

**WATER SUPPLY-DEMAND STRATEGY FOR
MELBOURNE 2006 - 2055**

FOREWORD

Building on our legacy

Melbourne is renowned for its early planning. Catchments were set aside high in the Yarra Ranges, where some of the world's best drinking water flowed down to Melbourne.

This Water Supply-Demand Strategy for Melbourne aims to build on the legacy and foresight of our civic leaders more than 100 years ago.

Just like our predecessors, we are planning for future generations. But now we face the challenge of climate change, and greater demands on our water than ever before.

Water management has become more complex especially as the limits of our supply loom larger on the horizon.

But we are fortunate to have time to change how we and future generations use water and from where we source this water. To ensure that we have enough water to meet the needs of future generations, we must plan now.

That is what this Strategy is all about. It is a co-operative effort involving the metropolitan water utilities (City West Water, Yarra Valley Water, South East Water and Melbourne Water), stakeholders such as the Department of Sustainability and Environment and the community, and has been underpinned by sound science and sophisticated researching of community views and sustainability assessments.

This Strategy implements the Victorian Government's water supply and conservation requirements for Melbourne, outlined in the Central Region Sustainable Water Strategy. In doing so it outlines environmentally sustainable, socially acceptable and cost-effective actions to save and source water for Melbourne, over the next 50 years.

This Strategy will be updated every 5 years and progress on its implementation will be reported via the Annual Reports of the Melbourne water utilities.

Professor John Lovering

Chair

Water Supply-Demand Strategy for Melbourne

EXECUTIVE SUMMARY

A new era

Melbourne is fortunate to have some of the best drinking water in the world. But we cannot continue to take our water for granted.

As our climate changes and our population increases, so too does pressure on our water supply. The last decade of inflows into Melbourne's reservoirs has been the lowest on record. It is possible that this is simply an episodic dry period and inflows will soon return to long-term average levels. But it is also possible that the last decade represents a permanent step-down in reservoir inflows linked to climate change. One thing is certain, to ensure a reliable and safe supply for future generations, we need to begin making long-term changes into the way we use water today.

If we continue to use water the way we do today, Melbourne may have some 200 billion litres less water in 50 years. That's a little under half of our existing water use.

This means we need to focus even more on conserving the water we have, using existing resources more wisely and securing different types of water to meet our needs.

There is no silver bullet or single solution, and our approach is to develop actions for a sustainable water supply in Melbourne that include water conservation and supply initiatives, and recognises the inter-relationships between water and the environment, and water and energy use.

Conservation the top priority

Our starting point is to ensure that the way we use water and the water supply system itself – everything from household appliances to large water mains – are as efficient as possible.

We can be proud of our performance in using 22% less water per person than we did in the 1990s and we are now one of the most water-efficient cities in Australia. But we need to keep strengthening our conservation culture and build on our record to become one of the most water-efficient cities in the world.

To achieve our goals, we need to maintain the savings we have already made and increase these through greater water efficiencies at home, work and play, and within the water delivery system. This will save 111 billion litres of water and alleviate half the water short-fall we face over the next fifty years. Water conservation also saves energy, delays water supply augmentations and is highly supported by the community.

Seeking new supplies

Even with more efficient use of water, we still need to find new water supplies to meet the shortfall. In the past, when our water supplies ran low, we turned to our rivers and creeks. This is no longer environmentally sustainable or socially acceptable.

We do have opportunities to invest in water efficiencies in the Yarra and Tarago catchments and use some of the water savings for urban consumption. There are also opportunities to connect Blue Rock Lake to Melbourne as the initial phase of the Eastern Water Recycling Scheme. Combined, these would provide over 21 billion litres of water for Melbourne. We also need to increase our use of different types of water.

Using local water sources such as rainwater, stormwater and recycled water to substitute for drinking water used in toilet flushing, clothes washing, open space and garden watering and many industrial processes, could save 10 billion litres a year.

Larger scale use of stormwater, groundwater, recycled water or even desalinated seawater could provide the remainder of water we need over the next 50 years. We don't know enough about these options yet to chose a

particular option for Melbourne. But we will investigate these options fully in the next two years so we can take action whenever new water sources are required.

Improving river health

The Victorian Government has limited the volume of water that can be extracted from the Yarra and Thomson Rivers to supply Melbourne. This action is fully supported by the metropolitan water utilities as part of an integrated approach to improving river health.

Rivers supplying water to Melbourne (either now or in the future) that will benefit from improved environmental flow regimes are the Yarra, Thomson and Tarago Rivers. The Werribee and Maribyrnong Rivers will also benefit from improved environmental flows.

Reducing greenhouse gas emissions

The connection between water use and climate change is clear: if we introduce energy-intensive supplies, we will contribute to increased greenhouse gas emissions and the potential impact of climate change, which in turn will reduce water in our rivers and reservoirs.

That is why this Strategy outlines ways to conserve water first as this also saves energy. For example, water efficient showerheads saves hot water which reduces energy use and associated greenhouse gas emissions.

The Strategy further commits the Melbourne water industry to continue to reduce greenhouse emissions from the current supply system, and use renewable energy sources or offsets to minimise the greenhouse impact of new water supplies.

Recommendations

In addition to supporting Policies made by the State Government in the Central Region Sustainable Water Strategy this Water Supply Demand Strategy for Melbourne makes a series of recommendations which are consistent with the Actions set out in that Strategy.

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SECTION 1 - PLANNING FOR A SECURE WATER FUTURE

Introduction

Melbourne is fortunate to have some of the best drinking water in the world and aside from temporary restrictions during periods of drought, Melbourne's supply has traditionally been reliable and safe.

But, as our population increases and our economy continues to grow apace, so too do the demands on our water supply. Planning to ensure our water supply is able to cope with the demands of a growing metropolis also has to take into account greater awareness of the potentially significant implications for our water supply system of climate change. .

Scientific research suggests that with the above factors and based on long-term average inflows into reservoirs, Melbourne could have a supply short-fall within the next 15 years. However, inflows into Melbourne's major reservoirs over the past 10 years have been about 30% lower than the long-term average. If these conditions continue the short-fall between available supply and demand will occur much sooner, resulting in an increase in the frequency and severity of water restrictions.

To ensure we continue to have reliable and safe supplies for future generations, we need to begin making long-term changes into the way we use water today.

The Water Supply-Demand Strategy for Melbourne sets out actions for the next 50 years that are aimed at managing demand and securing sufficient water for Melbourne's use. Actions within the Strategy are based on the past 50-100 years of climate behaviour with projections for future climate change and population growth. It has also been considered prudent to consider what actions would be needed to ensure security of supply should the low inflows experienced over the past 10 years continue. This approach is less risky than solely basing our future plans on the assumption that inflows will soon return to long-term average conditions with a gradual decline into the future due to climate change when this may not occur. Annual reviews of water availability and use will be compared to forecasts in this Strategy and actions will be brought forward or deferred as required depending on water availability. This approach ensures we are prepared for whatever the future holds.

Purpose

It is vital that water utilities and governments continue to work with businesses and communities to plan for the sustainable use and supply of water. The Victorian Government, through the *Our Water Our Future* action plan to secure Victoria's water future, requires water utilities to develop water supply-demand strategies every five years.

- 1 Melbourne's metropolitan water utilities – City West Water, South East Water, Yarra Valley Water and Melbourne Water - have worked together to develop the Water Supply-Demand Strategy for Melbourne.

The Strategy establishes new and extended ways to save and source water to provide a sustainable water supply for Melbourne and builds on the previous water resources strategy for Melbourne, which was completed in 2002¹.

¹ *21st Century Melbourne: a WaterSmart City – Final Report (2002)*

The Water Supply-Demand Strategy for Melbourne does four things:

1. Determines the expected 50 year water demand for Melbourne
2. Determines the expected available water supply to meet this demand
3. Identifies the range of potential water supply-demand options and assesses these against economic, environmental and social criteria
4. Sets actions to sustainably manage and meet Melbourne's water needs over the next 50 years.

The area covered by the Water Supply-Demand Strategy for Melbourne, is shown in Figure 1. It should be noted that Melton and Sunbury, while part of metropolitan Melbourne, are serviced by Western Water.

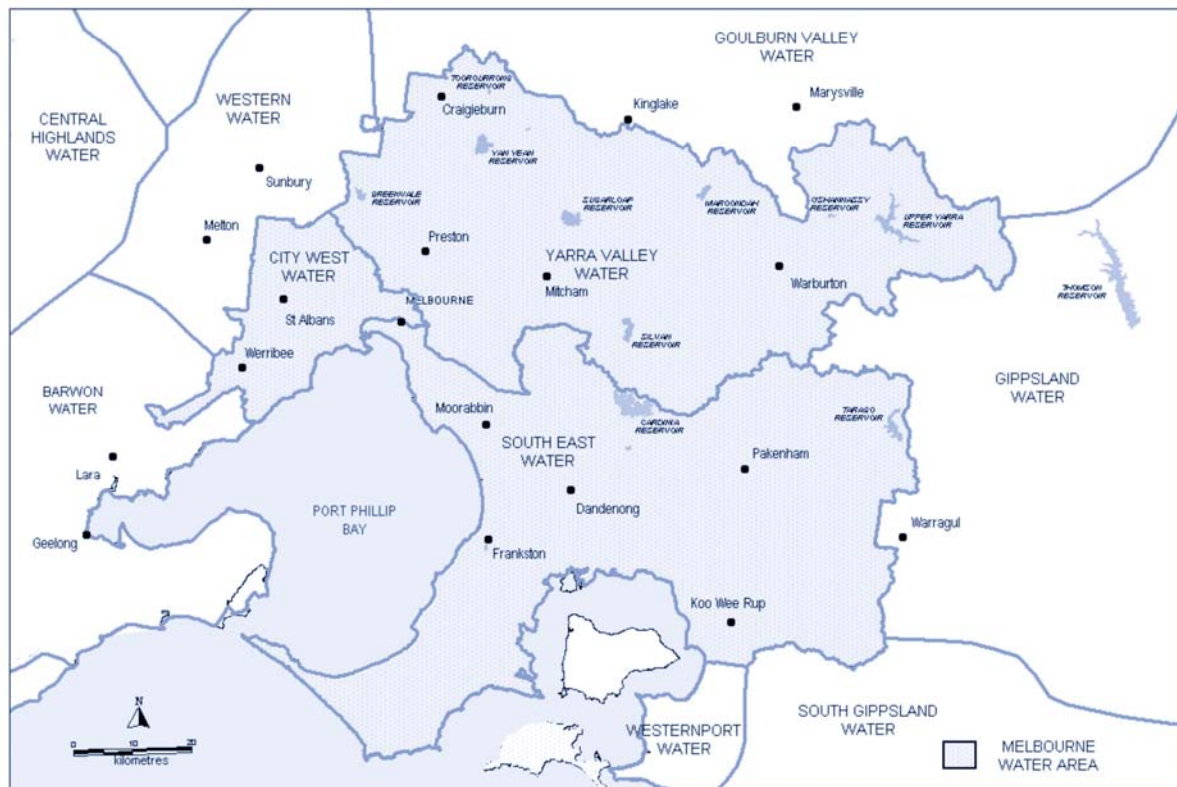


Figure 1: Area supplied by Metropolitan water businesses

Context

Cornerstones

- 2 The Strategy is based on the following:
 - o Water is an increasingly scarce resource, and finding ways for everyone to use less water is a high priority
 - o Planning for the uncertainty of the impact of climate change on water supplies through flexibility and adaptability in our actions and behaviours
 - o Using different types of water such as recycled water, stormwater and rainwater for non-drinking purposes is encouraged where it is affordable

- Priority is given to the most sustainable actions that are environmentally sensitive, socially supported and economically viable, and contribute to a balanced strategy.
- Harnessing water from rivers has to be done sustainably to ensure the environmental needs of rivers are met
- Climate change is expected to significantly reduce inflows and significant effort is required to reduce greenhouse gas emissions. Actions implemented under this Strategy, when considered together, will aim to achieve a greenhouse gas neutral strategy or better
- Diversity in actions is required to share the responsibilities and benefits of water management – everyone has a role

Linkages between energy use and water availability

Scientists believe that the rapid increase in greenhouse gases in the atmosphere over the past century, resulting from the increased use of fossil fuels, is changing the earth's climate. They predict that the earth will become warmer, drier and receive less rainfall in some areas. This means less water will be available in many parts of the world, including Melbourne.

National and State frameworks

The commonwealth and state governments have recently put in place the *National Water Initiative* and the Victorian Government has released its *Our Water Our Future* action plan. Through *Our Water Our Future White Paper: Securing Our Water Future Together* (June 2004) the Victorian Government has outlined its policy framework for securing Victoria's water supplies for the next 50 years. This framework shapes the Water Supply Demand Strategy and includes the following key policy decisions:

- No new dams for Melbourne
- Water cannot be traded between Melbourne and northern Victoria
- No water recycling for drinking purposes in the short to medium term

Building on the principles and approaches outlined in *Our Water Our Future* the Victorian Government has released the Central Region Sustainable Water Strategy which sets actions to secure water supplies for cities and towns, agriculture and rivers in the Central Region. The Central Region includes Greater Geelong, Ballarat, Greater Melbourne, Westernport and West Gippsland areas.

Relationship between the Melbourne and Central Region strategies

The Water Supply-Demand Strategy is focused on securing supplies for Melbourne urban water customers for the next 50 years. The Central Region Sustainable Water Strategy is focused on balancing the water needs of urban and rural customers and the environment across the whole region for the next 50 years. It also addresses any conflicts arising from sharing water between urban areas, irrigators and rivers in the Central Region.

The Water Supply-Demand Strategy for Melbourne details how the Melbourne water utilities will implement the government's policy directions and actions announced in the Central Region Sustainable Water Strategy.

- 3 Information on the Central Region Sustainable Water Strategy is available from the Department of Sustainability and Environment (www.dse.vic.gov.au).

Local frameworks

The Water Supply-Demand Strategy is the principal planning document for the metropolitan water utilities. It implements government directions for water management and conservation in the metropolitan area, and informs implementation plans such as joint metropolitan water conservation and water recycling action plans and the water plans developed by each water utility. Water plans set actions for water utilities over a five-year period and are the basis for the regulation of water prices by the Essential Services Commission. The Essential Services Commission will review the actions in the water plans and ensure that actions are implemented in the most cost-efficient manner.

There are several other plans in place or under development which focus on specific components of water management including drought management plans, bushfire contingency plans, Eastern Treatment Plant and outfall upgrade and other sewerage, stormwater and trade waste management plans. These are not covered in detail in this Strategy.



Figure 2: Strategic planning framework for metropolitan water supply and demand

Drivers and levers

There are a number of ways to influence the demand for water and actions to augment supply, including:

Targets to drive action

Targets provide clear direction and motivation for action. The Victorian Government has set short-term water conservation targets for the Central Region:

- 25% reduction* in per capita drinking water consumption by 2015, growing to 30% by 2020
- 25% reduction* in residential per capita drinking water consumption by 2015, growing to 30% by 2020
- at least 1% annual reduction in current water consumption in the non-residential sector

* from 1990s average

The Government supports the water utilities working with communities to achieve greater water efficiencies and bring forward the achievement of these targets wherever possible.

This Water Supply Demand Strategy for Melbourne is based on the additional conservation measures which will be implemented in Melbourne to bring forward the 30% targets to 2015 as set out in Action 3.1 of the Central Region Sustainable Water Strategy.

The current recycled water target for Melbourne is 20% by 2010.

Information to drive behavior change

Changing people's behaviour is fundamental to saving water and adopting different sources of water.

Studies such as the Our Water Our Future social research study show that many people are locked into their current habits because of a lack of information on how to save water, how to easily access water saving services and how to use different types of water such as rainwater and recycled water.

By providing information and assistance to help people make small changes to their lifestyle, we can make a big difference to how water is used in Melbourne.

Successfully influencing people's behaviour requires a combination of mass marketing campaigns and more personalised approaches. It is also important to influence people at an early age so that saving water and acceptance of different sources of water become part of daily life.

Example of a personalised approach to changing behaviour

Interactive behaviour change pilot programs are being undertaken in Melbourne to assist householders save water. The technique involves being invited into people's homes, listening to their needs and assisting them to identify and implement ways to save water.

On average, householders in the pilot group have reduced their water consumption by around 29,000 litres per household or 12%. These water savings are still being realised a year later but will need to be monitored into the future to test the effectiveness of this approach.

Incentives

Incentives are an effective way of encouraging water conservation. Incentives can be wide ranging from rebates and subsidies on water efficient saving appliances to rewarding urban developers for water conservation and use of different types of water in new developments.

Before any incentive program is implemented, a sufficient level of community knowledge needs to be achieved through a comprehensive information and education program. It is also important that incentives are targeted to achieve an overall community benefit and that the cost of the incentives is based on the volume of water saved and the value these savings have in delaying future supply augmentations.

Examples of incentives

The WaterSmart Gardens and Homes rebate program – The Victorian Government and water utilities currently provide rebates to householders for water conservation devices such as water efficient showerheads and rainwater tanks.

