"Using less, paying more"

Making the case for long term investment in water efficiency

Cilla de Lacy
Manager Liveable Communities
Water Services Association of Australia
Docklands Victoria 3008

Paper Presented at the
6th Making Cities Liveable Conference, in conjunction with the Sustainable Transformation Conference, Melbourne (VIC) www.healthycities.com.au

"Using less, paying more"

Making the case for long term investment in water efficiency

ABSTRACT: *Major capital investment in seawater desalination and recycled water in response to the Millennium drought (which ravaged parks, sporting ovals and gardens) caused a steep increase in water prices just when water efficiency efforts really stepped up. With the drought now broken in eastern Australia, and water consumption at low levels, customers are now "using less but paying more" as utilities strive to recover large capital costs. This makes continuing water efficiency efforts problematic. However, this paper articulates why this is just a short-term problem and that a long-term strategy for maintaining investment in water efficiency is important to create and maintain liveable communities no matter what the weather. This involves putting customers' front and centre, along with a greater focus on the energy-water nexus, adaptive planning in response to climate risk, good regulation, technological and social/behavioural innovation, and education and communication. As Australia's population grows, and the economy and climate fall prey to 'shocks,' part of the way forward must be to build water efficiency into the long-term water security equation.*

Keywords: *water efficiency, drought, customers, energy, regulation*

Introduction

For many years now, the urban water industry has supplied safe and secure drinking water services to its customers, made possible by the significant investment in dams designed to meet a fixed demand projection based on population growth estimates and trends in consumption. Dams in protected catchments provided a safe, low cost water supply with the added benefit of storing water in years of high rainfall, to supplement years of lower rainfall. On occasion temporary outdoor water restrictions balanced the demand – supply equation when rainfall was very low.

This approach served the industry and customers well; until the 2000's when the worst drought on record hit most of southern and eastern Australia (the Millennium drought) significantly reducing stream flows into dams. In Victoria, stream flow reductions were four times greater than the decline in rainfall (CSIRO 2010) and in Canberra were almost six times (ACTEW 2012). The drought reduced national GDP by almost 1% and the net welfare costs of mandatory restrictions amounted to several hundred million dollars per jurisdiction per year (PC 2011).

In some parts of Australia prolonged water restrictions affected community wellbeing through the loss of public and private gardens, and sporting fields. Consequently, the community became highly engaged demanding government funding for:

- water efficient products and services like showerheads
- decentralised water supplies such as rainwater tanks and greywater systems
- large scale seawater desalination and recycling plants.

These measures and the efforts of customers now contribute to about 350GL/yr of savings across Australia as reflected in much lower rates of per capita consumption (eg in Melbourne it dropped 43% from 423 l/p/d in the 1990's to 241 l/p/day in 2009/10). However, this reduction in consumption when combined with the massive capital spend on seawater desalination has resulted in some customers upset at how they are "using less but paying more." It has also forced the industry to better define the 'value proposition' for their customers and in particular to determine how water can enhance community amenity and wellbeing beyond the status quo. This paper examines these two issues and makes the case for why long-term investment in water efficiency is important to create and maintain climate-resilient, liveable communities.

A decade of savings

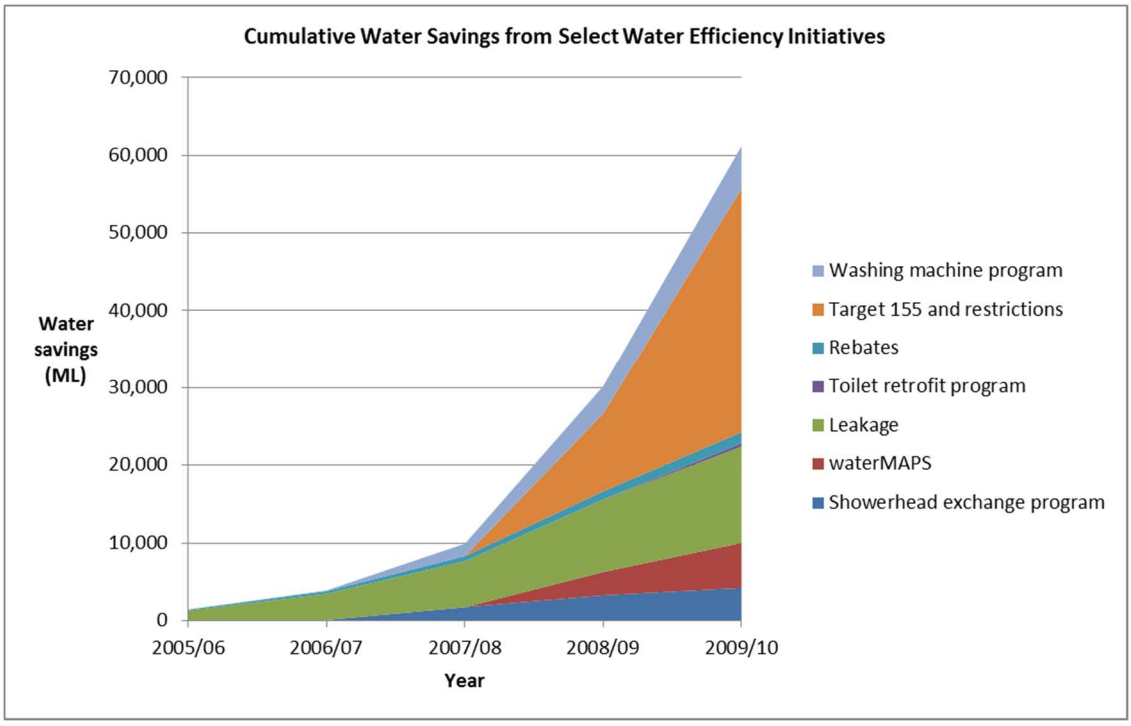
Water savings made by customers over the last 10 years make for a great success story (Table 1). In Perth savings now total about 100GL/yr, which is equivalent to the size of Adelaide's seawater desalination plant. Most savings are due to regulated permanent water efficiency measures, rebate programs (strongly linked to the mandatory Water Efficiency Labelling and Standards Scheme) and temporary water restrictions (Figures 1 and 2). These large water savings also result in large financial savings (eg in Melbourne, 60GL/yr of savings equates to over $100m/year)[1]. Without these savings, water storages could have dropped dangerously low during the drought (Figure 3).

