

Submission to the Standing Committee on Natural Resource Management (Climate Change) Inquiry into Water Management

February 2010

Executive Summary

The Legislative Assembly Standing Committee on Natural Resource Management (Climate Change) is undertaking an Inquiry into Water Management. The inquiry will cover issues of sustainable water management with particular reference to climate change impacts, and in particular, report on the following terms of reference:

- a) the likely impact of climate change on the availability of water resources under different climactic scenarios;
- b) approaches to the management of water resources by all water users, including provision for environmental flows; and
- c) best practice in water conservation and management.

Key messages

This submission has been prepared to inform the Standing Committee of Sydney Water's range and scope of operations, as well as specific initiatives Sydney Water is undertaking in the areas of climate change, sustainable water management and water efficiency.

Essential operations and services

Sydney Water supplies drinking water to over 4 million people every day through a network of 21,000km of pipes, 263 reservoirs and 162 pumping stations. As well as supplying water, Sydney Water collects and treats over 1.3 billion litres of wastewater a day, through a network of 24,000 kms of pipes, 674 pumping stations and 29 sewage treatment plants. Sydney Water works closely with the Sydney Catchment Authority and NSW Health to ensure water quality meets Australian Drinking Water Guidelines.

Climate change

Sydney Water has been working in collaboration with Government agencies and research partners to better understand the potential impacts of climate change on future water supply and demand since 2006. The NSW Office of Water is leading this project and it is expected that a report will be released later in 2010. Early work suggests that in 2030 and 2070, inland areas of Sydney may experience on average lower rainfall and runoff and coastal areas on average higher rainfall and runoff, as well as an overall shift towards higher summer and lower winter rainfall, with a high degree of variability. Sydney's major water catchment for Warragamba Dam is inland and other smaller dams and catchments are more coastal. Even without climate change impacts, Sydney's rainfall is likely to continue to be highly variable over shorter periods, due to large-scale atmospheric and oceanic patterns.

Water resources management

The Metropolitan Water Plan outlines the supply of water to the Sydney Metropolitan Area for drinking and other uses. Sydney Water has a number of responsibilities under this plan. These involve building a desalination plant, increasing the amount of wastewater recycled, continuing to help households and businesses use water efficiently and becoming more efficient in managing leaks and breaks within the Sydney Water network. The Metropolitan Water Plan also provides for environmental flows, and Sydney Water is finalising works on a project that will see 25-40 billion litres of recycled water released to the Hawkesbury Nepean River each year.

Sydney Water manages 5% of Sydney's stormwater infrastructure (which carries 25% of the flow). The remaining 95% of stormwater infrastructure is managed by local councils. Stormwater

harvesting projects are primarily developed and managed by local councils to use stormwater for irrigation of parks and playing fields. Sydney Water works in partnership with councils to deliver stormwater harvesting projects, and to improve stormwater quality.

Water conservation and efficiency

Sydney Water has been involved in water conservation since 1995. The current program includes water efficiency initiatives for residential, commercial, industrial and education sectors, recycling initiatives and a leak reduction program.

Structure of Sydney Water's submission

This submission is structured in line with the Inquiry's terms of reference.

Section 1 provides an overview of Sydney Water operations and services, including population serviced, infrastructure details, water quality and drinking water standards and regulatory frameworks.

Section 2 addresses impacts of climate change on supply and demand and outlines the risk assessment of impacts of climate change on Sydney Water operations.

Section 3 discusses Sydney Water's responsibilities regarding management of water resources under the Metropolitan Water Plan, including Sydney Water's role in environmental flows. This section also includes an overview of Sydney Water's responsibilities with regard to stormwater.

Section 4 describes how Sydney Water is contributing to best practice water conservation and management through water efficiency initiatives, recycling initiatives and sustainable water management practices.

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1. Sydney Water operations and services

1.1 Purpose and objectives

Sydney Water provides essential water services for the benefit of the community. These include providing drinking water, recycled water, wastewater and some stormwater services to more than four million people living in Sydney, the Illawarra and the Blue Mountains. Sydney Water is a large water utility with about 3,600 staff and an area of operations covering 12,700 km².

A statutory State owned corporation, Sydney Water has three, equal principal objectives:

- To protect public health
- To protect the environment, and
- To be a successful business.

Operating Licence

Sydney Water's Operating Licence enables Sydney Water to undertake the provision of water and wastewater services within its area of operations. The current Licence is effective from 1 July 2005 to 30 June 2010.

The Licence reflects public expectations of Sydney Water's performance and provides key regulatory drivers to ensure that Sydney Water maximises the community's investment in line with its three objectives. The Operating Licence sets out:

- Drinking water (health and aesthetic) requirements
- Infrastructure performance requirements
- Customer and consumer rights
- System performance standards (continuity, water pressure & sewage overflows)
- Water conservation targets, demand management and recycling requirements
- Environment - indicators & management, and
- The Customer Contract.