Home loan incentives - There are a number of home loan products that provide interest rate discounts for homes that install water conservation measures.

Pricing

Water has traditionally been delivered to Melbourne consumers at a relatively low cost. The Victorian Government's recent introduction of step tariffs to reward water conservation is designed to encourage consumers to conserve water.

Current water prices

The price for each step tariff for residential customers varies slightly for each water utility but is approximately: step 1 (0-440 litres per day) \$0.78 per kilolitre; step 2 (441-880 litres per day) \$0.92 per kilolitre and step 3 (881+ litres per day) \$1.36 per kilolitre.

This new pricing structure is directed at residential customers only. A review of non-residential pricing is currently underway and will be completed in 2006.

Future pricing reforms should continue to reward water conservation.

Regulation

Regulation has proven useful to aid the adoption of water saving devices such as dual flush toilets in homes and businesses and water efficient taps, showerheads and pressure reduction in new homes. There is significant community support for regulation that encourages the uptake of water conservation measures across Melbourne.

Currently, there are two key regulatory programs that aid the adoption of water conservation measures and rainwater tanks:

1. *Water Efficiency Labelling and Standards Scheme* - this scheme establishes a six star water efficiency rating and labelling regime for water using appliances and fixtures. It will help people choose more water efficient products for their homes.

The Scheme has introduced water efficiency labels for various appliances and products and mandatory minimum efficiency standards for toilets. The Scheme has been designed so that over time, it can incorporate more products and standards. Any additions to the Scheme are evaluated through a national regulatory impact assessment².

2. State building and plumbing regulations set minimum water efficiency standards for new and renovated homes, and mandate the adoption of appliances like water efficient showerheads and taps.

The Strategy development process

In February 2005, the four metropolitan water utilities formed an independently chaired committee called WaterSmart, supported by a project team to develop the Water Supply-Demand Strategy for Melbourne. This project team is governed by a Steering Committee comprising of metropolitan water utility and Department of Sustainability and Environment representatives. The Boards of Directors for each water utility approved the Strategy.

Review of the previous water resources strategy for Melbourne

The previous water resources strategy for Melbourne was reviewed to assess the effectiveness of its actions in securing water supplies for the future. The last strategy, combined with the Victorian Government's *Our Water Our Future* Program and water restrictions was highly successful in encouraging Melburnians to save water, with over 22% savings per person compared to the average water use in the 1990s.

The previous Strategy (2002) and the *Our Water Our Future* Program instigated the follow programs: metropolitan water pricing reform, smart water bills, the top 200 Large Commercial Water Users Program, the Five Star Building Standard, Permanent Water Saving Measures, Water Smart Gardens and Home Rebate Scheme, Water Saving Garden Centres, Savewater.com alliance, water utility active leak control programs. Victoria has also helped develop the national Water Efficiency Labelling and Standards Scheme.

Key achievements include, by 2004/05:

- 6
 - Water consumption per person has dropped by 22% since the 1990s. This is enough to provide nearly 10% of Melburnians with water for a year!
 - Water consumption by businesses using large volumes of water has shrunk by over 3 billion litres a year

² see www.waterrating.gov.au for further information

- Water utilities have reduced bursts and leaks saving 1.6 billion litres a year
- Water utilities also saved water by installing rainwater tanks and water efficient devices at their premises.

This Strategy aims to build on these successes.

In addition, research recommended by the 2002 Strategy was completed and incorporated into this Strategy. The most significant research finding is the scientific data on the potential impact that climate change could have on water resources. These potential impacts are the key reason why the 2002 strategy has been revised.

Technical assessments

The following major pieces of research have been undertaken to guide the Strategy:

- o Forecast of water supply and demand to 2055
- o Identification and assessment of water conservation, catchment water supply and alternative water supply (eg. rainwater, recycled water and seawater) options
- o Assessment of all options using a triple bottom line framework
- o Social research on acceptability of all options
- o Assessment of the greenhouse impacts and offsets.

This work is summarised in this Strategy but recorded in detail in a number of technical reports available from the metropolitan water utilities – South East Water, City West Water, Yarra Valley Water and Melbourne Water.

Input from community and stakeholders

There have been several different opportunities for public and stakeholder input into the Water Supply-Demand Strategy, including:

- o A Discussion Paper describing the future challenges for water supplies in the Central Region and identifying possible options to restore the supply-demand balance and address environmental needs of rivers was released for public comment by the Victorian Government in October 2005. In all, some 80 submissions were received in response to the Discussion Paper.
- o In December 2005, a public meeting was held in Melbourne to discuss the water future for Melbourne and the Central Region and potential options to augment supply, reduce demand and restore river health.
- o From October to December 2005, a series of meetings were held with stakeholders from the community and the environment, commercial and industrial, local government and catchment management sectors.
- o A joint Water Supply-Demand Strategy for Melbourne and Central Region Sustainable Water Strategy Stakeholder Reference Group was formed consisting of a selection of stakeholders (Appendix 1). This enabled direct stakeholder contributions to the strategies.
- o Research was undertaken to examine the community's understanding of, and preferences for, water supply and demand options. This research was particularly useful because it assessed people's understanding and preferences before and after they were exposed to information about the benefits and impacts of options and the challenges facing Melbourne's water resources due to population growth and climate change.

- A draft Strategy was released, along with the Victorian Government's Draft Central Region Sustainable Water Strategy, for comment in April, 2006. The Draft Central Region Sustainable Water Strategy was the primary document for public comment with the draft Water Supply-Demand Strategy providing further information for Melbourne stakeholders. A second series of meetings was held with stakeholders and communities from April to June to discuss the draft strategies. Over 430 submissions were received on the Draft Central Region Sustainable Water Strategy, a number of which provided comment on Melbourne proposals.

Sustainability assessment process

During the development stages of the Strategy, a range of possible water conservation and water supply options were identified. Each option was assessed against critical environmental, social and economic criteria by independent experts. Assessment criteria included:

- Environment: environmental flow impacts in rivers, greenhouse gas emissions, surface and ground water quality impacts and terrestrial (land ecosystem) impacts
- Social: public acceptability of options, cultural and recreational impacts, effort required to protect human health
- Economic: cost per million litres of water

The results of the sustainability assessment are summarized in the Strategy (Section 5) via the following symbols:

✓ represents a benefit X represents an adverse impact - means no impact \$ represents a cost

✓✓✓ ✓✓	Very large benefit	XXX XX	Very large adverse impact	\$	Very low cost
✓✓✓ ✓	Large benefit	XX XX	Large adverse impact	\$\$	Low cost
✓✓✓	Moderate benefit	XXX	Moderate adverse impact	\$\$\$	Moderate cost
✓✓	Small benefit	XX	Small adverse impact	\$\$\$ \$	High cost
✓	Very small benefit	X	Very small adverse impact	\$\$\$ \$\$	Very high cost

Table 1: Results of the sustainability assessment

The distribution of impacts and benefits across communities and the impact on the regional economy resulting from each action were also assessed. However, it is more appropriate that these impacts be assessed across the full set of actions included in the Strategy. For example, while one action could benefit one element of the community (e.g. residential sector) another could benefit another element of the community (e.g. commercial sector).

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Independent review process

In addition to the independent sustainability assessment and public acceptability research undertaken, and the review of strategy assumptions and actions by the Essential Services Commission, the Minister for Water appointed an Independent Panel to consider comments made on the draft Central Region Sustainable Water Strategy and report its findings to Government. The Independent Panel also provided advice to the

Government on the process to establish a short-term target for reducing per capita drinking water consumption beyond 2010 in Melbourne. This builds on the existing target of 15% reduction by 2010.

The Independent Panel's findings on the draft Central Region Sustainable Water Strategy (which incorporates the supply and demand actions for Melbourne identified in this Strategy) were considered by Government during the finalisation of the Strategy.

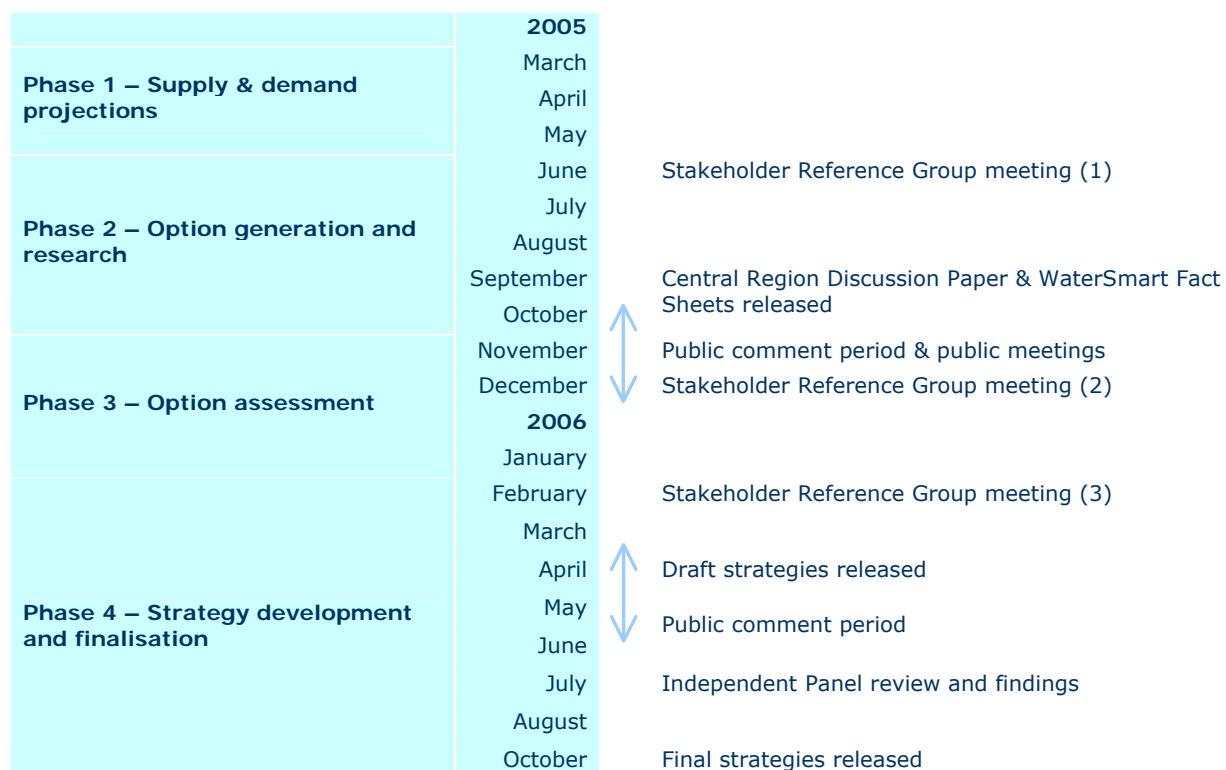


Figure 3: Summary of the Strategy development process

Recommendations

The State Government released the Central Region Sustainable Water Strategy in October 2006. In addition to supporting Policies in that Strategy this Water Supply Demand Strategy for Melbourne makes a series of recommendations which are consistent with the Actions set out in the Central Region Sustainable Water Strategy.

SECTION 2 - MELBOURNE'S WATER TODAY

Water available to Melbourne

There are five potential sources of water available to Melbourne:

- rivers and reservoirs
- groundwater
- recycled water
- rainwater and stormwater
- seawater

Almost all water used in Melbourne today comes from rivers and reservoirs (Table 2). This is nearly 10 times the amount of groundwater or recycled water, and over 400 times the amount of rainwater and stormwater currently used in Melbourne. Virtually no seawater is used. There are many opportunities to increase our use of these alternative sources of water.

Table 2: Water sources and volumes currently used in Melbourne each year

Water source	Volume used
Rivers and reservoirs	435 billion litres in 2004/2005 474 billion litres (average from 1990 – 2005)
Recycled water	46 billion litres overall ³
Groundwater	up to 33 billion litres
Rainwater and stormwater	less than 1 billion litres
Seawater	Negligible

Rivers and reservoirs

Rainfall runs off catchment areas and is captured in several reservoirs – the major ones being the Thomson Reservoir in Gippsland, and the Upper Yarra, Maroondah and O'Shannassy Reservoirs in the Yarra catchment. Most of Melbourne's water is from uninhabited catchments and requires minimal treatment to be safe to drink. Water is also extracted from the mid Yarra River near Yarra Glen and transferred into Sugarloaf Reservoir. As this water runs off inhabited areas below the forested catchments and is of lower water quality, it is treated before being distributed for drinking. Water is also sourced from the Wallaby and Silver Creeks which are part of the Goulburn River catchment.

The Yarra and Thomson Rivers and Wallaby Creek have historically provided an average long-term reliable supply of 555 billion litres for Melbourne per year. This could increase to around 576 billion litres when Tarago Reservoir is reintroduced to the Melbourne supply system. However, over the period from 1997 to 2005 inflows have been 29% lower than the long term average in the Yarra catchment, 34% in the Thomson catchment and 41% in the Tarago catchment. This has reduced the reliable supply over the last decade to around 395 billion litres a year, increasing to 410 billion litres when Tarago Reservoir is reintroduced.

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The volumes used from the above water sources vary considerably depending on rainfall and storage conditions in the Thomson and Yarra basins. For example, in wetter years, more water is used from the Yarra basin, allowing water to accumulate in the Thomson Reservoir for use in dry years. Since 1980, the highest recorded annual take from the Yarra was 503 billion litres in 1986 when Thomson Reservoir was filling, and the lowest

³ Most of this volume is recycled at Melbourne Water's sewage treatment plants with only a small volume used to substitute for drinking water supplies.

was 207 billion litres in 1997 during the drought. Water use from the Thomson Reservoir varies depending on streamflow in the catchment and the storage level, from just 13 billion litres in 1996 to 255 billion litres in 1997.

The Victorian Government has implemented 'caps' based on long-term annual average harvest to limit the average annual volume of water extracted from the Yarra and Thomson Rivers to sustainable levels.

Diversions to Melbourne from the Thomson Reservoir are capped at 172 billion litres per year. An interim cap of 420 billion litres a year for the Yarra River was specified subject to a detailed environmental flow study. This study⁴ has been undertaken and it found that while the Yarra is generally in good health from a flow perspective, current operations of the water supply system are impacting on some of the flow characteristics required to maintain river health.

The Victorian Government and Melbourne Water will provide the environmental flows recommended in the 2005 scientific study for the Yarra River, through a combination of the granting of a new environmental entitlement and extracting water for consumptive purposes consistent with the environmental flow study recommendations. This includes 17 billion litres per year that can be stored and released as needed to provide operational flexibility to maximise environmental benefits.

In addition, the cap will be reduced to 400 billion litres a year to ensure that periodic high flows continue to occur in the Yarra River.

A program of complementary works, such as restoration of riparian revegetation and reinstatement of woody debris for fish habitat are being undertaken as part of the Regional River Health Strategy. Works to upgrade septic tanks and improve stormwater quality, are also underway as part of the Yarra River Action Plan to maximise the likelihood of achieving the environmental objectives of the environmental flow study. These works combined with environmental flows, monitoring and reporting will form an integrated package of measures to protect and enhance the ecological health of the Yarra.

Recycled water

After use by Melburnians the water provided to homes and businesses is collected and treated primarily at two main sewage treatment plants - the Western Treatment Plant at Werribee and the Eastern Treatment Plant at Bangholme. A number of small local plants treat about 8% of Melbourne's sewage. In total, this currently equates to a resource of about 350 billion litres of water a year.

About 14%, or 49 billion litres, of this water is recycled for non-drinking uses such as watering pasture, turf growing, market gardens, parks and golf courses and, more recently, for flushing toilets and garden watering where there are dual-pipe systems in place.

However, use of recycled water in Melbourne is growing. Over the next 20 years, it is anticipated that 40,000 new homes and businesses in Melbourne will use an additional 5.3 billion litres of recycled water from sewage treatment plants for toilet flushing, garden watering and industrial processes. Highly treated water from the sewage treatment plants is provided to homes and businesses by a recycled water pipe or dual pipe. There is

11 the potential for further growth in the use of recycled water in Melbourne.

Currently water from sewage treatment plants is treated to various levels, depending on its use. Water from treatment plants can be treated to any level and suitable for any use (subject to community acceptance), ranging from open space and industrial use to potentially drinking and environmental flows. Harmful pathogens and other contaminants can be removed from recycled water by advanced treatment processes. However,

⁴ Melbourne Water (2005). *Determination of the minimum environmental water requirements for the Yarra River*

advanced treatments are costly and energy intensive, although it is expected that these impacts will reduce as technology advances.

Some cities across the world already use small quantities of recycled water as part of drinking supplies and recycled water is also being considered as a drinking water source in some Australian cities.

The on-site recycling of household water from showers, bathroom sinks and laundries (greywater) for use on gardens and in the toilet and laundry is not widely practiced in Melbourne. However, some residents recycle household water for garden watering.

As population growth and climate change impact on catchment sources of water, recycled water is increasingly recognised as a valuable, reliable resource.