Table 1. Water savings in Australian cities

City	**Annual water savings (GL)**
Sydney	120
Perth	100
Melbourne	60
Adelaide	55
Canberra	25

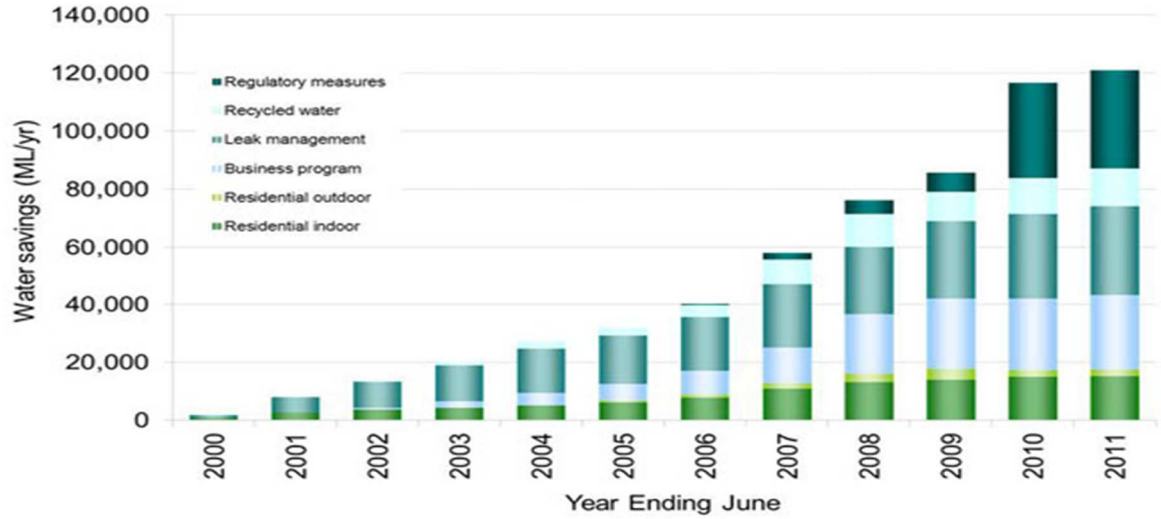
[1] This is based on the wholesale cost of water in Melbourne being around $1.80/kL.

Figure 1. Cumulative water savings - Melbourne.



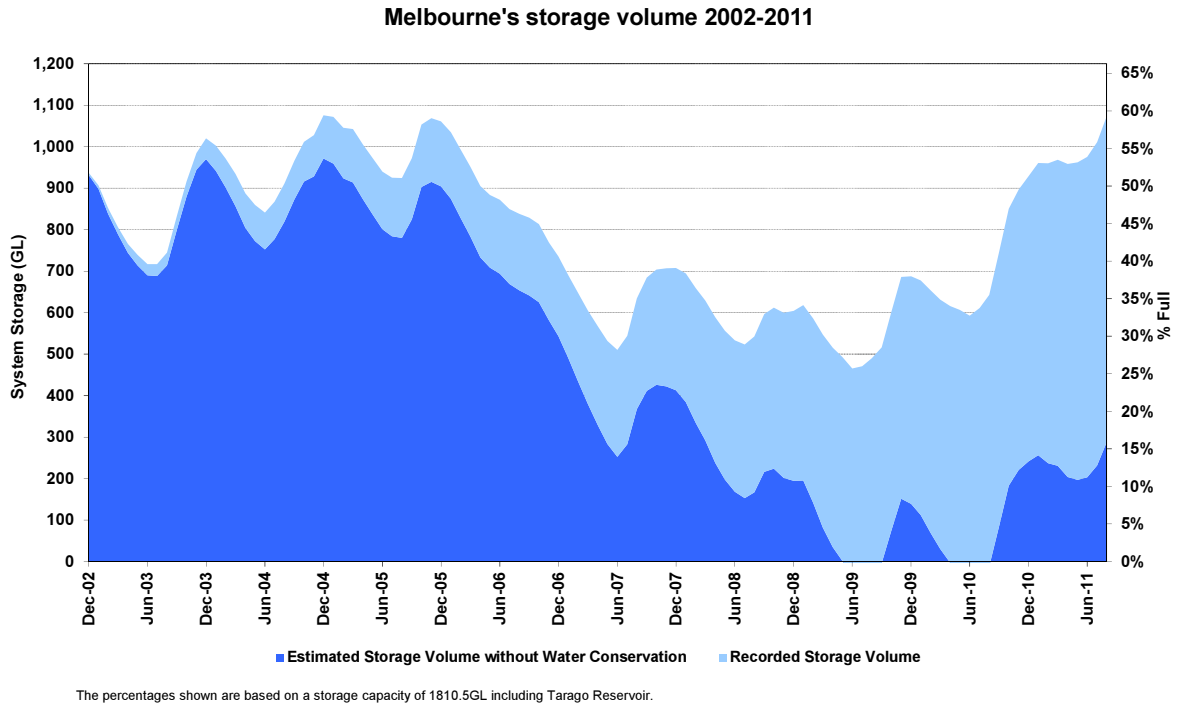
Source: Wetherall and Connell, 2011

Figure 2. Cumulative water savings - Sydney



Source: Sydney Water, 2011

Figure 3. Melbourne's storage volume 2002 – 2011 (showing impact of water conservation)



Source: Melbourne Water, 2012

Target 155 – a social marketing campaign to reduce water use

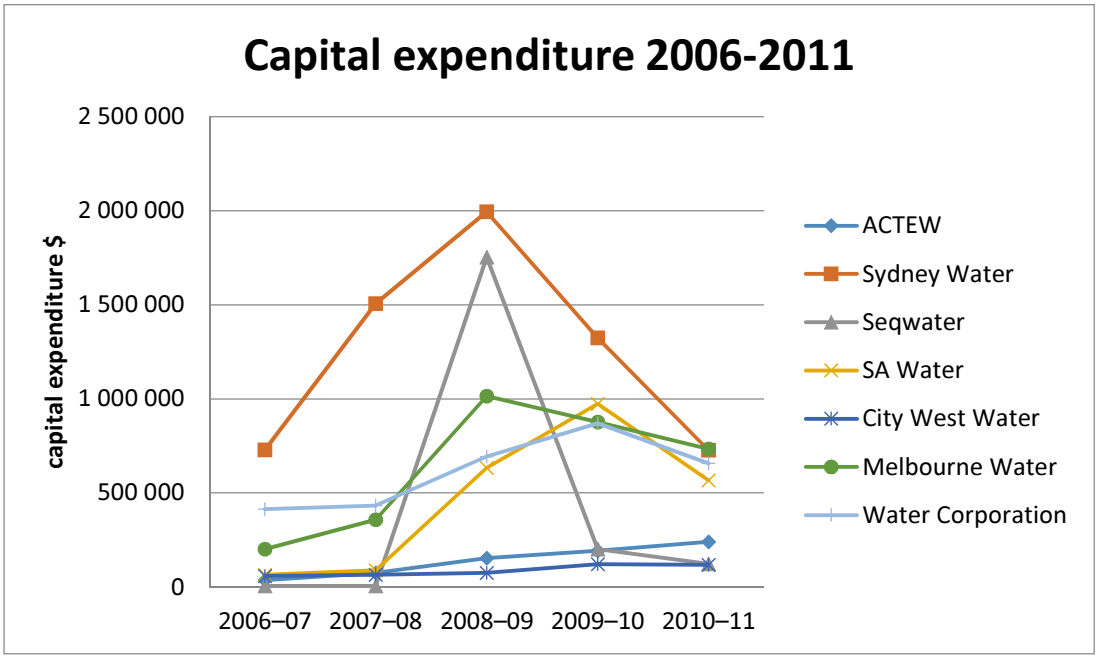
Target 155 was a water conservation campaign encouraging all Melburnians to voluntarily limit their water use to 155L/p/d. It was designed to achieve similar savings to stage 4 water restrictions while offering the community greater flexibility in how they reduced their water use (Office of Water, 2011). It ran from December 2008 to February 2011. Setting a target clearly stated goals for individuals to achieve and with the assistance of fact sheets people received simple instructions on how to determine their water use and where they could make easy savings without compromising their lifestyle. Ultimately T155 portrayed that consumer needs can still be met but through more sustainable means.