Sydney Water's performance under the Operating Licence is assessed by an annual operational audit that is managed by Sydney Water's Licence Regulator, The Independent Pricing and Regulatory Tribunal (IPART). An annual audit of Sydney Water's performance is conducted by IPART and presented to the Minister for Water, who is then required to table this advice in Parliament.

1.2 Operations and services

Providing drinking water

Every day Sydney Water supplies the community with over 1.3 billion litres of water. At present, about 80% of supply comes from Warragamba Dam. Six other major dams store Sydney's water and there are also secondary dams that store water available for transfer to the major dams. Dam water is treated at nine filtration plants then delivered to customers by a network of about 21,000 kilometres of pipes, 263 reservoirs and 162 pumping stations. The larger water filtration plants at Prospect, Macarthur, Illawarra and Woronora are privately owned and operated.

In addition to dam water, water from Sydney's desalination plant supplies up to 1.5 million people as part or all of their water supply. The desalination plant uses reverse osmosis technology to extract fresh water from seawater. After screening and pre-treatment to remove any solids and sediment, the water is then pushed through membranes under high pressure. Fresh water passes through the membranes and the remaining seawater concentrate is returned to the ocean. The water is treated to meet Australian Drinking Water Guidelines and transferred to supply to customers. The guidelines are published by the National Health and Medical Research Council to provide the Australian community and water supply industry with guidance on what constitutes safe, good quality drinking water, based on the latest scientific evidence.

Water recycling

Water recycling schemes that provide water for non-potable uses reduce demand on potable water supply sources. They also reduce the amount of wastewater. About 25 billion litres of water is currently recycled a year. This is increasing to 70 billion litres a year by 2015. Sydney Water currently has six recycled water plants in operation or under construction at Gerringong Gerroa, Wollongong, Picton, Rouse Hill, St Marys, Camellia/Smithfield and Hoxton Park. Further information on water recycling schemes is provided at Section 4.2.

Wastewater services

Sydney Water collects and treats over 1.3 billion litres of wastewater a day, via a network of 24,000 kilometres of sewer pipes, 674 sewage pumping stations and 29 sewage treatment plants (STPs). This network services around 1.6 million homes and businesses in Sydney and the Illawarra. After wastewater is treated it is reused or released into the ocean or rivers. Sydney Water produces about 180,000 wet tonnes of biosolids annually which are 100% beneficially used in agriculture, composting or land rehabilitation. To help improve the quality of biosolids, Sydney Water has developed a number of strategies to keep toxic substances such as chemicals and paints out of the sewerage system and the environment, including a trade waste program and community education campaigns.

The Department of the Environment, Climate Change and Water regulates and monitors wastewater discharges. Around 75% of wastewater is processed at Sydney's three largest sewage treatment plants at Malabar, North Head and Bondi.

Stormwater services

In Sydney, stormwater drainage services are shared among a number of agencies and groups. Stormwater generally flows into small street drains owned by local councils and then into much larger pipes or channels called 'trunk drains', some of which are owned by Sydney Water. Sydney Water works with local councils and other agencies to manage the stormwater system. Stormwater services help in protecting people and property from flooding, as well as improving waterway health and aesthetic appeal.

Water quality standards

Droughts, bushfires and heavy rain have the potential to affect the quality of water in the dams, causing higher than normal levels of algae, sediment, organic material ash or micro-organisms in the water. Sydney Water, the Sydney Catchment Authority (SCA) and NSW Health work together to continuously improve water supply management in Sydney from the catchments to customers' taps. This includes identifying and managing risks in the catchment, creating multiple physical barriers to stop contamination, and monitoring water quality in near to real time. Sydney's water filtration plants operate under stringent filtration targets and the pipes that transport treated water

to customers' taps are fully enclosed. Drinking water is treated to meet the Australian Drinking Water Guidelines.

In order to detect any deterioration in quality, Sydney Water undertakes rigorous water treatment, quality testing and monitoring. Samples are taken in the catchments, after water is treated, in distribution pipes and at customers' taps. Water is tested for Cryptosporidium and Giardia and other water quality characteristics, according to a water quality monitoring plan agreed to by NSW Health. NSW Health also closely monitors all water quality results. Water quality reports are provided daily and quarterly on the Sydney Water website.

In the unlikely event that there are concerns about drinking water, Sydney Water and NSW Health have protocols in place to issue clear public advice on drinking water quality. In an extreme case, water filtration plants can be shut down for short periods if source water becomes untreatable.

2. Impacts of Climate Change on the availability of water resources under different climatic scenarios

2.1 Impacts of climate change on supply and demand

Since 2006, Sydney Water has been working in collaboration with a number of NSW Government agencies and key research partners to better understand the potential impacts of climate change on future water supply and demand. This project, 'Climate Change and its impact on water supply and demand in Sydney', is being led by the NSW Office of Water. Other partners include the Commonwealth Department of Climate Change, Department of Environment Climate Change and Water (DECCW), Sydney Catchment Authority, University of New South Wales and CSIRO. A project report is due this year. Sydney Water understands that the NSW Office of Water will be providing further detail on the themes addressed in the project report to the Standing Committee.