Rainwater and stormwater

Rain runs off roofs, roads and other urban surfaces and flows into drains, rivers and creeks and eventually Port Phillip Bay and Western Port Bay. On average, about 500 billion litres of stormwater is generated throughout greater Melbourne annually – more than half as a result of the city's impervious surfaces.

Rain that falls on the roofs of buildings could be captured in rainwater tanks and used for non-drinking uses. While the use of rainwater tanks in Melbourne is growing, it is estimated that less than one billion litres of water a year is captured in rainwater tanks. The Victorian Government's five-star home standards require new homes to either have a rainwater tank that provides water for toilet flushing (or equivalent volumes through a dual water recycled water or stormwater supply) or a solar hot water heating system. This means that over the next 50 years, 362,000 new homes could have a rainwater tank or dual water supply. This would save up to 6.4 billion litres per year⁵.

There is the capacity to capture more rainwater via rainwater tanks at new and existing homes and businesses and use this water to flush toilets, for laundry and shower use and even for hot water use. In Melbourne, rainwater tanks are generally less efficient when used mainly for garden use because of the high volume required to water the garden and the irregularity of rainfall in summer.

The volume of water that could be captured is dependent upon rainfall, which varies across greater Melbourne and could be affected by climate change. It is also dependent on the size of the rainwater tank, the roof area and how householders use and maintain rainwater tanks.

The capture and use of rain on a larger scale via stormwater recycling is not widely practised in Melbourne but this is changing, for example, at Albert Park Lake where stormwater is being used to replenish the lake instead of drinking water. Stormwater can be used for watering gardens and open spaces, flushing toilets, industrial use or, after treatment, for drinking.

Capturing a proportion of the stormwater generated in Melbourne could provide significant volumes of water. Large storage facilities such as reservoirs, retarding basins, wetlands, artificial lakes or aquifers would be required to capture stormwater during heavy rainfall events. This water may require treatment depending on the intended use.

⁵ This volume is based on half of all new homes adopting rainwater tanks but could vary depending on preferences for rainwater tanks or solar hot water systems.

Groundwater

Groundwater is stored in natural underground water storages known as aquifers and is pumped to the surface from bores or flows into rivers. Up to 33 billion litres of groundwater is licensed for use in the greater Melbourne area annually, primarily for watering market gardens and golf courses.

Groundwater can vary in quality as a result of salinity and contamination caused by nearby urban or rural activities and would need to be treated before being used for drinking.

A deep, largely unused groundwater storage is located in the Werribee area, but this water is high in salt. Little is known about this groundwater source and further investigation would be required to determine if there were sustainable volumes that could be extracted without affecting surface water flows or triggering ground subsidence. This water would also require desalination before being pumped to the water supply distribution system.

Aquifers can also be used to store water, including stormwater and recycled water. Research has begun to investigate aquifer storage opportunities in the north and east of Melbourne and it is expected that initial results from trial operations will be known by 2007.

Seawater

Very little seawater is used in Melbourne with only very small volumes of estuarine water used in a Melbourne power station for cooling.

Desalinated seawater is increasingly used worldwide for the supply of safe drinking water. As it is not dependent on climate change or rainfall, it also represents a more secure supply of water.

While seawater is high in salt, desalination technology can effectively remove salt and other impurities. The volume of seawater that could be made available to Melbourne would be limited only by the cost and energy usage which is high compared with other water sources. However, there could be environmental concerns over the greenhouse impacts and disposal of highly saline waste streams from the desalination process.

How water is currently used in Melbourne

Water consumers in Melbourne have worked hard to reduce their water use and the efforts of householders, councils, industry, sporting bodies and water utilities, combined with temporary water restrictions and the introduction of Permanent Water Savings Rules, have led to a cumulative saving of about 22% compared to the average water use in the 1990s (Figure 4). This means that Melburnians use around 331 litres per person per day compared to 423 litres per person per day in the 1990s. If these savings continue, they will exceed the existing government-set water conservation target for Melbourne of 15% water reduction per person per day from a 1990s average consumption, to be met by 2010.

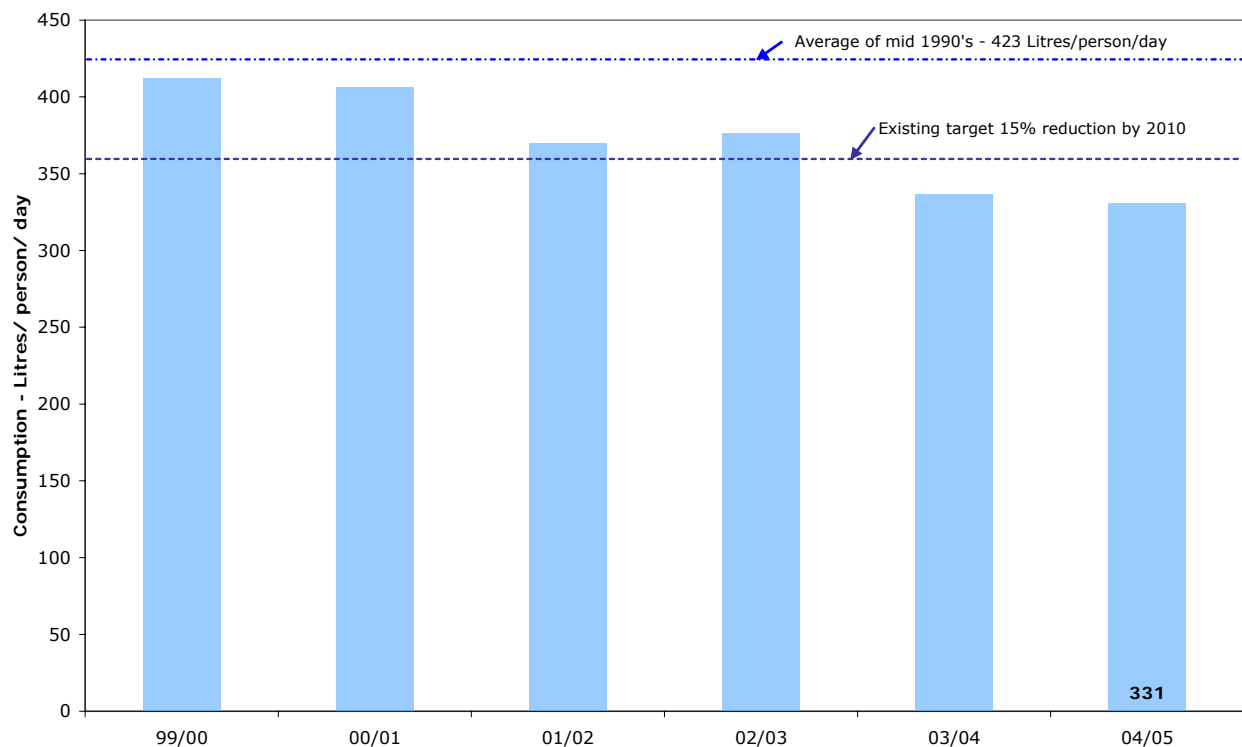


Figure 4: Water savings (per capita) made by Melburnians since the 1990s

However, while water use has declined over the past six years and Melbourne is one of the most water efficient capital cities in Australia, many other cities around the world use far less water at home. For example, northern European households use 125 litres of water per person per day compared with 157 litres in Melbourne for indoor use. Indoor water consumption is a good indicator of water efficiency because it focuses on typical household activities such as showering, cooking and clothes washing and excludes outdoor use, which varies depending on climate and the incidence of houses with gardens.

- 14 Water-efficient appliances, such as water-efficient washing machines, are also used more extensively in European countries.

Litres consumed in Melbourne per person per day

Total	331
At home	208
Indoors at home	157

Analysis of water use data indicate that most water consumed by Melburnians is used at home (59%), with about 30% used in industry and businesses. Some 11% is taken up by 'non-revenue water' which includes leakage from water mains (7%) with the remainder used for firefighting, stolen or unaccounted for due to meter inaccuracies (Figure 5).

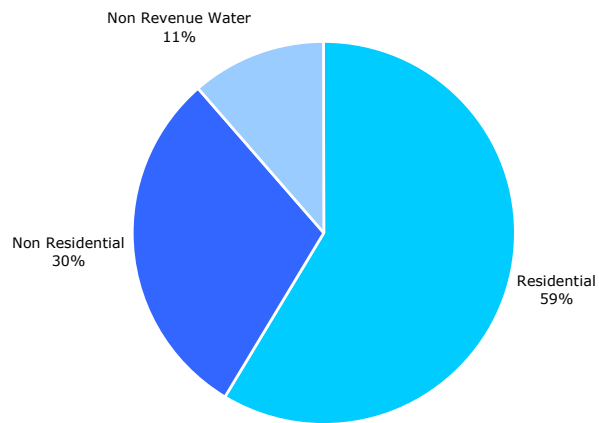
It is more difficult to determine how water is used within homes. Data from across Australia has been collected by the Water Services Association of Australia, but a recent study undertaken by Yarra Valley Water⁶ specifically on Melbourne homes, indicated that 80% is used internally in the kitchen, bathroom and laundry and 20% is used externally on gardens and car washing. Showers (30%) and washing machines (14%) are the highest uses of water inside homes.

About half of the water used by industrial and commercial customers in Melbourne is used by just 1,500 companies with the remaining 122,000 businesses using the rest of the water. Some 500 of the 1,500 largest commercial water users (that use more than 10 million litres a year) are manufacturing businesses. Hospitals, parks and golf courses, universities and hotels also feature in the top 1,500 water users.

As well as supplying water to metropolitan Melbourne customers, Melbourne provides up to 11.25 billion litres per year to Western Water customers in Sunbury, Melton and Bacchus Marsh.

⁶ Yarra Valley Water (2005). Yarra Valley Water's Residential End Use Measurement Study.

TOTAL CONSUMPTION - MELBOURNE



CURRENT RESIDENTIAL CONSUMPTION

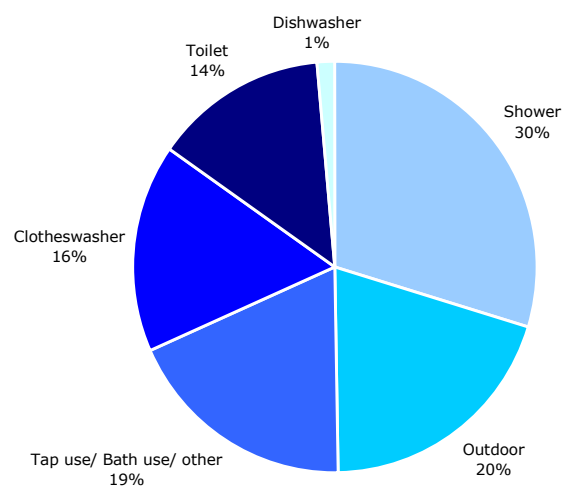


Figure 5: Water use in Melbourne

SECTION 3 - MELBOURNE'S WATER FUTURE: THE CHALLENGES AHEAD

Planning for the sustainable management of our water means taking into consideration the potential long-term impacts of several major factors, including:

- increasing population
- changing housing stock and occupancy rates
- climate change
- the need to protect river health
- changing community attitudes to water use.

Population growth

By 2055, it is anticipated there will be 4.7 million people living in the Melbourne metropolitan area⁷. This is a 31% increase from today's population of 3.6 million. These projections are based on overseas migration, fertility and death rates and net migration from Melbourne to regional Victoria. However, population growth can be difficult to accurately forecast and variations to assumptions may affect Melbourne's population growth.

While per capita demand for water has decreased in the past 10 years, the overall demand for water will increase because of population growth.

Changing housing stock and occupancy rates

It is anticipated that there will be around another 725,000 new homes in Melbourne over the next 50 years. Of these, 57% will be detached homes and 43% will be multi-residential (units and apartments)⁸. Detached homes on average use around 35,000 litres per year more than a unit or apartment due to garden watering and other outside uses.

In addition to this, Melburnians are increasingly moving towards homes with fewer people, which impacts water use. While the current average indoor residential water use is 157 litres per person per day, homes with lower occupancy rates use more per person. For example, a single-person home typically uses around 250 litres per person per day, a two person home uses around 200 litres per person and a three person home uses around 170 litres per person. This is largely due to activities such as clothes washing, dishwashing and cooking which tend to be more efficient in homes with more people.

Climate change

- ¹⁷ There is now strong scientific evidence that climate change is happening. The CSIRO and Melbourne Water have recently completed a comprehensive investigation of the potential impacts of climate change on water

⁷ Victorian Government (2004). *Beyond 5 Million– the Victorian Government's Population Policy*

⁸ Victorian Government (2002). *Melbourne 2030 – Planning for Sustainable Growth*

supplies for Melbourne. This study has indicated that less water may be available in the future from our existing supplies due to lower rainfall⁹ overall, despite more frequent storms.

There is a wide range on uncertainty associated with the rate of change and the extent of the impacts of climate change on water resources. To manage this uncertainty, the Strategy takes an adaptive management approach which includes monitoring and reviewing climate change impacts.

Initial estimates forecasted that climate change could potentially result in a water supply yield reduction of between 4% and 14% (medium about 8%) by 2020 and between 10% and 38% (medium about 20%) by 2050. These estimates are based on overlaying low, medium and high climate change scenarios on long-term inflows to Melbourne's Reservoirs. However inflows to reservoirs in the last decade have been well below the long-term average. Low inflows are not just limited to Melbourne but are occurring across South-east Australia. It is possible that this is simply an episodic dry period as has been experienced in the past (although past recorded dry periods have been less severe and shorter duration than the current drought).

It is also possible that the last decade represents a permanent step-down in reservoir inflows linked to climate change. This has occurred in Western Australia where a similar step reduction in inflows was experienced in the 1970s and inflows continue to reduce.

The Water Supply-Demand Strategy for Melbourne focuses on addressing the impacts of the low inflow scenario with the flexibility to adapt to less severe climate change scenarios if required.

The CSIRO and Melbourne Water study also found a potential increase of temperature of 1.4°C (medium) and a reduction in rainfall (medium of -4%) by 2050. This will have implications for water demand, for example, by increased volumes of water used on the garden. However, Melburnians continue to be more efficient with their use of water and it is difficult to estimate how the potential increase in demand due to climate change is balanced by reduced demand due to behaviour change. The study indicated that climate change could increase water demand in Melbourne by 3% over 50 years but this requires further investigation. Ongoing monitoring and periodic review of the climate change projections, particularly rainfall projections, will be required to ensure Melbourne remains well placed to adapt to climate change (see Section 7).

Protecting river health

Melbourne is dependent on the health of the Yarra and Thomson Rivers and in the future, the Tarago River. Protecting the ecosystems of these rivers is complex, but crucial to ensuring there is sufficient clean water to drink and a healthy environment that supports a range of ecosystems and recreational and cultural activities. It is important that these rivers receive enough water at the right time to maintain their health.

The Victorian Government's *Our Water Our Future* program recognised the impacts water extractions have had on river health and put in place actions to increase flows and restore river health.

Government required the Melbourne water utilities to give up water to boost flows to the Thomson River by 10 billion litres per year from water savings made by Melburnians. The Victorian Government has committed to increasing this by another eight billion litres per year by 2014.

18

Similar environmental flow investigations on the Yarra River have shown that it is largely in a healthy state but requires an additional 17 billion litres to improve some reaches.

⁹ CSIRO and Melbourne Water (2005). *Melbourne Water climate change study: Implications of potential climate change for Melbourne's Water Resources*

The Bunyip and Tarago Rivers will receive 3 billion litres as an environmental entitlement in Tarago Reservoir. The Maribyrnong and Werribee Rivers will also receive increased environmental flows although this will not have a significant impact on Melbourne's supplies.

Returning water to the rivers will reduce water available for consumption and will require increased water conservation by rural and urban users, or the use of alternative water supplies. River health will also be impacted by climate change and it is important that the right balance is achieved between protecting our rivers and consumptive water use.

Changing community attitudes to water

Over recent years, Melburnians have responded positively to the need to save water. The challenge for the future is to maintain the community's commitment to saving water and increase the understanding of alternative water supplies such as recycled water, desalinated water, rainwater and stormwater.

This will be particularly challenging during non-drought periods where the focus on the scarcity of water is diminished. However, it is critical that we continue to save water now and in the future as population growth and climate change cause water to become increasingly scarce.

SECTION 4 – LOOKING AHEAD TO SUPPLY AND DEMAND NEEDS

The baseline supply-demand forecast is the starting point for the development of the Water Supply-Demand Strategy for Melbourne. It is based on what the water supply and water demand for Melbourne would look like if we did not put in place any further water conservation or supply augmentation actions (except those already approved by Government).

However, water utilities will put in place further actions to conserve more water and augment supply and while the baseline forecast is the starting point, the end point will be a reliable and safe water supply.