T155 helped Melburnians collectively save 53 billion litres of water over 20 months; this brought the average use down from 188L/p/d to 147L/p/d during the drought (Liubinas and Harrison, unpublished). Positioning of the T155 brand achieved its goal by finding its way into the hearts and minds of Melburnians. Having seen the success of T155 other cities have developed their own target savings campaigns eg Target60, Perth.

Using less, but paying more

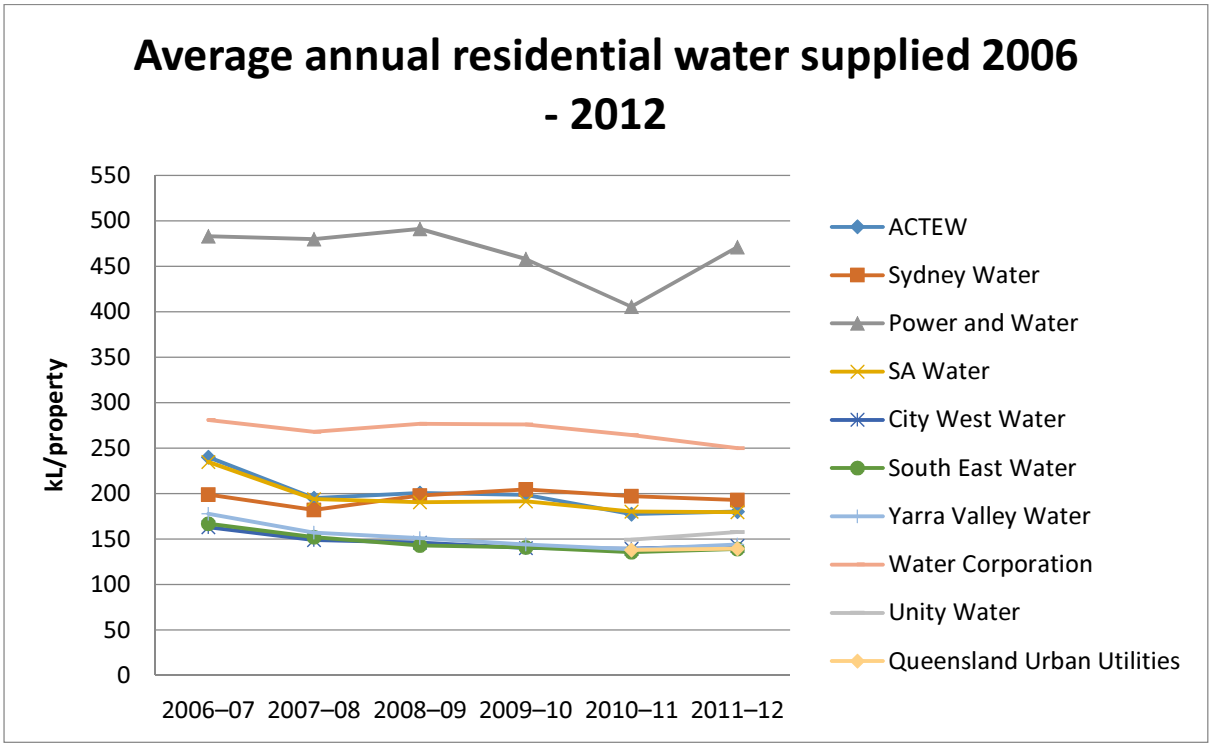
On the back of the Millennium drought, significant capital investment made in large-scale infrastructure has caused the cost of water supply (and hence prices) to significantly increase quickly (Figure 4). The timing could not be worse with eastern Australia awash with flooding rains to the extent where various dams are now full to capacity. Therefore, with water use down (Figure 5) in response to the investment made in water conservation during the drought (and due to the rains) utilities are experiencing a decrease in revenue but a strong need to recover significant fixed costs. Simultaneously electricity prices have quickly climbed on the back of expenditure on 'poles and wires' to improve the reliability of supply, and Australia's economy has slowed.

Figure 4. Capital expenditure on water and sewage 2006-2011



Source: National Performance Report Urban Water Utilities

Figure 5. Average annual residential water supplied 2006-2012



Source: National Performance Report Urban Water Utilities

This complex situation may make justifying investment in water efficiency currently difficult. But this does not have to be the case. While some customers may be upset about "using less, but paying more", overall, recent customer surveys in the industry show that customers do strongly support continued investment in water efficiency. For example:

- 71% of Western Water's (WW) customers support funding WW commitment to promoting water efficiency activities to customers, while 70% support retention of inclining block tariffs to discourage excessive water use[2]
- South East Water (SEW) customers have expressed high interest in water efficiency programs, with about half of those surveyed preferring SEW to invest in those programs with the remainder prepared to pay about 5 – 10% in addition to their quarterly bill for these programs (GA Research, 2011)
- 77% of Yarra Valley Water (YVW) customers support YVW continuing to invest in water efficiency programs at an average cost of 80c/bill (Yarra Valley Water, 2012)

[2] As part of Western Water's Water Plan 2013-2018, Western Water sought comments from its online customer panel on various issues including water efficiency.

