

## Water solutions adapted for climate change

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**The *Water Transformed* online education package demonstrates how Australia is leading in many aspects of water management, as well as how, across several sectors, companies and organisations are achieving significant savings – of both water and money.**



Credit: stockphoto

The federal Department of Climate Change and Water has allocated \$3.45 million to help local government and professionals, such as engineers and architects, better manage and adapt to the effects of climate change. One initiative funded is the development of *Water Transformed: Sustainable Water Solutions for Climate Change Adaptation*,<sup>1</sup> a suite of freely available, online lecture-style resources that highlight the latest innovations, proven technologies, and leading research and practice in water management and supply.

Water management decisions over the next decade will have significant impacts on Australia's economic, environmental and social well-being. The complex challenge to adapt to the impacts of climate change will require action across the economy to respond to reduced availability and increasingly unreliable supply of water.

Here we highlight examples of water saving opportunities and initiatives across major water consuming sectors, which are covered in more detail in *Water Transformed*:

**Agriculture:** As the largest consumer of fresh water in Australia (~70 per cent), and being particularly vulnerable to the drought and temperature impacts of climate change, this sector has a lot of incentive to improve its performance. Innovative land management practices such as 'time controlled grazing', 'natural sequence farming' and changing from surface channel irrigation to sprinkler and sub-surface drip irrigation has had a dramatic improvement on agricultural water efficiency in various parts of the country, by as much as 50 to 80 per cent.

**Built environment:** Retail, commercial and office buildings are large consumers of water, where a moderate-sized building of 10 000 m<sup>2</sup> can consume over 20 000 L per day, or more than 7 million litres per year, enough to supply 40 average homes.<sup>2,3</sup> A key opportunity lies in addressing leaks, then investing in efficient amenities, and upgrading cooling systems to 'wet/dry' hybrid cooling systems. These can reduce water use by up to 80 per cent while only

consuming around 5 per cent more energy than water-cooled systems. Rainwater harvesting and grey water reuse can also significantly reduce town water consumption, as can proactive maintenance and tenant education for behaviour change.

*Manufacturing:* Comprising a diverse mix of industries engaged in transforming materials, substances or components into consumer or industrial goods, this sector includes companies which chemically, mechanically or physically process anything from fabricated metals, food and beverages, wood, wood products and furniture, clothing and footwear, to paper, printing and publishing, and basic metal products. Water saving opportunities include identifying end-user opportunities (for example client expectations regarding whether the product is washed), checking the functionality of water handling equipment in the factory (for leaks and efficiency), and considering the potential for using alternatives to mains water supply (for example rainwater, stormwater and recycled water). Installing steam traps and condensate return systems can also provide significant savings.<sup>4</sup>

*Food processing:* Water savings are possible in this sector for a variety of operations including general processing (such as washing, rinsing, blanching, cooling, cooking, and conveying), operating specific utilities (such as boilers, cooling towers and pumps), cleaning equipment, and for auxiliary amenities such as toilet flushing and washing facilities.

*Mining:* As water is involved in all stages of mining processes, there are a range of opportunities to reduce its consumption, while protecting the supply and natural receiving systems. Understanding and actioning reuse opportunities for ‘raw’ (fresh) and ‘worked’ (reuse) water can achieve significant reductions in the use of surface freshwater resources and groundwater while maximising water reuse.<sup>5</sup>

*Tourism (hotels and hospitality):* Within the tourism sector, hotels and associated hospitality (companies within the food services, recreation and entertainment sectors) represent a large portion of industry-wide water saving opportunities. For example, in a typical hotel, water consumption can be reduced by an average of 20 to 40 per cent without compromising guest comfort.<sup>6</sup>

*Health (hospitals):* In an urban setting, hospitals are among the top water users, yet little action is yet taken to inform and support water savings in this sector. Six main areas to consider include water leakage; sanitary/amenities (taps, showers, toilets); heating, ventilation and air-conditioning (HVAC) systems; medical processes; and cafeteria and laundry use.

*Education (schools and higher education institutions):* Many schools now have developed a water plan for their campuses and are committed to reducing water use each year, encouraged by programs such as the national Sustainable Living Challenge (SLC) and the Australian Sustainable Schools Initiative (AuSSI). However, the situation for higher education institutions is much more variable, with very limited national government support for campus-based water management plans, despite campuses being significant water users. The Australian Campuses Towards Sustainability (ACTS) initiative is a voluntary national program targeting sustainable campuses, with many examples of best practice online.

Leading industry innovators are being supported through key studies on water saving opportunities. For example, Sydney Water has provided benchmarks (water intensity measures) for expected water consumption in a growing number of sectors including buildings and hotels, where expected water consumption figures are provided to assist companies to identify instances of excessive use and likely potential leakages.<sup>7</sup>

Common to all leading examples is a water management plan which provides a committed senior management with a clear understanding of an organisation’s current water consumption, costs and future opportunities for water saving measures, and the potential risks of inaction. Such a situation report can then underpin a systematic and strategic process of auditing, procurement, retrofitting and maintenance to reduce water use across the organisation’s operations.

The *Water Transformed* online resources include discussion of recommended water management plan components, including the following priority actions:

1. Establish the baseline water demand through metering, benchmarking and auditing;
2. Identify leakages;
3. Develop a measure of water intensity;
4. Consider water saving options;
5. Undertake a cost–benefit analysis of options;

6. Set water saving targets; and
7. Engage in public commitments and wider action.

With such clear leadership in Australia across the major water consumers, there are plenty of precedents for transformations in water consumption. The ultimate question for the public and private sectors alike is moving from *'what does climate change mean for fresh water availability?'* to *'how far and how fast and where are we willing to proceed with reducing our fresh water demand, to prepare for increasingly altered climate conditions this century?'* Our answers will certainly affect the future well-being of our communities, environment and economy.

*Cheryl Desha, Charlie Hargroves and Mike Smith are members of the sustainability think-tank, The Natural Edge Project, hosted by Griffith University, the Australian National University and Curtin University.*

1 Smith, M., Hargroves, K., Desha, C., and Stasinopoulos, P. (2009) *Water Transformed: Sustainable Water Solutions for Climate Change Adaptation*, The Natural Edge Project (TNEP), Griffith University, and Australian National University, Australia. [www.naturaledgeproject.net/Sustainable\\_Water\\_Solutions\\_Portfolio.aspx](http://www.naturaledgeproject.net/Sustainable_Water_Solutions_Portfolio.aspx), accessed 12 November 2009.

2 Quinn R, Bannister P, Munzinger M and Bloomfield C (2006) *Water Efficiency Guidelines: Office and Public Buildings*. Commonwealth of Australia, Canberra, Australia, p. 5.

3 Ibid. See <http://www.environment.gov.au/settlements/publications/government/pubs/water-efficiency-guide.pdf>, accessed 20 November 2009.

4 The Department of Environment, Water, Heritage and the Arts (DEWHA) (2007) *Water Efficiency Guide: Office and Public Buildings*. DEWHA.

5 Minerals Council of Australia (2009) 'A water accounting framework for the minerals industry – draft February 2009'. Minerals Council of Australia and the Sustainable Minerals Institute.

6 Sydney Water (2001) 'Hotels'. [www.sydneywater.com.au/Publications/FactSheets/SavingWaterHotels.pdf#Page=1](http://www.sydneywater.com.au/Publications/FactSheets/SavingWaterHotels.pdf#Page=1), accessed 25 August 2009.

7 Sydney Water (undated) 'Publications and downloads'. <http://www.sydneywater.com.au/Water4Life/InYourBusiness/Publications.cfm>, accessed 12 November 2009.

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