

# Water use efficiency and conservation

## Key findings

- 3.1** Melbourne's water users have made substantial progress in water use efficiency and conservation in recent years. However, there is still scope to continue reducing demand and using alternative water sources for non-potable water uses, particularly through infrastructure investments.
- 3.2** There is a limit to how far residential water demand can be reduced before impacting on people's quality of life.
- 3.3** A key challenge for water managers will be to maintain and improve on Melbourne's water use efficiency and conservation efforts following the introduction of additional water supplies delivered as part of the Victorian Water Plan.
- 3.4** Water restrictions and the permanent water savings rules have played a key role in helping Melbourne's water users achieve significant water savings over the past seven years.
- 3.5** Water restrictions based on supply limitations are generally accepted by the community.
- 3.6** Water restrictions affect some water users more than others. This is true for some industries such as nurseries, pool and spa retailers and commercial car washes. Other water intensive industries, such as manufacturing and power generation, do not face restrictions that are primarily aimed at residential water users. Municipal councils and residential vegetable growers may also be disproportionately affected.
- 3.7** Water shortages and restrictions, through qualifications to the allocation of the Environmental Water Reserve, have adversely affected the ecological health and productivity of rivers and wetlands.
- 3.8** Behavioural change programs, such as the Target 155 Campaign, are essential for maintaining the present water conservation ethos of the Victorian community, however they should be designed to be responsive to changes in water availability, as is the case in South East Queensland.

- 3.9** Performance based water efficiency standards are a flexible and cost effective means of achieving water efficient houses and non-residential buildings.
- 3.10** In order to set water efficiency performance standards, an environmental sustainability assessment and rating system for houses and other non-residential buildings needs to be established in Victoria.
- 3.11** At present there is no minimum standard for water efficiency that applies to new, renovated or existing non-residential buildings.
- 3.12** Financial incentives such as rebates and subsidies are cost effective ways of sharing the financial burden of installing water saving devices, whilst reducing the demand for new supplies of water.
- 3.13** Stakeholder views vary on the extent to which the government funds the Water Smart Gardens and Homes Rebate Scheme, the size of the rebate, the variety of eligible products and the eligibility of the rebate applicant.
- 3.14** The Victorian Government has targeted large industrial water users with a range of specific water use and conservation programs, however, behavioural change programs and financial incentives, such as rebates are primarily focused on residential water users. While water restrictions still apply to businesses and industry, behavioural change programs and financial incentives are not specifically targeted to the many businesses with more moderate water needs.
- 3.15** The Melbourne non-residential sector has made significant water savings since the 1990s, reducing water consumption by 38 per cent.
- 3.16** Water prices are set to double in real terms by 2012 to pay for the water infrastructure investment plans outlined in the Victorian Water Plan.
- 3.17** Water pricing can influence water consumption decisions but the potential impact of price rises is reduced while severe water restrictions are in place. As water demand is relatively inelastic and represents only a small percentage of household expenditure, the direct impact of price increases on consumption is likely to be minimal.
- 3.18** The present rising block tariffs structure for residential water users sends an appropriate water conservation message but creates some equity and efficiency issues.
- 3.19** The non-residential sector may be more likely to respond to price increases than residential water users, as rising prices make

alternative water sources and the investment in their associated infrastructure more viable.

- 3.20** Up to seven per cent of Melbourne's water is lost through broken pipes and leaks.
- 3.21** Due to the age of the infrastructure and extremely dry weather conditions, Melbourne's water retailers have experienced high levels of water main breaks.
- 3.22** Further water savings can still be achieved through increased leak detection efforts although the cost implications are significant.

## Introduction

The Inquiry's first term of reference requires the Committee to examine the merits of supplementing Melbourne's water supply by further water savings through increased conservation and efficiency efforts.

In the 2004 *Securing Our Water Future Together* white paper, the Victorian Government prioritised water conservation as one of the most important activities to improve Melbourne's water security.<sup>1</sup> The government further acknowledged the role of water conservation and efficiency in the 2006 *Central Region Sustainable Water Strategy* (CRSWS), stating that "using less water should be the starting point in addressing the challenge of water scarcity because it is generally the most cost effective solution and it has little or no environmental or social drawbacks."<sup>2</sup>

The merits of conserving water, in comparison to the production of "new or additional" water, are compelling. A litre of water saved is equivalent to a litre of "new or additional" water, but is less costly to supply and has fewer environmental impacts. The white paper describes water conservation and efficiency as the priority action because:

- all Victorians can conserve water;
- measures to reduce water use are generally less costly than substituting drinking water with alternative supplies;
- it reduces discharge of effluent into the environment;
- it reduces energy used for treatment, pumping and heating and hence greenhouse gas emissions; and

<sup>1</sup> Department of Sustainability and Environment, *Securing Our Water Future Together*, Victorian Government, Melbourne, 2004, pp. 93, 96.

<sup>2</sup> Department of Sustainability and Environment, *Sustainable Water Strategy Central Region: Action to 2055*, Victorian Government, Melbourne, 2006, p. 4.

- it reduces extraction of water from the environment.<sup>3</sup>

This chapter will discuss water use efficiency and conservation efforts presently being implemented by the Victorian Government, Melbourne's metropolitan water retailers, business, industry and the community. Areas of discussion include:

- water restrictions and permanent water savings rules;
- behavioural change programs;
- water efficient buildings and appliances;
- rebates and other incentives for water efficient products;
- water use efficiency in the non-residential sector;
- water pricing to encourage water saving; and
- leak detection and repair.

The Committee notes that the previous Environment and Natural Resources Committee tabled its *Inquiry into Sustainable Communities* report in 2005 which contained 24 recommendations that relate to water efficiency in households, see Appendix 5.

## Definition of water use efficiency and conservation

Water use efficiency can mean more than just using less water. Any improvement to water use efficiency will conserve existing water supplies by using and wasting less water. Additionally, water efficiency also means using water more wisely, for example, using alternative sources or various qualities of water for different purposes. Using alternative sources of water that are 'fit-for-purpose' is an efficient outcome because the highest quality and most valuable water, that is potable drinking water is saved by substituting it for water of lesser quality. Fit-for-purpose water may include treated recycled water, rainwater, stormwater or groundwater for some household purposes, use on plants and gardens, irrigation and industry.

In their submission to the Inquiry WaterMark Australia discusses the expanded notion of water efficiency, stating that it is more than just using less water, it is about using and reusing all available sources of water:

'Water efficiency' is a term in common use within the water sector and government quarters. It tends to be narrowly defined, focusing only on ways of reducing water consumption, such as cutting down shower time or not hosing driveways. It suggests that we become water efficient simply when we use less water in everyday activities. We are currently profligate users of the highest quality fresh water. A token reduction in our daily use of such water does not equate with real water efficiency.

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<sup>3</sup> Department of Sustainability and Environment, *Securing Our Water Future Together*, Victorian Government, Melbourne, 2004, p. 96.

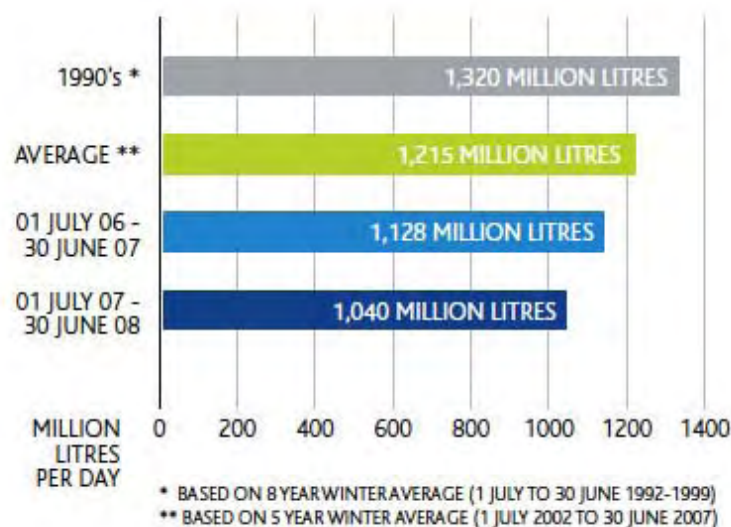
Real water efficiency is reached when we significantly reduce the volumes of potable water *and* when we use all available water (rainfall, stormwater, treated wastewater) again, and again, before we finally discharge it.<sup>4</sup>

Water conservation and efficiency as a demand management outcome is the focus of this chapter while the efficient use and substitution of potable water by other water sources such as stormwater, treated wastewater and groundwater are examined in more detail in Chapters 4, 5 and 6 of this report.

### Progress in water use efficiency and conservation

Recent water use efficiency and conservation efforts have resulted in Melbourne's water storages being at a substantially higher level than they would have been without conservation measures. The encouragement of water savings, the imposition of water restrictions and a program of leak detection and repair has seen average total daily water use decline from 1.32 gigalitres per day in the 1990s to 1.04 gigalitres per day in 2007-08, as presented in Figure 3.1. This 21 per cent reduction in average daily use occurred while Melbourne's population grew by about 22 per cent.<sup>5</sup>

**Figure 3.1: Daily water use for Melbourne**



Source: Melbourne Water, 'Sustainability Report, 2007-08: Managing Our Current Supplies', viewed 26 May 2009, <<http://www.melbournewater.com.au>>.

The government set water consumption targets to reflect its conservation and efficiency objectives in the *Central Region Sustainable Water Strategy*

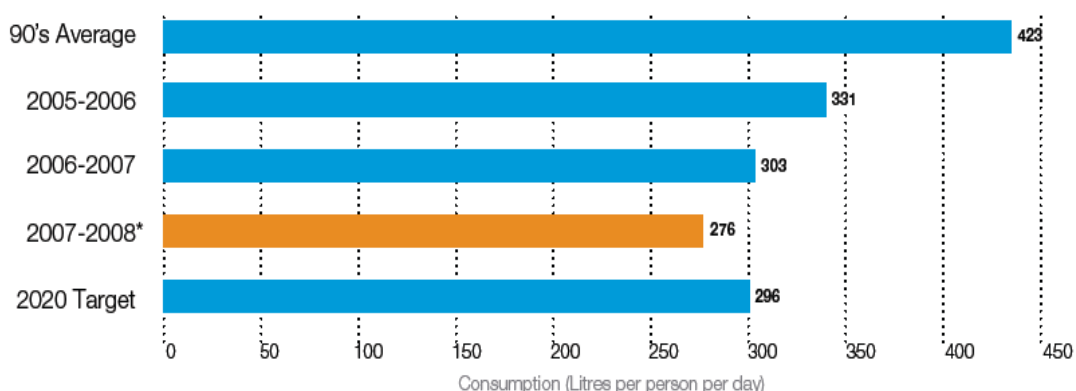
<sup>4</sup> Watermark Australia, *Submission*, no. 63, 29 August 2008, p. 6.

<sup>5</sup> Melbourne Water, 'Sustainability Report, 2007-08: Our Water Our Future', viewed 26 May 2009, <[http://www.melbournewater.com.au/applications/annual\\_report\\_2008/water\\_owof.htm](http://www.melbournewater.com.au/applications/annual_report_2008/water_owof.htm)>.

Population growth calculated from a 1991 census calculation of 3,156,700 and a 2008 population estimation of 3,850,000.

(CRSWS). The region-wide targets aim to reduce total per capita water use, i.e. combined residential and non-residential, by at least 25 per cent compared to the 1990s average in 2015, and 30 per cent in 2020.<sup>6</sup> In 2007-08, Melbourne's per capita water consumption was 34 per cent below the 1990s average, well exceeding the 2020 target. Figure 3.2 provides an overview of water consumption by households and businesses and the 2020 consumption target of 296 litres per person per day as set out in the CRSWS. Since the late 1990s Melbourne's average daily water consumption has been reduced from 423 litres (1990s average) per person to 276 litres.<sup>7</sup> The Committee has since been advised that the actual per capita daily water consumption in 2007-08 was 269 litres.<sup>8</sup>

**Figure 3.2: Per capita water consumption in Melbourne**



\* 2007-08 is projected consumption based on actual data to 31 May 2008.

Source: Department of Sustainability and Environment, 'Our Water Our Future - The Next Stage of the Government's Water Plan 12 Month Progress Report', Victorian Government, Melbourne, 2008, p. 6.

In addition, Melbourne has the lowest water use per property (a slightly different measurement to above) compared with some of Australia's other capital cities.<sup>9</sup> These figures, presented in Figure 3.3, include all water consumption – household, industry, leakage etc.

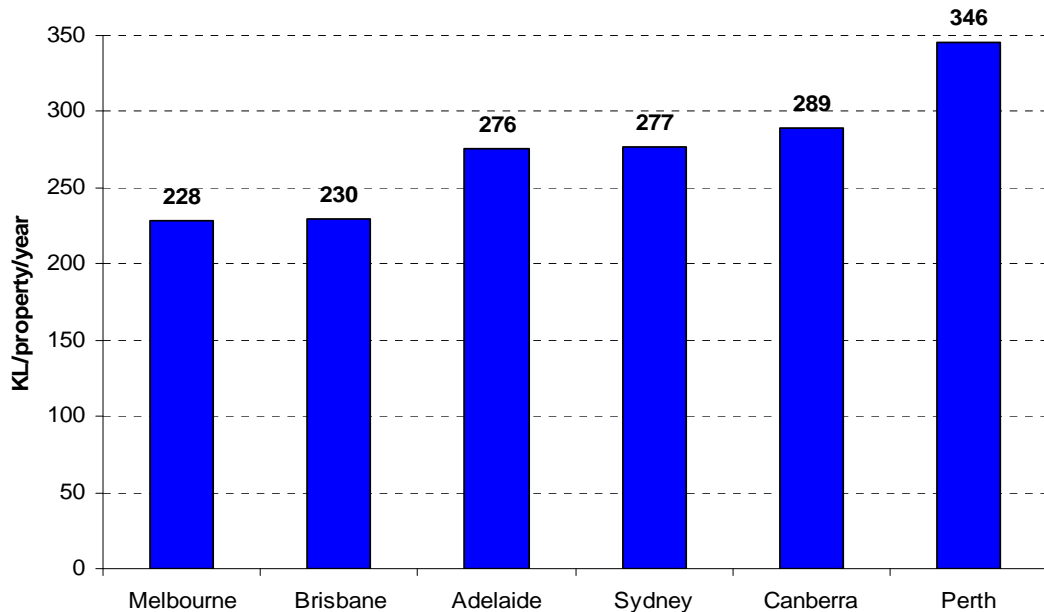
<sup>6</sup> Department of Sustainability and Environment, *Sustainable Water Strategy Central Region: Action to 2055*, Victorian Government, Melbourne, 2006, p. 4.

<sup>7</sup> Department of Sustainability and Environment, 'Our Water Our Future - The Next Stage of the Government's Water Plan 12 Month Progress Report', Victorian Government, Melbourne, 2008, p. 6.

<sup>8</sup> D. Sheehan, Senior Policy Officer, Office of Water, Department of Sustainability and Environment, *personal communication*, 29 April 2009.

<sup>9</sup> T. Holding, Minister for Water, 2009, 'Melburnians the nation's best water users', Media Release, 6 April, 2009.

**Figure 3.3: Australian capital city water consumption comparison, 2007-08**



Source: T. Holding, Minister for Water, 2009, 'Melburnians the nation's best water users', Media Release, 6 April 2009. Interpreted data originally sourced from Water Services Association of Australia, *National Performance Report 2007–2008: Urban water utilities*, Melbourne, 2009. Melbourne data is the combined average of Melbourne's water retailers and Melbourne Water.

The CSIRO presented data which the Committee has incorporated into Figure 3.4. The figure shows a breakdown between residential (including outside watering) and internal residential water consumed in the years 2004-05 and 2006-07. This two year period is significant in highlighting the effect of water restrictions. On 1 March 2005 permanent water savings rules replaced stage 2 water restrictions. Stage 1 water restrictions were re-introduced on 1 September 2006 and were progressively strengthened to Level 3a on 1 April 2007.<sup>10</sup>

<sup>10</sup> Melbourne Water, 'Sustainability Report 2007/08: Our Water Our Future', viewed 25 May 2009, <[http://www.melbournwater.com.au/applications/annual\\_report\\_2008/water\\_owof.htm](http://www.melbournwater.com.au/applications/annual_report_2008/water_owof.htm)>.

**Figure 3.4: Residential and internal residential daily, per capita water use, 2004-05 and 2006-07**

Melbourne's residential water consumption – Litres per person per day	2004-05	2006-07
Total	208	185
Internal	157	150
External	51	35

Source: CSIRO, *Submission*, no. 34, 29 August 2008, p. 7. Data from WaterSmart working group report, 2006 and Melbourne Water's Sustainability Report 2006/07.

The figure shows that external water use reduced from 51 to 35 litres/day, a 31 per cent reduction. Meanwhile daily internal water use fell by an average of seven litres over the period. The CSIRO submission comments on the figure:

It can be seen that the major impact of water restrictions is on external residential water use, although consumer concerns and the impact of more efficient water appliances has also reduced internal consumption.<sup>11</sup>

The CSIRO also notes that whilst consumption has fallen, internal residential consumption rates in northern Europe are still below what has been achieved in Melbourne during water restrictions:

In comparison with the 2006-07 figure for Melbourne of 150 litres per person per day, average internal water consumption in northern European households is 125 litres per person per day.

This comparison indicates the prospect for further water savings if a higher adoption of water efficient appliances can be achieved. From these figures alone, Melbourne wide achievement of northern European internal household consumption levels would save about 35 GL/annum or about 8% of the total 2006-07 supply.

It is important to distinguish between permanent water use reductions that may be achieved through long term demand management initiatives, as against temporary drought restrictions.<sup>12</sup>

The Committee notes that continued water conservation and efficiency improvements remain a vital component of the future management of Melbourne's water supplies. However, it also acknowledges that, given current water savings technology, there is a limit to how much water can be conserved. The CSIRO analysis confirms the value of continuing to pursue water savings in homes, commerce and industry, however, its analysis notes:

It needs to be realised that there is a minimum level of water consumption that is needed to preserve household amenity and the aesthetics of parks and gardens. The 2006-07

<sup>11</sup> CSIRO, *Submission*, no. 34, 29 August 2008, p. 7.

<sup>12</sup> *Ibid*, p. 7.

consumption figures for Melbourne occurred while the city was under significant water restrictions and the concept of the 'Garden State' was brought into severe question. At the same time, Brisbane has achieved average residential water consumption levels of 140 litres per person per day, while under very severe Stage 6 water restrictions. However, it is expected that this consumption level will rise after the recent easing of Stage 6 restrictions. Economic studies by Marsden Jacob Associates (personal communication) have indicated a significant negative economic impact of the current severe water restrictions in Brisbane.

Unless there is a significant breakthrough in the technology associated with residential water use, it is unlikely that any large reduction in water consumption below that achieved in 2006-07 will be sustainable in the long term. Consequently, prudence dictates that long term planning of water supply assumes a total consumption (including industry, commerce and residential supply) for Melbourne of around 300 litres per person per day, with the aim of reducing this to perhaps 250 litres per person per day as new, more efficient water saving technologies enter the market.<sup>13</sup>

**A significant challenge for water managers is to ensure that any long term demand management initiatives maintain or improve on current conservation efforts into the future. This will be particularly important as water restrictions are eased with the introduction of new water supplies and if significant rainfalls return. In his submission to the Inquiry the Commissioner for Environmental Sustainability commented on the risks posed by the government's proposed large scale desalination plant on maintaining Melbourne's conservation ethos and its ability to optimise supply options:**

Water restrictions and other demand management measures have fostered a strong conservation ethos in Melbourne and markedly reduced consumption. Without on-going commitment to demand management strategies, and institutionalising water efficiency measures through building codes and design standards, the large volume of additional water produced by the desalination plant carries the risk of undermining this ethos and a return to excessive water use by households and industry. The large volumes of water produced may have lesser economic and environmental costs, and allow Melbourne's supply system to be optimised at a finer scale.<sup>14</sup>

**Similarly, Professor John Langford, Director of Uniwater provided the Committee with a copy of Figure 3.5 and advised that:**

... the drought of 1967 stimulated a major program of dam construction. People declared you could have all the water you want and they induced a boom in water consumption, and our per capita water consumption got up to 500 litres per day by about 1982.

In 1982 we had another one of our periodic droughts. It was short and sharp and severe, and it was the first drought that did not stimulate a dam-building program, but what it did do was stimulate a major demand management program that has been going on for the last 25 years, and you can see that it has been reasonably if not very effective ...

