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Securing water supplies



This chapter outlines the Government's action plan to meet our future water needs. The initiatives apply to the whole Central Region. Local actions are outlined in the next chapter.

The Strategy balances our water needs by:

- conserving and using our existing water supplies more efficiently
- interconnecting water supply systems and encouraging water trading
- making use of alternative sources such as recycled water and stormwater
- adding to (augmenting) current urban supply systems.

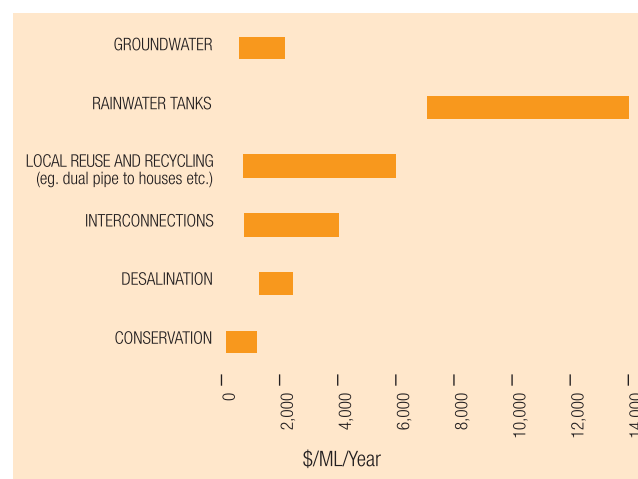
Choosing the best options

The sustainability assessment completed as part of the Draft Strategy released in April 2006 investigated the economic, environmental and social benefits and impacts of all options. This has helped to inform the selection of the best mix of actions for the Central Region in the short, medium and long term.

After 150 years of water harvesting and use in the Central Region, the most cost-effective and energy-efficient options have already been implemented. The exception to this is water conservation and efficiency and that is why the Government promotes these measures first. In addition to being cost effective, conservation actions also reduce pressure on our rivers and aquifers, save energy and greenhouse gas emissions and have widespread community support.

Figure 3.1 demonstrates that many future options for securing water supplies will cost more due to significant treatment and/or pumping requirements.

Figure 3.1 Relative cost ranges (\$/ML/year) for various option categories*



* Based on uniform cost analysis used for all options assessed as part of the Strategy

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There are currently 26 major reservoirs in the Central Region that supply about 90 per cent of our water. Groundwater from the region's aquifers provides about 8 per cent of our water.

In the future we will need to use a greater diversity of water sources to avoid over-use of any one source. In addition, alternative water sources such as recycled water, stormwater and seawater are not reduced by climate variability and climate change to the same extent as supplies from rivers and aquifers.

Alternative sources of water are under utilised in the region largely because they tend to cost more to harvest, treat and use. Recycled water, stormwater and desalinated seawater however can provide safe, fit for purpose alternatives to river and groundwater where these latter resources are stretched.

In some instances, the sustainability assessment has shown that increasing an area's water supply by reintroducing existing infrastructure, duplicating existing pipelines or interconnecting with another system makes the most sense. These augmentation actions help to get the most out of our existing infrastructure. Interconnections mean water can be moved where and when it is needed most.

Meeting our long term water needs will mean all sectors of the community increasing conservation and efficiency and making better use of alternative sources. It will also be necessary to increase water supplies. The Strategy reflects this need for diversity. The Government will continue to strive to undertake the most cost-effective and sensible water supply and demand actions that take into account all economic, social and environmental considerations.

Aligning water planning with statutory planning

The Government recognises the importance of aligning the efforts of water authorities and councils in achieving more sustainable water use in urban areas. Water authorities are currently finalising the first round of water supply demand strategies, due for completion by early 2007. These strategies are an excellent first step in increasing the use of alternative sources throughout the region. When they are next reviewed, they will need to incorporate sewer and stormwater networks to provide a fully integrated assessment of alternative water supplies.

The Government is supporting the alignment of water authorities and councils efforts in sustainable water use in urban areas through its reform of the planning and building regulatory frameworks to ensure that new developments support water conservation and use recycled water and alternative supplies where appropriate.

The new Clause 56 of the Victoria Planning Provisions, which came into operation on 9 October 2006, requires developers in residential subdivisions to incorporate water sensitive design into their developments to reduce their impact on waterways and the bays. This provision applies throughout Victoria and sets a new standard in environmental protection for residential subdivision.

Stormwater management, including the implementation and promotion of water sensitive urban design by councils and Melbourne Water, is important in ensuring that stormwater is of a quality high enough to enable its cost-effective use as an alternative source.

Dual pipe water supply systems for home use (ie. a second pipe system to transport treated recycled water or stormwater to homes) provide significant opportunities for reducing demand for river water. As stated in *Our Water Our Future*, the Government will work with local Government, water authorities and developers to support dual pipe systems for recycling where they are likely to be economically viable. As there are many instances where dual pipe systems will not be cost effective and there will be other more viable options, the Government will not mandate dual pipe systems in all new greenfield residential developments.

Clause 56 of the Victorian planning provisions now provides water authorities with the power to mandate dual pipe systems for particular areas, where they are identified as the best solution for balancing overall supply and demand. These areas are likely to be located close to wastewater treatment plants or a long way from drinking water supplies.

The Melbourne 2030 strategic planning process also considers water conservation and alternative supplies, including stormwater. The Growth Areas Authority was established to promote housing affordability and housing choices, and to support infrastructure planning, land rezoning and preparation of developer contribution plans in Melbourne's five growth areas – Casey-Cardinia, Hume, Melton-Caroline Springs, Whittlesea and Wyndham.

To help coordinate the provision of alternative water supply systems, the Authority will include dual pipe water infrastructure (regional treatment plants and related infrastructure) in its planning guidelines to ensure dual pipe systems are considered in planning for the growth areas. In addition, water authorities will consult with the Growth Area Authority, local government and developers when planning for water services in growth areas, and will consider dual pipe servicing wherever possible.



Conservation and efficiency

The best way to live within our water means is to stop water wastage and to try and use less water at home, work and play.

Our starting point must be to ensure that we place a high value on water by conserving it wherever we can and using it as efficiently as possible. As water resources become scarcer, water will become more valuable. Water conservation is the only remaining low-cost option for securing water supply.

Reducing the amount of water wasted – in everything from household appliances to large water mains – is the first and best action because generally it is less financially, socially and environmentally costly than alternatives. Water conservation saves energy and greenhouse gas emissions, delays the need to augment or expand water supply systems and has widespread community support.

Conserving our traditional drinking water supplies also has important public health benefits. For many years, water authorities in the Central Region have undertaken catchment management practices to protect our traditional water sources. Consequently, drinking water from these sources is higher quality and lower risk and it requires less treatment than alternative sources. It is important to save these high quality resources as much as possible for drinking purposes.

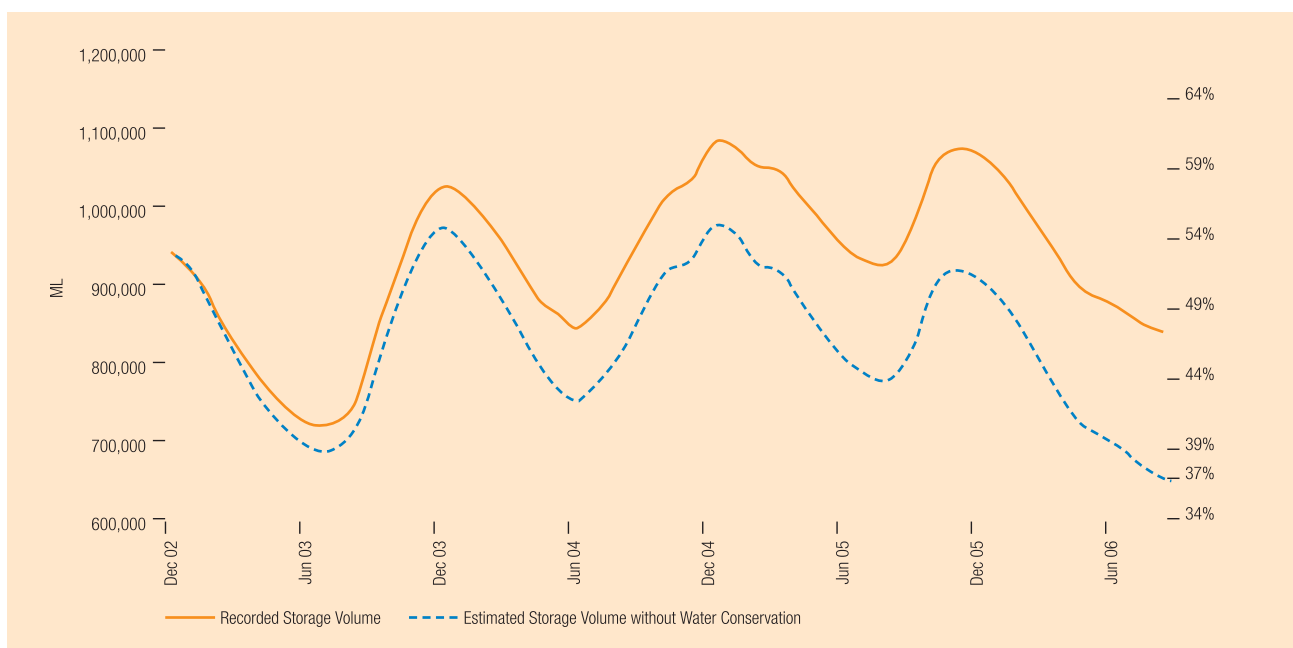
Continuing our urban water conservation success

The community has embraced conservation throughout the region. Melburnians have reduced per capita water consumption from average 1990's levels by 22 per cent. This is a great success. These savings have been achieved through a range of demand management initiatives including the permanent water saving rules, Water Smart Gardens and Homes Rebate Scheme, block tariffs (pricing), the *Our Water Our Future* behavioural change campaign, and the Stage 1 and 2 water restrictions in place during November 2002 and February 2005.

Figure 3.2 indicates that if Melburnians had not made these savings then storage levels would have fallen from 47 per cent to 37 per cent and Melbourne would be on Stage 3 water restrictions. (Melbourne was on Stage 1 restrictions at the time of publication).

To help secure our water supplies, it is important that the community works together to maintain these savings and extend our water conservation efforts into the future.

Figure 3.2 Impact of conservation and restrictions on Melbourne's water storage levels



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Water conservation targets

Public comment on the Draft Strategy highlighted that the community expects all water users to contribute to the water conservation effort. Through this Strategy, the Government has set targets to reduce total per capita water use across the Central Region by at least 25 per cent by 2015 (compared to the average 1990's use), increasing to 30 per cent by 2020. Figure 3.3 outlines these targets for each water authority in the Central Region.

Policy

The Government requires water authorities throughout the Central Region to work with the community to reduce total per capita water usage by at least 25 per cent by 2015, increasing to 30 per cent by 2020. The basis of comparison is the 1990's average water use.

