

*Innovation for Sustainability: Seeking Water Solutions in an Urban Environment*

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Abstract

Organisations have been encouraged to innovate to obtain competitive advantage. Much of our understanding about innovation focuses on developing new products, new markets or new business models. The relatively recent focus on sustainability and sustainable development are beginning to align private and public organisations towards innovation for sustainability. Multiple stakeholders including companies, governments, communities and individuals investigate and experiment with sustainable practices around energy generation and use and water use. This paper focuses on initiatives related to sustainable practices around the issue of water and its use in an urban environment. We contend that initiatives and innovation from multiple stakeholders are more likely to lead to sustainable development and practices.

Key words: innovation, sustainability, stakeholders

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## **Introduction**

The growing consideration of issues of sustainability across the world at the firm and company level as well as local, national and international levels ((OECD 2001, 20002; World Business Council for Sustainable Development) and the desire to effect some change in the situations is becoming a powerful force (Global Reporting Initiative). Private companies are encouraged to engage in corporate sustainable responsibility (Hart, 1997; Lockwood, 2006; Matten & Moon 2008) and public organisations set targets for compliance.

Across the nation it appears that organisations and communities are now much better focused on exploring and experimenting with more innovative practices geared towards sustainability. The questions considered in this paper are: How can we define innovation for sustainability? What are the drivers of innovation towards sustainability in the local region? What do their goals and current progress indicate?

The paper begins with a brief discussion of definitions of sustainability and sustainable use of resources. We then discuss innovation from multiples perspectives with a particular focus on sustainability and apply the notion of innovation for sustainability in the context of a situation of limitation of water supply. We focus on one area of relevant to sustainability – domestic water supply and consumption in one city location, in a broader national context of an arid continent which has not traditionally managed its water processes (Melbourne Water Board). We argue that sustainability initiatives which involve individuals and teams as well as industry and government are more likely to generate useful processes and we present some useful examples of innovation in multiple forms.

Our contribution is to articulate some of the perspectives relevant to innovation for sustainability in a unique case study, identifying some of the systemic process necessary for innovation and the actors who are creating and shaping the possibilities for innovation. We argue that actors not only use their resources at hand but actively shape possibilities within and across organisational boundaries.

## **Defining sustainability and sustainable development**

Sustainability has been interpreted in different ways. According to the OECD (2001) the meaning of sustainability involves ‘linking the economic, social and environmental objectives of societies in a balanced way,’ and taking a long term perspective about the consequences of today’s activities.

The Brundtland Commission, led by a former Norwegian Prime Minister, defined sustainable development as ‘meets the needs of the present without compromising the ability of future generations to meet their own needs.’ This definition thus’ implicitly argues for the rights of future generations to raw materials and vital ecosystem services to be taken into account in decision making’ (Brundtland, 1987).

The World Commission on Sustainable Development stated in 1987 that “our global future depends upon sustainable development. It depends upon our willingness and ability to dedicate our intelligence, ingenuity and adaptability – and our energy – to our common future. This is a choice we can make” (OECD, 2008)

Sustainability has further been defined as a “characteristic of a process or state that can be maintained at a certain level indefinitely. The term, in its environmental usage, refers to the potential longevity of vital human ecological support systems, such as the planet's climatic system, systems of agriculture, industry, forestry, and fisheries, and human communities in general and the various systems on which they depend in balance with the impacts of our unsustainable or sustainable design” (Wikipedia, March 2008). The implied preference would be for systems to be productive indefinitely, or be "sustainable." For example, "sustainable agriculture" would develop agricultural systems to last indefinitely; "sustainable development" can be a development of economic systems that last indefinitely, etc.

Some common principles identified in programs to achieve sustainable development, sustainability or sustainable prosperity (Hargroves & Smith 2005) include:

- Dealing transparently and systemically with risk, uncertainty and irreversibility.
- Ensuring appropriate valuation, appreciation and restoration of nature.
- Integration of environmental, social, human and economic goals in policies and activities.
- Equal opportunity and community participation/Sustainable community.
- Conservation of biodiversity and ecological integrity.
- Ensuring inter-generational equity.
- Recognizing the global integration of localities.
- A commitment to best practice.
- No net loss of human capital or natural capital.
- The principle of continuous improvement.
- The need for good governance.

