REPORT ON COSTS AND BENEFITS OF INSTALLING WATER METERS IN PUBLIC HOUSING

Report prepared under the Water Industry Act 2012

Section 99

June 2013

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GLOSSARY OF TERMS

AMR	Automated meter read (device)
CBA	Cost benefit analysis
DCSI (formerly DFC)	Department for Communities and Social Inclusion, South Australia (formerly Department for Families and Communities, South Australia)
DTF	Department of Treasury and Finance, South Australia
Exempt dwellings	Dwellings which and/or tenants who are not charged for water use
kL	Kilolitre
Manifold	A pipe with multiple apertures to allow separate connections
MHC	Marchment Hill Consulting
mm	Millimetre
MMR	Manual meter read
MP	Member of Parliament
Non-exempt dwellings	Dwellings which and/or tenants who are charged for water use
NPV	Net present value
Ofwat	Water Services Regulation Authority, England and Wales
SA Water	South Australian Water Corporation
SAHT	South Australian Housing Trust
SRE	Standard Residential Equivalent (400kL per annum)
SWIC	State-wide Infrastructure Charge
SWM	Smart water metering
The Commission	The Essential Services Commission
Water Industry Act	*Water Industry Act 2012* (SA)

EXECUTIVE SUMMARY

On 1 January 2013, the Essential Services Commission (**Commission**) became the independent economic regulator for the water industry in South Australia, with the primary objective of protecting the long-term interests of South Australian consumers with respect to the price, quality and reliability of those services.

This report presents the results of a cost benefit analysis (**CBA**) of implementing a scheme to ensure, as far as is reasonably practicable, individual water metering at public housing premises, to meet the Commission's obligations under section 99 of the *Water Industry Act 2012* (**Water Industry Act**).

The CBA focused on South Australian Housing Trust (**SAHT**) properties (which are managed by Housing SA) supplied by SA Water and included consideration of retrofitting individual meters to all existing properties.

It considered costs and benefits from both a quantitative and qualitative perspective, along with the distribution of impacts between four groups directly impacted by the analysis: SA Water, SAHT, tenants and the State Government.

In this report, the Commission presents and discusses three scenarios for retrofitting meters:

- Base Case Scenario – continue to meter within current arrangements and at current levels;
- Immediate Scenario – ensure all SAHT properties are fully metered in 1-2 years; and
- Gradual Scenario – ensure all SAHT properties are fully metered within 10 years.

Using a net present value (**NPV**) approach, the key findings of this analysis are that, under all scenarios, over a 20 year period the quantifiable costs of all schemes outweigh the quantifiable benefits.

Moving to individual metering from group metering will have a net present cost of $6.1m to $33.7m. Even assuming a best case scenario of high benefits, low costs, and a high discounting factor, the project still has a net present cost ranging from $4.1m to $20.6m.

CBA Scenario Assessment ($m)

	High costs/low benefits	**Mid case**	**Low costs/high benefits**
Base Case	-6.8	-6.1	-5.1
Immediate (1-2 yr)	-45.1	-33.7	-22.4
Gradual (10 yr)	-36.2	-27.1	-18.0

On this basis, the Commission concludes that there is no financial case to proceed with a widespread retrofit individual metering project. Indeed, given that all assessed options have a net present cost, on a purely financial basis, the best outcome would be to cease all additional metering activity.

However, there are qualitative issues that should also be considered. The Commission does not feel in this instance that it is appropriately placed to assess any value or weighting which has been attributed by SAHT in deciding its current approach to metering. Hence, the Commission has not made any findings in this regard. The current position taken by SAHT (reflected in the 'base case' scheme) shows that SAHT has considered the qualitative benefits of deploying extra metering and has concluded that there are certain cases where it should be undertaken. The Commission has, therefore, treated this as the base case in its analysis.

Other key findings include:

- While the financial costs for the immediate scheme are highest, this scheme is likely to realise the greatest unquantifiable benefits.
- SAHT, SAHT tenants and SA Water will pay more under separate metering.
- A better financial case for individual metering can be made for tenants, for those dwellings which can be installed with a separate SA Water meter and obtain a separate 'valuation parcel' on the land title. This is due to the tenants being able to receive a greater amount of water at the lower priced tiers.
- The mandating of separate metering to new builds is likely to be less costly than retrofit.

The Commission has made some observations in related areas, where opportunities may exist to improve the current metering and charging arrangements of dwellings which are not individually metered. For example,

- more frequent on-charging for water usage, to better distribute the costs incurred by SAHT tenants throughout the year;
- obtaining separate valuation parcels, so that SAHT tenants benefit more from tier 1 and tier 2 water usage charges; and
- reviewing the arrangements for SAHT tenants that are currently uncharged for water use.

The Commission notes that the findings of this review are heavily dependent on the current pricing policy of SA Water Corporation (**SA Water**) and the State Government.

The Commission has been requested by the Treasurer to undertake an Inquiry into Drinking Water and Sewerage Retail Services Pricing Reform, in the period to December 2014 (**Inquiry**). The findings of this CBA will be relevant to that inquiry.

Finally, the Commission acknowledges the assistance provided by a number of persons and organisations during the course of the study. In particular, the Commission would like to extend its gratitude to the SAHT for its cooperation and swift provision of information throughout the review process.

1. INTRODUCTION

The Commission, established under the *Essential Services Commission Act 2002* (**ESC Act**), is the economic regulator of essential services in South Australia. In undertaking its regulatory functions, the Commission's primary objective is the "***protection of the long-term interests of South Australian consumers with respect to the price, quality and reliability of essential services.***"[1]

The purpose of this report is to present the results of a cost benefit analysis (**CBA**) of implementing a 'scheme' designed to result in the individual metering of certain dwellings which are not currently individually metered. The report has been prepared in accordance with the requirements of section 99 of the *Water Industry Act 2012* (**Water Industry Act**).[2]

The Commission's analysis is focused on South Australian Housing Trust (**SAHT**) properties (which are managed by Housing SA) supplied by SA Water, where approximately 39% of all dwellings are not separately metered. The analysis included the retrofitting of individual meters to all existing properties and also considered the mandating of individual meters for all newly built properties acquired by SAHT.

This report presents costs and benefits from both a quantitative and qualitative perspective along with the distribution of impacts between four groups directly impacted by the scheme: SA Water, SAHT, SAHT tenants, and the State Government.

The costs used in the analysis were informed by SA Water's schedules of fees and charges, information provided by SAHT on its previous metering activities and quotes from other water meter providers. The benefits were informed by information provided by SA Water and other metering studies.

The Commission's key findings are that, using a net present value (**NPV**) analysis, moving to individual metering from group metering will have a negative NPV and that installing individual meters at construction will also have a negative NPV (but will be less costly than retrofitting).

The Commission has made some further observations in related areas, where opportunities may exist to improve the current metering and charging arrangements of such dwellings which are not individually metered.

The Commission acknowledges the assistance provided by a number of persons and organisations during the course of the study. In particular, the Commission would like to

[1] Essential Services Commission Act 2002, section 6(a); available at http://www.legislation.sa.gov.au/LZ/C/A/ESSENTIAL%20SERVICES%20COMMISSION%20ACT%202002/CURRENT/2002.14.UN.PDF.

[2] The Terms of Reference for this project are available at http://www.escosa.sa.gov.au/projects/projectdetails.aspx?p=69&id=188.

extend its gratitude to SAHT for its cooperation and swift provision of information throughout the review process.

1.1 Background

1.1.1 Legislative Background

The Water Industry Act received Royal Assent on 17 April 2012. It represents a significant overhaul of water industry legislation in South Australia combining previously separate legislation into a single Act to facilitate an integrated approach to water industry management and administration.

Section 99 of the Water Industry Act requires the Commission to undertake an analysis of some water metering arrangements.[3] Specifically, it states:

> ***99—Report on installation of separate meters on properties***
>
> *(1) The Commission must undertake a cost benefit analysis of implementing a scheme designed to ensure, so far as is reasonably practicable, that—*
>
> *(a) all land—*
>
> *(i) that is owned by the South Australian Housing Trust or another agency or instrumentality of the Crown; and*
>
> *(ii) that is used for residential purposes; and*
>
> *(iii) that is supplied with water by a water industry entity as part of a reticulated water system; and*
>
> *(b) any other land the Commission determines to include in the analysis, would have a meter that records the amount of water supplied to that piece of land.*
>
> *(2) The scheme for the purposes of the analysis must address—*
>
> *(a) the fitting of meters to premises existing at the time of the publication of the report (insofar as meters are not fitted); and*
>
> *(b) the fitting of meters to premises constructed after the publication of the report.*
>
> *(3) The Commission must prepare and publish a report on the analysis by 30 June 2013.*

Section 6 of the ESC Act stipulates the objectives the Commission must have regard to in performing any of its functions.

[3] A function of the Commission under section 5 of the ESC Act is to perform functions assigned to it under any Act.

6—Objectives

In performing the Commission's functions, the Commission must—

(a) have as its primary objective protection of the long term interests of South Australian consumers with respect to the price, quality and reliability of essential services; and

(b) at the same time, have regard to the need to—

(i) promote competitive and fair market conduct; and

(ii) prevent misuse of monopoly or market power; and

(iii) facilitate entry into relevant markets; and

(iv) promote economic efficiency; and

(v) ensure consumers benefit from competition and efficiency; and

(vi) facilitate maintenance of the financial viability of regulated industries and the incentive for long term investment; and

(vii) promote consistency in regulation with other jurisdictions.

These objectives have informed the Commission's deliberations throughout this CBA.

1.2 Structure of this Report

Chapter 2 of this report outlines the Commission's approach and methodology in conducting the CBA. It specifies the scope of the scheme considered in the analysis, explains the current metering arrangements in South Australia, examines the types of individual metering solutions available and provides an explanation of the costs and benefits that the Commission used in its analysis.

Chapter 3 provides a detailed analysis of three possible schemes to retrospectively move to individual metering where individual metering does not currently exist, including an option to do nothing and continue with the current arrangements (**base case**).

Chapter 4 presents a qualitative analysis of mandating individual metering for new builds only.

Chapter 5 provides a summary of the CBA findings.

Chapter 6 provides some additional observations based on the Commission's findings where opportunities may exist to improve the current metering and charging arrangements.

2. APPROACH AND METHODOLOGY

In conducting this CBA, the Commission considered metering arrangements in other jurisdictions to identify possible options. The Commission has also consulted with SAHT, the South Australian Water Corporation (**SA Water**) and other participants in the South Australian Water Industry.

The Commission released Terms of Reference for this review, attached at Annexure A, on 5 December 2012 and invited submissions from stakeholders. No submissions were received.

2.1 Scope

In many instances, dwellings located on group housing sites are supplied by a single SA Water meter, at the boundary of the site. As a result, SA Water issues a single bill to the owner or manager of the site for the aggregate of consumption of all dwellings within the site. There are various ways the owner or manager of a group housing site might currently charge occupants for water use. This includes, but is not limited to: no charge; a fixed charge; or, some form of a proportionate charge. Hence, in all cases, charges do not reflect actual use.

This means many occupants are not receiving the appropriate water consumption price signals. This can influence their consumption behaviour. For example, if the cost of a tenant's usage is spread among all tenants, there may be little incentive for that tenant to use less water.

Drought conditions and ensuing water restrictions, coupled with significant rises in water prices in recent years, have increased customer awareness of water consumption and bills.

A potential impact of this at shared meter sites is neighbour disputes, where water users living in dwellings without individual water meters are trying to combat bill increases by reducing consumption, whilst observing that their neighbours, with whom they share a meter, are not displaying similar behaviours.

Under section 99 of the Water Industry Act, the Commission is required to conduct a CBA of implementing a scheme to ensure (so far as is reasonably practicable) metering at all residential premises owned by the SAHT, other agency, or instrumentality of the Crown supplied with water by a licensed water retailer.

Currently, no such scheme exists. The Commission must, therefore, develop various plausible and robust schemes which it can test for the purposes of the section 99 analysis.

2.1.1 Ownership of Land

While section 99 refers to a scheme which could be applied to a range of publicly owned land, the Commission has focused on land owned by the SAHT. With respect to the other types of land, the Commission found no evidence of a central source of information for land

owned by 'agencies' or 'other instrumentalities of the Crown', which would allow the Commission to reliably determine whether that land:

- receives water from a water industry entity for residential purposes; and
- is not individually metered.

To gain an appreciation of the possible extent of land that fits this criteria, the Commission requested information from SA Water. While land use (not ownership) information and limited information relating to the type of customer is available from SA Water, its billing system is not able to provide the information requested by the Commission.

As a result, in order to develop the schemes for testing and assessment, the Commission has assumed that costs and benefits are to be derived by reference to SAHT-owned land. The findings relating to SAHT land are likely, in the Commission's opinion, to be equally applicable to other Crown lands for the purposes of the section 99 analysis.

2.1.2 Residential Purpose

Under section 99, the Commission must consider schemes for metering of land used for residential purposes. The term 'residential purposes', is not defined in the Water Industry Act. The Commission has interpreted this term to include water used for domestic purposes, including indoor and outdoor usage. This includes drinking water and non-drinking water (e.g. recycled water).

2.1.3 Water Industry Entity

The Water Industry Act requires water industry entities that provide a water or sewerage 'retail service' to be licensed by the Commission. The Water Industry Act defines a retail service as the sale and supply of water through a reticulated system, and the sale and supply of sewerage services for the removal of sewage. At 1 May 2013, the Commission had licensed twenty-two water retailers under the Water Industry Act.

SA Water is the largest licensed water retail service provider in the State, providing services to about 96% of South Australia's population.[4] The remaining 4% receive water from either Local Government, private water retailers or are serviced by their own independent water source (e.g. rainwater tanks). The Commission understands that the population served by Local Government and private retailers is likely to be only a small component of this 4%.

The licensed water retailers other than SA Water collectively provide drinking and non-drinking (including recycled) water services to 1,574 customer connection points. When

[4] ESCOSA (2013), *Proposed Price Regulation for Water and Sewerage Service Providers other than SA Water – Discussion Paper*; available at http://www.escosa.sa.gov.au/library/120713-PriceRegulationNonSAWater-DiscussionPaper.pdf.

compared to SA Water's total of 739,965 connections[5] providing the same services, it can be inferred that the remaining retailers serve around 0.2% of the population (Table 2-1). Of these, there may only be a handful that actually fit the remaining criteria laid out in section 99 of the Water Industry Act.

