Essential Services Commission of Victoria

A new methodology for establishing a water entity's revenue allowance – Final report

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9 July 2015

sapere research group

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Contents

Appendices

No table of contents entries found.

Glossary

CBA	Cost benefit analysis
CPI-X	A form of price regulation where by the regulated tariff is indexed to inflation, but also reduced each year by an 'X-factor' based on efficiency gains
DPP	Default price-quality path
ED	Electricity distributor
ESC	Essential Services Commission
ESC Act	*Essential Services Commission Act* 2001
LRMC	Long-run marginal cost
NCC	New Customer Contributions
NWI	National Water Initiative
NZD	New Zealand dollar
Ofwat	The economic regulator of the water sector in England and Wales
RAB	Regulatory Asset Base
Sapere	Sapere Research Group
SRMC	Short-run marginal cost
VCEC	Victorian Competition & Efficiency Commission
WACC	Weighted average cost of capital
Water Act	*Water Act 1989*
WIRO	*Water Industry Regulatory Order*
Water Industry Act Act	*Water Industry Act 1994*

Executive summary

Introduction and overview

Currently, the Essential Services Commission (ESC) applies a building-blocks approach to regulating urban water businesses to establish each entity's revenue allowance. This revenue allowance is used to set limits on the prices the entities may charge. Under the building-blocks approach, the ESC attempts to establish efficient cost benchmarks for different elements (the 'building blocks') of the business for the regulatory period.

The regulatory framework was revised in 2014 allowing the ESC greater flexibility to use an approach other than the building-blocks methodology. In light of the greater flexibility, the ESC has engaged us (and a select number of others) to develop conceptual (high-level) papers that set out the main features of an alternative method for establishing the revenue allowance.

Our proposed approach

In this paper we provide a high level overview of a different approach for determining the revenue allowance for urban water and wastewater services.[1] In doing so, we also consider the prices for the services provided.

There are a number of key elements to our proposed approach. First, we propose unbundling, for the purposes of economic regulation, the services into four sections of the value chain being:

- bulk water (functions involved in the supply of water up to the point of treatment)
- water treatment and distribution (other water functions except retailing)
- wastewater treatment and distribution (wastewater functions except retailing), and
- retailing (billing, customer management and related functions).

This separation would involve ring-fencing the regulatory assets, liabilities and costs. It has several benefits including enabling simpler and more transparent performance measures to be established for water services and facilitating a move to competition in the future, should it be desired.

Second, we propose the ESC track and focus on a few new key measures (cost per customer by value-chain section and the water-availability per customer) by customer group. These measures aim to be simple and to reflect directly the key customer wants (in addition to quality standards).

Third, we propose that the ESC require water businesses to publish a framework for determining how (under the principle of cost-recovery) connection fees (by customer group)

[1] We do not discuss regulation of the rural water businesses as part of this proposal, however many of the concepts discussed are likely to be relevant.

change if usage prices are changed. In effect, this involves allocating the assets and liabilities associated with bulk water supplies among customer groups. This step has a number of benefits; perhaps most importantly in encouraging efficient usage pricing.

Fourth, we propose changes to the ESC's method of determining the revenue allowance. For the sections other than bulk water we propose a more light-handed approach with a much stronger focus on improving the transparency and comparability of the cost-per-customer measure. With proper application of the new customer contributions (NCC) framework, the cost per customer should be insensitive to new customer growth. While the level may differ, trends in the cost-per-customer measures should be reasonably comparable across regions.

While improved transparency, combined with a threat of return to an intrusive form of price control, may be a sufficient incentive in the long-run, we propose the ESC adopt an intermediate step known as 'default price-quality path' (DPP) regulation for sections other than bulk water. This is a lower cost form of regulation that would involve the ESC establishing a default price path based on the cost-per-customer measures that sets a revenue cap but allows each business to opt for a customised price path that would be developed using a similar approach as is used today.

For bulk water we propose that the ESC focuses on measures of cost per customer and the water-availability per customer. Due to the lumpy and localised nature of investment in bulk water we propose that the ESC maintains the current building-blocks approach. With proper application of the NCC framework, changes in water-availability per customer should be offset by changes in the cost per customer.

The proposed method of regulation for each value-chain section is set out in Table S1 below. The allowed revenue for the entire business is simply the aggregation of the sections.

Table S1: Method of determining revenue-allowance by value-chain section

Value-chain section	Key measures by customer group	Method of regulation	Extent of review by ESC
Bulk water	Cost per customer Water availability per customer	Building blocks (similar to today)	About the same. Greater scrutiny of augmentation
Water treatment and distribution	Cost per customer	DPP approach	More light-handed
Wastewater treatment and distribution	Cost per customer	DPP approach	More light-handed
Retailing	Cost per customer	DPP approach	More light-handed

While the setting of usage prices is not the focus of this paper, we have recommended that usage prices should, as practically as possible, be set to the marginal cost of supply. In the

interests of equity and efficiency we propose that water businesses should engage more on price structures and should present the impact on customer bills when a deviation from marginal-cost pricing is proposed.

On the surface our proposal should not seem a large change. The foundations are greater transparency through analysis by value-chain section and simpler measures along with greater clarity of entitlements and obligations. If this greater transparency and clarity had no benefits then, aside from the administrative costs, there should not be any significant implications.

However, our assessment is that the greater transparency and clarity will provide large benefits and lead to significant implications. In particular, it will:

- allow for simpler performance measurement, which in turn:
  - will result in greater and improved scrutiny from stakeholders on the water-businesses' performance
  - allow the ESC to move towards a more light-handed approach to regulating the treatment-and-distribution (of water and wastewater) and retailing sections, and
  - facilitate improved scrutiny over investments in augmentations, and
- encourage improvements in pricing, including:
  - greater discipline in pricing relating to NCC and access pricing, and
  - more efficient customer price structures, and
- enable competition to be introduced in the provision of bulk water and retailing.

We do not envisage that any changes in legislation are required. The current legislation allows the ESC to obtain the required information from the water businesses and allows great flexibility in the manner in which prices are determined.

The foundation work for this proposal can be undertaken outside of the normal regulatory process. For example, there appears no reason why preliminary work could not be undertaken on ring-fencing the sections of the value chain, establishing and analysing the customer measures and developing a framework for how changes in usage prices affect other charges. Such work would no doubt lead to further analysis that might help to better understand the performance of the water businesses.

1. Introduction

Currently, the Essential Services Commission (ESC) applies a building-blocks approach to regulating urban water businesses to establish each entity's revenue allowance. This revenue allowance is used to set limits on the prices the entities may charge. Under the building-blocks approach, the ESC attempts to establish efficient cost benchmarks for different elements (the 'building blocks') of the business for the regulatory period.

The regulatory framework was revised in 2014 allowing the ESC greater flexibility to use an approach other than the building-blocks methodology. In light of the greater flexibility, the ESC has engaged us (and a select number of others) to develop conceptual (high-level) papers that set out the main features of an alternative method for establishing the revenue allowance.

This paper outlines our proposed alternative methodology. In doing so we attempt to 'unwrap' the regulatory challenges of regulating water entities and suggest solutions targeted to those challenges. We consolidate this analysis to describe the main features of a new approach to regulating Victoria's water industry, which we would expect to improve the long-term interests of consumers.

In the paper we have focused on urban water and wastewater services. However, many of the concepts and principles discussed would be applicable to regulation of the rural water corporations.

Our paper is structured as follows:

- Section 2 describes the challenges and issues in regulating water and wastewater services.
- Section 3 describes our proposed approach.
- Section 4 draws conclusions and outlines the way forward.

2. Challenges in regulating water and wastewater services

2.1 Overview of the water and wastewater sector

2.1.1 The water corporations

Water and wastewater services are delivered in Victoria by 19 state owned 'water corporations' (water businesses) established under the *Water Act 1989* (Water Act). These are:

- Melbourne Water — a supplier of bulk water and some wastewater treatment services
- three metropolitan Melbourne retail water corporations (City West Water, South East Water and Yarra Valley Water), which are customers of Melbourne Water
- thirteen regional urban water corporations — Barwon Water, Central Highlands Water, Coliban Water, East Gippsland Water, Gippsland Water, Goulburn Valley Water, Grampians Wimmera Mallee Water, Lower Murray Water, North East Water, South Gippsland Water, Wannon Water, Western Water and Westernport Water,[2] and
- two rural water corporations that provide services for domestic, irrigation and stock purposes — Goulburn-Murray Water and Southern Rural Water.[3]

The sector is significant. The forecast revenue for the urban-water corporations from 2013/14 to 2017/18 is around $16 billion. The corporations service 2.5 million residential and non-residential customers using 44 700 kilometres of water mains and 36 300 kilometres of sewer mains.[4]

2.1.2 Current governance and regulation

The water corporations are Government-owned geographic monopolies. From an economic perspective, the Victorian Government regulates the corporations through a combination of:

- independent economic regulation performed by the ESC, and
- other governance arrangements relating to the Government's ownership of the corporations.

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2 Barwon Water and Western Water are adjacent to the Melbourne metropolitan area and are increasingly metropolitan in their customer base and activities.

3 This report does not consider price setting for the rural water corporations.

4 Source: ESC (2013b).

ESC's role in independent economic regulation

Independent economic regulation of the water corporations is established by the *Water Industry Act 1994* (Water Industry Act), and performed by the ESC under the *Essential Services Commission Act 2001* (ESC Act), and in accordance with the *Water Industry Regulatory Order* (WIRO).

Under the legislation the ESC, in performing its role, is required to consider a large number of factors. Our interpretation is that these are aligned with the ESC's overarching objective established under the ESC Act 'to promote the long term interests of Victorian consumers' having 'regard to the price, quality and reliability of essential services.'

The ESC's role involves setting prices and standards, monitoring, performance reporting and auditing. In setting prices the ESC:

- determines the revenue allowance; the amount of revenue each water corporation may recover from its customers, and
- the set of prices, or tariffs, that will be expected to recover the revenue allowance.

The scope of our review is on how the ESC determines the revenue allowance for each water corporation; however, in doing so we have given consideration to the setting of prices.

Broadly, the process followed by the ESC in determining the revenue allowance and prices involves:

- the ESC releasing and consulting on guidance material
- the businesses delivering price submissions
- the ESC reviewing the submissions, which typically involves engaging experts to critically assess the expenditure and publishing a draft determination
- the ESC consulting on the draft determination
- the ESC publishing a final determination.