Demand forecast and assumptions

Water demand is difficult to forecast because it varies depending on weather conditions, changing population and water use behaviours. Currently, Melburnians are subject to water restrictions and are conserving water at a similar level to that saved during

A snapshot of water demand (billion litres)				
	Now	2015	2030	2055
Demand on Melbourne supplies	446	468	508	550
Potential demand bounce-back ¹⁰	38	42	48	53
TOTAL	484	510	556	602
Potential transfers to regional centres	6	9	9	13

stage 1 and 2 restrictions which were in place from November 2002 to February 2005. Water restrictions along with new permanent water saving rules and dozens of water conservation incentives and programs have encouraged Melburnians to save water on a daily basis (Figure 6). The challenge is to maintain these behaviours and water savings into the future.

¹⁰ Demand may increase if Melburnians revert back to pre-restriction water use behaviour – see page 22 for further information

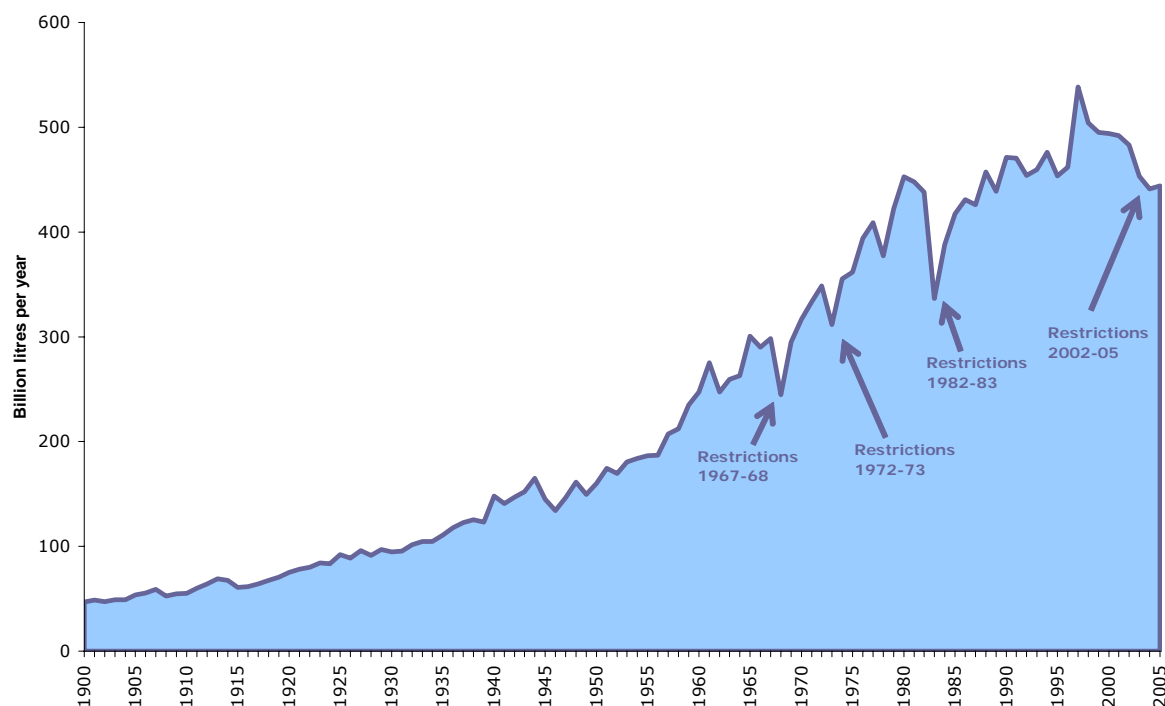


Figure 6: Water savings during restrictions

The baseline demand forecast is based on the current low consumption level as the starting point and sophisticated demand modelling to forecast demands for the next 50 years. The forecast is based on several assumptions:

- Victorian Government forecasts for population increases
- Victorian Government policies for housing stock growth
- projections for industrial and commercial growth
- water savings from existing water conservation programs (eg. Top 200 Water Users Program and Permanent Water Saving Rules)
- water savings from the current and anticipated adoption of water efficient appliances (eg. water efficient washing machines and showerheads) and rainwater tanks
- water savings from the recent pricing reform
- existing water transfers of up to 11.25 billion litres to other water utilities (Western Water).

Melburnians currently use around 446 billion litres of water a year (of this 11.25 billion litres is supplied to Western Water to supply Melton and Sunbury). If we revert back to the way we used water in the 1990s (before water restrictions), our demand would increase to 484 billion litres.

With population growth and continued adoption of existing water conservation measures, Melbourne's demand for water (without new actions to reduce demand) would increase to 550 billion litres in 2055 if no 'bounceback' in demand occurs. This could be as high as 602 billion litres in 2055 if we revert back to pre-restriction water use behaviours (Figure 7).

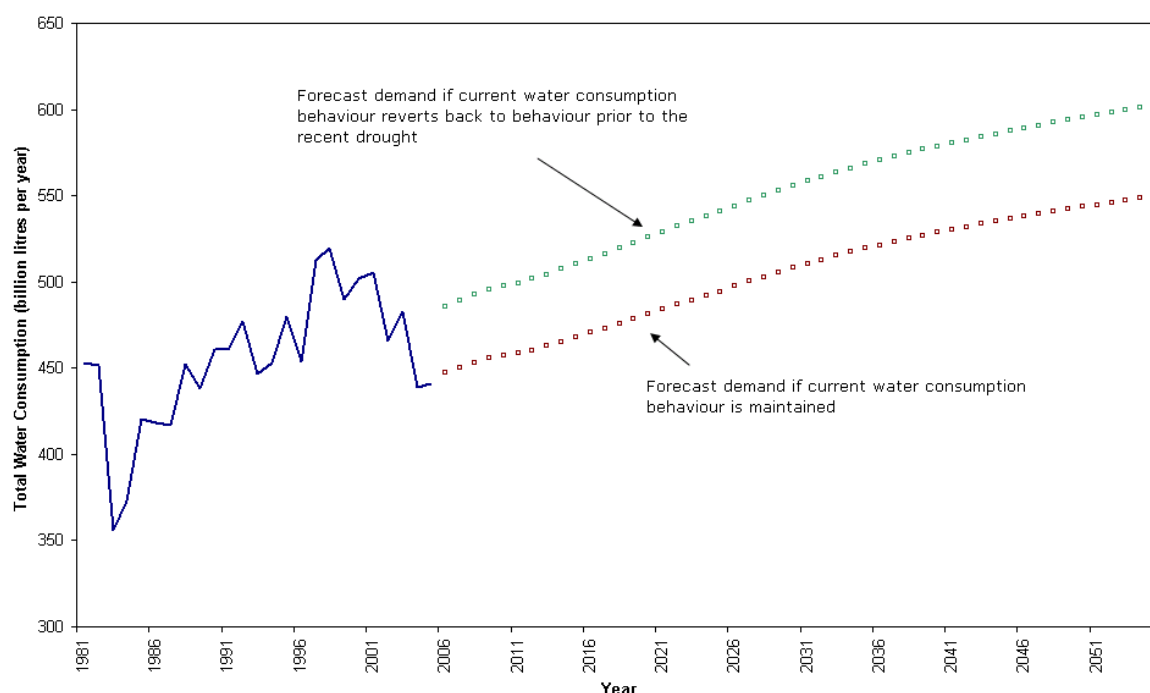


Figure 7: Baseline demand forecast for Melbourne without further action to conserve water.

Water demand varies from year to year depending on the climate and if there are variations to the underlying assumptions. Changes to the assumptions have been included in a variation to the demand forecast. These potential variations would result in a demand forecast range of 540 to 656 billion litres in 2055.

To ensure demand is not under-estimated and that adequate actions are implemented to secure future water supplies for Melbourne, the short-fall calculations in this Strategy include the potential 'bounceback' in demand. However, the metropolitan water utilities are committed to maintaining existing water savings and existing investment in water conservation (see Objective 1).

Potential transfers to other urban areas

In addition to existing water transfers to Western Water and Westernport Water may require further transfers from Melbourne's water supply system to augment supplies to Melton/ Sunbury and Phillip Island respectively. These transfers, documented in the Central Region Sustainable Water Strategy, could increase the demand on Melbourne's water supplies by around 13 billion litres a year by 2055 (Table 2). Due to the limited availability of river water sources, these transfers would bring forward other more expensive water supply options for Melbourne. Associated increased costs would need to be passed on to customers of water utilities requesting transfers.

Table 2: Annual potential transfers from Melbourne's supplies to other towns (reduced transfers are expected

22 under a long-term inflow scenario)

Town	Potential transfer (billion litres)		
	2015	2030	2055
Sunbury and Melton	7	7	10
Phillip Island	2	2	3
Total	9	9	13

Supply forecast and assumptions

The baseline supply forecast for Melbourne includes water harvested by Melbourne's water supply system taking into account the impact of climate change, as well as metered alternative supplies (eg. dual pipe systems) that are currently in place or are approved.

The Strategy uses two different supply forecasts.

The first assumes a return to average inflows (based on the past 100 years) with a gradual reduction due to climate change over the next 50 years. However the 2006 winter / spring inflows were the lowest on record following a decade of inflows lower (on average) than anything experienced over the past 100 years. This prompted a second scenario which assumes that the last ten years of low inflows continues into the future. While continuation of these dry conditions would be an extreme situation, prudent planning means that this possibility should be planned for.

Both scenario's include:

- the reconnection of Tarago Reservoir in 2010 (which was announced by the Victorian Government in 2005)
- current environmental flows for the Tarago and Thomson Rivers and Silver and Wallaby creeks as of July 2005
- proposed new environmental flows for the Tarago River and the Yarra River including an additional 17 billion litres environmental reserve
- caps of 400 billion litres for the Yarra River and 172 billion litres for the Thomson River
- yield from currently committed dual pipe recycling projects.
- 'level of service' to customers is maintained which aims to provide a 95% reliability of supply; and restrictions for no longer than 12 months and no more severe than stage three restrictions.

The baseline supply forecast is shown in Figure 8. It indicates that under long-term average inflows, with a medium climate change impact and without further actions to augment supply, Melbourne's water supplies could reduce from 581 billion litres to 424 billion litres by 2055. This shortfall was based on a medium climate change impact but could range from 324 billion litres to 500 billion litres in 2055 under more and less severe climate change impacts.

A snapshot of supply (billion litres)				
	Now	2015	2030	2055
Low inflows	395	413	415	415
Long-term average inflows	555	548	503	424

* includes supply increases from Tarago Reservoir reconnection in 2010 and planned dual pipe recycling

Reliability of water supplies

Typically, an acceptable level of reliability for Melbourne is 95%. This means water restrictions would be expected no more than 5% of the time.

- 23 Under low inflows, supplies would remain at the current low level of 395 billion litres increasing to 410 billion litres when Tarago Reservoir is reintroduced and further increasing to 415 billion litres as previously committed recycling projects are brought on-line.

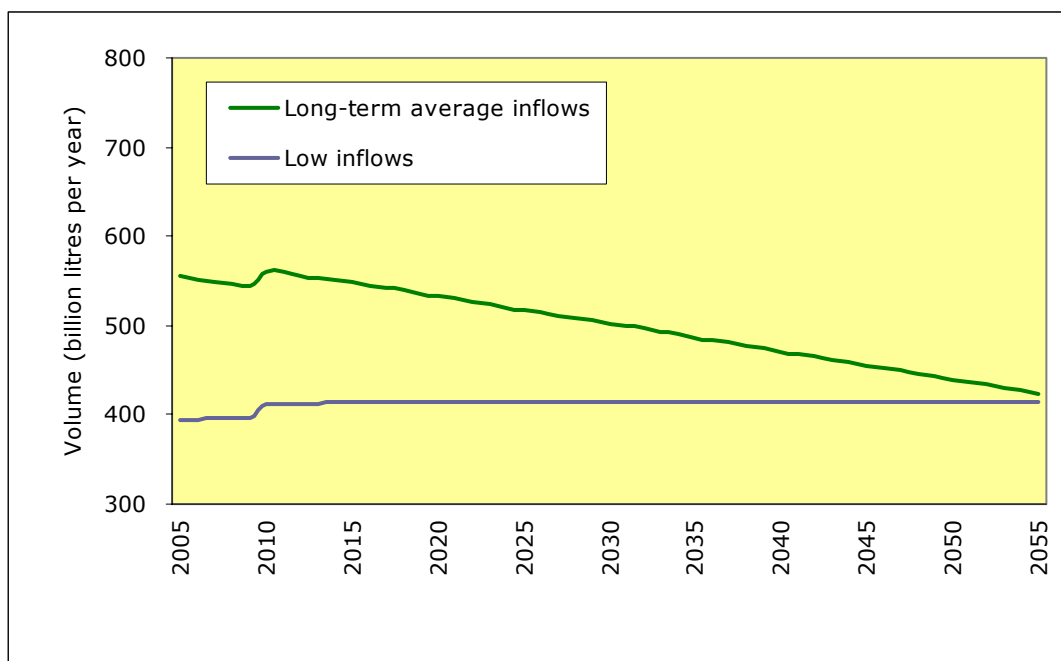


Figure 8: Baseline supply forecast (without further actions to augment supply)

The supply-demand balance

As a result of the current low inflows into reservoirs, Melbourne is experiencing a short-fall of water which is evident through the current water restrictions. To return to a 95% reliability of supply an additional 89 billion litres of water needs to be secured. Almost half of this volume has already been achieved through the excellent water saving efforts made by Melburnians.

Under this scenario, the short-fall grows to around 200 billion litres by 2055 (assuming transfers to other urban centres occur).

With long-term average inflows, the

A snapshot of supply-demand balance (billion litres)				
	Now	2015	2030	2055
Low inflows				
Without transfers	-89	-97	-141	-187
With transfers	-95	-106	-150	-200
Long-term average inflows				
Without transfers	+71	+38	-53	-178
With transfers	+71	+33	-60	-191

+ indicates a surplus

- indicates a short-fall

The low inflow shortfalls vary from the Central Sustainable Water Strategy because of the inclusion of up to an additional 5 billion litres available from committed recycled water schemes

- 24 combined supply and demand forecast shows that, if no further action were taken, by 2021 Melbourne's water demand could exceed reliable supply. This scenario also shows that, in 2055, Melbourne could have a potential supply short-fall of around 191 billion litres (Figure 9) if transfers to regional centres occur. To ensure adequate supplies for Melburnians, this Strategy sets actions to reduce demand and increase supplies by at least 200 billion litres. Given the uncertainties of climate change, significantly greater volumes of water have been sought through actions in this Strategy to ensure we are prepared for the future.

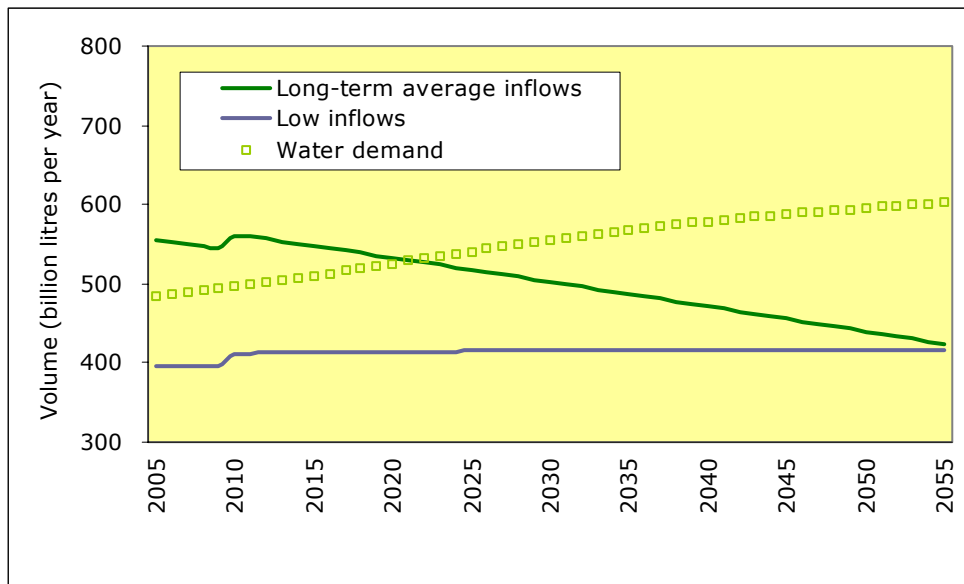


Figure 9: Baseline supply-demand forecast (without action)

SECTION 5 - ACTIONS TO SECURE MELBOURNE'S WATER FUTURE

The previous section set out the potential challenges and short-fall in supply Melbourne may face without further planning and management. Of course, considerable activity has occurred in recent years to conserve water and optimise water supplies and this section includes actions to maintain these achievements, and build on them with a range of new actions to save more water and augment water supplies.

Objective 1: Maintain existing water conservation savings

Currently, Melburnians are using around 331 litres per person per day. This includes residential, industrial and commercial use, as well as non revenue water which overall is around 38 billion litres less water per year than we were using prior to the recent water restrictions. This will increase to 53 billion litres in 2055 as our economy grows.

Maintain current water use at 331 litres per person per day

Implementation timeframe: ongoing

Cost: \$up to 21 million a year

CRSWS reference: Action 4.31

The starting point for the Strategy is to maintain these water savings into the future after water restrictions are lifted.