The work aims to provide location-specific information on the potential impacts of climate change on Sydney's water supply and will inform the Government's future water supply planning.

Early work on this water balance project has indicated that in 2030 and 2070, the inland areas of Sydney may experience on average lower rainfall and runoff while coastal areas may experience on average higher rainfall and runoff. This is important because the large Warragamba catchment is inland and other catchments are smaller but more coastal. The studies covering the Sydney region indicate a shift towards increased summer rainfall and decreased winter rainfall, while showing a high degree of variability across seasons. This is generally consistent with other studies that have taken place recently for the Sydney region.

It is important to note that these potential changes or shifts are "average" shifts. They cannot describe future rainfall variability and hence cannot accurately describe how rainfall and runoff might vary on shorter timescales. Sydney's climate is, and will most likely continue to be highly variable over shorter periods, even without climate change impacts, due to large-scale atmospheric and oceanographic patterns such as the El Nino Southern Oscillation (ENSO). Predicting future drought persistence will remain a significant challenge for future research.

Sydney Water notes that there are still a large number of uncertainties in the research because of the limitations of current climate modelling, ongoing developments to global climate science and unknown changes to greenhouse gas emissions in the future. With this in mind, Sydney Water will continue to work with the NSW Government and leading researchers to monitor and review new information and science outcomes as these become available.

In terms of impacts of climate change on water demand, it is not expected that climate change will have a major impact on water demand in Sydney Water's area of operations. There may be some increase in future water demand due to climate change; however, climate change may also result in a slight increase in savings from water conservation programs targeting outdoor use. This may occur if rainfall patterns in summer become more dominant, as this is when most outdoor water is used.

Beyond water supply and demand, climate change and future climate variability could pose additional challenges for Sydney Water in delivering water and wastewater services, as well as managing Sydney Water's extensive asset base. It is important for Sydney Water to understand these potential impacts so we can adapt and respond appropriately. Accordingly, in 2008, Sydney Water undertook a risk assessment of climate change impacts on Sydney Water's operations (see Section 2.2 for further detail).

2.2 Risk assessment of impacts of climate change on Sydney Water operations

In April 2008, Sydney Water completed a qualitative assessment of the risk that climate change poses to Sydney Water infrastructure and operations. The risk assessment confirmed that Sydney Water is well positioned to address climate change risks, particularly as Sydney Water staff deal with weather-related events on a daily basis and have a thorough understanding of how the climate influences Sydney Water's business from over a century of experience in dealing with extreme natural events.

However, as more accurate and more localised information becomes available, potential risks from climate change can change and new hazards can emerge. For this reason, Sydney Water is undertaking further research to better understand climate change impacts on Sydney Water assets and operations. This includes work on sewer corrosion, seawater inundation, impacts of drying soils, asset vulnerability and interdependencies.

Over the next two years, Sydney Water's focus will be collaborating with relevant agencies to develop appropriate tools to improve our understanding of climate change impacts.

3. Approaches to the management of water resources by all water users including provision for environmental flows

3.1 The Metropolitan Water Plan

The NSW Government released the first Metropolitan Water Plan in 2004. The plan involves a whole-of-government approach, with responsibilities spread across a number of agencies. The aim of the plan is to ensure a sustainable and secure water supply for Sydney, the Illawarra and the Blue Mountains. To balance water supply and demand, four elements are considered: dams, recycled water, desalination and water efficiency. This means that Sydney's water supply is no longer reliant on dams alone. Water is also used and managed more efficiently than it has been in the past. Together, this prepares for population growth and the potential impacts of climate change and future droughts.

Sydney Water has a number of responsibilities under the Metropolitan Water Plan, including:

- **Building a desalination plant** at Kurnell as part of the measures to balance supply and demand. The desalination plant commenced operation in February 2010. The plant will gradually be ramped up to supply 250 million litres (ML) of drinking water a day, which is 15% of Sydney's water needs. If required, the plant can be scaled up to supply 500 ML of water a day.
- **Increasing the amount of wastewater recycled.** By 2015, recycled water equivalent to about 12% of annual drinking water demand will contribute to non-drinking water needs and replacing environmental flows releases to the Hawkesbury-Nepean. Further detail on Sydney Water recycling initiatives is provided at Section 4.2.
- **Continuing to help households and businesses use water efficiently.** Water efficiency initiatives will save 24% of Sydney's water needs by 2015. Further detail on Sydney Water water efficiency initiatives is provided at Section 4.1.

The *2006 Metropolitan Water Plan* is currently under review. Sydney Water is participating in the review of the current plan and development of the *2010 Metropolitan Water Plan*.