The process involves substantial consultation with the water businesses and customers.

In this process, the ESC and the water corporations have applied a 'building-blocks' approach to determine the revenue allowance. The building-blocks is a cost-based approach to estimating the amount of revenue that a regulated business can earn, so the business can cover the efficient costs of its operations and allow the owners of the business a commercial return on the capital invested in the business that is commensurate with the level of risk borne by the owners.

This building-blocks method establishes a value of the regulatory asset base (RAB) — that is, the value of the assets used by the business in providing the regulated services. This RAB is rolled forward over the next regulatory period to account for capital investment, depreciation and asset disposals. An estimate of the entity's weighted average cost of capital (WACC) is applied to the RAB to determine the allowed 'return on capital'. Forward looking estimates are made of the operation, maintenance and depreciation costs that the entity is expected to

incur over the next regulatory period. These amounts are summed to determine the revenue allowance for each year.[5]

The WIRO was revised in 2014. The revised WIRO allows the ESC greater flexibility to use an approach other than the building-blocks methodology to establish an entity's revenue allowance and prices.

Governance arrangements

The water corporations are state-owned corporations accountable to the Minster for Water. As the owner of the corporations, the Government is responsible for appointing boards, setting a variety of performance expectations, and establishing guiding policies and rules.

The governance arrangements, while not part of the scope of this review, are nevertheless a relevant consideration. A number of factors arising from how the entities are governed may prove important to the design of the regulatory approach to setting prices. These include that:

- Water Corporations are guided by a Statement of Obligations that is set by the Minister for Water in consultation with the Treasurer and the ESC, and
- the Government, through the Minister for Water, has substantial powers, overall responsibility for industry performance and a central role in influencing strategy for the water corporations.

These factors give rise to several implications:

First, the current 'Statement of Obligations' includes guiding principles that require the corporations to be efficient. They include requirements, for example, 'to be an efficient provider' and 'optimise the operation of water and wastewater systems'.

Second, the Government has substantial influence on the efficiency of the sector. For example, the Minister for Water has made significant decisions with regard to policies relating to supply (e.g. decisions to invest in a desalination plant) and demand management (e.g. the timing and extent of water restrictions). This Ministerial involvement in the sector has attracted very strong reactions from some commentators, with some viewing political involvement as the biggest issue facing the sector.[6]

Given the role of the Government, a potentially important consideration for the ESC in promoting the interests of Victorian consumers is to regulate in a way that reduces the risk of political decisions (where 'political' is defined as incentives for short-term decisions which might be at odds with the longer term interests of consumers).

5 In some situations, the revenue profile may be smoothed to address step changes in tariffs.

6 For example see Crase et al (2014).

2.2 The economics of water and wastewater services

In developing the method of regulation it is useful to consider some key relevant features of the economics of water and wastewater services. Below we do so in terms of:

- what customers want from the services provided
- how the services are priced, and
- how the services are supplied.

2.2.1 The services provided and customer wants

From the view point of a customer, the water and wastewater services are relatively simple and uniform across the state of Victoria (and indeed much of Australia). The core services involve provision of drinking water to uniform water quality standards[7] and a provision of a wastewater system that disposes wastewater to required standards.

There are some variations in the quality of the services provided; most significantly (and most relevant for this review), in terms of the level of security of supply offered. Customers are not just affected by the price and availability of water in the present, but also the price and availability during a drought (or other period of stress). The level of supply security may vary significantly by region; for example, during a drought different locations can be subject to different levels of restrictions.

The quality of the service provided by each water business can also vary. The ESC reviews the performance of the water businesses along a number of measures that include customer complaints, water network reliability, sewerage network reliability, water quality, and environmental measures.

Water businesses also provide other ancillary services and have other impacts upon the environment. These include storm water management benefits and wastewater impacts on others systems.

In summary, subject to minor qualifications, we propose the key customer wants may be categorised as:

1. having water available at a reasonable usage price (both in the present and the future)
2. a low cost of connection to the water network
3. a low cost of connection to the wastewater network, and
4. services provided to established standards.

[7] In some locations customers may be supplied recycled water, which can be treated to a lower level of quality.

2.2.2 The supply of water and wastewater services

In this paper we have found it useful to unbundle the supply of water and wastewater services into four ('value-chain') sections being:

- Bulk water — functions involved in the supply of water up to the point of treatment. These functions include catchment management, operation of manufactured sources (e.g. desalination and recycled water) and transporting the bulk water to the water network.
- Water treatment and distribution — essentially all other functions in providing water except retailing
- Wastewater treatment and distribution, and
- Retailing — which includes billing, customer-service and related functions for water and wastewater.

A high level summary of the characteristics by section is provided in Figure 1 below.

There are some important differences to note. First, the potential for competition varies. Treatment and distribution of both water and wastewater (with some qualification) tends to have characteristics of a natural monopoly. There are significant economies of scale in treatment and distribution and it would be inefficient to replicate the network that connects customers and treatment facilities. In contrast, full competition is feasible for bulk water and retailing. Bulk water markets exist in many rural locations. Even in a location like Melbourne where there is a concentration of bulk water sources, it is feasible to establish a bulk water market through allocation of entitlements to bulk water sources. Retail competition already exists in the provision of energy in Australia and in the provision of water in Scotland.

Second, there are important differences in the cost drivers. Broadly:[8]

- For bulk water, the key cost driver in the long-run[9] is the volume of water supplied. The average per-unit-cost of providing bulk water generally increases over time as the lowest cost sources of water are developed first. Furthermore, the cost of supplying an additional unit of water (the marginal cost) can also vary significantly in the short-run. This short-run marginal cost (SRMC) can vary significantly even when there is water in storage as it reflects the opportunity cost of not using the water in the future when storages are almost empty.[10]
- For treatment and distribution, the key cost driver in the long-run is the number of customers. There are some volumetric costs (both for water and wastewater). In the short-run these include chemicals and pumping costs. In the long-run the capacity required will also depend on the volume used. However, the infrastructure is built to

[8] There are some qualifications to these comments. For example, in some situations the marginal cost of wastewater can be significant and may vary over time. Nevertheless, for the purposes of our review, the generalisations are appropriate.

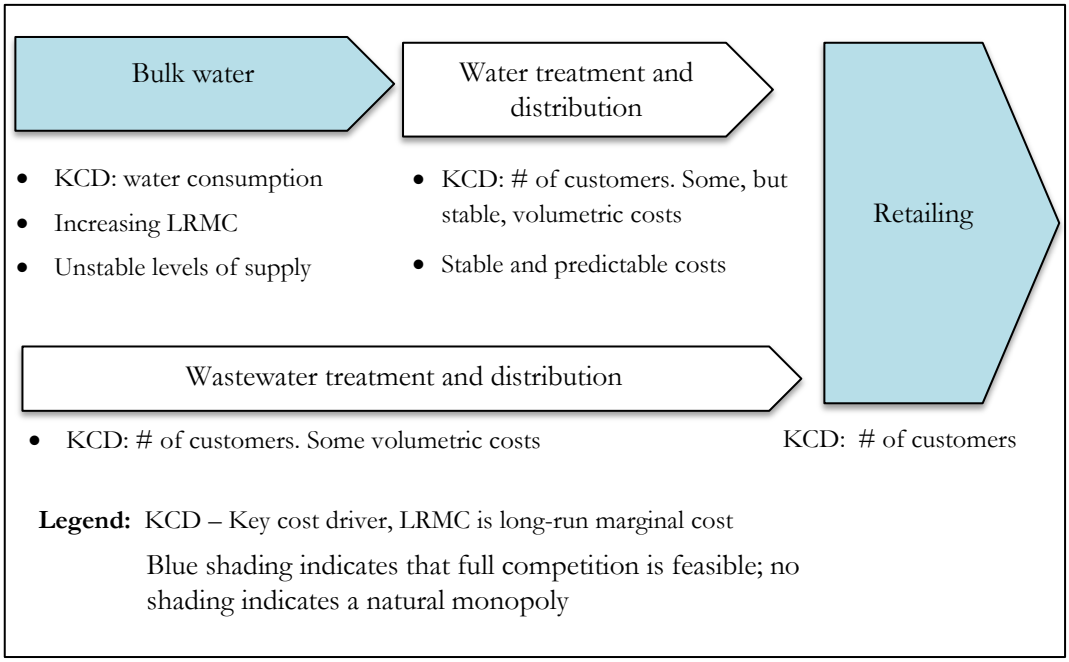
[9] It is common to refer to the short-run as a period during which capacity (or some other cost) is fixed and the long-run as a period over which additional capacity may be built.

[10] The short-run marginal cost can also vary for other reasons, including for example, if higher cost sources need to be used or additional water entitlements need to be purchased.

meet peak capacity and therefore, on an average per-unit-of-volume basis, the volumetric costs tend to be small and stable.

- For retailing, the key cost driver is the number (and type) of customers. There are no volumetric costs.

Figure 1: Value chain for water and wastewater services



2.2.3 Pricing of water and wastewater services

Victoria and other jurisdictions in Australia and around the world typically apply a common broad approach to recover the costs of urban water and wastewater services. The approach may be summarised as setting usage prices to encourage efficient use and using connection ('service availability') charges to recover the difference between the efficient cost of supplying the services and the revenue from other charges. This approach is reflected in the National Water Initiative (NWI) Pricing Principles that were agreed in 2004 by the Council of Australian Governments.[11]

The four main fees that are applied are:[12]

- a new customer contributions (NCC) fee, which is a one-off payment for connecting to the network.[13]
- a water-usage fee based on a metered volume and water price(s)[14]

[11] See http://www.environment.gov.au/resource/national-water-initiative-pricing-principles.

[12] There are many other miscellaneous fees and charges.

[13] NCC is often described as developer charges in other jurisdictions.

- a water connection fee (that is fixed; i.e. independent of volume), and
- wastewater fees, including a connection fee and, in some cases, a fee based on wastewater volumes that is typically estimated from water use.[15]

These fees are typically set according to the following pricing principles:

- The water-usage price is set to encourage efficient water use. This price is commonly assumed to be the long-run marginal cost (LRMC) of water, which is a measure of the marginal cost that takes into account the capital costs of future augmentations (see discussion in Box 1 below).[16] Similarly wastewater usage fees, where applied, are often set to encourage efficient use of the wastewater network.
- The NCC fee is set to recover the net incremental cost of a new customer so as to ensure existing customers are not subsidising new connections.[17]
- The two connection charges are set to recover the balance of the costs of providing water and wastewater services not recovered from the other fees.