- 56% of Sydney Water (SW) customers support SW providing different price structures or mechanisms that either reward water efficiency or enable customers to have some control over their water usage such as through smart meters (Jenkins and Storey, 2012)

'Customer driven, enriching life'

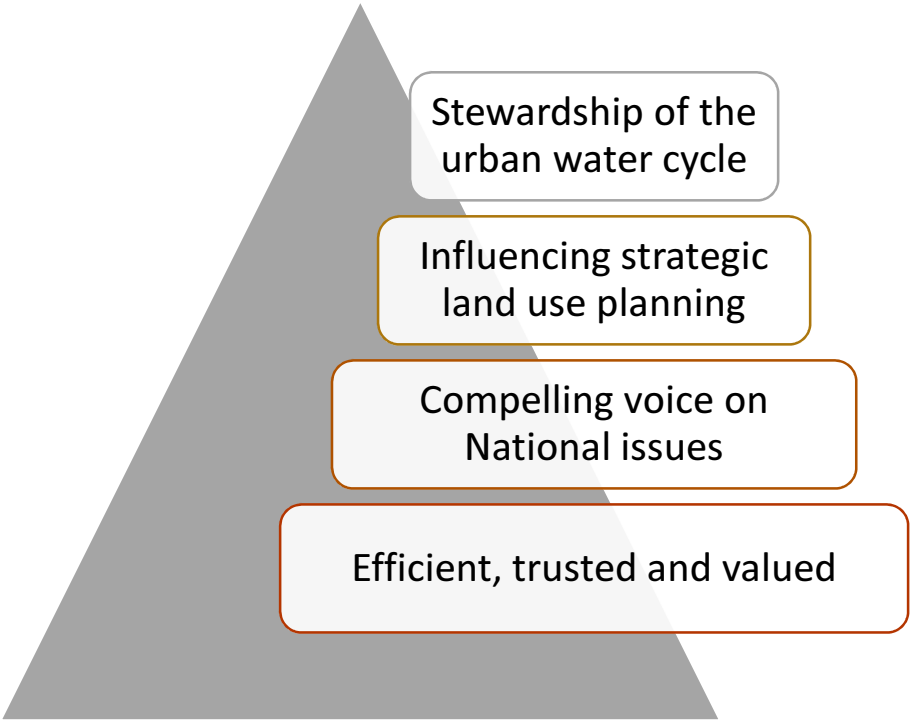
The Millennium drought has changed the urban water industry. The reality of bucketing water, and sporting ovals resembling dust bowls, now sees customers and communities more engaged than ever. This change is reflected in the urban water industry's Vision; 'Customer driven, enriching life' (Figure 6). In pursuing this Vision, we want to:

- be easy to deal with, providing customers with a service experience that is second to none
- engage the communities we serve to understand and influence how they will use water to create attractive, enjoyable and affordable places to live and work
- truly integrate urban water planning and operations with other sectors such as waste, energy and even transport to create liveable and sustainable communities.

For water efficiency, the following aspects of this Vision and associated outcomes are important:

- urban water security
- resource linkages
- regulation
- customers
- strategic land use planning

Figure 6. 2030 Vision for Urban Water

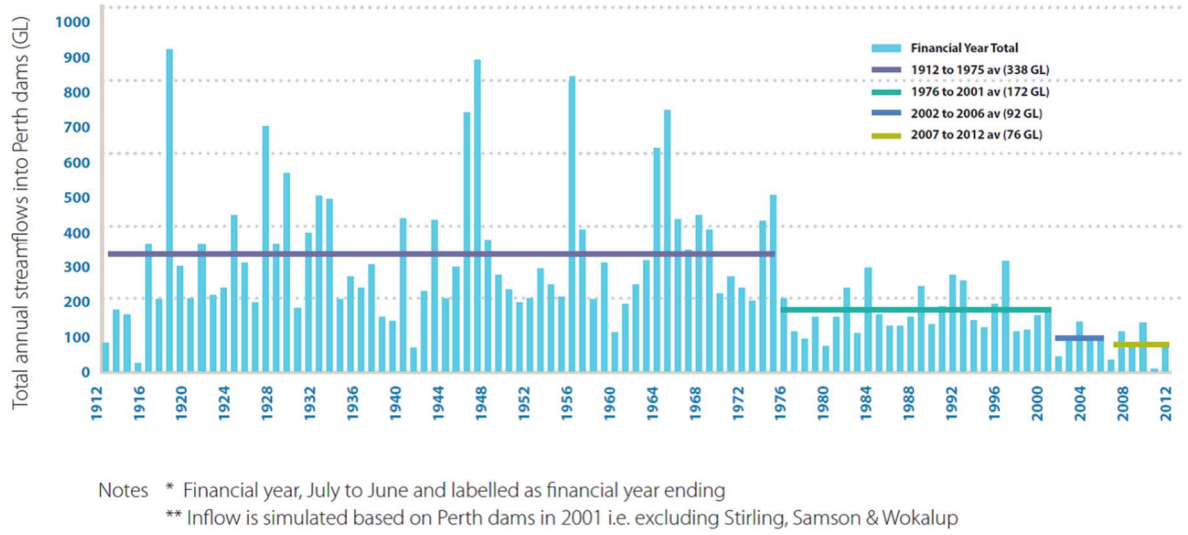


The following sections of this paper further describe why and how these aspects are important to support long-term investment in water efficiency.

Urban water security

Urban water utilities, and their government owners now face planning for and managing an urban water system where extreme events such as drought, floods, bushfires and heatwaves are likely to be worse under climate change and where the cooler months in southern Australia are getting drier reducing streamflows into dams (Figure 7).

Figure 7. Historical annual streamflows into Perth dams



Source: Water Corporation, 2012

The United Nations sees water security and the growth in cities as critical issues for the 21st century. For the industry, urban water security is about future water supply reliability. It is about balancing the future supply of water with future demand without the need for excessive periods of outdoor water restrictions and large, lumpy investments in capital works causing sharp increases in price, all of which are unfavourable to customers and communities. It is dependent upon the three main factors affecting demand; climate, population growth and support from policy makers and the community for water efficiency.

The role of water efficiency and conservation in managing the supply-demand balance

WSAA advocates for consistent investment in a cost effective baseline water efficiency program for householders and businesses even in times of plenty. This is akin to routine funding of operations and maintenance for infrastructure assets; except in this case the assets are your customer's water efficient fixtures and fittings, and their behaviours. The small scale nature of water efficiency measures implies that a long term strategy of continuous investment will be required, unlike most water sources, which require a single large investment at a particular trigger point.

Maintaining a baseline investment in times of plenty provides a good platform to launch more aggressive water efficiency programs as water security drops. It also readies the community

for short term water conservation measures that may be necessary should a sudden and severe drought hit; for this reason pre-prepared contingency plans manage demand during this time.