Table 2-1: Water providers – estimated population served

Source of water services	*No. of Connections*	*population served (%)*
SA Water	739,965	96%
Other Water Retailers	1,574	0.2%
Own sources	37,372	3.8%
Total	778,911	100%

These estimates are supported by information provided by the SAHT, which shows that only about 0.2% of its dwellings are supplied by a water industry entity other than SA Water. Only 12% of these did not have an individual meter[6] (i.e. 0.03% of all SAHT properties).

Having regard to these matters, the Commission considers that SAHT land supplied by SA Water is an appropriate proxy for the overall scheme and has conducted its analysis on that basis. The Commission notes that the results should be sufficiently robust to apply to non-SAHT Crown lands supplied by any water retailer.

2.2 Approach

To gain an appreciation of the various types of housing stock owned by SAHT and serviced by shared SA Water meters, as well as an understanding of individual metering solutions available and recently deployed, the Commission visited six sites at various locations in metropolitan Adelaide (refer to Annexure B for further information regarding these sites). The Commission also conducted a literature review of the costs and benefits of water metering, drawing on interstate examples.

The Commission analysed data obtained from SAHT and formulated data inputs for each of the quantifiable costs and benefits identified.

The Commission then developed three potential schemes to analyse for retrospectively fitting individual meters. For each scheme, the annual costs and benefits were calculated using the formulated data inputs in real dollars per dwelling per annum.

[5] National Water Commission (2013) *National Performance Report 2011-12: Urban Water Utilities;* available at http://www.nwc.gov.au/publications/topic/national-performance-reports/urban-2011-2012.
[6] South Australian Housing Trust (2013), *unpublished data.*

All quantifiable costs were sensitivity-tested for a 20% increase and decrease, based on expected economies of scale impacts, and all benefits tested for a 50% under and over realisation, based on the range of percentages cited for reduced consumption in other water metering studies (refer Annexure C).

The NPV of each scheme was derived from the annual costs and benefits using a real discount rate of 6%,[7] sensitivity-tested for a high and low case of 4% and 8% real,[8] and assessed over a twenty year period.

For the quantitative analysis, costs and benefits were assessed at a whole of society level, taking account of the overall costs and benefits to society of moving towards separate metering, rather than from the perspective of an individual party.

Following the quantitative analysis, the Commission assessed the qualitative costs and benefits of each scheme, along with the distribution of impacts between four groups directly impacted by the scheme: SA Water, SAHT, tenants, and the State Government.

The final steps involved an assessment of the financial and non-financial merits of each scheme individually, as well as comparatively, a qualitative assessment of mandating individual water metering for new builds only and a compilation of any other relevant observations made by the Commission during all stages of its analysis.

Throughout the process, the Commission requested much of the required data and information required to run its analysis from SAHT. The Commission extends its thanks to staff at the SAHT for their cooperation and for providing the required data promptly.

2.3 Current Arrangements

As at 30 June 2012, SAHT owned almost 45,000 dwellings. Around 28,000 (61%) of these dwellings are separately metered, with the majority having an individual meter. Tenants at these dwellings are charged by SAHT for water consumption (water usage charges), as recorded at the water meter. SAHT pays sewerage and water supply (fixed) charges in full for these tenants.

The remaining 17,000 dwellings (39%) (approximately) owned by SAHT do not have separate water meters, and instead share SA Water meters between a group of dwellings.

Around 2,000 of these are exempt from any water charge, due to property or tenant characteristics (**exempt dwellings**), for example, due to specific health needs, in cases of strata dwellings where SAHT does not own 100% of the property, and 'on-arrival' accommodation.

[7] Discount rates are drawn from South Australian Government, Department of Treasury and Finance, *Initiative Evaluation Guidelines,* November 2012.
[8] Discount rate sensitivity testing of +/- 2% as set out in the South Australian Government, Department of Treasury and Finance, *Initiative Evaluation Guidelines,* November 2012.

For the residual 15,000 dwellings (**non-exempt dwellings**), SAHT pays 30% of the water usage charge, with tenants paying the remaining 70%, based on costs being distributed among them equally. SAHT also pays sewerage and water supply (fixed) charges in full for shared meter sites. Table 2-2 illustrates the current metering arrangements for SAHT.

Table 2-2: Current water metering and charging arrangements – SAHT

Type of Dwelling	Number	fixed charge	usage charge
Separately metered	28,000	Paid by SAHT	Paid by Tenant
Not separately metered	17,000		
Non-exempt	*15,000*	Paid by SAHT	70% Paid by Tenant 30% Paid by SAHT
Exempt	*2,000*	Paid by SAHT	Paid by SAHT
Total	**45,000**		

The purpose of the 30% discount is to cover the costs of common usage (e.g. shared garden irrigation, shared laundries etc.) and to make allowance for differential water uses in different households.[9] This arrangement commenced in July 2009. Prior to that time, SAHT tenants were granted a 125kL per annum allowance.

Water charged to tenants of shared metered sites is charged at the first and second tier rates only.[10]

Many SAHT tenants are also eligible for State Government water concessions.[11] Under 2012/13 pricing arrangements, tenants receive 25% off their annual water account, subject to a $90 minimum and $200 maximum amount.[12] For all eligible tenants, the concession is administered by SAHT.

Data for 2011/12 show the average annual water usage per dwelling, on a shared meter, was approximately 106kL, with the average tenant paying $105.00 in water usage charges

[9] South Australia, *Parliamentary Debates,* Legislative Council, 13 March 2012, p 492 (Ian Hunter, Minister for Communities and Social Inclusion, Minister for Social Housing, Minister for Disabilities, Minister for Youth, Minister for Volunteers and Member of the Executive Council, ALP).
[10] DCSI, *2011-12 South Australian Housing Trust Annual Report*, September 2012, p 34.
[11] See explanation and eligibility for water concessions; available at http://www.dcsi.sa.gov.au/pub/tabId/209/itemId/427/moduleId/795/Water-and-sewerage-rates.aspx.
[12] The Commission notes that concessions for 2013/14 have increased to 30%, subject to a $120 minimum, but this has not been accounted for in the Commission's analysis. Incorporating concession increases would distort the distributional impacts of further metering between year zero and later years.

for that year (approximately $1.00 per kilolitre of water consumed). Prices for 2012/13 are approximately 25% higher than those in 2011/12.[13]

SAHT is billed by SA Water quarterly, at residential tariffs, for water use, water supply and sewerage supply, at each of its residential properties. Based on the 2012/13 prices, SA Water allocates, to each separately rateable parcel of land,[14] the first 30kL water use for the quarter at $2.42/kL, the next 100kL at $3.45/kL, and $3.73/kL for each kL of water consumed thereafter, except where that rateable parcel has multiple dwellings. SAHT then on-charges its tenants, at six monthly intervals, for water usage based on bills it receives by SA Water.

SA Water also charges a $293 per annum water supply charge at each point of connection to its network. As this is a fixed charge, it is incurred by SAHT.

Since SAHT began charging tenants for water usage in 2009, it has run a program each year to investigate and assess solutions for all group sites with mixed dwelling types or above average water usage per meter. For example, a site with 74 dwellings was the first to have additional SA Water and private 'flow meters' installed. The installation was completed in April 2009, at an approximate cost of $90,000. Since then, the deployment of individual metering, or smaller group metering, has continued, addressing a limited number of SAHT sites each year.[15] The program for 2012/13 has a budget of $300,000 and is typically prioritised where SAHT tenants have raised concerns with their water usage charges or have an abnormally high level of water usage.[16]

The following summarises the key land and housing arrangements that are relevant to this study and their relationship to SA Water's charging for retail services.

[13] The Commission has not included the effect of the South Australian Government's one-off water security rebate, which was applied to each SA Water customer account in 2012/13.
[14] SA Water receives customer, land use and valuation information from the State Valuation Roll. It is possible to have separately valued land parcels within a single land title record.
[15] DFC (now DCSI), *South Australian Housing Trust 2008-09 Annual Report*, September 2009, p 24; available at http://www.dcsi.sa.gov.au/pub/tabid/256/itemid/1256/Housing-SA-publications.aspx.
[16] SAHT define high consumption as above 160kL per annum.

Land Title[17]

Certificate of title for an allotment of land which registers all transactions and holds information regarding owners, easements and encumbrances.

SA Water uses land title information to establish the owner and therefore the customer.

Valuation Parcel

The Valuer-General has the discretion to make a separate valuation of any portion of any land.[18] The valuation also records the use of the land parcel – e.g. residential, commercial, public. There may be multiple valuation parcels per title.

SA Water uses the valuation to allocate the sewerage, water supply and water usage rates. For residential land this includes one allocation of water tier allowances per quarter.

Dwelling

A dwelling is a single tenancy/household unit. There may be multiple dwellings per valuation parcel.

Third tier charges do not apply to valuation parcels containing more than one dwelling.

SAHT on-charges each tenancy for water consumption only.

2.4 Types of Individual Metering

The following provides an overview of the main types of metering solutions based on a duplex dual occupancy situation. In practice, the metering solutions are more complex where a large number of dwellings exist on the property and are land-locked (not close to an SA Water main), and/or multiple storeys are involved. Some situations may require considerable on-site investigation to locate the supply pipe-work for a specific dwelling, to determine where a meter could be placed and whether all potential water lines to that individual dwelling could be metered from that location.

[17] See information at http://www.sa.gov.au/subject/Housing%2C+property+and+land/Buying+and+selling/Buying+and+selling+processes/Information+guides/Understanding+types+of+titles.

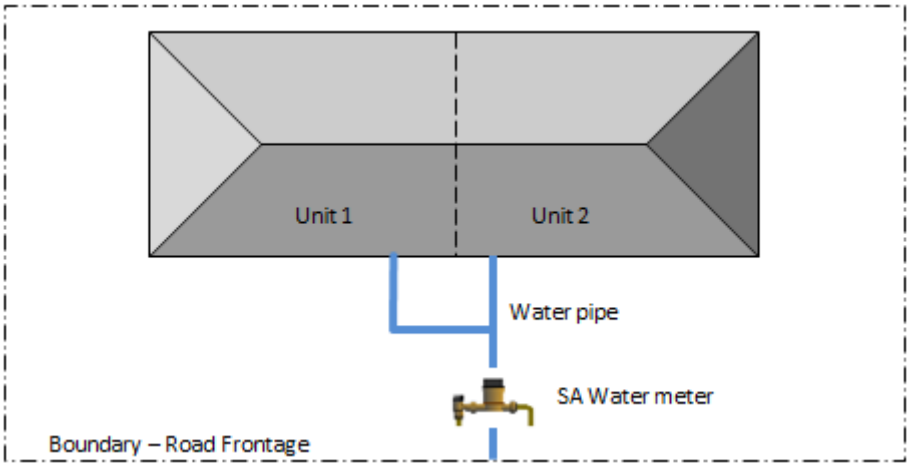
[18] Section 16(1) of the Valuation of Land Act 1971 (SA).

For the purposes of the examples used in this chapter, it is assumed that an SA Water main runs alongside the road frontage. SA Water's current policy is to only place its meters within 0.5-0.6m of the boundary of the property abutting an SA Water main.[19]

2.4.1 Typical Existing Shared Meter Supply Configuration

Figure 1 shows an example of an existing metering configuration, with one meter shared between two dwellings. In this situation, SAHT would be billed by SA Water based on the reading of the single meter. SAHT would then separately on-charge Unit 1 and Unit 2 residents, based on an equal share of the water consumption, less 30% and any concessions (this is explained at 2.3 above).

Figure 1: Shared meter



2.4.2 Private Flow Meter Solution

Figure 2 shows an example of how private flow or 'sub-meters' can be fitted into the existing pipe-work. In this situation, SAHT would continue to be billed by SA Water based on the reading of the SA Water meter, with the two individual flow meters enabling SAHT to on-charge each unit separately, based on their actual recorded water usage. SAHT would meet any shortfall between the amount billed by SA Water and the sum of the recordings on the private flow meters. Any difference could be due to meters recording differently, or the provision of a 'landlord supply' (e.g. the provision of taps between the SA Water meter and the private meters, for outdoor and common use).

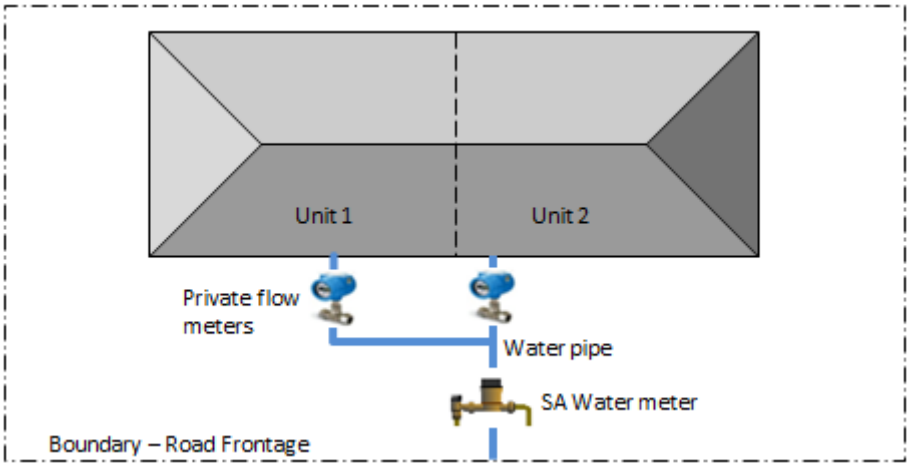
This represents a relatively low capital cost option, if the supply to the individual units is easy to locate (if it is not easy to locate, any solution is likely to be expensive). Under current SA Water arrangements, SAHT would be required to read the private flow meters. There is also potential to read the meters 'remotely' by installing automated meter read (**AMR**) devices to

[19] SA Water, *Installation of a Water Meter,* Fact Sheet, available at http://www.sawater.com.au/nr/rdonlyres/15923f91-7a6d-4430-890f-587fc593c871/0/installwatermeter.pdf.

the meters. Whilst this can reduce reading costs, it may be offset by higher maintenance costs associated with such devices.