Box 1: About marginal cost and long-run marginal cost

Marginal cost is defined as the cost[18] of supplying an additional unit of good or service.

The concept of marginal cost is critical for pricing of utility services. A commonly recognised starting point for efficient utility pricing is the setting of usage prices to marginal cost. As stated by Alfred Kahn:[19]

> *The central policy prescription of microeconomics is the equation of price and marginal cost. If economic theory is to have any relevance to public utility pricing, that is the point at which the inquiry must begin.*

Pricing can provide a signal to both consumers and suppliers for efficient use of resources. A price set below marginal cost can encourage an individual to consume additional units even when the benefits to the individual are outweighed by the costs to society. Conversely a price

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14 Customers of water businesses in Victoria may not face a single water-usage price. Currently, an inclining block tariff structure applies for water use, whereby the water price varies with the volume consumed. A further complication is that the wastewater charge can also vary with the level of water use.

15 For some large customers wastewater volumes may be metered.

16 The NWI Pricing Principles specify that the 'water usage charge should have regard to the long-run marginal cost of the supply of additional water'.

17 The guiding framework is that NCC charges must:

(i) have regard to the incremental infrastructure and associated costs in one or more of the statutory cost categories attributable to a given connection

(ii) have regard to the incremental future revenues that will be earned from customers at that connection

(iii) be greater than the avoidable cost of that connection and less than the standalone cost of that connection.

The explanatory notes (ESC 2013a) state 'the pricing principle that charges must be greater than the avoidable cost of that connection […] will ensure existing customers are not subsidising new connections.'

18 For the purposes of public utility pricing, the costs considered should include all societal costs (e.g. including environmental externalities).

19 As recorded in Kahn (1988 p. 65).

set above marginal cost can discourage individuals from consuming additional units despite the benefits to them outweighing the costs to society. As a result, a price set at marginal cost will balance demand with (the cost of) supply.

Despite its attraction, marginal cost pricing is not straight forward to apply. A common challenge in utility pricing occurs when large investments are required to expand output. In such situations, economists often recommend that pricing be set with regards to long-run marginal cost (LRMC).[20] In practice, LRMC is a measure that takes into account the cost of future investments. It involves estimating the costs in future periods that are required to meet future changes in demand.

A common misconception is to assume the short-run marginal cost (SRMC) is equal to the variable costs of production (e.g. the costs of pumping). When water is stored, the SRMC of using water includes the opportunity cost of not using that water in the future.[21] Through this inter-temporal relationship, the SRMC of water will reflect (assuming adequate storage) the capital costs of augmentation in the future. Furthermore when water can be traded, the marginal cost will reflect the opportunity cost of not trading the water.

Source: Extracted and adapted from Tooth (2014, p. 1).

There is a clear rationale for this pricing approach. It is generally accepted that the fixed fees will not have a material impact on the customer's decision to connect but that the water-usage price can significantly influence consumption and that the NCC fee can influence development decisions. Therefore, emphasis is placed on setting usage prices and NCC fees to encourage efficient use and decision making and using the connection charges to meet the goal of cost recovery.

An implication of using connection fees as a balancing item is that they will typically not be equal to the fixed costs of providing connections and may change independently of connection costs. If, for example, a water business recovers more in water-usage charges than the volumetric costs of supplying water, then the connection fees will be less than the water business's fixed costs. This occurs if the price of water is greater than the average cost (of providing water).[22]

Historically and generally we might expect the price of water to be greater than the average cost of water for two reasons:

- First, the price of water tends to be set to LRMC[23] which tends to be greater than the average cost because bulk water is an increasing-cost industry. That is each new augmentation tends to be more expensive (on a per-unit basis) than the last. This is

[20] The National Water Initiative pricing principles, which have been agreed to by state and territory governments, include the principle that drinking water prices shall be set with regard to LRMC.

[21] Operators of electricity hydro generation plant with storage, for example, develop highly sophisticated methods for valuing the opportunity cost of water to guide offer strategies in wholesale electricity markets.

[22] That is, the cost of the bulk water plus the volumetric costs associated with treatment and distribution.

[23] In keeping with the NWI pricing principles.

because cheaper water sources tend to be exploited first; so as demand expands, more expensive sources need to be developed.[24]

- Second, the average cost borne by utilities may be low because they have been granted (i.e. free of charge) bulk water entitlements.[25]

The reverse may also occur; that is, the water-usage price may be below the average cost of providing water. This may occur during times of excess supply (e.g. when catchments are full) or as a result of a recent investment in water supply that has excess capacity to allow for growth. Furthermore, a concern in many regions of eastern Australia is that there has been excessive investment in bulk water infrastructure, whereby there are investments whose financial liabilities exceed their value.

2.3 The objectives and risks in regulation

In considering the most appropriate regulatory approach, it is natural to consider the objective of regulation, the risks of regulation and the water sector issues that regulation might address. In this sub-section we first consider the objectives and risks of regulation and then consider the issues facing the water industry.

2.3.1 Objectives of regulation

The Productivity Commission (2011, p. 297) summarised that the 'primary rationales advanced for price regulation of the urban water sector can be summarised as:

- preventing the exercise of market power by monopoly utilities:
  - setting prices above the cost of supply to increase profits […]
  - X-inefficiency, whereby a lack of competitive forces reduces the incentive for utilities to minimise the cost of supply and offer innovative services […]
- avoiding politicisation of utility pricing, and
- ensuring full cost recovery.'

The exercise of market power is clearly a concern. However, it is not necessarily the case that regulation will improve efficiency. For example, an unregulated monopolist could maximise profits by setting a variable charge equal to marginal cost (which encourages efficient use) and then appropriate as much as possible of the consumer surplus by manipulating connection charges.[26] A monopolist may also be productively efficient. Having priced up to

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[24] Where this occurs, the owner of the lower cost resources can earn a 'resource rent' that reflects the difference between the price (which is based on marginal cost) and the average cost of the resource. The situation is analogous to the return to a gold-mine which can be mined at a lower long-run cost than the current gold price.

[25] Some bulk water entitlements have been purchased by the water utilities.

[26] A utility does not have the information to price discriminate perfectly, but it does have reasonable proxies (e.g., property location and value, and quantity consumed, are indicators of likely willingness to pay). For a development of this argument, see Cowen and Cowen (1998). The authors develop a model in which an unregulated utility will approximate efficient pricing using a block tariff structure.

the highest point which customers will bear, a monopolist has strong incentive to reduce costs, since every dollar in cost-savings translates into a dollar of extra profit.

There is also the risk that regulation reduces efficiency. For example, regulation can reduce incentives for firms to be productively efficient because a regulator takes the firm's actual costs into account when setting prices.[27]

Furthermore, regulatory processes can be time consuming and expensive. For the 2013-18 review, the time between the business's submissions and the final determination (released late June 2013) was around 7 to 9 months.[28] The NZ Commerce Commission (2014) recently estimated that a complex regulatory review for an electricity distributor cost in the order of NZD $2.5 million (AUD $2.3 million). The incremental costs to the businesses may be small if the reporting requirements for price reviews largely reflect what businesses should already be preparing. There are also costs to the regulator but these are less. Deloitte (2014) estimated the total direct costs to the ESC of the regulatory process to be $2.8 million across all 19 businesses.[29]

Despite that regulation may not increase efficiency and that there are risks and the costs of regulation, almost all jurisdictions control utility prices in some way, either through explicit regulation or via forms of community ownership. A rationale for this is that allowing utilities to charge above cost would cause significant dissatisfaction among customers. The resulting dissatisfaction provides an opening for political entrepreneurs to win votes by promising regulation to redistribute the rents from producers (who have few votes) to consumers (who have many). This dynamic is so powerful that there are in the world today almost no private, unregulated utilities.[30]

In summary, we conclude that the main objective of utility price regulation is to achieve socially and politically acceptable utility prices, and thus affect the distribution of wealth between utility owners and utility customers. The primary regulatory challenge is how to achieve these objectives while minimising the economic efficiency losses and compliance costs which result from the regulation. This reflection is fully consistent with our interpretation of the statutory objectives set for the ESC.

2.3.2 Issues facing the water sector

The economic performance of the water sector in Victoria (and other states of Australia) has attracted considerable attention in the last decade (see Box 2 below).

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27 As a result, the company can expect that saving a dollar in costs will lead to some reduction in tariffs in the future, and thus to less than a dollar in profits. Under incentive compatible regulatory forms such as price-caps, the reduction in tariffs will be less than the reduction in costs, so the company will still have an incentive to reduce costs. However this incentive will be weaker than in the unregulated case.

28 This does not include the time the businesses spent preparing their submissions. The time between the guidance paper (released October 2011) and the final report was 23 months.

29 Of note, Deloitte (2014) found that on a per-$million of regulated revenue basis, the ESC's direct costs were the lowest among comparable Australian regulators that were surveyed.

30 New Zealand, for example, exempts 'consumer trust owned' electricity distribution companies from price regulation on the basis that the customers of these firms are the owner and therefore there is no role for the regulator in redistributing the surplus.

Box 2: Recent water sector reviews

Several reviews have noted that productivity in the sector has been slow or declined.

- Research by ESC staff identified that over the period 2006 to 2010, the productivity of Victoria's four major water retailers remained virtually unchanged or declined and for water corporations in regional Victoria it declined significantly.[31]
- The Productivity Commission found that multifactor productivity of both urban and rural water sectors in Australia has declined over the past decade after strong growth from the mid-1980s to the mid-1990s.[32] Multifactor productivity is a measure of the amount of output from the combined input of capital and labour.
- The Productivity Commission also found that there is evidence of inefficient investment in augmenting water supplies in most of Australia's largest cities; it found that inefficient water supply augmentation in recent years in Melbourne and Perth has cost the community about $3.1 to $4.2 billion over the 20 year period.[33]
- The Victorian Competition & Efficiency Commission (VCEC) has highlighted a significant decline in productivity growth over the last 10 years. VCEC estimates that declining productivity in the wastewater and water and electricity and gas sectors combined contributed around 6 per cent of the *reduction* in Victoria's average rate of multifactor productivity growth between the period 2001-05 and 2006-10.[34]

There are indications of concern. In the 7 years to 2012/13, the average water bill per residential property in Victoria has outpaced inflation, with the median annual growth rate among utilities being around 4 per cent per annum.[35] This is despite the median level of water consumption falling by around 20 per cent over the same period. The change in customer bills is, however, not the complete picture of the issues in the sector. In addition:

- Customers have incurred additional costs — for example, households have spent significantly on alternatives including rainwater tanks and groundwater bores.[36]
- During the drought customers were restricted in the consumption of water services.