3.2 Sydney Water's role in environmental flows

As part of the Metropolitan Water Plan, environmental flows are progressively being implemented so that, as far as possible, the pattern of streamflows that would have occurred naturally in rivers is restored. Environmental flow releases from dams can help native fish and other species to breed, reduce the growth of weeds and improve the sustainability of the river for swimming and boating. Apart from the Replacement Flows Project outlined below, the Sydney Catchment Authority and the NSW Office of Water are responsible for environmental flows provisions in the Metropolitan Water Plan.

Replacement Flows Project

The Government currently releases set volumes of water stored in Warragamba Dam for environmental flows in the Hawkesbury-Nepean River and for riparian purposes (to enable households with river frontages to extract water for stock and domestic uses and some irrigation).

Sydney Water's \$250 million investment in the Replacement Flows Project will increase its recycling by about 70%, from 25 billion litres a year to over 40 billion litres a year. Sydney Water has built pipelines between the sewage treatment plants at Penrith, St Marys and Quakers Hill to carry treated wastewater and recycled water.

Treated wastewater from all three plants will be transferred to a new recycled water plant at St Marys, further treated and then used to maintain the flow of the Hawkesbury-Nepean River, downstream of Warragamba Dam. As a result, up to an extra 18 billion litres a year of water will be available in Warragamba Dam.

Sydney Water has also upgraded an existing pipeline between Quakers Hill and Seven Hills to carry concentrate waste from the recycled water plant. A pipeline from Seven Hills to Oatlands has also been built, to connect with the northern Sydney sewerage system. An additional benefit of the project will be the reduction of nutrients currently discharged into the river from sewage treatment plants.

Deerubbin WaterFutures, a consortium including United Group Infrastructure, McConnell Dowell Constructors (Australia) and GE Water & Process Technologies, is working with Sydney Water to deliver the Replacement Flows Project. Construction of the new plant at St Marys began in May 2008 and is nearing completion. An extensive program of testing will then take place over a number of months before test flows of purified recycled water begin to be released in the Hawkesbury-Nepean River. The plant is expected to be fully operational from mid-our2010.

Figure 1 shows the pipeline route for the Replacement Flows Project.



Figure 1 Pipeline route for the Replacement Flows Project

3.3 Sydney Water's role in stormwater management

Sydney Water manages 436 kilometres of trunk stormwater channels and conduits, predominantly in the southern and inner-west regions of Sydney. Sydney Water also manages flood prone areas and trunk drainage at Rouse Hill. By length, this represents less than 5 per cent of the total metropolitan stormwater network. By volume, this part of the network conveys approximately 127 billion litres of stormwater – around 25 per cent of the total stormwater runoff volume in Sydney. The majority of the stormwater channels and drains across Sydney (approximately 95 per cent) are the direct responsibility of Councils.

Sydney Water's stormwater management programs include operating and maintaining 65 Stormwater Quality Improvement Devices (SQIDs), as well as several detention basins and wetlands to remove litter and sediment from the stormwater system. These programs assist in improving the health of various waterways around Sydney.

The different ownership of stormwater assets means that partnerships with Councils and/ other parties are critical in coordinating stormwater outcomes such as managing flood risk, environmental flow protection, improving waterway health and amenity, providing for growth and providing integrated water cycle opportunities.

Integrating stormwater harvesting and reuse into Water Sensitive Urban Design (WSUD) allows for reductions in drinking water use and protection of receiving waters from pollution and stormwater flow.

Stormwater harvesting

Sydney Water supports stormwater harvesting projects and has developed a Stormwater Harvesting and Reuse Agreement and Guidelines to encourage these schemes. Stormwater harvesting projects are primarily developed and managed by local councils to use stormwater from Sydney Water's assets to irrigate parks and playing fields.

Sydney Water is currently negotiating several stormwater harvesting agreements with local councils including the City of Sydney, Auburn City and Kogarah Council. Many of these incorporate WSUD to help achieve a number of water conservation, amenity and environmental outcomes.

One example of a successful stormwater harvesting agreement is the Sydney Park project at Alexandria. This joint project with the City of Sydney will see stormwater from the network running through Sydney Park, initially up to 50 million litres a year, used for irrigation at the park. Sydney Water will invest \$100,000 to operate and maintain a pilot harvesting and reuse scheme. Depending on the performance of the pilot scheme, the project has the potential to be expanded to harvest up to 440 million litres per year.

As well as reducing reliance on drinking water, this scheme will also help improve the health of Alexandra Canal by preventing sediments and pollution in stormwater making their way further downstream.

4. Best practice in water conservation and management

Sydney Water first developed a water conservation strategy in 1995. At this time, water utilities had minimal experience in the development and implementation of large-scale water conservation programs. Water conservation includes water efficiency, recycling and leak reduction.