SAHT is not likely to incur any notable increases in the costs of on-charging tenants as, in the current situation described above, it already incurs the cost of on-charging each unit separately.

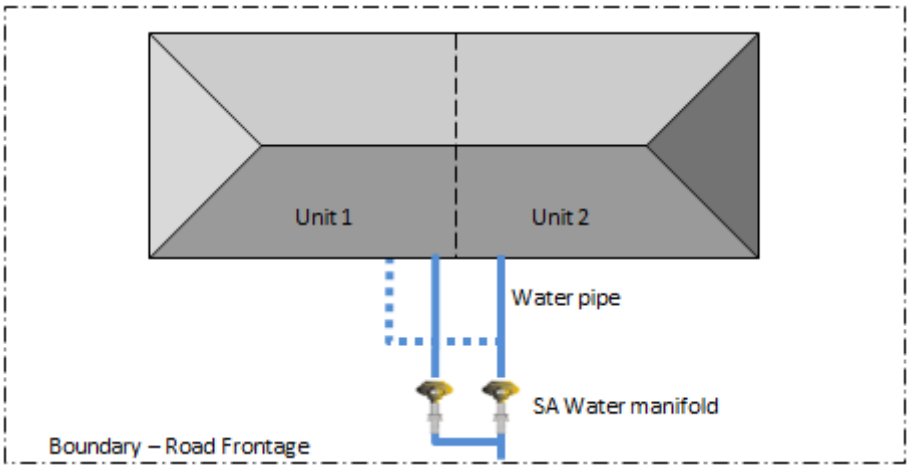
Figure 2: Private flow or sub-meters



2.4.3 SA Water Manifold on Existing Mains Connection Solution

Figure 3 shows an example of installing an additional SA Water meter, in the form of a 'manifold' (a pipe with multiple apertures to allow separate connections), to an existing SA Water mains connection. This enables both units to have a separate SA Water meter once a section of new pipe is connected to Unit 1. In this situation, SAHT would receive separate readings for each meter, from SA Water, enabling SAHT to send separate accounts to Unit 1 and Unit 2 tenants, based on actual water usage.

Figure 3: New manifold connection



There is a cost advantage with the manifold connection approach compared with a new mains connection (refer 2.4.4 below), as it does not involve works to footpaths and roads to make a new connection to the SA Water mains. However, if the existing supply pipe is not close enough to the boundary, additional pipe-work within the property may be required compared with the new mains connection option. The blue dashed line in Figure 3 above shows the existing internal property pipe-work that would need to be disconnected in such an instance.

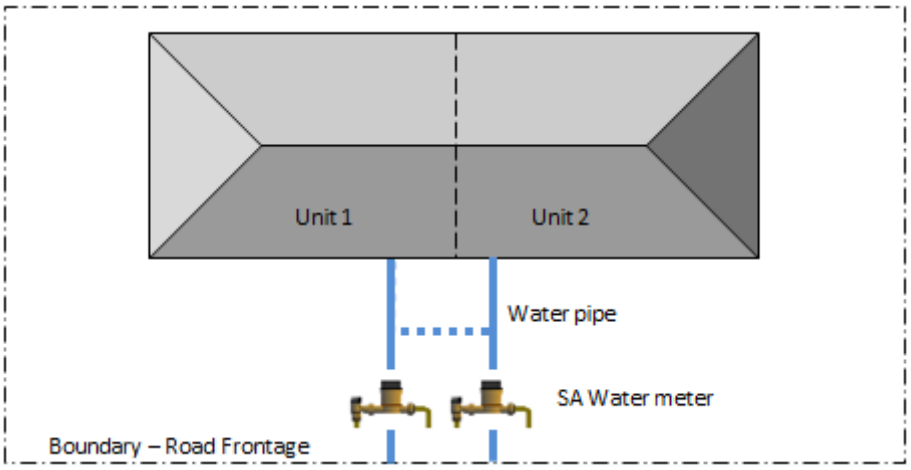
A limitation in the application of this solution is that SA Water will only allow manifold connection where the existing mains supply connection pipe is between 25mm (where up to four 20mm meters can be attached on a manifold) and 40mm in diameter (where up to twelve 20mm meters can be attached on a manifold).[20]

2.4.4 SA Water Mains Connection Solution

Figure 4 shows an example of a new mains connection for Unit 1, consisting of a new SA Water meter and a section of new pipe, with the second SA Water meter supplied directly from the SA Water mains. In this situation, SAHT would be billed by SA Water separately for each meter, enabling SAHT to send separate accounts to both Unit 1 and Unit 2 residents, based on actual water usage. This option has the highest installation cost as it requires works to footpaths and roads to make a new connection to the existing SA Water mains.

[20] SA Water, New Community Title Development – Water Fact Sheet, available at http://www.sawater.com.au/NR/rdonlyres/83E8E7BA-EA05-4CBF-82CA-5BD51BC613D5/0/NewCommTitleDevWater.pdf.

Figure 4: New SA Water mains connection



2.5 Costs

The cost values used in the CBA represent the net cost to society of each cost category.

As indicated by the site visits (see Annexure B) there are a number of existing group site configurations, with varying degrees of complexity and, consequently, individual meter installation costs. Recognising that the costs of metering and metering solutions available differ between housing stock types, for the purposes of this CBA SAHT group housing stock has been allocated into two different types for costing.

Type 1

Generally smaller dwellings of higher density and without a private garden, such as villa flats and apartments.

Type 2

Generally medium to larger dwellings, of medium to low density and typically with a small private garden, such as attached and semi-detached houses and townhouses.

The Commission's allocation of SAHT housing stock to each of these categories was supported by the SAHT.

It should be noted that, whilst SAHT has a substantial number of larger (3 bedroom or more) detached properties, these are almost all individually metered at present and, therefore, fall outside the scope of this study.

2.5.1 Key Assumptions

The following assumptions underpin the cost per dwelling attributable to each dwelling type and have been made with regard to a sample of properties already retrofitted with individual metering, the views and experience of SAHT staff, the operation of the Water Industry Act and the Commission's consideration of arrangements that are in the long-term interests of consumers.

For example, where an SA Water meter can be installed, this has been assumed as the preferred option, as SA Water is well placed to manage and maintain the connection point to its supply, including the meter.

- *Type 1 dwellings would only be installed with private AMR enabled meters.*

  This was assumed because the existing water infrastructure cannot support more than twelve lengths of 20mm piping from one mains connection at the boundary of the property, as it is not possible to maintain appropriate flows in 20mm piping over relatively long distances and/or heights (multiple stories). Any other solution would require large-scale capital works, such as new supply pipes and piping reconfigurations, both external and internal to the property.

- *For type 2 dwellings, which are lower density, it has been assumed that a mix of metering solutions would be employed*

  These solutions meet the following conditions:

  - 50% of type 2 dwellings would be installed with private AMR enabled meters. This is because many of the same practicality issues as described for type 1 dwellings also arise for type 2 dwellings which are land-locked (i.e. do not abut a water main).
  - 25% of type 2 dwellings would be installed with an SA Water manifold connection. This is because where current infrastructure supports such a solution it is of a comparatively lower cost than a new mains connection, as it does not require digging of the road and footpath.
  - 25% of type 2 dwellings would be installed with a new SA Water mains connection because not all current infrastructure will support the addition of metered connections to an existing mains connection (see 2.4.3 above).

Table 2-3 summarises the costs, and their timing, that have been considered in the Commission's analysis.

Table 2-3: Nature of the costs of individual metering

Cost	Nature of cost	Occurrence of cost
Meter	Costs of procuring an approved 20mm water meter	At installation
Plumbing	Costs of labour and plumbing associated with installing the meter	At installation
Meter administration	Costs of reading and servicing the installed water meter	Recurring
Meter maintenance	For remote read technology, cost of replacing remote reading device/batteries	At end of life of remote reader e.g. 12 yearly
Billing	Costs of customer billing requirements per meter	Qualitative only
Customer Enquiries	Cost of answering increased customer enquiries	Qualitative only

The Commission has also assessed a 'high case' and a 'low case' for all costs based on actual costs incurred, plus and minus 20% of the mid (or average) case costs. The figure of 20% was informed by the literature review conducted as a part of this project (refer to Annexure C) that economies of scale savings of a large scale roll-out would likely be around 20%.

2.6 Benefits

The benefit values used in this CBA represent the net gain to society of each category of benefit.

The literature review and consultation with the key stakeholders revealed a number of benefits of individual metering, which have been assessed in this study (refer to Table 2-4).

Table 2-4: Nature of the benefits of individual metering

Benefit	Nature of benefit	Occurrence of benefit
Reduced/economically efficient water consumption	Proper pricing signals would lead to economically efficient levels of consumption which would reduce overall consumption	Recurring
Reduced leakage	Better visibility of leaks on the customer side of the meter	Recurring
Capital efficiency	Dispersed reduced demand load, resultant deferral of network upgrade works	At installation
User pays	Less perceived unfairness as customers pay for exactly what they are using	Qualitative only
Reduced disputes	Reduced neighbour disputes	Qualitative only
Customer Enquiries	Reduced cost of answering customer enquiries	Qualitative only

All quantifiable benefits are assumed only to accrue to non-exempt dwellings, as those exempt dwellings not paying water charges will not have the same incentives to change their consumption behaviour.

The value of the reduced consumption and leakage was ascertained using SA Water's estimates of the long run marginal cost (**LRMC**) faced by SA Water per kL multiplied by the amount in kL of bulk water that it would not have to source and treat as a result. This quantity in kL would be 13% higher than the reduction in consumption by customers due to unaccounted for water that is lost in the system before reaching customers, through leakage, theft and other reasons or is otherwise unbilled.[21]

Capital efficiency has been valued using SA Water's proposed developer charges for 2013/14 as a proxy. According to SA Water,[22] these charges are related to its current capital plan for network augmentations and have been calculated as a State-wide Infrastructure Charge (**SWIC**) to apply per Standard Residential Equivalent (**SRE**) for new network connections. The Commission notes it has only used the SWIC as a proxy for the value of deferral of capital

[21] SA Water, unpublished information.
[22] SA Water, *Community Consultation Discussion Paper - Developer Charges*, February 2013; available at http://www.sawater.com.au/NR/rdonlyres/4DB5A588-5D1E-4C72-9544-0A6400DC47EC/0/Industry_Summary_Developer_Charges.pdf

works resulting from depressed demand and not in relation to the costs of an extra meter connection.

SWIC

The State-wide infrastructure charge is a measure used by SA Water of the capital cost of network augmentation (based on SA Water's current capital plan for network upgrades) required for each additional load added to the drinking water and sewerage network. SA Water proposes that this charge will apply when installing a new connection to its network.

SRE

The Standard residential equivalent is used by SA Water to calculate the State-wide infrastructure charge applicable to larger developments, such as a block of apartments, or the subdividing of an existing development. The SRE is a measurement of peak load requirements per connection and is 400kL pa.

A high and a low case for benefit realisation were also tested, with benefits increasing and decreasing by 50%. The high and low case benefits fit within the bounds of other metering studies reviewed at Annexure C, which demonstrated consumption could change by 5-15%.

2.7 Distributional Analysis Assumptions

The CBA assessed the overall costs and benefits to society of installing separate water meters at SAHT sites currently connected by a group SA Water meter. However, such a program will have ongoing impacts on the yearly expenditure of SA Water, SAHT, SAHT tenants and the State Government. Therefore, a distributional analysis of costs and benefits, for each of the schemes to install individual metering to SAHT owned residential dwellings, has been conducted for these four major stakeholders. This is summarised below.

- *SA Water* is impacted by changes in both revenue and costs due to changes in consumption (all costs associated with extra meters and billing are assumed to be directly reflected in the fixed water supply charge for each meter, hence the increased costs of operating extra meters is offset by the extra revenue recovered from the water supply charges or service rent charges associated with those extra meters).
- *SAHT* is impacted by changed expenses on water usage associated with changes in consumption, subsidisation and average prices (through a changed proportion of water use at lower tiers), and changed water supply costs associated with additional water meters.

- *SAHT tenants* are impacted by changed expenses on water usage associated with changes in consumption, subsidisation and average prices (through a changed proportion of water use at lower tiers).
- *State Government* is impacted by any subsequent changes to average concessions received by tenants.

For the purposes of this analysis, it is assumed that SAHT will continue to consume 10% of water usage for landlord and common purposes at type 1 dwelling sites, recorded by the difference in the boundary water meter and the sum of flow meters (i.e. tenants of type 1 dwellings will pay 90% of the average usage per dwelling once separately metered).

For type 2 dwelling sites, the landlord consumption is assumed at 5% of the average usage per dwelling, recorded by a separate landlord meter (i.e. tenants of type 2 dwellings will pay 95% of the average usage per dwelling once separately metered).

For all dwellings, SAHT will continue to pay any fixed charges associated with water supply and meters.

This is consistent with past experience and future expectations of the characteristics of various SAHT sites.

2.8 Other Jurisdictions and Other Studies

SA Water only installs and reads meters at the property boundary and is not involved in the operation of sub-meters. As indicated in section 2.4, this can result in multiple lengths of individual pipe being laid in parallel, if individual meters owned and read by SA Water are to be used.

Various water service providers operating in other jurisdictions of Australia, however, are prepared to take over responsibility for sub-meters within strata properties, once installed in accordance with the water service provider's specifications.[23] As a result, a number of individual meters placed close to multiple dwellings are able to be serviced with one water service provider pipe, similar to the situation in the supply and metering of electricity. The water service provider then provides itemised or separate billing for each dwelling of the strata.

[23] For example, Sydney Water requires all multi-level buildings that are either being vertically strata subdivided, or are capable of being vertically strata subdivided in the future to be constructed to allow for individual metering. *"Sydney Water would take over the metering system after the accredited meter supplier has provided appropriate commissioning documentation to Sydney Water and after the strata plan has been registered"* This can also apply in the case of retrofitting of individual metering where the new development requirements are able to be met for existing buildings. (Sydney Water, *"Multi-level individual metering guide, Stage 1 – Building plumbing requirements"*, 8 November 2012).

