prevail.
Nine	**Minimise regulatory risk** for WaterNSW	Only so long as the NSW Government was willing to continue to provide a subsidy.

Summary Finding: A price freeze would provide a degree of certainty for water users however it does not align with the requirement in the Water Act to reduce or completely remove the need for an ongoing subsidy and creates uncertainty for WaterNSW in recovering its revenue (i.e. it relies on an ongoing subsidy).

5.3.3. Option 3: Optimise schemes for pricing purposes

Option description

This option involves setting the user share of capital costs in valleys not currently recovering costs based on a revised value of the assets using for example, the DORC approach which forms one component of the Optimised Deprival Value (ODV) approach.[13] Valley-based pricing would remain in place.

There are a range of approaches and levels of detail that can be applied to undertake a DORC valuation and the appropriate approach should reflect the nature of the assets and the cost of the valuation relative to the size of the subsidy. Given that WaterNSW do not operate complex distribution systems such as channels, the prospect for asset optimisation should be focussed on dam and pumping station infrastructure. Under this option, operating costs can also be optimised, particularly where new technology (e.g. for a pumping station) or a hypothetical asset reconfiguration would reduce operating costs.

At the simplest level, DORC could involve a desktop review of demand complemented with a high-level assessment of how the dam and pumping infrastructure would be reconfigured to meet revealed demand. However, in practice, it is likely that customers will contest valuations which inevitably leads to the requirement for more detailed engineering studies in order to achieve a transparent outcome. Revaluing the asset using the present value of future revenue streams based on prices set with reference to WTP could be a more cost-effective approach so long as it is consistent with the ODV approach (i.e. less than a DORC value).

Option disadvantages

The main disadvantage with this approach is that it does not align with the requirement in the ACCC Pricing Principles which state that “once a RAB value is set it must not be subject to revaluation” (ACCC, 2011). IPART is required to develop prices in accordance with these principles as a condition of its accreditation to set prices for WaterNSW. The ACCC (2011) argue that “revaluation creates uncertainty for the regulated business and its customers and can result in price shocks and windfall gains or losses to the business”. Other disadvantages with this approach are that:

- With the possible exception of telecommunications assets, DORC is commonly the highest value within the range of feasible asset values which are consistent with economic efficiency principles.
- Calculating a DORC is very sensitive to a greenfields or brownfields estimate.
- Calculating depreciation is contentious as subjectivity rises with optimisation.
- Where DORC values exceed indexed historical cost, potential exists for the recovery from customers of capital never invested.
- If DORC is higher than depreciated historical cost, switching methods provides the utility with a windfall gain (IPART, 1999).

In addition to these deficiencies, some of which are major barriers in the context of valleys that are already experiences high charges compared to other valleys, calculating DORC values can be an expensive and time consuming exercise. This is particularly relevant in the context of the quantum of subsidies in the North and South Coast valleys (see Table 5). There is also the real risk that customer’s in other valleys would request similar valuations, opening up the prospect for high costs

[13] ODV is the lesser of the DORC value and the present value of future revenue streams. ODV is the approach to asset valuation recommended by the Expert Group on Asset Valuation (1999) and was reaffirmed in the NWI Pricing Principles (2010).

for little gain. Given that the ODV is the lesser of the DORC and the present value of future revenue, the same outcome can be achieved by setting prices at or just below customers' WTP.

Option advantages

The main advantage with this approach is that a DORC valuation provides an opportunity to investigate how the value of the assets would change under an optimised scenario which takes into account observed demand for bulk water. The user share of capital costs can then be adjusted based on the DORC valuation which could result in reductions to the return on and of capital cost inputs to the revenue requirement.

A revaluation based on the present value of future revenue streams using prices set with reference to WTP provides an opportunity to revalue the asset based on prices that lie within the efficient pricing band (i.e. option 3 and 5 complement one another).

A summary of the option against the assessment framework is presented in Table 13.