Publically communicating water demand forecasts and supply situations annually (in relation to a water efficiency benchmark or water use reduction target) and prioritising management of water use above or below the approved forecast is important.

Managing demand for water

Despite climate and population growth other factors affecting demand for water include:

- housing type and density
- the performance of water efficiency programs
- higher prices for water
- changing demographics
- bounceback in demand post-restrictions

Housing type and density

The types of houses built in the future can influence water consumption, in particular the extent to which there are outdoor areas that require watering. In some capital cities in Australia outdoor water consumption represents nearly 50 percent of total household consumption. A denser city is likely to use less water for outdoor purposes.

Performance of water efficiency programs

One of the major issues affecting water efficiency programs is the uncertainty surrounding the 'stickiness' or longevity of water savings over time. Measuring water efficiency savings can be a complex exercise, as programs vary significantly in both form and scale. Changes in household and business consumption will vary considerably from year to year, due not only to the water efficiency program, but also to a range of other external and internal factors. The other challenge is isolating the savings to a particular program given a myriad of programs, as well as mass communication activities, can be running concurrently. Nevertheless utilities do measure and track savings over time adjusting demand forecasts as necessary.

Higher water prices to pay for water security

Urban water is a resource insensitive to price. However, current price increases (price shocks) associated with the new seawater desalination plants are far more significant than inflation based increases of the past. These price shocks may partly explain why significant bounceback in demand following the Millennium drought has not occurred in our major capital cities.

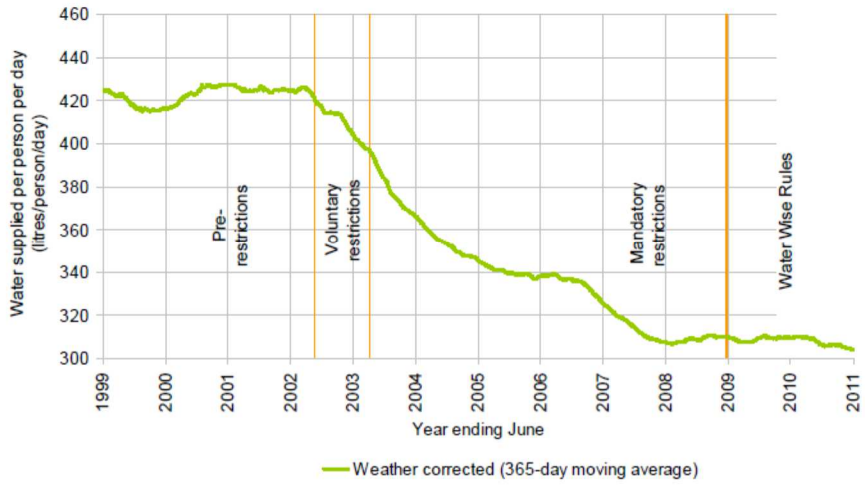
Changing demographics

The fastest growing household type in Australia is single person dwellings. A range of factors including the ageing of the baby boomers, a high divorce rate and people delaying marriage drives this. The reason that this trend is important to the urban water industry is that with single person dwellings economies of scale are lost which can lead to higher per capita water consumption. Studies show that if an additional person moves into a single person dwelling, water consumption only increases by 80 percent and subsequent people only use 50 percent of the amount of water consumed by one person. This is because clothes washing and dishwashing is more efficient with larger loads and garden watering remains the same.

Bounce back in demand following restrictions

Figure 8 highlights what has happened in Sydney since restrictions finished in 2009. Because of the imposition of water wise rules (low-level common sense water restrictions), penetration of water efficient appliances, socialised behaviour change and the significant summer rainfall experienced in both cities since restrictions were lifted, the bounceback has been limited. Historically bounce back has however, occurred after restrictions. For example in Melbourne after a period of restrictions in the early 1980's total per person water use increased by 15% from 1983-84 to 1988-89.

Figure 8. Daily water use in greater Sydney 1999 - 2011

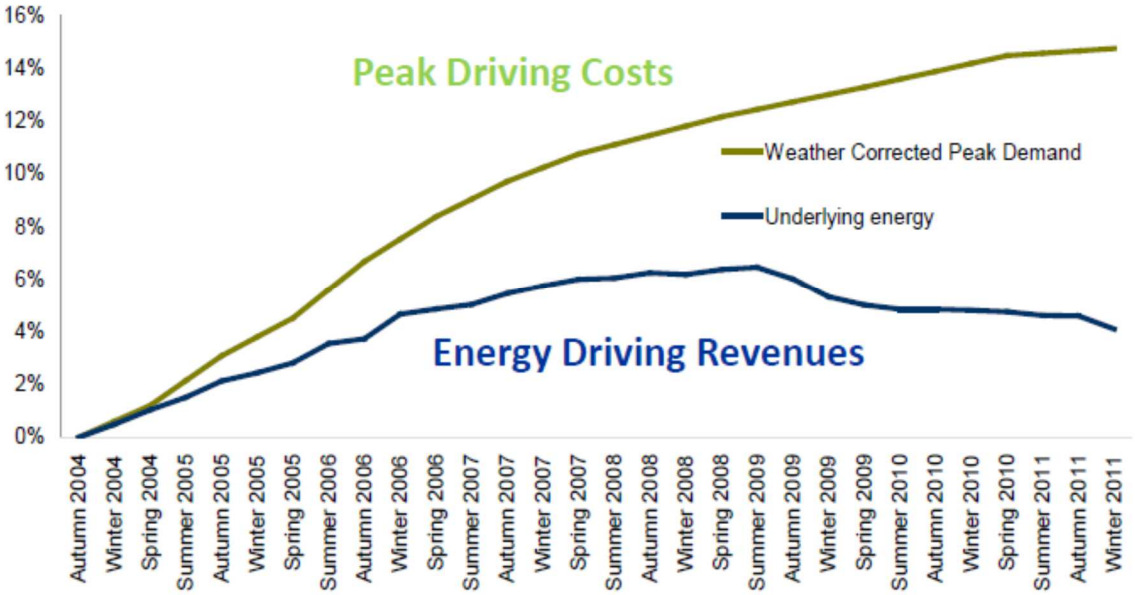


Source: Sydney Water, 2011

Save water, save energy!

There are currently two main issues affecting energy network businesses; these are costly augmentations of the network to meet short lived spikes in demand, and rising unit costs of supply as higher costs are recovered from flat or falling volumes (Figure 9)[3].