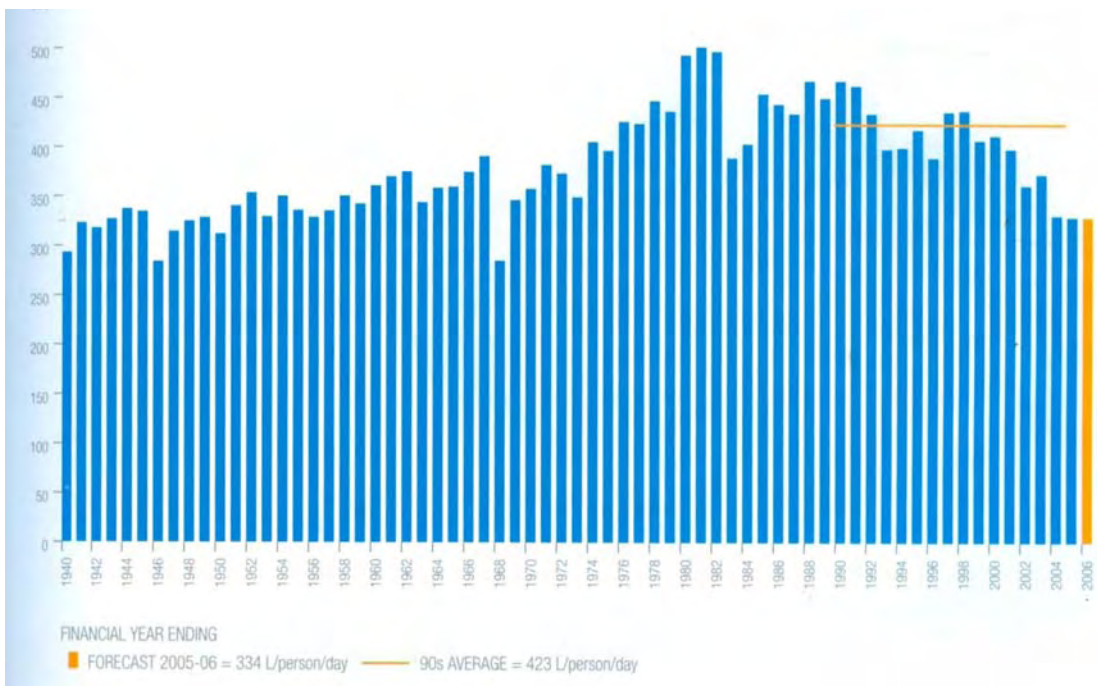
There are two things to remember. One, when this desalination plant is operational we do not want to say, "You can have all the water you want so long as you are prepared to pay for it"

<sup>13</sup> Ibid, p. 8.

<sup>14</sup> | McPhail Commissioner for Environmental Sustainability, *Submission*, no. 105, 15 November 2008, p. 19.

and remove the efficiency program because I can tell you what will happen – exactly what happened there. We will be building desalination plant after desalination plant, which is something I would think is unacceptable. So demand management stays on and efficiency programs stay on, and we keep at it.<sup>15</sup>

**Figure 3.5: Melbourne's historical average water use per capita per day**



Source: Professor J. Langford, Director, Uniwater, Department of Civil and Environmental Engineering, The University of Melbourne., *Transcript of evidence*, Melbourne, 27 October 2008, presentation notes.

The installation of further water efficient appliances, fixtures and other water saving infrastructure will defer the need for further large scale supply augmentation. Irrigation Australia Limited advised the Committee on the water saving potential of efficient technologies, products and practice and highlighted the challenge of setting policy frameworks that support these investments and efforts:

Water efficient technology, products and practice can achieve significant additional water savings. The additional water savings could be in the order of 30% of outdoor water use. The challenge is to set policy frameworks that encourage investment in technology and improved practice to meet a minimum benchmark of performance, and to design systems to check and enforce the maintenance of minimum benchmarks.<sup>16</sup>

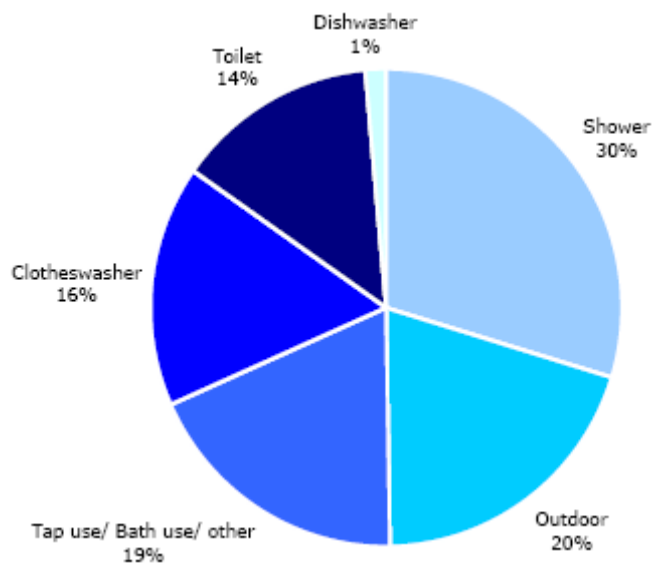
<sup>15</sup> J. Langford, Director, Uniwater, Department of Civil and Environmental Engineering, The University of Melbourne, *Transcript of evidence*, Melbourne, 27 October 2008, pp. 3-4.

<sup>16</sup> Irrigation Australia, *Submission*, no. 52, 29 August 2008, p. 7.

## Residential water conservation and efficiency

Residential water consumption accounts for 59 per cent of Melbourne's total water consumption with around 80 per cent of this water consumed in bathrooms, laundries and kitchens, the remainder is used outdoors.<sup>17</sup> In a typical suburban home, about 30 per cent of water is used in the shower, 16 per cent by washing machines, 14 per cent for toilet flushing and the remaining 20 per cent is used in the kitchen, baths and for other miscellaneous uses.<sup>18</sup> This breakdown is represented in Figure 3.6.

**Figure 3.6: Typical breakdown of residential water use**



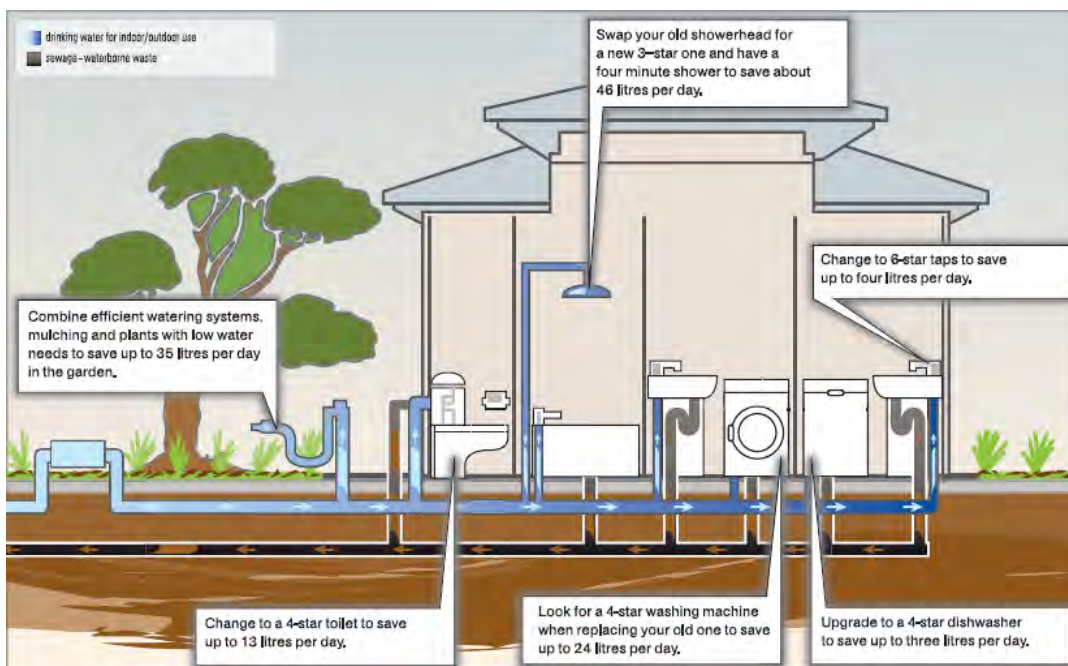
Source: WaterSmart, *Water Supply-Demand Strategy for Melbourne 2006-2055*, Melbourne, 2006, p. 16.

Two broad measures can be used to improve water use efficiency and conservation in households: the installation of more efficient water savings fixtures and appliances and behavioural changes. Current water saving fixtures and appliances include water saving shower heads, dual flush toilets, water saving dishwashers and washing machines, trigger hoses and water tanks connected to indoor appliances and for watering gardens. Some of these residential water efficiency fixtures and appliances are illustrated in Figure 3.7.

<sup>17</sup> WaterSmart, *Water Supply-Demand Strategy for Melbourne 2006-2055*, Melbourne, 2006, pp. 14-15.

<sup>18</sup> Victorian Government, 'Our Water Our Future: Target 155 - How much water do you use?' viewed 25 May 2009, <<http://www.ourwater.vic.gov.au/target155/water-use>>.

**Figure 3.7: Residential water saving fixtures and appliances**



Source: Department of Sustainability and Environment, *Sustainable Water Strategy Central Region: Action to 2055*, Victorian Government, Melbourne, 2006, p. 43.

Behavioural change measures include shorter showers, turning off taps, replacing leaking valves, collecting water during showers, using grey water to water the garden and using mulch and soil moisteners.

To encourage water conservation and efficiency, Melbourne households can receive financial rebates on the purchase of water saving fixtures and appliances and goods from their respective water retailer. Rebates will be discussed later in this chapter.

Many of the Victorian Government's water conservation and efficiency programs are focused on regulating or rewarding behaviours and purchasing in the residential sector. CSIRO's Principal Research Scientist for the Land and Water Division, Dr Shiroma Maheepala, questions the merit of applying further pressure on the residential sector to reduce water consumption as she believes there are limited water savings to be found. Instead Dr Maheepala argues that further water conservation opportunities exist in the non-residential sector:

We are basically putting pressure on the residential sector to reduce water consumption. Do we want to continuously do that, or do we want to look beyond the residential sector? The immediate sector is the industrial sector, and the next immediate consideration is to look

beyond urban water – looking at other possibilities... Can we somehow free up some water and bring it to the residential sector? We do not believe pressuring the residential sector is the way to go.<sup>19</sup>

## Non-residential water conservation and efficiency

Non-residential water use accounts for 41 per cent of Melbourne's total consumption. Thirty per cent is used by non-residential customers and 11 per cent is non-revenue water which includes leakage from water mains (7 per cent) with the remainder used for firefighting, stolen or unaccounted for due to meter inaccuracies.<sup>20</sup>

Melbourne's non-residential customers, includes business, industry and community institutions. These customers have collectively reduced their daily per capita water consumption by about 38 per cent compared to the 1990s average.<sup>21</sup> In 2007-08, Melbourne's non-residential sector reduced its demand by eight gegalitres. In the context of Melbourne's overall reduction of 31.6 gegalitres in 2007-08, this equates to the non-residential sector contributing 25 per cent of the savings for that year.<sup>22</sup>

In addition to the specific non-residential conservation and efficiency initiatives, such as water management plans and real time monitoring of water use with smart meters, and changes to water pricing, every business could install water efficient fixtures and appliances and adopt behavioural changes that also apply to the residential sector.

## Discussion

The Committee concludes that while substantial progress in water conservation and efficiency has been made in recent years, there is still scope to continue reducing demand and using alternative water sources for non-potable water uses. It is clear that there is a limit to how far demand can be reduced before people's quality of life begins to be compromised. As many viable water conservation and efficiency opportunities exist, the Committee does not believe that we have reached that point yet.

Water conservation and efficiency should remain the Victorian Government's highest priority water management activity because of its comparative economic, environmental and social benefits compared with other options. Incentives and regulation can continue to be applied to influence water use behaviours and the adoption of permanent water efficient technologies.

The Committee also acknowledges the challenge of maintaining water conservation and efficiency behaviours and investments once additional water

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<sup>19</sup> S. Maheepala, Land and Water Division, CSIRO, *Transcript of evidence*, Melbourne, 28 October 2008, p. 5.

<sup>20</sup> WaterSmart, *Water Supply-Demand Strategy for Melbourne 2006-2055*, Melbourne, 2006, p. 14.

<sup>21</sup> Victorian Government, 'Business & Industry', viewed 22 May 2009, <<http://www.ourwater.vic.gov.au/saving/industry>>.

<sup>22</sup> *Ibid.*

is delivered as part of the Victorian Water Plan and water restrictions are eased. The Committee is concerned that water consumption may markedly increase to earlier levels and further investment in water efficiency and alternative sources of water may be deferred. This impact may be offset by the forthcoming increases in water prices, making the relative cost of water efficient technologies lower and therefore investment more viable.

Accordingly, the Committee recommends that:

#### **Recommendation 3.1**

**Water conservation and efficiency be maintained as the top priority in water management.**

#### **Recommendation 3.2**

**Current water conservation and efficiency funding, programs and initiatives such as behavioural change programs, water pricing, incentives and regulation be expanded.**

#### **Recommendation 3.3**

**Having met the water conservation and efficiency targets in the *Central Region Sustainable Water Strategy*, the Victorian Government develop more ambitious targets to demonstrate its ongoing commitment to water conservation and efficiency and continuous improvement.**

#### **Recommendation 3.4**

**The Victorian Government and water authorities develop a detailed strategy (including funding commitments for specific programs and initiatives) for the continuation of water conservation and efficiency efforts to counter the possible increase in water use following major supply augmentations.**

#### **Recommendation 3.5**

**As part of its water augmentation program, the Victorian Government continue to promote water conservation to avoid the historically large increases in household water consumption that have accompanied the delivery of 'new' supplies of water.**

## **Water conservation and efficiency programs**

### **Victoria's water conservation and efficiency programs**

Through the *Our Water Our Future* program, the Victorian Government and the Melbourne water sector are delivering a range of water conservation programs initiatives including:

- water restrictions and permanent water savings rules;

- behavioural change programs;
- water efficient buildings and appliances;
- rebates and other incentives for water efficient products;
- water efficiency programs for industry; and
- water pricing to encourage water saving.

The government estimates that up to 250 gegalitres of water was saved through water use efficiency and conservation between December 2002 and June 2007.<sup>23</sup> In the future, programs such as the rebates scheme and water pricing to encourage water saving will continue, but new ways of saving water are also likely to be explored.<sup>24</sup> Melbourne's water retailers deliver some of the programs, spending around \$6 million each year on conservation initiatives such as:

- industry/business specific programs;
- educational programs;
- water saving rules;
- the savewater.com alliance website – which provides detailed information on water conservation;
- the smart water fund;
- water infrastructure leak control programs; and
- community grants.

## Water use efficiency and conservation programs in Orange County, California

As part of its investigations, the Committee visited the Municipal Water District of Orange County (MWDOC) in Fountain Valley, which is located approximately 55 kilometres south of Los Angeles. The MWDOC is a public planning and resource management agency that provides water imported from outside the County to more than two million Orange County residents through its 28 member agencies.

The MWDOC outlined the programs currently in place in Orange County to promote water use efficiency and conservation, which include:

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<sup>23</sup> Department of Sustainability and Environment, *Our Water Our Future: The Next Stage of the Government's Water Plan*, Victorian Government, Melbourne, 2007, p. 25.

<sup>24</sup> *Ibid*, p. 13.

- single family residence rebates for the purchase of garden irrigation timers, rotating sprinkler nozzles, high efficiency toilets and clothes washers, and synthetic turf;
- commercial, industrial, institutional and multi-family rebates for the purchase of high efficiency toilets and clothes washers, high efficiency and zero water urinals, irrigation timers, water efficient sprinkler nozzles, synthetic turf, and food steamers;
- the *Landscape Performance Certification Program* – a free program to water agencies, property owners, property managers and landscape maintenance contractors which provides monthly Irrigation Performance Reporting;
- the *Public Sector Program* which provides free indoor and outdoor surveys to identify opportunities for water savings, rebate incentives to public agencies and incentives to connect public sites to reclaimed water;
- the *Industrial Process Water Use Reduction Program*, which targets five industrial sectors (food processing, metal plating, circuit board manufacturing, commercial laundries and textiles) with tailored surveys and monetary incentives for process improvements;
- the *Hotel Survey and Incentive Program*, which surveys and retrofits hotels for water efficiency; and
- *Budget Based Tiered Rate Structures* that are designed to assist retail water agencies in customising budgets for individual customers on the basis of a static indoor allocation based on people per household and a variable outdoor allocation.<sup>25</sup>

MWDOC anticipates that these programs will conserve approximately 11 gigalitres of water each year, providing water that can be used to meet increasing demand while reducing the need to develop new supplies.<sup>26</sup> Domestic water usage in Orange County currently averages approximately 475 litres per person per day, sixty per cent of which is used for outside watering.<sup>27</sup>

Despite using significantly more water per capita than Melbourne, the Committee was interested in the different ways the Municipal Water District of Orange County promotes water efficiency. The Committee was particularly interested in the products that attracted rebates and extent of the rebate scheme which includes non-residential water users. This is reflected in the

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<sup>25</sup> K. Hunt, General Manager, J. Berg, Assistant General Manager and District Engineer and R. Bell, Water Use Efficiency Programs Manager and Principal Engineer, Municipal Water District of Orange County *personal communication*, 17 November 2008.

<sup>26</sup> Municipal Water District of Orange County, 'Who We Are', viewed 5 March 2009, <[www.mwdoc.com/Who\\_we\\_are.htm](http://www.mwdoc.com/Who_we_are.htm)>.

<sup>27</sup> K. Hunt, General Manager, J. Berg, Assistant General Manager and District Engineer and R. Bell, Water Use Efficiency Programs Manager and Principal Engineer, Municipal Water District of Orange County *personal communication*, 17 November 2008.

Committee's findings and recommendations on rebates discussed later in this chapter.

## Water restrictions

Water restrictions are intended to be a short term response to critical water supply shortages that temporarily restrict or ban discretionary or wasteful water uses. Since 1 November 2002, Melbourne residents have experienced either water restrictions or Permanent Water Savings Rules which were introduced on 1 March 2005. Figure 3.8 shows when water restrictions were introduced or scaled back in response to Melbourne's variable water supplies.

**Figure 3.8: Melbourne's water storage level and restrictions timeline (1997-2008)**



Source: Melbourne Water, 'Sustainability Report, 2007-08: Our Water Our Future', viewed 26 May 2009, <<http://www.melbournewater.com.au>>.

The Victorian Uniform Drought Water Restriction Guidelines define four stages of restrictions on water use activities, of increasing severity.<sup>28</sup> Water authorities implement and administer the appropriate stages of water restrictions when supply level trigger points are reached. The water storage level trigger points for water restrictions are presented in Figure 3.9. The trigger point guidelines differ monthly to reflect seasonal variability.

<sup>28</sup> Victorian Water Industry Association, *Victorian Uniform Drought Water Restriction Guidelines*, September 2005, pp. 11-30.

**Figure 3.9: Water storage level trigger points for water restrictions**

Level of Drought Response	Trigger Level (percentage full)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Stage 1	52.2	50.7	47.8	46.3	45.9	44.8	45.9	48.0	50.7	52.2	53.9	53.0
Stage 2	44.6	43.6	41.6	40.6	40.3	39.7	40.3	41.7	43.6	44.6	45.7	45.1
Stage 3	36.9	36.4	35.5	35.0	34.9	34.5	34.9	35.5	36.4	36.9	37.5	37.2
Stage 4	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3

Source: Melbourne Water, 'Water restriction percentage trigger levels for Melbourne', viewed 1 April 2009, <<http://www.melbournewater.com.au>>.

On the 1 April 2007 the Stage 3a restrictions were introduced<sup>29</sup> while storage levels were at 32.1 per cent,<sup>30</sup> less than 3 per cent above the Stage 4 trigger. This intermediate restriction stage increased the severity of restrictions whilst still allowing the maintenance of some municipal sporting fields and certain water dependent industries, such as nurseries and commercial car washes, to operate. The implementation of Stage 4 restrictions would ban all outdoor water use.

Under the Victorian Uniform Drought Water Restriction Guidelines all water restriction stages target outdoor discretionary water use such as the watering of parks and gardens, car washing and the filling of pools. There are no restrictions on indoor water use, such as cooking, cleaning, bathing and washing which are considered essential uses. Any restrictions placed on these activities may present a health risk and would be difficult to enforce.

Water restrictions are targeted at residential water use although the restrictions may also affect many non-residential customers. However, industrial water use such as manufacturing and power generation are not restricted. Water restrictions apply to all residential and non-residential customers on a reticulated supply of potable water, however, restrictions do not apply to customers using rainwater, recycled water, greywater or groundwater.