International bodies have also stated the importance of sustainability. The World Resources Institute established a “Sustainable Enterprise Initiative (SEI) which helps companies accelerate their transformation toward sustainability by engaging them in dialogue, learning, and action”. The World Business Council for Sustainable Development (WBCSD) and others have convincingly demonstrated the potential for cutting material and energy costs through a process they call "eco-efficiency" which will improve but may not be sufficient for changing business processes.

Working directly with a few key companies, WRI's Strategic Partnerships Learning About Sustainability Horizons (SPLASH) project has identified three ‘tiers’ of potential business value from a firm's pursuit of sustainability beyond regulatory requirements: Process Efficiency, Product Enhancement, and Market Positioning” (Day, 1998 WRI)

The notion of eco-efficiency encompasses cost savings that can be captured by firms that minimize their material, energy, and toxic throughput; and changes in products to extend their durability and increase their service intensity can create more value for firms and their customers. Thus, eco-efficiency in sustainable development includes process efficiency and product enhancement (WRI).

Radical transformation of our technologies and economic patterns (such as total substitution of renewable energy for fossil fuels, or agricultural practices that restore instead of degrade eco-systems) are necessary and even more efficient "business as usual" will not suffice.

The link between sustainability and financial performance will not be easy to prove. “At WRI we are working with leading companies to develop the business case for sustainable development. The key is innovation: Not only does society need radical innovation, as described above, but innovation is also a key driver of financial success for the firm.

Sustainability and sustainable practices are also the topic of eco-innovation and new product development (Pujari, 2006) through notions of improved design (Birkeland, 2002) and appropriate technology (G24I, Demotech) which does not create waste or converts waste into new resources.

Organisations have been working to reduce their energy usage, the toxicity of their outputs and improve the recycling of their wastes. The Organization for Economic Cooperation and Development (OECD, 2001, 2002) and others have asserted that in order to achieve this goal, we must become ten times more efficient in what we do over the next thirty to fifty years. The international focus on sustainability remains strong and 2005 marks the beginning of the UN Decade on Education in Sustainability Development.

The notion of sustainability used here is in line with the Brundtland Commission *Our Common Future* which aims to ‘meet the needs of the present without compromising the ability of future generations to meet their own needs’.

### **Sustainable Development at a System Level**

Sustainable development at a system level would include examples where a system recycles the ‘waste’ or residue from one process and creates value through harnessing the waste to form useful by-products or creating new business opportunities. An interesting example of such processes is found in Grayson Hill Farms, Raleigh Illinois (Baker & Nelson 2005) where Tim Grayson was a farmer whose land was crisscrossed by abandoned coal mines. “*Grayson knew that the tunnels - a nuisance to farmers because of their tendency to collapse, causing mammoth sinkholes in fields - also contained large quantities of methane. Methane is a toxic greenhouse gas that poisons miners and persists in abandoned mines for generations. Grayson and a partner drilled a hole from Grayson's property to an abandoned mine shaft, then acquired a used diesel generator from a local factory and crudely retrofitted it to burn methane. During the conversion process, Grayson was repeatedly blown off his feet when the odorless, colorless gas exploded. His making do with existing resources sometimes called ‘bricolage’ produced electricity, most of which he sold to the local utility, using scavenged switchgear.*

*Because Grayson's generator also produced considerable waste heat, he built a greenhouse for hydroponic tomatoes, which he heated with water from the generator's cooling system. He also used electricity generated during off-peak hours to power special lamps to speed plant growth. With the availability of a greenhouse full of trenches of nutrient-rich water heated ‘for free’, Grayson realized he might be able to raise tilapia, a tropical delicacy increasingly popular in the U.S. He introduced the fish to the waters that bathed the tomato roots and used the fish waste as fertilizer. Finally, with abundant methane still at hand, Tim began selling excess methane to a natural gas company” (Baker & Nelson 2005).*

Examples of system level approaches appear remarkable and praiseworthy but we tend to see them as special cases. More recently some companies have been capturing their waste products and recycling them for other purposes such as heating.

Working towards sustainability in a prosperous western country like Australia has different dimensions from those required in a developing country. The issues here are not issues of obtaining reliable access to potable water but rather of reducing excessive use.