Figure 9. Long term growth index of rolling 12 month values: Autumn 2004 = 0%



[3] Amos, M. Energy Networks Association. Presentation to the WSAA Water Efficiency Network Meeting, August 2012.

Residential demand for energy

The three main drivers of peak demand in the residential sector are air conditioning, water heating, and pool pumps and filters. Table 2 shows just how much energy is needed to heat water in a home. In fact nationally, a 15% reduction in the use of residential hot water would completely offset the total energy used by the utilities providing water to those households in 2006/07 (Kenway et al, 2008). This explains why many programs have targeted shower and washing machine use as these can significantly reduce household energy demand and associated greenhouse gas emissions. Shifting to a WELS 3- star shower rose decreases energy consumption for hot water by approximately 50% for households with considerably greater-than-average water use. For houses with average water use low flow showerheads can reduce total household energy consumption by 19% (Beal and Steward, 2011). This could equate to savings of $380 off the average annual household electricity bill[4].

Table 2. Energy use for utilities, residential hot water and total urban system (2006/07)

	Energy use (PJ/a)			Energy (% of urban system)		Utility energy use as % of hot water energy use (W/Rx100%) (%)	Energy use (MJ/capita)		
	Water utility (W)	Res hot water (R)	Urban system (T)	Water utility (W/Tx100%) (%)	Res hot water (R/T) (%)		Water utility	Res hot water	Urban system
Sydney	2.7	14	950	0.3	1.5	19	626	3 260	223 000
Melbourne	1.3	15	1 050	0.1	1.4	9	369	4 140	284 000
Brisbane	0.5	3	560	0.1	0.5	15	450	2 980	314 000
Gold Coast	0.2	2	160	0.1	1.3	11	442	4 070	314 000
Perth	1.1	6	600	0.2	1.0	19	741	3 910	402 000
Adelaide	1.3	6	240	0.5	2.5	21	1 157	5 480	214 000
Total	7.1	46	3560	–	–	–	–	–	–
Weighted Averages	–	–	–	0.2	134	15	590	3818	277 000

Non-residential water and energy use

A number of non-residential water efficiency programs have had the added benefit of reducing energy use for their customers. This is why engagement with non-residential customers has morphed into a focus not just on water but on energy given that for business customers the bottom line is often dominated more by energy costs than water.

[4] This is based on a annual average household electricity bill being about $2000.

For example:

- an upgrade of cooling towers at a glass manufacturing plant is saving 22 million litres of water and 440,000 kilowatt hours of electricity each year at a one off cost of $443,000 (the dollar savings for energy equate to $35,000/year, and chemical savings are $30,000/year)[5]
- City West Water's Steam System Efficiency Program involves providing free steam system audits and training to manufacturing, industrial and hospital customers to improve water and energy efficiency in these systems. Across the program they expect to save 239ML/year of water, 187,000GJ/year of energy and 10,400tonnes of CO2/year[6]
- replacing 11 showerheads at an aquatic centre saved $2400/yr in energy costs and using a pool blanket saved $180,000 in energy costs (before factoring in the cost of the pool blanket at $140,000).[7]

Establishing great relationships with non-residential customers through seeing the interdependencies between water and other resources in their business (eg energy, waste) can help water utilities become a 'one stop shop' for advice on better resource management. To complement this, partnering with the energy industry on education programs designed to highlight how water and energy are inextricably linked will help drive savings.

[5] City West Water
[6] Audra Liubinus (pers.comm. City West Water, October 2012).
[7] Water Corporation, S Atkinson (pers. comm.)

Regulation

Temporary water restrictions

Most customers become aware of regulation and its impact on water use when a drought hits invoking temporary water restrictions to conserve dwindling water supplies. The use of regulation in this case is often the quickest and easiest way to conserve water. However, it is also the most controversial.

The water savings made in Sydney when water restrictions were in place totalled 575 billion litres. Follow up analysis by Sydney Water on these savings has discovered that despite the restrictions being on outdoor water use, households made significant indoor water savings. In fact as the level of restrictions increased so too did the level of savings inside the home. This suggests people are willing to restrict their water use above and beyond the regulatory measures imposed during drought and that they are also listening to general messaging around waterwise behaviour during this time.

Impacts on liveability

With the recent record drought the longevity of the restriction period (about 6 years in Sydney and Melbourne) affected amenity and led to millions of dollars of annual net welfare costs per jurisdiction.[8] This led the Productivity Commission (2011) to conclude that

> The prescribed use of water restrictions should be the exception, limited to emergencies and of short duration. Utilities, not governments, should make decisions on when to prescribe restrictions, subject to supply obligations set out in utility governance charters.

Hence, while temporary water restrictions do have an impact on reducing water use and can contribute to a step change in water use they do come at a cost through the loss of gardens and public open space, and impacts on the garden industry. They can and do affect lifestyle and amenity, and can do so in a relatively short period of time.

[8] The Productivity Commission estimated that the equivalent of Level 3a restrictions in Melbourne would create a net welfare loss in that city of between $400m and $1.5b over a 10 year period depending on inflow and elasticity assumptions. This is relative to a flexible pricing scenario that does not contain water restrictions, and instead uses prices to reduce demand in times of scarcity.

Fam et al (2008) note that 'green space can positively affect a person's physical and mental health, and reduce the risks of contracting lifestyle diseases. Further social benefits are shown from the use of green space for participation in sporting and recreational activities. Communities as a whole also benefit from green space from an aesthetic perspective, and by its contribution to improving social cohesion.' Also on the economic side green space facilitates a commercial, income-generating outcome from festivals and sporting events, and residential properties with well-maintained gardens, or close to green open spaces are valued approximately 10% higher (Fam et al, 2008). For these reasons WSAA believes temporary water restrictions are not a water efficiency measure because they result in a 'loss of utility'. As for the use of severe water restrictions WSAA only supports their use in an emergency.

Permanent water efficiency measures

However, the willingness of customers to save water during the drought has led to the establishment of low level 'common sense' water restrictions known generally as permanent water efficiency measures (PWEMs) or Water Wise Rules which do not have a significant impact on lifestyle and amenity. These rules generally cover:

- the use of trigger nozzles
- sprinkler use (time of day and/or rostered use)
- no hosing of driveways and paving areas.