Analysis of water use data over the past few years indicates that water use reductions have occurred throughout the year, with a greater reduction in summer months (Figure 10). This indicates that Melburnians are adopting water efficient behaviours at home and work throughout the year through activities such as shorter showers and turning off taps, and in summer months in the garden and open spaces. Current water restrictions are assisting in reducing water use too.

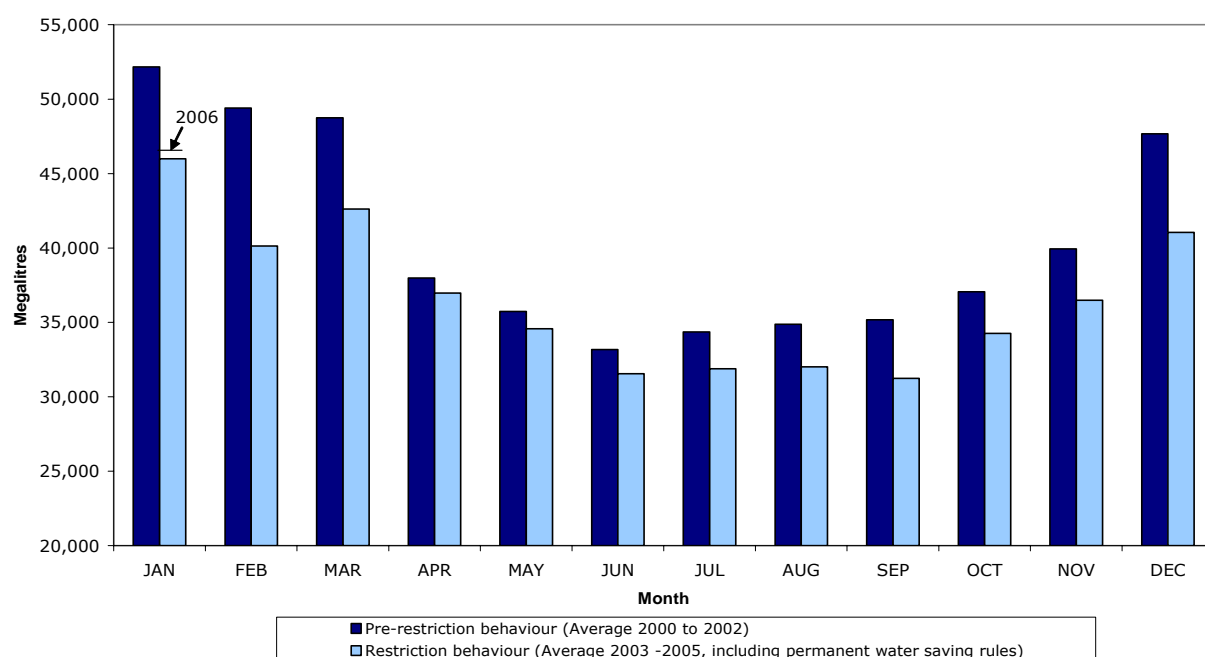
To maintain these savings, the metropolitan water utilities will continue to spend around \$6 million per year on water conservation measures (e.g. commercial, industry, local government and schools programs; Permanent Water Saving Rules; Savewater.com alliance; Smart Water Fund; water utility active leak control programs; community grants; and information, education, monitoring and behaviour change programs), and contribute a further \$6 million to the Victorian Government as part of the *Our Water Our Future program*. This investment needs to continue.

In addition, more sophisticated and targeted behaviour change and communications programs will be required to motivate Melburnians to save water after the drought is over and reservoirs start to fill. This will assist to maintain behaviorally driven water savings such as shorter showers and reduce water use in the watering of gardens and open space. This will cost around \$9 million per year. This increased investment in water conservation will be required if water demand increases back to pre-restriction levels.

Focus on garden watering

Education and behaviour change programs will need a particular focus on garden and open space watering. Many gardens in Melbourne are not designed for our variable and at times often harsh climate. But to maintain existing savings, gardens in the future will need to be 'Melbourne friendly' with native and drought tolerant plants and warm season grasses, or watered through local water sources such as rainwater tanks or recycled water. This would allow gardens to thrive even in the driest conditions.

Research and monitoring programs will also need to continue to assess water conservation savings and enable review and redesign of water conservation programs. In particular, studies that assess how water is used in homes, work places and open spaces (end use studies) will need to be frequently undertaken and water savings



will need to be monitored on an annual basis.

Figure 10: Seasonal water consumption in Melbourne from 2000 to 2005

Action 1: To maintain existing water savings, the metropolitan water utilities will:

- over the next five years, continue to invest \$12 million per year in water conservation programs
- continue to monitor and report water savings, review the effectiveness of conservation programs on an annual basis and develop contingency plans to manage any future bounce-back in demand
- invest \$5 million over the next five years to extend existing water use studies to improve the knowledge of how and where water is used in Melbourne. This will ensure that an updated water use study is ready for inclusion in the next strategy in 2011
- if required, increase investment in water conservation activities to maintain existing savings. In particular, educational, behaviour change and communication programs will be expanded with an increased focus on gardens and water saving behaviours. This is expected to cost a further \$9 million per year

Recommendation 1: That the Victorian Government maintains its direct investment in water conservation as set out in the Central Region Sustainable Water Strategy.

Objective 2: Smarter management of existing river supplies

The caps and environmental water allocations for the Yarra, Thomson and Tarago Rivers will contribute to safeguarding the health of these rivers and the many recreational and cultural activities surrounding them. They also provide a sustainable basis for extracting water for urban consumption.

Additional supply: 0 - this action maintains supplies while protecting environmental flows
Cost: \$80 million capital and \$3.8 million a year
CRSWS reference: actions 4.39 & 4.41

More sophisticated water resource management will be required in the future to secure supplies for Melbourne and maintain healthy rivers. For example, the environmental flow study for the Yarra River indicated that there are a number of times throughout the year when recommended environmental flow levels are exceeded during wetter periods. These provide opportunities to harvest water for consumptive use while protecting river health. Similarly, there are a number of times when water harvesting from the Yarra River will be limited in order to meet environmental flow requirements (Figure 11).

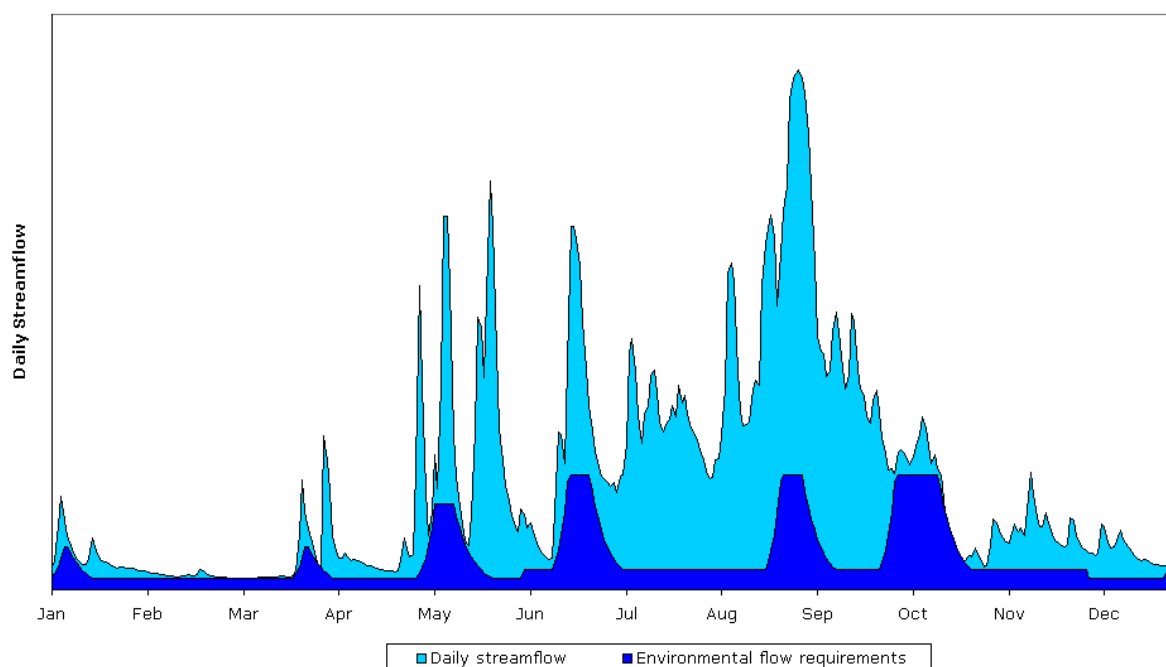


Figure 11: Example of streamflow and environmental flow requirements for the Yarra River

More sophisticated resource management requires detailed water supply assessment and modeling techniques to better align yield and environmental flow models and ensure that sustainable outcomes are achieved. This will also require the development of detailed rules for the operation, release and keeping of accounts for water harvesting and environmental flows.

- 28 Harvesting water from within existing catchments is inexpensive in comparison to other water supply and water conservation options. The cost of reconnecting Tarago Reservoir is around \$55 million in capital and up to \$3 million in operating costs. Changing water harvesting processes from the Yarra River to ensure the protection of environmental flows may require an upgrade of water transfer infrastructure. This is estimated to be less than \$25 million in capital and \$0.8 million in operating costs. Further studies are required to determine the extent of additional infrastructure required to optimise water supply operations.

Harvesting water from the Bunyip River is a possible option for Melbourne but further work is required to ensure that harvesting could be undertaken without affecting river health, particularly given the significant

recent reduction to inflows. This option is therefore not recommended in this Strategy but will be further investigated following the results of the Bunyip River scientific flow study due for completion in December 2006.

There are also number of new dam sites that could provide water to Melbourne. However new dams are not supported by Government or the metropolitan water industry given the significant impact new dams would have on the environment and local communities, and that dams rely on inflows which are significantly lower than they were ten years ago.

There are a number of ongoing programs undertaken by Melbourne Water to protect Melbourne's water supplies including river restoration works, stormwater improvement programs, catchment management and protection to reduce the risk of contamination of water supplies, and fire protection plans and emergency response capabilities.

Action 2: Melbourne Water will work with the Victorian Government to provide the environmental flows recommended in the 2005 scientific study for the Yarra River by 2007. A new environmental entitlement will include 17 billion litres per year that can be stored and released as needed to provide operational flexibility to maximise environmental benefits.

Action 3: By 2007, Melbourne Water will work with the Department of Sustainability and Environment and other stakeholders to:

- develop an annual watering plan (operational plan) to safely release water from the environmental water reserve to the Yarra and Tarago Rivers, to deliver the agreed environmental outcomes
- develop a comprehensive river health and environmental flow monitoring program to quantify the benefits of increased environmental flows, and report on compliance in delivering flows.

Action 4: Melbourne Water will continue to prepare for the reconnection of Tarago Reservoir by 2010, including the completion of an environmental flow assessment for the Tarago and Bunyip Rivers by December 2006.

New water conservation actions

Everyone in Melbourne has a responsibility to use water efficiently – at home and at work. Continuing to reduce water consumption will defer or reduce the need to seek new water supplies which has significant economic and environmental benefits.

Immediate implementation of these new conservation actions is required to delay expensive supply options and build on Melbourne's recent water saving achievements. However, full implementation will not be possible until after 2008 when program costs are incorporated in water prices by the Essential Service Commission.

Implementation of conservation actions has been accelerated until 2015 due to the current low inflows into Melbourne's reservoirs.

Anticipated water savings from water conservation measures have been estimated for the short (2015), medium (2030) and long (2055) term.

The implementation of water conservation actions is not included in detail in this Strategy. The metropolitan water utilities will revise the existing Joint Water Conservation Plan for metropolitan Melbourne to include the Strategy's water conservation actions by October 2006. This will include a further detailed assessment of who will pay for the implementation of measures outlined in the Strategy. This work will be independently assessed by the Essential Services Commission as part the pricing regulation process.

The metropolitan water utilities support the development of new regulatory measures to encourage water conservation. While new regulatory measures are considered by Government, the metropolitan water utilities will utilise existing regulation, information and behaviour change programs, incentives and pricing to drive water conservation.

What is the best way to save water?

There are hundreds of ways to save water and this Strategy identifies new actions that will save the most water at the lowest cost.

Conservation actions chosen were all less than the cost of the next supply augmentation (per litre of water).

However, technology will advance, new conservation products will emerge and others will become more affordable.

Although the conservation actions listed in this Strategy will be a priority for the next five years, priorities may change in the future.

One thing that will not change is our commitment to water efficiency and meeting the conservation targets set by Government.

Objective 3: Save more water at home

Melburnians have achieved astonishing efficiencies in their water consumption in recent years. There are still many more savings that can be made around the home to ensure that Melbourne is one of the most water efficient cities in the world.

Savings: 2015: 21.9 billion litres per year
2030: 34.6 billion litres per year
2055: 38.6 billion litres per year
Cost: up to \$25 million a year to 2015
CRSWS reference: action 4.32

There are several low cost and environmentally friendly options to reduce water consumption in and around the home. These options compare well with options to augment water supplies because they do not require large capital expenditure and have environmental benefits rather than environmental impacts.

To save the most water, the actions supported in this Strategy focus on the largest uses of water at home. Many of these actions have already helped to save water in other cities around the world. The most effective actions include:

Water-efficient showerheads (★★★ efficiency rating or better)

Showers use the most water in the home and a water efficient showerhead uses 35% less water per minute than a conventional showerhead and saves energy by reducing the amount of water heated for showers. Water efficient showerheads are already mandatory in new homes. The long-term goal is to save 18 billion litres by ensuring all suitable homes have water efficient showerheads (or flow control valves on existing showerheads) by 2055¹¹. By 2015, the aim is to save 12.6 billion litres through installing around 1 million showerheads in existing homes.

It will be important to support this measure (and other new conservation measures) with education and behaviour change programs to encourage Melburnians to save water by, for example, reducing shower times (see Objective 1 for education and behaviour change programs).

Water-efficient washing machines (★★★★ efficiency rating or better)

Washing clothes is another high water user at home. ★★★★★ machines use about 45% less water than other washing machines and also provide energy savings. Higher star rated washing machines are even more efficient and are starting to enter the market in Melbourne. The long-term goal is to save 16.1 billion litres through ensuring all homes have ★★★★★ (or better) washing machines by 2055. In the short-term, the goal is to save 8.5 billion litres by 2015 by providing incentives to install around 400,000 machines in homes.

Water-efficient evaporative air conditioners (no rating)

The number of evaporative air conditioners being installed in homes is increasing rapidly. They are often preferred over reverse cycle air conditioners due to their comparative energy efficiency. However they use a lot of water and the most inefficient evaporative air conditioners available today use more than twice as much water as efficient evaporative air conditioners. The goal is to ensure all evaporative air conditioners are rated and labeled under the Water Efficiency labeling and standards by 2010. Further research is required to determine associated costs but these are anticipated to be relatively low in comparison to other conservation actions.

Melbourne friendly gardens (no rating)

In the past, up to 35% of water used at home was used in the garden. Across Melbourne, considerably less water is now used in the garden as a result of the recent drought and behavioural change. The goal is to

¹¹ Water efficient showerheads can be installed in the majority of homes. They may not be suitable for homes with gravity fed hot water systems or for showers connected to rainwater tanks.

maintain these savings through Permanent Water Saving Rules and existing conservation and pricing programs, as well as improved education and behaviour programs with a focus on developing 'Melbourne friendly gardens' (see Objective 1).

Action	Annual water saving (billion litres)			Annual cost	Sustainability assessment							
	2015	2030	2055		Cost per million litres saved	Environmental flows	Greenhouse gas	Water quality	Terrestrial ecosystems	Public acceptability	Cultural & recreational	Effort to protect human health
Showerheads	12.6	18.0	18.0	\$13 million	\$\$	—	√√ √ √√	—	—	√√√	—	—
Washing machines	8.5	14.6	16.1	\$12 million	\$\$ \$	—	√√ √	—	—	√√√	—	—
Evaporative air conditioners	0.8	2.0	4.5	\$30,000	\$	—	√√√	—	—	√√√	—	—

See section 1 for a key to interpret the sustainability assessment scores

The annual costs shown are to water utilities.

The cost for evaporative air conditioners is not annual, but once off.

These actions are highly supported by the community with the social acceptability research showing over 80% support for their adoption. Although most of the costs associated with these actions would be incurred by home owners (minus any incentives and rebates provided by water utilities and the Victorian Government), the use of a water efficient showerhead alone will save householders around \$60 per year in reduced water and energy bills. This is an average six month return on investment.

There are a number of other ways that householders can save water around the home but many of these are more expensive and save less water than the preferred conservation actions and, therefore, are currently lower priority for implementation. These include dual-flush toilets which were regulated in 1985 and are already used in over 70% of homes, household leak management, pool covers, water-efficient taps which are mandatory for new homes but are expensive to retrofit in existing homes, and cold water re-circulators which recycle cold water from the shower while waiting for hot water to flow. Another option is to reduce the security of water supply for Melbourne which essentially means that Melburnians would endure more frequent water restrictions. Permanent, sustainable water savings are preferred over water restrictions.