Much can be explained by the impact of the drought and the cost of government-mandated augmentations to supply in response to the drought. Nevertheless it is appropriate to consider whether an alternative regulatory approach may have led to different outcomes.

We understand that there have not been material issues with regard to quality. In light of this we focus on matters of efficiency. In this regard, in the two following sub-sections we assess the risks and issues relating to:

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31 ESC (2012, p. 21).

32 Productivity Commission (2011, p. 39).

33 Productivity Commission (2011, p. 83).

34 VCEC (2011, p. 153).

35 Source: National Performance Reports.

36 We (LECG 2010, p. 13) estimated that Australian households had spent an additional $650 million on these in 2009/10.

- risks of inefficient expenditure, and
- risks and issues of inefficient price structures.

2.3.3 Risk of inefficient expenditure

The current building-blocks approach focusses on the risk of excessive (inefficient) expenditure. On the surface, the current regulatory process appears to have been successful in this regard. The key results from the building-blocks process in the most recent determination are provided in Table 1 below. The table shows the revenue allowance proposed by the businesses and recorded in the final determination. The differences in these amounts suggest the regulatory process has resulted in $1.2 billion in savings over the 5 year regulatory period.

However, this amount may not measure the benefit of regulation for several reasons.

First, some of the difference will not be due to regulatory intervention, but rather to changes that have occurred between the time of the proposal and the final determination. In theory this should make no difference on average; however, in practice water businesses may be conservatively high with the initial proposal due to the concern that it is more difficult to increase the revenue requirement than to reduce it.

Second, it is not clear what the counterfactual would be. In the absence of regulation, the businesses would expect to face less scrutiny. This may cause them to propose a lower amount in the knowledge there will not be a regulatory adjustment or cause them to propose a greater revenue requirement on the basis that it won't be challenged.

Finally, and perhaps most importantly, the amount is not an estimate of the waste prevented. An economic benefit from regulation stems from preventing inefficient spend or encouraging productivity improvements. However, much of the reduction may represent a potential wealth transfer to customers from the shareholders of the business (i.e. the State of Victoria). For example, a reduction in the allowance for financing costs reduces the costs to customers but is directly offset by a reduction in the revenue returned to the state.

Furthermore, we might question to what extent the regulation is needed to control costs. The governance arrangements in Victoria, which include (albeit possibly weak) incentives for efficiency in the Statement of Obligations, should help to reduce the risk of inefficient operations. The separation of urban water businesses means that some meaningful comparisons of the performance of water business are carried out.

A related concern is that the current regulatory approach does not appear to address the risk of inefficient expenditure that results from socio-political pressures being imposed on large investments.

Table 1: Revenue allowance for the regulatory period 2013/14 to 2017/18 – proposed by businesses and final decision

Businesses	Proposed $m	Final decision $m	Difference $m	Difference %
Regional urban businesses[37]	4,226.3	3,990.7	-235.6	-5.6%
Metropolitan businesses[38]	13,059.3	12,065.7	-993.6	-7.6%
Total	**17,285.6**	**16,056.4**	**- 1,229.2**	**-7.1%**

Source: Data compiled by ESC from public water pricing determinations.

2.3.4 Risks and issues of inefficient price structures

Usage prices

The most significant issues facing the water industry appear to relate to inefficient price structures and a related issue of a lack of independent process in infrastructure investment decisions. While the price structure and governance of the water industry are not the focus of this review, they are nevertheless important considerations as the methodology for establishing the revenue allowance can facilitate — or be a barrier to — efficient price structures and may also affect the likelihood that investment decisions will be influenced by socio-political pressures.

In Victoria, and other Australian jurisdictions, there have been a number of issues with the usage pricing of water services. A common recognised starting point for pricing regulation is that usage prices should be set to marginal cost. Setting prices to marginal cost can encourage efficient use and encourage efficient investment.

Usage pricing in most Australian jurisdictions (including Victoria) has not been at marginal cost. Three common issues are that:

- usage prices do not respond to changes in supply and demand (i.e. they are rigid)
- inclining block tariffs are applied whereby the usage price faced by a customer increases with their usage, and
- 'postage stamp' pricing is applied whereby the same price applies across different locations despite there being different marginal costs of supply.

[37] Source: ESC, Regional water price review 2013-18 - Final decision executive summary, 18 June 2013. Available at http://www.esc.vic.gov.au/Water/Water-Price-Review-2013-18.

[38] Source: Greater Metropolitan water price review 2013-18 - final decision, 25 June 2013. Available at http://www.esc.vic.gov.au/Water/Water-Price-Review-2013-18.

All of these practices reduce efficiency to the detriment of consumers. Simply put, the more that prices diverge from marginal cost, the greater the loss in efficiency and the greater the risk that customer bills will be higher than necessary. The practices are also inequitable (in that they impact more heavily on poorer households) relative to more efficient alternatives.[39] Furthermore, a lack of efficient pricing may contribute to the risk of inefficient expenditure by making it more difficult to evaluate the benefits of water augmentation projects.

Arguably, the greatest concern is that water prices have not responded to changes in supply and demand with the result that there are periods when prices have been too low (below marginal cost) and Governments have had to impose demand restrictions and periods when the usage price has been too high (above marginal cost) and consumers have used less water than is efficient. Given that water use is metered there appears no practical reason why a rigid pricing approach is applied and rationing has been used to manage the balance between supply and demand.[40]

The costs of the rigid pricing have been very large.[41] The costs include:

- inefficient demand management resulting in:
  - an inefficient allocation of water use between residential users and uses and between residential and non-residential sectors
  - excessive spend by households and businesses on water saving devices and water replacement (i.e. rainwater tanks and groundwater bores), and
  - indirect impacts on labour-intensive businesses (such as landscaping) when restrictions are applied.
- excessive expenditure on supply augmentation infrastructure,[42] and
- reduced incentives for innovation. Efficient pricing over time location and service, can help encourage innovation, for example, by encouraging localised small scale solutions.

Furthermore, it is simple to demonstrate that the rigid pricing approach has led to outcomes whereby (relative to simple alternatives) poorer households have been financially worse off when restrictions have been applied. A simple numerical example showing the alternative to restrictions applicable to Victoria is provided in Sibly and Tooth (2011) and repeated in Box 3 below. As shown in this example, flexible usage pricing could have been used to reduce demand in a way that would benefit households and particularly poor households while ensuring the average revenue for the water businesses was not affected.

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39 The inequity of rigid pricing relative to a feasible alternative is demonstrated in Box 3. The inequity of inclining block tariffs is demonstrated in in Sibly and Tooth (2014). Using analysis similar to that in Box 3 it is straight-forward to create a more efficient and equitable alternative to postage-stamp pricing.

40 Scarcity (i.e. non-rigid) pricing has been used to great effect during water shortages in other regions where water meters are used; see LECG (2010, Box 3 on p. 31). See also Sibly and Tooth (2011). Even during drought on most measures water will still be the most abundant (e.g. in terms of volume or weight) and cheapest (e.g. in terms of price per volume / weight) good that people purchase.

41 A quantification of some of these inefficiencies is provided in LECG (2010, section 7.1).

42 These include costs reflected in water bills (e.g. the costs of desalination and recycled water projects) and costs directly borne by households (e.g. expenditure on rainwater tanks and groundwater bores).

Box 3: Flexible pricing — a Melbourne example

The table below shows a simple example of the impact of flexible pricing based on water use in Melbourne in the period 2005-06.

The top section of the table shows the actual consumption and water bills for average household and business connections. The table presents results for the average household in the bottom and top income quintiles as well as averages for household and non-residential sectors. The bottom section examines the effect of using a change in the mix of fixed and variable prices to achieve a further 10 per cent price reduction in demand.[43] It is assumed that the excess revenue collected from usage charges is returned to consumers, in this case, in proportion to existing connection charges.

The bottom row of the table summarises the financial impact on the total bill. The average total bill per connection does not change and thus there is no change to water utility revenue. Small users fare much better and on average the household sector is financially better off.

	Residential			Non-residential use	Average per connection
	Bottom income quintile	Top income quintile	Average of all		
Actual for Melbourne 2005-06 (weighted average)					
Average consumption per connection (kL per year)	174	255	202	1,126	271
Water usage charge (at average)	$138	$212	$164	$950	$222
Water connection charge	$60	$60	$60	$90	$62
Total water bill	$198	$272	$223	$1,040	$284
Scenario: prices changed to reduce demand by 10%					
New demand	157	229	182	1014	244
New water use charge	$224	$327	$259	$1,447	$348
Water connection charge (rebate)	-$61	-$61	-$61	-$92	-$64
Total bill	$162	$266	$198	$1,355	$284
Impact of pricing change on average total bill to achieve 10% reduction	**-$35**	**-$6**	**-$25**	**$315**	**$0**

Source: Water consumption for households is taken from the Productivity Commission's Draft Report on the Urban Water Sector. All charges, number of connections and non-residential consumption is derived from the final determination of the Urban water price review 2005-08.

Source: Adapted from Sibly and Tooth (2011).

[43] In the example it is assumed that a constant price elasticity of demand of -0.2 applies equally to all customers (both household and non-residential). That is, a 2 per cent demand reduction may be achieved by (roughly) a 10 per cent price increase. The core findings are not sensitive to assumptions as to the price elasticity.

Changes in usage prices (and the issue of entitlements to the water resource)

The example shown in Box 3 above is useful in illustrating another issue. There will be times when it is efficient that water-usage prices change to reflect changes in supply and demand. A change in the usage price leads to a change in the usage revenue, which, if the principle of cost-recovery is applied (as in the Box 3 example), leads to a change in the connection charges.

But if usage prices are increased, how much of the additional revenue should be returned to existing customers and how should it be allocated to different customer groups? In the example, all additional revenue was returned simply in proportion to the existing connection charges collected. However, relatively more or less could have been allocated to the non-residential sector. Currently, there appears to be no public established framework for answering this question.