Submissions received by the Committee were generally supportive of water restrictions as a short term response to water supply shortages. However, some stakeholders supported permanent restrictions or applying restrictions earlier in response to low storage levels, while others warned against maintaining restrictions over a long period. Other submissions called for water restriction exemptions for the conversion of sporting fields to more drought tolerant grasses and for food production.

<sup>29</sup> Department of Sustainability and Environment, *Augmentation of the Melbourne Water Supply System: Analysis of Potential System Behaviour*, Parliament of Victoria, Melbourne, 2008, p. 7. The report noted that the Drought Response Plan was updated in June 2008 to reflect that Stage 3a restrictions have now replaced Stage 3 restrictions.

<sup>30</sup> J. Thwaites, Minister for Water, 'Stage 3a restrictions begin today', *Media Release*, April 1 2007.

**Frankston City Council supports continued water conservation and efficiency efforts and calls for water restrictions to become permanent:**

Continuing the water restrictions, education campaigns and showerhead swaps have proved effective in reducing domestic water use. However, there is much more water savings yet to be captured. Water conservation is the most cost effective method for dealing with water shortage. Water restrictions should become permanent.<sup>31</sup>

**Alternatively, Colac Otway Shire Council suggests raising the water storage trigger levels so that restrictions are applied earlier to encourage water conservation as a community expectation:**

The dam level trigger points for the introduction of water restrictions should be increased to prevent wastage even when the supplies are relatively full. This will encourage behaviour and attitude change that will become a standard community expectation over time.<sup>32</sup>

**Conversely, Irrigation Australia Limited acknowledges the role of temporary restrictions but draws attention to the community costs of long term restrictions:**

While temporary water restrictions may be a useful and acceptable tool for infrequent, short duration use, the long term application of water restrictions has significant costs for the community.

The implied costs of long term water restrictions in Australia have been estimated in the order of \$1.6-\$6.2 billion each year. Urban green spaces are estimated to account for 27% of these costs. The magnitude of this estimate is confirmed by the Productivity Commission which listed estimates of the cost of water restrictions in various Australian cities as:

- \$150 per annum per household in Sydney, as the additional costs to using higher water prices to achieve behavioural change;
- between \$437 and \$870 per annum per household in Perth if sprinklers were to be banned, using opportunity cost of time based on mean wage; and
- a willingness to pay up to \$268 per household per annum in Canberra to avoid Level 5 water restrictions.

While there is no equivalent information for Melbourne, the costs of water restrictions can be assumed to be within the same magnitude as other Australian capital cities.<sup>33</sup>

**Infrastructure Partnerships Australia warns that continued water restrictions pose the risk of conflict between water users and the government:**

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<sup>31</sup> Frankston City Council, *Submission*, no. 44, 28 August 2008, p. 1.

<sup>32</sup> Colac Otway Shire, *Submission*, no. 74, 29 August 2008, p. 1.

<sup>33</sup> Irrigation Australia, *Submission*, no. 52, 29 August 2008, p. 5.

Strong legislative approaches, such as stringent water restrictions, run the risk of creating conflict and hostility between governments and their electorates, as many consumers place the blame for Australia's failure to invest in essential infrastructure squarely with our governments.<sup>34</sup>

The Victorian Government regards water restrictions as a temporary measure in response to climate change and drought. The Victorian Water Plan declares that taking Melbourne off severe water restrictions, Stages 3 and 4, and eventual restoration of unrestricted water supply on a sustained and secure basis, is the key objective.<sup>35</sup> The plan estimates that:

If the scenario based on the past three years is taken as a guide, the new supply will enable Melbourne to move to Stage 2 water restrictions by 2010 and progressively move back to low level or no restrictions by 2013. If inflows closer to the average of past 10 years are restored, Melbourne will move out of water restrictions earlier.<sup>36</sup>

However, on 17 March 2009, an article in *The Age* stated that under a revised water plan, Melbourne will remain on water restrictions until at least July 2013 with no end to restrictions predicted.<sup>37</sup>

The Committee notes that as water restrictions are eased, it is probable that discretionary water use will increase. The extent of this increase, or return to pre-restriction consumptive levels, is not known. The Essential Services Commission predicts that water consumption will not fully return to previous consumption levels, as permanent water efficient installations and long term decisions that reduce water demand, have occurred during the period of water restrictions:

There are certain assumptions that stages of restrictions bring down demand by certain percentages. But to suggest that once those restrictions are lifted because we have got more water, that those levels of consumption will return to where they were, is probably not quite right. That would not happen. There would be obviously things put in place that are of a more permanent nature such as rainwater tanks or grey water diversions, people making long term decisions to replace gardens that have typically relied on a lot of watering with more Australian-type gardens, I suppose, that rely a little less [on watering].

We would certainly expect that there would be some increase in demand once restrictions are lifted because people would be able to use the water that they are currently not able to use, but how much they go back to what they used to do is an interesting question.<sup>38</sup>

Irrigation Australia Limited argues that water savings will not be sustained when restrictions are removed:

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<sup>34</sup> Infrastructure Partnerships Australia, *Submission*, no. 42, 27 August 2008, p. 3.

<sup>35</sup> Department of Sustainability and Environment, *Our Water Our Future: The Next Stage of the Government's Water Plan*, Victorian Government, Melbourne, 2007, pp. 17, 23.

<sup>36</sup> *Ibid.*, p. 17.

<sup>37</sup> P. Ker, 'Plan flags stricter water restrictions for longer', *The Age*, 17 March 2009.

<sup>38</sup> S. Crees, Director, Water Regulation, Essential Services Commission, *Transcript of evidence*, 2 February 2009, p. 5.

While water restrictions have reduced water consumption in most urban centres the water savings will not be sustained once restrictions are removed because the community has not increased its knowledge of good water practice. Sustainable improvements in outdoor water use behaviour will be achieved by greater community knowledge and understanding about how to achieve efficient water use combined with their investment and use of water efficient products and technology.<sup>39</sup>

The Committee recognises that debate surrounds the definition of discretionary water use and that perceptions of what constitutes discretionary water use may change as water storage levels decline. A number of stakeholders questioned whether maintaining the health of parks, gardens and sporting fields should in fact be considered discretionary. Irrigation Australia Limited argues that urban green space has a high social value and that its watering is not discretionary:

Water restrictions presume outdoor water use is discretionary, and ignore both the significant social benefits derived from urban green space and significant cost to the community.<sup>40</sup>

In special circumstances, water authorities may grant exemptions from restrictions for those with special needs, and have principles in place to ensure consistency in processing exemption applications.

Under Stage 3a restrictions, metropolitan councils are permitted to use potable water for watering one in four of their sporting grounds. Some councils have called for exemptions for the replacement of cool season grasses with more drought tolerant warm season grasses. Brimbank City Council outlined in its submission to the Inquiry that exemptions during water restrictions for the conversion to warm season grasses would achieve long term water savings:

Sporting fields are predominantly sown with cool season grasses. These sporting fields have suffered badly as the result of drought conditions and the necessary limitation imposed by water restrictions, and a large number have consequently become unsafe and unplayable. For community health and OH&S reasons, and to help ease Melbourne's water problem, it would be reasonable to allow council's exemption during water restrictions for the conversion of sporting fields from cool season to warm season grasses.

There is a degree of frustration with the inability to undertake warm season grass conversion works as a response to the drier weather conditions that Melbourne is experiencing. The current 1 in 4 watering regime, for sporting fields, in metropolitan Melbourne does not provide the ability to undertake these much needed conversions.<sup>41</sup>

Frankston City Council highlights its water conservation efforts in relation to sports fields and reiterates Brimbank Council's call for exemptions for warm season grass conversion:

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<sup>39</sup> Irrigation Australia, *Submission*, no. 52, 29 August 2008, p. 7.

<sup>40</sup> *Ibid*, p. 5.

<sup>41</sup> Brimbank City Council, *Submission*, no. 39, 26 August 2008, p. 1.

Water restrictions on municipal sports fields have reduced water consumption and have caused Council to plant warm season grasses and restrict the use of playing venues and playing times. Council is also installing flow restrictor valves in the showers and sinks used in sporting pavilions.

Special consideration should be given to further exemptions for sports fields where warm season grasses have been planted due to the potential adverse social impacts of restricted access.<sup>42</sup>

**Garlic and herb growers, Bromley Organics, recognise the need for water restrictions but call for less severe restrictions on watering for local food production which could reduce greenhouse gas emissions associated with food transport:**

It would be a great idea to let people have longer watering times if they used that water for food production. This would also reduce greenhouse gases given that produce such as lettuces travel on average 7000 kms before being eaten by the consumer.<sup>43</sup>

**Moreland City Council also calls for exemptions for not-for-profit food production at all stages of water restrictions: 'Food security activities must be exempt from water restrictions and therefore the non-profit growing of food should be an eligible activity under all stages of water restrictions'.<sup>44</sup>**

Water restrictions also have a significant impact on environmental management, particularly river health. The Victorian Water Plan states that if Melbourne is required to move to Stage 4 water restrictions, environmental flows will be reduced by 10 gigalitres in the Thomson River and 10 gigalitres in the Yarra River. Also under the Plan, additional new environmental flow commitments for the Yarra will be deferred until Melbourne returns to Stage 1 water restrictions.<sup>45</sup> Environment Victoria advised the Committee that:

Providing the Yarra and Thomson with, for the first time in history, a secure entitlement to a portion of their own flow were key actions stemming from the 2004 white paper and the 2006 Sustainable Water Strategy for the Central Region.

At present, both these entitlements have been 'qualified' by the Minister for Water; that is, they have been put on hold until Melbourne is back to low level water restrictions.<sup>46</sup>

**Furthermore, the Commissioner for Environmental Sustainability advised the Committee that:**

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<sup>42</sup> Frankston City Council, *Submission*, no. 44, 28 August 2008, p. 2.

<sup>43</sup> Bromley Organics, *Submission*, no. 4, 8 July 2008, p. 1.

<sup>44</sup> Moreland City Council, *Submission*, no. 95, 18 September 2008, p. 1.

<sup>45</sup> Department of Sustainability and Environment, *Our Water Our Future: The Next Stage of the Government's Water Plan*, Victorian Government, Melbourne, 2007, p. 16.

<sup>46</sup> Environment Victoria, *Submission*, no. 58, 29 August 2008, pp. 18-19.

In 2006-07, about 40 temporary qualifications to environmental flows were made in Victoria, as part of the Government's drought contingency response. To date no water has been delivered to the rivers of the Central region as a result of the *Central Region Sustainable Water Strategy*. Additional flow committed to the Yarra River has been delayed by the Minister for Water until storage levels recover. Such delays pose a serious risk to the environment. Inland waters do not necessarily benefit from water use efficiency *per se*, but from secure flow regimes to maintain their condition. At this stage, this remains a policy commitment rather than a measurable achievement.<sup>47</sup>

## Permanent water savings rules

Action 5.4 of the *Our Water Our Future* white paper requires all urban water authorities to introduce permanent water saving measures to be developed at the local level and be suitable for local conditions.<sup>48</sup> On 1 March 2005 these measures were introduced in Melbourne as Permanent Water Savings Rules (PWSR). The six rules are:

- use manual watering systems only between 8pm and 10am;
- use automatic watering systems only between 10pm and 10am;
- fit hoses with a trigger nozzle;
- no hosing paved areas;
- apply to fill a new pool; and
- non-residential customers who use more than 10 megalitres per annum of potable (drinking) water from an urban supply are required to develop a water management action plan.<sup>49</sup>

The PWSR aim to stop water wastage around the home and in the community by banning practices such as watering during the heat of the day and hosing down paved areas. Penalties apply to those who disregard the rules.<sup>50</sup> When water restrictions are also in place, the more severe rules or restrictions apply.<sup>51</sup>

The PWSR have only been applicable on a stand alone basis for the period between 1 March 2005 and 1 September 2006, at which date restrictions were reintroduced which overrode the rules. The Committee notes that due to the limited period of application of the PWSR, evidence provided to the Inquiry regarding their effectiveness was limited. However, Barwon Water the water

<sup>47</sup> I McPhail Commissioner for Environmental Sustainability, *Submission*, no. 105, 15 November 2008, p. 11.

<sup>48</sup> Department of Sustainability and Environment, *Securing Our Water Future Together*, Victorian Government, Melbourne, 2004, p. 98.

<sup>49</sup> Victorian Government, 'Permanent Water Saving Rules', viewed 22 May 2009, <<http://www.ourwater.vic.gov.au/saving/restrictions/rules>>.

<sup>50</sup> Victorian Government, *Submission*, no. 54, 29 August 2008, p. 15.

<sup>51</sup> Victorian Government, 'Permanent Water Saving Rules', viewed 22 May 2009, <<http://www.ourwater.vic.gov.au/saving/restrictions/rules>>.

authority for Geelong, the Bellarine Peninsula, Colac and Surf Coast Shire, notes Victorian-wide acceptance of the rules and calls for the possible strengthening of them in line with community expectations:

The permanent water savings plan is widely accepted by communities throughout Victoria, consideration should be given to increasing the savings rule consistent with current community expectations to drive water conservation through smart water rules.<sup>52</sup>

The Committee iterates the sentiments from the previous Environment and Natural Resources Committee's 2005 *Inquiry into Sustainable Communities* that recommended a review of the rules with the intention of strengthening them:

Permanent water saving measures were introduced in Melbourne in March 2005. However the measures do not include a ban on watering private lawns or the requirement for hoses used to clean vehicles to be fitted with a high pressure cleaning unit, as was the case under stage two restrictions. The Committee has recommended that these former provisions be reviewed to ensure consistency with the principle of water conservation.<sup>53</sup>

## Water offset arrangements

Water offset arrangements allow water users the opportunity to be granted an exemption from water restrictions in exchange for funding or purchasing water savings made by a third party. Such exemptions allow for the maintenance of high value water uses such as watering parks, gardens and sports fields. Purchasing water savings from a third party may alleviate some of the economic and environmental costs associated with purchasing alternative water such as recycled water or groundwater. The premise of water offset arrangements is that there is no net loss of water. That is, the quantity of water granted as part of the exemption must be less than or equal to the amount of water saved as part of the water user's investment.

Citing social equity concerns and compromising water restrictions, the Minister for Water said that despite the potential to save water, he was reluctant to see offsets become widespread: "It would result in some communities that financially are very well off being able to get around water restrictions and I just think that's unfair."<sup>54</sup>

Two high profile venues make use of water offset arrangements, as reported in *The Age*, on 6 February 2009:

Victorian Water Minister Tim Holding is reluctant to allow "water offset" deals to become widespread, despite approval of such deals at high-profile venues such as Flemington Racecourse, and growing support from industry and water groups.

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<sup>52</sup> Barwon Water, *Submission*, no. 86, 5 September 2008, p. 1.

<sup>53</sup> Environment and Natural Resources Committee, *Inquiry into Sustainable Communities*, Parliament of Victoria, Melbourne, 2005, p. xxiv.

<sup>54</sup> P. Ker, 'State cautious on water deals', *The Age*, 6 February 2009.

Mr Holding said offsets had been approved at Flemington and Royal Melbourne Golf Club because those venues staged events of international significance, while other programs were in place to encourage water savings in the industrial sector.<sup>55</sup>

Under the Flemington (Victorian Racing Club) and Royal Melbourne Golf Club arrangements, the quantity of the proposed water savings is greater than the quantity of water required at the facilities, resulting in a “net saving”.<sup>56</sup> These arrangements follow the Minister’s rejection of an Expression of Interest put forward by some of Melbourne’s Councils to apply for offset arrangements. Under the proposal the entire water saving offset was to be used by Councils and no net water savings would be achieved.

Maribyrnong City Council Mayor, Mr Michael Clarke is lobbying for councils to use water offsets to maintain their public assets following the approval of the Victorian Racing Club arrangement. Water offsets have also received support from a number of other councils, the Australian Water Association and business lobby groups, which have called for further investigation of offsets as a way to save water.<sup>57</sup>

## Alternatives to water restrictions

The current water restrictions in Victoria particularly target outdoor water use, which is seen as a more discretionary use than indoor use. Whilst there is good argument for this, issues around social impacts of gardens and effects of soil moisture on evapotranspiration and thus on amelioration of the urban heat island effect (see Figure 3.10) should be taken into account.<sup>58</sup> For example, if the urban landscape contains a range of vegetated systems for the filtration, infiltration and harvesting of stormwater, or gardens are kept green by irrigation, local temperatures and heat extremes will be reduced.<sup>59</sup>

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<sup>55</sup> Ibid.

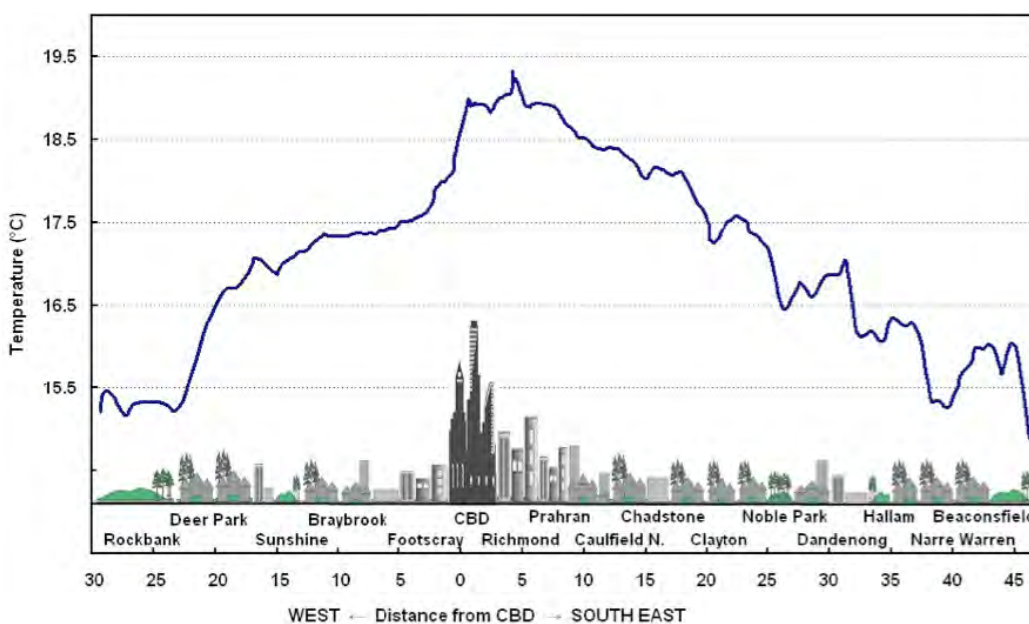
<sup>56</sup> Ibid.

<sup>57</sup> C. Gatt, 'West demands water top-up', *The Star*, Melbourne, 3 February 2009.

<sup>58</sup> T. Fletcher, Associate Professor, Institute for Sustainable Water Resources, Department of Civil Engineering, Monash University, *personal communication*, 18 May 2009.

<sup>59</sup> T. Endreny, 'Naturalising urban watershed hydrology to mitigate urban heat-island effects', *Hydrological Processes*, vol. 22, Syracuse, New York, USA, 2008.

**Figure 3.10: The urban heat island effect**



Source: A. M. Coutts, J. Beringer, and N. J. Tapper, 'Impact of Increasing Urban Density on Local Climate: Spatial and Temporal Variations in the Surface Energy Balance in Melbourne, Australia. *Journal of Applied Meteorology*, vol. 47, no. 4, pp. 477-463.

There is thus some argument for a different approach to water restrictions; based on a permissible maximum water use, i.e. a mandatory form of restriction structured similarly to the Target 155 Campaign. Such an approach would encourage water users to innovate and to choose how they wish to use and conserve water.

Two submissions to the inquiry recommended the use of household or property water allocations or quotas. This would give households choice as to how they use a limited allocation of water. As is the case in the agricultural and farming sectors, these allocations could be amended annually to reflect the scarcity of water supplies. Colac Otway Shire Council suggested that those who exceed their quota would be charged heavy penalties to discourage overuse:

Individual properties should be given an allocation of water per year and where this allocation is exceeded heavy penalties should be applied. This will further encourage the community to take more responsibility for managing a common resource that has been traditionally undervalued and wasted.<sup>60</sup>

The Australian Institute of Landscape Architects also supports a shift to water quotas for individual households, commercial centres, industry, agriculture and horticulture: 'In the case of individual households, this would assist residents to

<sup>60</sup> Colac Otway Shire, *Submission*, no. 74, 29 August 2008, p. 3.

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maintain vegetable gardens and specimen trees that contribute to household budgets, life cycle activities, local character and micro-climates'.<sup>61</sup>

## Discussion

The Committee concludes that water restrictions are an appropriate response to water scarcity and send a clear message to the community emphasising the need to conserve water. It notes, however, that the longer term application of restrictions, without appropriate explanation or justification, may cause some degree of community dissatisfaction. The Committee notes that after more than six years of water restrictions and water savings rules, it is appropriate to reflect on their effectiveness in reducing consumption and the conditions for exemptions. Such a review should be used to inform any amendments to the Victorian Uniform Drought Water Restriction Guidelines.