2.9 Data Inputs

The following dwelling numbers, site numbers and average usage were sourced from three separate data sets provided to the Commission by SAHT.

NUMBER OF DWELLINGS	Type 1	Type 2
Group metered sites	500	1,600
Total dwellings	7,900	9,400
Exempt dwellings	1,200	800
Non-exempt dwellings	6,700	8,600
Average water usage per dwelling (kL p.a.)	97	115

Costs were obtained from market information, SA Water fee schedules[24] and other published information,[25] and SAHT expense data. These are presented below.

COSTS*	
Private flow meter[26]	
20mm flow meter	$ 80.00
AMR device	$ 130.00
Flow meter basic install	$ 190.00
Reading per meter	$ 2.50
Data service per meter read	$ 7.70
SA Water	
20mm connection + meter	$ 2,249.00
20mm meter only	$ 304.00
Relocate 20 or 25mm metered connection 0.6m - 1.0m	$ 646.00
Manifold connection per meter (up to 12 x 20mm meters)	$ 443.00

[24] SA Water, *2012-13 Fees and Charges;* available at http://www.sawater.com.au/NR/rdonlyres/A84D7160-EF94-4536-A101-35ECE80472A4/0/201213FeesandCharges.pdf.
[25] SA Water, *Community Consultation Discussion Paper - Developer Charges*, February 2013; available at http://www.sawater.com.au/NR/rdonlyres/4DB5A588-5D1E-4C72-9544-0A6400DC47EC/0/Industry_Summary_Developer_Charges.pdf.
[26] Unpublished market information obtained in quotes.

Standard capital contribution - water main extension to existing allotments[27]	$ 3,523.00
Water disconnection fee	$ 524.00
LRMC ($/kL)	$ 2.75
SWIC ($/SRE)	$ 2,550.00
Tier 1 ($/kL)	$ 2.42
Tier 2 ($/kL)	$ 3.45
Tier 3 ($/kL)	$ 3.73
Water supply charge ($ p.a.) [28]	$ 293.00
Service rent charge ($/additional meter)	$ 293.00

*Note all prices are displayed in $Dec-12

Consumption information was obtained from SA Water fee schedules[29] and other published information,[30] and the literature review of the impacts of water metering (refer Annexure C).

CONSUMPTION	
Tier allocation per land assessment (kL p.a.)	
Tier 1	120
Tier 2	400
Water sales to bulk water requirement multiplier (loss factor)	1.13
SRE (kL p.a.) [31]	400

[27] This charge has been listed as two mains extensions were carried out for the purposes of individual metering at a site visited by Commission staff. However, this is considered an exceptional cost, not an average cost, therefore it has not impacted the value of quantifiable costs used in the NPV analysis.

[28] This cost is much higher than that of a private company. The Commission notes the private company is providing a meter reading and data recording service only. However, SA Water's water supply charge reflects the reading of the meter, the upkeep of a water consumption billing system, debt recovery functions, customer service functions and capital maintenance of water connection points.

[29] SA Water, *2012-13 Fees and Charges;* available at http://www.sawater.com.au/NR/rdonlyres/A84D7160-EF94-4536-A101-35ECE80472A4/0/201213FeesandCharges.pdf.

[30] SA Water, *Community Consultation Discussion Paper - Developer Charges*, February 2013; available at http://www.sawater.com.au/NR/rdonlyres/4DB5A588-5D1E-4C72-9544-0A6400DC47EC/0/Industry_Summary_Developer_Charges.pdf.

[31] This represents a capacity requirement in the network of a standard residential connection (e.g. peak load factors) and does not represent the average annual use of a residential customer.

Households	
Reduced consumption p.a.	9%
Reduced leakage p.a.	1%

A review of multiple sources revealed that the estimated meter asset life was in the range of 10-25 years.[32] An estimate of 20 years has been chosen for this study.[33] AMR devices have been assumed to have a life of 12 years.[34]

METER LIFE (years)	
Flow Meter	20
AMR Device	12

The real discount rate was informed by the South Australian Department of Treasury and Finance's *Initiative Evaluation Guidelines*.[35]

CASHFLOW TREATMENT	
Time Horizon (years)	20
Discount rate (real)	6%

2.10 NPV calculation

The net benefit (or cost) of each scheme has been calculated as an NPV of all quantifiable costs and benefits over a 20 year horizon. The NPV has been calculated in accordance with the Federal Office of Best Practice Regulation CBA Guidelines.[36] The NPV formula adopted by the Commission is:

$$\text{NPV} = \sum_{t=0}^{20} \frac{Benefits_t - Costs_t}{(1+r)^t}$$

Where:

t=time (years)

r=discount rate

[32] See Annexure C.
[33] A meter life of 20 years is consistent with SA Water's assumptions for its fleet of meters.
[34] This is consistent with market information obtained by the Commission and with assumptions used in other interstate studies.
[35] South Australian Government, Department of Treasury and Finance, *Initiative Evaluation Guidelines*, November 2012.
[36] Australian Government 2010, *Best Practice Regulation Handbook,* Canberra, Appendix E.

3. SCHEMES TO INDIVIDUALLY METER

This chapter provides the detailed results of the Commission's analysis of three schemes to retrospectively achieve full individual metering for SAHT residential dwellings. These schemes are:

- continue to spend $300k per annum on installing separate metering – the '**base case**';
- deploy individual metering to shared metered sites as quickly as possible (practical completion of deployment within 2 years) – the '**immediate**' case; and
- deploy individual metering to shared metered sites on a phased basis (practical completion of deployment within 10 years) – the '**gradual**' case.

The Commission's analysis took an average view of the cost range of deploying individual metering to SAHT group residential sites. It should be noted, however, that there may be some sites not within these bounds. Hence, moving to a 'fully' metered environment may not translate to 100% practical completion of individual metering.

It is plausible that some sites exist where the costs would be so significant that the deployment of individual meters would not be attempted. Conversely, there may be some sites in existence where the costs of individual metering would be minimal and outweighed by the benefits, such that there is a financial case to deploy separate metering.

3.1 Base Case – Continue to Meter at Current Budget Levels

The base case scheme involves a continuation of the current SAHT practice of spending approximately $300,000 per annum from its maintenance budget on individual metering. If this is spent only on installing individual meters and not on reducing group sizes or changing group configurations, this strategy is expected to address approximately 250 (1.5%) of the 17,000 properties per annum, based on mid case costs.

The Commission modelled a high and low case of the cost-benefit scenario for this scheme.

The high case is based on 20% higher costs incurred and 50% lower benefit realisation. As this scheme involves a fixed expenditure on meter implementation, the number of properties addressed per annum under the high case is smaller at approximately 200 (1.2%).

The low case analyses the results of a 20% reduction in costs and a 50% improvement in benefit realisation over the 20 years. Based on the same fixed annual expenditure, individual metering under the low case would be deployed to approximately 300 (1.8%) properties each year. The Commission notes that, by targeting the available funds to single out lower cost sites, SAHT could address up to 400 (2.3%) properties per annum in the early years of an ongoing individual metering program.

Under the midpoint of the base case scheme, assuming no change in housing stock, 29% of dwellings (4,930) would have an individual water meter measuring their water usage by year 20.[37]

3.1.1 Annual Costs

The quantifiable costs for this analysis fall into three categories:

- Installation costs – based on the capital cost of the meter and associated plumbing costs related to the installation.
- Additional reading and administration costs, resulting from an increase in the number of meters, once additional individual metering is achieved. This cost becomes more significant in the later years of the base case scheme.
- AMR replacement, which would begin to be incurred from year 13 as the automatic meter reading technology installed with the first of the additional meters reaches the end of its useful life.

[37] It would take between 55 and 83 years under the base case scheme for practical completion of the individual water meter roll out.

Table 3-1: Annual costs of base case scheme

$'000s Dec12	Annual Costs					Total Costs
	in year 1	in year 2	in year 5	in year 10	in year 20	
Type 1						
Meter Install	69	69	69	69	69	1,375
Meter Read/admin	2	7	21	44	91	1,869
AMR replace	-	-	-	-	17	344
Type 2						
Meter Install	232	232	232	232	232	4,634
Meter Read/admin	11	34	102	216	444	9,099
AMR replace	-	-	-	-	10	204
Total (mid case)	**314**	**342**	**424**	**561**	**863**	**17,526**
Total (high case)	**315**	**342**	**424**	**562**	**864**	**17,550**
Total (low case)	**314**	**341**	**423**	**560**	**861**	**17,502**

Notes: AMR replacement assumed to commence in year 13, at an annual cost of $27k
All costs assumed to be expensed as incurred

3.1.2 Annual Benefits

The quantitative annual benefits also fall into three categories:

- Reduced water consumption, based on the more accurate price signals faced when tenants face water charges that reflect individual use.
- Reduced leakage in the internal piping network, based on more accurate data and an increased awareness of water use within a site.
- Capital efficiency gains to SA Water from a reduced demand load, which would delay the need for network upgrades and augmentations to address capacity

constraints. The Commission has calculated this saving as $2,550 per SRE,[38] for the reduction in demand directly following the installation of separate meters.

Table 3-2: Annual benefits of base case scheme

$'000s Dec12	Annual Benefits					Total Costs
	in year 1	in year 2	in year 5	in year 10	in year 20	
Type 1						
Reduced Consumption	1	4	12	25	51	1,054
Reduced Leakage	-	-	1	3	6	117
Capital Efficiency	7	7	7	7	7	136
Type 2						
Reduced Consumption	2	6	18	38	78	1,604
Reduced Leakage	-	1	2	4	9	178
Capital Efficiency	10	10	10	10	10	207
Total (mid case)	**21**	**28**	**50**	**87**	**161**	**3,296**
Total (high case)	**39**	**53**	**94**	**163**	**302**	**6,172**
Total (low case)	**9**	**12**	**21**	**36**	**67**	**1,375**

3.1.3 NPV of Costs/Benefits

The NPV of the above quantifiable costs and benefits was assessed over a twenty year time horizon, using a discount rate of 6%, and sensitivity tested for a lower case (e.g. costs incurred in the future are valued comparatively lower with a higher discount rate of 8%) and a higher case (future costs incurred are valued comparatively higher with a lower discount rate of 4%).

[38] This is based on SA Water's SWIC charges, as published in its *Community Consultation Discussion Paper - Developer Charges*, February 2013; available at http://www.sawater.com.au/NR/rdonlyres/4DB5A588-5D1E-4C72-9544-0A6400DC47EC/0/Industry_Summary_Developer_Charges.pdf.

Therefore, the upper and lower bounds of the net present societal value for implementing individual metering under the existing scheme are -$4.1m and -$8.8m, with the most likely outcome a net present cost of $6.1m (see Table 3-3).[39]

Table 3-3: NPV 'Base Case' scheme

NPV ($m Dec12)	4%	6%	8%
Mid case	-7.9	-6.1	-4.9
High costs/low benefits	-8.8	-6.8	-5.4
Low costs/high benefits	-6.4	-5.1	-4.1

The two other assessed schemes for the implementation of individual metering, 'immediate' and 'gradual', have been assessed against this base case in sections 3.2.3.1 and 3.3.3.1 below.

3.1.4 Qualitative Issues

There are further costs and benefits in addition to those stated above, which are important to consider in this analysis, but cannot be easily quantified.

The increased cost of billing for extra water meters, incurred by SA Water and the private meter operator, are reflected through the meter administration and reading costs. However, it is difficult to determine any impacts to the costs of on-charging faced by SAHT due to extra metering. Currently, SAHT issues water accounts to all non-exempt tenants. On-charging for those non-exempt tenants on group sites varies as follows:

- dwellings with an individual private flow meter are on-charged at SA Water prices for the consumption recorded at their meter, but, depending on valuation arrangements,[40] may only receive a proportion of the allocated kLs at tiers 1 and 2, and, hence, are not passed on charges at the third tier; and
- those in dwellings fed only by the group water meter, must pay for 70% of the water used over the six months, proportioned equally between dwellings; tenants on a group meter are charged for an equal proportion of water at tier 1 and pay the rest of their apportioned usage at tier 2 prices.

At the end of year 20, under the base case, the proportions falling under each variation to group dwelling on-charging changes but there would nonetheless be two variations to the

[39] Practical completion of the base case scheme individual water meter roll out would have an NPV in the range of -$15.6m and -$5.1m.

[40] It is possible to have a single land title split into separate parcels for valuation purposes. A quarterly allocation of tiers is assigned to each land parcel on the State Valuation Roll with an SA Water drinking water connection.

method of group dwelling on-charging. For this reason, the overall costs of on-charging faced by the SAHT are not expected to change materially.

The benefit of 'reduced consumption' is the more economically efficient use of water that results from a greater percentage of water users facing more robust pricing signals for water use.

Currently, SAHT regularly receives representations from tenants, either directly or via MPs, stating that equally proportioning water use at group sites is not fair and equitable. Further, it is an ongoing source of neighbour disputes regarding comparative water consumption.

However, a further potential source of complaint may arise with a long-term phased introduction of individual metering, in that, whilst individually metered tenants will receive more accurate charges, those charges are likely to be higher than under the current group metering arrangements. This may lead to further complaints of perceived unfairness, when compared to those tenants that remain on the previous group metering arrangements. It may be possible to minimise this by ensuring that entire SAHT sites are individually metered within a single billing period, ensuring that tenants do not receive water accounts that are prepared on a different basis to their neighbours.

It is difficult to ascertain not only the quantum but also the direction (cost or benefit) of customer enquiries following individual metering. This is complicated by the fact there is no readily available information as to the proportion of all water related complaints which stem from water charging and accounts. It would be expected that any change from current practices would lead to a short-term spike in enquiries, which would decrease as users become familiar with the new charging method. For the base case, this would be a slight increase, sustained for a long period of time, due to the slow and steady scheduling of individual meter deployment.