The issue is not confined to the use of scarcity pricing. For example, consider the situation that from one regulatory period to the next the water-usage price increases. The increase in the water-usage price will result in additional revenue being obtained from water-usage charges, which — under the pricing principles — will result in lower water connection charges.

The lack of a framework for determining how changes in usage charges affect customer bills reflects a lack of clarity of rights to the water resources (and obligations for any liabilities). For example, if water came from bulk water entitlements that were privately held, then increases in the price of water would result in a higher financial return to the owners of those entitlements. Similarly, in theory, it is possible that customers themselves may own water entitlements and use the water businesses to treat and distribute the water.

The lack of framework (or lack of clarity of rights to the resource) is a significant concern. The lack of clarity may be a contributor to a resistance to efficient usage pricing. For example, a commonly stated concern with the introduction of scarcity pricing is that higher prices would negatively impact on the poor. However, as illustrated in Box 3, this need not be the case. As no framework was in place for how the value of water entitlements were to be allocated among user groups, this potential benefit for poorer households was not publicly discussed. The potential significance of this is not well understood. As discussed in the previous section, the lack of efficient usage pricing results in allocative inefficiency and may contribute to expensive solutions to manage demand (e.g. restrictions) and supply (augmentations).

A second issue with the lack of transparency is that it increases the difficulty of determining the appropriate NCC. For example, consider a large new customer (e.g. a factory) that demands a very large volume of water. Without a matching augmentation, this new customer reduces the water available to existing customers. Under the NCC framework, existing customers should not be impacted by new customers; however without clarity as to which customers have entitlement to the water resources this is difficult to resolve.

There are other similar issues that arise from a lack of clarity over the rights to water assets and obligations for water liabilities relating to other pricing matters. For example, how rights and obligations are assigned could have implications for:

- connection charges when lots are subdivided or merged, and

- access prices[44] when there are significant bulk water assets and/or liabilities connected to the network (that the access seeker may or may not use).

Finally, the lack of clarity of rights to the resource is a potential barrier to introducing private markets in bulk water. Consider, for example, if the provision of bulk supply was privatised. Without clarity over the current allocation of rights, there would not be clarity over how the proceeds of the privatisation would be shared among customers.

2.4 Methods of regulation

In the following section we review briefly alternative regulatory forms and their applicability to regulating the water sector in Victoria. In practice, there is a continuum of regulatory forms that are applied and the differences between some methods may be slight.

2.4.1 Rate-of-return regulation

Rate-of-return regulation is essentially a cost-based approach to regulation. Under a pure rate-of-return method (also referred to as cost-of-service or cost-plus regulation), an historic review of the costs of production are undertaken by the regulator, usually at the request of the regulated entity. Prices are then reset to allow the company to earn a fixed rate-of-return on its actual costs.

Rate-of-return regulation was the dominant regulatory paradigm in the industrialised economies but by the late 1970's it had become somewhat discredited. Concerns included that:

- utilities had only weak incentives to reduce costs because any cost reduction could quickly lead to a reduction in the regulated price, and
- it encouraged utilities to over-invest[45] because regulated utilities could earn higher profits from increasing the regulated capital base.

This list of issues is not exhaustive. The common theme of critiques of cost-based regulation is that regulatory intervention changes the incentives faced by the regulated firm when making other business decisions that are not directly controlled by regulation.

2.4.2 Price-cap, CPI-X and related forms of regulation

In response to the concerns with rate-of-return regulation, Littlechild (1983) proposed an alternative form of regulation based on price-caps. The theory was that rather than setting an allowed rate-of-return, the regulator would set a maximum tariff. This tariff would be indexed to inflation, but would also reduce each year by an 'X-factor' based on the efficiency gains the utility could be expected to achieve. This form of regulation became known as, 'CPI-X'.

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44 Access prices are the prices charges to parties wishing to use some of the regulated assets such as the water network.

45 This is known as Averch-Johnson (1962) critique.

Under a pure price-cap regulation, the regulator would not consider the actual costs of the regulated entity but would set prices based on the 'efficient costs' of a hypothetical entity providing the same service. Because tariffs were not linked to a utility's costs, it would encourage utilities to increase efficiency (and hence was also referred to as performance based regulation). The utility would benefit by keeping its costs below the regulated tariff. A share of these efficiency gains would be passed on to the customer through the X-factor. Typically, at each reset, the regulated entity would be permitted to retain some of the efficiency gains into the next regulatory period, to provide a continuing incentive to minimise costs.

However, through the experience of using CPI-X regulation in water and energy networks it became clear that CPI-X regimes also had potentially distorting effects on the incentives of the regulated entity.[46] The risks identified under CPI-X regimes included:

- Under-investment; because investors received less explicit guarantees than under cost-of-service regulation as to the future recovery of capital expenditures and may fear that future regulators would set prices below cost-recovery levels (the 'policy credibility problem').
- Reduced product or service quality; if costs can be cut by reducing quality, then reducing quality can be a quick means of increasing profits since prices are not reduced in line with costs (unlike for cost-of-service regulation).

These risks emphasise that consumers can be harmed as a result of the regulator setting prices too low. Under-pricing can harm consumers to a greater degree than if prices are set too high. This is because under-pricing tends to discourage investment and innovation over the longer-term and possibly may reduce reliability and security of supply in the short-term.[47]

Price-cap, or performance-based regulation, can also lead to price increases. Under price-cap regulation, the regulated firm is exposed to the risk of unforeseen and uncontrollable increases in costs for the period of the review (under rate-of-return regulation these costs will be compensated, though sometimes with a lag). This increase in risk increases the regulated entity's cost-of-capital which feed through into higher prices for consumers.

In practice, CPI-X regulation always takes a company's own costs into account in some way when setting tariffs – it is not realistic for a regulator to set revenue for an entity across multiple regulatory period (that is, decades) without some assessment of the actual costs incurred by the entity. As a result, aspects of how CPI-X is applied in practice converge with rate-of-return regulation. For example, in electricity transmission regulation in both Australia and New Zealand, transmission investment is now taken into the RAB at cost and rolled forward using depreciated historic cost.[48]

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46 D. Helm and G. Yarrow, "The Regulation of Utilities", Oxford Review of Economic Policy, No. 4, 1988.

47 These concerns are far from being a theoretical point, of academic interest only. Soviet type economies spent decades during the twentieth century applying policies that sought to hold down prices below what would have been market clearing levels, across a whole range of economic sectors. The impacts on the supply side of such economies are a matter of economic history. As a consequence of those supply-side impacts, those economies were not good places to be a consumer.

48 Initially, asset values were established using optimised depreciated replacement cost (a form of 'hypothetical new entrant valuation). This approach was abandoned in both regulatory regimes because of the cost of the

2.4.3 Benchmark regulation

Another approach is to set rates with reference to a price benchmark that is based on the performance of other providers. This approach is used by Ofwat (the water regulator in England and Wales), who from data collected on regulated utilities determines a 'yardstick' as to what efficient regulated firms are able to achieve and from this the regulated price of different components of water and wastewater services

To control for system differences that drive costs, Ofwat collects substantial amounts of data and uses regression modelling to predict what an efficient provider could achieve. The advantages of this approach include that, in addition to determining efficient prices for service components, it can help to identify cost drivers. The key disadvantages of the approach are the effort in collecting data to undertake comparisons and the difficulty in accounting for different factors that may drive costs. We understand that some aspects of expenditure (particularly some capital expenditure) are particularly difficult to benchmark.

2.4.4 Default price path

The default price-quality path (DPP) approach is an alternative that attempts to minimise the cost of regulation while combining some of the elements of the CPI-X and the rate of return regulation. An overview of the DPP approach is provided in Figure 2 below. Essentially it involves a applying a low-cost method to determine a default revenue-allowance (or set of prices) that the regulated entity can accept; but with the option of allowing the regulated entity to seek a customised price-path that is more costly to develop but aims to be more accurate.

This approach is used by the NZ Commerce Commission to regulate the privately owned gas pipeline businesses and electricity distributors (EDs) across New Zealand.[49] The stated purpose of the DPP regulatory approach is 'to provide a relatively low cost way of setting price-quality paths for suppliers of regulated goods and services, while allowing the opportunity for individual suppliers to have alternative price-quality paths that better meet their particular circumstances.'[50]

The DPP approach can involve a CPI-X or rate-of-return methodology to establish the default prices. In its most recent review of establishing DPPs for EDs, the Commerce Commission (2014, p. 15) established the default price limit for each distributor as:

- the 'starting price' allowed in the first year of the regulatory period, and
- the 'rate of change in price', relative to the Consumer Price Index ('CPI'); that is allowed in later parts of the regulatory period.

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valuation exercise and because the approach disadvantages the regulated entity in terms of the profile of cash flows during periods of high investment (once revaluation gains are recognised as income in setting the maximum allowable revenue).

[49] Community trust owned entities are exempt from regulation on the basis that the owners of the entity are its customers and therefore there is no role for the regulator.

[50] Commerce Commission (2014, p. 7).

Figure 2: Overview of default/customised price-quality regulation

Source: Commerce Commission (2014, p. 9).

In setting the DPP, the Commerce Commission weighs up the costs and benefits and risks of the regulated entity seeking a customised proposal. They recognise that if they set the default prices too low, a regulated entity will seek a customized price path which can be expensive. If they set the DPP too high, they risk that the regulation will be ineffective in constraining prices.

An emerging issue with the DPP is that while the Commerce Commission is projecting costs forward on average reasonably accurately, individual entities may face a cost profile that is very different from average. The Commerce Commission and the industry are considering methods for addressing these differences.

2.4.5 Sunshine competition and transparency

A light-handed approach to incentivising businesses to achieve greater performance simply involves providing greater transparency to stakeholders on the businesses' performance. Where this involves comparisons with other like businesses, it is often described as 'sunshine competition' or 'comparative competition'.

Currently, some degree of sunshine competition takes place in the water sector in Victoria (and more broadly Australia). In Victoria the ESC publishes comparative data on the performance of the water businesses.[51] Furthermore, by contributing to the water industry's National Performance Report framework, Victorian businesses can be compared with other major water service providers in Australia.

There is some evidence to suggest that sunshine competition can generate significant benefits. In 2007, the Victorian ESC argued that comparative competition had worked to

[51] ESC (2013b).

improve performance and in particular to 'encourage management teams to innovate to improve service delivery relative to other businesses' (ESC 2007, p. 12).