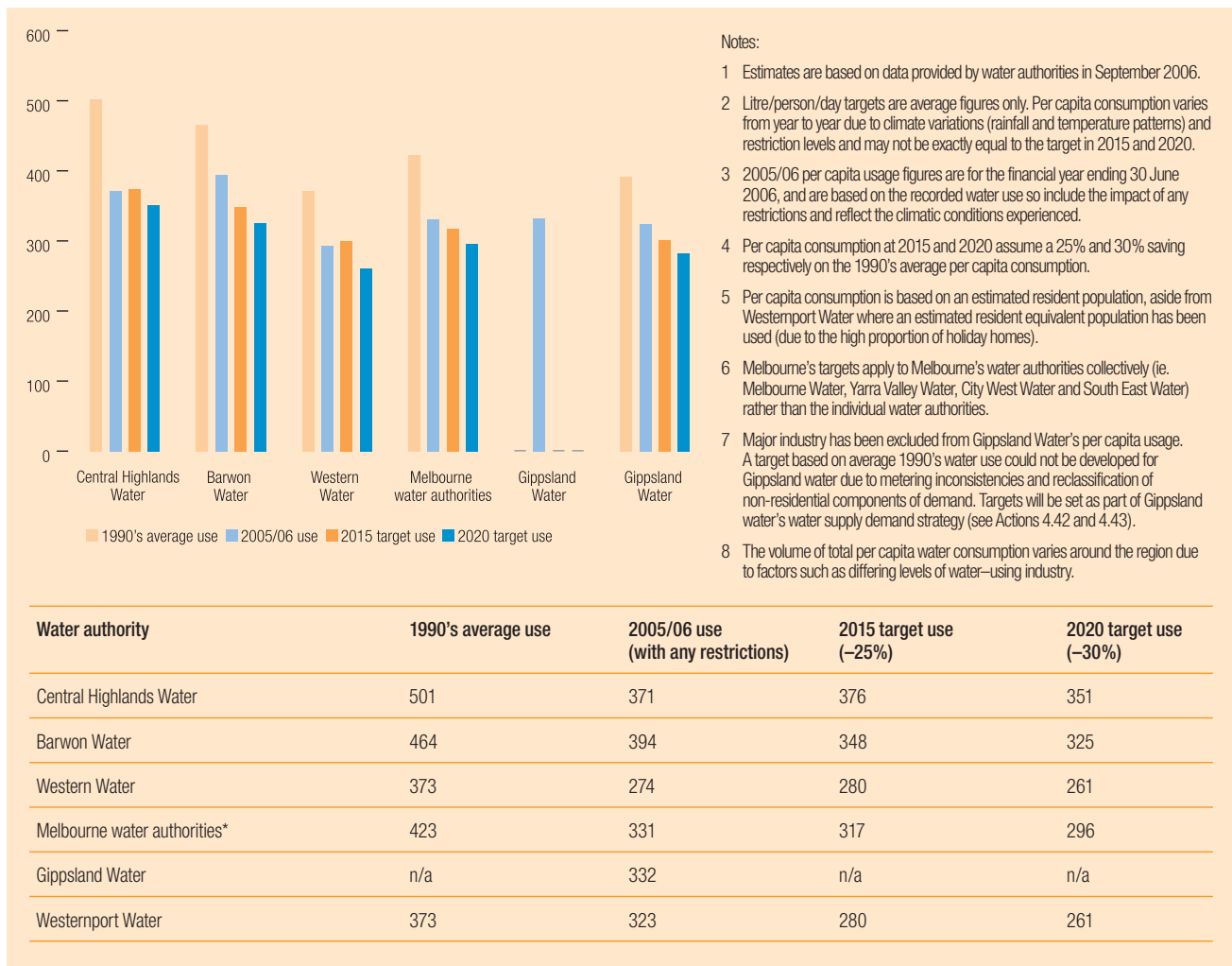
Policy

The Government, in response to continuing low inflow conditions, supports water authorities accelerating conservation programs, to bring forward the achievement of targets wherever possible.

Total per capita water use includes all water used in the residential sector (homes) and non-residential sector (including industry, commercial/institutional buildings, open spaces and losses from the water distribution system).

These targets can only be met if all water users act to save water. This includes households, businesses and industry, councils, water authorities and the Government.

Figure 3.3 Targets to reduce total per capita water use (litres/person/day)





It needs to be noted that per capita water use across the water authorities is influenced by the proportion of industrial water use. Water authorities with a higher proportion of industrial use have higher per capita water use.

Targets based on average 1990's usage could not be developed for Gippsland Water because of metering inconsistencies during the 1990's and reclassification of non-residential components of demand. Gippsland Water, in consultation with the Government, is required to develop targets for total per capita water conservation for 2015 and 2020. These will be consistent with other water authorities in the Central Region and achieve a significant decrease in per capita use compared to current levels. They should include a separate target for major industry which is based on industry best practice.

Reducing water use at work

In order to achieve the targets to reduce total per capita water use, the non-residential sector must play its part.

There is insufficient data of non-residential consumption in the 1990's to set a target of a 25 per cent reduction from 1990's water use. However, it is recognised that a consistent effort must be made by both residential and non-residential water users. As such, an interim target for the non-residential sector has been developed.

It is expected that the non-residential sector will contribute to water savings going forward in proportion with its contribution to the overall demand for water. This approach also takes into account that different water authorities will have different proportions of residential and non-residential use. The non-residential sector will also be made up of a range of users (eg. different industries, open spaces etc.) all using very different volumes of water, with different opportunities to make savings.

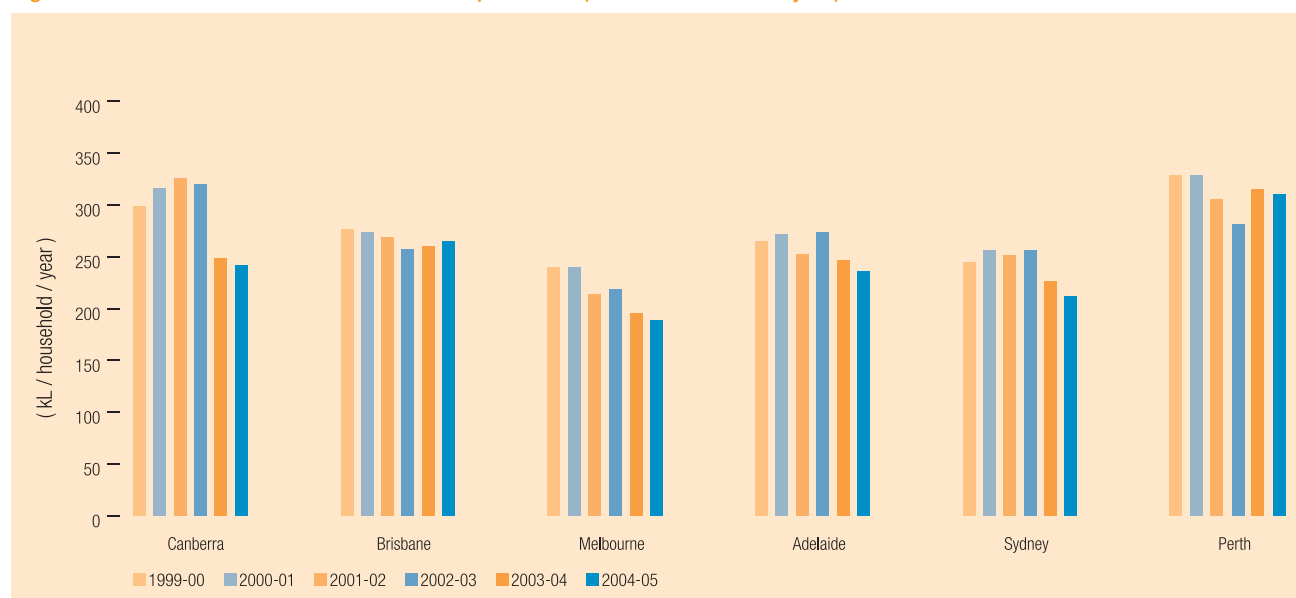
Policy

The Government requires water authorities throughout the Central Region to work with the non-residential sector to contribute to water savings going forward in proportion with its contribution to the overall demand for water. This should be at least 1 per cent per year of current non-residential usage.

Reducing water use at home

Figure 3.4 shows the average amount of water used around the home per person per year for some of Australia's capital cities. This demonstrates that Melbourne has made the greatest savings to date and maintains the lowest residential water consumption per property in comparison to other capital cities. However, there is still more that can be done. Prior to the 1990's, water use per person per day in Melbourne households was 400–500³ litres. It is currently 200–300⁴ litres and in the future it could be as low as 100–150⁵ litres based on use in European cities. It is recognised that Melburnians enjoy different lifestyles with larger gardens than many Europeans. However, there is still a lot of opportunity to reduce our daily water use. The Government is committed to remaining a national leader in this area, and reducing household water use even further in the future (see Table 3.1 for a list of Government actions to achieve this).

Figure 3.4 Household water use in Australian capital cities (kilolitres/household/year)⁶



Note: One kilolitre (kL) equals 1000 litres

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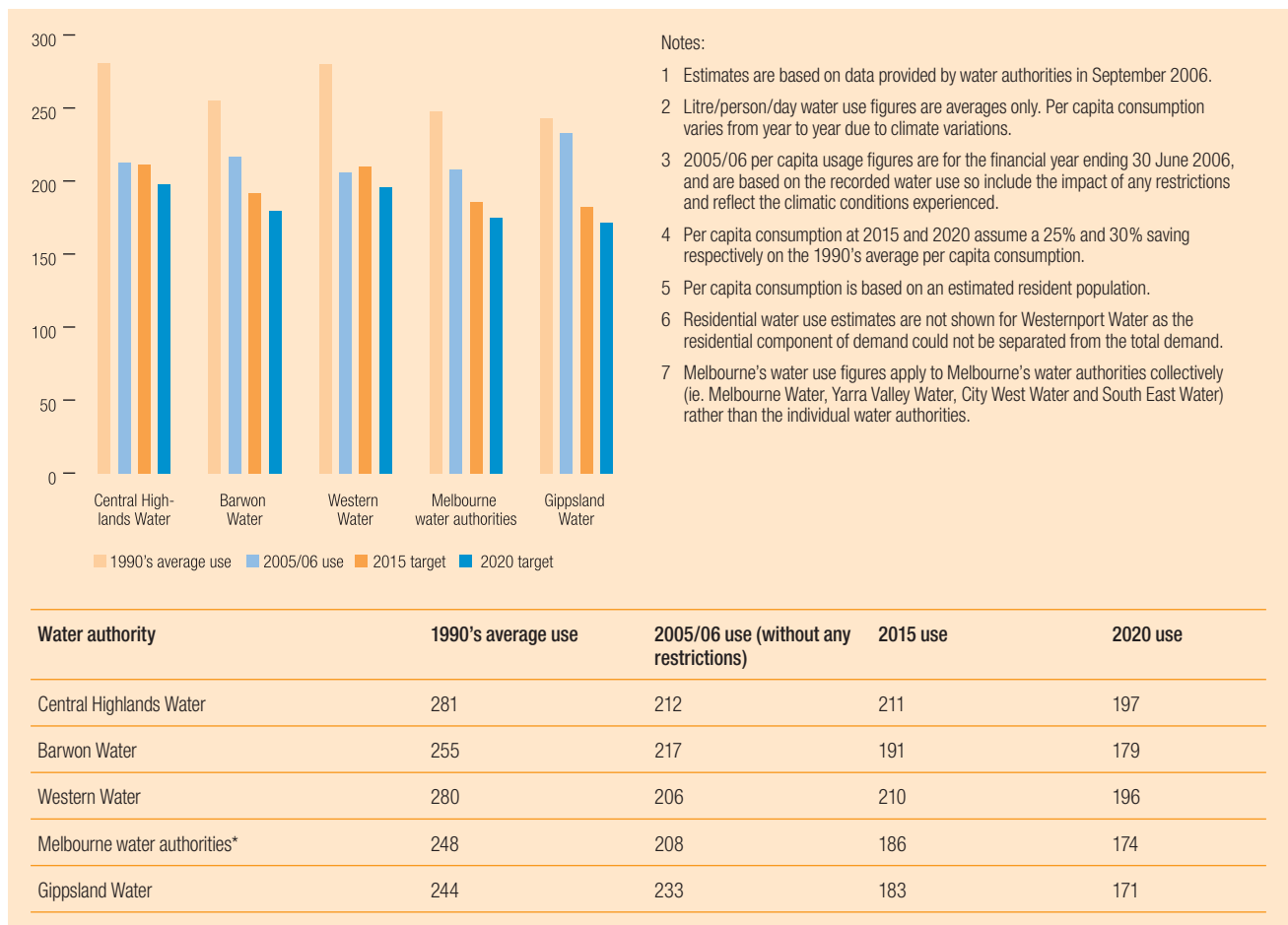
Policy

The Government requires water authorities throughout the Central Region to work with the residential sector to reduce its water usage by at least 25 per cent by 2015, increasing to 30 per cent by 2020. The basis of comparison is the 1990's average water use.