3.1.5 Distributional Issues

There are also distributional impacts in providing additional metering. These are summarised, based on the mid-case, in the following table:

Table 3-4: Distribution of impacts base case scheme

$'000s Dec12	Annual shift in costs from year zero				
	in year 1	in year 2	in year 5	in year 10	in year 20
SA Water	+5	+15	+35	+74	+152
SAHT	+3	+10	+25	+54	+117
SAHT Tenants	+4	+13	+30	+62	+122
State Government	-	-	-	-	-

Reduced consumption of around 52ML per annum by year 20 would reduce the costs faced by SA Water in providing drinking water to South Australian customers by $144,000 under the base case scheme; but the lost revenue associated with this is $296,000, making SA Water $152,000 worse off. The Commission has assumed metering, billing and administration costs faced by SA Water are directly offset by the increased revenue it will receive from charging an annual water supply charge; hence there would be no net impact to SA Water.

SAHT would face a $535,000 increase in water supply charges it pays by year 20 but its expense on water usage would reduce by $418,000 over the same period. Therefore, the SAHT would spend $117,000 more in year 20 than year 1 on water charges.

It should also be noted that there is a possibility that SAHT could be impacted by increased sewerage charges and/or council rates associated with the creation of a new valuation parcel for some dwellings. The existence of this impact is subject to the value of the individual dwelling and the minimum sewerage charges and council rates applicable.

For sewerage charges, this would only impact SAHT dwellings which have an individual value lower than $270,000. For council rates, this would vary between different councils. The Commission considers this impact would not be material and, in any case, does not change the outcome of the distributional analysis, as SAHT will still be worse off in year 20, than in year zero.

With approximately 29% of tenants supplied by a group meter at year zero being supplied with an individual meter to record their individual water consumption by year 20, SAHT tenants would collectively face an extra $122,000 in annual water charges. This is due to individually metered tenants no longer receiving the 30% discount for common usage, partially offset by reduced consumption driven by more accurate pricing signals.

With tenant charges before concessions, even by year 20, not reaching an amount higher than $270, the average annual concession received (which is 25%, subject to a $90

minimum) would not change.[41] Therefore, the State Government would continue to incur the same expense in water concessions for SAHT tenants throughout the period.

The modelled average annual tenant charges would increase by a little under $8.00 (or 5% in real terms). It should be noted the 71% yet to have their individual meters installed by year 20 would not face a real increase in average charges while the 29% charged based on the reading of individual meters would face a larger rise in water charges of approximately $28.00 (18%) per annum on average. There are further distributional impacts between those tenants receiving an SA Water meter, as the creation of a separate valuation parcel would increase the kLs they are allocated at tiers 1 and 2, and those tenants receiving a privately operated flow meter, who will not receive this benefit.

3.1.6 Summary

Even at the low case and highest discount rate, the base case scheme has a net present cost of $4.1m. However, the inclusion of qualitative benefits to this analysis is also important.

In terms of distributional impacts, none of the key stakeholders realises reduced expenses after the installation of extra water meters.

While SAHT's water usage expenditure would decrease, this is more than offset by the increase in expenditure for fixed water supply and meter charges. Of course, it is possible there would be some tenants (although it is likely to be only a very few) who would benefit in only paying for their individual usage. This could only occur for those occupying a dwelling installed with a private flow meter who use less than 70% of the average, or for those occupying a dwelling installed with an SA Water meter who have lower than average use due to receiving the increased tier 1 allocation benefits of a separate valuation parcel.

3.2 Immediate – Move to Fully Metered in 1-2 years

The immediate scheme to move to full individual metering represents an investment in individual metering as quickly as possible. Practical completion for this has been assumed within two years from beginning the program, with installation occurring at a constant rate.

The Commission has also modelled a high case and a low case cost-benefit scenario for the immediate scheme based on costs increasing and decreasing by 20% and benefits by 50%.

Under this scheme, full individual metering of the 17,000 properties is achieved at the end of year 2 and full annual benefits are realised by year 3, recognising that customer behaviour would not change immediately, especially as tenants are currently only on-charged by SAHT on a six monthly basis.

[41] This is based on the 2012/13 concession scheme. The Commission notes the concessions are due to increase on 1 July 2013 to 30%, subject to a $120 minimum.

3.2.1 Annual Costs

The quantifiable costs for this analysis fall into three categories:

- Installation costs – based on the capital cost of the meter and the associated plumbing costs of installation.
- Additional reading and administration costs resulting from an increase in the number of meters once individual metering is achieved.
- AMR replacement, which would be incurred in years 13 and 14 as this technology installed in years 1 and 2 reaches the end of its useful life.

Table 3-5: Annual costs of immediate scheme

$'000s Dec12	Annual Costs					Total Costs
	in year 1	in year 2	in year 5	in year 10	in year 20	
Type 1						
Meter Install	2,370	2,370	-	-	-	4,740
Meter Read/admin	81	242	322	322	322	6,446
AMR replace	-	-	-	-	-	1,185
Type 2						
Meter Install	7,990	7,990	-	-	-	15,980
Meter Read/admin	392	1,177	1,569	1,569	1,569	31,377
AMR replace	-	-	-	-	-	705
Total (mid case)	**10,833**	**11,778**	**1,891**	**1,891**	**1,891**	**60,434**
Total (high case)	**12,999**	**14,134**	**2,269**	**2,269**	**2,269**	**72,520**
Total (low case)	**8,666**	**9,423**	**1,513**	**1,513**	**1,513**	**48,347**

Note: AMR replacement assumed to take place in years 13 and 14, at an annual cost of $945,000
All costs assumed to be expensed as incurred

3.2.2 Annual Benefits

The quantitative annual benefits also fall into three categories:

- Reduced water consumption based on the price signals faced when an accurate account representing individual usage is issued to tenants.
- Reduced leakage in the internal piping network, based on more accurate data and an increased awareness of water use within a site.
- Capital efficiency gains to SA Water, from reduced demand load, which would delay the need for network upgrades and augmentations to address capacity constraints.

Table 3-6: Annual Benefits of immediate scheme

$'000s Dec12	Annual Benefits					Total Costs
	in year 1	in year 2	in year 5	in year 10	in year 20	
Type 1						
Reduced Consumption	45	136	182	182	182	3,635
Reduced Leakage	5	15	20	20	20	404
Capital Efficiency	234	234	-	-	-	468
Type 2						
Reduced Consumption	69	207	277	277	277	5,532
Reduced Leakage	8	23	31	31	31	615
Capital Efficiency	356	356	-	-	-	712
Total (mid case)	**718**	**972**	**509**	**509**	**509**	**11,366**
Total (high case)	**1,076**	**1,458**	**764**	**764**	**764**	**17,050**
Total (low case)	**359**	**486**	**255**	**255**	**255**	**5,683**

3.2.3 NPV of Costs/Benefits

The NPV of all above quantifiable costs and benefits has been assessed over a twenty year time horizon, using a discount rate of 6%, and sensitivity tested for a lower case (e.g. costs incurred in the future are valued comparatively lower with a higher discount rate of 8%) and

a higher case (future costs incurred are valued comparatively higher with a lower discount rate of 4%).

The resulting upper and lower bounds of the net present societal value for implementing individual metering under an immediate scheme are -$20.6m and -$50.6m, with the most likely outcome a net present cost of $33.7m.

Table 3-7: NPV immediate scheme

NPV ($m Dec12)	4%	6%	8%
Mid case	-37.6	**-33.7**	-30.7
High costs/low benefits	-50.6	-45.1	-40.8
Low costs/high benefits	-24.6	-22.4	-20.6

3.2.3.1 NPV of Costs/Benefits vs. existing 'Base Case' strategy

The value of completing the program as quickly as practically possible versus the base case strategy is in the range of -$41.7m to -$16.5m, with the most likely outcome an incremental net present cost of $27.6m.[42]

Table 3-8: Incremental NPV immediate vs base case

NPV ($m Dec12)	4%	6%	8%
Mid case	-29.7	**-27.6**	-25.8
High costs/low benefits	-41.7	-38.3	-35.4
Low costs/high benefits	-18.2	-17.3	-16.5

3.2.4 Qualitative Issues

There are further costs and benefits in addition to those stated above which are important to consider in this analysis but which cannot be easily quantified.

Under the immediate strategy, it is expected the impact on SAHT's costs of on-charging to tenants where there is extra metering would actually be a saving. This is because, instead of the on-charging to group sites consisting of two different methods for allocating charges, it would be based on only one – applying the individual meter reading for each tenant. The quantum of this saving is not able to be determined, though it is unlikely to be significant.

[42] The incremental net present cost of the immediate scheme compared to the base case scheme, with full practical completion (i.e. both achieving full individual metering), is between $15.5m and $35.0m.

The real benefit of 'reduced consumption' is the more economically efficient use of water that results from a greater percentage of water users facing appropriate pricing signals. Under the immediate scheme to meter, this benefit would be realised earlier.

'User pays' is an economically sound way to allocate costs. The more reflective charges are of the economic value of a good or service consumed, the more economically efficient its consumption levels will be. While a tenant being charged for exactly what they have used would certainly be a more appropriate result than the current equal proportioning, it is also, in the vast majority of cases, going to be more expensive for that tenant. Implementing this consumption-based charging regime immediately may result in fewer perceived unfairness issues than the gradual or base case strategies, as there would be little transition time where some tenants still benefit from the old charging method (which typically results in lower water charges).

A further consequence is the benefit of reduced neighbour disputes regarding water consumption at group sites. This benefit would be realised in full in the shortest timeframe under the immediate scheme.

It is difficult to ascertain not only the quantum but also the direction (cost or benefit) of customer enquiries following individual metering. This is complicated by the fact there is no readily available information as to the proportion of all water related complaints which stem from water charging and accounts. It would be expected that any change from current practices would lead to a short-term spike in enquiries which would fade as users become familiar with the new on-charging methods. For the immediate scheme, this would be reflected in a spike in customer queries in years 1, 2 and possibly 3, dropping off quite quickly from year 4. It is not possible to say whether it would return to a level above, or below, that experienced prior to individual metering.

3.2.5 Distributional Issues

Further to the societal level costs and savings identified above, there are also distributional issues in providing additional metering. These are summarised, based on the mid-case, in the following table:

Table 3-9: Distribution of impacts immediate scheme

$'000s Dec12	Annual shift in costs from year zero				
	in year 1	in year 2	in year 5	in year 10	in year 20
SA Water	+135	+404	+538	+538	+538
SAHT	+102	+353	+503	+503	+503
SAHT Tenants	+109	+279	+341	+341	+341
State Government	-	-	-	-	-

Reduced consumption of around 0.2GL by year 3 would reduce the annual costs faced by SA Water in providing drinking water to South Australian customers by $509,000 but the associated loss of revenue would equate $1.047m. This puts SA Water in a financially worse position in year 3 than year zero, by $538,000. The Commission has assumed metering, billing and administration costs faced by SA Water are directly offset by the increased revenue they will receive from charging an annual water supply charge, hence there would be no net impact to SA Water from this.

SAHT would face a $1.891m increase in water supply charges it pays by year 3 but its usage expenditure would reduce by $1.389m over the same period. Therefore, the SAHT would spend $503,000 more per year on water. It should also be noted there is a possibility that SAHT could be impacted by increased sewerage charges and/or council rates associated with the creation of a new valuation parcel for some dwellings. The existence of this impact is subject to the value of the individual dwelling and the minimum sewerage charges and council rates applicable. For sewerage charges, this would only impact SAHT dwellings which have an individual value lower than $270,000. For council rates, this would vary between different councils. The Commission considers this impact would not be material, and, in any case, does not change the outcome of the distributional analysis in that SAHT will still be worse off in year 20 than in year zero.

With 100% of tenants who were supplied by a group meter at year zero supplied with an individual meter to record their specific water consumption by the end of year 2 and 27% of these tenants receiving their own allocation of all tiers, SAHT tenants would collectively face an extra $341,000 in annual water usage charges.

With average tenant water usage, even by year 20, not reaching a value higher than $270, the average annual concession received (which is 25%, subject to a $90 minimum) would not change. Therefore the Government would continue to incur the same expense in water concessions for SAHT tenants throughout the period.

The modelled average annual tenant water account would increase by approximately $22.00 or 15% in real terms from year three onward.

3.2.6 Summary

At a societal level, the quantifiable costs of this scheme far outweigh the quantifiable benefits. Even using the low case costs and high case benefits at the highest discount rate, the immediate scheme has a net present cost of $20.6m, with the most likely value a net present cost of $33.7m.

It should be noted, however, that the immediate scheme has the strongest case for unquantifiable benefits.

From a distributional perspective, no stakeholder benefits from the immediate individual metering of grouped SAHT dwellings. While SAHT's water usage expenditure would decrease, this is more than offset by the increase in expenditure for water supply including meter reading and administration. It is possible a small number of tenants whose usage is

below 70% of average usage in a property installed with a private flow meter, or is below average in a property installed with an SA Water meter where a separate valuation parcel is obtained receiving the benefit of increased volume at tier 1 prices, would benefit.

3.3 Gradual – Move to Fully Metered in 10 years

The 'gradual' scheme represents a transition to individual metering on a phased basis, with practical completion over ten years (i.e. 10% of properties addressed annually).

The Commission has also modelled a high and low case cost and benefit scenario, with costs varying each way by 20%, and benefits varying each way by 50%.

This scheme achieves full individual metering of the 17,000 properties at the end of year 10. Full annual benefits are realised in year 11, as customer behaviour would not change immediately but would follow receipt of resulting water accounts.

3.3.1 Annual Costs

The quantifiable costs for this analysis fall into three categories:

- Installation costs – based on the capital cost of the meter, and the associated plumbing of installation.
- Additional reading and administration costs, resulting from an increase in the number of meters, once additional individual metering is achieved. This cost becomes more significant in the later years of the gradual case scheme.
- AMR replacement, which would begin to be incurred from year 13, as the automated meter reading technology installed with the first of the additional meters reaches the end of its useful life.

