

# waste(d) water



“For a dry continent, it is puzzling that we have for decades dragged the chain on any large-scale water recycling. Despite a looming water crisis, there is still inertia ...”

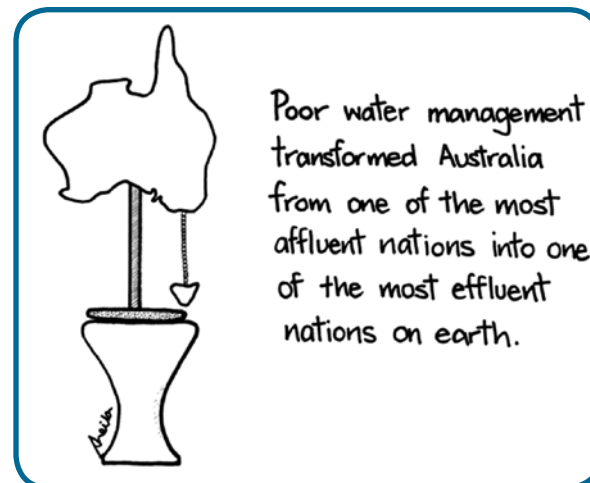
*The Israelis assume that nobody in their right mind would ever dispose of raw sewage. I had to bite my tongue at that point.*

Malcolm Turnbull, *Watermark* Australia session notes, no. 5

*Recycling processes in Europe are sophisticated and commonplace. Most importantly, attitudes to water in Europe are completely different.*

Kate Shaw, 'Just another case of being a wally', *the Age*, 15 September 2006, p. 17

Every day millions of litres of used water are carried away from homes, factories, businesses and farms. This is water that has been used in day-to-day human activities. It can contain a wide range of contaminants, including human and industrial wastes, household products, food wastes, cleaning chemicals, fats, oils etc. Once generated, this water is usually moved to more remote locations for treatment before being discharged.



**It's symptomatic that Australians use the term 'waste water' rather than 'wasted water'!**

The technology now exists to treat this 'waste' water to varying standards, right up to making it fit for human consumption. We could substitute much of our potable water if we treated and used what we now call waste water.

This is not news for many countries around the world. Israel recycles, after treatment, 70% of its waste water of urban and industrial origin for reuse in agriculture. Singapore uses state-of-the-art technology to recycle water and the use of recycled water has become a way of life. California has been recycling water for over 50 years. It has over 300 water-recycling plants in operation.<sup>1</sup>

In Europe, water recycling and reuse through surface and groundwater bodies is common practice. Denmark, for example, treats something like 87% of its waste water mechanically, chemically or biologically.<sup>2</sup>

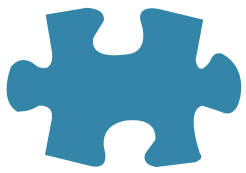
In Australia, however, the driest inhabited continent, 97% of our city runoff and 86% of effluent water is unproductive.<sup>3</sup> Sydney alone pumps 450 billion L of barely treated sewage into the ocean every year. In 2002–03, 360 billion L of waste water was discharged into Bass Strait and Port Phillip Bay, from Melbourne, after treatment.<sup>4</sup>

## SLOW GOVERNMENT RESPONSE

As with harnessing stormwater, Australia has been very slow to move towards treating and recycling the water we use in our day-to-day activities. Foremost among the reasons why is the lack of active leadership from governments across our federal system.

Around 30 years ago, the Federal Government received recommendations from a major review of wastewater use. The review recommended that we should initiate:<sup>5</sup>

- a national program of research, demonstration and education
- an integrated approach to water supply, sewerage and solid-waste disposal as an integral part of one planning process



# waste(d) water

- smaller, simpler sewer networks based on regional plants located near opportunities to reuse
- the use of recycled water for conserving water resources in rivers and streams and recharging aquifers providing nutrients were controlled
- an assessment into the substitution of recycled water for fresh water in Adelaide and inadvertent groundwater recharge in Perth
- the development of conceptual models, pilot applications and some full-scale projects, particularly for the 'interception' method (presumably 'sewer mining') and the 'dual pipe' supply concept.

Visiting Australia 30 years later, a member of the original 1977 study team observed, with some amazement, that little had happened.<sup>6</sup>

In 1992 the productivity commission was asked to enquire into water resources and waste disposal.<sup>7</sup> While its recommendations formed the basis for the COAG National Water Reform Framework, recycled water was left out.

Only since 2003 has there has been any national government funding for a number of water recycling projects.

**Other countries are recycling, so why are we so far behind?**

Organic Apples Watermark Australia group

## DEMONSTRATION PROJECTS ONLY

A number of local recycling projects have been implemented in Australia. Most are small in scale (recycling less than 10 ML per day) and aimed at using recycled water for a designated purpose (e.g. irrigation or watering a golf course). The largest of these is the Lower Molongo Water Quality Control Centre in the ACT, which treats 90 ML each day.