Table 13 Option assessment against assessment framework – Option 3: Revalue assets

Criteria #	Objective/criteria	Assessment
One	**Be consistent with the pricing principles** outlined in section 3.6	No. The option is not consistent with the principle that the RAB value must not be subject to revaluation.
Two	Promote **efficient water use** and efficient investment in water infrastructure	Yes, if optimisation reduced prices it would reduce the risk of under-utilised sunk assets.
Three	Facilitate the **efficient functioning of water markets**, including inter-jurisdictional water markets	No, this policy would create inconsistencies between jurisdictions.
Four	Provide **certainty for water users**	Once the prices have been revised on the basis of the revalued assets, yes.
Five	**Promote equitable outcomes**	Yes on one hand although it may be inequitable from the point of view of the water market.
Six	Be flexible enough to cater for longer-term demand forecasts and the nature of that demand (e.g. the long-term mix of rural and urban users)	Yes, revaluing the assets would take into account demand over the price determination period. Subsequent revaluations would mean that demand is considered on a rolling basis.
Seven	**Be relatively cost-effective** (i.e. relative to the size of the subsidy) and administratively simple and transparent to water users	There are administrative concerns and cost issues associated with undertaking the DORC valuation (costs could range between $200, 000 for a desktop review up to $1 million for a comprehensive engineering and demand-based assessment).
Eight	**Be transparent to water users**	There is often uncertainty and a lack of transparency associated with asset revaluations based on DORC.
Nine	**Minimise regulatory risk** for WaterNSW	No change

Summary Finding: This approach is not consistent with the requirement in the ACCC Pricing Principles which state that "once a RAB value is set it must not be subject to revaluation" (ACCC, 2011). IPART is required to develop prices in accordance with these principles as a condition of its accreditation to set prices for WaterNSW.

5.3.4. Option 4: Set prices to achieve lower bound

Option description

This option involves adjusting the target revenue requirement to achieve lower bound cost recovery as defined in the NWI (i.e. excluding a return on capital).

Option disadvantages

The major disadvantage with this approach is that it is not consistent with the BWCOP to continue to move to upper bound pricing. Furthermore, there would be inconsistencies in approaches between NSW and Victoria which could impact the efficiency of the water market in the MDB.

Option advantages

The main advantage with this approach is that it would reduce prices and possibly help move to within the efficient price band if this was currently being breached.

A summary of the option against the assessment framework is presented in Table 14.

Table 14 Option assessment against assessment framework – Option 4: Set prices to achieve lower bound

Criteria #	Objective/criteria	Assessment
One	**Be consistent with the pricing principles** outlined in section 3.6	No. This approach is that it is not consistent with the BWCOP to continue to move to upper bound pricing.
Two	Promote **efficient water use** and efficient investment in water infrastructure	No. Earning a return on capital on new and existing infrastructure contributes to efficiency investment in water infrastructure. Like the status quo, if prices based on lower bound exceed WTP, there will be inefficient outcomes.
Three	Facilitate the **efficient functioning of water markets**, including inter-jurisdictional water markets	No, this approach applied to selected valleys would create inconsistencies across valleys and between jurisdictions.
Four	Provide **certainty for water users**	No discernible change from the status quo.
Five	**Promote equitable outcomes**	Arguably yes, from the point of view of water users in valleys where under-recovery and high price issues prevail.
Six	Be flexible enough to cater for longer-term demand forecasts and the nature of that demand (e.g. the long-term mix of rural and urban users)	No discernible change from the status quo.
Seven	**Be relatively cost-effective** (i.e. relative to the size of the subsidy) and administratively simple and transparent to water users	Yes as there is no discernible change in costs compared to the status quo.
Eight	**Be transparent to water users**	Yes
Nine	**Minimise regulatory risk** for WaterNSW	Yes, although revenue would decrease as a result of excluding a return on capital.

Summary Finding: Pricing at lower bound may reduce prices however it is inconsistent with requirements under the Water Act to continue to move to upper bound pricing and would result in revenue risk for WaterNSW, particularly if it was applied across all valleys, including valleys that are recovering the upper revenue bound through prices

5.3.5. Option 5: Set prices to sit within the efficient pricing band

Option description

This approach aligns with economic first principles whereby a customer or group of customers' WTP is used as a proxy for the upper limit for cost recovery. If this leads to under-recovery within a valley (relative to "full cost recovery levels"), WaterNSW can recover the shortfall:

1. From other customers in a manner that least distorts future consumption and investment decisions. For example, the revenue gap is recovered from the most inelastic product (e.g. higher fixed charges for urban customers, subject to not breaching customers' stand alone cost or WTP).