Table 3-10: Annual costs of gradual scheme

$'000s Dec12	Annual Costs					Total Costs
	in year 1	in year 2	in year 5	in year 10	in year 20	
Type 1						
Meter Install	474	474	474	474	-	4,740
Meter Read/admin	16	48	145	306	322	6,446
AMR replace	-	-	-	-	119	1185
Type 2						

Meter Install	1,598	1,598	1,598	1,598	-	15,980
Meter Read/admin	78	235	706	1,490	1,569	31,377
AMR replace	-	-	-	-	71	705
Total (mid case)	**2,167**	**2,356**	**2,923**	**3,869**	**2,080**	**60,434**
Total (high case)	**2,600**	**2,827**	**3,508**	**4,642**	**2,496**	**72,520**
Total (low case)	**1,733**	**1,885**	**2,338**	**3,095**	**1,664**	**48,347**

Note: AMR replacement assumed to commence in year 13, at an annual cost of $189k
All costs assumed to be expensed as incurred

3.3.2 Annual Benefits

The quantitative annual benefits also fall into three categories:

- Reduced water consumption, based on the more accurate price signals faced by tenants when water charges reflect actual individual usage.
- Reduced leakage in the internal piping networks, based on more accurate data and an increased awareness of water used within a site.
- Capital efficiency gains to SA Water, from a dispersion of reduced demand load, which would delay the need for network upgrades and augmentations required to address capacity constraints.

Table 3-11: Annual benefits of gradual scheme

$'000s Dec12	**Annual Benefits**					**Total Costs**
	in year 1	**in year 2**	**in year 5**	**in year 10**	**in year 20**	
Type 1						
Reduced Consumption	9	27	82	173	182	3,635
Reduced Leakage	1	3	9	19	20	404
Capital Efficiency	47	47	47	47	-	468
Type 2						
Reduced	14	41	124	263	277	5,532

Consumption						
Reduced Leakage	2	5	14	29	31	615
Capital Efficiency	71	71	71	71	-	712
Total (mid case)	**144**	**194**	**347**	**602**	**509**	**11,366**
Total (high case)	**215**	**292**	**521**	**903**	**764**	**17,050**
Total (low case)	**72**	**97**	**174**	**301**	**255**	**5,683**

3.3.3 NPV of Costs/Benefits

The NPV of all the above quantifiable costs and benefits was assessed over a twenty year time horizon, using a discount rate of 6% and sensitivity tested for a lower case (e.g. costs incurred in the future are valued comparatively lower with a higher discount rate of 8%) and a higher case (future costs incurred are valued comparatively higher with a lower discount rate of 4%).

Therefore, the upper and lower bounds of the net present societal value for implementing individual metering under a gradual scheme are -$15.5m and -$43.5m, with the most likely outcome a net present cost of $27.1m.

Table 3-12: NPV gradual scheme

NPV ($m Dec12)	4%	6%	8%
Mid case	-32.3	**-27.1**	-23.1
High costs/low benefits	-43.5	-36.2	-30.7
Low costs/high benefits	-21.2	-18.0	-15.5

3.3.3.1 NPV of Costs/Benefits vs. existing 'Base Case' strategy

The gradual scheme represents an extra net present cost, compared to continuing the base case scheme, of between $11.4m and $34.7m, with the most likely outcome an incremental net present cost of $21.0m.[43]

[43] The incremental net present cost of the gradual scheme compared to the base case scheme, with full practical completion (i.e. both achieving full individual metering), is between $10.4m and $27.9m.

Table 3-13: Incremental NPV gradual vs base case

NPV ($m Dec12)	4%	6%	8%
Mid case	-24.5	**-21.0**	-18.2
High costs/low benefits	-34.7	-29.4	-25.3
Low costs/high benefits	-14.8	-12.9	-11.4

3.3.4 Qualitative Issues

In analysing a gradual scheme toward full individual metering of SAHT group site dwellings there are important costs and benefits, in addition to those stated above, which must be considered but cannot easily be quantified.

It is difficult to quantify the impact to the costs of on-charging by SAHT if there is extra metering under all schemes. It is expected there would be little change until group site properties are fully metered, at which point a saving is expected for the same reasons as outlined above at 3.2.4. It is not considered likely that this saving would be material.

Of greater benefit to society than simply reduced consumption is the more economically efficient use of water that results from more water users facing appropriate pricing signals.

Whilst user pays is an economically efficient principle, and one the Commission supports, in the case of SAHT tenants in a group metered dwelling, obtaining their own meter and paying for exactly the amount they use would generally increase tenants' expenditure for the same volume of water. Implementing this gradually also results in further distributional issues, which could negatively impact perceived fairness, as discussed above at 3.1.4 under the base case.

A further consequence is the benefit of reduced neighbour disputes, which under the gradual scheme cannot fully be realised until year 11.

For the gradual case, the cost of customer enquiries would be a small increase, sustained over around 10 years (the time frame for the completion of metering works), and then a reduction for the later years of the analysis. It is not possible to determine whether these costs would return to a level above, or below, that experienced prior to individual metering, due to lack of data on the current costs incurred.

3.3.5 Distributional Issues

In addition to the societal level costs and savings identified above, there are also distributional issues in providing additional metering. These are summarised, based on the mid-case, in Table 3-14.

Table 3-14: Distribution of impacts gradual scheme

$'000s Dec12	Annual shift in costs from year zero				
	in year 1	in year 2	in year 5	in year 10	in year 20
SA Water	+27	+81	+242	+511	+538
SAHT	+19	+59	+195	+471	+503
SAHT Tenants	+23	+67	+185	+330	+341
State Government	-	-	-	-	-

Reduced consumption of around 0.2GL would reduce the annual costs faced by SA Water in providing drinking water to customers by $509,000 by year 11, but the associated loss in revenue has a greater impact ($1.047m). By year 11, SA Water is $538,000 financially disadvantaged than it was in year zero. The Commission has assumed metering, billing and administration costs faced by SA Water are directly offset by the increased revenue they will receive from charging an annual water supply charge, hence there would be no net impact to SA Water from this.

The SAHT would face a $1.891m increase in water supply charges it pays by year 11 but its usage bill would reduce by $1.389m in the same period. Therefore, the SAHT would spend a net $503,000 more per year on water charges. It should also be noted there is a possibility SAHT could be impacted by increased sewerage charges and/or council rates associated with the creation of a new valuation parcel for some dwellings. The existence of this impact is subject to the value of the individual dwelling and the minimum sewerage charges and council rates applicable.

For sewerage charges, this would only impact SAHT dwellings which have an individual value lower than $270,000; however, this would not impact the NPV calculations, as SA Water would recover the same total revenue for sewerage services from its customers regardless of the number of valuation parcels. For council rates, this would vary between different councils.

The Commission considers these impacts would not be material and, in any case, does not change the outcome of the distributional analysis in that SAHT will still be worse off in year 20, than in year zero.

With 100% of tenants supplied by a group meter at year zero being supplied with an individual meter to record their specific water use by the end of year 10, and 27% of these their own allocation of all tiers, SAHT tenants would collectively face an extra $341,000 in water charges.

With tenant usage charges even by year 20 not reaching an amount higher than $270, the average annual concession received (which is 25%, subject to a $90 minimum) would not change. Therefore, the Government would continue to incur the same expense in water concessions for SAHT tenants throughout the period.

The modelled average annual tenant water account would increase by approximately $22.00 (or 15%) in real terms from year 11 onward.

3.3.6 Summary

At a societal level, the quantifiable costs of this scheme are much more significant than the quantifiable benefits. Even using the low case at the highest discount rate, the immediate scheme has a net present cost of $15.5m, with the most likely value a net present cost of $27.1m.

No stakeholder from the distributional analysis clearly benefits from the gradual roll out of individual metering at SAHT grouped sites. The extra water supply charges the SAHT incurs from a higher volume of water meters exceeds its reduced expenditure on water usage. It is possible a small number of tenants whose usage is below 70% of average usage in a property installed with a private flow meter, or whose usage is below average in a property installed with an SA Water meter where a separate valuation parcel is obtained receiving the benefit of increased volume at tier 1 prices, would benefit.

4. MANDATE INDIVIDUAL METERING FOR NEW BUILDS ONLY

The Terms of Reference also provide for a review of mandating individual metering only for new builds.

The Commission notes there has been a clear steer toward separate metering for all new build multi-dwelling properties in more recent years. In fact, the Productivity Commission in 2011 put forward a recommendation that stated *[a]ll new single and multi-unit dwellings should have separate water meters installed. The case for retro-fitting existing single and multi-unit dwellings with separate water metering technology should be assessed by utilities.*[44] This recommendation was based on the Productivity Commission's observation that *[t]he benefits of consumption-based pricing…are widely recognised*,[45] citing the trend towards higher density housing, and the need to ensure that households are subject to efficient price signals in their use of water services. Notably, many of the participants in the Productivity Commission's study, including both tenants groups and Councils, were supportive of this recommendation.

The Commission further notes that, in New South Wales, developers are currently encouraged to install individual metering in new build strata units, with an expectation that mandatory requirements for individual metering will be introduced in 2014.

It is not possible to analyse the total quantifiable costs and benefits of this scheme without knowing the likely take up rate of such new dwellings by the SAHT over the next 20 years. The Commission, therefore, has considered costs and benefits (consistent with those outlined throughout Chapter 3), which it expects would result from a scheme to mandate individual metering for new builds only.

4.1.1 Qualitative Issues

Under a new build scheme, capital costs for a 20mm water meter would not change but the Commission would expect to see lower costs for installation and plumbing internal to the property, as it would be appropriately configured from the outset and included in the overall design and build costs of a new property. There is also the possibility that properties can be designed in such a way that does not confine the options for individual metering, i.e., a design that supports a current SA Water individual metering solution.

[44] Productivity Commission 2011, Australia's Urban Water Sector, Report No. 55, Final Inquiry Report, Canberra, p 159.
[45] Productivity Commission 2011, p 158.

Individual metering of new build multi-dwelling properties would likely increase the costs associated with maintaining and reading a separate water meter, when compared to a group meter solution.

If all new builds are designed in a way that results in separate SA Water metering being available for all dwellings, SA Water would be responsible for meter replacement at the end of their useful lives (rather than SAHT). Furthermore, SA Water does not have a current program to install meters with AMR capabilities, which some metering studies show are beneficial.[46]

The extra costs of billing faced by SA Water are reflected through the water supply charges paid by SAHT. Billing costs then faced by SAHT to on-charge its tenants would be lower if all new builds were separately metered, as individual dwelling water usage would be itemised within the SA Water bill.

If individual metering is installed from the outset and tenants are charged for their actual usage, there would be more a more economically efficient use of water resulting from more water users facing appropriate pricing signals.

It is expected that it would be financially beneficial for any future property resale, including the potential for a transfer into the not-for-profit sector, for all dwellings constructed by the SAHT to be individually metered. The Commission, at this time, given the context of this review, has not quantified this value.

The Commission notes that many new builds undertaken by SAHT in recent years are unattached dwellings dispersed through new residential estates and are generally individually metered.

Furthermore, it is common for smaller dwellings which are acquired by SAHT to be a part of a private strata/community title (i.e., where dwellings on a multi-unit site are not 100% SAHT owned). It is also common for these properties to be individually metered from construction.

4.1.2 Summary

It is considered both interstate, notably Sydney Water in NSW, and at a national level by the Productivity Commission, that individual water metering is desirable. As the costs of separately metering a new build multi-dwelling property are lower than those of retrofitting, and there are benefits to the value of the property for resale, it is likely that the case for separately metering new builds is stronger than for retrofitting.

[46] See Annexure C.

5. FINDINGS

5.1 Costs and Benefits Summary

Table 5-1 presents an NPV over twenty years based on central case costs for each option and a 6% discount rate.

Table 5-1: Option Assessment ($m)

Base Case	Immediate (1-2 yr)	Gradual (10 yr)
-6.1	-33.7	-27.1

Even assuming a best case scenario of high benefits, low costs, and a high discounting factor, the project still has a net present cost depending on implementation option, ranging from $4.1m[47] to $20.6m.[48]

Based on the above, the Commission notes that there is no financial case to proceed with a widespread retrofit individual metering project. Indeed, given that all assessed options have a net present cost, on a purely financial basis the best outcome would be to cease all additional metering activity.

However, there are qualitative issues that should also be considered. At this time, the Commission is not in a position to assess any value or weighting attributable to qualitative benefits and, hence, has not made any findings in that regard. The current position taken by SAHT (reflected in the 'base case' scheme) shows that SAHT has considered the qualitative benefits of deploying extra metering and has concluded that there are certain cases where it should be undertaken. The Commission has adopted that approach as the base case in its analysis.

It is clear from the Commission's analysis that, whilst individual metering would provide more accurate water charges to tenants, for the great majority of tenants those charges would be higher than those under current group metering arrangements.

The Commission notes that a stronger distributional case exists for tenants, in individually metering dwellings which have a separate valuation parcel on the title and which can be fitted with a separate SA Water meter. In these instances SAHT and tenants would, in some cases, benefit from a full allocation of the lowest tier prices; however, this does not change the NPV outcomes.

A policy of mandating individual metering on new build properties appears more appropriate than retrofitting, as it is clearly cheaper to design and configure plumbing/metering during an initial build as compared to retrofit at a later date. It is noted,

[47] See Table 3-3: NPV 'Base Case' scheme.
[48] See Table 3-7: NPV immediate scheme.

however, that most SAHT new build properties are either detached houses or individual units within private stratas. In both cases, individual metering is typically already installed during the building of these properties.

The Commission has noted some further observations in Chapter 6 of this report that may address some of the perceived unfairness issues that exist with the current arrangements. Some of these areas could be addressed at minimal or no cost.

Finally, the Commission notes that it has been requested by the Treasurer to undertake an Inquiry into Drinking Water and Sewerage Retail Services Pricing Reform, to be completed by December 2014 (**Inquiry**).[49] The Terms of Reference for the Inquiry include assessing the costs and benefits of both the installation of individual metering for each customer and the installation of smart meters. That Inquiry is closely related to the work already undertaken and its outcome may have further relevance for SAHT metering.

In conclusion, it is the Commission's finding that SAHT's current policy, of working within a $300,000 annual budget to target properties according to those that have raised concerns with water usage charges remains less costly than a scheme to roll out individual meters to all group metered dwellings. The Commission reiterates that it has not attempted to place a value or weighting to the recognised qualitative benefits, as SAHT is better placed to make this assessment at this time.