The corresponding residential water use figures are shown in Figure 3.5.

The 2005/06 residential use shown in Figure 3.5 for Central Highlands Water and Western Water are close to the 2015 use due to the effect of restrictions before or during 2005/06.

Figure 3.5 Residential water conservation (litres/person/day)



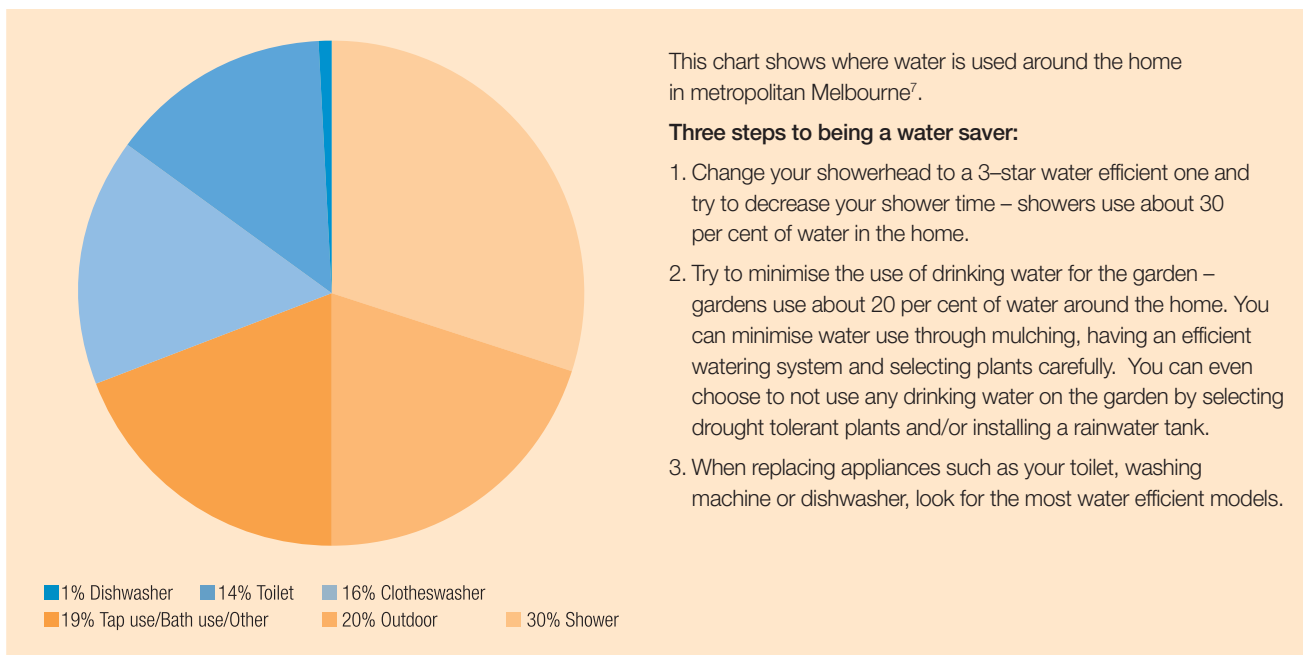
Notes:

- 1 Estimates are based on data provided by water authorities in September 2006.
- 2 Litre/person/day water use figures are averages only. Per capita consumption varies from year to year due to climate variations.
- 3 2005/06 per capita usage figures are for the financial year ending 30 June 2006, and are based on the recorded water use so include the impact of any restrictions and reflect the climatic conditions experienced.
- 4 Per capita consumption at 2015 and 2020 assume a 25% and 30% saving respectively on the 1990's average per capita consumption.
- 5 Per capita consumption is based on an estimated resident population.
- 6 Residential water use estimates are not shown for Westport Water as the residential component of demand could not be separated from the total demand.
- 7 Melbourne's water use figures apply to Melbourne's water authorities collectively (ie. Melbourne Water, Yarra Valley Water, City West Water and South East Water) rather than the individual water authorities.

*Melbourne Water, City West Water, Yarra Valley Water and South East Water



Figure 3.6 Water used around the home in metropolitan Melbourne

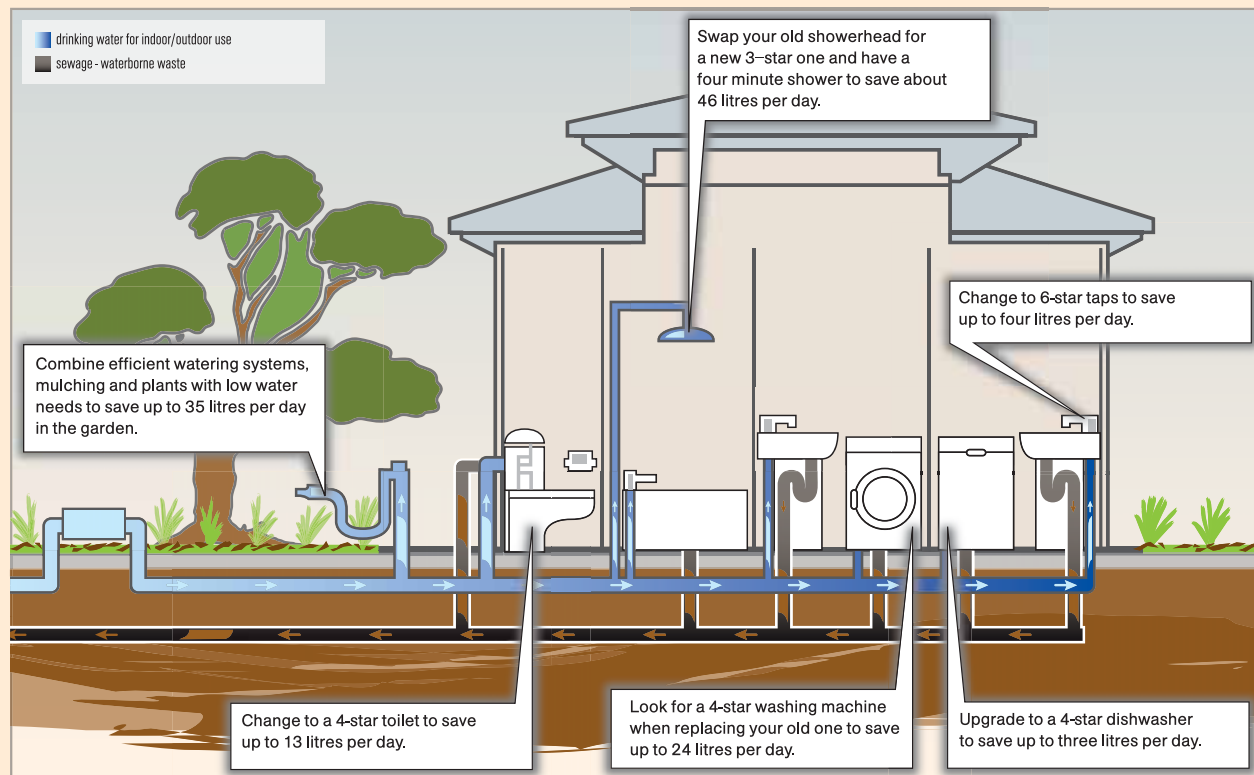


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Are you a water saver at home?

A range of water-efficient appliances and fixtures can be installed within the home to help save water. These will benefit the whole community by helping to meet the water conservation target in your area, and will also save money on your water and electricity bills. You could also encourage their installation at your workplace.

The home below shows how each member of the family can cut water use by about 45 per cent by installing all of these appliances. This would save a three-person household from \$180 to \$300 on their water and energy bills each year.



The star rating scheme will gradually replace the old AAA rating scheme. This is part of the national Water Efficiency Labelling and Standards (WELS) scheme, which became mandatory from 1 July 2006. The greater the number of stars the more efficient the product is.

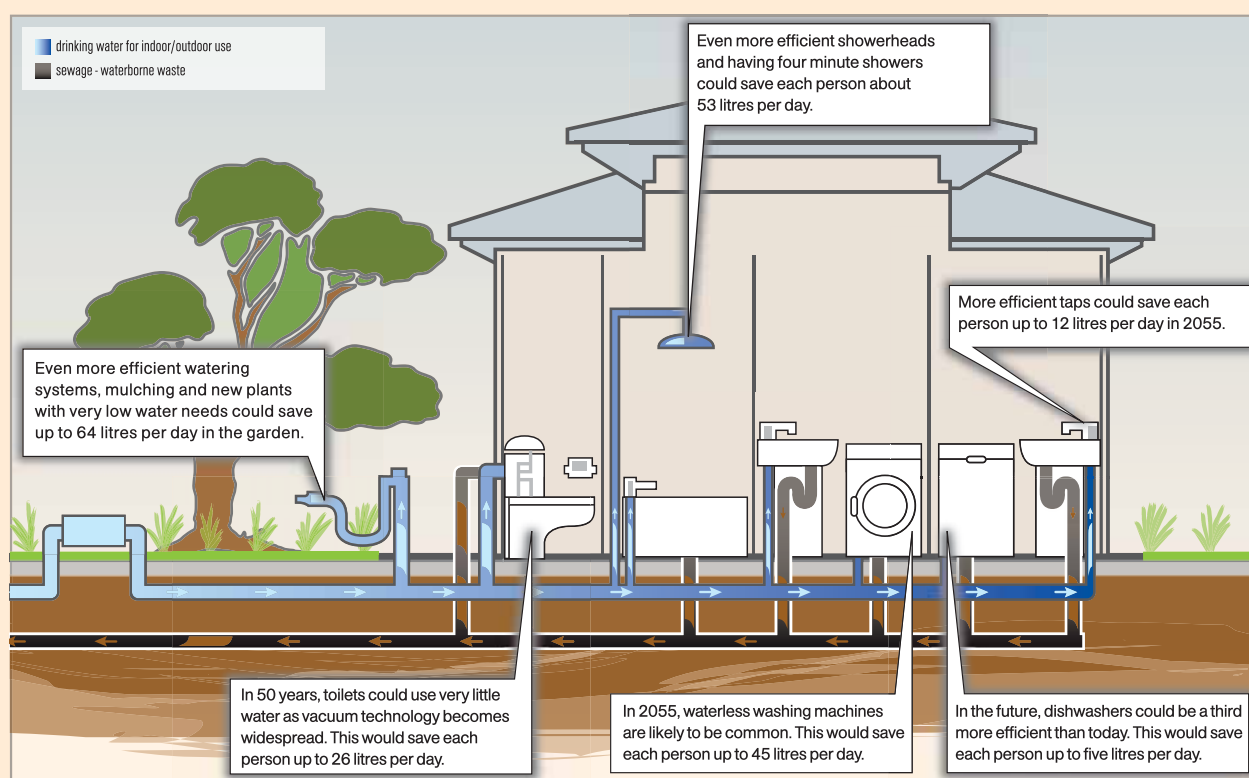


A 50-year vision for a home in the Central Region

The Government has established a long-term vision for the residential sector – to use about 70 per cent less water by 2055 than the average home today. This will be refined when the Strategy is reviewed in seven years.

This home shows how water-efficient a house could be in 2055. This home would use about 70 per cent less water than an average home today and about 45 per cent less than a current “water-saver” home.

Over the next 50 years, new technologies will emerge, and the amount of water used by household appliances and fittings will continue to decrease. Already there are clothes washing machines and toilets available which use very little or no water. In some cases, these technologies may consume more energy than their current counterparts. However, in time, these technologies will improve and also become cheaper. As a result, their adoption will be more widespread.



Improving our conservation targets

In recognition of the importance of water conservation, best practice benchmarks for water use will be developed for different types of non-residential water uses (different industry sectors, commercial and open spaces and public gardens). These benchmarks will be used to develop specific short and long-term targets in the next review of the Strategy.