State governments and private developers have initiated a number of 'suburban-scale' housing projects that incorporate recycled water. Notable ones include Olympic Park and Rouse Hill (Sydney), Aurora (Melbourne), Mawson Lakes (Adelaide) and Port Douglas (Queensland). These supply a residential community with water for multi-purpose use, excluding human consumption. They use a 'third pipe' to deliver recycled water to individual households. These schemes are evaluated in the context of each jurisdiction's planning regulations for water-sensitive urban design (WSUD). These integrate urban planning and development with water conservation, protection and use. This is done within the constraints of the overall water cycle.<sup>8</sup>

## WATER-SENSITIVE URBAN DESIGN

While at the present time WSUD principles generally focus on stormwater, it has been suggested that these principles could be extended to include elements such as:

- rainwater tanks
- the use of greywater from household kitchens, bathrooms and laundries

- on-site treatment of all household waste water for reuse
- the use of recycled water derived from off-site wastewater treatment.<sup>9</sup>

Despite the fact that such technology is used to provide potable recycled water in places like the USA, Singapore and Israel, the first 'metropolis-scale' project has only just been commenced in Australia. The Illawarra Project in Wollongong, south of Sydney, will treat all of Wollongong's sewage to tertiary level and have the capacity to provide 20 million L at least of treated effluent to the nearby BHP Billiton steelworks.<sup>10</sup>

## BARRIERS TO RECYCLING

There are several factors that frustrate moves to recycle more water. The first is cost. Treated water will be considerably more expensive than the potable water that is supplied to us now. While the technology will evolve and the unit cost of treating water should reduce over time, governments' willingness to address water-pricing issues is limited.

The second obstacle is community resistance to the idea that water derived from treated human waste is fit for consumption.

The third is the complexity of inter-governmental arrangements and regulations relating to planning, health standards and water in this country. This is apparent in the multiplicity of legislation and regulations that impact upon any party's attempts to progress water recycling.

In 2004, 65 separate pieces of legislation were on the statutes of various governments across Australia – all impacting in some way upon water recycling.<sup>11</sup> At the time of writing this number had increased!

**Table 1. Wastewater recycling in Australia's capital cities**

state capital	% recycled water use
SYDNEY	2.3
MELBOURNE	2.0
BRISBANE	6.0
ADELAIDE	11.1
PERTH	3.3
HOBART	0.1

Although the largest volumes of waste water are generated within our capital cities, the volume recycled is very low. The greatest use of recycled waste water is occurring in rural areas.

Source: Australian Academy of Technological Sciences and Engineering, *Water recycling in Australia*, special report, ATSE, 2004, p. 7, <<http://atse.org.au/index.php>>.

# THE BIG PICTURE waste(d) water

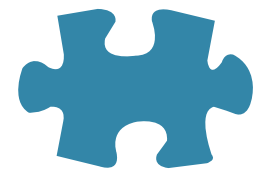


Table 2. Changes in rates of treatment and use of sewage effluent across Australia

Region	1996-99			2001-02		
	EFFLUENT, GL/YR	REUSE, GL/YR	%	EFFLUENT, GL/YR	REUSE, GL/YR	%
QLD	328*	38*	11.6	339†	38†	11.2
NSW	548†	40.1†	7.3	694	61.5	8.9
ACT	31*	0.25*	0.8	30	1.7	5.6
VIC	367	16.9	4.6	448	30.1	6.7
TAS	43	1	2.3	65	6.2	9.5
SA	91*	9*	9.9	101	15.2	15.1
WA	109	5.5	6.1	126	12.7	10.0
NT	21*	1*	4.8	21	1.1	5.2
<b>AUST</b>	<b>1538</b>	<b>112.9</b>	<b>7.3</b>	<b>1824</b>	<b>166.5</b>	<b>9.1</b>

†1996 \*1998 † Subject to revision

The table shows the amount of treated sewage effluent that is being treated and recycled as a proportion of the total amount being treated at sewage treatment plants in each state and territory at two points in time (1966-69 and 2001-02).

Source: Australian Academy of Technological Sciences and Engineering, *Water recycling in Australia*, special report, ATSE, 2004, p. 7, <<http://atse.org.au/index.php>>.

## ▶ REFERENCES

1. Australian Academy of Technological Sciences and Engineering, *Water recycling in Australia*, special report, ATSE, Melbourne, 2004, p. 23, <<http://atse.org.au/index.php>>.
2. Organisation for Economic Cooperation and Development, *OECD key environmental indicators*, OECD Environment Directorate, Paris, 2004, p. 23.
3. MD Young, W Proctor, M Ejaz Qureshi & G Wittwer, 'Without water: the economics of supplying water to 5 million more Australians', *Water for a healthy country flagship report*, CSIRO (Canberra) and Monash University (Melbourne), 2006, pp. 6-17.
4. Victorian Government White Paper, *Securing our water future together*, 2004, p. 107.
5. Australian Academy of Technological Sciences and Engineering, op. cit., p. 49.
6. HI Shuval, cited in *Water recycling in Australia*, ATSE special report, ATSE, Melbourne, 2004, p. 50.
7. Productivity Commission, *Water resources and wastewater disposal, industry commission report no. 26*, Productivity Commission, Canberra, 1992, <<http://www.pc.gov.au/ic/inquiry/26water/finalreport>>.
8. Australian Academy of Technological Sciences and Engineering, op. cit., p. 11.
9. op. cit, pp. 53-70.
10. E Drioli & F Macedonio, *New integrated water treatments and production modes for city planning*, New Technology for Infrastructure - The World of Tomorrow, ATSE Symposium, Sydney, 2006.
11. Australian Academy of Technological Sciences and Engineering op. cit., app. 2.

## Some other useful sources

- Department of the Environment and Water Resources, Australian Greenhouse Office, <<http://www.greenhouse.gov.au>>, (keyword: wastewater)