[49] ESCOSA, *Inquiry into Drinking Water and Sewerage Retail Services Pricing Reform*, 7 December 2012; available at http://www.escosa.sa.gov.au/projects/189/inquiry-into-drinking-water-and-sewerage-retail-services-pricing-reform.aspx.

6. OTHER OBSERVATIONS

During the course of this analysis, the Commission has identified areas where further work may be of benefit. As these areas are beyond the scope laid out in section 99, the Commission has not explored them in detail and has instead provided some observations for stakeholder consideration. The Commission notes that some of these observations may be relevant to, and may be addressed by, its Inquiry.

6.1 Addressing Perceived Unfairness Issue

A major driver in directing the expenditure of SAHT's $300,000 annual metering budget is complaints received from tenants as to perceived unfairness of shared water charges.

The Commission understands some tenants complain that, whilst they are very careful in their water use, current arrangements mean that they share the same SA Water bill as their neighbours, whom they perceive to be far less careful with water usage.

The size of the water account received has also been cited as causing hardship issues, given the expectation that it should be paid within 14 days.

The Commission observes that a number of actions may assist to, at least partially, address these concerns:

- SAHT could consider moving from on-charging tenants six monthly to quarterly. The typical annual water account of a SAHT tenant is $130-150, charged six monthly. Moving to quarterly charging would half the average water account to $30-40, reducing any "bill-shock" impacts of receiving an 'unexpected' or 'substantial' request for payment. It would also provide a positive cash-flow impact for SAHT.

  The Commission notes that SA Water moved from six monthly billing to quarterly billing for water charges in 2009 and currently bills SAHT on a quarterly basis.

- SAHT could consider sending some further explanatory literature[50] to tenants explaining how their water charges are calculated, highlighting that:

  - tenants receive a 30% discount on water usage, to cover common use water;
  - water use is charged on group sites only at tier 1 and tier 2 tariffs (i.e. the higher tier 3 charges only apply to a land parcel with a single dwelling receiving a full allocation of tiers);
  - tenants receive no water supply charges; and

[50] The Commission is aware that SAHT has previously provided explanatory information to its tenants regarding the composition of tenant water accounts.

- tenants receive no sewerage charges.

6.2 Addressing SAHT's Increasing Water Expense

The Commission noted a number of areas where there may be scope for SAHT to improve its on-charging procedures and, consequently, cash flows.

6.2.1 Uncharged Tenants

As noted above, there are approximately 2,000 SAHT tenants who, for various reasons, are currently exempt from water charges. These tenants include strata groups where SAHT owns only a portion of dwellings, with other dwellings being privately owned. In these instances, whilst SAHT pays the strata manager for water use, it has been considered too complex, administratively, to on-charge these tenants.

It is the Commission's view that a review of the 'exempt' tenants could be carried out, with the aim of identifying further tenants where water charges should be levied. In the example of part-owned strata groups, whilst charging would preferably be based on individual water use, at a minimum some alternative form of charging should be levied.

6.2.2 Obtaining Separate Valuation Parcels

The Commission is also aware of situations where multiple SA Water meters are installed on SAHT sites, which are currently on a single land valuation parcel. SA Water currently produces only one bill for each land valuation parcel, combining the individual meter readings into a single bill. Whilst this bill would include a water supply or service rent charge (currently $293 p.a.) for each meter, combining the meter readings into a single usage bill means that the lower tier 1 charges are only applied to water use based on a single supply (i.e. tier 1 applied to first 30kL per quarter). For parcels with more than one dwelling sharing a tier allocation, only tier 2 is applied to the remainder of kL use per quarter), with water use only charged at the higher tier 3 rates for usage over 130kL per quarter at a land parcel with a single residential dwelling.

SAHT may wish to explore the option of obtaining separate valuation parcels for these properties, to gain access to tier 1 and tier 2 water supply charges for each meter. Depending on the cost of establishing separate valuation parcels, this has the potential to provide further benefit to both SAHT and tenants, in the form of lower water use bills.

6.3 Further Observations

6.3.1 SA Water Involvement in Operating Sub-meters

SA Water currently has a policy of not becoming involved in the operation of sub-meters. The Commission notes that some other water service providers in Australia, for example Sydney Water in New South Wales and Southern Water in Tasmania, are involved in the ownership, metering, and billing of sub-meters on shared ownership sites.

The Commission may explore this issue further as part of the forthcoming Inquiry.[51]

6.3.2 Reduced Group Metering Sizes

SAHT currently has a policy of, on occasion, breaking group metering into smaller groups in response to tenant complaints regarding shared water charging, with the aim of reducing group sizes to below 15 tenants within a group.

For example, in response to complaints from tenants at one of SAHT's properties, work was undertaken to reduce the group metering from a single meter feeding 24 dwellings, to two meters feeding 16 and 8 dwellings. Due to the configuration of the existing supply pipework at the site it was deemed to be too difficult to divide the metering arrangements any further.

The Commission notes that, following this work, complaints from tenants have continued. This brings into question the value of the work carried out. Of note is that SAHT has not received complaints from tenants at a high density property with approximately 170 dwellings, served by only two meters.

The Commission considers it possible that breaking group metering into smaller groups serves to further highlight any high water users to those who continue to share a water meter (and water bill) with the high water users. By maintaining the existing larger groups, the impact of high water use tenants is diluted amongst a larger number of tenants.

Therefore, simply reducing group sizes may do little to resolve tenants' complaints and may not be the best use of available funds.

6.3.3 Reliability of Automated Meter Read Devices

SAHT raised concerns with the reliability of some AMR devices fitted to meters at several sites. During the March 2013 reading cycle, it was noted that 14 of 122 private meters at these sites were unable to be read, increasing from nine faulty devices noted during the previous reading cycle, with four meters not having produced readings since March 2012. The cause of this has yet to be ascertained, but highlights the importance of the technical reliability in any metering solution.

[51] ESCOSA, *Inquiry into Drinking Water and Sewerage Retail Services Pricing Reform*, 7 December 2012; available at http://www.escosa.sa.gov.au/projects/189/inquiry-into-drinking-water-and-sewerage-retail-services-pricing-reform.aspx.

ANNEXURE A. TERMS OF REFERENCE

Terms of Reference-Section 99 of the Water Industry Act 2012

5 December 2012

99—Report on installation of separate meters on properties

(1) The Commission must undertake a cost benefit analysis of implementing a scheme designed to ensure, so far as is reasonably practicable, that—

(a) all land—

(i) that is owned by the South Australian Housing Trust or another agency or instrumentality of the Crown; and

(ii) that is used for residential purposes; and

(iii) that is supplied with water by a water industry entity as part of a reticulated water system; and

(b) any other land the Commission determines to include in the analysis, would have a meter that records the amount of water supplied to that piece of land.

(2) The scheme for the purposes of the analysis must address—

(a) the fitting of meters to premises existing at the time of the publication of the report (insofar as meters are not fitted); and

(b) the fitting of meters to premises constructed after the publication of the report.

(3) The Commission must prepare and publish a report on the analysis by 30 June 2013.

ANNEXURE B. SITE VISITS

In order to gain a better appreciation of the variety of sites and resultant configurations of water supplies that SAHT has within its property portfolio, the Commission visited six SAHT sites.

Site 1

Site 1 contains 40 attached townhouses and five detached single units, fed by two SA Water meters at the property boundary. SAHT recently replaced, and continues to maintain, approximately 45 private flow meters. SAHT charges tenants for the consumption recorded by their private flow meter and pays the variance between the sum of these and the recorded usage at the two SA Water meters as landlord use for common areas. This site is unusual in that private flow meters were installed (but not utilised) at the time of construction (approximately 30 years ago).

Pictures from left to right: One of the two SA Water meters at the boundary of the property feeding approximately half the site; a private flow meter installed in the front garden of a dwelling; some of the attached townhouses at the site.

Site 2

Site 2 contains 148 villa flats situated over various three storey blocks. It is fed by two SA Water meters, one at each main entrance. Tenants are charged for 70% of consumption at the site divided equally. SAHT pays 30% of water consumption at the site to cover landlord use for common areas, including group laundry facilities, and to ensure tenants are not paying for more than they are consuming. Due to the current water supply configuration, this is one of the most difficult types of sites to deploy individual metering. SAHT staff informed the Commission they were unaware of any complaints about water charges from tenants at this site.

Pictures from left to right: One of the two SA Water meters at one of the main site entrances; a three storey block of villa flats.

Site 3

Site 3 comprised 158 dwellings of mixed dwelling types across three adjacent locations. Various individual metering solutions have been employed at the site over two years. There are now 36 dwellings with SA Water meters and 122 dwellings with private flow meters.

Pictures from left to right: Units at one of the site 3 locations; an SA Water meter feeding a group of dwellings; a private flow meter; attached townhouses and other dwellings at one of the Site 3 locations.

Site 4

Site 4 comprised 36 dwellings consisting of 14 townhouses, 14 attached houses and 8 flats. In June 2011, site 4 was installed with 36 new private flow meters, covering all properties. SAHT pays for common area use and recently upgraded common areas to low water use gardens.

Pictures left to right: Townhouses, flats and common gardens at site 4; two private flow meters - one servicing upstairs flat, one servicing downstairs flat.

Site 5

Site 5 consists of various larger size and lower density dwellings, with some private ownership. Most dwellings are road facing with close access to SA Water mains. Pairs of dwellings previously fed by a single SA Water meter between two properties were split by obtaining a new water connection or adding a manifold solution to the original SA Water mains connection where it was 25mm or greater (refer to Chapter 2.4 above for examples of these configurations). Two SA Water mains extension were carried out at this site to enable individual SA Water metering of properties at the end of an existing main in a cul-de-sac.

Pictures from left to right: Two-storey detached dwellings at site 5; SA Water mains extension at site 5; splitting of pairs with new SA Water mains connection; splitting of pairs with manifold solution.

Site 6

Previously, all 24 dwellings were fed by a single SA Water meter. A second SA Water mains connection and meter were added to the property recently, splitting it into two groups. New internal pipework was required to separate the group into two and provide appropriate flows to all dwellings. This site generates complaints about water consumption charges, even following the installation of an extra meter. SAHT staff are of the view that large scale works would be required to individually meter all dwellings at this site.

Clockwise from top left: Original SA Water meter feeding site; front block of attached townhouses fed by original SA Water meter; back block of townhouses; new internal pipework required to isolate into two groups; new SA Water meter added and internal pipework extensions to feed the back blocks of townhouses.

ANNEXURE C. LITERATURE REVIEW

The Commission has specifically reviewed five metering studies from both Australia and the United Kingdom that consider the costs and benefits of water metering. They are:

- a suite of reports from Tasmania;[52]
- a report by the Water Services Regulation Authority (Ofwat) in England and Wales;[53]
- an independent review conducted in the UK;[54]
- a report by the Environment Agency in the UK;[55] and,
- a study of the urban water sector in Australia conducted by the Productivity Commission.[56]

Types of Costs and Benefits

Costs

Based on the national and international studies reviewed, the key quantifiable costs of metering water supply are:

- the capital cost of the meter;
- installation costs of the meter and any AMR technology;
- maintenance of the meter and any AMR technology;

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[52] Marchment Hill Consulting (MHC), *A Report for the Department of Treasury and Finance, Meter Rollout Options for Moving to Two-Part Pricing in Tasmania,* 2009 ('MHC 2009'); available at http://www.treasury.tas.gov.au/domino/dtf/dtf.nsf/LookupFiles/MH-Consulting-Water-Meter-Rollout-CBA.pdf/$file/MH-Consulting-Water-Meter-Rollout-CBA.pdf.
SGS Economics & Planning, *Water meter cost benefit, Peer Review – Hobart City Council,* March 2011 ('SGS Economics & Planning 2011'); available at http://www.stors.tas.gov.au/item/stors/d101f7a8-e21f-5bd9-3b97-b7a934870ddd/1/web1/HCC%20Water%20meter%20peer%20review.pdf.

[53] Ofwat, *Exploring the costs and benefits of faster, more systematic water metering in England and Wales,* 2011 ('Ofwat 2011'); available at http://www.ofwat.gov.uk/future/customers/metering/pap_tec201110metering.pdf.

[54] Walker, A, *The Independent Review of Charging for Household Water and Sewerage Services, Final Report,* 2009 ('Walker 2009'); available at http://www.defra.gov.uk/publications/files/pb13336-walker-water-review-091205.pdf.

[55] Environment Agency, *The costs and benefits of moving to full water metering,* Science Report, 2008 ('Environment Agency 2008'); available at http://www.swan-forum.com/uploads/5/7/4/3/5743901/_env_agency.pdf.

[56] Productivity Commission, *Australia's Urban Water Sector,* Volume 1, No. 55, August 2011 ('Productivity Commission 2011'); available at http://www.pc.gov.au/projects/inquiry/urban-water/report.

- the cost of any associated works (e.g. pipework within a customers' property);
- meter reading;
- customer, data and billing systems and their on-going maintenance;
- embedded carbon associated with activities such as meter manufacture and transportation, and journey to a site;[57] and,
- social disruption costs associated with increased pipe maintenance and repairs (due to the expectation that increased metering would identify more sources of water leaks).[58]

An unquantifiable cost of metering also noted by Ofwat was that there would be less certainty over bill levels when based on actual consumption and not a fixed charge.[59]

Benefits

Based on the national and international studies reviewed, the key quantifiable benefits of metering water supply are:[60]

- it incentivises efficient usage of water, generally reducing overall consumption (i.e. there are economic costs associated with excess water consumption that occurs when consumers do not face a price signal);
- it reduces network leakage (i.e. within the reticulated network);
- improves capital efficiency (reduced consumption results in capital expenditure savings, as there is a reduced need for network augmentation); and
- carbon savings from lower water consumption, including lower use of heated water. [61]

Key qualitative benefits identified include:

- customer empowerment;
- the potential for more frequent billing, to assist customers in managing payments;
- less need to enter customer's property (where automated or remote meter reading is in operation);
- reduced household leakage (i.e. as more leaks within the property boundary of the householder are found and repaired);

[57] Ofwat 2011, p 7.
[58] Ofwat 2011, p 7.
[59] Ofwat 2011, p 11.
[60] Refer to studies detailed throughout this annexure.
[61] Ofwat 2011, p 8.