Water authorities will be required to identify the contribution made by the non-residential sector to the businesses' overall water savings and compare these contributions to the benchmarks. This will be

done through water authorities' water supply and demand strategies. This will allow water authorities to target those particular sectors that are going to deliver the most significant water savings at the least cost.

As technology advances, it is possible that authorities will achieve targets sooner than expected. If this occurs, the Government supports authorities continuing to pursue opportunities that are cost-effective.

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Taking action to meet the conservation targets

The Government has used a range of approaches to encourage water conservation and efficiency. Some of these are detailed below, while new actions and initiatives to be introduced throughout the region are summarised in Table 3.1.

The Government recently required urban water authorities around the State to introduce permanent water saving rules. These rules aim to curb inefficient and unacceptable use of water. They are locally appropriate, and so they vary from area to area. Water restrictions and permanent water saving rules will be strengthened with the introduction of on-the-spot fines for offenders. If required, the Government will consider further adjustments to the permanent water saving rules to curb water wasting including the possibility of introducing additional measures if water conservation targets are not met.

As outlined in *Our Environment Our Future*, the Government will invest \$4 million to install water-efficient showerheads and dual flush toilets in all Victorian Government public housing in the next four years. An additional \$3.9 million will also be provided to enable hospitals and aged care facilities across the State to retrofit water efficiency measures and develop innovative water reuse and recycling projects.

All water authorities in the Central Region are required to invest in water conservation programs such as reduction in system losses (mainly through increased leak detection), community education and incentive programs. Further details of these programs are outlined in Chapter 4 and in each water authority's water supply demand strategy.

The Government will also continue to encourage water authorities, in consultation with their customers, to examine and further develop innovative pricing that supports and encourages water conservation efforts. Tariff structures and prices are regulated by the independent Essential Services Commission. The Government recognises that any future price changes need to be considered in an open and consultative manner, and be balanced with the ability of all Victorians, particularly low income and vulnerable customers, to afford essential water and sewerage services.





Table 3.1 The Government's new state and regional commitments to water conservation

Action	Implementation
Action 3.1 Water authorities in the Central Region will implement water conservation programs to achieve the Government's targets for the reduction of total per capita drinking water consumption (25 per cent reduction from 1990's average use by 2015, increasing to 30 per cent by 2020). Additional conservation measures will be implemented in Melbourne with a view to bringing forward the 30 per cent target to 2015. See Figure 3.3 for specific targets.	Who: Water authorities Timeframe: By 2015 and 2020
Action 3.2 The Government will extend the existing <u>regional</u> <i>Our Water Our Future</i> behavioural change program until 2015. This program aims to maintain existing savings, increase community awareness and understanding of water and to drive behavioural change. This is currently done through a media, marketing and advertising campaign.	Who: Dept. of Sustainability and Environment and water authorities Timeframe: Ongoing until 2015
Action 3.3 The Government will extend the existing <u>metropolitan</u> <i>Our Water Our Future</i> behavioural change program until 2015, with funding from the metropolitan water authorities. This program aims to maintain existing savings, increase community awareness and understanding of water and to drive behavioural change. This is currently done through a media, marketing and advertising campaign.	Who: Dept. of Sustainability and Environment and metropolitan water authorities Timeframe: Ongoing until 2015
Action 3.4 The Government will introduce on-the-spot fines for breaching water restrictions or permanent water saving rules. These will be implemented during summer 2006/2007.	Who: Dept. of Sustainability and Environment and water authorities Timeframe: Summer 2006/2007
Action 3.5 The Government will reform the water component of the 5 star standard for buildings to make it performance-based, in line with the recommendations of the Victorian Competition and Efficiency Commission. The Government will: <ul style="list-style-type: none"> • complete a regulatory impact assessment that considers benchmarks, water saving targets and energy saving targets, to be published in 2007, to ensure there is broad consultation on the new proposals. • develop and implement a tool along the lines of BASIX, a computerised sustainability assessment tool, to support the new performance-based approach, and modify the Victorian building regulatory framework to support the tool. • during 2007–08, the Government will explore the feasibility of implementing performance-based water savings requirements for commercial and industrial buildings through the Building Code of Australia 	Who: Dept. of Sustainability and Environment Timeframe: Operational by 2009
Action 3.6 Through the national Water Efficiency Labelling and Standards (WELS) scheme for water appliance products available on the market, the Government will seek the adoption of: <ul style="list-style-type: none"> • a mandatory minimum water-saving standard for showerheads • a mandatory minimum water-saving standard for washing machines • a higher mandatory water saving standard for toilets • the inclusion of a mandatory water efficiency labelling for evaporative coolers. 	Who: Dept. of Sustainability and Environment Timeframe: 2010
Action 3.7 South East Water will conduct a trial of smart water meters showing real time water use with in-home displays for residential, commercial and industrial customers. The Government will then consider the roll out of smart water meters in the Central Region.	Who: South East Water Timeframe: Trial completed December 2007
Action 3.8 The Government will continue to support the Smart Water Fund, which aims to drive and support innovation around the State in water conservation and the recycling of water and biosolids. A review of the program will be undertaken in 2008 to determine whether it should be continued.	Who: Metropolitan water authorities and Dept. of Sustainability and Environment Timeframe: Until 2008
Action 3.9 The Water Smart Homes and Gardens Rebates scheme, currently funded by the Victorian Water Trust, will be extended for a further four years. Currently under this scheme, rebates are available on rainwater tanks, dual flush toilets, greywater systems and various other water saving appliances and devices.	Who: Victorian Water Trust and water authorities Timeframe: Ongoing until June 2011
Action 3.10 The Government and urban water authorities will distribute, through various exchange programs around 160,000 water efficient, three star shower heads in the Central Region over the next three years. Once implemented these shower heads will save about 1, 900 ML of water per annum. Please note that these water savings are included in the local actions in Chapter 4.	Who: Urban water authorities Timeframe: Ongoing until June 2009.
Action 3.11 The Government will work with water authorities to develop a web-based ready-reckoner to assist home-owners in choosing different water saving options for their home. This will include: <ul style="list-style-type: none"> • water saving appliances • rainwater tanks • greywater systems. 	Who: Dept. of Sustainability and Environment and water authorities Timeframe: 2007
Action 3.12 The Government will continue the Sustainable Water Efficiency Program for schools. This involves an audit of indoor water use and a retrofit of fittings and appliances. Payment is based on estimated water savings over two to three years.	Who: Dept. of Sustainability and Environment Timeframe: Until 2009

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The Government continues to support the use of regulation to increase conservation and efficiency, through the reform of the 5 star standard for buildings and the Water Efficiency Labelling and Standards (WELS) scheme. These approaches are the most cost-effective as they ensure improved water efficiency of fixtures and appliances when they are being replaced.

As outlined in Action 3.5, the Government will reform the water component of the 5 star standard for buildings to make it performance-based. This will require separate water and energy-saving targets to be established for new homes and will be in operation by 2009. This will replace the current choice between a rainwater tank and a solar hot water system. To allow building designers to accurately predict the performance of their building designs against these targets, a computerised tool is required. The Government will develop a building sustainability assessment tool along the lines of the New South Wales BASIX tool.

The New South Wales BASIX tool is a web-based tool that allows building designers to enter details of their building designs, including a wide range of water and energy-saving measures, and calculates the resulting water and energy-savings. Once the water and energy-saving targets are reached, it issues a certificate that forms part of the building approval. This allows building designers to choose water and energy-saving measures that best suit their circumstances at least cost. It encourages building designers to innovate and allows the market to provide a range of water and energy-saving measures rather than prescribing one particular solution. This tool will be applied through the Victorian building regulatory framework.

As outlined in Action 3.6, at the national level, the Victorian Government is seeking to include minimum standards for showerheads, toilets, washing machines and the inclusion of evaporative coolers through the WELS scheme. This would mean all products of these types available on the market would be required to be of a certain water efficiency standard.

The Victorian Government will also seek inclusion of evaporative coolers in the scheme. WELS is a cooperative scheme between the states, territories and the Commonwealth. The inclusion of new standards or new products in the scheme requires agreement of the other jurisdictions and is subject to a regulatory impact assessment.

As outlined in Action 3.7, South East Water will trial smart water meters with in-home displays for residential customers. These meters enable customers to see their water use in real-time, without waiting for their water bills. This information allows customers to better understand their water usage patterns. The trial will allow smart meters to be considered for roll-out throughout the Central Region.

In addition to the smart water trials, South East Water has been involved with the development of an inexpensive web-based software product that provides commercial, industrial, and open space customers with the opportunity to track their water use in virtually real-time using a data-logger. Being a web-based product, the information can be accessed anywhere and by different parties including water authorities. This type of innovation is useful for industrial customers to work with water authorities to identify water conservation initiatives.



Leading by example

As part of its commitment to minimise the environmental impact of its own operations, the Victorian Government requires all of its departments to adopt an environmental management system (EMS). An EMS is a program that can be used to identify, manage and reduce an organisation's impact on the environment and generate reports on environmental performance progress. It provides a systematic and methodical approach to planning, implementing and reviewing an organisation's response to those impacts.

Through the EMS, the Government is committed to reducing water use within all departments, as well as the impacts of energy use, waste production, paper consumption and transportation.

As an example, the following measures illustrate how one department, the Department of Sustainability and Environment, is working to reduce water use in its head office building:

- data analysis to better understand water use within the building
- waterless urinal system installed in all male toilets (42 urinals in total)
- low flow showerheads installed in all 12 showers
- flow restrictors installed on all 180 taps
- signage to increase awareness and reporting of water leaks
- dual flush toilets to be installed in all female toilets.

It is estimated that in this one office building, these measures will save about 6 ML of water each year.

Industry acting to meet the targets

Industrial and commercial customers account for about 25 per cent of water used in the Central Region (this includes the power generating industry in the Latrobe Valley but excludes agriculture). Many businesses have already made considerable efforts to improve the water efficiency of their systems and processes. However, there is still significant scope for industries in our cities and towns to improve water conservation and efficiency measures.

The Pathways to Sustainability program encourages the top 200 industrial and commercial water users in the metropolitan area to develop plans and voluntarily reduce their water use. As a result of this program between 2000/2001 and 2005/2006, more than 6,000 ML of water has been saved annually – this is equivalent to 13.3 per cent of total industry water use in Melbourne. The Qenos box on the next page shows one example of an industrial user that participated in the Pathways to Sustainability program. Qenos is now saving 1,200 ML a year.

Through Action 3.13, the Pathways to Sustainability program will now be extended throughout the region to target all non-residential users using 10 ML of water per year or more. Within Melbourne, this will apply to about 1,500 users.

Who: Water authorities

Timeframe: 2015

Action 3.13

The Government will extend the Pathways to Sustainability program to target all industrial and commercial users throughout the Central Region that use 10 ML of water per year or more.

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As outlined in *Our Environment Our Future*, compulsory Environment and Resource Efficiency Plans (EREP's) will be developed by the State's top 250 users of energy and water to achieve reductions in industrial energy and water use. The companies will be required to implement EREP's that include energy, water and waste reduction actions that have a payback period of three years or better. This means that costs of implementing these projects can be recovered through energy and water savings within three years. This program will recognise existing plans developed through the Pathways to Sustainability program.

In addition to the programs discussed above, prior to the next pricing period (2008–2011) the Government will work with water authorities, in consultation with their customers, to explore and further develop pricing structures that encourage sustainable use by industry. Possible alternative pricing structures could include expanding the step tariff approach to industrial and commercial customers or establishing water markets for large water users. Water markets would provide large industrial users, including those supplied by urban water authorities, with new opportunities and economic incentives to conserve water in the Central Region.

QENOS – Taking the initiative

When Stage 1 water restrictions were introduced in late 2002, plastics manufacturer Qenos began looking at ways to play its part and save water.