Anecdotal evidence (sourced from personal correspondence) suggests that the managers of the Melbourne water retailers pay significant attention to their relative performance. The performance data also appears to support this contention. In the years following the disaggregation, the performance of Melbourne retailers improved significantly on many measurable customer performance metrics, including customer complaints, water quality compliance and the speed with which unplanned interruptions and sewer spills were rectified (ESC 2007).

There is international evidence that finds benefits of comparative competition. De Witte and Saal (2008) studied the behaviour of Dutch drinking water companies before and after the introduction of sunshine regulation that involved transparent publication of relative performance. The authors found that in the 10 years following the regulatory change, water quality and service levels steadily increased and the sector experienced a productive efficiency increase (i.e. increase in output per unit of cost) of around 23 per cent. They also argued that the increased transparency and political pressures led to more efficient industry structures. These results are also consistent with the findings of Wallsten and Kosec (2005).

In a study on the productivity of Portuguese urban waste utilities following the introduction of quality of service regulation, Simões and Marques (2012) found 'unequivocal improvements in the quality of service induced by sunshine regulation'. However, they also found that 'low incentive economic regulatory methods' led to an overinvestment.

2.4.6 Competition

Competition is not a method of regulation that the ESC could introduce. Nevertheless, it is worthy of consideration because, as noted earlier, some sections of the value chain could potentially be provided by competitive markets and the ESC's method of regulation may facilitate or become a barrier to competition. There are many benefits of competition. Competitive markets (where they are possible) may deliver more efficient outcomes with resources being allocated efficiently, the cost of services being reduced and firms innovating to drive further efficiency improvements. Furthermore, we note that: under the ESC Act (section 8A(1)), the ESC must have regard to 'the degree of, and scope for, competition within the industry'.[52]

[52] In 2010, we (then LECG) conducted a review for the National Water Commission on 'Competition in the Australian urban water sector'. This review considered the potential for competition across the water and wastewater and the potential benefits and costs. See LECG (2010).

3. Our proposal

3.1 Foundations

3.1.1 Overview

Our proposed methodology is based on a number of foundations which, once in place, allow us to recommend the method of determining the revenue allowance and prices. The foundations are:

- separation of analysis by value-chain section
- improving transparency by establishing a set of simple measures of performance that align with customer wants, and
- establishing a clear framework for managing changes to usage prices (which effectively involves allocating bulk water assets and liabilities among customer groups).

3.1.2 Separation of analysis by value-chain section

We propose that, for the purposes of determining the revenue allowance, the services offered are separated into the four value-chain sections described in Figure 1 (on page 7) as comprising.

- bulk water
- water treatment and distribution
- wastewater treatment and distribution, and
- retailing.

The revenue allowance for the business is simply the sum of the revenue allowance for each of the component sections.

The choice of value-chain sections reflects the differences in the economics by section including the key cost drivers, the variability of costs over time and the potential for competition.

Before discussing the advantages of this approach, it is worth noting there is little downside other than the administrative costs. Therefore, unbundling, as we propose, is a low-risk policy.

It is also worth noting that separation by value-chain section is not without precedent. The economic regulator of water in England and Wales (Ofwat) separates the value chain into retailing, water and wastewater services. Ofwat does not separate out bulk water; however, this may be explained by the low level of metering. In 2011, it was estimated that in England only 37 per cent of households had a water meter (forecast to increase to around half of

homes by 2015).[53] The lack of comprehensive water metering reduces the importance of usage pricing and the value of separating out bulk water.

There are two key advantages to the value-chain approach.

First, separation simplifies the measures that may be used to track performance. As discussed further below, having separated out the value-chain sections as proposed, the key measures of performance for both water and wastewater treatment-and-distribution becomes simply the cost-per-customer (by customer group) of those sections. This in turn facilitates a simpler approach to economic regulation.

Second, separation as proposed would be a necessary step in moving to competition in bulk water and retailing in the future, should it be desired.

The process of separation would involve financially separating the accounts (including operating expenses, assets and liabilities) of each of the value-chain sections. This process, known as 'ring-fencing', would be undertaken by the water businesses. The ESC would have some oversight in establishing guidelines and in ensuring the ring-fencing is clear, broadly reasonable and consistently applied. We expect that this ring-fencing is to be based on the existing regulatory accounts that currently separate water and wastewater services. The ring-fencing could also be beneficial in helping to clarify costs, assets and liabilities that may be considered for access prices (i.e. prices for accessing part of the water network).

We expect that there will be grey areas as to which section of the value chain it is best to allocate assets and costs. For our proposed regulatory approach, the exact allocation is not significant. However, given the potential for competition in bulk water and retailing, a potentially useful guiding principle is to ring-fence in a way that best facilitates a move to competition in these functions in the future, should it be desired. In determining what activities are defined as retailing, a useful guide will also be how retailing has been defined in the UK where retail competition has been introduced (in Scotland) and retail cost-benchmarking is undertaken (in England and Wales).

3.1.3 Measures of performance by customer group

We propose that the ESC tracks and focuses on a few additional[54] key measures of performance by customer group and value-chain section. The different customer groups may be simply residential and non-residential customers, however further disaggregation may be appropriate (see Box 4 below). We propose the key measures should be:

- the cost per customer (by customer group) for each of:
  - water treatment and distribution
  - wastewater treatment and distribution, and
  - retailing, and

[53] Source: Water for Life, December 2011, Paper presented to Parliament by the Secretary of State for Environment, Food and Rural Affairs by Command of Her Majesty December 2011.

[54] In addition, service measures (e.g. customer complaints) should continue to be monitored.

- for bulk water, again by customer group, measures of water availability per customer and the cost per customer.

The selected measures aim to be simple and directly reflect the key wants of customers relating to cost and water availability. They would be in addition to the service quality measures that the ESC currently monitors.

The simplicity of the measures is an important feature. A key rationale for establishing these customer measures is to improve transparency of performance, which as international evidence suggests,[55] should create incentives for performance improvement. A challenge with current reporting is that it is difficult to measure changes in productivity as the reporting typically bundles multiple inputs (which include different customer groups with different servicing needs) and multiple outputs (which include water and water-connection services). When there are multiple inputs and/or multiple outputs, sophisticated techniques are required to measure changes in productivity. In effect, we propose that, through separate accounting by value-chain section and customer group, this complexity is removed and the key cost measures can be summarised into a single input and a single output.

We expect that the simpler presentation would result in stakeholders more closely scrutinising performance and thereby providing businesses with stronger incentives for improvement. The incentive for performance improvement will come from a combination of stakeholders including the ESC, the customer groups and internal stakeholders (e.g. the board) of the water businesses.

Transparency of the measures by customer group will also have other important benefits. In particular, we expect that they will help to ensure that the NCC framework is applied correctly and that they will impose additional discipline around investment decisions by increasing the transparency of how costs are shared between customer groups.

The measures by value-chain section are discussed in more detail further below.

Box 4: Determination of customer groups

Customers might be simply grouped into residential and non-residential customers. However, customer groups might be further disaggregated. The key criterion for customer groupings is that the cost to service the customer is common across the group. Where the costs to serve (in terms of usage costs or ongoing connection costs) vary significantly, it may be advantageous to disaggregate the group into smaller groups. For example, this may be where customers are served from different water sources (and therefore the water availability per customer differs) or where customers have different ongoing connection costs.[56]

Disaggregation may be advantageous for two reasons. First, where costs vary within the group the average cost per customer can change as the mix of customers within the group changes, thereby reducing the transparency of performance measures.

Secondly, disaggregation can facilitate more efficient tariff structures with regard to usage

[55] See discussion in section 2.4.5.

[56] For example, this might be due to significantly higher pumping costs or higher wastewater treatment costs.

charges. We expect it would help to break down resistance to price changes as it would clarify how revenue collected from usage charges is recycled among customers (that is how connection charges would change in response to a change in usage prices).

3.1.4 Framework for managing changes to usage prices

We propose that the ESC requires the water businesses to develop and publish a framework that establishes how connections fees by customer group are affected if usage prices are changed. For example, the framework would clarify how, if water prices were increased during a drought, the additional revenue collected would impact on customer bills.

We propose that a guiding principle for this framework is that a customer group should not be worse off as a result of changes in usage by another customer group.[57] Such a framework would have the effect of determining how the assets and liabilities of the bulk water resources are allocated among customer groups. These would include bulk water entitlements, other bulk supply assets (including the desalination plant) and the liabilities for the cost of water infrastructure (including the desalination plant).

Similarly we would expect that new customers via the NCC charges would (consistent with NCC principles) make a financial contribution that compensates the existing customers for diluting each customer's share of the value of bulk water assets.

The framework is important to address the issues discussed at the end of section 2.3.4. Most significantly we expect that establishment of the framework would provide a foundation for breaking down barriers to establishing efficient prices. We expect that the current lack of clarity is likely to be a significant contributor to resistance in reform of usage prices and a reason for political pressures being applied in urban water decisions.

We propose that the initial framework is developed by the water businesses. From the perspective of efficiency it is of relatively little importance how the allocation is undertaken. However, for encouraging the adoption of efficient price structures it is important that it is clear and consistently applied.

One might question whether customers should be allocated rights that can then be traded. We believe that such an approach would be administratively complex and unnecessary. Tradable rights could have two potential benefits. First, tradable rights could be used to establish water-usage prices; however, rights do not need to be allocated to customers to achieve this.[58] Second, customers might wish to trade water rights to help manage risk. However, with efficient pricing there should be no need for restrictions and the financial exposure to higher water prices should be negligible for all but the largest (e.g. industrial) customers (who, if the financial risk was very significant, might adopt other strategies such as recycling).

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[57] This can happen because increased usage by one group may impact on the usage price for other customer groups.

[58] See Sibly and Tooth (2008) for an alternative.

Box 5: Should all assets and liabilities be allocated by customer group?

We might consider whether there is a benefit to allocating all the assets and liabilities by customer group; in effect, ring-fencing the regulatory accounts by customer group as well as by value-chain section.

This should not be necessary. The lack of clarity of how bulk water resources and liabilities are allocated is an issue because the efficient water-usage price can vary materially over time affecting the value of bulk-water resources. This issue could potentially occur to an extent with some other assets. For example, it is feasible that due to limited capacity of wastewater treatment assets the volumetric prices for wastewater disposal need to increase. In such case similar concepts might apply, whereby any changes in the net revenue collected is recycled within the customer groups affected by the changes in volumetric prices.