The metropolitan water utilities support the Victorian Government in seeking to set a minimum water efficiency standard for showerheads, washing machines and the inclusion of evaporative air conditioners via the Water Efficiency Labelling and Standards Scheme.

32

While potential regulatory approaches are considered by Government, the water utilities will use education programs and incentives such as rebates and showerhead swap programs to achieve water savings. The costs of this program are based on the use of incentives but costs would be reduced if regulation were implemented earlier.

Action 5: To increase water savings at home, the metropolitan water utilities will work with the Victorian Government and water customers to:-

- ensure water efficient showerheads are in all Melbourne homes by 2055 and are installed in more than 1 million existing homes by 2015

- ensure water efficient washing machines are in all homes by 2055 and are installed in up to 400,000 homes by 2015

- establish cost-beneficial incentives and rebate programs by June 2007, to offset the cost of purchasing water efficient appliances and to encourage water conservation

To achieve these goals and meet the new water conservation targets for Melbourne set by Government, Melbourne water utilities will need to immediately commence and implement new water conservation programs.

Recommendation 2: That the Victorian Government continue to work with other States and the Commonwealth to investigate the costs and benefits of setting minimum water efficiency standards for showerheads and washing machines a higher minimum standard for toilets, and labeling standards for evaporative air conditioners via the national Water Efficiency Labeling and Standards Scheme

Objective 4: Save more water at work and play

Around a third of the total amount of water used by the commercial and industrial sector is used by 200 businesses. Since the last water strategy, Melbourne's water utilities have been actively working with these top 200 water using businesses to develop plans to reduce their water use.

Savings: 2015: 13.0 billion litres per year
2030: 15.7 billion litres per year
2055: 17.0 billion litres per year
Cost: up to \$4 million a year to 2015
CRSWS Reference: action 4.34

Under this Strategy, this program will be expanded to all businesses that use 10 million litres or more a year. This equates to around 1,500 businesses in Melbourne¹² which collectively use around 65 billion litres of water a year. Water utilities will work with these businesses to identify water conservation actions within the business and to identify how these measures will be implemented.

Current water efficiency programs in Melbourne and Sydney indicate that potentially some 9 billion litres of water could be saved under this program by 2055.

The remaining 122,000 businesses in Melbourne use less water individually but collectively they use about 66 billion litres a year. A program to target water consumption within various commercial and industrial sectors could save considerable quantities of water. For example, there is significant scope to improve the water efficiency of commercial buildings. Ceramic Funds Management, a civic building management group, has reduced water use in four of its sites by 19% through the installation of flow control valves on appliances. While this required a once off investment of \$9,000, the company has slashed its water bills by over \$6,000 each year. To support increased adoption of these types of activities, a performance standard for commercial and industrial buildings could be established by Government as has been done for new and renovated residential homes.

The Victorian Government expects the industrial and commercial sector to reduce its forecast water demand by an additional 8 billion litres a year by 2015 which represents a 1% per annum efficiency gain. A proposal such as that by City West Water and Melbourne Water to supply Class A recycled water from Melbourne Water's Western Treatment Plant to large industries in the Altona Industrial Precinct, if implemented, could free up 4.5 to 7.5 billion litres per year.

Significant volumes of water can also be saved in the open space sector. Many councils are using drought tolerant grasses in parks and sports grounds. By doing so, the City of Greater Dandenong for example, has generated a 70% water saving. Water utilities have worked closely with local government and the International Council of Local Environmental Initiatives to achieve such savings.

Although water use by large water users is fairly well understood, water utilities will need to continue to measure water use in various sectors across Melbourne to identify water saving measures specific to each sector.

34 Research has indicated that many of the large water using companies do not believe the expense and effort in implementing water conservation is justified by the low cost of water and those that do save water do so for social and environmental benefits. As outlined in the Victorian Government's Our Environment Our Future, compulsory Environment and Resource Efficiency Plans are to be developed by the State's top 250 users of energy and water to achieve reductions in industrial energy and water use. A number of these large users will include industrial and commercial water users in Melbourne. The provision of incentives for other commercial

¹² Includes all businesses using in excess of 10 million litres of water a year, including those in the existing top 200 program.

water users would significantly increase the adoption of water efficiencies. This has proven to be successful in trade waste reduction programs where incentives are provided to trade waste generators to reduce trade waste.

Melbourne water utilities are also assessing the benefits of expanding pricing reforms to reward water conservation by businesses and open space managers. Pricing reform options for consideration include expanding the step tariff approach to businesses and open space watering or establishing a water entitlement for each large water user (similar to water entitlements for irrigators) and establish a system to trade water between users.

Action	Annual water saving (billion litres)			Annual cost	Sustainability assessment							
	2015	2030	2055		Cost per million litres saved	Environmental flows	Greenhouse gas	Water quality	Terrestrial ecosystems	Public acceptability	Cultural & recreational	Effort to protect human health
Large commercial water users	5.0	7.7	9.0	\$2.4 million	\$	—	—	—	—	√√ √√	—	—
Business sectors	8.0	8.0	8.0	\$3 million	\$	—	—	—	—	√√ √√	—	—

Action 6: To increase water savings at work, the metropolitan water utilities will:

- assist Melbourne businesses using 10 million litres or more water a year, to identify and initiate implementation of water conservation actions
- by June 2007, work with the Victorian Government and water customers to investigate the cost-benefit of establishing an incentive program for commercial and industrial water users to aid the implementation of water conservation measures
- by June 2007, complete research into pricing reforms to reward water conservation by businesses and open space managers, and make recommendations to the Victorian Government for incorporation into the next water price review
- continue to enhance measurement of water use from various commercial and industrial sectors to assist in benchmark comparisons to encourage water conservation programs.

Recommendation 3: The Melbourne water utilities support the Victorian Government's investigation into the development of minimum performance standards for commercial and industrial buildings to encourage the adoption of water conservation measures.

Objective 5: Reduce water leaks and wastage

Each year about 7% of Melbourne's water is lost in leaks from pipes and through operational uses such as pipe flushing to maintain water quality.

Melbourne's water utilities have worked hard in recent years to improve this situation and reduce water leaks and bursts through pressure reduction programs (reducing water pressure in off peak times), more accurate metering, better leak detection (e.g. locating leaking pipes below ground) and quicker responses to burst and leaking water mains. As a result, the level of water loss is very low compared to other cities in Australia and around the world.

However it is possible to further reduce water leaks although it is impossible to eliminate leaks and bursts altogether.

Recent analysis suggests that the metropolitan water utilities could double the water leakage detection program for Melbourne's water pipes. This means that inspection of pipes for leakage will increase from 3,000 kilometers per year to 6,000 kilometers per year. This will save an additional 2.5 billion litres per year at a cost of \$750,000 per year. The program, once commenced, will take several years to realise the savings. It would also reduce greenhouse emissions due to reduced water pumping and treatment costs.

The water utilities will also continue to modify the water supply system in high pressure areas in Melbourne's east to reduce bursts. In addition, water utilities will continue and enhance monitoring and investigation programs such as zone metering to identify, account for, and reduce water losses.

Savings: 2.5 billion litres per year from 2008

Cost: \$1.2 million a year

CRSWS reference: action 4.33

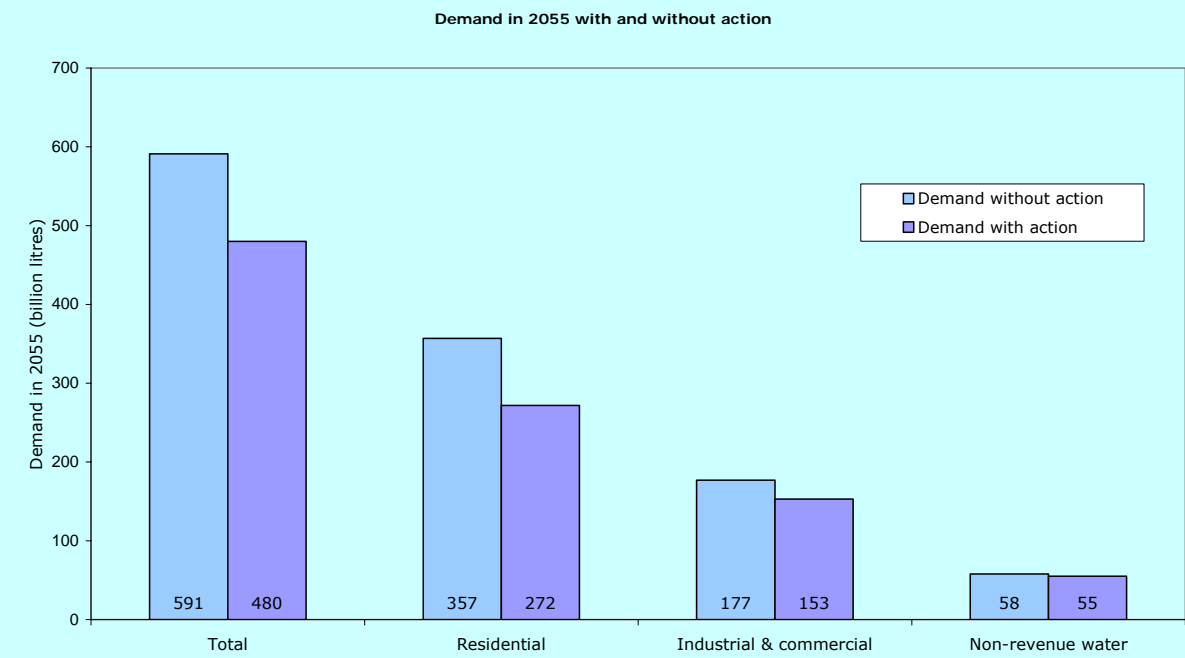
Sustainability assessment

Cost	Environmental flows	Greenhouse gas	Water quality	Terrestrial ecosystems	Public acceptability	Cultural and recreational	Effort to protect human health
\$\$	–	✓	–	–	✓✓	–	–

Action 7: The metropolitan water utilities will:

- double the water leakage detection program for Melbourne's water pipes from 3,000 kilometres to 6,000 kilometres of pipes per year
- assess further opportunities for pressure management programs in Melbourne's high water pressure areas and implement the most cost-effective and sustainable programs
- continue to monitor and account for water losses to enable quick action to reduce losses

How water conservation reduces Melbourne’s demand



	Litres per person per day			
	In 1990s	In 2005	In 2055	
			without action	with action
Total Melbourne	423	331	342	278
Residential sector only	248	208	206	158

. .

- Figures:
- assume bounce-back in demand
 - includes new savings plus those achieved through maintaining current savings
 - focuses on demand from Melbourne customers only

Figure 12: How water conservation reduces Melbourne’s demand

New water supplies

Water conservation measures alone will not meet Melbourne's short-fall so new water sources are required. Available supplies include local water sources such as rainwater tanks and dual pipe water recycling, larger scale alternative sources such as recycling and desalination, and interconnections with other water supply systems.

Objective 6: Increase the use of local water sources

Traditionally Melburnians have used high quality drinking water as the only water source for all residential and commercial activities. However many activities such as toilet flushing, clothes washing, open space and garden watering and many industrial processes do not require water of drinking water quality. Water resources such as rainwater, stormwater and recycled water that can be collected locally are suitable substitutes for the above activities.

Currently less than one billion litres of water each year is sourced from local water supplies but this is set to grow to around 12 billion litres due to the uptake of rainwater tanks in some new homes (6.4 billion litres a year) and commitments to water recycling (5.3 billion litres a year). There is the potential to further expand the use of local water sources in residential and commercial sectors.

For example, if all new residential and commercial developments adopted a local water source for various non-drinking uses inside and outside the home, a potential additional volume of 23 to 30 billion litres could be saved depending on the type of local water supply used¹³. However with current technology, local water sources are expensive compared to other water supply and water conservation actions and achieving the above water savings could cost upwards of \$2.1 billion with an annual operating cost of \$46 million. It is however recognised that local supply technology is advancing rapidly and it is likely that the costs associated with local water supplies will reduce significantly in the future. On-going monitoring of advances in these technologies will assist development of future water management strategies and the timing for implementation.

Given this, the preferred approach for Melbourne is to:

1. continue to implement the most cost-effective local water sources, to provide 10 billion litres at a capital cost of \$700 million and an operating cost of \$16 million per year. This will include a mix of rainwater tanks, stormwater use and dual pipe recycling. This is in addition to the 13.5 billion litres from committed local water sources.

Additional supply:

2015: 6.2 billion litres per year

2030: 10.0 billion litres per year

2055: at least 10.0 billion litres per year

Cost: \$700 million capital, \$16 million operating

CRSWS reference: action 4.36

Sustainability assessment

Cost	Environmental flows	Greenhouse gas	Water quality	Terrestrial ecosystems	Public acceptability	Cultural and recreational	Effort to protect human health
\$\$\$ \$	—	X	✓	—	✓✓ ✓	—	X

¹³ The volume of drinking water that could be saved by using local water sources depends on whether dual pipe recycling, rainwater tanks or stormwater supplies are used. Dual pipe recycling could provide the greatest volumes but use of this resource is usually only feasible in greenfield developments, which are determined by the *Melbourne 2030* planning policy.

2. investigate opportunities to reduce the cost difference between local water supplies and other water supplies. This will include an analysis of emerging technologies, and reflect the high community support for local supplies as well as their environmental benefits such as avoiding augmentations to sewerage systems, reducing peak flows and pollutants running off into waterways and avoiding greenhouse emissions from energy intensive alternatives. If these externalities are credited to local supplies then the cost of local water supplies (per litre) compares more favourably with centralised water recycling or seawater desalination projects.

In the draft strategy water utilities committed to increasing water supplies by 5 billion litres but this is now increased to 10 billion litres given the possibility of current low inflows continuing into the future. If inflows increase, these actions could be implemented at a slower rate, deferring the significant costs associated with local supplies.

Metropolitan water utilities will need to work with planning authorities and developers to identify cost-effective local water source projects. Initial investigations have shown that stormwater reuse can be cost-effective but is very specific to sites that have adequate rainfall and enough storage space or access to potential storages such as aquifers or unused quarries. Stormwater recycling opportunities should be further explored by water utilities.

While water utilities focus on the most cost-effective local water sources, the Victorian Government will continue its research into expanding State building and plumbing regulations to set a minimum water efficiency performance standard that encourages the use of local water sources in all new homes. This research needs to recognise the significant community support for local water sources and their associated environmental benefits. The Victorian Government should also consider standards for energy and nutrients to ensure that there are no unintended increases in these parameters as a result of water efficiency measures.

Funding sources for the different local supplies vary, with rainwater tanks largely funded by home owners with rebates from the Victorian Government's Water Smart Gardens and Homes Rebate Scheme, and dual pipes jointly funded by home owners and water utilities. The need for incentives to fund these programs should be considered to ensure that new home owners are not disadvantaged by requirements for local water sources.

If larger volumes of water were required from local water sources, management of these sources should be reassessed to ensure that systems are adequately maintained, public health is protected and volumes are monitored.

Action 8: The metropolitan water utilities will work with developers and planning authorities to:

- by June 2007, develop a plan that identifies priority local water source projects that will provide an addition 10 billion litres of water. If feasible, the plan will be implemented over the period of 2010 to 2030.
- over the next five years, investigate the feasibility of using stormwater as a local water supply.

Action 9: By June 2007, water utilities will investigate opportunities to reduce the cost difference between local water supplies and other water supplies. This will include an analysis of the environmental and social benefits associated with local water sources.

Recommendation 4: That the Victorian Government reform the water component of the 5 Star standard for buildings to set a minimum water efficiency performance standard that encourages the use of local water sources in all new homes.

Objective 7: Investing in water efficiency opportunities around Melbourne

Victoria is a leader in water efficiency. The dramatic improvement in the efficiency of water used in agricultural production has been instrumental in supporting Victoria's strong rural economy. In combination with trading, water efficiencies have assisted in gradually moving water from low value to higher value agricultural uses.

Around 70% of Victoria's water is used for irrigation. Just as with urban water delivery systems, there are opportunities to reduce leakage and evaporation within irrigation delivery systems and improve the efficiency of

irrigation practices on the farm. For example, in irrigation districts where water is supplied by water utilities, about 25%¹⁴ of the water extracted from rivers is lost in the course of being distributed to farms and similar savings are possible on-farm depending on current practices. It is estimated that in total there could be up to 1,000 billion litres recovered through investment in better irrigation infrastructure which could be shared amongst water users and the environment.

The Victorian Government does not support metropolitan water utilities entering the northern Victorian water trading market. While there are many billions of litres that could be saved through efficiencies in the irrigation districts of southern Victoria, most of these savings are not accessible by Melbourne. However, in the Yarra, Tarago and other nearby irrigation districts, it is estimated that up to 1.5 billion litres could be available from water efficiency gains with irrigation infrastructure and on-farm. This would require a capital investment of around \$2.3 million and an operating cost of around \$50,000 each year.