The OECD's Environmental Performance Review of Australia in 2007 compared Australia's environmental performance with recommendations from 1998 review. The review noted the 2004 adoption of the National Water Initiative and recognised some areas of improvement. However the report noted that "overall water consumption is still increasing" ..... "water prices for consumers remain low and hence do not encourage conservation or investment in new sources of supply. The potential for water re-use and recycling has yet to be fully exploited" (OECD 2008: 13).

## **Perspectives of Innovation**

Innovation can be described in a number of ways from 'the process of bringing any problem solving ideas into use' (Kanter 1983: 20), 'a new way of doing things that is commercialized (Porter, 1990:780) to "the process whereby new ideas are transformed, through economic activity, into sustainable value-creating outcomes" (Livingstone, 2000: 1).

"Innovation is about change - it's about findings new and better ways of doing things" (Brisbane Water Innovation and Action Plan 2007). While the constituent parts are employees, systems and processes, knowledge networks and research and development with management support, training and products and services, the processes of interaction are the essential dynamics.

Frameworks for understanding innovation include the 4P's of innovation such as product, process, positioning and paradigm (Francis & Bessant, 2005). Innovation is recognised as being a social process, and in the context of sustainable development, the notion of sustainable innovation suggests that:

- Innovation is about products, services and organisational forms
- Innovation is about knowledge carried in the minds of people
- Innovation requires cooperation
- Innovation should be seen as an ongoing and enduring process (Jorna, 2006).

Some authors discuss notions of eco-innovation or sustainable development innovation where innovation has been designed to achieve ecological purposes (Pujari 2006).

## **Context of the case study**

Australia is the driest inhabited continent. Although it has a large land mass and a relatively small population, as a nation its citizens and residents had largely ignored the necessity for careful usage of this limited resource. Australia's rainfall is the lowest of the continents (excluding Antarctica). This low rainfall combined with very high evaporation leads to low river flows. Despite this, Australia has one of the highest per capita water consumption rates in the world.

The recent droughts experienced across much of the country brought home to its residents the relatively finite nature of this resource and the need for careful usage. For example comments from the Melbourne Water Board: "Since 1939 restrictions have been applied in metropolitan

Melbourne on 15 separate occasions to conserve water during drought. Drought is a natural occurrence that we must plan for and respect - we need to manage our water resources with utmost care. When it comes to resource planning, we need to increasingly look for innovative ways of doing more with less. While two thirds of all the people on Earth use less than 60 litres of water a day the average Australian uses more than twice that amount during a single shower. In fact, Australians are among the biggest users of water in the world, especially around the home.”

Innovation relevant to the transformation and use of water is essential in the climate affected Australian context, and legislative requirements, community attitudes, firms and individuals can all be engaged in search to achieve better water usage, water storage and reduce consumption. This study focuses on innovation to develop new ways to reduce water consumption

## **Methodology**

Using secondary data available in the public domain, plus discussions with a Senior Manager in Brisbane Water and some informal discussions with residents, a brief case study of water management in Brisbane was developed.

## **Information about Brisbane**

The Brisbane City Council (BCC) developed a document, *Living in Brisbane 2026 – our vision* which sets out its direction for the next decades. The following extracts from this document provide some general information and illustrate some of the issues relevant to sustainability.

*Brisbane is at the centre of the second-fastest growing region in the western world, and is the largest local government authority in Australia – both in population and budget – with jurisdiction over an area of 1367 square kilometres.*

*Brisbane is “in the top 10 fastest-growing OECD regions in the world. It is the second-fastest growing city in the western world, and, with a population of almost one million people, is Australia’s largest municipality.*

*Each year, almost 16,000 people move here. While most people are coming from regional areas of Queensland, some are also migrating from other states and overseas” (Living Brisbane extract)*

A goal articulated in Living Brisbane states, “*In 2026, Brisbane will continue to be a city that is open to the world, generous in sharing knowledge and enthusiastic about embracing new ideas from other regions and cultures. It will be the education heart of Australia, the national centre of excellence in environmental sustainability, a world leader in tropical science, biotechnology and health research, and an exemplar of regional governance and democracy with the highest level of citizen participation in the nation”.*

The goal for Sustainable water use

*“By 2026, all Brisbane’s waste water will be recycled and safely reused many times over. Our reliance on dams for our water supply will have reduced through our conservation efforts and by using a variety of ‘fit-for-purpose’ water from alternate sources such as grey water, recycled water, storm water and ground water. Our target for 2026 is to reuse 100% of waste water” (Living in Brisbane: 18).*