Almost four years later, the company has slashed annual water and trade waste costs by \$1.3 million, and won several water conservation awards along the way.

Environmental engineer Chris Hutchins has given several presentations at industry and environmental forums about how Qenos has made annual savings of more than one billion litres of drinking water (or 1,200 ML) and about 900 ML of trade waste discharges.

"I'm proud to talk about what we've achieved," he says.

"It's great to be able to make such a significant contribution to the community, and to our company's bottom line."

The company began by identifying water use and eliminating waste. Then it invested in more efficient equipment, such as a new heat exchanger (see picture below) partly financed by a grant from the Victorian Water Trust for Water Smart industry demonstration projects that reduce water consumption and salt discharge.

Qenos also embraced opportunities for reuse and recycling. It built pipelines to transport effluent from two of its sites to a recently upgraded water treatment facility at a third site. Another pipeline was installed to return the treated effluent for reuse to replace drinking water in cooling towers.

Qenos, as one of Melbourne's top 200 water users, worked with its water retailer, City West Water, to develop cleaner production initiatives as part of the Government's *Our Water Our Future* action plan.





Who: Water authorities and Dept. of Sustainability and Environment

Timeframe: Pricing – June 2007, Water markets – 2010

Action 3.14

The Government will work with water authorities and all industries in the region to:

- explore alternative pricing options to encourage sustainable use by industry prior to the next pricing determination (2008–2011)
- investigate how to develop water markets in the Central Region that could be open to large industrial water users.

Who: Water authorities

Timeframe: From 2008

Action 3.15

Water authorities will be required to report annually to the Minister for Water the names; location; involvement in water conservation programs of industrial/commercial/institutional users consuming more than a set volume of water per year (as determined by the Minister for Water); and volumes of water use (in ranges).

Primary industries – efficient use on farms

Agricultural production in the Central Region significantly contributes to the State's economy, generating \$1.7 billion from more than 1.17 million hectares of farmland. It accounts for 34 per cent of water used in the Central Region.

Primary industries are already embracing water conservation and efficiency measures. There are many factors that drive water use efficiency by primary industries, including:

- pressure to produce more product from the same or decreased amount of water
- risk management strategies
- options provided by available technology and infrastructure such as channel automation technology
- the need for the industries to remain competitive in the global market.

The Government and the rural sector remain committed to increasing the efficiency of irrigation systems across the State by 25 per cent by 2020 as outlined in *Our Water Our Future*.

The Government will continue its approach of encouraging efficient water use in primary industries, and working towards the target of 25 per cent by 2020. This approach includes capping rural entitlements from rivers and aquifers, enabling water trading and supporting increased efficiency both on-farm and within the water distribution system.

This approach is consistent with market demands and community expectations for increased agricultural productivity using less water, and is especially important given diminishing water resources in rivers and aquifers as a result of climate change.

Water trading between willing buyers and sellers provides an important mechanism through which water can move to where it is needed and valued most. It provides an incentive for farmers to increase their water efficiency because excess water can be

traded on the water market. It also enables flexibility in the business and risk management strategies used by enterprises. As an example of market activity in the Central Region, over the past 12 months, about 13,700 ML has been traded on the temporary market and 600 ML on the permanent market in the Macalister Irrigation District (MID) in West Gippsland.

Rebates are available to farmers in the MID for on-farm efficiencies such as conversion from flood irrigation to spray irrigation. Channel automation technology is also being implemented to increase efficiency within the distribution system. Channel automation technology generates water savings while also providing an improved level of service to irrigators.

The channel automation project in the MID is a six-stage process. Stages One and Two, funded by the Victorian Water Trust (\$8 million), are now complete. Preliminary results of these stages indicate that the target savings of 5,000 ML will be achieved. Target water savings from the remaining stages is a further 10,000 ML. These will be funded by the Commonwealth Government as part of the National Water Initiative. As outlined in *Our Water Our Future*, this water will provide additional flows for the Thomson/Macalister Rivers and the Gippsland Lakes. Construction of Stages Three and Four has now begun. The project is expected to be completed by 2012.

A number of agricultural industries across the region are also utilising treated recycled water, which provides a high reliability source of water for their irrigation needs. An example of this is the Eastern Irrigation Scheme, where 5,000 ML Class C recycled water from the Eastern Treatment Plant is treated to Class A standard and used for substitution of groundwater and surface water. It is supplied to regional vegetable growers in the Cranbourne–Five Ways area to the south east of Melbourne, for irrigation of market gardens, open space irrigation and for use through dual pipe systems in residential developments.

3

Alternative sources of water – reusing and recycling water

The need for using alternative sources

Conservation and efficiency measures help to make the best use of our water and should be done first. However, it is also important to reduce our reliance on water from rivers and reservoirs, because there will not be enough water from these sources alone to meet our future needs.

Rivers and reservoirs provide 90 per cent of the water used in the Central Region. This water has been fundamental in helping the region grow and prosper. However, it has led to stressed rivers, which require more water to ensure their sustainability. Also, water from these traditional sources will become increasingly scarce due to climate change, with a forecast 25 per cent reduction by 2055 under medium climate change.

In the longer term, new water sources will be needed to meet demand. Alternative water sources include recycled water, greywater and stormwater. These sources, that have remained relatively untapped to date, could be captured, treated and re-used. For example, approximately 500,000 ML a year of stormwater drains from our towns and cities into our rivers and bays. In some instances, this may provide important environmental benefits to flow stressed rivers. However, in many cases, some of this water can be captured and re-used for a range of non-drinking purposes.

Stormwater and effluent can be treated to a high-quality fit for purpose and re-used. Options can range from small-scale stormwater uses such as rainwater tanks on residential properties to large-scale water recycling projects such as the Eastern Water Recycling Proposal.

Reuse and recycling reduces discharges to bays and oceans. It also helps to conserve our precious high quality drinking water in rivers and reservoirs to meet future needs. The volume of recycled water is not reduced as a direct result of climate change. Therefore it represents a secure supply of fit for purpose water.

Dual pipe schemes – case studies

Sandhurst Golf Club and Hunt Club Estate

South East Water supply Class A recycled water from the Eastern Irrigation Scheme to the two golf courses of Sandhurst Club and through a dual pipe system to the Hunt Club Estate for use in toilet flushing and outdoor use. This is expected to reduce demand on drinking water supplies by 650 ML/year.

West Werribee residential developments

At full development, City West Water is expected to supply around 10,500 residential lots with Class A recycled water (through dual pipe systems) from Melbourne's Western Treatment Plant. This is for use in and around the home for garden watering, toilet flushing and car washing. The scheme will free up an estimated 1,550 ML/year of drinking water that would have otherwise been used in these developments.

Altona Industrial Precinct

City West Water and Melbourne Water have undertaken preliminary investigations into the supply of Class A recycled water from Melbourne's Western Treatment Plant to industry, residential lots and for open spaces in the Altona Industrial Precinct. There are a number of large industries within this Precinct which currently use drinking quality water for a range of industrial processes, including cooling water and boiler feed. If implemented, this project has the potential to free up about 5,500 – 8,500 ML.



Ensuring alternative sources are fit for purpose

The Government will encourage the use of recycled water and stormwater to meet our growing needs for water over the long term. The use of recycled water and stormwater needs to be ‘fit for its purpose’ – that is, an appropriate quality for the intended use. Appropriate opportunities for substitution of river and groundwater with treated recycled water or stormwater include non-drinking uses in households and industry, and for agriculture, open spaces and gardens.

The Government does not propose to place treated recycled water or stormwater directly into the drinking water supply system. However, it should be noted that in many parts of the State, recycled water is discharged into streams upstream from where drinking water is extracted. Technical developments and implementation of the use of recycled water and stormwater for potable purposes will continue to be monitored.

“Fit for purpose” can also apply to the use of recycled water for the environment, where this is in line with EPA guidelines. The Government supports the use of recycled water for environmental flows where the water is of suitable quality and there is a demonstrable net gain to the environment.

The quality of effluent and stormwater has an effect on how much treatment is required before it can be reused, and thus the cost-effectiveness of reuse. Contaminants including salt from industries (in trade waste), and to a lesser extent households, reduce the quality of sewage, limiting the uses of recycled water. The Government’s Trade Waste Review and EPA Victoria’s Trade Waste Partnerships Program are examples of the Government working with industry to reduce trade waste sent to sewerage systems. These programs are focused on ensuring that treated effluent can be used as a future resource. Stormwater collects litter, engine oil and other pollutants from hard surfaces. Water sensitive urban design features are used to reduce pollution in stormwater. These features are described in the “Increasing the use of stormwater” section of this chapter.

Overview of stormwater and recycled water projects

A range of stormwater and recycled water projects are being progressively introduced in the Central Region, as shown in Table 3.2. By 2055, reuse and recycling projects could provide more than 150,000 ML – at least half of the regional shortfall for urban use.

Table 3.2 New recycled water and stormwater projects

Type of project	Description	Examples
At home		
Treated recycled water and stormwater	Separate pipes to houses in new developments for non-drinking uses	<ul style="list-style-type: none"> • Eastern Irrigation Scheme • Eynesbury • Aurora
Rainwater tanks	Capture rain and use it for non-drinking uses (in towns and cities)	• Rebates available through State Government Water Smart Homes and Gardens Rebate (see Action 3.9)
Greywater recycling	Reuse greywater from shower/bath and laundry for non-drinking uses	• Rebates available through State Government Water Smart Homes and Gardens Rebate (see Action 3.9)
At work		
Treated recycled water for industrial/commercial uses	Separate pipes to businesses or on-site recycling for non-drinking uses	<ul style="list-style-type: none"> • Business case for Eastern Water Recycling Proposal (Action 3.21) • Gippsland Water Factory (Action 4.45) • On-site treatment plant at Shell’s Geelong refinery, subject to successful business case (Action 4.12) • Nepean Sustainable Water Recycling Scheme
Treated recycled water for agricultural uses	Separate pipes to farms for non-drinking uses	<ul style="list-style-type: none"> • Western Treatment Plant recycling initiatives, including in the Werribee Irrigation District (see Action 4.22) • Eastern Treatment Plant recycling initiatives, including the Eastern Irrigation Scheme
Other		
Treated recycled water for recreational and other uses	Use for non-drinking uses associated with recreational and environmental needs	<ul style="list-style-type: none"> • Use of treated recycled water in Lake Wendouree (Action 4.3) • Continuation of treated recycled water discharges from South Ballarat Treatment Plant to the Leigh River for environmental purposes (Action 4.17a)
Treated stormwater for drinking use	Investigation only	• Investigation of stormwater capture and use at Dights Falls (Action 3.24)
Aquifer storage and recovery of treated recycled water	Injection of treated recycled water into aquifers for later recovery and use	• Trial of the storage of recycled water from Black Rock Treatment Plant in the upper Jan Juc aquifer for future use by industry (Action 4.13)

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Table 3.3 shows each water authorities existing recycling target and the level of recycling currently occurring.

The Government requires that all water authorities set new targets for recycling as part of their water supply demand strategies, due for completion by early 2007.

Table 3.3: Current recycling targets and achievements in the Central Region

Water authority	Current recycling target	Current level of recycling
Central Highlands Water	22% by 2011	8.8%
Barwon Water	25% by 2015	12.1%
Western Water	92% by 2011	78.1%
Melbourne water authorities*	20% by 2010	14.2%
Gippsland Water	No target	5.8%
Westernport Water	18% by 2008	17.2%
TOTAL		14.6%

*Melbourne Water, City West Water, Yarra Valley Water and South East Water

As demand for water increases, it is sensible to focus recycling and stormwater reuse on potable water substitution – that is, using recycled water and stormwater for purposes that would otherwise use fresh drinking water.

Who: Water authorities
Timeframe: 2007

Action 3.16

The Government will require water authorities to set new targets for potable water substitution by recycling and stormwater reuse. This will be done as part of their water supply demand strategies.