Sydney Water provides its *Water Conservation and Recycling Implementation Report* to the Independent Pricing and Regulatory Tribunal (IPART) each year. This report details the water conservation and efficiency programs undertaken and the water savings achieved. The report is published on the Sydney Water website at:

<http://www.sydneywater.com.au/Water4Life/WhatSydneyWaterIsDoing/Initiatives.cfm>.

In its Operating Licence audit for 2008-09, IPART acknowledged that Sydney Water has shown commitment to addressing the water conservation and demand management requirements of the Operating Licence and continues to improve its performance through its adaptive management approach.

Water Wise Rules

Water Wise Rules replaced drought restrictions on 22 June 2009.

Water Wise Rules are long-term, water-savings rules that allow for sensible use of water outside of drought conditions. The rules build on water efficient behaviours adopted by the community while drought restrictions were in place and encourage people to continue to use water wisely and at times where it is most effective. For example, while customers now have the convenience of watering their garden on any day of the week, outdoor watering is to occur in the coolest parts of the day, to avoid excessive water loss through evaporation.

Water Wise Rules allow:

- Hand-held hoses, sprinklers and watering systems on any day before 10am and after 4pm. Hand-held hoses must be fitted with a trigger nozzle when watering
- Children to play under the sprinkler on a hot day
- Washing vehicles using a trigger nozzle
- Fire hoses for fire fighting only
- No hosing of hard surfaces except for health and safety purposes or emergency and construction activities, and
- Automatic exclusion for nurseries, market gardeners, landscapers, garden contractors, bowling greens, cricket wickets, golf tees and croquet, hockey, tennis and racing surfaces.

Sydney Water has estimated that Water Wise Rules will reduce annual demand by around 19 billion litres per year, or 3% of Sydney's annual needs, compared to demand over a ten-year average prior to drought restrictions.

4.1 Water efficiency initiatives

Water efficiency program

Sydney Water's water efficiency program has evolved into a comprehensive program targeting all major areas of water use in the residential, commercial and industrial sectors, as well as in schools. The areas targeted are those not covered by existing regulations, such as Building Sustainability Index (BASIX) requirements for new or renovated homes and the Commonwealth's Water Efficiency Labelling and Standards scheme (WELS).

The program adopts a variety of approaches to encouraging water efficiency, including rebates, advisory services, loans, subsidised supply and installation of water efficient fixtures, and education. An adaptive management approach is also taken involving an ongoing cycle of review and development. New programs are piloted and existing programs are improved or replaced based on customer feedback, research and lessons learnt, or when more cost efficient opportunities become available.

Examples of water efficiency initiatives

Some examples of individual water efficiency initiatives implemented by Sydney Water include:

- WaterFix
- Toilet Replacement
- One-to-one partnerships, and
- Smart Rinse.

WaterFix

WaterFix is Sydney Water's longest running demand management program. The program offers the supply and installation of a water efficient showerhead, tap flow regulators, a toilet cistern flush arrestor and repair of minor leaks by a qualified plumber. The retail cost of the service (\$180) is subsidised by Sydney Water. The cost to customers starts from \$22 and the service is provided free to low-income households holding a Pensioner Concession Card, a Health Care Card or a Veteran's Affairs Gold Card.

Programs like WaterFix that offer supply and installation of water efficient devices have proven to be very successful. Around 400,000 households have participated in WaterFix, resulting in water savings of around 8 gegalitres (GL, note: one GL is equal to one billion litres) per year (see Figure 2). The program is very cost effective at around \$1.30 per kilolitre, well below the usage price for water.