The Committee is concerned that under the present water restrictions system, some water users are affected more than others. This is true for industries such as nurseries, pool and spa retailers, commercial car washes, while other water intensive industries, such as manufacturing and power generation, do not face restrictions. Councils are also disproportionately affected by water restrictions in their role of providing safe and healthy sporting grounds. The inability to maintain up to 75 per cent of sports grounds affects Councils' ability to support many health and community benefits associated with playing fields. Also, residents who grow their own food on their property can be adversely affected by water restrictions. For many residents, growing food is a cost effective way of providing for their families and represents part of their cultural tradition.

The Committee is also concerned that on-going qualifications to the allocation of the Environmental Water Resource may cause significant degradation to the ecological health and productivity of Melbourne's rivers and wetlands.

The Committee supports the principle of the Permanent Water Savings Rules, despite the limited period of application, but acknowledges that further rules could be imposed on other water wasting behaviours. Additional rules may increase the PWSR's effectiveness in reducing water consumption and maintain the message to the community that water wasting activities are unacceptable.

The Committee also recognises the potential in water offset arrangements to achieve net water savings. Water offset arrangements impose a value on the use of potable water equal or greater than that of investing in water efficiency. The major benefits of water offset arrangements are that they allow greater water use flexibility during water restrictions and provide greater incentives to invest in long term water efficiency projects. These arrangements will only be attractive to potential water users seeking cost-effective and readily achievable water savings. The Committee recognises that water offset arrangements could potentially 'cannibalise' existing water efficiency programs, particularly those targeted at the large industrial water users. To ensure that the water offset arrangements achieve new water savings, the government should

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<sup>61</sup> Australian Institute of Landscape Architects, *Submission*, no. 77, 1 September 2008, p. 4.

consider limiting them to small to medium sized non-residential water users (i.e. those consuming less than ten megalitres per year who are not currently targeted in the Pathways to Sustainability Program). Also, any water offset arrangement must achieve water savings within the same water supply region.

The Committee did not receive sufficient evidence on the use of household or property water quotas and allocations to support or oppose such an approach. While, the Committee accepts that household or property water quotas and allocations may grant water users greater flexibility, it is concerned that the cost of administering such an approach may exceed the benefits.

Accordingly the Committee recommends that:

### **Recommendation 3.6**

**The Victorian Auditor-General conduct a performance audit of the present water restrictions regime including: its effectiveness in reducing water consumption, the equity of its application and the conditions for exemptions.**

### **Recommendation 3.7**

**The Victorian Government revise the Victorian Uniform Drought Water Restriction Guidelines to:**

- a) ensure greater equity in the application of water restrictions; and**
- b) include appropriate restrictions targeting discretionary water use in the non-residential sector.**

### **Recommendation 3.8**

**The Victorian Government deliver the environmental flows contained in the *Central Region Sustainable Water Strategy's* Environmental Water Resource commitments as a matter of priority.**

### **Recommendation 3.9**

**The Permanent Water Savings Rules be strengthened to reflect community attitudes regarding wasteful water use.**

### **Recommendation 3.10**

**The Victorian Government consider the wider use of water offset arrangements to promote investment in long term water savings.**

## **Behavioural change programs**

In addition to water restrictions, the Victorian Government and Melbourne's water retailers are implementing various behavioural change programs aimed at water conservation and efficiency. On the 1 December 2008, the government launched the Target 155 Campaign to encourage the voluntary reduction of household water use to an average daily consumption of less than

155 litres per person. Target 155 is based on the Queensland Water Commission's highly successful Target 140 campaign which ran from March 2007 until July 2008. South East Queensland residents averaged consumption of 129 litres per person a day for the last year compared with 300 litres per day before the drought.<sup>62</sup>

Queensland Water has also defined a range of household water consumptions targets that are tied to the level of water restrictions. For example, the current target under medium level water restrictions is 200 litres per person, per day, although actual average daily consumption remains at around 130 litres per person in May 2009.<sup>63</sup> The Committee notes that Melbourne's Target 155 campaign is not linked to water restriction levels and there is no end point for its implementation.

As part of the Target 155 campaign, Melbourne's water retailers have distributed free shower timers and information about measuring personal water consumption and how to reduce water demand. In the first three months of the Target 155 campaign, daily water consumption averaged 177 litres per person, compared with 180 litres over the 2007-08 summer months.<sup>64</sup> Figure 3.11 shows that Melbourne's average daily residential water consumption over the first 25 weeks of the Target 155 campaign was 162 litres per person.

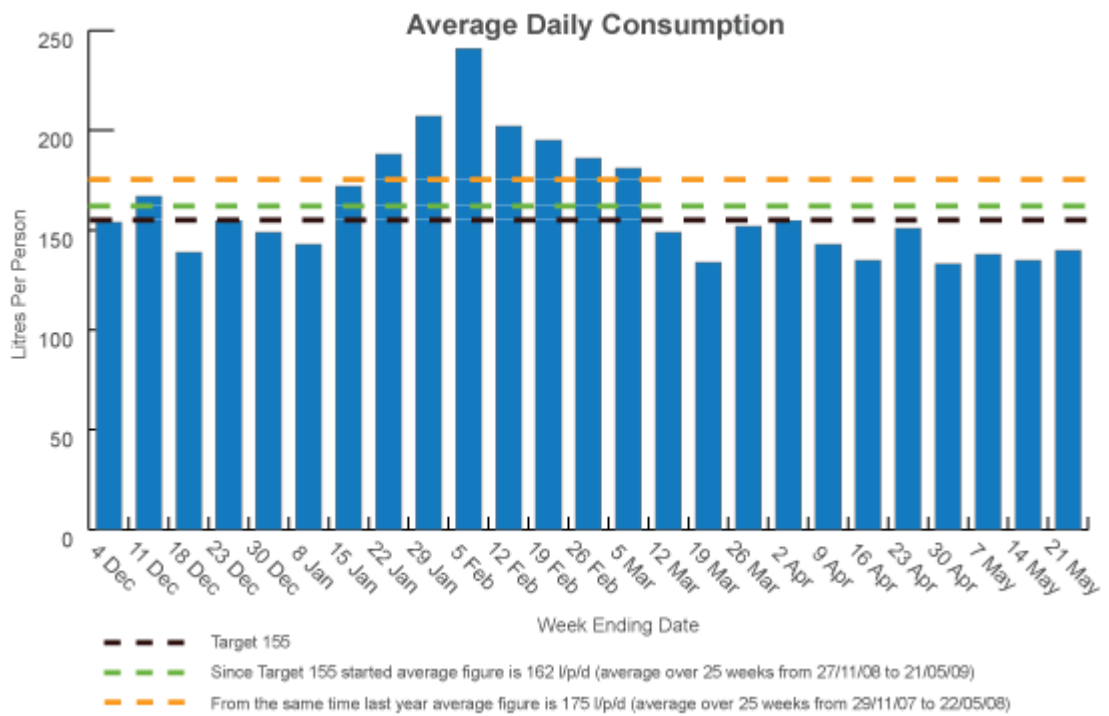
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<sup>62</sup> Queensland Water Commission, 'About Target 140', viewed 25 May 2009, <<http://www.target140.com.au/About+Target+140>>.

<sup>63</sup> Queensland Water Commission, *SEQ residents keep a lid on water use*, 2009. Water restrictions were eased in central South East Queensland from High Level (Target 170) to Medium Level (Target 200) on April 11, 2009.

<sup>64</sup> T. Holding, Minister for Water, 'Victorians get cash back for water saving', *Media Release*, 10 March 2009.

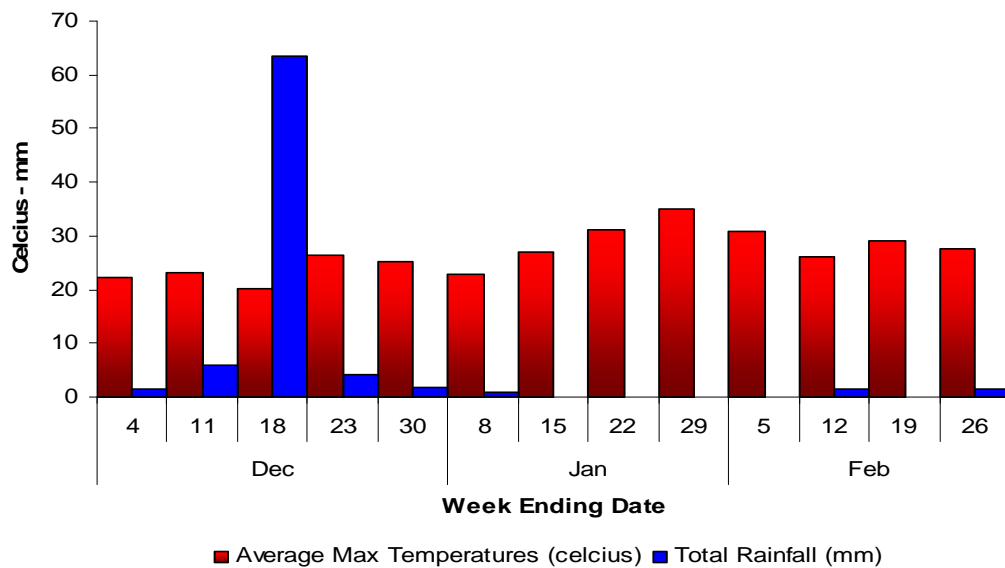
**Figure 3.11: Average daily residential water consumption (litres per person)**



Source: Victorian Government, 'Melbourne's Daily Water Consumption', viewed 25 May 2009, <<http://www.ourwater.vic.gov.au/target155/calculating-consumption>>.

Water consumption increased rapidly in late January and spiked in early February when Melbourne experienced a heatwave as shown in Figure 3.12.

**Figure 3.12: Average maximum temperatures and rainfall, summer 2008-09**



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Source: Bureau of Meteorology, 'Melbourne, Victoria Daily Weather Observations: December 2008, January 2009, February 2009', viewed 6 March 2009, <<http://www.bom.gov.au/>>.

The demand on water supplies was temporarily eased due to good rain in December. Low rainfalls thereafter have resulted in one of the driest starts to a year on record.<sup>65</sup> The Committee observes that water consumption has a positive relationship with temperature and an inverse relationship with rainfall. It is too early to determine whether the Target 155 campaign has been a success.

The government's WaterSmart Behaviour Change Program is another voluntary behaviour change approach aimed at reducing water consumption in the home. The program's aim is to develop sustainable behaviour change on a household basis supporting practical approaches to climate change. The program works by providing direct advice to householders either face-to-face or by phone. Water authority employees talk to the householders about how they use water in their home and identify ways in which water use can be reduced through a simple change in behaviour and provide the customer with information on water efficient appliances and rebates available. Roll-out of the program to 100,000 Melbourne households commenced in June 2008. DSE and Melbourne's water authorities are funding the program on a 60:40 split.<sup>66</sup>

<sup>65</sup> The Bureau of Meteorology says the statewide average rainfall since January 1 has been 99 millimetres - perilously close to the 99.9 millimetres recorded in the first five months of 1967. From P. Ker, 'Running on empty: dams dry up', *The Age*, 21 May, 2009.

<sup>66</sup> Victorian Government, *Submission*, no. 54, 29 August 2008, p. 16.

Melbourne's water retailers are also members of the Savewater Alliance, which is a not-for-profit association that delivers water conservation initiatives through a combination of web resources and programs to assist all water users.<sup>67</sup>

The Committee was advised by Irrigation Australia Limited on promoting behavioural change and the associated drivers required:

Different people are motivated to change behaviour for different reasons. A permanent water conservation framework needs to have a range of drivers including market settings to encourage investment in efficiency, education to empower people to use water more efficiently and a base regulatory framework to prohibit wanton water wastage.<sup>68</sup>

As previously discussed, the eventual easing of water restrictions will present a significant pressure on water conservation behaviour. However, once restrictions are lifted, there is still significant potential for further water efficiency technology and infrastructure investment.

The Commissioner for Environmental Sustainability, Dr Ian McPhail, noted in his submission to the Inquiry the need to harness public attention and the challenge of maintaining the water conservation ethos:

In recent years the urgency of the situation has engaged public attention and water has been high on the public agenda. This generates both risks and opportunities, and a responsive approach will be necessary. Awareness is high, but there is also potential for fatigue or frustration with restrictions. It is vital that system augmentations do not weaken the strong water conservation ethos that has emerged. As water restrictions are eased, sophisticated and targeted behavioural change and communications programs are required to maintain and build community engagement with water conservation issues.<sup>69</sup>

## Discussion

The Committee supports the current targeted behavioural change programs and acknowledges the challenge of maintaining the present water conservation ethos of the Victorian community.

The Committee supports the intent of the Target 155 campaign but acknowledges that it is too early to determine its success. It is unclear when its wider success as a behavioural change campaign will be evaluated, beyond whether the target is simply met or not. The Committee believes that the campaign's target should be linked to water storage levels and the severity of water restrictions. This would allow the campaign to be responsive to significant changes in water availability. It may be difficult to restrict individual water use to 155 litres per day should significant rains return or once additional water is delivered to Melbourne as part of the Victorian Water Plan.

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<sup>67</sup> Savewater Alliance, 'About Us', viewed 22 May 2009, <<http://www.savewater.com.au/about-us/savewater-alliance>>.

<sup>68</sup> Irrigation Australia, *Submission*, no. 52, 29 August 2008, p. 7.

<sup>69</sup> I McPhail Commissioner for Environmental Sustainability, *Submission*, no. 105, 15 November 2008, p. 13.

Conversely, a more severe target may also be appropriate if Melbourne water users are forced to comply with stage 4 water restrictions.

The Committee concludes that behavioural change programs should continue to be used to complement water savings through restrictions and water pricing signals. Both of which send a strong water saving message to the community. Accordingly, the Committee recommends that:

**Recommendation 3.11**

**The effectiveness and extent of water conservation behavioural change campaigns over the last decade be evaluated.**

**Recommendation 3.12**

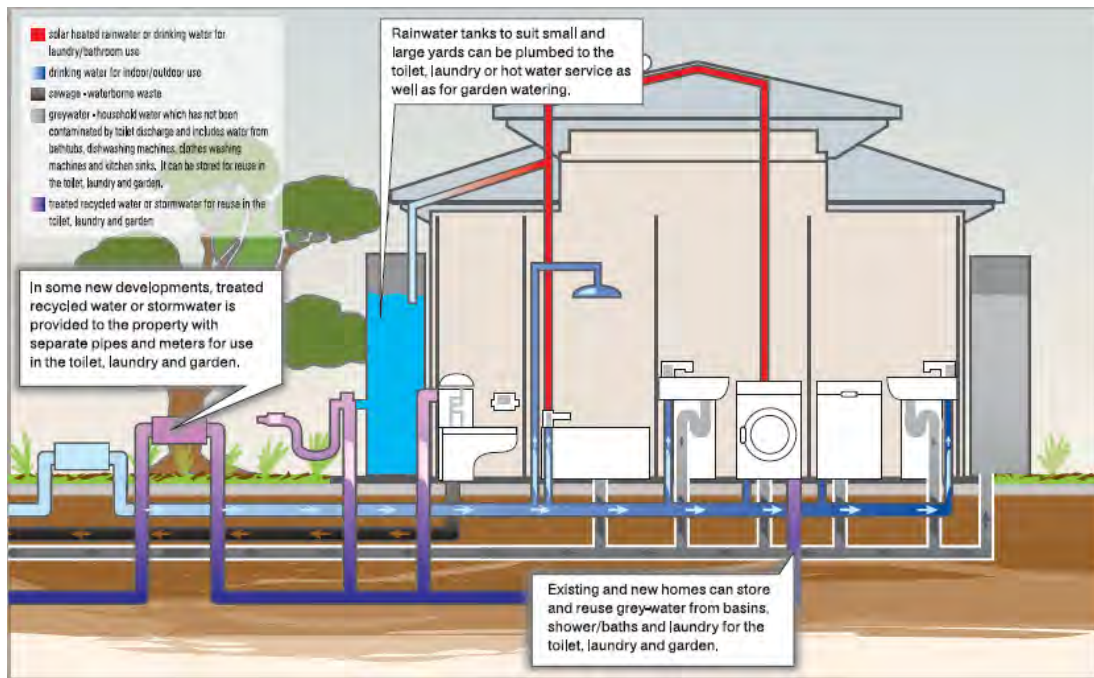
**Individual daily water consumption targets be linked to each water restriction level, as is the case in south east Queensland.**

## Water efficient buildings and appliances

Significant water conservation and efficiency gains can be achieved by raising the overall water efficiency of buildings and the fittings and appliances within them. Water efficient buildings reduce the overall water demand of the building and its occupants by directly reducing the consumption of potable water and substituting potable water with alternative sources of water including rainwater, greywater, recycled water and stormwater.

Each alternative source can be connected for indoor non-drinking uses such as flushing the toilet, laundry and gardening. Figure 3.13 illustrates the types of alternative water supply sources that can be used in a domestic setting.

**Figure 3.13: Examples of domestic alternative water supply sources**



Source: Department of Sustainability and Environment, *Sustainable Water Strategy Central Region: Action to 2055*, Victorian Government, Melbourne, 2006, p. 55.

The effectiveness and viability of different water efficient fixtures, appliances and the use of alternative water sources will vary depending on a variety of factors, such as building size, type, location and use. For example, small dwellings such as apartments or units may not have the physical space for a rainwater tank, recycled water connections may only be practical in close proximity to a water recycling facility, and water efficient showers, washing machines and dishwashers may not be appropriate in some commercial or industrial facilities.

### Rainwater tanks

The installation of rainwater tanks internally connected to replace potable water use is one of the major water saving initiatives that can be undertaken in the domestic sector. The Victorian Government acknowledges the greater efficiency of internally connected rainwater tanks by offering larger rebates than for tanks that supply outdoor water only. However, the majority of existing rainwater tanks are plumbed only for outdoor water use which helps to manage seasonal rainfall fluctuations and water restrictions, while also providing a substitute for potable mains water use. According to Melbourne Water over 25,000 Victorian homes have installed a rainwater tank and received a water-saving rebate, over the 5-year period to May 2008. The water savings from these tanks is around 600 megalitres of drinking water per year<sup>70</sup>. However, the Committee notes that using the number of rebate claims as a predictor of the number of rainwater tanks is a gross underestimate, as research undertaken as part of the Little Stringybark Creek Stormwater Tender suggested that only around 10 per cent of people who install a tank claim the rebate.<sup>71</sup> Furthermore, rainwater tank expert, Dr Peter Coombes informed the Committee, "of the 240,000 rainwater tanks that are in Melbourne ... only seven per cent of those people have taken a rebate."<sup>72</sup>

The cost effectiveness of rainwater tanks depends on rainfall, the area of roof space used for rainwater capture and tank size. Despite the relatively high cost of the water captured and stored in rainwater tanks, public acceptance has been high due to their environmental benefits and ability to be installed in, or retrofitted to, new and existing buildings and a wide variety of building types.

The capture of rain in rainwater tanks also reduces stormwater runoff which has benefits for the environment and waterways (discussed further in Chapter 4).

### Greywater systems

Greywater is recycled water from domestic use in the home. It includes water from baths, showers, hand basins and washing machines. Greywater systems collect and store water for non-potable reuse such as the flushing of toilets and on gardens. Greywater should not be used for watering plants that produce food to be eaten raw. There are two types of greywater systems commonly used in the domestic sector: simple greywater diversions and permanent treated greywater systems.

Simple greywater diversions collect water discharged from washing machines, baths and showers that can be stored for up to 24 hours. The Environmental Protection Authority (EPA) guidelines suggest that untreated greywater should be used within 24 hours of its capture and unused water discharged into the sewer system otherwise there is a risk of bacterial growth.

Permanent treated greywater systems filter water of bacteria and other impurities, except salt which requires desalination. Treated greywater systems are more costly but the water can be used safely for gardening purposes and can be stored for longer, up to a month. To be eligible for a government rebate, all permanent greywater systems must be installed by a licensed plumber, include a Plumbing Industry Commission certificate and be compliant with EPA regulations. Some municipal councils may require an additional permit.

Improving the water efficiency of buildings is an effective means of water conservation because it achieves permanent conservation independently of

<sup>70</sup> Melbourne Water, 'Stage 3a Water Restrictions - Questions and Answers: How much water does using rainwater tanks actually save?' viewed 25 May 2009, <<http://www.melbournewater.com.au>>.