3.2 Method of regulation by value chain section

3.2.1 Bulk water

Bulk water performance measures

There are a number of possible measures for water availability. One possible measure is the 'yield', which is the long-run consumption that is possible without compromising system security.[59] An alternative approach would be to align the measures with those used in water markets.

We expect that most businesses should report at least two measures of availability; one measure which reflects the water available during normal circumstances (analogous to yield) and another measure which reflects the water availability at times of drought.[60] The measure of water availability during a drought might be stated as the percentage reduction in water use required during, for example, a 1 in 20 year drought. Relative to average levels of consumption, the 'normal-circumstances' measure should be reasonably comparable across regions with similar average consumption; however, the drought measure may not be.

The bulk water measures should — in combination — be reasonably stable. The NCC framework also means that the existing customers should be no worse off in terms of the bulk water. An implication is that growth in new customers should result in either no change in these measures or an offsetting impact. For example, if new customer growth results in a decline in the water-availability per customer, then it should also result in a reduction in the cost per customer. Due to changes in the climate, the water availability measure may move outside of the water utility's control.

[59] Yield reflects the uncertainty of supply. For example, a desalination plant will provide a greater addition to yield than a surface water source that provides the same average supply but with greater variability.

[60] It may be useful for water businesses to report multiple measures that reflect different drought extremes.

We expect that a focus on the bulk water measures should have several benefits. These include the following:

- The combination of the water-availability and cost measures should:
  - encourage greater discipline in the application of the NCC framework by ensuring that existing customers are appropriately compensated, and
  - aid the evaluation of water augmentations investments by more clearly demonstrating the trade-offs in cost and availability.
- The water-availability measures by themselves could:
  - be used as a foundation for measuring water security, and
  - provide a useful guide for residential and non-residential customers in preparing for drought.

Regardless, our proposed regulation of bulk water necessitates allocation of bulk water assets and liabilities across customer groups. Water-availability is a simple non-monetary measure of the value of these assets.

Determining the revenue allowance

The costs of providing the bulk water service may differ greatly to the water-usage revenue (net of the volumetric costs associated with treatment and distribution).[61] For example, when usage prices are set to LRMC and LRMC is greater than average cost, the water-usage revenue recovered will be greater than the cost of providing bulk water.

It is therefore necessary to establish a process for determining the allowable revenue for costs of providing bulk water.

In our opinion it is not practical to benchmark the bulk water costs across regions as the costs of provision are highly dependent on localised factors. Furthermore, we expect the measures of water availability (a key output) will not be directly comparable across businesses.

We are also of the view that bulk water does not lend itself towards establishing a lighter-handed regulatory approach (such as comparative competition or DPP) because in our view, relative to other sections of the value chain, the bulk water investment decisions tend to be more significant and complex. A price-cap approach (e.g. application of CPI-X to the cost-per-customer measure for the bulk water service) also does not appear appropriate given the significant changes that may occur in bulk-water costs in response to augmentations.

By a process of elimination, we recommend that cost-based regulation be retained for establishing the revenue to be recovered from the bulk-water section of the value chain. That is, the overall revenue to be recovered for bulk water is determined by a process of calculating the efficient costs to be recovered, a process which necessitates calculating a RAB. The key change to the current process is that the bulk water costs need to be ring-fenced from the water treatment-and-distribution section of the value-chain.

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61 The volumetric costs of treatment and distribution tend to be small and stable.

We also recommend that the ESC takes a more significant role with regard to scrutinising investments involving augmentation. The role should include ensuring that a cost-benefit analysis (CBA) be undertaken for all bulk water investments. While potentially investments could be scrutinised as part of the normal 'building blocks' process, it may be more effective for the ESC to require that a CBA be undertaken as investments are being considered. This process could be similar to a 'Regulatory Investment Test' (essentially a CBA) that is required for significant transmission and distribution investments in the electricity sector. In light of the experience with urban water investments in Australia, a key requirement could be that the options considered include the option of using price changes to manage demand. A potential limitation is that the Government can mandate water businesses to undertake water supply investments. Nevertheless, a requirement that a CBA be published may ensure greater discipline in undertaking investments.

Potential for competition

The method of regulation for bulk water may change over time. In the long term we expect that market-based competition may be used to establish prices. Market-based competition for bulk water is potentially feasible in all water systems. In many regions bulk-water markets already exist. Where markets do not currently exist they could be created through division of water rights.[62]

The advantages of competition include the setting of water prices to provide signals for efficient demand and supply. There are, however, some challenges to moving to full competition for bulk water. Socio–political considerations aside, potential issues include:

- There are some functions of bulk water that have natural monopoly characteristics. These may include the catchment management and service delivery of established water sources and water-grid management.
- Supply security. It is possible that in some systems there are public benefits to greater supply security,[63] in which case private markets would be expected to under deliver.
- Water augmentations often involve 'lumpy' investments[64] with the implication that the public benefit of an investment can be greater than the expected return to the private investor.

Regardless, a move to full competition is not within the ESC's control and therefore not a method we have recommended in this paper. Rather we have proposed that the regulation be undertaken in such a way as to enable the option of competition in the future, should this be desired. Our proposed approach — involving ring-fencing of the functions of bulk water and clarifying how bulk water assets are allocated among customer groups — is consistent with enabling bulk-water competition in the future.

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62 A description of how this could be achieved is described in Sibly and Tooth (2008).

63 These might stem from issues associated with public health, congestion (in obtaining emergency supplies) and social tensions. For a further discussion see LECG (2010, p. 42) or Sibly and Tooth (2011).

64 That is where the minimum efficient scale requires that the investment has a significant impact on available supply.

Summary

In summary, our recommendations for bulk water are as follows.

- We recommend that the bulk water section be ring-fenced from treatment-and-distribution.
- The water businesses should develop measures of water-availability per customer (by customer group) and cost per customer (by customer group). These measures should be monitored and reported by the ESC. The water-availability measures should become a foundation for measuring water security.
- A building-blocks approach should be used to set the allowable revenue. In assessing 'efficient' expenditure, the ESC should closely scrutinise significant investments in light of the implications for the water availability-per-customer and cost-per-customer measures. An important role for the ESC is ensuring a CBA for water augmentations is undertaken rigorously and transparently and, in particular, ensuring that efficient alternatives (including using price to manage demand and stimulate local supply) are considered.

3.2.2 Treatment and distribution of water and wastewater

Cost-per-customer measures

We propose that for the treatment and distribution of both water and wastewater the ESC tracks and focuses on, for each customer group, the cost-per-customer measure. To enable comparison over time these cost-per-customer measures may be based on only fixed costs; that is, excluding the costs that vary directly with usage.[65]

An attractive feature of cost-per-customer measures for treatment-and-distribution and retailing is that they should (with proper application of the NCC framework) be insensitive to new customer growth. This is because the NCC is designed to ensure existing customers are not subsidising new connections. Furthermore, with forward planning the cost of renewals should be amortized so as to be a reasonably steady cost.

As a result, the cost-per-customer measures should only vary significantly because of:

- changes in efficiency (in which case they should fall)
- changes in the cost of factor inputs (e.g. energy, chemicals and labour), or
- service improvements (which may be for the service received by customers or the services relevant to the environment).

Due to the localised nature of the costs of water and wastewater provision, we would expect these measures to vary by water business. However, trends relating to treatment-and-distribution costs should be reasonably comparable across regions as they are affected by common factors. This may be the case for all three factors mentioned above (relating to efficiency, cost of inputs, and service improvements).

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[65] Short-run variable costs (which might include energy for pumping and chemicals for treatment) are likely to be small in most cases. We do not see a need to exclude long-run volumetric costs.

As part of the cost-per-customer measures we recommend that the ESC requires the water businesses provide a breakdown of any proposed changes to the cost-per-customer measures.

We expect this greater transparency will help to drive performance improvements.

Determining the revenue allowance

We have proposed the DPP as a method of price-regulation as a way of reducing the cost of regulation while allowing pricing flexibility. Our rationale is a follows. First, with the establishment of simpler cost-per-customer measures we expect that the risks of inefficient expenditure will be reduced thereby enabling a focus on more light-handed cost-effective regulation.

Second, we do not expect that a completely light-handed approach is appropriate. At least in the medium-term we believe there is value in having regulatory oversight.

Third, we do not see value in alternative approaches such as productivity benchmarking. Productivity benchmarking can be expensive and, given the localised nature of costs, can be very difficult to do for treatment-and-distribution.

We expect the DPP would apply as follows. The revenue allowance would be calculated as the allowed cost-per-customer multiplied by the number of customers. Assuming the cost-per-customer measure is net of variable volumetric costs an additional adjustment would be made for those costs. For each utility the initial cost-per-customer would be based on the prior regulatory period.

To establish the default price path, the businesses would make initial submissions to the ESC including a justification for any changes in the cost-per-customer. The ESC would review this information to calculate a DPP (essentially a growth-rate) for the cost-per-customer for each service. This would then be applied in conjunction with projected customer numbers by customer group for each utility to estimate the revenue allowance. The ESC would, where it sees it appropriate, make any modifications based on the submissions.

In effect the process would be similar to the current process with the exception that:

- The businesses in their initial price submissions would have an increased focus on describing the rationale for their proposed cost-per-customer measures.
- The ESC would not undertake a detailed critical review of expenditure with the possible exception of major investments. Rather the ESC would provide a preliminary determination for each business that reflects the average cost-per-customer growth across all submissions. In setting the default price path we expect the ESC to take into account the historical changes in cost-per-customer from previous regulatory periods.
- Following the preliminary determination, the water business may elect to have a customised price path in which case the 'normal' critical review is undertaken and a draft determination is developed from this process. If the business does not elect for a customised price path the preliminary determination becomes the draft determination.

Having developed the draft determinations, the current process would continue. That is

- the ESC would consult on the draft determinations, and
- following feedback, the ESC would publish a final determination.

Summary

For each of the water and wastewater treatment-and-distribution sections of the value-chain we propose that the ESC:

- improves transparency by focussing on reporting of cost-per-customer measures by customer-group, and
- employs a DPP approach similar to that employed in New Zealand for electricity distribution businesses to determine the revenue allowance.