- increased social equity and fairness with all customers paying for their individual metered consumption;
- reduced need for water restrictions as a tool for demand management;
- changing society's perceptions of water;[62]
- the potential for the development of water markets, including assisting in the development of retail competition (enabling individual customers to contract with a retailer of choice, as retailers can bill on actual consumption);
- the potential for the development of more sophisticated tariffs (e.g. smoothing peak seasonal demand); and
- environmental benefits.

Key Points from other Studies

Tasmanian Reports

A cost-benefit assessment of a rollout of water meters was recently undertaken in Tasmania. The leading report was prepared by Marchment Hill Consulting (MHC). The Commission has also had regard to a peer review conducted by SGS Economics & Planning for the Hobart City Council.

Key aspects of the MHC report are:

- it involves the evaluation of a meter rollout for dwellings with no metered consumption;
- it found that a mandated roll out of meters with AMR capability had the strongest positive return (NPV) of the meter rollout options and that options using manual meter read (MMR) technologies produced the weakest net returns;[63]
- the study did not look at smart meter solutions as the benefits of smart water metering (SWM) were considered unlikely to justify the additional costs;[64]
- for the mandatory rollout option, it was assumed that the rollout of meters to all customers took place over one year, with all customers billed on actual consumption within one year;

[62] SGS Economics & Planning 2011, p 9. Report argues that a unit price being charged for water use removes the perception that water is abundant. The authors of this report, however, consider that it would be difficult to isolate this effect from the incentivised more efficient water usage benefit listed under the quantified benefits.
[63] MHC 2009, pp 7-8.
[64] MHC 2009, p 1.

- a voluntary solution risks an outcome that only low-usage customers with less than the deemed average usage in their class or location would have the incentive to move to metered billing;
- a 15% reduction in consumption for unmetered households once a meter is installed is assumed;
- a $5m Commonwealth Government grant would be provided to Southern Water and is factored into the NPV analysis;
- the study used real discount rate of 7%, over a 20 year time horizon with an expected meter lifetime of 10 years;
- whilst the quantitative assessment did not produce a favourable outcome over the base case (i.e. no new meter rollout), where the base case assumes AMR, MHC suggests that "(i)t is possible that the qualitative benefits provided by the Mandatory (AMR) metering option could service to provide a clear advantage over the Base Case (AMR)";[65] and
- MHC concluded that "(i)n the context of the Government's water and sewerage reform objectives, MHC therefore recommends the option of the Mandatory (AMR) metering option for Tasmania on the strength of its quantitative and qualitative benefits."[66]

The quantitative results of the MHC Tasmanian report are reproduced in Figure 5.[67]

[65] For Base Case (AMR) only those properties currently metered would get an AMR meter, where the current meter is inaccurate or due for replacement, or not currently read due to the condition of the meter not being known, but no new meters would be rolled out to unmetered properties.
[66] MHC 2009, p 2.
[67] MHC 2009, p 1.

Figure 5: Tasmanian Review - NPV for each rollout option compared to base case (MMR) [68]

NPV Element	Base Case (MMR)	Base Case (AMR)	Voluntary (MMR)	Voluntary (AMR)	Mandatory (MMR)	Mandatory (AMR)
Meters	-	-$1.4m	-$13.6m	-$16.8m	-$19.4m	-$23.6m
Meter Reading	-	+$1.8m	-$1.8m	+$0.7m	-$3.2m	-$0.3m
Systems	-	+$0.1m	+$0.1m	+$0.3m	+$0.6m	+$0.8m
Water Consumption	-	-	+$6.2m	+$6.2m	+$11.3m	+$11.3m
Network and Household Leakage	-	+$3.7m	+$3.3m	+$9.6m	+$6.0m	+$14.4m
Capital Efficiency	-	+$0.1m	+$0.1m	+$0.3m	+$0.1m	+$0.4m
Total NPV relative to Base Case	**-**	**+$4.3m**	**-$5.7m**	**+$0.2m**	**-$4.7m**	**+$3.1m**

A peer review report on the MHC Tasmanian Report was prepared for the Hobart City Council by consultants SGS Economics and Planning Pty Ltd. The peer review report concluded that:

- in relation to the MHC Tasmanian Report, the "benefits case is highly dependent on assumptions about water savings, but the reduction in water use is not well supported, resulting in uncertainty about the claimed savings";[69]
- there was no clear, obvious systematic bias in the MHC assumptions;
- while its review of Australian and overseas studies shows water system savings of 15% to 40%, none of these savings were achieved by the use of meters alone;[70]
- the MHC capital efficiency benefits are heavily dependent on the level of assessed water reduction (consumption and leakage) benefits;
- the strength of the pricing effect on reducing consumption would depend on the split between fixed costs and variable costs;
- excluding a potential $5 million Commonwealth Government grant for Southern Water, the peer review assessed net economic benefits based on quantifiable benefits and costs at -$6.2 million (15 year time period) and -$2.8 million (30 year time period), at a 7% discount rate.

[68] Positive NPV figures under an option indicate that costs have decreased relative to the base case, while negative figures represent increased costs.
[69] SGS Economics & Planning 2011, p 1. Note that the Tasmanian Peer Review was principally on a MHC report commissioned by Southern Water, rather than the report for the Tasmanian DTF which was summarised above in this report, however SGS Economics and Planning has regard to both MHC reports.
[70] SGS Economics & Planning 2011, p 16.

Ofwat (England & Wales)

The England and Wales water regulator, Ofwat, compared the costs and benefits of five broad scenarios for the future level of water metering, with the quickest rollout scenario leading to 90% of households having a water meter in 10 years. The Ofwat review:

- supported the Walker Review conclusion (see below), finding that "faster rates of metering in England and Wales could be 'significantly beneficial for customers and the environment' under certain conditions. For example, in areas where it is expensive to supply water";[71]
- found that the existing level of water metering in England and Wales was 38%;
- on the basis of current voluntary take-up it was expected about 50% of households would have a water meter by 2015, rising to 90% by 2050, with an assumption that it would be prohibitively costly to meter the remaining 10% of customers;
- found that achieving 90% household water meter penetration within 20 years achieved the greatest net benefits compared with the business as usual base case;
- states the cost-benefit assessment undertaken "is a restricted assessment and does not address wider issues, including customer acceptability, distributional impacts on customers' bills, and the environmental value of scarce water resources";[72]
- used a study time horizon of 40 years and only considered standard meters, due to high levels of uncertainty over the costs and benefits associated with smart meters;
- used a real discount rate of 5.5% for financial costs and a real discount rate of 3.5% for environmental and social costs in the first 30 years and then 3% real for the remaining 10 years;
- assumed that selective metering reduced demand by 12.5% (due to installation of meter and introduction of a metered bill), in line with a 2006 UK report that reviewed research concerning the effects of charging and collection methods on water demand;[73]and
- assumed that companies installing meters in a planned manner would achieve a 2% operational efficiency saving for every 10% increase in metering rates.

Independent "Walker" Review, UK

The terms of reference for this review was to make recommendations to ensure that England and Wales could achieve a sustainable and fair system of charging for water and sewerage services. Findings of the review include:

[71] Ofwat 2011, p 2.
[72] Ofwat 2011, p 6.
[73] Ofwat 2011, p 8.

- charging by volume of water used (which requires installation of meters) is the fairest approach to charging and can incentivise more efficient use of water – but installation of meters incurs costs;[74]
- there is a strong case for metering where water is scarce, for high discretionary users (where not paying for what they use), and on change of occupancy;[75]
- all new dwellings should now be metered, and other customers should have a right to opt for a meter;[76]
- leakage levels were around 25% of water supplied;[77]
- estimated water savings from metering consumption were around 16% of average household demand, with the research undertaken for the review showing that "(t)he best available studies indicate that when people pay for water according to volume used, total water consumption falls by an average of around 10 to 15 per cent."[78]
- a note that individual customers are likely to behave differently – "(s)ome customers are likely to reduce their demand considerably (particularly if they have taken very little notice of their water usage previously and/or are high discretionary users) while others may not change their use very much at all, if they were already mindful of their water consumption";[79]
- a systematic metering programme would allow for more efficient installation, with an estimated cost reduction of 20% to 50%;[80]
- "Ofwat should develop an agreed methodology for assessing the costs and benefits of metering, incorporating the wider benefits identified by the review team, taking into account the full value of water";[81]
- UK government should set a goal of 80% coverage by 2020;[82]
- "individual meters for each property should be the preferred option";[83]
- "individual meters should be provided for all homes in new multi-occupied buildings and in existing buildings where the cost is not prohibitive. Where this is the case, a meter for communal water use should be installed and billed direct to

[74] Walker 2009, p 2.
[75] Walker 2009, p 2.
[76] Walker 2009, p 31.
[77] Walker 2009, p 47.
[78] Walker 2009, p 74.
[79] Walker 2009, p 198.
[80] Walker 2009, p 76.
[81] Walker 2009, p 81.
[82] Walker 2009, p 81.
[83] Walker 2009, p 81.

the landlord; individual homes should then be billed on the basis of an assessed charge direct to the owner or tenant by the water company";[84]

- "meters should be installed in the property boundary whenever possible…" (as a means of incentivising customers to maintain the pipework on their properties);[85]
- estimates of meter life ranging from 10 to 20 years, with 15 years used in the review;[86]
- used a social time preference rate of 3.5 per cent as the discount rate;[87]
- a very large benefit is ascribed to unwinding transfers through introducing fairer tariffs; and
- for the remaining benefits (reduced leakage, consumption and environmental emissions), the benefits need to be at the high end of the range to match the costs.[88]

Environment Agency (UK)

A study conducted by the Environment Agency recommends for metering to be accelerated where it is most needed but, in any event, expects metering to form the basis for charging in the longer term across England and Wales. The study found:

- that the two groups of properties identified where metering can be more expensive are those on shared supplies and flats, with a meter penetration rate of 93% achievable if meters were installed in all but the most complex situations;[89]
- that there were likely to be efficiencies in meter installation and meter cost under a full metering programme, with savings estimates typically of 10% to 20%[90], assumed at 10% in the study[91];
- "evidence for a reduction in consumption with metering of the order of 10% is quite strong", although this evidence tends to be based on studies of customers choosing to install meters, who in turn are customers expected to be water conscious,[92] with a reduction of 10% assumed for the study consistent across all properties;[93]

[84] Walker 2009, p 82.
[85] Walker 2009, p 82.
[86] Walker 2009, p 205.
[87] Walker 2009, p 209.
[88] Walker 2009, p 211.
[89] Environment Agency 2008, p iv.
[90] Environment Agency 2008, p v.
[91] Environment Agency 2008, p 83.
[92] Environment Agency 2008, p v.
[93] Environment Agency 2008, p 44.

- study period of 25 years;[94]
- "(c)ertain property types, such as flats or terraces with very small or no gardens, tend to have low discretionary use. A full metering policy promoted to reduce demand may have less impact on customers living in these types of property compared with those living in properties with large gardens and higher discretionary usage. The question arises as to how much effort is justified in metering flats and certain terraces if there are little water savings to be made. However, metering coupled with an appropriate tariff mechanism could be effective in controlling demand patterns, for example reducing peak demand, which could be beneficial in certain areas. The arguments for leakage targeting and equitability of charging also remain";[95]
- utilities funded an average of £200 per meter to install meters, with some variation permitted depending on local conditions;[96]
- the study used a typical meter life of 15 years,[97] with a discount rate of 5.5%;[98]
- it was not until the 1991 Water Industry Act that individual properties were required to have a single supply,[99] with an estimate of 15% and 25% of UK properties being on shared supply;[100]
- options for metering shared supplies include:
    - metering at the point where the individual property supply comes off the common pipe (however issues exist where this occurs under paved yard, building extension or outbuilding);
    - installing an internal meter (difficulty of ensuring all the dwelling's consumption runs off one pipe, i.e. there can be more than one water entry point for each dwelling, or hot water supplies fed from a common hot water header tank, or cross supplies);
    - replacing with individual supplies (separating supplies can be time consuming and expensive, generally involving installing a complete new supply to one or more of the properties affected – typical overall cost of £1500 to £3000). Some customers may, however, benefit from improved water pressure;[101]

[94] Environment Agency 2008, p v.
[95] Environment Agency 2008, p 11.
[96] Environment Agency 2008, p 11.
[97] Environment Agency 2008, p 12.
[98] Environment Agency 2008, p 84.
[99] Environment Agency 2008, p 12.
[100] Environment Agency 2008, p 13.
[101] Environment Agency 2008, p 14.

- bulk metering (unlikely to be acceptable to customers and unlikely to achieve any benefits in demand reduction, but could assist in targeting leakage); and
- "(t)he view of the water companies was that, although expensive, separating shared supplies to allow individual external meters was the optimum solution."[102]

- bulk metering does have some benefits for a water utility, for example, it only needs to bill and deal with one organisation, with reduced credit risk;[103]
- research shows customers generally consider metering to be a fairer charging mechanism;[104] and
- complex installations assumed to be an average of 5 times the cost of a simple installation.[105]

Productivity Commission (Australia)

The Productivity Commission's report on Australia's urban water sector recommended that:

- "All new single and multi-unit dwellings should have separate water meters installed. The case for retro-fitting existing single and multi-unit dwellings with separate water metering technology should be assessed by utilities" (Recommendation 6.2);[106] and
- "Utilities should charge tenants directly for both the fixed and volumetric charges where water is separately metered. Where this does not already occur, State and Territory Governments should consider whether transitional arrangements are required to ensure that savings to landlords are passed through to tenants" (Recommendation 6.3).[107]

The Productivity Commission also noted an IPART submission quoting international results showing potential reduction in water consumption of 12% to 35%, and significantly larger reductions during peak summer months, with the installation of water meters.[108]

[102] Environment Agency 2008, pp 14-15.
[103] Environment Agency 2008, p 19.
[104] Environment Agency 2008, p 21.
[105] Environment Agency 2008, p 44.
[106] Productivity Commission 2011, p 159.
[107] Productivity Commission 2011, p 160.
[108] Productivity Commission 2011, p 158.

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