The use of recycled water is generally not subject to low level PWEMs, but this needs changing. As the majority of the community will be mostly reliant on the drinking water scheme, sending a conflicting message to recycled water users may confuse both customer groups and dilute the general water wise message. Sending a single, consistent message about the importance of 'common sense' water use may produce better outcomes for the whole community when viewed in the broader context. In fact a recent study by the Australian National University has found that

> households now prefer low level restrictions to a situation with no restrictions. However, households are now more opposed to higher level restrictions than they were in 2003 and are willing to pay more to avoid them (McNair and Ward, 2012)

Building and appliance standards

Other mandatory water efficiency measures include:

- Water Efficiency Labelling and Standards Scheme (WELS)
- minimum water efficiency standards for new and renovated homes e.g. BASIX (NSW)
- the preparation and implementation of water efficiency management plans (WEMPs) or WaterMAPS by large nonresidential customers (e.g. WA and Victoria)
- minimum water efficiency standards for rental properties (NSW and Qld).

The dollar value energy and water bill savings through BASIX (Building Sustainability Index) compliance are estimated at between $7,123 and $10,249 for an average four-bedroom Western Sydney household built in 2006, or between $158 and $228 a year to 2050 (an average home's lifespan is estimated at around 40 years). A two-bedroom Sydney high-rise unit, with lower occupancy and energy targets, can expect to save between $3,273 and $3,451, or between $72 and $76 a year to 2050. Results from Sydney Water analysis have found that from 2007-08 to 2010-11 the sample of BASIX dwellings assessed had achieved 41%, 38%, 36% and 36% in drinking water savings. 84% of BASIX homes have a tank or recycled water supply for toilet use, laundry use and/or irrigation.

One area not regulated for minimum water efficiency standards is commercial office buildings[9]. Analysis by Adams et al (2012) has found that the majority of water consumption (i.e. 94%) in a typical office building is through leakage of fixtures, valves and pumps from amenities such as showers, toilets and taps; and from heat rejection equipment particularly cooling towers. Therefore, the simplest and most cost effective way to reduce water use in a new and existing building is to prevent and eliminate leakage (Quinn et al, 2006). For example the new Pixel building in Melbourne has extensive metering to easily detect leaks through alerts on changing water consumption trends.

Economic regulation

[9] The 2010 Building Code of Australia includes minimum energy efficiency standards for all new commercial buildings. National regulations now also exist for the disclosure of energy efficiency standards at point of sale or lease for all large commercial buildings.

The fundamental objective of water efficiency programs is to decrease per-capita demand for water over the long term.[10] In some cases there may be a mandatory requirement to reduce demand e.g. Sydney Water's 2010 – 2015 Operating License. As water businesses earn the majority of their revenue from the sale of water, implementing water efficiency measures would appear to be a contradiction. However, economic regulators have acknowledged that reducing demand can contribute to efficient service delivery rather than augmenting supply. For example Victoria's Essential Services Commission states that

> There may be merit in including water conservation costs in recoverable revenue only when conservation is the lowest cost solution for managing demand and supply; that is it must be lower than the cost of augmenting water infrastructure or alternative sources of supply (ESC, 2012)

Water efficiency measures should therefore be an integral part of, rather than an addition to long-term planning processes.

Utilities use a variety of methods to assess the 'costs' of water efficiency options to meet demand. For example the Water Corporation uses the Long Run Marginal Cost (LRMC), others like Sydney Water use a Net Present Value (NPV) or levelised cost. Melbourne has adopted a NPV approach to setting a comparator cost. Cost effectiveness is only one (albeit important) element that should be taken into consideration when assessing water efficiency measures. Others include social and environmental costs and benefits.

However, in practice, as most water efficiency programs require operational and not capital funding, it can be hard to get a piece of this much smaller pie. In May 2011 Ofwat (The Water Services Regulation Authority – England and Wales) concluded that while regulatory incentives (including reputational, process and financial) as a whole are not clearly causing a bias towards capital expenditure (capex) other drivers that may do this include:

- company approaches to risk management and control
- company engineering culture
- investor interest

[10] Except in the case of leak detection and repair within the water utility's own network, this will reduce the amount of water that must be supplied through the network, without reducing revenue from customers.

- the company reaction to potential enforcement action and the specification of outputs by regulators (Ofwat, 2011).

Ofwat are now proposing to change their approach to cost assessment and cost recovery. They propose 'treating capital expenditure (capex) and operating expenditure (opex) together ie. a total costs or 'totex' approach.

Customers may expect water prices to fall when water use efficiency has increased. However, while a decrease in water demand will reduce revenue to the water business, it will only have a marginal effect on short term variable costs such as pumping and treatment. As more than 60 per cent of revenue is typically associated with fixed capital costs, short term changes in water demand are unlikely to significantly affect the revenue requirement. This imbalance between revenue and costs may require a short term increase in prices, which should reduce over time as capital costs are avoided or deferred.

Over the longer term, any significant reduction in water use will lead to a reduction in infrastructure costs. The water business will receive less revenue from consumption charges, but will also require less revenue due to the reduction in costs. If, in accordance with current regulatory practice, the consumption charge has been set at the long run marginal cost, the reduction in costs and revenues will exactly offset each other.

Pricing and elasticity of demand

Demand for water has always been relatively inelastic as most believe it as an essential need. However, in reality not all water use is essential, particularly residential outdoor use. This is why water restrictions target outdoor use and why some utilities now have tiered pricing to send stronger signals to higher water users to reduce demand.

To determine the impact that the Millennium drought had on price elasticity of demand Sydney Water assessed 95,000 stand-alone homes and 3,300 apartments at a water usage price of $1.20/kL (in $2009-10) (Sydney Water, 2011). Table 3 shows the results.

Table 3. Immediate and long term price elasticities of residential water use in Sydney

Household type	Immediate	Long-term
Owner occupied houses	-0.08	-0.14
Tenanted houses	-0.02	-0.10
Housing units	-0.01	-0.03
Weighted average	**-0.05**	**-0.11**

Other key findings from the study included:

- it takes about a year for households to adjust from their immediate to long term position
- if water usage prices were increased by 10% the total decrease in demand over a year would be 1.1%
- that once a household upgrades the efficiency of its appliances its long term price elasticity is almost halved
- the importance of developing individual price elasticity estimates for different user groups
- the combination of a forecast increase in the proportion of housing units, new houses with smaller property sizes, and improvements in penetration of and efficiency of water using appliances will reduce the ability of water usage prices to influence residential demand (Sydney Water, 2011).

Strategic land use planning

Australia's cities top the liveability stakes. However, as they become more complex water must be in the front row of planning. Greater integration of urban water services planning with strategic land use planning is essential to deliver services that meet multiple objectives including improving liveability and urban design. A strategic approach to planning keeps open the maximum number of options for servicing a community to achieve the best scale, delivery model and development timeframes.