The Melbourne water authorities, who are currently finalising their water supply demand strategies, will not set a new target until their existing target of 20 per cent by 2010 has been achieved. A list of committed projects underway to help them meet this target is provided in Table 3.4.

Melbourne water businesses have also identified a range of further recycling projects within their water plans. These will contribute to achieving the 20% recycling target and beyond (see Table 3.5).



Table 3.4 2004–05 Committed recycling projects to achieve 20% target in Melbourne⁶

Project	Estimated volume by 2010 (ML/year)	Comments
Altona golf courses	500	Class A recycled water from Altona Sewage Treatment Plant for irrigation of golf courses (Koorringal Golf Club and Sanctuary Lakes Golf Club). Estimate recycled water to be delivered late 2006.
Inkerman D'LUX	6	The Inkerman D'LUX Development in St Kilda will be the state's first residential complex of its type to feature a greywater–recycling project. Stormwater and greywater will be treated on–site to a standard suitable for garden irrigation and toilet flushing for all 237 units.
Werribee South – Werribee Irrigation District recycled water scheme	8,500	Since January 2005, Class A recycled water has been provided to Werribee Irrigation District farmers. 112 customers have signed up for recycled water.
Western Treatment Plant on–site recycling	37,000	Werribee Agriculture (a business unit of Melbourne Water) is using recycled water for irrigation purposes, to manage crop production and cattle and sheep grazing.
Eastern Irrigation Scheme, including Sandhurst Club	4,400	Major advances have been made for the Eastern Irrigation Scheme. The scheme will deliver recycled water from Melbourne Water's Eastern Treatment Plant to residential, industrial, recreational and agricultural customers in Melbourne's south–east by way of a second pipe. This includes providing recycled water to residential customers at the Sandhurst Club and will substitute approximately 380 million litres of drinking water.
Whittlesea recycling scheme	285	Class B recycled water is being provided for the Growling Grass Frog Golf course irrigation.
Aurora Estate	335	Class A recycled water will be supplied to an open space and residential recycling land development project in Epping by VicUrban. The development will take 15–20 years to complete and will contain 8,500 lots when fully developed.

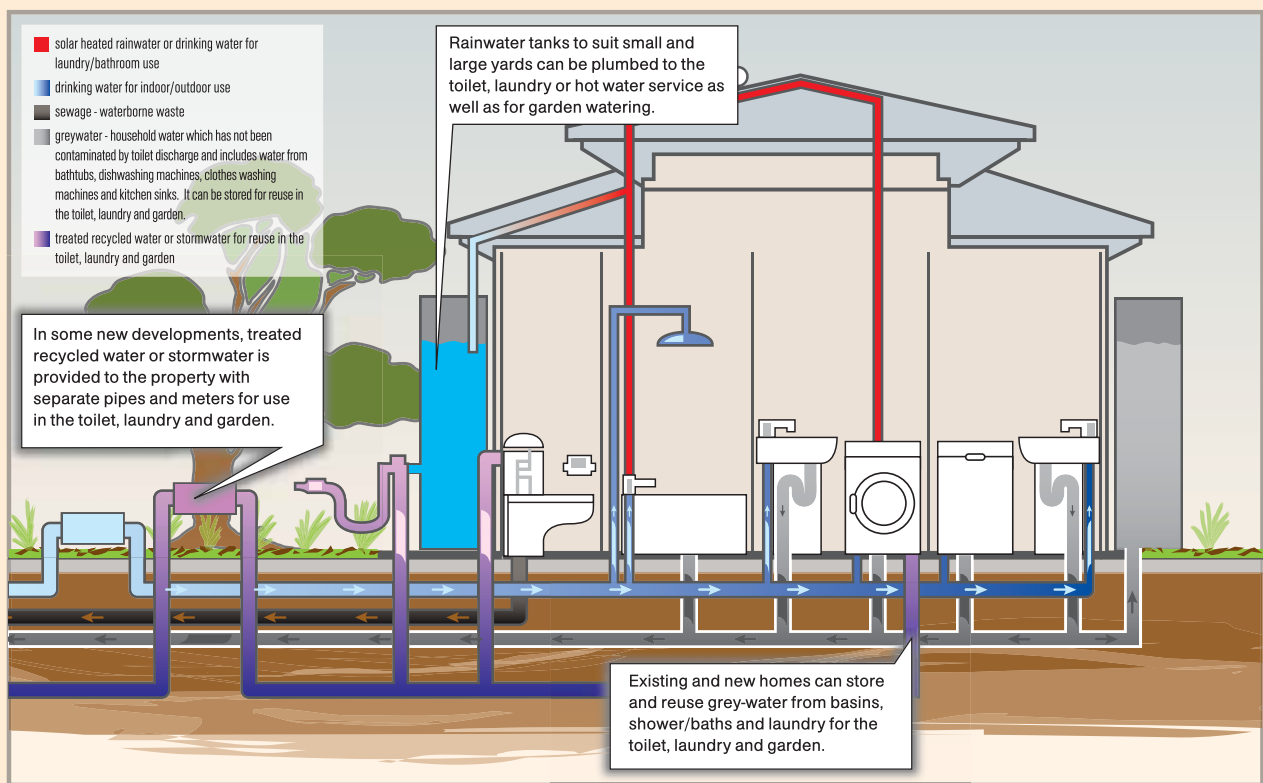
Table 3.5 Melbourne water recycling projects included in water plans (2005–08)⁶

Project	Estimated volume by 2010 (ML/year)	Comments
Mornington Peninsula schemes	775	Class C recycled water to open spaces and agriculture. Mt Martha golf course scheme to be operational for summer 2005/06.
Cranbourne East scheme	180	Class A recycled water to residential development in the area.
West Werribee water supply project	860	Class A recycled water to open spaces and residential recycling purposes. Target date to supply recycled water is late 2008.
Werribee technology precinct dual pipe project	315	Class A recycled water to golf courses, schools, businesses, Wyndham Council open spaces and Melbourne Water's Hoppers Crossing Pump Station. Target date to supply water is mid 2006.
Werribee tourist precinct	Up to 480	Recycled water used for recreation and commercial uses.
Mackillop College recycled water project	20	Supply of Class A recycled water to College for the irrigation of sporting grounds and recreational areas. Target date to supply recycled water is early 2006 (Note: delivery to occur in mid 2006).

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The types of alternative sources that can be used at home

Use of alternative sources, such as stormwater and recycled water, around the home helps to save our precious drinking water.



Making use of alternative sources at home

As outlined in the “Aligning water planning with statutory planning” section of this chapter, Clause 56 of the Victorian planning provisions now provides water authorities with the power to mandate dual pipe systems for particular areas, where they are identified as the best solution for balancing overall supply and demand. These areas are likely to be located close to wastewater treatment plants or a long way from drinking water supplies.

Who: Water authorities
Timeframe: Ongoing

Action 3.17

Water authorities will mandate dual pipe systems for areas where they are identified as the best solutions for balancing overall supply and demand (as provided in Clause 56 of the Victorian planning provisions)

In addition, the Growth Areas Authority (which has a critical planning role in Melbourne) will be required to promote water conservation and recycling in new developments in the growth areas.

Who: Dept. of Sustainability and Environment and Growth Areas Authority
Timeframe: Ongoing

Action 3.18

The Government will set a target for the Growth Areas Authority (GAA) to promote water conservation and recycling in new developments in the growth areas of Melbourne.



Aquifer storage and recovery

Aquifer storage and recovery (ASR) is an emerging opportunity in the Central Region. Typically, ASR involves the capture and use of stormwater or recycled water to recharge an aquifer for future recovery and use. The aquifer provides not only the mechanism to store the stormwater or recycled water, but can also improve the quality.

Barwon Water has initiated a \$1.18 million trial to investigate storing recycled water in an underground aquifer to reduce ocean outfall and provide a potential alternative water source for industry in the Geelong region (see Action 4.13). The ASR trial could lead to a full-scale project for the future using recycled water from the Black Rock treatment plant, boosting supplies in the Geelong area by 12,500 ML a year.

Another ASR demonstration project is operating at the Rosedale Golf Club in the Melbourne suburb of Aspendale. When fully operational, the aquifer will enable the Golf Club to harness and store recycled stormwater, increasing the club's water storage capacity and ensuring the long-term viability of the club during times of water shortages.

Who: Water authorities and Dept. of Sustainability and Environment
Timeframe: Ongoing

Action 3.19

The Government and water authorities will continue to research and explore opportunities to utilise aquifer storage and recovery (ASR) as an alternative water supply option.

Large-scale recycling projects

The Government has demonstrated its commitment to large-scale recycling in the Central Region through a \$50 million dollar investment in Stage 1 of the Gippsland Water Factory, scheduled for completion by late 2008. When completed, the Gippsland Water Factory will treat domestic and industrial wastewater and provide high quality recycled water for use by Australian Paper. This will free up about 3,000 ML of river water each year for urban use in Gippsland.

The recycled water will benefit local industry and the community. The project will address the odour currently created by the open channel section of the regional outfall sewer.

The Government is continuing to explore other large-scale recycling opportunities in the Central Region using recycled water from the Eastern Treatment Plant at Carrum and the Western Treatment Plant at Werribee.

Eastern Treatment Plant

To the east of Melbourne a number of water recycling initiatives are underway or being investigated to reduce discharges to the ocean and secure new water supplies for Gippsland, Melbourne and the environment.

Melbourne Water is currently progressing the ammonia reduction upgrade at the Eastern Treatment Plant at Carrum towards staged completion by 2010. In 2007, Melbourne Water will also proceed with upgrade of the plant to tertiary treatment and disinfection, based on technical design and business case. This will deliver a quality of recycled water that falls within the broad industry standard of 'Class A'. The technical design and business case will be followed by the construction of pilot plants to trial available technology so as to achieve national and State water quality guideline requirements. The construction of the full tertiary process upgrade is expected to take five years to complete. This upgrade will help to maximise future recycling opportunities of this new resource.

Who: Melbourne Water
Timeframe: 2012

Action 3.20

Melbourne Water will proceed with the Eastern Treatment Plant upgrade to tertiary filtration and disinfection based on technical design and business case to meet EPA works approval requirements and to maximise future recycling opportunities with this new water resource.

South East Water operate three treatment plants on the Nepean Peninsula which share the Boags Rocks outfall with the Eastern Treatment Plant. Following on from Action 3.20, business cases to consider options to upgrade these plants will be undertaken.

Together, the Gippsland Water Factory and Eastern Treatment Plant upgrade would provide foundation assets for the regional scale Eastern Water Recycling Proposal, of which the preliminary investigation was a key action in the *Our Water Our Future* Action Plan.

Currently the electricity generators and other major industry in the Latrobe Valley use about 117,000 ML of water a year for cooling and other industrial purposes. This is equivalent to about one quarter of all the water used in Melbourne and about 12 times the residential water use in West Gippsland. This water, currently taken from the Latrobe River, could alternatively be used for drinking water supplies and environmental flows.

The Eastern Water Recycling Proposal involves Class A recycled water from Melbourne's Eastern Treatment Plant being piped to the Latrobe Valley for use in power generation. In addition to providing secure water for industry to grow in the Latrobe Valley, this proposal would free up 139,000 ML of entitlements to water that could be used for environmental flows and urban use across Gippsland and Melbourne.

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The feasibility of the proposal has already been assessed. The study demonstrates that the proposal is technically feasible, subject to acceptance of the recycled water by the Latrobe Valley power generators and satisfactory completion of a business case.

The Government commits to working with metropolitan water authorities to complete the next stage of the Eastern Water Recycling Proposal – preparing a business case.

Who: Dept. of Sustainability and Environment
Timeframe: 2009

Action 3.21

The Government will proceed with the business case for the Eastern Water Recycling Proposal.

The Eastern Water Recycling Proposal and the Eastern Treatment Plant initiatives would significantly contribute to delivering on a key Government priority to reduce the impact of the ocean outfall at Boags Rocks. The Eastern Water Recycling Proposal has the potential to reduce the volume discharged at the Boags Rocks ocean outfall by 80 per cent per year on average.