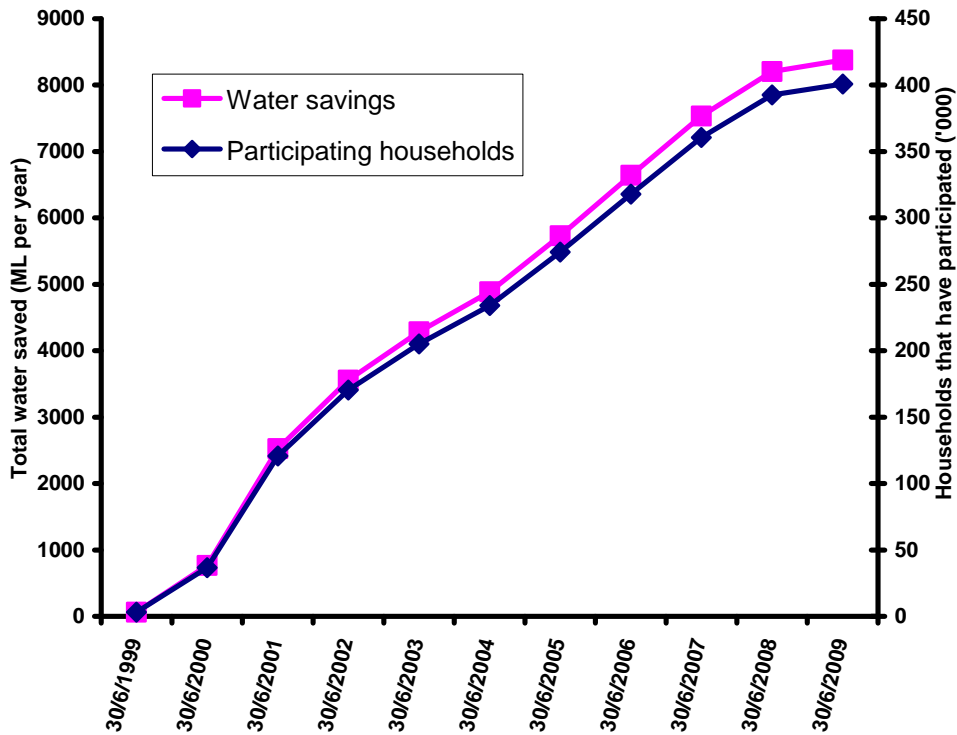


Figure 2 Participating households and water saved through the Water Fix program

Toilet replacement

Single flush toilets are one of the biggest users of water in homes, using 12 litres of drinking water with every flush. By switching to a 4-star rated dual flush toilet, households can save about 25,000 litres of water a year. Sydney Water estimates that around a quarter of residential toilets in Sydney Water’s area of operations are single flush.

The Toilet Replacement Program offers a subsidised supply and installation service to replace single flush toilets with new, water efficient dual flush toilets. A qualified plumber removes the customer’s old toilet and replaces it with a dual-flush toilet, allowing the customer to save up to \$370. Prices range from \$330 for a standard toilet to \$550 for a premium toilet. All are WELS 4-star rated. The price of the service can also be spread over four water bills, on request. In the first year of the program 9,981 toilets were replaced.

Sydney Water also currently offers a rebate to customers who prefer to organise their own replacement.

Every Drop Counts Business Program

The Every Drop Counts Business Program has implemented a range of successful water efficiency programs leading to a reduction in business water use of 46ML per day.

The program targets two distinct customer groups:

- Large water users through a one-to-one customer service model. Sydney Water has developed partnerships with 417 customers at over 10,000 sites to date.
- Small to medium water users on a one-to-many basis. Over 1500 small to medium water user businesses have taken part in Sydney Water water efficiency programs.

In 2006 Sydney Water was awarded the Stockholm Industry Water Award for the Every Drop Counts Business Program. The program has a range of management, technical and support tools to help Sydney Water customers in business, industry and the government sector achieve sustainable water efficiencies in their businesses. Two examples of these tools, one-to-one partnerships and Smart Rinse, are outlined below.

One-to-one partnerships

A core component of the Every Drop Counts program is fostering one-to-one partnerships with businesses that are large water users to achieve sustainable water savings and best practice. These partnerships are based around continuous improvement in water management. Sydney Water's partners include major industrial, commercial and institutional water users. The partnerships involve:

- a water management diagnostic to understand and improve water management in the business
- a water efficiency audit to identify potential cost effective water saving opportunities
- assistance in trialling new technologies and implementing commercially viable water saving projects.

Since 2001, Sydney Water has developed partnerships with 417 business customers. In 2008-09, the program exceeded its targets with 19 new large water using businesses joining and 50 water efficiency audits completed.

Smart Rinse

In addition to programs for large water users, Sydney Water provides opportunities for small to medium water users to save water. For example, Sydney Water identified that pre-rinse spray valves used in commercial kitchens were often inefficient. The Smart Rinse program was developed to replace these inefficient valves with low flow pre-rinse spray valves, reducing water use by an average of 42%. Sydney Water replaces these valves for free.

Smart Rinse began in 2007-08 and has been well received by business customers. At 30 June 2009, 3,039 Smart Rinse valves had been installed since 2007-08.

4.2 Recycling initiatives

Water recycling is a key component in securing Sydney's water supply in the future. Using recycled water instead of water sourced from dams or desalination allows these sources of water to be saved for drinking.

To support the *Metropolitan Water Plan* target for recycled water to provide 12% of Sydney's water needs by 2015, Sydney Water seeks to provide recycled water schemes where it is economically, technically and environmentally feasible to do so. In 2008-09, Sydney Water has saved 10,014 ML of drinking water from schemes that have been in operation since 1999.

Some examples of Sydney Water recycled water initiatives are:

- Rouse Hill Recycled Water Scheme
- Wollongong Recycled Water Scheme
- Cammellia/Smithfield Public Private Partnership, and
- Using recycled water at sewage treatment plants (STPs).