<sup>71</sup> Chris Walsh and Tim Fletcher, *Mt Evelyn Rainwater Tank & Stormwater Survey*, 2007, p. 6.

<sup>72</sup> P. Coombes, Director, Bonacci Water, *Transcript of evidence*, Melbourne, 16 March 2009, p. 16.

behavioural changes which can be difficult to maintain over a long period. However, achieving a sufficient improvement in the quantity of water efficient buildings to significantly reduce pressure on Melbourne's water supplies will take time and require a significant upfront capital investment.

In his submission to the Inquiry the Commissioner for Environmental Sustainability, Dr Ian McPhail, highlighted the magnitude of water efficiency gains that can be made during the design and building phase of new buildings:

Water consumption and the potential for water savings is also determined through the whole cycle of land-use planning, building, owning and furnishing a house. Of the total gains in the water use efficiency possible, up to 80% can be made or lost in decisions taken by the developer and builder [the remaining 20% of gains are made by owners and occupiers]. These findings highlight the importance of incorporating water use efficiency into planning procedures..., household design (e.g. Five Star Building standard), and mandating water-efficient appliances.

Water use efficiency of existing buildings, both residential and non-residential, also needs to be addressed in the context of social equity. 92% of Victoria's existing housing stock were constructed before the 5 Star Building Standard was introduced in 2004.<sup>73</sup>

## Water efficiency rating systems

Water efficiency rating systems allow consumers to make more informed choices when purchasing water-using products, houses and non-residential buildings. They also allow for governments to set minimum standards or to mandate the use or installation of efficient products. Rating systems may also promote the development of water efficient products.

At the national level the Water Efficient Labelling and Standards (WELS) scheme provides a nationally comparable rating tool for a range of water-using fixtures and appliances. The WELS scheme applies mandatory water efficiency labelling and minimum performance standards to household water-using products. The WELS Water Rating label is mandatory for showers, washing machines, dishwashers, toilets and taps. WELS labels include a star rating (from one to six) for comparative assessment of the product's efficiency and an estimate of the water consumption of the product. WELS also applies minimum mandatory water efficiency standards, currently only for specified toilet equipment.<sup>74</sup>

Under the WELS expansion program the Commonwealth Department of Environment, Heritage and the Arts will mandate minimum performance standards for existing WELS products, and expand the WELS scheme to include additional products. New products to be considered for WELS labelling are:

- evaporative air conditioners;

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<sup>73</sup> I McPhail, Commissioner for Environmental Sustainability, *Submission*, no. 105, 15 November 2008, p. 13.

<sup>74</sup> Department of Sustainability and Environment, *H2OME: A guide to permanent water savings in your home*, Victorian Government, Melbourne, 2008, p. 12.

- instantaneous gas hot water heaters;
- hot water recirculators; and
- domestic irrigation controllers.<sup>75</sup>

The WELS expansion program is currently underway and expected to be complete in 2010.<sup>76</sup>

In its 2005 Inquiry into Sustainable Communities, the previous Environment and Natural Resources Committee called for stronger minimum standards for washing machines:

A national mandatory Water Efficiency Labelling Standards (WELS) scheme has been introduced. The Committee was advised that further significant water saving benefits would arise from the introduction of minimum efficiency standards for washing machines in Victoria. Therefore the Committee has recommended that the Victorian Government introduces a minimum efficiency standard for washing machines and seek to have a minimum standard for washing machines included in the national WELS scheme.<sup>77</sup>

The Victorian Government response to this recommendation was to support the introduction of a minimum efficiency standard for washing machines and support the inclusion of a minimum efficiency standard for washing machines as part of the WELS scheme 'subject to national processes', see Appendix 6.

While the Victorian Government offers a range of rebates for water saving fixtures and appliances, rebates do not apply for all WELS listed products. The Committee recognises the opportunities to extend the rebate scheme to include all water efficient products with a WELS four star or higher rating.

Currently in Victoria there is no dedicated rating system for water efficiency as there is for energy efficiency. House Energy Rating Software programs, compliant with the Building Code of Australia, calculate energy efficiency ratings on the energy saving characteristics of the building envelope. It does not include indoor fittings and appliances. Energy ratings are on a scale of zero to ten stars with ten stars representing a zero energy requirement.

Performance-based standards, such as mandatory minimum star ratings, provide flexibility – allowing builders and designers a wide choice of features to achieve a regulated standard, and potentially fittings, although fittings are not included in Victorian energy ratings. Since June 2005 all new Victorian houses were required to achieve a five star energy rating or higher. From 1 May 2008

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<sup>75</sup> Australian Government, 'Water Efficiency Labelling and Standards (WELS) Scheme: Expanding the WELS Scheme', viewed 25 May 2009, <<http://www.waterrating.gov.au/expansion/index.html>>.

<sup>76</sup> National Water Commission, 'Water efficiency labelling and standards (WELS) scheme - phase 2', viewed 25 May 2009, <<http://www.nwc.gov.au/www/html/507-water-efficiency-labelling-and-standards-wels-schemephase-2.asp>>.

<sup>77</sup> Environment and Natural Resources Committee, *Inquiry into Sustainable Communities*, Parliament of Victoria, Melbourne, 2005, p. xxv.

coverage of the five star energy standard was extended to include the 40,000 houses renovated, extended or relocated in Victoria each year.<sup>78</sup>

Since July 2004, New South Wales has had the Building Sustainability Index (BASIX) rating system. BASIX is a web-based design tool that ensures each new residential dwelling design meets the NSW Government's mandatory targets of a 40 per cent reduction in water consumption and a 25 per cent reduction in greenhouse gas emissions, compared with the average home. The features of a house that are rated are:

- landscape: area of vegetation and number of indigenous species;
- stormwater: collection and use of rainwater;
- water: use of recycled water and installation of water-efficient showerheads and tap fittings;
- thermal comfort: glazing and shading details which influence the heating and cooling loads of the dwelling; and
- energy: type of hot water system used and use of cooling and heating systems.<sup>79</sup>

All new residential buildings and modifications with an estimated worth of over \$50,000 require a BASIX rating and certificate prior to approval. In the reporting period from 2005 to 2008, 42,570 houses were approved with BASIX certificates. According to the NSW Government, this has achieved 5.7 gegalitres of water savings with around 98 per cent of new houses using some form of alternative water source (95 per cent rainwater tanks).<sup>80</sup>

Action 3.5 from the *Central Region Sustainable Water Strategy (CRSWS)* states that:

The Government will reform the water component of the 5 star standard for buildings to make it performance based, in line with recommendations of the Victorian Competition and Efficiency Commission. The Government will:

- complete a regulatory impact assessment that considers benchmarks, water saving targets and energy saving targets, to be published in 2007, to ensure there is broad consultation on the new proposals;
- develop and implement a tool along the lines of BASIX, a computerised sustainability assessment tool, to support the new performance-based

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<sup>78</sup> Building Commission Victoria, 'What you need to know about 5 Star for new houses, home renovations and relocations', viewed 25 May 2009, <<http://www.makeyourhomegreen.vic.gov.au/>>

<sup>79</sup> Environment and Natural Resources Committee, *Inquiry into Sustainable Communities*, Parliament of Victoria, Melbourne, 2005, pp. 244-245.; NSW Department of Planning, 'BASIX: Frequently asked questions', viewed 25 May 2009, <<http://www.basix.nsw.gov.au>>.

<sup>80</sup> New South Wales Department of Planning, *BASIX: Single Dwelling Outcomes, 2005-08 Building Sustainability Index, Ongoing Monitoring Program*, NSW Government, 2008, p. 7.

approach, and modify the Victorian building regulatory framework to support the tool; and

- during 2007-08, the Government will explore the feasibility of implementing performance-based water savings requirements for commercial and industrial buildings through the Building Code of Australia.<sup>81</sup>

The CRSWS states that this project will become operational in 2009. The Department of Sustainability and Environment advised the Committee that the Victorian Government is in the process of reviewing options to reform the water component of the five star standard for residential buildings. Any changes that are proposed for regulatory instruments (i.e. the Building Code of Australia and Victorian Plumbing Regulations) will be subject to analysis and community scrutiny through the Regulatory Impact Statement process. The department did not indicate whether it will meet the CRSWS target for implementation in 2009.<sup>82</sup>

The 2005 *Inquiry into Sustainable Communities* noted that rating tools can also be useful in informing home buyers or tenants of the water efficiency of the house they intend to buy or move into:

The requirement to inform home buyers or tenants of the water efficiency of houses and buildings has the potential to raise awareness, influence behaviour and stimulate markets for water efficient appliances and fittings.<sup>83</sup>

The Committee believes that the development of a computerised water efficiency assessment tool along the lines of BASIX would be highly valuable in terms of establishing flexible performance-based standards to apply to all new building developments and alterations, not just residential.

## Mandating water efficiency in buildings

Since July 2005, building and plumbing regulations have required that all new houses, including flats have water efficient showers and taps and comply with Victoria's 5 star building standard for energy.<sup>84</sup> New houses or townhouses are also required to have either a rainwater tank (at least a 2000 litre capacity and be internally connected), a solar hot water heater or be connected to a supply of recycled water provided by a water authority.<sup>85</sup> In 2006, the government

<sup>81</sup> Department of Sustainability and Environment, *Sustainable Water Strategy Central Region: Action to 2055*, Victorian Government, Melbourne, 2006, p. 46.

<sup>82</sup> D. Sheehan, Senior Policy Officer, Office of Water, Department of Sustainability and Environment, *personal communication*, 29 April 2009.

<sup>83</sup> Environment and Natural Resources Committee, *Inquiry into Sustainable Communities*, Parliament of Victoria, 2005, p. xxv

<sup>84</sup> Building Commission, *What you need to know about 5 Star for new houses, home renovations and relocations*, 2008, pp. 3, 4.

<sup>85</sup> Department of Sustainability and Environment, *H2OME: A guide to permanent water savings in your home*, Victorian Government, Melbourne, 2008, pp. 6,10.

predicted that with these measures in place 6.4 gigalitres of water could be saved in the 362,000 new homes built over the next 50 years.<sup>86</sup>

The Committee has received evidence both for and against mandating water efficiency measures in buildings. Debate surrounds the feasibility of certain mandated installations, the equity of mandating water efficiency for new houses only and timeframes for the implementation of the mandates.

Hume City Council supports a range of water efficiency features being included in the Victorian building standards:

New houses should be designed to incorporate rainwater to supply toilet cisterns and washing machines, taking pressure off potable water supplies. This could be achieved through individual or communal water tanks fed by rain gardens from houses and streetscapes incorporated at the subdivision design phase. Greywater systems, water saving shower heads, flow restrictors and dual flush toilets should be incorporated into building standards for new houses.<sup>87</sup>

WaterMark Australia also calls for the regulation of minimum water efficiency standards in all buildings, not just residential, including the use of alternative water sources:

A set of uniform changes to government regulations and building codes is required so that all new building construction produces homes, commercial and public buildings that meet new mandated water efficiency standards covering the use of potable water, stormwater and treated wastewater inside and outside of the building. The changes should include:

- mandating water efficient technology and appliances in households and industry;
- mandating pressure reduction valves;
- regulations minimizing "dead space" between the domestic/industrial hot water service and the main area where water is used;
- fitting of "dead-space" water valves;
- collection and use of stormwater, and where possible the use of treated wastewater and greywater; and
- compulsory reporting and auditing of water used in industries and government facilities.<sup>88</sup>

The Housing Industry Association (HIA) accepts the mandating of some low cost water saving installations in new houses but rejects the viability of rainwater tanks on the basis of cost:

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<sup>86</sup> WaterSmart, *Water Supply-Demand Strategy for Melbourne 2006-2055*, Melbourne, 2006, p. 12.

<sup>87</sup> Hume City Council, *Submission*, no. 80, 2 September 2008, p. 1.

<sup>88</sup> Watermark Australia, *Submission*, no. 63, 29 August 2008, p. 6.

HIA recognises that the installation of water efficient tapware and shower fittings can deliver significant water savings as low cost items to the consumer with a short pay back period. However, the reverse occurs with the installation of a rainwater tank as a capital item as this comes at a significant cost to the homebuyer and with reduced water savings when compared to the low cost items.<sup>89</sup>

**The Urban Development Institute of Australia supports further savings on water usage, however the Institute is concerned that by mandating certain measures innovation will be stifled:**

Many of our developers are already pushing the boundaries to find better measures for saving water. The industry wishes to continue to work with the water authorities to come up with innovative methods on a site by site basis.

The issue that concerns the industry is mandating certain measures such as third pipe schemes as it will stifle innovation where something different to what is mandated may be more appropriate to the particular development. Any regulation needs to remain flexible (guidelines rather than mandatory control).<sup>90</sup>

**The HIA acknowledges that there is, and will remain, a need to build environmentally responsible residential buildings and land developments. However it notes the inequitable nature of mandating water efficiency for new houses only:**

Whilst the housing industry is making a significant effort to introduce water efficiency into new homes the same unfortunately cannot be said for existing housing stock.

HIA believes that the financial burden imposed on new home buyers is an inequitable approach to sharing a community wide problem of resource efficiency, with many purchasers being the first home buyer who can least afford the additional high costs. Commonsense confirms that greater benefit can be achieved through the increased efficiency of Melbourne's 2 million residential dwellings rather than focusing on marginal efficiency improvements on 40,000 new dwellings.<sup>91</sup>

**The Master Builders Association also highlights the inequity between energy and water efficiency requirements for existing housing stock and new housing and calls for universal water efficiency obligations:**

While new homes that are being constructed meet mandated water and energy efficiency requirements, the bulk of the existing housing stock does not. Common differences between existing and new homes include the presence of inefficient showerheads, single flush toilets and outdated and leaky plumbing.

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<sup>89</sup> Housing Industry Association, *Submission*, no. 91, 17 September 2008, p. 4.

<sup>90</sup> Urban Development Institute of Australia, *Submission*, no. 25, 22 August 2008, p. 1.

<sup>91</sup> Housing Industry Association, *Submission*, no. 91, 17 September 2008, p. 4.

As there is such a big discrepancy between the water and energy efficiency performance of new and existing housing stock, Master Builders believes that existing homes should face the same basic regulatory requirements as new homes to ensure that all Victorians meet their water efficiency obligations equally.<sup>92</sup>

**Environment Victoria recommends that water efficiency regulations and programs should apply to all existing building stock:**

This will require regulations and programs that will cover existing buildings of all types, fittings and appliances used within these buildings, and apply to both rental and freehold properties.

The simplest measure to deliver a 'renovation rescue' package for all our buildings, would be for the Victorian Government to require that all buildings meet acceptable environmental performance at the time of sale or lease ... Such an approach would have the added advantage that it would spread the responsibility for improving our building stock across the whole community, not just new home buyers and builders. It would also remove the split incentive that sees many renters and commercial tenants inhabiting buildings with poor water efficiency, but with no incentive or ability to invest in environmental measures.<sup>93</sup>

**WaterMark Australia notes that existing incentives and rebates are not achieving a sufficient take-up of water efficient appliances. Part of its recommended solution is to mandate minimum standards at the point of sale:**

The existing range of incentives and rebates are nowhere near adequate in achieving the quantum improvement in domestic and industrial water efficiency that must take place.

...The rate of take-up of simple water saving technologies such as low-flow showerheads is parlous ... Tens of thousands of new homes are being added to Australia's stock of housing annually, and very few are genuinely water efficient.

...state governments would introduce new regulations covering property sales. These would have the effect of requiring any property that is coming onto the market for sale/re-sale to be already retro-fitted.<sup>94</sup>

**In 2005, the Environment and Natural Resources Committee *Inquiry into Sustainable Communities* recommended an examination of the merits of requiring houses to meet minimum standards at the point of sale or lease:**

The Committee has recommended that the merits of a requirement for houses sold or rented in Victoria to meet minimum water efficiency standards be examined and that the water consumption of local and state government buildings should be displayed in a prominent public area.<sup>95</sup>

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<sup>92</sup> Master Builders Association, *Submission*, no. 104, October 2008, p. 2.

<sup>93</sup> Environment Victoria, *Submission*, no. 58, 29 August 2008, p. 17.

<sup>94</sup> Watermark Australia, *Submission*, no. 63, 29 August 2008, p. 6.

<sup>95</sup> Environment and Natural Resources Committee, *Inquiry into Sustainable Communities*, Parliament of Victoria, 2005, p. xxv.

The Committee also notes that many apartment buildings approved prior to 1988 were not required to have individual water meters for each property.<sup>96</sup> Without individualised water meters, residents pay average water use charges that do not reflect their personal water use. Therefore there is little price incentive to reduce consumption. While the Committee did not receive any evidence in relation to this issue, it does believe an investigation into the number of apartments that are not individually metered would be of value.

## Technological innovation

New water saving products, more efficient products and water substitution technologies are continually being developed and entering the market. Professor John Longford, Director of Uniwater described one such innovative product development that has recently become available: “there are [washing] machines around at the moment that use steam, not water and they are radically more energy-efficient and water-efficient.”<sup>97</sup>

The Committee recognises that technological developments can offer significant water savings to businesses, industry and households.

## Discussion

The Committee concludes that a greater uptake of simple water efficient fixtures and appliances in existing houses is required. In its *Green Light Report*, Sustainability Victoria reported that inefficient showerheads and single-flush toilets are still present in 31 per cent and 12 per cent of Victoria’s total housing stock, respectively.<sup>98</sup> The showerhead exchange program has provided Victorians with an incentive to retrofit houses using water inefficient showerheads since 2003, however participation remains voluntary. Mandatory minimum standards at the point of sale or lease would increase the uptake of such simple water efficient fixtures and appliances.

The Committee notes that at present there is no minimum standard for water efficiency that applies to new, renovated or existing non-residential buildings. The Committee acknowledges that water use requirements are different in non-residential buildings compared with residential, but notes there is a clear need for the responsibility of water conservation to be shared across the community.

The Committee acknowledge that performance based water efficiency standards are a flexible and cost effective means of achieving water efficient houses and public buildings and therefore supports the timely implementation of Action 3.5 of the CRSWS. The Committee prefers the application of performance based water efficiency standards to mandating specific water saving features, with the exception of simple low cost fixtures such as

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<sup>96</sup> Brett Mathieson, Manager, Regulation and Planning, Yarra Valley Water, *personal communication*, 21 April 2009.

<sup>97</sup> J. Langford, Director, Uniwater, Department of Civil and Environmental Engineering, The University of Melbourne., *Transcript of evidence*, Melbourne, 27 October 2008, p. 5.

<sup>98</sup> Sustainability Victoria, *Green Light Report: Victorians and the Environment in 2008*, Victorian Government, 2008, p. 20. The report also notes that in the mid-1990s, legislation banned the sale of single flush toilets in Victoria.

showerheads and dual flush toilets. Mandatory performance based standards allow choices to be made regarding the most appropriate and viable means of achieving efficiency targets. Mandatory targets can also be applied to all building types and uses, whereas prescriptive standards cannot. Additionally, performance standards can be readily altered to achieve greater efficiency as new technologies become available or more viable.

In order to set water efficiency performance standards, an environmental sustainability assessment and rating system for houses and other non-residential buildings, along the lines of BASIX, needs to be established in Victoria.

The Committee notes that on 30 April 2009, the Council of Australian Governments (COAG) reaffirmed its commitment to introducing a comprehensive National Strategy for Energy Efficiency to help households and businesses reduce their energy costs, improve economic productivity and reduce the cost of greenhouse gas abatement under the Carbon Pollution Reduction Scheme.<sup>99</sup>As a first step, COAG agreed to five key measures to improve the energy and water efficiency of residential and commercial buildings across Australia. One such measure was to phase-in mandatory disclosure of residential building energy, greenhouse and water performance at the time of sale or lease, commencing with energy efficiency by May 2011.<sup>100</sup> The Committee welcomes this development.

While new houses and greenfield developments present the most viable opportunities for installing water efficient fixtures, appliances and alternative water supplies, there still remains an upfront capital investment which increases the cost of the development. The Committee acknowledges that although much of this cost will be recovered over time through reduced water bills, and that the pay back periods are likely to decrease as water prices increase, there still remains a degree of inequity in mandating some of the more initially expensive water efficient features only for new houses.

In recognition of the water savings potential of technological advancement, the Committee encourages the Victorian Government to monitor and facilitate the development of new water efficient technologies and where practicable facilitate public and private research and development and implement pilot or demonstration projects that support the development process.

Accordingly, the Committee recommends that:

### **Recommendation 3.13**

**The Water Smart Gardens and Homes Rebate Scheme be extended to all products with a Water Efficient Labelling and Standards star rating of four or higher.**

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<sup>99</sup> Council of Australian Governments, *Council of Australian Governments Meeting: Communique*, Hobart, 2009, p. 7.

<sup>100</sup> *Ibid*, p. 8.