Melbourne Water and EPA Victoria will contribute to monitor the quality and volume of the Boags Rocks outfall to understand and quantify the environmental and social benefits and impacts over time.

Who: Melbourne Water
Timeframe: Ongoing

Action 3.22

Melbourne Water and EPA Victoria will continue to monitor the quality and volume of the ocean outfall at Boags Rocks to quantify the implications of the tertiary upgrade of the Eastern Treatment Plant.

Western Treatment Plant

The Western Treatment Plant currently receives around 170,000 –180,000 ML of sewage each year for treatment. The lagoon treatment process at the plant results in seven to eight per cent of the water being lost to evaporation (varies depending on climatic conditions in any year) – resulting in the production of about 160,000 ML of water treated to a Class C standard per year.

Of this water, about 100,000 ML is necessary on-site for the operation of the treatment process, including the maintenance of the lagoons (which also provide bird habitat) and for on-site irrigation. This leaves about 60,000 ML of water available for off-site recycling, of which 25,000 ML is already committed.

The Government has progressed the *Our Water Our Future* actions relating to water recycling west of Melbourne. Recycled water is now being supplied to the Werribee Tourist Precinct (about 1,000 ML) and 124 farmers in the Werribee Irrigation District (about 4,800 ML). Work has commenced on the installation of a pipeline to supply recycled water to customers in the Werribee Technology Precinct (about 300 ML) and Wyndham West growth corridor (about 1,500 ML) for non-drinking uses. In total, these projects could result in about 7,500 ML of river water being substituted with recycled water and therefore freed up to meet the Inner West and Melbourne's future urban and environmental needs.

Salt levels in the recycled water from the Western Treatment Plant remain a challenge. Options to reduce salinity in recycled water from the Western Treatment Plant have been the subject of ongoing investigations, which have recognised that the cost of removing salt from the recycled water through additional treatment is high. One option under consideration, which a preliminary business case has been completed for, is the construction of a salt reduction plant at the Western Treatment Plant.





Melbourne Water, City West Water and the Department of Sustainability and Environment are continuing to investigate lower cost alternatives to a salt reduction plant to provide lower salinity, fit for purpose recycled water by 2009. These alternatives include combinations of the following options:

- salt reduction at source
- blending of recycled water with river water
- diversion of high salt influent to Western Treatment Plant
- end-of-pipe salt reduction treatment by reverse osmosis.

Currently over 50 per cent of the Werribee Irrigation District farmers are using recycled water directly from the Western Treatment Plant due to a shortage of river water and high salinity levels in the Werribee River water.

Approximately 35,000 ML of treated water is available at the Western Treatment Plant for recycling. This is treated to Class C standard. The Government will conduct an expression of interest process, involving private sector and water authorities, for this water. This will seek expressions of interest for projects consistent with the Werribee Plains Vision, that may involve agricultural, industrial or residential use.

Who: Melbourne Water, metropolitan water retailers, Western Water, Barwon Water, Southern Rural Water and Dept. of Sustainability and Environment

Timeframe: Expressions of Interest – December 2006

Action 3.23

The Government will make available a portion of the 35,000 ML of recycled water until 2030 from the Western Treatment Plant for immediate or future potable substitution. The volume allocated will be consistent with the Werribee Plains Vision while also ensuring the sustainable water supply to existing users in the region. The Government will invite Expressions of Interest for the use of this water, seeking projects that are economically viable and make best use of the water. The Government will work with Melbourne Water, the metropolitan water retailers, Barwon Water, Western Water and Southern Rural Water and seek input from the private sector, stakeholders and the community to help determine the best and highest value use of this recycled water.

Increasing the use of stormwater

It is estimated that urban areas in the Central Region generate 500,000 ML of stormwater a year. As with recycled water, stormwater is a valuable resource if it can be harvested, treated and stored efficiently. Stormwater is defined here as the net increase in run-off and decrease in groundwater recharge resulting from the introduction of impervious surfaces such as roofs and roads within urban development.

At present, a large number of councils and water authorities are undertaking small-scale stormwater reuse projects across the region. These projects focus on substituting supplies of drinking water for non-drinking purposes such as watering parks, gardens and sporting grounds. In some cases, developers have initiated the capture, treatment and reuse of stormwater in new housing developments to water open spaces. In households, the Government continues to encourage property owners to install tanks to capture rainwater and prevent stormwater run-off. Action 3.9 outlines the products on which the Government currently offers rebates.

The Stormwater and Urban Water Conservation Fund is a \$10 million Government initiative spanning three years. It provides support to innovative water sensitive urban development projects, stormwater conservation and water recycling projects that will lead to significant savings in existing drinking water supplies across Victoria. The completion of Round 3 projects will result in about 2,700 ML of water savings in the Central Region each year. Appendix 2 outlines the successful projects in the region contributing to these savings.

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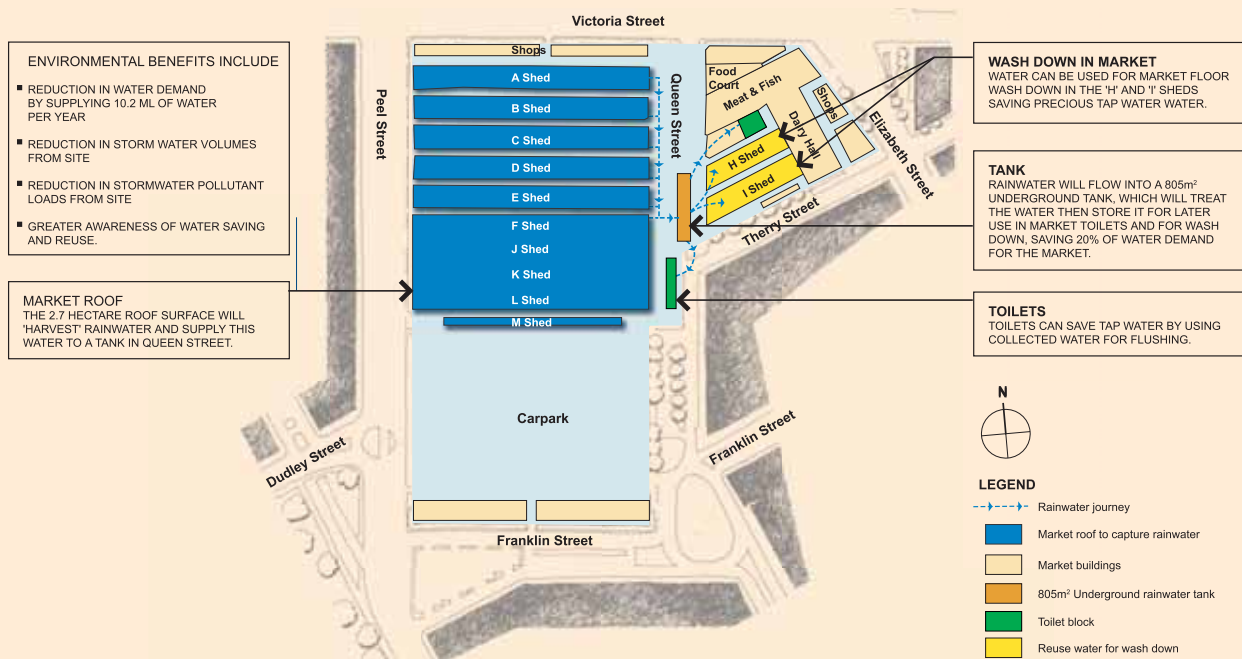
Taking advantage of stormwater

Urban stormwater is an under-utilised water source in the Central Region. It also picks up and transports significant amounts of pollution from streets and other hard surfaces to Melbourne's rivers and bays. That's why councils, water authorities and the Government are working together on initiatives to clean up and harvest stormwater.

A good example is at Queen Victoria Market, where rainwater from shed roofs will be treated and stored underground before being recycled for toilet flushing and washing down areas of the market.

The rainwater would otherwise have run off hard surfaces and collected litter, engine oil and other pollutants before flowing into stormwater drains and eventually the Yarra River and Port Phillip Bay.

The \$800,000 City of Melbourne and Queen Victoria Market project, which will save about 10 ML of drinking water a year, is co-funded by the Government's Stormwater and Urban Water Conservation Fund. The fund has supported 66 projects that will save 55,000 ML of drinking water over the next 25 years.



Other councils are incorporating initiatives into road and streetscape works that clean stormwater and protect rivers, creeks and bays.

Kingston City Council, in Melbourne's south, is one of many councils in the Central Region to use structural features to trap, absorb and filter stormwater running off hard surfaces before it enters rivers, creeks or bays. These 'water-sensitive urban design' features include rain gardens (vegetated areas along nature strips and car parks), swales (shallow grass channels – see pictures above) and wetlands (including lakes). They are included in

planning conditions on development, and council works on roads, parks and gardens.

In the past five years, Kingston has introduced a total of 84 rain gardens within existing local roads, car parks and parks. This has encouraged developers to incorporate similar works in residential subdivisions.

Other examples of improved stormwater practices introduced by councils include sediment and litter traps, clean construction sites, and community awareness programs.



Large-scale stormwater treatment and reuse may be possible in Melbourne. This option would collect, store and treat stormwater to drinking water standards, and then blend this water with drinking water sourced from rivers and reservoirs. The stormwater could be harvested from the lower reaches of the Yarra River at Dight's Falls after heavy rainfall, then transferred to Sugarloaf or Yan Yean Reservoir, where it would mix with stored river and reservoir water before being treated and released into Melbourne's drinking water system.

This is still a relatively conceptual longer-term option that requires significant evaluation. Options such as this may be necessary if medium or high climate change were to occur. Alternatively, they could help meet the environmental needs of stressed rivers and aquifers. This option has a long lead time to plan and construct. With technologies rapidly developing, new large-scale stormwater options may become viable and warrant further investigation.

Who: Dept. of Sustainability and Environment and metropolitan water authorities

Timeframe: 2009

Action 3.24

The Government will work with metropolitan water authorities to complete feasibility studies for large scale stormwater treatment and reuse options, in particular at Dight's Falls, and then proceed to business case if appropriate.

Building alternative water sources in to Victoria's water allocation policy

As water from traditional sources becomes scarcer, recycled water and stormwater are becoming more valuable.

It is important that Victoria's water allocation framework incorporates these alternative sources of water and readily facilitates their use as a resource in the Central Region.

Policy

The Government will not include recycled water, stormwater and irrigation drainage in estimates of the amount of water in rivers and groundwater available to be allocated to water users or the environment (through bulk water entitlements, diversion licences and environmental water reserves).

If these sources of water were allocated to downstream users and the environment it would be necessary for these discharges to continue. This would remove any incentive to use these resources more efficiently. In addition, because high nutrient levels and other pollutants in irrigation drainage water can damage our rivers, it is desirable to reduce discharges. While it is recognised that stormwater can be detrimental to river health on a local scale by adding nutrients causing erosion to a river, in some systems stormwater plays an important part in providing water for flow-stressed rivers. It is important that any significant proposals to harvest stormwater consider the implications for river health.



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Policy

The Government will allow:

- property owners to use recycled water and irrigation drainage that is generated on their properties, subject to environmental and health approvals
- urban property owners to use stormwater that is generated on their properties, subject to environmental and health approvals
- water authorities to allocate stormwater, recycled water and irrigation drainage collected in their infrastructure systems.

Policy

The Government adopts the following allocation rules for stormwater in urban areas:

- if stormwater is flowing to the sea via a drain, all of the stormwater may be harvested
- if stormwater is flowing to a stream from an existing development, assume up to 50 per cent of existing stormwater can be harvested for consumptive use and 50 per cent is reserved for the environment. If there is a scheme to harvest more than 50 per cent of the resource a study is required to assess the implications for the environment
- if stormwater is generated from a new development, all of it is available for consumption with the aim of the development having no impact on catchment run-off
- all diversions from waterways will continue to require a Section 51 licence under the *Water Act 1989*.