Rouse Hill Recycled Water Scheme

The Rouse Hill Recycled Water Scheme is Australia's largest residential water recycling project. The scheme started in 2001 and over 18,000 houses are now using up to 1.7 billion litres of recycled water each year for flushing toilets, watering gardens, washing cars and other outdoor uses. NSW Health has now approved recycled water to also be used in washing machines. Recycled water used in the scheme is treated to a very high standard. Wastewater that has previously been used in bathrooms, laundries, kitchens and businesses goes through a series of processes including microfiltration and ultraviolet disinfection, on top of the usual high level of wastewater treatment.

In 2008, Sydney Water expanded the Rouse Hill Recycled Water Plant so that it has the capacity to provide recycled water to up to 36,000 homes in surrounding areas. This expansion will allow up to 4.7 billion litres of wastewater to be recycled each year for residential use.

On average, the Rouse Hill scheme has reduced demand for drinking water by about 40%.

Wollongong Recycled Water Scheme

The Wollongong Recycled Water Scheme is one of the biggest water recycling projects in Australia. The water recycling plant has been operating since 2006 and produces high quality recycled water suitable for a range of industrial and irrigation purposes.

Under Stage 1 of the scheme, up to 7.3 billion litres of recycled water a year is supplied to BlueScope Steel, which is the region's largest water user. This is equal to about 17% of the Illawarra's water needs. In early 2009 under Stage 2 of the scheme, the plant also started supplying up to 580 million litres a year to the Port Kembla Coal Terminal, Wollongong Golf Club and nearby Wollongong Council parks. Recycled water used under Stage 2 replaces approximately 1.4 ML a day of drinking water and Port Kembla Coal Terminal's fresh water use has been reduced by more than 70%. The terminal uses recycled water for dust suppression, washing equipment and water available for firefighting.

Due to the success of the project, Sydney Water is investigating the potential to expand the water recycling treatment plant to provide more recycled water to large industrial water users in the area (Stage 3). If Stage 3 proceeds, this would see virtually all sewage in the catchment recycled, reducing the region's water consumption by up to 25%.

Camellia/Smithfield Public Private Partnership

Aquanet Sydney and Veolia Water, supported by Sydney Water in a retailer capacity, will build, own and operate a \$100 million project at Camellia/Smithfield that will initially deliver 4.3 billion litres of recycled water a year via Sydney Water's distribution network by 2011. Major industrial customers that have already signed agreements to receive recycled water from the scheme include Shell Refining, Visy Paper, Marubeni Australia Power Services, LyondellBasell Industries and Sydney Turf Club – Rosehill Gardens.

Using recycled water at STPs

Under its Operating Licence, Sydney Water has been required to reduce drinking water use by 80% at Malabar, North Head and Bondi STPs and by 85% at all other STPs. This target has been met at all STPs.

Since 1995, the amount of recycled water used in Sydney Water’s STPs has increased from 17ML a day to 43 ML a day, significantly reducing the volume of drinking water used at the plants (see Figure 3 and Figure 4 below).