**Recommendation 3.14**

**Simple, low cost water efficient fixtures (e.g. showerheads, flow restrictors, dual-flush toilets) become mandatory for existing houses and non-residential properties at the point of sale or lease.**

**Recommendation 3.15**

**The Victorian Government establish an environmental sustainability assessment and rating system which includes water efficiency. The system should be applied to all new, altered and existing housing types and non-residential buildings at the point of occupation, sale or lease.**

**Recommendation 3.16**

**The Victorian Government investigate ways in which the costs of performance based standards for environmental sustainability, including water efficiency, can be offset for 'affordable housing'.**

**Recommendation 3.17**

**The Victorian Government monitor and facilitate the development of new water efficient technologies and where practicable facilitate research and development and implement pilot or demonstration projects that support the development process.**

### **Water Smart Gardens and Homes Rebate Scheme and other incentives for water efficient products**

The Victorian Government and Melbourne water authorities offer a range of rebates and other incentives for water efficient products to encourage water conservation and efficiency. The *Water Supply-Demand Strategy for Melbourne 2006-2055* states that:

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; and

It is important that incentives are targeted to achieve an overall community benefit and that the cost of the incentive is based on the volume of water saved and the value these savings have in delaying future supply augmentations.<sup>101</sup>

The Victorian Government's Water Smart Gardens and Homes Rebate Scheme was launched in January 2003 with funding of \$10 million over four years to 30 June 2007. It was then extended for a further four years from 1 July 2007 with a further \$20 million. The main objective of the rebate scheme is to reduce demand on urban water supply systems by:

<sup>101</sup> WaterSmart, *Water Supply-Demand Strategy for Melbourne 2006-2055*, Melbourne, 2006, p. 5.

- encouraging improved water use efficiency throughout the home and garden and to change the way water is used in these areas;
- encouraging urban water customers to implement more sustainable water use; and
- increasing community awareness of the importance of saving water around the house and garden.<sup>102</sup>

Since the rebate scheme commenced, over 195,000 rebates have been approved with drinking water savings estimated at 1.85 gigalitres per year. Victoria's urban water customers have received about \$15 million in rebates to 30 June 2008.<sup>103</sup> The rebate scheme is administered by the retail water authorities on behalf of the Victorian Government, in partnership with the Department of Sustainability and Environment.

The rebate scheme allows Victorian residents to claim rebates on products like three-star water efficient showerheads, upgrading to eligible dual flush toilets, garden products, rainwater tanks and systems for reusing household wastewater. Rebates range from \$10 for showerheads to \$1000 for large rainwater tanks connected to indoor appliances. Most rebates are granted to the customer as credits for their future water bills while larger rebates (i.e. greater than \$500) for large rainwater tanks may be paid via a one-off Electronic Funds Transfer or by cheque.

On 10 March 2009, the Minister for Water announced an enhanced rebate on eligible water saving products. Until 31 May 2009 households that spend \$50 on one or more eligible water saving products could claim a rebate of \$30 off their water bill. Prior to the announcement households needed to spend \$100 to claim the \$30 rebate. Eligible products include mulch, compost/mulch bins, trigger nozzles, drip watering systems, garden tap timers, temporary greywater diverters, wetting/moisture agents, shower timers, flow interrupters for toilets and waterless car cleaning products.<sup>104</sup>

To claim a rebate, a licensed plumber must install all rainwater tanks, permanent greywater systems, hot water recirculators, dual-flush toilets and cisterns and tank to the toilet connections. For installations with a total cost (including product, installation and material costs) over \$750 a Plumbing Industry Commission certificate must also be supplied.

In addition, as part of the \$12.9 billion *Water for the Future* plan, the Federal Government is delivering a \$250 million National Rainwater and Greywater

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<sup>102</sup> Victorian Government, *Submission*, no. 54, 29 August 2008, p. 15.

<sup>103</sup> *Ibid*, p. 15.

The approximate one-off cost to the Government for every kilolitre saved from the rebate scheme is \$8.10 in the first year, but following water savings have no cost to the Government (the real cost per kilolitre depends on the life of the water saving product). This estimate is based on the Victorian Government's total rebate outlay divided by its water savings estimate from the rebate products (i.e. \$15 million divided by 1.85 gigalitres per year). It does not include the contribution paid by the consumer, which may be far greater than the rebate amount.

<sup>104</sup> T. Holding, Minister for Water, 2009, 'Victorians get cash back for water saving', *Media Release*, 10 March 2009.

Initiative to encourage the collection and reuse of rainwater and greywater. On 30 January 2009 the Federal Minister for Climate Change and Water announced that the Australian Government is offering rebates of up to \$500 to households for the purchase and installation of either:

- a new rainwater tank which is connected for internal reuse of the water for toilet and/or laundry use; or
- a permanent greywater treatment system.

The Committee notes from the submissions it received, that rebates on water efficient products are generally supported as a cost effective way of helping to reduce household water consumption. Some stakeholders argued that rebates were not high enough to sufficiently encourage wide-scale adoption of water efficient products, while other submissions called for additional products to be included on the product eligibility list. On the other hand the Housing Industry Association notes that the majority of rebates are inequitable because they are only available for existing housing while new houses are more strictly regulated:

The majority of rebates being offered by both the Federal and State governments are aimed at existing homes. The principle of rebates is to facilitate the purchase of efficient products which have an upfront cost that is prohibitive when compared with other available products. Presently, state rebates are focused primarily on water conservation, covering rainwater tanks, taps and toilets and some appliances (Victorian rebates unfortunately exclude washing machines).

The majority of water rebates are only available to the existing home owner. This approach is inequitable as not only should this be available to new home owners, in particular first home buyers, but there are some circumstances where this approach could be usefully extended to both the land developer, in the case of alternative water supply schemes and the owners of rental properties. It is also important that rebates do not unnecessarily lead to an increase in the price of the product being promoted.

HIA believes government attention should be focused to resolve the present disparity between the responsibility of new homes to meet environmental benchmarks and performance of existing homes.<sup>105</sup>

**Hume City Council called for rebates to be extended to the commercial and industrial sectors:**

Rebates should be made available to businesses that incorporate rainwater tanks, raingardens and low water-use landscaping into their buildings in order to reduce their need to draw on the potable water supply.

Water saving equipment and technology should be subsidised for non-residential water customers whose daily operations requires potable water usage in excess of 10 ML per annum.<sup>106</sup>

<sup>105</sup> Housing Industry Association, *Submission*, no. 91, 17 September 2008, p. 5.

<sup>106</sup> Hume City Council, *Submission*, no. 80, 2 September 2008, p. 2.

Mr Brian McGuire and Ms Freya Headlam's submission outlined their personal experience of installing a rainwater tank and commented on the relative inadequacy of the rebate received:

Our ability to lower our home water consumption was greatly assisted by installing a rainwater tank and various piping installations, mostly for garden watering, costing us well over \$1,000 for materials plus weeks of labour. However the only rebate available, of \$150 for the tank, seems somewhat pathetic as an incentive to encourage greater efficiency of water use.

We believe higher rebates are needed for the costs of equipment and installation of tanks and recycling set-ups.<sup>107</sup>

Hume City Council also called for subsidies to be available for a wider variety of products to encourage retrofits of existing houses:

Rebates should be made available to existing households to encourage retrofits. Subsidies should be made available for households that plant indigenous species, create a raingarden or plant a low water-use garden, utilise mulch or use water saving crystals.<sup>108</sup>

Two pool cover suppliers called for rebates on pool covers which reduce pool water evaporation. The Sealed Air Corporation noted that the Western Australian and Queensland Governments currently provide rebates on pool covers and recommended that a similar rebate be offered in Victoria:

The Western Australian Government and Queensland Government provide a substantial cash rebate to pool owners fitting an Approved Smart WaterMark solar pool cover. NSW Government and the South Australian Government, whilst not offering rebates, have mandated pool covers as compulsory for all new pools.

The benefits – social, economic and environmental – will be gained by the people of Victoria through significant conservation of water.<sup>109</sup>

Daisy Pool Covers claims that: 'A rebate scheme of \$100 to \$200 per swimming pool cover installation would see (in our experience) a tremendous public response ... to the uptake of swimming pool covers'.<sup>110</sup>

Some economists would argue that a flat rebate (i.e. the Water Smart Gardens and Homes Rebate Scheme) may not be the most economically efficient mechanism, because it does not allow government to purchase public good benefits necessarily at the 'least possible cost'. More flexible market-based instruments are available,<sup>111</sup> such as the Victorian Government's EcoMarkets and BushTender program.<sup>112</sup> Ideally, rebate schemes should have significant

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<sup>107</sup> B. McGuire and F. Headlam, *Submission*, no. 24, 22 August 2008, p. 2.

<sup>108</sup> Hume City Council, *Submission*, no. 80, 2 September 2008, p. 1.

<sup>109</sup> Sealed Air, *Submission*, no. 41, 27 August 2008, p. 2.

<sup>110</sup> Daisy Pool Covers, *Submission*, no. 37, 26 August 2008, p. 2.

<sup>111</sup> D. Bos, et al. S, *Restoring urban streams through the management of stormwater at the catchment scale*, Melbourne, 2009.

<sup>112</sup> Department of Sustainability and Environment, *EcoMarkets: Valuing Our Environment*, Victorian Government, Melbourne, 2008.

input from expert economists, to ensure that their design represents the most economically efficient outcome.<sup>113</sup>

## Other incentives

Rebates are just one type of incentive the government and water authorities have adopted to encourage water conservation and efficiency. Other incentive-based programs include the showerhead exchange program, green loans and tax incentives.

On average 30 per cent of all household water usage is in the shower.<sup>114</sup> A family of three can save 25,000 litres of water per year by replacing an old inefficient showerhead with a water efficient showerhead. Water efficient showerheads are one of the cheapest and most effective ways to reduce household water use. Water efficient showerheads can also save households up to \$60 per year on water and energy bills.<sup>115</sup>

Since 2003, the Victorian Government in collaboration with water authorities has distributed more than 250,000 free three star water efficient showerheads in exchange for their old, inefficient models as part of the Showerhead Exchange Program.<sup>116</sup> This voluntary program is available to tenants and landlords as well as owner occupiers across the state. Customers can arrange a free showerhead exchange with their local water authority or retailer.

Financial incentives such as green loans and tax breaks are increasingly being considered as an additional means of encouraging energy and water efficiency investments.<sup>117</sup> To date, most attention has been given to energy efficiency as governments move towards a carbon trading scheme. However, water efficiency and energy efficiency are closely linked. For example, water efficient showerheads and flow restrictors conserve the quantity of hot water used, therefore reducing the energy required to heat the water.

The Federal Government has recently released a five year \$175 million Green Loans Program<sup>118</sup> to assist residents install solar, water saving and energy efficient products. From 1 July 2009, the Green Loans Program will provide:

- household sustainability assessments; and
- access to low interest Green Loans of up to \$10,000 each.

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<sup>113</sup> T. Fletcher, Institute for Sustainable Water Resources, Department of Civil Engineering, Monash University, *personal communication*, 18 May 2009.

<sup>114</sup> WaterSmart, *Water Supply-Demand Strategy for Melbourne 2006-2055*, Melbourne, 2006, p. 15.

<sup>115</sup> South East Water, 'Showerhead exchange', viewed 25 May 2009, <<http://www.sewl.com.au>>.

<sup>116</sup> Victorian Government, '250,000 Showerheads exchanged', viewed 25 May 2009, <<http://www.ourwater.vic.gov.au>>.

<sup>117</sup> J. Brumby, Premier of Victoria, 'Interest free loans for rainwater tanks', *Media Release*, 14 May 2009.

<sup>118</sup> The 2008-09 Federal Budget initially allocated \$300 million over five years to the Green Loans Program, however funding was reduced to \$175 in the 2009-2010 Budget. Commonwealth of Australia, *Portfolio Budget Statements 2009-10: Budget Related Paper No. 1.6 - Environment, Water, Heritage and the Arts Portfolio*, 2009, p. 28.

The program will help households who choose to undertake water and energy efficiency actions, by reducing the cost of loans of up to \$10,000 made available through partnering financial institutions.<sup>119</sup>

Some banks and financial institutions offer home loan products that provide interest rate discounts for homes that install water conservation measures.<sup>120</sup> Discounted loans have significant potential to encourage water efficiency investment at the building design or development stage as well as at the point of sale for both new and existing houses. These opportunities should be further explored.

Tax incentives to encourage water efficient investments are emerging overseas, for example in the United States of America.<sup>121</sup> Tax incentives offer significant opportunities to encourage water efficient investments in both the residential and non-residential sectors. The Australian Conservation Foundation calls for, "financial and taxation incentives to encourage landlords to retrofit properties to improve energy and water efficiency."<sup>122</sup>

## Discussion

The wide-spread roll-out of water efficient products clearly helps to achieve long term water conservation and efficiency objectives. Financial incentives such as rebates and subsidies are cost effective ways of sharing the financial burden between the government and the water user, who also benefits from the cost savings of reduced water bills. The extent to which the government funds the rebate scheme, the size of the rebate, the variety of eligible products and the eligibility of the rebate applicant are subject to debate. The Committee received a number of submissions calling for extensions to the scheme, all of which have cost implications.<sup>123</sup>

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<sup>119</sup> Australian Government, 'Green Loans', viewed 25 May 2009, <<http://www.environment.gov.au/greenloans/index.html>>.

<sup>120</sup> The following financial institutions have signed a Deed of Agreement with the Australian Government to develop Green Loans products:

MECU (Municipal Employees Credit Union)

Community First Credit Union

Maleny and District Community Credit Union

New England Credit Union

Old Gold Credit Union

Note that no products are available at this time and the availability of product to the market is dependent upon what kind of loan facility is the best fit for a given financial institution as well as the individual organisation's own circumstances, resources and internal capacity.

Australian Government, 'Green Loans: Financial Institutions', viewed 25 May 2009, <<http://www.environment.gov.au/greenloans/about/finance.html>>.

<sup>121</sup> US Environment Protection Agency, 'Energy Star: Federal Tax Credits for Energy Efficiency', viewed 26 May 2009, <[http://www.energystar.gov/index.cfm?c=products.pr\\_tax\\_credits](http://www.energystar.gov/index.cfm?c=products.pr_tax_credits)>.

<sup>122</sup> Australian Conservation Foundation, 'Energy incentives for households must start now', viewed 25 May 2009, <[http://www.acfonline.org.au/articles/news.asp?news\\_id=1481&c=62450](http://www.acfonline.org.au/articles/news.asp?news_id=1481&c=62450)>.

<sup>123</sup> Housing Industry Association, *Submission*, no. 91, 17 September 2008, p. 5; Hume City Council, *Submission*, no. 80, 2 September 2008, pp. 1, 2; B. McGuire and F. Headlam, *Submission*, no. 24, 22 August 2008, p. 2; Sealed Air, *Submission*, no. 41, 27 August 2008, p. 2; Daisy Pool Covers, *Submission*, no. 37, 26 August 2008, p. 2; Urban Development Institute of Australia, *Submission*, no. 25, 22 August 2008, p. 1.

From the government's perspective, rebates represent water savings. Therefore the value of the rebate should be linked to a product's efficiency or water saving potential rather than the type of product. For example, the same rebate is available for a three-star rated showerhead as four star showerheads however the four star showerhead could attract a higher rebate to encourage its purchase over the less efficient three star showerhead.

The Committee believes that there are significant water saving opportunities that could be captured by expanding the rebate scheme beyond the residential sector to community institutions, businesses and industry. Additionally, the Victorian Government should regularly monitor new water efficient products and evaluate their water saving value for inclusion in the scheme.

The Committee notes that washing machines account for around 14 per cent of household water use<sup>124</sup> and the government encourages residents to buy water efficient washing machines, yet washing machines are not covered under the rebate scheme. Efficient front-loading machines typically use up to 50 per cent less water than regular machines.

The Committee notes that funding doubled for the second four year phase of the rebate scheme and recommends funding continue to be allocated to promote water conservation and efficiency.

The Committee recognises that the voluntary roll out of water efficient showerheads will become increasingly difficult under the current Showerhead Exchange Program as some people have a preconceived aversion to using water efficient showerheads or are unable or unwilling to voluntarily take up the offer for a number of other reasons. The Committee predicts that the effectiveness of the program will diminish as the cost of the program exceeds the value of the water savings achieved.

The Committee also recognises that the water saving potential of the Showerhead Exchange Scheme could be enhanced by offering four star rated showerheads, instead of three star. This may require an expansion of the rebate scheme for showerheads to cover the additional costs of the more efficient showerheads.

To enhance the uptake of water efficient products through the rebate scheme and other incentives schemes, a sufficient level of community knowledge needs to be achieved through a comprehensive information and education program. Therefore, the Committee acknowledges the link between the government's behavioural change programs and the rebate scheme and other incentive schemes.

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<sup>124</sup> WaterSmart, *Water Supply-Demand Strategy for Melbourne 2006-2055*, Melbourne, 2006, p. 15.

Accordingly the Committee recommends that:

**Recommendation 3.18**

**The Water Smart Gardens and Homes Rebate Scheme be extended to include a greater range of water efficient and water conservation products, for example front loading washing machines.**

**Recommendation 3.19**

**The rebate paid under the Water Smart Gardens and Homes Rebate Scheme be directly linked to a product's water efficiency or potential water savings.**

**Recommendation 3.20**

**The Victorian Government monitor the ongoing effectiveness of the Showerhead Exchange Program and consider moving to a more proactive (e.g. offering free door-to-door retrofits) or mandatory roll out of the program.**

**Recommendation 3.21**

**The Victorian Government mandate the use of pool covers for all outdoor domestic pools.**

**Recommendation 3.22**

**The Victorian Government consider alternative financial incentive models, such as green loans, to further encourage water conservation and efficiency.**

## Water efficiency programs in the non-residential sector

In the *Central Region Sustainable Water Strategy*, the government committed to work with industry to reduce non-residential water usage in Melbourne by at least one per cent per year on current usage, that is, an estimated saving of eight gigalitres per year by 2015.<sup>125</sup> In 2007-08 alone the sector reduced overall consumption by eight gigalitres.<sup>126</sup>

The non-residential sector accounts for around 30 per cent of Melbourne's water demand.<sup>127</sup> However, as discussed earlier in this chapter, behavioural change programs and financial incentives, such as rebates are primarily focused on residential water users. While water restrictions still apply to businesses and industry, they are not specifically targeted to many industrial water uses, for example water used in manufacturing, or for the cooling

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<sup>125</sup> Department of Sustainability and Environment, *Sustainable Water Strategy Central Region: Action to 2055*, Victorian Government, Melbourne, 2006, pp. 40, 92.

<sup>126</sup> Victorian Government, 'Business & Industry', viewed 22 May 2009, <<http://www.ourwater.vic.gov.au/saving/industry>>.

<sup>127</sup> WaterSmart, *Water Supply-Demand Strategy for Melbourne 2006-2055*, Melbourne, 2006, p. 14.

requirements of energy production. To date, the government has targeted large industrial water users with a range of specific programs, and less attention has been directed towards the many businesses with more moderate water needs.

The Victorian Government initiatives to encourage the non-residential sector to become more water efficient include:

- the Pathways to Sustainability program which requires all non-residential customers that use more than 10 megalitres of potable water a year to develop a water management action plan (WaterMAP) to identify ways to conserve water. The program involves over 1,250 organisations in the Melbourne area and aims to save up to five gigalitres annually;
- since January 2008, the EPA has required all organisations using more than 100 megalitres of water a year to develop an Environmental and Resource Efficiency Plan to improve water and energy use and to reduce waste;
- installation of smart water meters for Melbourne's top 200 water users;
- annual water reporting by water corporations on significant water users. These users are named in Parliament as part of the annual reporting process, although the level of water use by individual corporations is not disclosed; and
- analysing (benchmarking) water use to build a picture of how water is used by industry and where savings can be made.<sup>128</sup>

The Essential Services Commission is also considering pricing options to encourage sustainable water use by industry as part of the metropolitan water corporation Water Plan reviews.<sup>129</sup> At present, non-residential water users are subject to a standard usage dollar per kilolitre consumption charge.<sup>130</sup> This contrasts with the rising-block pricing structure for residential customers.

As noted above, under the *Water Act 1989* and *Water Industry Act 1993* and in satisfying Melbourne water authorities' Permanent Water Savings Rules, all non-residential customers consuming more than 10 megalitres per annum are required to develop Water Management Actions Plans (WaterMAP).<sup>131</sup> Penalties apply for non-residential customers who fail to comply. Commencing in 2007, the \$2 million, four-year program requiring large business and industrial water users to:

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<sup>128</sup> Victorian Government, 'Business & Industry', viewed 22 May 2009, <<http://www.ourwater.vic.gov.au/saving/industry>>; Department of Sustainability and Environment, *Our Water Our Future: The Next Stage of the Government's Water Plan*, Victorian Government, Melbourne, 2007, p. 13.