A couple of ways to achieve this, and in the process improve water efficiency, include:

- defining the industry's role and responsibilities in delivering liveability across levels of service
- engaging with communities to bring them to the planning table
- influencing public policy debate concerning the form and function of growing cities, towns and regions and determine how best to service their water needs in the short and long term considering population growth and demographic change
- protecting natural and built water assets from degradation affecting performance
- placing a 'value' on ecosystem services and social benefits/costs in the context of 'who benefits' and 'who pays'.

Innovation: know your customers!

Innovation can occur in processes, products, services or business models. And companies that excel at innovation today often:

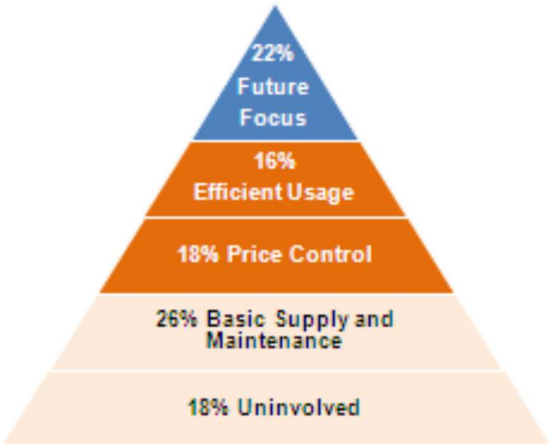
- develop a very strong customer focus e.g. they spend a lot of time with their customers to see how they use their products and/or services to determine how they can more efficiently meet their needs
- embrace change and take risks
- involve partners from outside their organization
- embrace sustainability.

Segmenting the residential customer base

Sydney Water recently completed a market research program identifying the needs and priorities of its residential customers. The result was the identification of five clear customer segments (Figure 10) with nearly 60% of customers saying they wanted more than a basic level of service that included water and energy efficiency, as well as technological solutions (Jenkins and Storey, 2012). Therefore, Sydney Water is considering future product and service development in:

- sustainable energy
- different price structures or mechanisms that either reward water efficiency or enable customers to have some control over their water usage such as Smart Meters
- an emergency plumbing service.

Figure 10. Customer segments



Smart metering and intelligent water networks

Both small and large utilities servicing cities and regions are either trialling or planning the roll out of smart meters to about 60% of Australia's population. Smart meters are informing customers and utilities 'with actionable and timely insights in new, simple and visually rich ways, so you know precisely who, when, and where water is being used, both in dollar terms and volume terms (Little and Flynn 2012).' There are benefits to customers and utilities including:

- deferral of network capital investment
- reduction in under billing caused by undetected meter degradation
- earlier identification of leaks
- presentation of more frequent, timely and actionable information empowering customers to better control and understand their water use.

Integrating, analysing and using this data in new and different ways to deliver better, more productive and efficient services to customers is exciting. This can help to deliver billing, customer information, asset management and GIS processes that are 'instant on.' In a world of growing social media use and 'portable' internet use this capability could revolutionise customer services in the urban water industry.

Social media

Facebook and Opower have a social energy mobile application designed to encourage some 20 million households served by 16 utilities to compare energy use among friends and similar homes. The program could yield new opportunities in energy management as companies connect people through technology and a healthy sense of competition.

The Water Corporation's H2Ome Smart program in Perth gives participants access to a web-based dashboard showing their water use in real time and that of others. Participants are saying they are working hard to improve their position on the leaderboard and they are using the real time data to compete with family members.

Conclusion

The last decade tested the resilience of the Australian urban water industry. Various responses to reduce water use will now help cushion the blow when future extreme events occur, but only if they are embedded into 'business as usual' behaviour. For the sake of creating and maintaining liveable communities in a drying climate (like that in southwestern Australia) this is a must. But it's only possible if water utilities consider that they are indeed in the 'forever' business, and are open to exploring such things as new products and services based around water and energy efficiency. Helping a customer to reduce their water use can indeed be considered as much of a 'service' as supplying a customer with water. All it takes is a mindset change and a bit of imagination.

References

Abrams, B, Kumaradevan, S, Sarafidis, V and F Spaninks (2012) *An Econometric Assessment of Pricing Sydney's Residential Water Use*‡ Article first published online: 18 DEC 2011 Economic Record**.** Volume 88, Issue 280, pages 89–105, March 2012.

ACTEW Water (2012) *Urban Water Security Program Future Climate Update***.**

Adams, L., Emore, S. And S Solarska (2012) *Towards Water neutrality in commercial office buildings*. Paper presented at OzWater 2012.

Beal, C and R. A. Stewart (2011) *South East Queensland Residential End Use Study: Final Report.* Urban Water Security Research Alliance Technical Report No. 47.

CSIRO (2010) *Climate variability and change in south-eastern Australia: A synthesis of findings from Phase 1 of the South Eastern Australian Climate Initiative* (SEACI), CSIRO.

ESC (2012) *Guidance paper 2013 'Water Price Review'*

Fam, D, Modley, E, Lopes, A, Mathieson, L, Morison, J and G Connellan (2008) *Irrigation of Urban Green Spaces: a review of the Environmental, Social and Economic benefits.* Technical Report No. 04/08 Cooperative Research Centre for Irrigation Futures.

GA Research (2011) *South East Water Customer Segmentation Research 2011. Report of Findings.*

Jenkins, S and M Storey (2012) *What customers really want – findings of a value segmentation study.*

Kenway, S. J., Priestley, A., Cook, S., Seo, S., Inman, M. and Gregory, A. (2008). *Energy use in the Provision and Consumption of Urban Water in Australia and New Zealand*. CSIRO and Water Services Association of Australia. ISBN 978 0 643. ISSN 1835-095X.

Liubinas, A and P Harrison (unpublished) Saving a Scarce Resource: A Case Study of Behavioural Change. Deakin University.

McNair, B and M Ward (2012) *Willingness to pay research project. Final Report*. Prepared by the Australian National University for the ACTEW Corporation.

Office of Water (2011). T155 for Melbourne. Retrieved from http://www.water.vic.gov.au/resources/news_items/news_items_folder/2008-newsitems/ target-155-for-melbourne

Ofwat (2011) *Capex bias in the water and sewerage sectors in England and Wales – substance, perception or myth?*

Productivity Commission (2011). *Australia's Urban Water Sector.*

Quinn, R., Bannister, P., Munzinger, M., Bloomfield, C. 2006. *Water Efficiency Guide: Offices and Public Buildings*. Department of the Environment and Heritage, Canberra, ACT, Australia.

Sydney Water (2011) *Water Efficiency Report 2010-11.*

Wetherall, B and D Connell (2011) *Water Supply Demand Strategy. Water Efficiency Options in Melbourne*. Part one.

Yarra Valley Water (2012). *Customer insights emerging from Water Plan 3.*