The Government will develop a detailed set of rules for the allocation and pricing of stormwater as part of the Statewide Urban Stormwater Strategy, due to be completed in 2007. This will aim to further increase the use of stormwater. This will include rules that will enable councils to allocate stormwater collected in their infrastructure systems.

The Government will explore the need for rules for the allocation and pricing of recycled water. In the interim, authorities will continue to allocate recycled water on a contractual basis.

Encouraging investment in innovative recycling opportunities

New technologies are rapidly emerging to enable recycled water and stormwater to meet our water needs. It is important that water authorities continue to participate in the development of these new technologies and find ways to incorporate them into their day-to-day businesses.

Policy

The Government supports investment in recycled water and stormwater projects by water authorities, if the total community cost of the water supplied by these projects is comparable with the estimated costs of other long-term water augmentation options.

As technology advances it is possible that authorities may achieve targets sooner than expected. If this occurs, the Government supports authorities continuing to pursue opportunities that are cost-effective.





Interconnecting water supply systems and expanding water markets

Many of the supply systems in the region are already interconnected with strong links between urban and rural systems – see Figure 3.7.

Interconnecting supply systems does not create water, but it does provide benefits. The main advantage of interconnecting these systems is that it increases flexibility in water management by recognising there can be significant fluctuation in the availability and use of water throughout the region within and between years. Creating a “grid” of water connections allows water to be moved to where and when it is needed, including opportunities for sharing water with the environment.

Several actions outlined in Chapter 4 will result in further interconnections across the region. Action 4.6 means a connection from the Waranga Channel (part of the Goulburn supply system) to Ballarat will be implemented in the short term. This will allow Central

Highlands Water to enter the water market to purchase water from farmers who wish to sell their water.

A Melbourne–Geelong interconnection will be investigated immediately as a contingency option to provide additional water to Geelong. This interconnection would be implemented only if it is not feasible to extract sufficient water from the Newlingbrook aquifer (see Action 4.14).

Depending on the outcome of further assessments of its supply options, it is possible that Westernport will also need to connect to Melbourne at some stage in order to supplement its supplies (see Action 4.52 and 4.53).

The Eastern Water Recycling Proposal would create a link between the Melbourne supply system and the Latrobe Valley (Action 3.21).

Figure 3.7 Existing and possible interconnections in the Central Region



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Expanding water markets

Available water sources in the Central Region have effectively been fully allocated. However, people's changing needs for water still need to be met.

Water resources in northern Victoria became fully allocated more than 10 years ago. In response, the Government established water markets. This has enabled farmers and water authorities to buy and sell water depending on their needs. Some farmers who were expanding their businesses bought water from farmers who had more water than they needed. An active water market exists and water is moving from low value uses to high value uses.

The total amount of water used in northern Victoria has not increased yet economic development has been accelerated and the changing water needs of the community are being met through voluntary transfers made possible by the water market.

Water markets need to be developed in the Central Region now that the region's water resources from rivers have effectively been fully allocated. The expansion of water markets is consistent with the objectives of the National Water Initiative.

The development of the market in the Central Region has traditionally been limited to the regulated river systems that supply the Werribee, Bacchus Marsh and Macalister Irrigation District because only those farmers hold water entitlements that are tradeable. Customers of urban water authorities do not own tradeable water entitlements.

The first step in expanding the market in the Central Region would be to enable large industrial customers of urban authorities to buy and sell water. It would also be necessary to develop market rules to ensure that the market operated fairly.

An effective water market in the Central Region would also present opportunities for the environment. Water could be bought (and sold) on a temporary or permanent basis at opportune times to improve the environment.

Who: Dept. of Sustainability and Environment and water authorities
Timeframe: Ongoing

Action 3.25

The Government will progressively interconnect water supply systems and expand water markets in the Central Region to meet the needs of all water users, including large industrial users and the environment.

Trading by urban water authorities

Just as markets enable farmers to efficiently adjust their water supplies to meet their changing needs, they can provide the same benefits to water authorities. However, water trading between authorities needs to be carefully designed and regulated because in most cases there will be only one or two buyers and sellers. (Markets work best when there are many buyers and many sellers.)

Checks and balances need to be developed to ensure trades made by urban authorities are consistent with their water supply demand strategies and are made following rigorous and transparent consideration of the costs and benefits of conservation and alternative supply options.

Who: Dept. of Sustainability and Environment and the Essential Services Commission
Timeframe: June 2007

Action 3.26

The Government will develop a governance framework to guide the manner in which urban authorities in the Central Region could participate in the water market.

This governance framework will include consideration of:

- the role of water supply demand strategies in guiding decisions about water trading
- adopting consistent approaches for assessing and comparing costs and benefits of conservation and alternative supply options
- steps to be followed in negotiating trades between authorities
- the manner in which the costs of buying water on the market should be recovered.

This framework will ensure trading by urban water authorities separately addresses the financial cost of providing infrastructure and the economic value of water (ie. purchase price for the water).

To protect the interests of customers where trades occur between two authorities, the Government will prescribe a role for the Essential Services Commission in settling disputes over terms and conditions of the trade. This would complement the commission's existing role in ensuring that prices passed on to customers are fair and reasonable.



Trading with northern Victoria to meet Melbourne's future urban needs

The Government considers that Melbourne must tap the significant potential for conservation, efficiency and reuse and recycling gains within the Central Region rather than connecting with northern Victoria and buying water from northern Victorian irrigators.

Irrigation in northern Victoria generates significant direct and indirect economic benefits for the State which the Government will continue to foster. There is also a critical need to recover water from supply systems in northern Victoria for the environment, most notably as part of the Living Murray Initiative and commitments to restore environmental flows to the Snowy River. Furthermore, irrigators will need to gain further water savings in light of potential climate change impacts.

Due to the magnitude of water required, the significant potential alternate options to meet Melbourne's shortfall and the challenges already facing the irrigation community, the Government does not support Melbourne buying water from irrigators in northern Victoria to meet Melbourne's future consumptive needs.



3

Augmenting current urban supply systems

Current urban supply systems can be augmented by:

- reintroduction of existing infrastructure, such as Tarago Reservoir
- harvesting more water from rivers
- harvesting more from groundwater sources
- utilising seawater treated by desalination plants.

Immediate projects

This Strategy contains a range of augmentations based on reintroducing existing dams and diversion weirs to supply systems. Some further groundwater resources will also be developed.

These include Jan Juc and Newlingbrook aquifers for Geelong (see Actions 4.14 and 4.15), Cardigan aquifer for Ballarat (see Action 4.7) and Corinella aquifer for Westernport (see Actions 4.52 and 4.53).

The existing infrastructure which connects Tarago Reservoir to the Melbourne water supply system will be reintroduced in 2010, boosting water supplies by about 21,000 ML a year (reduced to 15,000 ML a year if low inflows continue). This infrastructure was taken out of the system in 1994 due to water quality issues. Before reintroducing Tarago Reservoir, a water treatment plant will be built to improve water quality.

Dams old and new

Many large dams have been built in Victoria over the past 150 years to supply water for towns, industry and irrigation. There are 26 major reservoirs in the Central Region alone. These storages supply about 90 per cent of the water used in the Central region.

The past ten years of drought have seen the levels of these reservoirs drop. This reveals that there is a significant risk in relying almost solely on water supplied from rivers and reservoirs. It is expected that climate change will significantly reduce the volume of runoff available to store in reservoirs. The Government believes it is prudent to seriously consider alternatives to dams that are less affected by climate change, such as recycled water or seawater desalination.

Moreover, the most cost effective and reliable storages have already been built. It would take large investments to create new dams.

New dams do not create new water. They take water from rivers and downstream irrigators. They would also seriously impact on the health of rivers, to which the community wants more water returned to protect their sustainability. This view was reiterated by a large number of public submissions received in response to the Draft Strategy.

We can meet our future water needs by making better use of the water resources we already have through conservation and efficient use of drinking water from current supply systems, developing recycled water and other alternative supplies and by trading between systems.

Therefore, augmentation options exclude new in-stream reservoirs, as outlined in *Our Water Our Future*.

No dam on the Mitchell River

The Government banned dams on Victoria's 18 Heritage Rivers under legislation announced in July 2006 as part of its Environmental Sustainability Action Statement.

These rivers include the Mitchell River, a heritage-listed river renowned for its imposing cliffs and gorges including the Den of Nargun, which is mentioned in Aboriginal legends. The Mitchell River, identified as an icon river in the Victorian River Health Strategy, is the largest river in south-eastern Australia without a dam.

The Mitchell River provides about one-third of the total flow into the Gippsland Lakes. The Lakes alone host approximately four million visitors a year and contribute \$250 million a year to the regional economy.

The option to construct a dam on the Mitchell River near Dargo would involve a 200 kilometre tunnel and pipeline to the Thomson Reservoir, a water filtration plant, two pump stations and an 80 metre dam wall. The dam would have inundated 2,160 hectares of land which is now part of the Mitchell River National Park.

Pre-feasibility estimates put the financial cost of a dam on the Mitchell River at over \$1.7 billion. But the financial costs of dams go far beyond the initial construction. The proposed dam would hit communities through reduced access to downstream river water, which is relied on for agriculture, tourism, irrigation, industry and drinking water.

A dam on the Mitchell River would destroy the local cultural heritage and jeopardise fishing, boating and tourism in the Gippsland Lakes. Any negative impacts on the health of the Gippsland Lakes system have severe economic consequences.

The proposed dam would significantly impact on the natural flow regime of the river, destroy scenic landscapes and recreation opportunities such as fishing, canoeing and bushwalking, and devastate the local ecology including native plants, fish and other animals that live in the Mitchell Gorge.



Desalination

Large scale seawater desalination could provide new supplies of water for people and the environment. Desalination is technically viable and an increasingly attractive strategy worldwide to extend the available water supply through the production of fit for purpose water for drinking, industrial and agricultural applications. Desalination taps seawater as a new source of water and therefore does not take water from other consumptive uses or the region's rivers.

Seawater desalination is not affected by climate change in the same way as rivers and aquifers and so is highly reliable. Desalination plants can be designed to provide more water over time as demand increases. This incremental approach provides a way in which costs can be spread more gradually to benefit the community. This is important as there are significant costs associated with the construction and operation of desalination plants.

There are also significant environmental and social implications with seawater desalination that require careful consideration. A source of reliable and high quality seawater is critical for seawater desalination plants. In order to be cost effective, it would also need to be in close proximity to existing water distribution infrastructure (to decrease the cost of transporting the water). There are few ideal locations along the coastline of the Central Region to site a large-scale desalination plant.

Energy remains a significant cost of desalination. This energy consumption corresponds to greenhouse gas emissions – making the source of energy an important consideration. In the event that desalination proceeds, the Government would require that greenhouse offsets were provided as part of the project.

Desalination plants produce considerable volumes of saline concentrate. Planning processes for desalination need to consider issues associated with waste disposal as well as noise and air quality. Other limitations include the impact of the extraction process on sensitive ecosystems.

While the Government will not immediately implement large scale seawater desalination projects, it has not been ruled out as a supply option to meet future water needs for Melbourne. Advances in desalination technology and the potential to use renewable energy to power these plants will continue to be monitored within Australia and overseas. If high climate change occurs or low inflow conditions continue, it is possible that Melbourne may need to utilise seawater desalination.

In order to be prepared for this, the Government will work with metropolitan water authorities to complete a feasibility study of desalination options for Melbourne and proceed to business case if appropriate. This will be done in conjunction with a broader assessment of all large scale augmentation options for Melbourne.

Who: Dept. of Sustainability and Environment and water authorities

Timeframe: 2008

Action 3.27

The Government will work with metropolitan water authorities to:

- continue to monitor the rapid advances in desalination technology, within Australia and overseas, and the potential for renewable energy
- complete a feasibility study for desalination options for Melbourne and proceed to business case if appropriate.