Action 10: By June 2007, the metropolitan water utilities will assess opportunities to invest in irrigation efficiency savings in the Yarra catchment, and will work with Southern Rural Water to do the same in the Tarago catchment.

Additional supply: 2015 - 2055: 1.5 billion litres

Cost: \$2.3 million capital, \$50,000 operating

CRSWS reference: Action 4.35

Sustainability assessment

Cost	Environmental flows	Greenhouse gas	Water quality	Terrestrial ecosystems	Public acceptability	Cultural and recreational	Effort to protect human health
\$	✓	x	✓	—	✓✓	—	—

¹⁴ Victorian Government (2003). *Securing our water future – A government green paper*

Objective 8: Harnessing alternative supplies

Under the low inflow scenario Melbourne will require alternative supplies within the next decade but if inflows return to the long-term average, alternative supplies could be deferred until the medium to long term. The volume of water Melbourne will need to source from alternative supplies depends on the impact of climate change on water supplies but could be as much as 140 billion litres in the next 50 years.

Additional supply:

2015: up to 80 billion litres a year

2030: up to 100 billion litres a year

2055: up to 140 billion litres a year

CRSWS reference: Action 4.38

A range of potential alternative supplies are available to Melbourne. These include water recycling, stormwater reuse, groundwater or seawater desalination. We don't know enough about these options yet to choose a particular option for Melbourne. But we will investigate these options fully in the next two years so we can take action whenever new water sources are required.

Gippsland – Melbourne interconnection and the Eastern Water Recycling Proposal

The Victorian Government has completed a feasibility assessment of the Eastern Water Recycling Proposal. This proposal involves recycling water from Melbourne's Eastern Treatment Plant and using it to replace river water currently used for industrial purposes (power generation and paper manufacturing) in Gippsland. This would free up to 139 billion litres of water in the Latrobe River system which would be used to improve the health of Gippsland's rivers, to secure supplies for Gippsland, and to secure supplies for other urban centres, including Melbourne.

The potential major benefit of this proposal is that it would replace large volumes of drinking water currently being used for industrial processes and would free water for other uses such as drinking water and environmental purposes. It would also reduce the volume of wastewater and pollutants discharged into Bass Strait by up to 80%. The major disadvantage of the proposal is that it would involve very high energy use, and would have significant greenhouse impacts if renewable energy sources were not used.

Staging the EWRP

An initial stage of the project could be to inter-connect Blue Rock Lake to Melbourne to enable the purchase and transfer of currently unallocated water in Blue Rock Lake to Melbourne. This could provide at least 20 billion litres in the short-term for an investment of around \$200 million.

The Victorian Government has committed to progressing the project to a business case.

Seawater

Desalinated seawater is increasingly used world wide for the supply of safe drinking water. As it is not dependent on climate change or rainfall, it also represents a secure supply of water. Desalinated seawater is now being used in a number of countries and it is a preferred option for Perth to supplement water supplies. While seawater is high in salt, desalination technology can effectively remove salt and other impurities. For Melbourne, seawater could be extracted from Port Phillip, Western Port bays or Bass Strait, treated and pumped

41 into the water supply system.

Desalinated seawater could provide large amounts of drinking water to Melbourne and can be implemented relatively quickly. The major disadvantage of seawater desalination is that it requires almost three times as much energy to produce the water than it does to create recycled water. However, it can also take a lot of energy to transport the water to the point of use so when comparing options it is important to consider the total project energy and greenhouse impacts. Disposal of salty waste from desalination would need to be managed to avoid any adverse impact on marine waters.

The Victorian Government and the metropolitan water utilities will work together to complete a feasibility study for desalination options for Melbourne and proceed to business case if appropriate.

Stormwater

It is important that research be undertaken into the potential for treating stormwater to drinking water standards in order to potentially blend it into the water supply system. Stormwater could either be collected via stormwater basins at several different locations around Melbourne or from the lower reaches of the Yarra River which, after heavy rainfall, comprises a large quantity of stormwater. Like recycled water, high levels of treatment and catchment protection would be required due to the presence of urban runoff pollutants in stormwater. The health risks associated with this option would also require detailed consideration.

This could potentially contribute from 15 to 45 billion litres of drinking water to Melbourne a year. The viability of this option would be subject to further investigation to determine the volume of stormwater that could be harvested without impacting environmental flows, management of the systems to ensure public health and maintenance of high quality water, and associated costs.

This is a conceptual longer-term option requiring significant evaluation. The government and metropolitan water utilities will complete a feasibility study for large-scale stormwater treatment and reuse, in particular at Dight's Falls, and then proceed to business case if appropriate.

Groundwater as a drinking supply

There are limited large aquifers in the Melbourne area. However, a deep groundwater storage is located in the Werribee area, but this water is high in salt. An option could be to pump groundwater from around 200 metres below ground from the Werribee aquifer. This water would require desalination prior to pumping to the water supply distribution system.

The groundwater desalination process would be considerably less energy intensive than seawater desalination as the salinity of this groundwater is 10% of that of seawater.

The metropolitan water utilities will further investigate this option to determine if there were sustainable volumes that could be extracted from this groundwater source without impacting on the environment or triggering ground subsidence.

Other options

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.

Treating recycled water to a drinkable quality is technically feasible but is not yet accepted by the community and is not currently supported by the Victorian government. 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.

- 42 Technical developments and implementation of the use of recycled water and stormwater for potable purposes will continue to be monitored.

Another possible future action would be to treat recycled water to a very high standard and pump it into the Yarra River below the current drinking water offtakes to maintain environmental flows while additional water is extracted upstream into Sugarloaf Reservoir for drinking.

Recycled water could be treated to a standard that is the same as or better than water in the Yarra River which would ensure that human and aquatic health is not affected. Recycled water would also need to be delivered at

appropriate times to ensure that river health was protected. This option could provide an additional 70 billion litres of water

Using recycled water for environmental flows is not currently supported by Government unless there is a clear benefit for the environment. As such this option will not be investigated in detail in the next years.

Action 11: The metropolitan water utilities will:

- work with the Victorian Government to undertake feasibility assessments for the use of treated seawater, stormwater and groundwater by June 2008
- continue to contribute to, and where necessary, enhance programs that protect the quality of future water sources such as recycled water, stormwater and groundwater. This includes sewage management, trade waste and stormwater management programs.

Recommendation 5: That as part of the Eastern Water Recycling business case, the Victorian Government considers the interconnection of Blue Rock Lake and Melbourne as a first stage of the project.

SECTION 6: A SUMMARY OF THE STRATEGY

The Strategy in brief

The Strategy has set a range of the most environmentally, socially and economically sustainable actions to meet Melbourne's supply needs over the next fifty years:

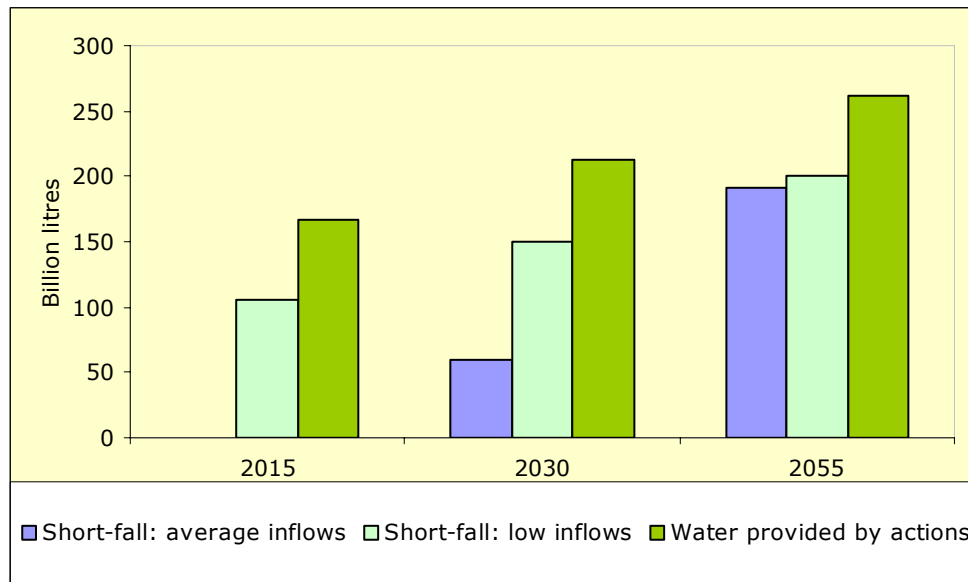


Figure 13: Shortfalls and water from actions for Melbourne

The Strategy relies on both water conservation and well as new water supplies:

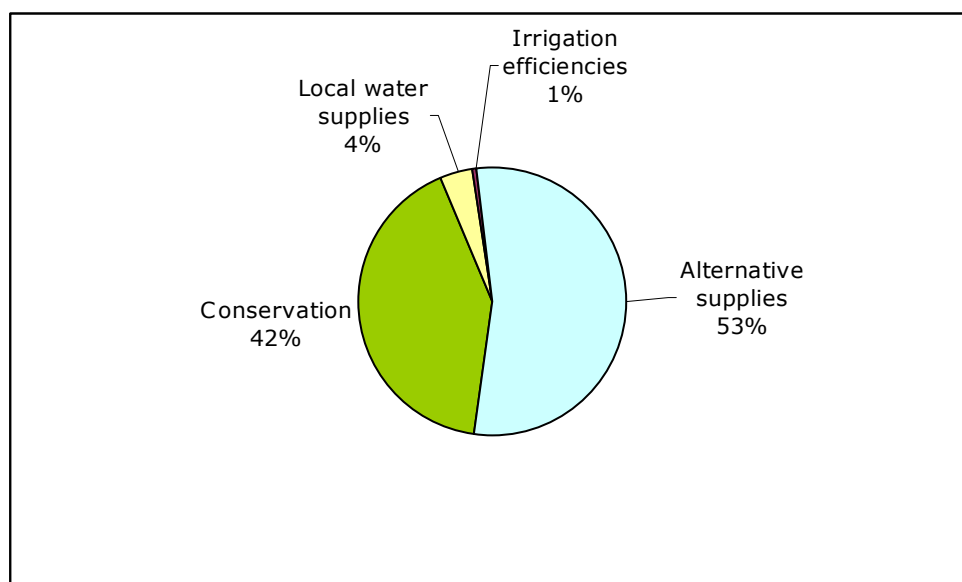


Figure 14: Actions to meet shortfalls

The costs of each action are summarized below:

	Capital (millions)	Annual operating (millions)
Objective 1: Maintain existing savings	-	\$21
Objective 2: Secure existing water supplies	\$80	\$3.8
Objective 3: Save more water at home		\$25
Objective 4: Save more water at work		\$5.4
Objective 5: Reduce water leaks and wastage		\$1.2
Objective 6: Increase the use of local water supplies	\$700	\$16
Objective 7: Water efficiency opportunities around Melbourne	\$2.3	\$0.05
Objective 8: Alternative supplies	to be determined	

In addition, over the next five years, \$5.2 million will be invested to monitor water demands, the impacts of climate change on supplies and the implementation of the Strategy's actions.

How will it impact water customers?

The cost of many of the actions in this Strategy will be incorporated into the price of water to ensure a reliable funding source. Some actions will be the responsibility of water utilities, some the responsibility of Government, and others will be the responsibility of the community with incentives and education programs funded by the water utilities and government.

Although water tariff charges will increase as water authorities implement the conservation activities it is expected that the increase in the customers water bill will be partially offset by the lower water usage by customers. Customers implementing water conservation activities such as water efficient showerheads may also see a reduction in their energy bills due to lower hot water usage..

The most significant impact on the water bill would result from the use of alternative supplies. If these measures where implemented today, bills could increase up to 15%. However, if inflows return to average conditions, Melbourne would not need to invest in these actions for around 30 years and therefore there will be no impact on customers at this time. If low inflows continue then these actions will need to be accelerated.

Similarly, the Gippsland to Melbourne connection while having a medium impact on water bills if implemented today, would not need to be implemented until well beyond 2015.

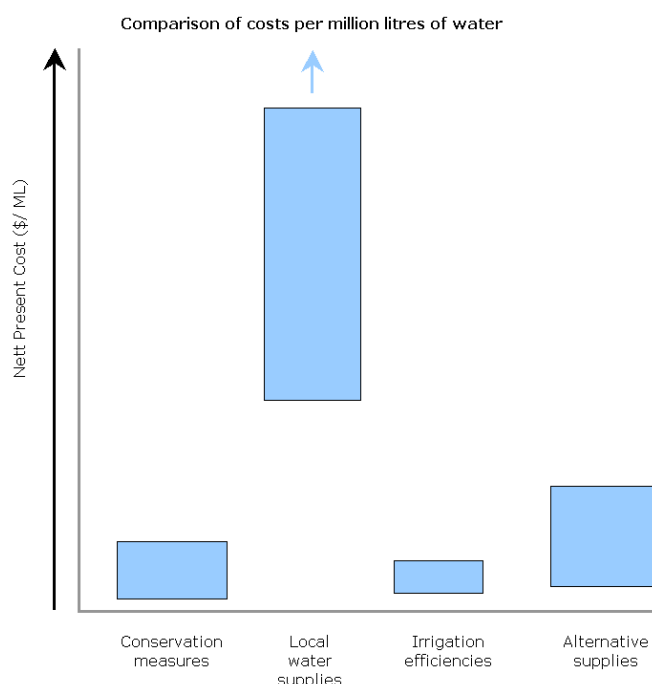


Figure 15: Comparison of costs per million litres of water

Local water supplies have a varying impact on water bills. For example, rainwater tanks have a low impact on the water bill as they are purchased directly by homeowners or businesses. However, some of the costs associated with dual-pipe recycling are paid for by water utilities and therefore could impact water prices. The Strategy commits to a continuous incremental increase in the amount of local supplies while monitoring improvements in technology and associated cost reductions.

In summary, water conservation and supply actions will not have a significant impact on water bills at this time.

Table 3: Expected impact on customer water bills if actions were implemented today¹⁵

	Impact on water bill
Water conservation actions	Low
Local water supplies	Low to high
Gippsland and Melbourne interconnection	Medium
Investing in water efficiency opportunities around Melbourne	Low
Possible long-term alternative supplies	High

Low = 0 – 1% increase Medium = 1% to 6% increase High = greater than 6% increase

Reducing energy and greenhouse impacts

Although Melbourne’s current water supply system is relatively energy efficient, a large amount of energy is still required to provide clean water for drinking and to remove and treat wastewater. In fact water utilities are amongst the highest energy users in Victoria.

In future, the amount of energy used to provide clean water for drinking from new water sources is expected to increase significantly due to higher levels of pumping and treatment.

This is why the Melbourne water utilities are striving to reduce their greenhouse impacts.

Reducing greenhouse emissions

Melbourne water utilities use renewable energy, greenhouse offsets and more efficient processes to avoid 192,000 (and growing) tonnes of greenhouse gas emissions.

Melbourne water also delivers renewable energy to the Victorian energy grid.

Currently, the metropolitan water utilities have a combined, net greenhouse emission of 460,000 tonnes per year¹⁶, of which around 20% results directly from water supply activities. If nothing is done, the energy use to provide water to Melburnians is set to rise as we shift from our largely gravity fed water supply system to energy intensive alternative supplies.

The greenhouse impact of future supply and demand actions for Melbourne is a very significant consideration of this Strategy. After all, the potential impact of climate change on our water resources is the key reason why we need to take actions to secure water resources for the future.

An independent analysis of the greenhouse gas emissions from the actions in the Strategy indicated that conservation actions save significantly more greenhouse emissions that would be produced via energy intensive alternative supplies (per litre of water)(Figure 16). By implementing conservation measures first, offsets can
46 be created to reduce current and future greenhouse gas emissions, and by using renewable energy or purchasing offsets for remaining emissions, a greenhouse neutral future can be achieved.

¹⁵ Potential customer impacts were determined by the Department of Sustainability and Environment by dividing the total increase in costs resulting from each action by the number of households within Melbourne.

¹⁶ Essential Services Commission (2006). *Water performance report: Performance of the urban water and sewerage businesses July 2004 - June 2005*

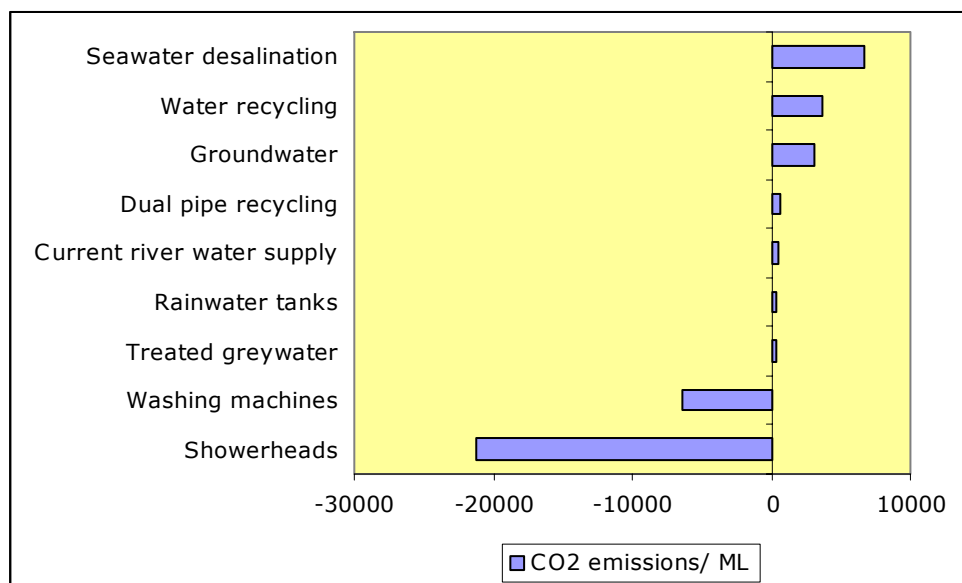


Figure 16: Emissions generated and saved from Strategy (cumulative over 50 years)

Currently there are limited carbon trading schemes available in Victoria. However, Victoria is currently participating in developing a national carbon-trading program and the metropolitan water utilities supports this work, particularly as water conservation actions could provide carbon credits which will help offset current emissions.