2. Through a CSO from the NSW Government.

or

3. Through a combination of both of options 1) and 2) above.

Option disadvantages

Disadvantages of this option include:

- It is potentially inconsistent with requirements under the Water Act to continue to move to upper bound pricing and may result in a rapid price reduction. However, this may be offset by avoiding perverse or unintended pricing outcomes which may emerge under the status quo option.
- A key challenge in applying this approach is that the regulator has incomplete information regarding customers' WTP, which will tend to vary between customers within and between valleys and change over time. Additional work would be required on WTP and avoidable cost.
- It may require under-recovery to be dealt with through other means (e.g. subsidy).

Option advantages

The major advantage of this approach is that, relative to other options, it should deliver efficient use of existing infrastructure. For example, pricing within the efficient band reduces the likelihood of users discontinuing to use the service which is a risk if cost recovery is pursued with no regard for customers' WTP. As a result, this approach could avoid perverse or unintended pricing outcomes which may emerge under the status quo option (a requirement under the BWCOP).

Another advantage is that it could avoid the need for ongoing real price increases and subjective decisions on the appropriate glide path.

A summary of the option against the assessment framework is presented in Table 15.

Table 15 Option assessment against assessment framework – Option 5: Set prices within the 'efficient price band'

Criteria #	Objective/criteria	Assessment
One	**Be consistent with the pricing principles** outlined in section 3.6	It is inconsistent with requirements under the Water Act to continue to move to upper bound pricing. However, this may be offset by avoiding perverse or unintended pricing outcomes which may emerge under the status quo option.
Two	Promote **efficient water use** and efficient investment in water infrastructure	This approach performs particularly well against this criterion. In particular, it ensures services from sunk infrastructure investments continue to be utilised where efficient.
Three	Facilitate the **efficient functioning of water markets**, including inter-jurisdictional water markets	Yes
Four	Provide **certainty for water users**	Yes. If customers are assured prices will not exceed WTP it will provide greater certainty relative to an option to blindly pursue cost recovery.
Five	**Promote equitable outcomes**	Yes, so long as WTP can be accurately determined.
Six	Be flexible enough to cater for longer-term demand forecasts and the nature of that demand (e.g. the long-term mix of rural and urban users)	Yes, so long as WTP assessments are undertaken periodically to reflect changes in the profile of demand over time.
Seven	**Be relatively cost-effective** (i.e. relative to the size of the subsidy) and administratively simple and transparent to water users	A key challenge in applying this approach is that the regulator has incomplete information regarding customers' WTP, which will tend to vary between customers within and between valleys and change over time.
Eight	**Be transparent to water users**	There will be some transparency issues associated with explaining this concept to water users.
Nine	**Minimise regulatory risk** for WaterNSW	Yes. Ensuring prices do not exceed WTP reduces the likelihood of users discontinuing to use the service which is a risk if cost recovery is pursued with no regard for customers' WTP.

Summary Finding: Setting prices within the efficient pricing band avoids the risk that customers either disconnect from the system or discontinue their water using activities. Each of these outcomes would not be desirable from an efficiency perspective and for WaterNSW's

revenue certainty. However, it potentially contravenes the requirement in the Water Act to continue to move towards upper bound pricing, although this may be offset in that it avoids the potential to result in perverse or unintended pricing outcomes if upper bound pricing is pursued without reference to prices being within the efficient price band.

5.3.6. Option 6: Implement state-wide pricing

Option description

This option involves recovering WaterNSW's total costs from the entire customer base (i.e. a state-wide postage stamp price).

Option disadvantages

The major disadvantage with this approach is that it is not consistent with the strict definition of user based pricing. Prices would be less cost reflective and the links between costs and outcomes for customers would be harder to communicate. Given the spread of prices outlined in Table 3, this would result in cross subsidies between valleys as prices would increase in some valleys to offset the decline in prices in other valleys. The removal of cross subsidies was a commitment by states and territories under the 1994 Council of Australian Government's Water Reform Framework and was reaffirmed in the NWI and BWCOP through the commitment to implement user based pricing.