<sup>129</sup> Essential Services Commission, *Metropolitan Melbourne Water Price Review 2009 - Draft Decision*, Melbourne, 2009, p. 95.

<sup>130</sup> *Ibid*, p. 135.

<sup>131</sup> Victorian Government, *waterMAPs: Securing Victoria's water supplies*, Melbourne, 2007, pp. 1, 2.

- assess their water usage;
- identify inefficiencies and opportunities for water savings;
- prepare an action plan to implement water conservation activities; and
- annually report on the implementation of water conservation activities.<sup>132</sup>

Water authorities recommend that businesses seek to achieve a ten per cent reduction in water use through the implementation of their WaterMAP. In July 2008, 100 per cent compliance with WaterMAP was achieved.<sup>133</sup> Since 2001, the Pathways to Sustainability program has achieved water savings of over six gigalitres, representing a 13 per cent efficiency gain.<sup>134</sup>

In January 2008 the Victorian Government introduced the Environment and Resource Efficiency Plan (EREP) program to assist businesses reduce water and energy consumption and waste generation. Under the *Environment Protection (Amendment) Act 2006*, the EREP requires that all commercial and industrial sites in Victoria that use more than 120 megalitres of water and/or 100 TeraJoules of energy in a financial year are required to register with the EPA. The EREP requires the businesses to annually report on resource use data and progress made.<sup>135</sup> In addition, the EPA publicly lists registered businesses and their operational sites that use more than 120 megalitres of water and/or 100 TeraJoules of energy in a financial year.<sup>136</sup>

The EREP is additional to WaterMAP. The EPA and DSE aim to align the two programs to avoid duplication of processes while water authorities will work with customers and the EPA to develop a WaterMAP that meets the requirements of the EREP program.<sup>137</sup> DSE advised the Committee that non-residential water customers having to complete both WaterMAPs and EREPs will only be required to complete an EREP.<sup>138</sup> The water component of this plan will then suffice as a completed and updated WaterMAP.<sup>139</sup>

Additionally, Melbourne's water retailers facilitated the installation of 'smart' water meters for Melbourne's top 200 water users. Smart water meters monitor water use in real time and help customers better understand their water consumption patterns. Monitoring can help to identify leaks and other abnormalities and improve water conservation practices. This leads to more efficient decision making when investing in water-saving equipment and

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<sup>132</sup> Victorian Government, 'Business and Industry: waterMAP', viewed 26 May 2009, <<http://www.ourwater.vic.gov.au/saving/industry/watermap>>.

<sup>133</sup> Victorian Government, *Submission*, no. 54, 29 August 2008, p. 16.

<sup>134</sup> Victorian Government, *waterMAPs: Securing Victoria's water supplies*, 2007, p. 2.

<sup>135</sup> Environment Protection Agency, 'About Environment and Resource Efficiency Plans', viewed 26 May 2009, <<http://www.epa.vic.gov.au/bus/erep/default.asp>>.

<sup>136</sup> *Ibid.*

<sup>137</sup> Victorian Government, *waterMAPs: Securing Victoria's water supplies*, 2007, p. 3.

<sup>138</sup> D. Sheehan, Senior Policy Officer, Office of Water, Department of Sustainability and Environment, *personal communication*, 29 April 2009.

<sup>139</sup> *Ibid.*

encourages water conservation and the use of recycled water. The roll out of smart meters was completed in 2008.<sup>140</sup>

The Smart Water Fund is an initiative of Melbourne's water authorities in partnership with the Victorian Government. The Smart Water Fund is available to both residential and non-residential sectors and encourages innovation in water recycling, water conservation and bio-solid management. The Smart Water Fund has made approximately \$23 million available over five previous funding rounds; supporting over 120 innovative sustainable water use projects.<sup>141</sup> The potential combined water savings of these projects is more than 1.5 gigalitres a year.

## Discussion

The Committee concludes that the government has appropriately targeted the biggest non-residential water users with a range of water conservation and efficiency initiatives. These initiatives recognise the highly variable operating environments that businesses and industry face and offer flexibility in approaches to water conservation. The Committee notes that while residents have experienced water restrictions and reduced their water consumption by 34 per cent, water use in the non-residential sector has also been reduced by similar amounts, that is, 38 per cent compared to the 1990s average.

However, the Committee concludes that water conservation and efficiency measures should also apply to small and medium sized non-residential water users, that is, those using less than 10 megalitres per year. Beyond water restrictions, there are no water conservation and efficiency initiatives aimed at this component of the non-residential sector. The Committee believes that this sector may have the potential to achieve significant cost effective water savings.

The Committee also notes that many water efficient installations and conservation behaviours that apply to residential customers, may also be relevant to non-residential customers. For example, every business can use less water by installing dual-flush toilets, turning off taps and installing hot water recirculators. In some businesses, fitting three-star rated showerheads and or using efficient washing machines may also be appropriate.

Accordingly, the Committee recommends that:

### **Recommendation 3.23**

**The Victorian Government and water authorities develop a strategy to encourage water conservation and efficiency in the non-residential sector, especially for small to medium sized water users.**

### **Recommendation 3.24**

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<sup>140</sup> Ibid.

<sup>141</sup> Smart Water Fund, 'Questions & Answers about the Smart Water Fund', viewed 26 May 2009, <<http://www.smartwater.com.au/mainf.asp>>.

## The Victorian Government extend the eligibility of the Smart Gardens and Homes Rebate Scheme to non-residential water users.

### Water pricing to encourage water saving

Water pricing presents further opportunities to directly and indirectly influence water conservation and efficiency of use. Water consumption may be directly influenced by increased prices, however the responsiveness of water demand to price changes is expected to be fairly low due to the inelastic nature of water pricing. Increased prices also have an indirect influence by making the relative cost of alternative or substitute water cheaper. However, using water pricing to encourage water savings is more complex than simply increasing the price of consumption. Revenue security, incentives and equity issues also need to be considered.

The National Water Commission emphasises the importance of responsible water pricing:

Water prices convey important signals to customers. Getting water charging and institutional arrangements right is critical to ensuring that water is used wisely and that new sources of water supply are brought on in a timely fashion.<sup>142</sup>

Melbourne's water charges reflect the cost of providing water services and are also an important source of revenue for investment in infrastructure. Given the extensive water infrastructure investment plans outlined in the Victorian Water Plan, water charges are expected to double in real terms by 2012.<sup>143</sup>

Residential water pricing is currently structured in the form of a two-part tariff whereby customers pay: *fixed service charges* for the provision of water and sewerage services; and *usage charges* based on the volume of water used and sewage discharged from the property.<sup>144</sup> In October 2004, a reform to Melbourne's water pricing structure was introduced based on the concept of a three tiered *rising block tariff*, or inclining block tariff. The pricing framework comprises three blocks or steps, with the first step being based on an approximate essential indoor use of up to 440 litres per day. The second step is more reflective of a discretionary use level, of up to 880 litres per day. The third step incorporates a seasonal element, that is, the summer period during which many consumers use more than 880 litres per day. In theory, the rising block structure creates an incentive for water conservation because the more water used, the more expensive the water becomes.

At present, non-residential water customers do not have rising block tariffs, instead their water charges are based on a fixed fee per kilolitre.

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<sup>142</sup> National Water Commission, 'Water pricing', viewed 26 May 2009, <<http://www.nwc.gov.au/www/html/258-introduction-water-pricing.asp>>.

<sup>143</sup> Department of Sustainability and Environment, *Our Water Our Future: The Next Stage of the Government's Water Plan*, Victorian Government, Melbourne, 2007, p. 27.

<sup>144</sup> Yarra Valley Water, 'Account charges explained - Residential water pricing', viewed 26 May 2009, <<http://www.yarravalleywater.com.au/yvw/YourHome/YourAccount/AccountChargesExplained/>>.

## Pricing review and regulation

Under their Statements of Obligations, Melbourne's three water retailers and Melbourne Water are required to submit individual Water Plans to the Essential Services Commission (ESC). These Water Plans outline the water authorities' service standards, the revenue required to deliver services, and the prices proposed to generate sufficient revenue. The ESC reviews the pricing proposals to ensure that they align with the Water Industry Regulatory Order (WIRO) pricing principles before the proposed pricing schedules can be agreed upon and finalised. In its submission, the ESC explains how the WIRO pricing principles are applied to determine the water price and pricing structure:

Principles 14(1)(vi), (vii) and (ix) relate directly to the structure of the tariffs levied by businesses and how costs are allocated across customers. The other regulatory principles are relevant to determining and assessing the revenue required by the water businesses to meet their regulatory obligations and customer expectations. The amount of revenue approved for each business, the level and structure of prices, and the allocation of costs across customers determined in accordance with these principles for Melbourne Water and the three metropolitan retailers will have an impact on Melbourne's water supply management, demand levels, the supply/demand balance and investment incentives.<sup>145</sup>

The Committee notes that WIRO pricing principle 14(1) (vi) regulates prices to ensure they provide incentives for the sustainable use of Victoria's water resources by providing appropriate signals to water users.<sup>146</sup> At the public hearing on 2 February 2009, Mr Sean Crees, Director of Water Regulation at the ESC, advised the Committee that:

The commission will assess the extent to which the [water authority's] water plan complies with the WIRO principles. These can be summarised as being in basically two categories. One is that prices collectively recover the costs of delivering outcomes — that is, all the prices for all the services raise enough money for the water business to deliver those outcomes. The other is that prices individually are required to send signals to customers regarding the cost of providing water services. This is generally done through the level of variable charges that really reflect the margin of cost of providing our water services.<sup>147</sup>

In April 2009, the ESC released its *Metropolitan Melbourne Water Price Review Draft Decision*. In its decision the Commission has made some changes to the cost estimates of major projects and ongoing operating expenditure. For example:

Total revenue requirement for the water businesses has been reduced by 5.7% due to a re-estimate of the cost of capital and trimming of costs deemed to be inefficient. Since making their plans, retailers have revised their expectations for the easing of water restrictions in the

<sup>145</sup> Essential Services Commission, *Submission*, no. 13, 14 August 2008, p. 2.

<sup>146</sup> *Ibid*, p. 3.

<sup>147</sup> S. Crees, Director, Water Regulation, Essential Services Commission, *Transcript of evidence*, 2 February 2009, p. 3.

near future. The Commission has [also] suggested that businesses adjust their tariff structures to put more emphasis on variable water charges. The price rises predicted in the water plans have been curbed under the Commission's assessment.<sup>148</sup>

## Increasing charges for water

The Victorian Water Plan proposes a major investment in Melbourne's water infrastructure. In line with the *Our Water Our Future* principle that water users should pay the full cost, including infrastructure, delivery and environmental costs associated with water services, the construction and increased operating costs of the infrastructure will be met by Melbourne's water authorities and be funded mostly by increased customer charges.<sup>149</sup>

Although starting from a low base in comparison to other Australian cities, the planned increase in water bills can be expected to have some effect on water demand, particularly in the non-residential sector.

The Committee received a number of submissions supporting water price increases.<sup>150</sup> For example, the Master Builders Association supports an increase in water pricing to encourage water conservation as long as it is supported by appropriate welfare safeguards:

Exposing metropolitan households to the true cost of water is an important step in preserving Victoria's valuable water resources. Due to the fact that access to water has been so abundant and cheap in the past, consumers have had little regard for their excessive consumption habits.

In order to rapidly affect water consumption behaviour, the price of residential water must be increased to reflect the true value of this diminishing resource. As with any price increases, the State Government must be sensitive to the impact that price rises will have on some sectors of the community and welfare provisions should be provided to these people.

Raising the price of water is a quick, yet effective tool the State Government can use to artificially restrict superfluous residential water consumption. Master Builders supports the State Government increasing the price of metropolitan water to encourage responsible consumption habits.<sup>151</sup>

However, the effectiveness of pricing to directly influence demand has also been questioned during a period of severe water restrictions. Under Stage 3a restrictions, Melbourne's water customers have already significantly reduced their discretionary water use and so their demand for water is highly inelastic. Inelastic demand means that small price increases will have little or no effect on reducing demand. Furthermore, because the proposed water price increases are starting from an existing low base compared with other

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<sup>148</sup> Essential Services Commission, *Fact Sheet 1 - Metropolitan Water Price Review Draft Decision*, 2009, p. 1.

<sup>149</sup> Department of Sustainability and Environment, *Securing Our Water Future Together*, Victorian Government, Melbourne, 2004, p. 7.

<sup>150</sup> G. Harrison, *Submission*, no. 8, 29 July 2008, pp. 3, 4.; R. Friday, *Submission*, no. 26, 22 August 2008, p. 1.

<sup>151</sup> Master Builders Association, *Submission*, no. 104, October 2008, p. 4.

Australian cities' charges and other utility charges,<sup>152</sup> even a significant price increase may still not have much of an effect on reducing demand. However, for most products where demand is inelastic, there is a point or price where demand begins to respond with greater elasticity to further price changes. There are no estimates on the demand impact of doubling the price of water.

In its 2005 *Inquiry into Sustainable Communities*, the previous Environment and Natural Resources Committee reported the following on price setting as a means to manage water demand:

The Committee received conflicting evidence regarding the use of water pricing as a means of managing consumption. Household water is an inelastic commodity until substantial price increases are made, as has been the case in Denmark and Hungary. In Melbourne a rising block tariff was introduced on 1 October 2004 but the impact on water consumption, estimated by three water utilities, is only in the order of a 1.5 to 2 per cent reduction over 2004-05.<sup>153</sup>

In theory, increased prices should also have an indirect affect on water consumption by making the relative cost of purchasing reticulated water increase against the cost of substitute water sources, such as rainwater, recycled water, greywater and stormwater and their associated infrastructure requirements. Additionally, water efficient appliances may become more financially viable for households.

When asked by the Committee about incentives to promote water conservation and efficiency once major supply augmentations are commissioned, Mr Tony Kelly, Chief Executive Officer, Yarra Valley Water, representing all three retailers, stated that price will be a major determinant:

The first area will be the price. The price is going to double. I am sure you have heard other people say that. So that will be an incentive and straight away, a lot of the alternatives for a household will become more viable.

I think somebody mentioned that a rainwater tank was quite expensive, which is a disincentive to use it, but as the price doubles they will become more viable, as will rural-grade water recycling and the purchase of more efficient in-house appliances; all of that will become more viable, so that is one good thing.<sup>154</sup>

## Fixed and variable pricing structure

All residential and non-residential water pricing follows a two-part structure whereby a fixed component is charged for the provision of water and sewerage services and a variable component is charged, based on the volume of water used and sewage discharged. For an average family, around 60 per cent of the

<sup>152</sup> 'In 2003-04 the Australian Bureau of Statistics reported that the cost of water charges made up only 0.7 per cent of average annual household expenditure', National Water Commission, 'Edition 30 - July 2008, *Distilled*, 2008, p.4.

<sup>153</sup> Environment and Natural Resources Committee, *Inquiry into Sustainable Communities*, Parliament of Victoria, 2005, p. xxv.

<sup>154</sup> T. Kelly, Chief Executive Officer, Yarra Valley Water, *Transcript of evidence*, 2 February 2009, p. 11. (representing all three retailers)

water bill is based on consumptive use with the other 40 per cent representing the fixed component.<sup>155</sup>

The Committee received several submissions that support a greater proportion of the water charges being attributed to the variable component to encourage water conservation. Frankston City Council explained how it had significantly reduced its water consumption but that the financial incentive was reduced as the proportion of water costs were shifted to fixed costs:

Since 2000-01 to 2007-08 financial years, Frankston City Council has reduced its water consumption by 49%. However, the financial incentive for reducing water usage has been significantly reduced due to more costs being shifted to fixed water charges away from water consumption charges.<sup>156</sup>

Individuals who made submissions to the Inquiry were also frustrated that their efforts to reduce water consumption were not being adequately rewarded with the fixed charge component representing an increasingly large proportion of their total water bill. In their submission, Mr Brian McGuire and Ms Freya Headlam advised the Committee:

We believe water bills should be restructured so that charges for water usage are increased, while fixed and other charges are lowered. (Compensation should be built in for large families.) At present, only one third of the cost of water services (excluding the Parks charge) is for water usage and the (water-usage dependent) sewerage charge. Thus there is only minimal financial incentive for households to save water. For example, in our household, while we were able to lower our household usage by 25% (from 359 to 270 litres per day) over the past 2-3 years, the financial saving on our water bills amounted to less than \$50 per year or around one dollar per week – hardly a strong financial incentive.<sup>157</sup>

At a public hearing, the Committee was advised by Mr Tony Kelly, Chief Executive Officer of Yarra Valley Water, that for customers who have used less water, the fixed component can be greater than the variable. He also described how increasing the relative weighting of the variable component is possible but represents risks to the water retailers' revenues and to its customers:

It is quite feasible that we could go to 100 per cent user pays, but that then presents risks for the utilities as well ... The risks associated with that become even greater because more of our revenue is at risk, if you like. The community's risk is higher as well because we are having to forecast a particular demand. If we get it wrong, high or low, the community pays or we profit. It is a balancing act.<sup>158</sup>

In its draft decision for the *Metropolitan Melbourne Water Price Review, 2009*, the ESC noted that a number of public submissions supported a greater

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<sup>155</sup> Ibid.

<sup>156</sup> Frankston City Council, *Submission*, no. 44, 28 August 2008, p. 1.

<sup>157</sup> B. McGuire and F. Headlam, *Submission*, no. 24, 22 August 2008, p. 2.

<sup>158</sup> T. Kelly, Chief Executive Officer, Yarra Valley Water, *Transcript of evidence*, Melbourne, 2 February 2009, p. 8. (representing all three retailers)

emphasis on variable water charges as an incentive for people to save water and match cost drivers. Under the Commission's Draft Decision, variable water charges would increase more than fixed charges.<sup>159</sup>

## Rising block tariffs

All of Melbourne's residents are charged a three-tiered rising block tariff. Figure 3.14 shows Yarra Valley Water's rising block tariffs, effective from 1 July 2008. City West Water and South East Water's tariffs vary only slightly from Figure 3.14.

**Figure 3.14: Rising block tariff system, Yarra Valley Water**

Block	Litres used per day	Tariff (per kilolitre)
1	0 – 440	\$1.0192 per kilolitre
2	440 – 880	\$1.1957 per kilolitre
3	More than 880	\$1.7666 per kilolitre

Source: Yarra Valley Water, 'Account charges explained - Residential water pricing', viewed 26 May 2009, <<http://www.yarravalleywater.com.au>>

In the Inquiry into Sustainable Communities, the previous Committee recommended that the:

The State Government, through the Essential Services Commission:

- further investigate the pricing of metropolitan water, within the rising block tariff structure, to promote water conservation, including discretionary use above essential indoor consumption;
- pricing structures outside the metropolitan area should reflect the same principles; and
- the revised water pricing structure should ensure a safety net is in place to protect low income consumers.<sup>160</sup>

Rising block tariffs are often supported on equity and conservation grounds, on the basis that they ensure that everyone has access to a basic level of an essential good at a relatively low cost, but also result in larger water users paying increasingly more for their consumption. However, the National Water Commission has identified that inclining block tariffs are inequitable as they disadvantage households with larger numbers of people.<sup>161</sup> For example, even

<sup>159</sup> Essential Services Commission, *Fact Sheet 3 - Metropolitan Water Price Review Tariffs and Price Structures*, Melbourne, 2009, p. 1; Essential Services Commission, *Metropolitan Melbourne Water Price Review 2009 - Draft Decision*, Melbourne, 2009, pp. 130, 131.

<sup>160</sup> Environment and Natural Resources Committee, *Inquiry into Sustainable Communities*, Parliament of Victoria, Melbourne, 2005, pp. xxxv, 216.

<sup>161</sup> National Water Commission, *Approaches to Urban Water Pricing*, National Water Commission, Canberra, 2008, p. ix.

if a six person household limited their water consumption to meet the Government's 155 litre target for daily use, they would be facing consumption charges in the highest tariff block.

To address potential inequities, Melbourne's water retailers have allocated funding for Large Household Assistance Programs to provide support for households with five or more people who experience large water bills. The program involves providing a free household water assessment and water saving tips and where appropriate, retrofitting water saving fixtures. South East Water Limited told the Committee that in its program's first year only a limited number of large households applied for assistance. Having set aside the funding, South East Water has expanded the program to any sized household with large water bills.<sup>162</sup>

On the other hand, for small households, consisting of one or two people, the pricing incentives for conservation are minimal. For example, a single person household can consume 440 litres of water per day, that is 2.8 times the government's 155 litre target, and their charges will still remain within the lowest tariff block. The application of rising block tariffs, therefore has a far greater price impact on larger households. The affect on water conservation also depends on each households' respective demand elasticity.