Action 12: To minimise current and future emissions, the Melbourne water utilities will undertake 3 steps:

- Step 1: Support the Victorian Government contribution to the development of a national carbon trading scheme
- Step 2: Implement water conservation measures and use greenhouse savings to offset current emissions
- Step 3: Introduce lower energy supplies (eg. local water supplies) as a first priority and seek to integrate renewable energy sources or offsets into higher energy new supplies.

By June 2007, the Melbourne water utilities will prepare a carbon management proposal for consideration by Victorian Government that outlines how greenhouse gas savings from water conservation measures could be accredited to offset greenhouse gas emissions from current and potential future water supply operations.

Recommendation 6: That the Victorian Government continues to work with other States and the Commonwealth to develop a national carbon trading scheme.

SECTION 7: PUTTING THE STRATEGY TO ACTION

Implementation priority

Water conservation, local water supplies and investigations into water efficiency opportunities within the Yarra and Tarago catchments will be immediately implemented. Assessing the feasibility of alternative supplies and progressing these to business case (as appropriate) will be undertaken in the next two years to ensure the preferred actions can be implemented in the next decade.

Detailed implementation planning for short-term conservation and local water supply actions has been undertaken (through the Joint Metropolitan Water Conservation Plan and Joint Metropolitan Alternative Supply Plan) to ensure that implementation of these actions can begin immediately.

Being prepared

There are a number of uncertainties involved in planning for the future of Melbourne's water. These include uncertainties around climate change impacts on supply, demand and river health; population growth and environmental flow requirements as well as risks associated with droughts, bushfires in catchment areas, impact of pollutants on water quality and river health, and increases to water demands from activities such as logging.

There are a number of contingency plans in place to address these uncertainties and risks and these are not duplicated in this Strategy. However, each of these uncertainties and risks could result in a higher demand for water than predicted or there being less or more water available for urban consumption than predicted. These risks are addressed below.

What if demand is higher than predicted

The increasing scarcity of water as a result of climate change and population growth means that Melburnians cannot return to old water wasting habits. As a result, the metropolitan water utilities have committed to maintaining the water savings currently achieved, and increasing these savings through new actions. If monitoring indicates that a decrease in savings is occurring, action will need to be taken. For example, tougher permanent water saving measures could be enforced, regulation of water efficiency appliances could be brought forward and water prices could be increased to reflect the scarcity of water and the increased cost of providing water from alternative sources.

These actions would help ensure that the savings predicted from existing and new water conservation actions are achieved.

What if less water is available

- 48 This is a real threat to Melbourne and other water consumers particularly because of the uncertainties surrounding the rate and severity of climate change. However the use of the relatively extreme low inflow scenario ensures we are prepared for a drastic reduction in water availability. Under this scenario, all actions in this Strategy will be implemented in the next decade. Although these actions can not completely eliminate the possibility of water restrictions in the next few years (if inflows remain low) they will ensure that Melbourne continues to have secure supplies.

What if more water is available

Having more water than forecast would mean that alternative supplies could be slowed.

Ongoing monitoring of water supplies and demands will be required to ensure an adequate supply of water for Melbourne for the future so that we do not over or under invest in water conservation and supply augmentations.

Knowing when to augment supply

Given the uncertainties in forecasting supply and demand, it is not possible to precisely predict when new supplies will be required.

The Victorian Government has adopted a target buffer between estimated water availability and water use equal to 7 years growth in demand. This means that we need to be prepared to implement supply augmentations well before they are needed, particularly under a more extreme climate change impact . This will enable us to act quickly to augment supplies should this be required.

SECTION 8: MONITORING SUCCESS

It will be critical to monitor the implementation of the Strategy to ensure that there is always an adequate supply of water for Melbourne. Key elements to monitor are:

- ***Melbourne's water consumption and demands***

Given that maintaining and building on water conservation achievements in Melbourne is a critical component of the Strategy, it will be important for water utilities to continue to monitor water consumption in Melbourne to better understand water demands across residential and commercial and industrial sectors.

- ***the adoption of conservation measures and subsequent water savings***

To ensure we achieve the water conservation savings identified in this Strategy, improved monitoring of the adoption of water savings measures and subsequent water savings is required. Water utilities will need to work with appliance retailers to monitor sales of water conservation measures such as water efficient showerheads and washing machines. Water utilities will also need to work with appliance retailers and the Department of Sustainability and Environment to develop a system for tracking homes and businesses where water conservation measures are installed to assess resulting water savings.

- ***the adoption of local reuse and recycling measures***

Similar to water conservation measures, the adoption of rainwater tanks, stormwater and recycled water needs to be monitored and the resulting reduction in use of drinking water supplies assessed. This will be relatively straight forward for dual pipe systems which are operated by water utilities. However, a tracking system similar to that proposed for water conservation measures will be required for rainwater tanks. If the use of rainwater tanks grows more than predicted in Melbourne, water utilities may need to play a greater role in their ongoing operation.

- ***monitoring water supplies for Melbourne, in particular the impacts of climate change***

While the impacts of climate change on water supplies have been assessed, there is considerable variability in the possible long-term implications for our rivers and reservoirs. Ongoing monitoring of scientific developments in the understanding of climate change impacts on water resources is required. In addition, metropolitan water utilities will continue to monitor the impacts of climate change on our rivers and reservoirs to ascertain the rate and severity of climate change on our water resources.

Action 14: Metropolitan water utilities will:

- work with the Victorian Government and appliance retailers to invest \$5 million over the next five years to extend existing water use studies to improve the knowledge of how and where water is used in Melbourne (as outlined in action 1). This will include surveys of adoption of water saving devices.
- continue to monitor water consumption and demand across residential, and commercial and industrial sectors
- invest \$200,000 over the next five years to continue to monitor the status of water supplies and undertake periodic detailed assessment of potential climate change projections specifically for rainfall and streamflow in Melbourne's catchments

GLOSSARY

Bulk Water Entitlement	A legal right under the Water Act (1989) to harvest and use water
Catchment	An area of land draining rainfall into a river or reservoir
Demand	The expected average annual future water demand
Desalination	The process of removing salt from seawater or brackish water so that it becomes suitable for drinking or other uses
Ecosystem	A dynamic complex of plant, animal, fungal and micro-organism communities and the associated non-living environment interacting as an ecological unit
Environmental flow	The streamflow required to maintain appropriate environmental conditions in a waterway
Greenfield development	New urban development areas
Greywater	Wastewater from the laundry and bathroom
Groundwater	All subsurface water
Recycled water	Water derived from sewerage systems or industry processes that is treated to a standard appropriate for its intended use
Reliable supply	the supply available in storages despite seasonal variations to streamflow
Runoff	Precipitation or rainfall which flows from a catchment area into streams, lakes, rivers or reservoirs
Sewage	The waterborne waste from a community
Sewerage system	The pipes and plant for the collection, removal and treatment of sewage
Streamflow	The flow in a stream or river
Stormwater	Rainfall runoff from urban areas
Triple bottom line	Integrated approach to the achievement of environmental, social and economic outcomes
Water utility	An organisation charged with supplying water to towns and cities for urban, industrial or commercial use.
Yield	The quantity of water that a storage or aquifer reliably produces measured over a long period of time

APPENDIX 1: CONTRIBUTORS TO THE STRATEGY

Steering group members

Professor John Lovering AO	Independent Chair
Kelly O'Shanassy	WaterSmart
David Heeps	City West Water
Ray Beaton	Yarra Valley Water
Grant Wilson	Melbourne Water
Bruce Rhodes	Melbourne Water
Denis Santamaria	South East Water
Kate Vinot	South East Water
David Sheehan	Department of Sustainability and Environment
Tony Chapman	Department of Sustainability and Environment
Alieta Donald	Department of Sustainability and Environment

Stakeholder group members

The Strategy has been developed with the advice of a stakeholder reference committee that is co-chaired by the Department of Sustainability and Environment and WaterSmart and has representatives from:

Australian Conservation Foundation	Plumbing Industry Commission
Australian Industry Group	Property Council of Australia - Vic
Australian Water Association	South East Water
Barwon Water	Southern Rural Water
Bayside City Council	Stormwater Industry Association of Victoria Inc.
Central Highlands Water	Sustainability Victoria
City of Hume	Urban Development Institute of Australia
City of Monash	Victorian Council of Social Services
City West Water	Victorian Employers Chamber of Commerce and Industry
Department of Human Services	Vic Water
Department of Treasury and Finance	Victorian Coalition for Sustainable Water Use
Department of Primary Industries	Victorian Farmers Federation
Department of Sustainability and Environment	Victorian Local Governance Association
Environment Victoria	Victorian Womens Trust
EPA Victoria	VRFish

Essential Services Commission	Water Services Association Australia
Gippsland Water	West Gippsland Catchment Management Authority
Housing Industry Association	Western Water
Landscape Industry Association of Victoria	Westernport Water
Melbourne Water	Wyndham City Council
Moorabool Shire	Yarra Valley Water
Municipal Association of Victoria	Yarra Valley Water Customer Consultative Committee
Nursery and Garden Industry of Victoria	
Plastics and Chemicals Industries Association	

WaterSmart working group members

Professor John Lovering AO	Independent Chair
Kelly O'Shanassy	Project Director
Keith Johnson	Technical Manager – Demand
Rob Yurisich	Technical Manager – Supply
Bridie Meehan	Office Manager

APPENDIX 2: SUMMARY OF ACTIONS AND RECOMMENDATIONS

Actions committed to by the metropolitan water utilities

Action 1: To maintain existing water savings, the metropolitan water utilities will:

- over the next five years, continue to invest \$12 million per year in water conservation programs
- continue to monitor and report water savings, review the effectiveness of conservation programs on an annual basis and develop contingency plans to manage any future bounce-back in demand
- invest \$5 million over the next five years to extend existing water use studies to improve the knowledge of how and where water is used in Melbourne. This will ensure that an updated water use study is ready for inclusion in the next strategy in 2011
- if required, increase investment in water conservation activities to maintain existing savings. In particular, educational, behaviour change and communication programs will be expanded with an increased focus on gardens and water saving behaviours. This is expected to cost a further \$9 million per year

Action 2: Melbourne Water will work with the Victorian Government to provide the environmental flows recommended in the 2005 scientific study for the Yarra River by 2007. A new environmental entitlement will include 17 billion litres per year that can be stored and released as needed to provide operational flexibility to maximise environmental benefits.

Action 3: By 2007, Melbourne Water will work with the Department of Sustainability and Environment and other stakeholders to:

- develop an annual watering plan (operational plan) to safely release water from the environmental water reserve to the Yarra and Tarago Rivers, to deliver the agreed environmental outcomes
- develop a comprehensive river health and environmental flow monitoring program to quantify the benefits of increased environmental flows, and report on compliance in delivering flows.

Action 4: Melbourne Water will continue to prepare for the reconnection of Tarago Reservoir by 2010, including the completion of an environmental flow assessment for the Tarago and Bunyip Rivers by December 2006.

Action 5: To increase water savings at home, the metropolitan water utilities will work with the Victorian Government and water customers to:- ensure water efficient showerheads are in all Melbourne homes by 2055 and are installed in up to 1 million existing homes by 2015

- ensure water efficient washing machines are in all homes by 2055 and are installed in up to 400,000 homes by 2015

54 - ensure all evaporative air conditioners comply with water efficiency standards by 2015

- establish cost-beneficial incentives and rebate programs by June 2007, to offset the cost of purchasing water efficient appliances and to encourage water conservation

To achieve these goals and meet the new water conservation targets for Melbourne set by Government, Melbourne water utilities will need to immediately implement new water conservation programs.

Action 6: To increase water savings at work, the metropolitan water utilities will:

- assist Melbourne businesses using 10 million litres or more water a year, to identify and initiate implementation of water conservation actions
- by June 2007, work with the Victorian Government and water customers to investigate the cost-benefit of establishing an incentive program for commercial and industrial water users to aid the implementation of water conservation measures
- by June 2001, complete research into pricing reforms to reward water conservation by businesses and open space managers, and make recommendations to the Victorian Government for incorporation into the next water price review
- continue to enhance measurement of water use from various commercial and industrial sectors to assist in benchmark comparisons to encourage water conservation programs.

Action 7: The metropolitan water utilities will:

- from 2008, double the water leakage detection program for Melbourne's water pipes from 3,000 kilometres to 6,000 kilometres of pipes per year
- assess further opportunities for pressure management programs in Melbourne's high water pressure areas and implement the most cost-effective and sustainable programs
- continue to monitor and account for water losses to enable quick action to reduce losses.

Action 8: The metropolitan water utilities will work with developers and planning authorities to:

- by June 2007, develop a plan that identifies priority local water source projects that will provide an addition 10 billion litres of water. If feasible, the plan will be implemented over the period of 2010 to 2030
- over the next five years, investigate the feasibility of using stormwater as a local water supply.

Action 9: By June 2007, water utilities will investigate opportunities to reduce the cost difference between local water supplies and other water supplies. This will include an analysis of the environmental and social benefits associated with local water sources.

Action 10: By June 2007, the metropolitan water utilities will assess opportunities to invest in irrigation efficiency savings in the Yarra catchment, and will work with Southern Rural Water to do the same in the Tarago catchment.

Action 11: The metropolitan water utilities will:

- work with the Victorian Government to undertake feasibility assessments for the use of treated seawater, stormwater and groundwater by June 2008
- continue to contribute to, and where necessary, enhance programs that protect the quality of future water sources such as recycled water, stormwater and groundwater. This includes sewage management, trade waste and stormwater management programs.

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Action 12: To minimise current and future emissions, the Melbourne water utilities will undertake 3 steps:

- Step 1: Support the Victorian Government contribution to the development of a national carbon trading scheme
- Step 2: Implement water conservation measures and use greenhouse savings to offset current emissions
- Step 3: Introduce lower energy supplies (eg. local water supplies) as a first priority and seek to integrate renewable energy sources or offsets into higher energy new supplies.

By June 2007, the Melbourne water utilities will prepare a carbon management proposal for consideration by Victorian Government that outlines how greenhouse gas savings from water conservation measures could be accredited to offset greenhouse gas emissions from current and potential future water supply operations.

Action 13: Over the next 5 years, Melbourne Water and the metropolitan water retailers will continue to progress and progress investigations on medium and long-term alternative supplies so that planning can commence on the preferred option in the next Water Supply-Demand Strategy.

Action 14: Metropolitan water utilities will:

- work with the Victorian Government and appliance retailers to invest \$5 million over the next five years to extend existing water use studies to improve the knowledge of how and where water is used in Melbourne (as outlined in action 1). This will include surveys of adoption of water saving devices.
- continue to monitor water consumption and demand across residential, and commercial and industrial sectors
- invest \$200,000 over the next five years to continue to monitor the status of water supplies and undertake periodic detailed assessment of potential climate change projections specifically for rainfall and streamflow in Melbourne's catchments.

Recommendations for Government

Recommendation 1: That the Victorian Government maintains its direct investment in water conservation [as set out in the Central Region Sustainable Water Strategy](#)..

Recommendation 2: That the Victorian Government continue to work with other States and the Commonwealth to investigate the costs and benefits of setting minimum water efficiency standards for showerheads and washing machines a higher minimum standard for toilets, and labeling standards followed by water efficiency standards for evaporative air conditioners via the national Water Efficiency Labeling and Standards Scheme.

Recommendation 3: The Melbourne water utilities support the Victorian Government's investigation into the development of minimum performance standards for commercial and industrial buildings to encourage the adoption of water conservation measures and local water sources.

Recommendation 4: That the Victorian Government reform the water component of the 5 Star standard for buildings to set a minimum water efficiency performance standard that encourages the use of local water sources in all new homes.

Recommendation 5: That as part of the Eastern Water Recycling business case, the Victorian Government considers the interconnection of Blue Rock Lake and Melbourne as a first stage of the project.

Recommendation 6: That the Victorian Government continues to work with other States and the Commonwealth to develop a national carbon trading scheme.