Introducing state-wide pricing could also impact the water market and would be inconsistent with the NWI and BWCOP requirement to implement water pricing that facilitates the efficient functioning of water markets, including inter-jurisdictional water markets. For example, in valleys such as the Murray and Murrumbidgee, an increase in water prices to offset the decline in prices in other valleys would result in a change in the financials associated with water entitlement ownership and use which could manifest in sudden changes in the volumes of water being sold in the market.

Option advantages

The main advantage with this approach is that it would result in price reductions in valleys where prices at full cost recovery are above the state-wide weighted average. On the other hand, prices would increase in some valleys where prices are below the state-wide weighted average. Other advantages include that:

- It would meet obligations for upper bound pricing.
- It would eliminate the need for an ongoing CSO.
- It is administratively simple to set charges.

A summary of the option against the assessment framework is presented in Table 16.

Table 16 Option assessment against assessment framework – Option 6: Implement state-wide pricing

Criteria #	Objective/criteria	Assessment
One	**Be consistent with the pricing principles** outlined in section 3.6	While it is consistent with achieving upper bound pricing, it is not consistent with the strict definition of user based pricing.
Two	Promote **efficient water use** and efficient investment in water infrastructure	As above
Three	Facilitate the **efficient functioning of water markets**, including inter-jurisdictional water markets	While the level of aggregation varies across MDB states, a state-wide approach to pricing is not applied in Victoria, South Australia or Queensland. Introducing state-wide pricing would also impact the water market and would be inconsistent with the NWI and BWCOP requirement to implement water pricing that facilitates the efficient functioning of water markets, including inter-jurisdictional water markets.
Four	Provide **certainty for water users**	This would represent a major policy change and would create uncertainty for water users.
Five	**Promote equitable outcomes**	No from the perspective of the majority of customers that are already at cost recovery.
Six	Be flexible enough to cater for longer-term demand forecasts and the nature of that demand (e.g. the long-term mix of rural and urban users)	No discernible change from the status quo.
Seven	**Be relatively cost-effective** (i.e. relative to the size of the subsidy) and administratively simple and transparent to water users	Yes in terms of setting charges however it may present policy issues for government.
Eight	Be transparent to water users	No, would represent a major policy change.
Nine	**Minimise regulatory risk** for WaterNSW	Yes.

Summary Finding: A shift to state-wide pricing would address the revenue gap issue and would be relatively simple to administer. However, it is not consistent with the strict definition of user based pricing. Prices would be less cost reflective and the links between costs and outcomes for customers would be harder to communicate. Given the spread of prices outlined in Table 3, this would result in cross subsidies between valleys. Introducing state-wide pricing could also impact the water market and would be inconsistent with the NWI and BWCOP requirement to implement water pricing that facilitates the efficient functioning of water markets, including inter-jurisdictional water markets.

5.4. Non-pricing options

In addition to the pricing options presented and assessed in section 5.3, there are other options that could be pursued to reduce costs. These are discussed below.

5.4.1. Rationalise or reconfigure schemes

Option description

This option involves investigating engineering solutions to reconfigure schemes in order to reduce costs where high prices or under-recovery is an issue.

Option disadvantages

There are no major disadvantages with this approach in principle. However, further investigative work is required to determine whether there are material cost savings that can be achieved through asset reconfiguration. The costs of a scoping study, design and construction work need to be analysed to determine whether this option is financially viable over the long-term. That is, can the up-front costs be saved through lower prices over the long-term?

Option advantages

The main advantage with this approach is that there may be capacity to reduce costs and in-turn, the size of the subsidy required and prices in relevant valleys. Furthermore, this option can be pursued along with other options including the status quo. Given the importance of operating costs in the overall cost build-up, reconfiguration options that reduce operating costs would be worth investigating.

Summary Finding: In principle, the option to rationalise and reconfigure schemes is sound. However, further analysis is required to determine whether cost savings can be achieved and whether there is a net saving taking into account the up-front costs associated with scoping, design and construction. This option can be pursued with other options including the status quo.

5.4.2. Decommission schemes not providing urban water

This option involves transitioning the schemes out of service and set prices to recover operating and maintenance costs and minimum costs required to meet relevant safety standards and regulation.

Option disadvantages

So long as prices exceed avoidable (marginal) costs, which are likely to be very low and close to zero, decommissioning the small coastal systems prevents WaterNSW continuing to generate revenue on sunk assets. Furthermore, it is likely that there would be significant costs associated with decommissioning a scheme. Further investigations would be required to determine the likely cost impact if this option was deemed worthy of further consideration.