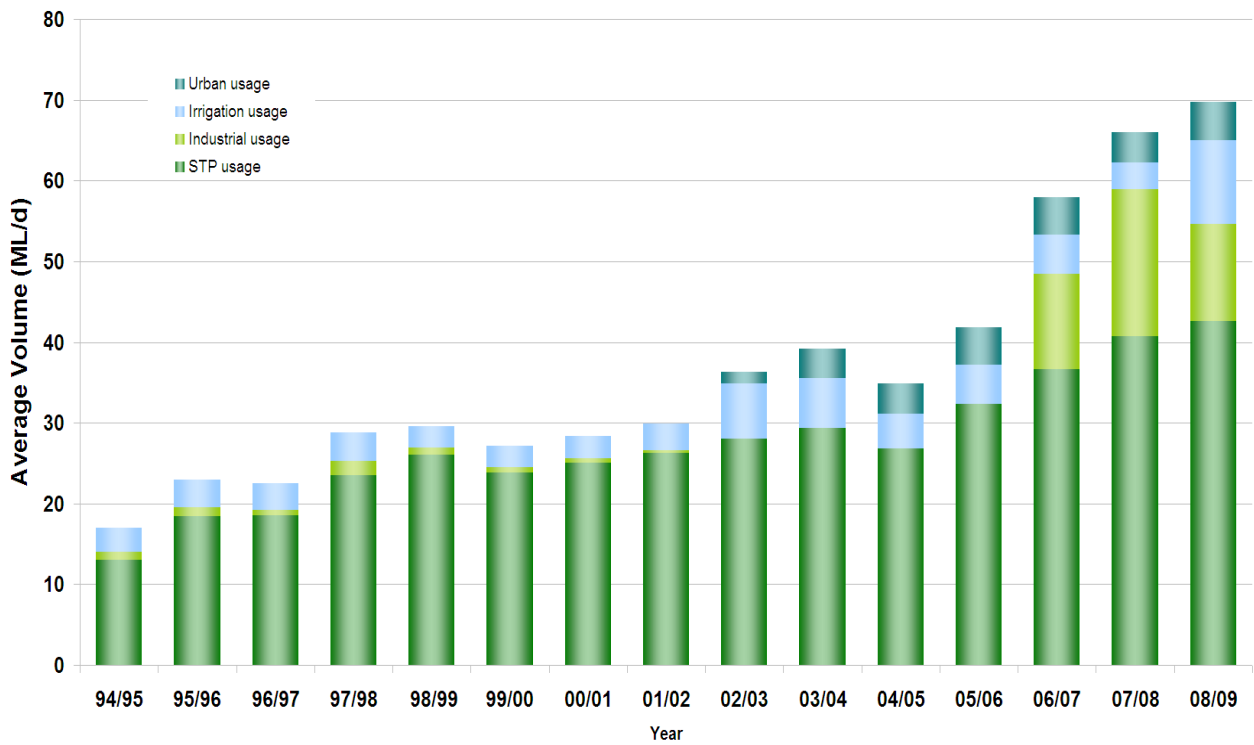


Figure 3 Recycled water usage by sector (excluding external schemes)

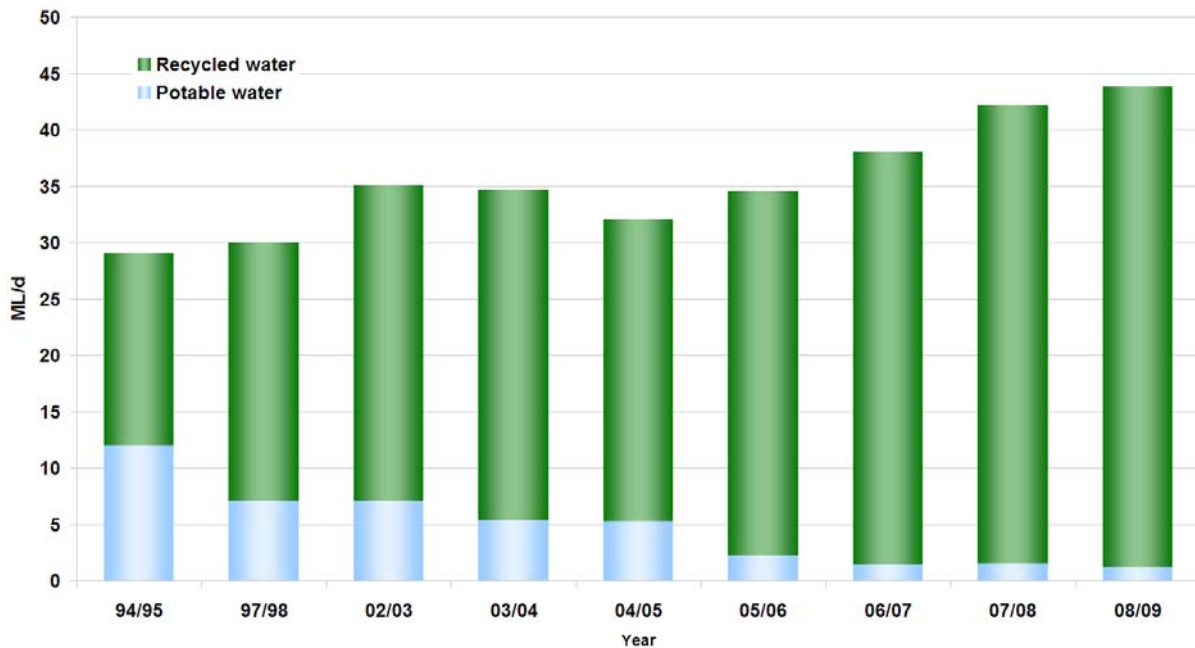


Figure 4 Drinking water versus recycled water use in STPs¹

4.3 Leak Reduction Program

Sydney Water’s Leakage Management Program commenced in 1999 as a key component of the strategy to achieve the water conservation target. Below are examples of some of the best management practices Sydney Water employs in leak reduction.

Active leak detection and repair

Leak detection and repair is a major priority for Sydney Water. The active leak detection and repair program uses world best practice to detect and repair hidden leaks using acoustic scanning. This continuously targets Sydney Water’s supply zones on an assessed priority basis. Leaks are found on water mains, connections to the mains, and on fittings such as hydrants and valves

Without active leak detection, leaks from pipes would increase each year. Since Sydney Water began active leak detection in 1999, it has reduced leaks by over 22,900 ML/year.

Pressure management

High water pressure contributes to burst water mains, leaks and water waste. Sydney Water uses pressure regulating valves and system monitoring points to achieve more consistent and lower water pressure levels across the water supply system. These valves are installed in the high-pressure areas to reduce water pressure and hence reduce system leaks and main breaks.

It is estimated that up to June 2009 savings of over 3,400ML/year have been achieved.

¹ Based on the 1994-95 drinking water use at STPs as baseline (4380 ML/year)