3.2.3 Retailing

Retailing is a fairly small (in terms of cost) section of the value chain. Based on data from England where retailing is separately assessed, the cost-per-customer of providing retailing might be in the order of $50 to $60, or less than 5 per cent of the typical combined average bill for water and wastewater services. Retailing is also similar to treatment-and-distribution in that the key cost driver is the number of customers (by type of customer).

Nevertheless, we have chosen to separate retailing on the basis that it can potentially be provided via competitive markets and because the costs of retailing may be reasonably common across water businesses as the costs are largely independent of location. Retailing is also of interest because there are different output measures of interest (relating to customer service) and (arguably) relatively more opportunities for innovation than in other sections of the value chain.

Currently, the retailing of urban water and wastewater services in Victoria is vertically integrated with other functions of the geographically-defined monopoly providers. In other utility markets there is retail competition. In our opinion, there are no practical reasons as to why retail competition could not be introduced but that there are risks to retail competition and it is not clear whether introducing retail competition would be in the long-term interests of consumers.[66]

There are a number of options for the method of regulation for the retailing section of the value chain. Because the costs of retailing are largely independent of local factors, retailing might be reasonably easily benchmarked across water businesses. This potentially could be simply done using the cost-per-customer measure as a benchmark.

However, a more light-handed approach may be justified as the benefits of benchmarking may be small given the additional transparency of cost-per-customer measures and the existing (albeit possibly weak) incentives for the water businesses to be cost-efficient. A further issue is that, due to common costs, it can be difficult to isolate the costs of retailing from the treatment-and-distribution sections of the value-chain. Therefore, if benchmarking was introduced, there is a risk that the water businesses would seek to allocate more cost towards the treatment-and-distribution sections. Given these considerations, if the DPP approach is adopted for the treatment-and-distribution value-chain sections then it might be

[66] We (then trading as LECG) discuss the potential for competition in retail and other aspects of the urban water sector in a report we conducted for the National Water Commission (NWC). See LECG (2010).

simple to adopt this approach for retailing as well. In establishing the DPP, we would expect the ESC could use cost-per-customer benchmarks.

3.3 Customer engagement and customer prices

3.3.1 Customer engagement

There has been substantial interest in recent times on improving customer engagement on prices for monopoly services.

We expect that the proposed approach will facilitate improved customer engagement. The introduction and focus on the cost-per-customer and water-availability measures will help customers better understand the performance of the business. The introduction of these measures should help customers better understand the trade-offs proposed between these measures and the customer wants related to quality and standards.

However, in our opinion, the largest benefit will be in providing a foundation for customers being able to understand the trade-offs between alternative price structures. In this regard we propose that water businesses should engage more on price structures and should present the impact on customer bills when a deviation from marginal-cost pricing is proposed. We expect that presenting simple analysis of the customer impact of alternative price structures should lead to customers expressing preference for the more efficient price structures.

3.3.2 Prices

Water-usage prices

While the setting of usage prices is not the focus of this paper, we do not hesitate in recommending that usage prices should, as practically as possible, be set to the marginal cost of supply. In this regard we recommend that water-usage prices should:

- not vary with a customer's usage; that is inclining-block tariff structures should not be applied
- vary to balance supply and demand, particularly during periods of drought (an approach described as scarcity pricing), and
- vary by location where there are substantial variations in water availability and/or costs of supply.

We do not think it necessary that the ESC set water-usage prices or mandate the above changes. We expect greater transparency and clarity over the allocation of bulk-water assets and liabilities will encourage acceptance of more efficient price structures. For example, once a framework is established for how bulk-water assets and liabilities are allocated by customer

group, simple analysis of the customer impact of alternative price structures[67] should demonstrate that:

- scarcity pricing, whereby prices rise during a drought to manage demand, benefits the households who use less than the average allocation (who tend to be poorer), and
- inclining-blocks tariffs are inequitable because the benefit of the lower tariffs is offset by higher connection charges, which impacts most significantly on small users.[68]

Setting usage prices to marginal cost is not straight forward. For the purposes of pricing there are debates as to how marginal cost should be defined and measured.[69] Given the challenges, the ESC could usefully provide guidance material.

Connection fees

In accordance with the NWI pricing principles and common practice, connection fees should be set to recover the difference between the revenue allowance and the expected revenue[70] from other charges. As retailing serves both water and wastewater, recovery of the cost of retailing needs to be allocated between water and wastewater connection fees. For the discussion below we have assumed the cost of retailing is equally shared between water and wastewater.

For wastewater, the connection fee by customer group will simply be the sum of the cost-per-customer for treatment-and-distribution and wastewater's allocation of the cost-per-customer for retailing.

For water, the connection fee by customer group will be:

- the cost-per-customer for treatment-and-distribution and (water's allocation of) retailing, plus
- an adjustment for bulk water costs not recovered, which will be equal to:
  - the cost-per-customer for bulk water, less
  - the expected average water-usage fees recovered (net of any variable costs).

As noted earlier, in the absence of significant liabilities, the adjustment should generally be negative. That is, the adjustment should be equivalent to a rebate and the water-connection fee should generally be below the cost-per-customer measure.

A customer's total water bill

Combining the usage fees and connection fees for water, a customer's water bill is:

- the cost-per-customer for all sections of water (i.e. the sum for each section)
- the customer's usage fee, equal to the customer's usage *times* the water-usage price, *less*

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67 Such as that shown in Box 3 on page 16.

68 This may seem counter intuitive. It is demonstrated in Sibly and Tooth (2014).

69 A discussion of the issues can be found in Tooth (2014).

70 The *expected* revenue is the projected revenue at the time of the determination. Should scarcity pricing be introduced the expected revenue from usage charges will need to be adjusted for changes in both price and volume.

- the expected average water-usage fees recovered (net of variable costs) equal to the expected average water use *times* the water-usage price (less the average variable cost)

Or more simply:

- the cost-per-customer for all sections of water, *plus*
- the customer's contribution to variable water costs,[71] *plus*
- the water-usage price *times* the difference in customer's usage to the expected average usage for the customer-group.

As can be seen from the above representation, if the cost recovery principle is applied, as long as a customer does not use more than the (expected) average of other customers (in their customer group), his/her water bill will not increase if the water-usage price increases.

[71] This is equal to the customer's usage multiplied by the average variable cost.

4. Conclusion and way forward

4.1 Summary and implications

Our proposed approach involves several changes. In summary these are:

1. Foundational changes
   (a) Separation of the value chain, requiring ring-fencing of assets, liabilities and costs by value-chain section.
   (b) Establishment of new measures by customer group including:
      (i) water-availability measures, and
      (ii) cost-per-customer by value-chain section.
   (c) Clarification of the allocation of bulk-water assets and liabilities, involving identification of customer groups and allocation to customer groups.
2. Changes to the method of determining the revenue allowance
   (a) Continuation of a building-blocks approach for bulk water but with additional scrutiny of bulk-water investments.
   (b) A more light-handed, DPP, approach for treatment-and-distribution and retailing.

A summary of the method of regulation is provided in Table 2 below.

Table 2: Method of determining the revenue-allowance by value-chain section

Value-chain section	Key measures by customer group	Method of regulation	Extent of review by ESC
Bulk water	Cost per customer Water availability per customer	Building blocks (similar to today)	About the same. Greater scrutiny of augmentations
Water treatment and distribution	Cost per customer	DPP approach	More light-handed
Wastewater treatment and distribution	Cost per customer	DPP approach	More light-handed
Retailing	Cost per customer	DPP approach	More light-handed

While the setting of usage prices is not the focus of this paper, we have recommended that water-usage prices should, as practically as possible, be set to the marginal cost of supply. In the interests of equity and efficiency we propose that water businesses should engage more on price structures and should present the impact on customer bills when a deviation from marginal-cost pricing is proposed.

On the surface our proposal should not seem a large change. The foundations for our proposal are greater transparency through analysis by value-chain section and simpler measures and greater clarity of entitlements and obligations. If this greater transparency and clarity had no benefits then, aside from the administrative costs, there should not be any significant implications.

However, our assessment is that the greater transparency and clarity will provide large benefits and lead to significant implications. In particular it will:

- allow for simpler performance measurement, which in turn:
  - will result in greater scrutiny from stakeholder of the water-businesses' performance
  - allow the ESC to take a more light-handed approach with regards to treatment-and-distribution (of water and wastewater) and retailing sections, and
  - facilitate improved scrutiny over augmentations, and
- encourage improvements in pricing, including:
  - greater discipline in pricing relating to NCC and access pricing, and
  - more efficient customer price structures, and
- enable the option of competition in bulk water and retailing.

Of note, a change in the method of regulation (that using a default price-quality path approach) is not a foundational aspect of our proposal but rather a recommended option that is facilitated by simpler performance measurement.

We do not envisage that any changes in legislation are required. The Water Industry Act (sect 4G) allows the ESC to obtain the required information from the water businesses. We note that the WIRO (clause 8) specifies that the commission must 'specify the prices which a regulated entity may charge' or 'the **manner** in which such prices are **to be calculated or otherwise** determined' [emphasis added].

This would appear give the ESC the freedom to implement the proposed approach including:

- requiring the entity provide information that specifies:
  - the framework for how assets and liabilities are allocated by customer group
  - how assets, liabilities and costs are split by value-chain section
  - the key measures identified in this report
- requiring the manner in which prices are calculated, in particular:
  - requiring that prices by customer group reflect the allocation of assets and liabilities, and
  - allowing a DPP approach to be taken.

4.2 Next steps

This paper outlines a high-level approach. We expect there would be significant work required to examine some of the more detailed issues and implications.

We expect the most significant challenges to be on the clarification of customer-groups and establishing the measures of water availability. In principle these could be done very simply;[72] however, examination of these issues would likely lead to challenging discussions on:

- how best to measure water security
- postage-stamp pricing, and
- the potential disaggregation of costs and water allocations across different customer groups including customers in different regions and different classes of non-residential customers.

The foundation steps can be undertaken outside of the normal regulatory process. For example, there appears no reason why preliminary work could not be undertaken on ring-fencing the sections of the value chain, establishing and analysing the new measures and developing a framework for the allocation of bulk-water assets. Such work would no doubt lead to further analysis that might help to better understand the performance of the water businesses.

[72] For example, customer groups might be simply established as being residential and non-residential. The water-availability measures could be simply expressed in terms of how the water assets are currently held.

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