The Committee received evidence in support of the rising block tariff structure. Moorabool Shire Council in its submission, expressed support for incentive based initiatives to encourage conservation of water resources which should include: "Pricing policies established at a minimum level for reasonable consumption and escalating significantly with each incremental consumption stage thereafter."<sup>163</sup>

However, Moreland City Council in their submission expressed concern about the affordability of water: "Whilst supporting the premise that high water users should pay more, it is important to ensure that all households have access to sufficient water at an affordable price."<sup>164</sup>

Acheron Valley Watch, a community group with social and environmental concerns, in their submission support an approach with:

... efficient and balanced urban tariff structures including developer charges for new developments, fixed access charges and volumetric charges for water and wastewater services, whereby none of the components should be over or under emphasized.<sup>165</sup>

The National Water Commission (NWC) discourages the continuation of rising block tariffs due to the disadvantage it places on larger households. The NWC also states that rising block tariffs are:

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<sup>162</sup> W. McGlone, Manager Customer Accounts, South East Water Limited, *personal communication*, 2 April 2009.

<sup>163</sup> Moorabool Shire Council, *Submission*, no. 78, 1 September 2008, p. 4.

<sup>164</sup> Moreland City Council, *Submission*, no. 95, 18 September 2008, p. 1.

<sup>165</sup> Acheron Valley Watch Inc, *Submission*, no. 71, 29 August 2008, p. 3.

Not very effective in influencing consumption as the cost impact of reaching higher tiers is often not evident until well after the event particularly where billing is infrequent. Inclining block tariffs often result in a departure from marginal cost pricing. The Commission therefore considers a two-part tariff, where the variable component set as a flat rate per kilolitre consumed, to be a more efficient and equitable tariff structure. This tariff structure is also simpler for customers to understand and respond to.<sup>166</sup>

Interestingly, the NWC's proposed flat rate variable consumption charge is the structure that is applied to the non-residential sector. Under the water authorities' water plans, there are no changes to the proposed pricing structure within the next regulatory period ending in 2012-13.<sup>167</sup>

## Revenue security

As water conservation and efficiency measures are implemented and water customers use less water, water retailers receive less revenue. Contrary to normal commercial operations, water authorities are required to actively encourage conservation and reductions in demand of the product that they sell. This arrangement has raised some concern that water retailers may have a reduced incentive to continue to promote water conservation and efficiency.

When queried on the incentives for water retailers to promote further water saving projects at a public hearing, Mr Tony Kelly of Yarra Valley Water advised the Committee:

I think there is a story around the community that the retailers — we are government-owned, of course, but we are running commercial businesses as well — do not have an incentive to conserve or that it affects our bottom line.

The facts do not support that very strongly, with 33 per cent or 34 per cent reduction in demand over the last 10 years, I think we have been very active in water conservation and if you compare us with other cities, as I mentioned before, we have done very well compared to other Australian capital cities.

What we have done is partner with the government, and the government has understood that to promote water conservation is the lowest community cost option and the government has accepted that our revenues would be depressed in the short term. Now we are using independent price setting through the Essential Services Commission, those lower demands are forecast into our prices anyway. If we set ourselves on a trajectory of continuing to reduce demand over the next five years, for instance, then that demand becomes the denominator in the equation and the price goes up.

We are not disincentivised at all to save water. Our revenues will be adequate to cover our costs under the ESC's methodology for computing the price.<sup>168</sup>

Under this pricing model, water retailers do not have a reduced incentive to promote water savings because the government, through the ESC, accepts

<sup>166</sup> National Water Commission, *Urban Water Pricing: National Water Commission position*, 2008, pp. 2, 3.

<sup>167</sup> Essential Services Commission, *Fact Sheet 3 - Metropolitan Water Price Review Tariffs and Price Structures*, Melbourne, 2009, p. 1.

<sup>168</sup> T. Kelly, Yarra Valley Water, *Transcript of evidence*, Melbourne, 2 February 2009, p. 12. (representing all three retailers)

that customer charges must increase in order to reflect the cost of supplying water and to preserve water retailer revenue. Therefore, the cost of reduced demand is ultimately met by the consumer.

The ESC reported that after the construction of the desalination plant, reduced demand will be the main cause for increased consumer water prices.<sup>169</sup>

## Other pricing models

A number of different pricing models can be applied to Melbourne's water customers, each with their merits and shortcomings. Most discussion on alternative pricing models surrounds 'scarcity pricing'. Instead of rising block tariffs, the NWC encourages further consideration of scarcity pricing in urban areas on the basis that scarcity pricing may be a more efficient way of balancing supply and demand and could significantly reduce the need for water restrictions.<sup>170</sup> In its water pricing position statement, the NWC explains scarcity pricing as follows:

Much like the prices for other goods and services, under a scarcity pricing approach, the variable component of the water charge would be more responsive and vary inversely with available supply. As water availability falls and water becomes more scarce, the variable component of the charge would rise to reflect the increasing 'scarcity value'. The Commission recognises that desalination options may reduce or alleviate supply scarcity.<sup>171</sup>

Mr Graeme Harrison, in a submission to the Inquiry, also recommended the use of water scarcity pricing:

Implement scarcity pricing, as is proven from basic economics, to cut consumption during prolonged droughts. Pricing is always the surest form of conservation. If necessary adjust pensioner support, but be assured that the poorest pensioners are not big users of water.<sup>172</sup>

At a public hearing, when asked about the NWC's support for scarcity pricing for Melbourne, Mr Sean Crees, Director of Water Regulation from the ESC replied:

In terms of the National Water Commission's discussion on scarcity pricing, I think it is an interesting discussion to have. As an economist I say there are many approaches, if you like, to pricing for water. I suppose on the one hand you have the issue of marginal costs in regard to the assets. Scarcity pricing is really about short-run marginal cost and how you are supposed to put off people using the product when there is not much of it about. It is an interesting issue. I suppose our assessment of the proposal, which has not been put forward to those water plans, would be to compare them to the principles in the WIRO to see whether they actually make a lot of sense.

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<sup>169</sup> P. Ker, 'Falling use pushing up water prices', *The Age*, 5 January 2009.

<sup>170</sup> National Water Commission, *Urban Water Pricing: National Water Commission position*, Canberra, 2008, p. 2.

<sup>171</sup> *Ibid*, p. 4.

<sup>172</sup> G. Harrison, *Submission*, no. 8, 29 July 2008, p. 4.

I would imagine there would be some issues in regard to timing. Signalling of that nature and scarcity pricing would, I imagine, come up with questions about how often do you change prices? Currently customers receive a bill every three months, so it is well and truly after they have used the particular product.

Do you have to increase the amount of times you change the price, you have to do more frequent billing? These things come with extra costs. How aware are people of these? What about specific price increases, and the suddenness that comes about via those? Scarcity prices due to a situation we are in now could see massive increases in prices. How are people able to adapt in the short term to those price increases? I suppose the approach now is to try and apply a price that reflects the long-run cost, together with methods such as restrictions to really manage that quite short term impact on the imbalance, if you like, between supply and demand. There are a lot of issues for us to consider.<sup>173</sup>

## Discussion

The Committee concludes that water pricing can have both direct and indirect impacts on water consumption decisions but is less likely to have direct impacts while severe water restrictions are in place. As water demand is relatively inelastic and represents only a small percentage of household expenditure, the direct impact of price increases on consumption is likely to be small. The pricing impact is further diminished as a large proportion of a consumer's water bill is fixed. This proportion grows as consumption falls, further reducing the financial incentive to conserve more water. The Committee believes that the pricing structure for water should move towards a higher proportion of the bill allocated to consumption and a lower reliance on fixed charges to promote efficient water use and conservation.

The Committee believes that rising block tariffs may send an appropriate water conservation message to consumers but also raises some equity and efficiency issues. Rising block tariffs can be described as inequitable because larger families are more likely to face the higher tariffs even if their average per capita consumption is low and inefficient because the second and third tier tariff blocks are unlikely to apply to smaller households consuming significant amounts.

The Committee acknowledges the intent of the Large Household Assistance Program but believes that in some instances it may remain an insufficient assistance program for large households that have low per capita water consumption, but whose bills remain high because of the number of people living in the house.

The Committee believes during severe water restrictions, the most significant opportunity that pricing can have on water conservation and efficiency may be its indirect effect where rising prices make investment in alternative water infrastructure more viable.

The Committee believes that the non-residential sector is more likely to respond to price increases than residential water users.

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<sup>173</sup> S. Crees, Director, Water Regulation, Essential Services Commission, *Transcript of evidence*, 2 February 2009, p. 4.

Therefore, the Committee recommends that:

**Recommendation 3.25**

**The Essential Services Commission and water retailers agree to responsibly increase water consumption charges to reflect the full environmental, social and economic costs of water.**

**Recommendation 3.26**

**The Victorian Government ensure an adequate safety net and water conservation assistance for:**

**a) low income households to help manage the forthcoming water price increases; and**

**b) larger households who have made reasonable water conservation efforts yet consistently face water charges at the highest tariff.**

**Recommendation 3.27**

**The pricing structure for water moves towards a higher proportion of the bill allocated to consumption and a lower reliance on fixed charges.**

## Water infrastructure leak detection and repair

In any reticulated (piped) centralised water supply system, leaks and breaks occur and potable water is lost. In Melbourne, around seven per cent of the potable water supply is lost through leaks and ruptured pipes.<sup>174</sup> Although seven per cent represents a large amount of water (approximately 27 gigalitres in 2007-08), the level of water loss is very low compared with other cities in Australia and around the world.<sup>175</sup>

In its submission to the Inquiry the CSIRO commented:

Leakage from water distribution systems is an issue that has gained considerable public attention during the current drought. By international standards, Australian water utilities control their water leakage to relatively low levels with Melbourne utilities at the forefront of leakage management in Australia.<sup>176</sup>

At the public hearing on 2 February 2009, Mr Tony Kelly, Chief Executive Officer of Yarra Valley Water explained to the Committee, "we have spent a lot of time and effort in getting our leakage down to world best practice, and that has been a very effective suite of programs as well."<sup>177</sup>

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<sup>174</sup> WaterSmart, *Water Supply-Demand Strategy for Melbourne 2006-2055*, Melbourne, 2006, p. 14.

<sup>175</sup> *Ibid*, p. 36.

<sup>176</sup> CSIRO, *Submission*, no. 34, 29 August 2008, p. 8.

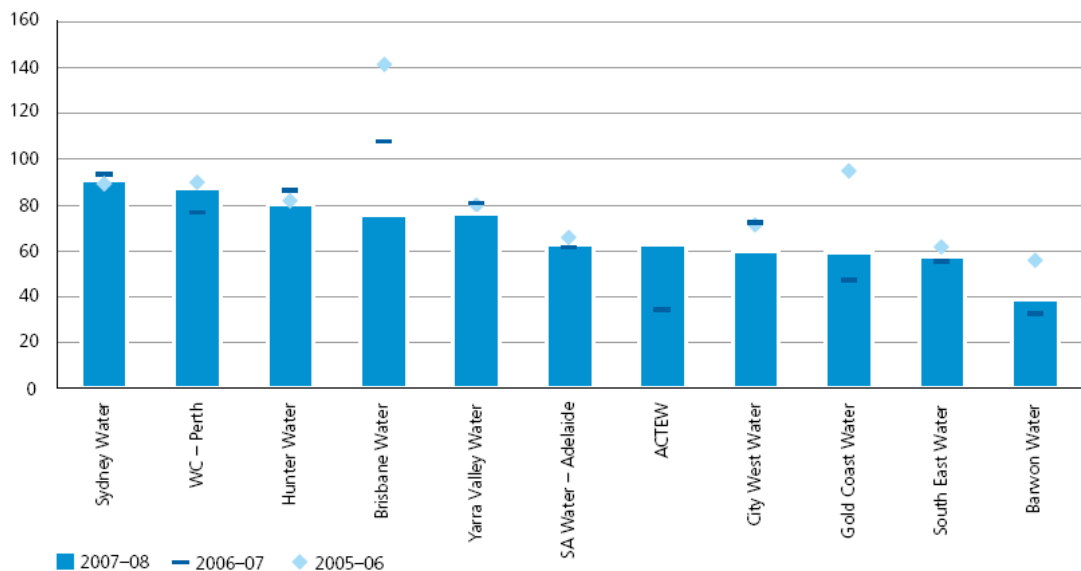
<sup>177</sup> T. Kelly, Yarra Valley Water, *Transcript of evidence*, 2 February 2009, p. 4. (representing all three retailers)

The Water Services Association of Australia reported in its *National Performance Report* in 2007-08 that South East Water and City West Water experienced real water losses below the national average for large urban water utilities (i.e. 68 litres/service connection/day), while Yarra Valley Water's real water losses were slightly higher.<sup>178</sup> The report explains that:

Real losses refer to leakage and overflows from mains, service reservoirs and service connections before the customer meter. It does not include metering error or unauthorised consumption or water used for purposes of firefighting. Performance on this indicator can be influenced by the condition of mains and other infrastructure, water pressure, and water consumption. As lower water supplied is generally correlated with lower leakage, utilities with a higher average water supplied tend to have higher real losses.<sup>179</sup>

The Committee notes that Yarra Valley Water has the largest water supply network of Melbourne's three water retailers and this may partially explain their relatively higher water losses compared with the other two retailers. Figure 3.15 shows the performance of the major Australian reporting utilities (with over 100,000 customers) for 2007-08.

**Figure 3.15: Real losses (litres/service connection/day)**



Source: Water Services Association of Australia, *National Performance Report 2007-2008: Urban water utilities*, 2009, p. 32.

The Water Services Association of Australia notes that comparisons between utilities should be interpreted with caution:

<sup>178</sup> Water Services Association of Australia, *National Performance Report 2007-2008: Urban water utilities*, Melbourne, 2009, p. 32. The Committee notes that the 2006-07 report did not report on real water losses.

<sup>179</sup> Ibid, p. 32.

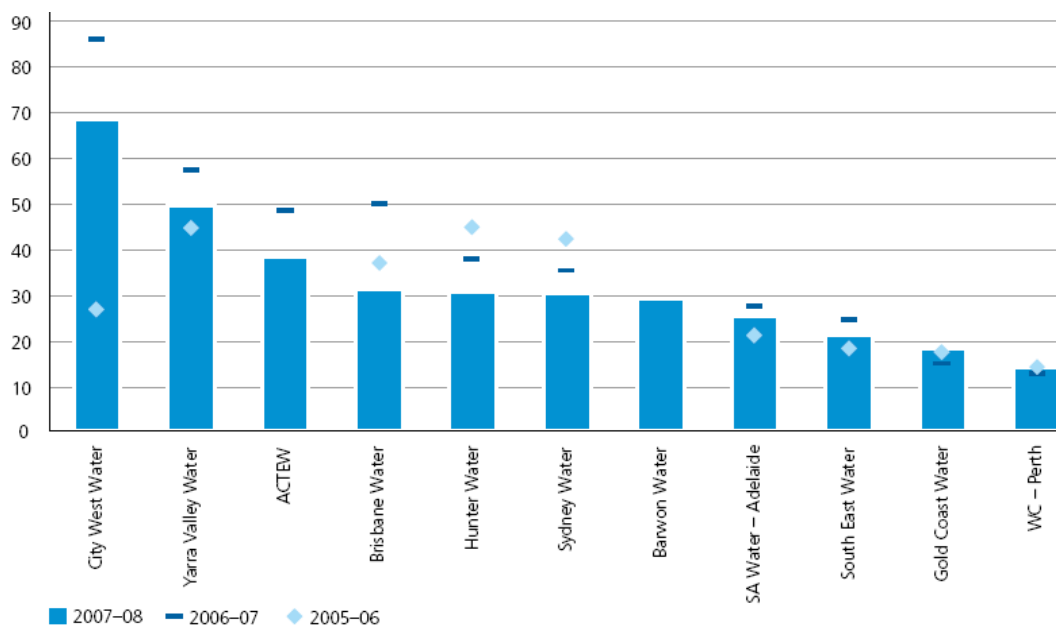
It is important to recognise that real losses are estimated using a range of assumptions, including assumed errors in metered water deliveries and estimates of unmetered components. Therefore, the real losses reported are not likely to be as accurate as some of the other indicators (for example, water main breaks) and this should be considered when comparing utilities.<sup>180</sup>

Despite this evidence, the Water Services Association of Australia also reported in its National Performance Reports in both 2006-07 and 2007-08 that two of Melbourne’s water retailers experienced the highest and second highest rate of water main breaks per 100 kilometres of pipes of all the major water utilities in Australia. The 2006-07 report explains:

[The water mains breaks] indicator captures the physical performance of the network and is therefore significantly affected by the physical conditions prevailing for each utility, for example land topography, soil conditions (e.g. sand versus clay), climatic variations (e.g. drought results in increased tree root invasions), as well as factors such as asset type, age, overall condition and mains pressure.<sup>181</sup>

Figure 3.16 shows the performance of the major reporting utilities (with over 100,000 customers) for 2007-08.

**Figure 3.16: Water main breaks (per 100 kilometres of water main)**



Source: Water Services Association of Australia, *National Performance Report 2007–2008: Urban water utilities*, 2009, p. 26.

<sup>180</sup> Ibid, p. 32.

<sup>181</sup> Water Services Association of Australia, *National Performance Report 2006-07*, Melbourne, 2007, p. 17.

For major utilities, there is significant variability in the incidence of water main breaks. Ranging from a low of 14 breaks (Water Corporation – Perth) to 68 breaks (City West Water) per 100 kilometres of main. The average number of main breaks for this utility grouping was 32 breaks per 100 kilometres. City West Water had the highest number of water main breaks for the second consecutive year; however they also had 21 per cent fewer breaks in 2007-08 than in 2006-07. City West Water has previously explained that the age of its water supply system is a factor, as are the expansive clay soils and low rainfall in the west of Melbourne.<sup>182</sup>

In his presentation to the Committee, Mr Peter Harris, Secretary of the Department of Sustainability and Environment explained how the Victorian Government and Melbourne's water authorities are improving operational efficiencies of Melbourne's water supply system through reducing leaks and breaks. Efforts include:

- leak detection and repair (forecast savings of seven gigalitres of water a year by 2010);
- reduction of pressure by an average of 15 per cent in key areas to reduce leaks and breaks (estimated saving of two and a half gigalitres of water);
- installation of zone metering to improve the targeting of leakage detection programs; and
- improved responsiveness to repairing water main breaks and leaks (Melbourne's water authorities are amongst the quickest in the world with over 99.4% of breaks repaired within 5 hours).<sup>183</sup>

Although it is not possible to eliminate leaks and breaks altogether, it remains possible to further reduce water leaks. The CSIRO discusses the costs of further detecting and reducing leaks, noting that for incremental savings costs rise exponentially:

Typically, water losses are managed to meet the "economic level of leakage". In simple terms this means that over a period of time investment in leakage control activities equates to the cost of purchasing water to meet water losses. This is sensible economic system management and means that as the incremental cost of supplying water from new sources increases over time, investment in water loss control will also increase. It should be noted that the cost of the next water saving increment from leakage control tends to increase exponentially.<sup>184</sup>

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<sup>182</sup> Water Services Association of Australia, *National Performance Report 2007–2008: Urban water utilities*, Melbourne, 2009, p. 26.

<sup>183</sup> P. Harris, Secretary, Department of Sustainability and Environment, *Transcript of evidence*, Melbourne, 8 September 2008. (Presentation Paper).

<sup>184</sup> CSIRO, *Submission*, no. 34, 29 August 2008, p. 8.

An additional benefit of leak reductions is reduced greenhouse emissions due to reduced water pumping and treatment costs.<sup>185</sup>

## Discussion

The Committee concludes that while a large amount of water is lost through broken pipes and leaks, the proportion of water lost by international and Australian standards is relatively low, given the size of the water distribution system. However, due to the age of the infrastructure and extremely dry weather conditions, Melbourne's water retailers are experiencing high levels of water main breaks. Further savings can still be achieved through greater leak detection efforts, although the cost implications are significant.

The Committee acknowledges the economic efficiency of investing in leak detection and management activities, to the point where the investment is equal to the cost of the water. The Committee believes that this cost of water should equal the full "sustainability value", that is the economic, environmental and social value (not just the purchase cost) and that this value should be met by the leak detection and management investment.

Therefore the Committee recommends that:

### **Recommendation 3.28**

**Melbourne's water authorities continue to invest in leak detection and management to improve the efficiency of the water delivery system and minimise water loss.**

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<sup>185</sup> WaterSmart, *Water Supply-Demand Strategy for Melbourne 2006-2055*, Melbourne, 2006, p. 36.