Another disadvantage with this option is that customers have made on-farm investment decisions on the understanding that the service will continue. It is likely, on this basis, that some customers will feel aggrieved with this course of action. Stakeholder engagement would be required to gauge the practicality of this option.

Option advantages

Even if systems are recovering their avoidable fixed costs and marginal costs associated with use, if they are not recovering full, upper bound costs through pricing, there are concerns about their long-

term viability. In particular, concerns may arise when new capital investments are required (e.g. dam safety upgrades). This option does align with the requirement in the Water Act to examine alternative management arrangements to reduce or remove the requirement for an ongoing subsidy. Depending on any compensation payments and decommissioning costs, this option may provide a saving to the NSW Government over the long-term although further financial analysis would be required to be undertaken if this option was deemed worthy of further consideration.

Summary Finding: Even if systems are recovering their avoidable fixed costs and marginal costs associated with use, if they are not recovering full, upper bound costs through pricing, there are concerns about their long-term viability. In particular, concerns may arise when new capital investments are required (e.g. dam safety upgrades). In these instances, government and WaterNSW, in conjunction with customers, need to consider the broader costs and benefits of continuing to provide bulk water services. However, so long as prices exceed avoidable (marginal) costs, which are likely to be very low and close to zero, decommissioning the small coastal systems prevents WaterNSW continuing to generate revenue on sunk assets. Importantly, the costs associated with decommissioning a dam can be substantial.

6. Findings, recommendations and next steps

This section presents the findings, recommendations and next steps coming out of the cost recovery review.

6.1. Findings and conclusions

- The forecast under-recovery over the 2017 determination period is restricted to only two valleys being the North Coast and South Coast valleys. Under-recovery is primarily driven by the comparatively low customer base and low average annual water usage in these systems.
    - Cost drivers contributing to under-recovery relate primarily to operating costs (which range from 61.7 per cent of the average total share of user costs in the North Coast valley up to 73.7 per cent of the total average user costs in the South Coast valley over the 2017 determination period).
    - The return of (8.8 per cent in the North Coast and 6.0 per cent in the South Coast) and on (29.8 per cent in the North Coast valley and 20.5 per cent in the South Coast valley) previous capital investments also makes a smaller contribution over the determination period.
    - In total, under-recovery in 2017-18 is estimated at $0.93 million in the North Coast valley and $0.54 million in the South Coast valley compared to a total proposed user share revenue requirement of $86.2 million across the business. The quantum of under-recovery is therefore very small.
- Prices in the North Coast and South Coast valleys are considerably higher than other valleys. For example, the fixed and variable charge for a GS WAL in the Murray valley in 2016-17 is $0.97 and $2.31 per ML respectively. However in the South Coast valley, the fixed and variable charge for a GS WAL is $21.12 and $40.38 per ML respectively.
- Moving towards full cost recovery is an accepted pricing principle and it is likely to be efficient in the major regulated systems serviced by WaterNSW where positive water entitlement prices reflect the value of access to regulated water systems. However, in relation to the North and South Coast systems, there is potential that continuing to move to full cost recovery might lead to an inefficient outcome. This is because prices might, at some point, exceed customer WTP thereby resulting in customers disconnecting from the system. This would have the effect of reducing the total level of cost recovery and could result in inefficient underutilisation of the system if the customers were willing to pay prices above the avoidable cost of supply by WaterNSW. On face value, this would appear to contravene the Water Act requirement for pricing policies to avoid perverse or unintended pricing outcomes. In general, and for all valleys, a significant increase in disconnection from the system would provide an indication that prices may exceed customers' WTP. Similarly, positive entitlement prices and customers remaining in the network would indicate that prices are below WTP.
- The proposal to continue to increase prices by 10 per cent per annum in these systems requires further consideration. There are a number of alternative options that have been considered.
- Each option has advantages and disadvantages. In summary:

- A price freeze would provide a degree of certainty for water users however it does not align with the requirement in the Water Act to reduce or completely remove the need for an ongoing subsidy and creates uncertainty for WaterNSW in recovering its revenue (i.e. it relies on an ongoing subsidy) and creates administrative issues as to where to set the price freeze.
- A revaluation of the RAB has some benefits however it may not reduce charges to below WTP and the conditions of IPART's accreditation by the ACCC appear to preclude this option.
- Pricing at the lower bound (NWI definition) may reduce prices however it is inconsistent with requirements under the Water Act to continue to move to upper bound pricing and would result in revenue risk for WaterNSW, particularly if it was applied across all valleys, including valleys that are at upper bound pricing.
- Setting prices within the efficient pricing band avoids the risk that customers either disconnect from the system or discontinue their water using activities. Each of these outcomes would not be desirable from an efficiency perspective and for WaterNSW's revenue certainty. However, it potentially contravenes the requirement in the Water Act to continue to move towards upper bound pricing, although this may be offset in that it avoids the potential to result in perverse or unintended pricing outcomes if upper bound pricing is pursued without reference to prices being within the efficient price band.
- A shift to state-wide pricing would address the revenue gap issue and would be relatively simple to administer. However, it is not consistent with the strict definition of user based pricing.

- There is little information currently available on customer WTP (which could be informed by analysis of the value of water entitlements) or on the avoidable costs of supply by WaterNSW in these small systems with high levels of under-recovery. Further analysis could help to inform whether the current WaterNSW proposal could result in inefficient disconnection. It could also help assess the merits of each of the alternative options and to set resultant prices.
- Even if systems are recovering their avoidable fixed costs and marginal costs associated with use, if they are not recovering full, upper bound costs through pricing, there are concerns about their long-term viability. In particular, concerns may arise when new capital investments are required (e.g. dam safety upgrades). In these instances, government and WaterNSW, in conjunction with customers, need to consider the broader costs and benefits of continuing to provide bulk water services. Importantly, the costs associated with decommissioning a dam can be substantial and need consideration.

6.2. Recommendations

Recommendation one: Undertake an assessment of what constitutes the efficient price band (with customers' WTP and stand alone cost the upper limit and avoidable costs as the lower limit) in valleys below full cost recovery to determine whether WaterNSW's proposed prices for the forthcoming determination period will exceed the upper limit of the efficient pricing band for any customer groups.[14]

[14] While it is likely that prices in other valleys are within the efficient price band given that they are at full cost recovery, there is a chance that prices may exceed WTP. A simple study which considers market prices or gross margins would clarify this and reduce the risk of inefficient disconnection from the network.

Recommendation two: If the analysis undertaken under recommendation one suggests that continued application of the 10 per cent glide path would breach the upper limit of the efficiency band, seek clarification from the ACCC as to whether this would constitute a perverse or unintended pricing outcome.

Recommendation three: Consult with stakeholders on the advantages and disadvantages of a short-list of options following consideration by the Tribunal and undertake more detailed assessment.

6.3. Next steps

Given that avoided cost is likely to be very low (close to zero), the next step should be to undertake a small piece of additional work to assess customers' WTP in valleys below full cost recovery to ensure that prices do not exceed WTP which could result in inefficient disconnection from the network. This analysis should:

- Use revealed water entitlement market prices and indicative gross margin analysis to establish a likely range for the major, lower-value crop types.
- Compare WTP for major irrigated crop types in each valley (and the dryland alternative) to WaterNSW's proposed prices for the 2017 determination period to determine the risk of prices exceeding WTP.
- Acknowledge that WTP is a medium-term concept as on-farm cash flow varies depending on on-farm revenue which is affected by growing conditions, rainfall and commodity prices. The analysis should therefore consider a series of scenarios for these variables.

This analysis will be helpful in determining the efficient price band for option 5. However it will also be useful in considering the efficiency implications of other options such as the mechanistic pursuit of cost recovery under the status quo (option 1).

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Document history

Revision:

Revision no.	Two
Author/s	Rod Coulton, Simon Hone, Rohan Harris
Checked	Chris Olszak, Rohan Harris
Approved	Chris Olszak

Distribution:

Issue date	Tuesday 29 November 2016
Issued to	John Madden, Independent Pricing and Regulatory Tribunal
Description	Final Report

Citation:

Aither 2016, WaterNSW Prices for Rural Bulk Water Services, Cost Recovery scoping study, Aither Pty Ltd.

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