In a prior presentation on Brisbane City's *Sustainable Future* (BCSF 2005) the CEO, Jude Munro illustrated some success stories of successful sustainability projects and outlined the strategy for Brisbane 2010, with a goal of integrating sustainability through long term and short term projects. Successful initiatives previously developed included a Rainwater Tank policy introduced in 2001, rebate scheme further for residents for 4 years with 100% of rebates allocated, and council mandating compulsory rain water tanks in new sub-divisions. Brisbane City Council developed strategies focused on sustainability for sustainability policy with a focus on water and waste management.

Other areas where Brisbane City Council had valued sustainability practices includes the new City Council building which received top rating

*“Brisbane Square is now the largest high-rise office building in Australia to receive a Five-Star Green Rating from the Green Building Council of Australia. Some of the features that enabled Brisbane Square to achieve the five-star rating include the building being constructed using, for example, recycled materials such as goat hair, wool, cotton and hemp and an air filtration system that reduces pollutants in the office tower.*

*The building's water-saving features also reduce our mains water consumption by 75-85 per cent by using river water for cooling the air conditioning system, on-site rainwater tanks and a sewerage treatment plant that recycles, treats and sterilises waste water. Brisbane Square also uses simple sustainable measures that can be applied in homes, such as using energy efficient lights, rainwater tanks, water efficient taps and recycling.”*

Brisbane City was the Queensland State Finalist in the inaugural “Keep Australia Beautiful Australian Sustainable Cities Award” in October 2007.

At the Local Government Level, the projection that Brisbane's water supply would run dry by 2025 was taken very seriously and a number of initiatives were developed including:

- Online information about water related services for homes and business
- Information about water meters, how to read them and how to check for leaks
- Information which encouraged the consumer to be actively involved in monitoring their own water use and comparing that with the average water use of their suburb
- Subsidies for rainwater tanks

Water re-use schemes were negotiated with regulatory bodies and industry as a major strategy for conserving the water supply. Some industries require high levels of purity of water for their processes while others could avoid wasting high-quality treated water on industrial activities and could use water of a lower grade. This initiative also reduced the unnecessary discharge of industrial waste water into Moreton Bay, saving 18 000 megalitres of potable water each year and improved water quality in Moreton Bay by reducing discharges of nitrogen and phosphorus by 18%.

### **Agents of Innovation**

The Brisbane City Council mandated water efficient fittings and fixtures in 1988. The previous year the Manager of Research and Development had attended the ISH conference, the world's largest plumbing fair in Frankfurt and this was the beginning of an R&D collaboration between the council and Caroma Industries, a local bathroom fittings and fixtures company.

This case study discusses approaches leading towards sustainable water management of water issues in Brisbane and local catchments. It describes new procedures and initiatives which were introduced at multiple levels of government and new eco-efficient products sourced by business. Further information about water related issues at the national and state government levels, initiatives by a local business with diagrams of new bathroom fixtures and diagrams are presented in Appendix A.

Brisbane Water, a commercialised business unit of Brisbane City Council provides water and wastewater services to almost one million consumers. It employs about 900 staff and is one of Australia's largest water utilities. Brisbane Water through its research and development unit had been involved in ongoing research and development with an Australian firm to develop more water efficient products over a long time period. Brisbane Water developed novel water purification processes for water supply and had negotiated with local industry for use of water recycling to reduce use of potable water and reduce deposits of nitrogen and phosphorus in local fishing and recreational areas. It also develops standards and processes for water and wastewater networks in the twenty-first century putting waste water re-use in the public arena.

The Brisbane Water Innovation and Strategy Action Plan outlines the initiatives this organization has developed to encourage and sustain innovation within the organization. Initiatives include three strategies: (1) an Information and Knowledge Management system, (2) a Communication Plan and (3) an Innovation Management Plan for tracking and measuring ideas, which includes internal web sites and training and recognition programs. Some diagrams from the plan are attached in Appendix B.

## **Discussion**

This study briefly investigated the notion of innovation for sustainability within one context – the domestic water use in one urban environment in one region in a very dry continent.

This overview of available material indicates that notions of sustainability and sustainable development are gaining in importance at all levels of government and are becoming part of everyday conversations. Drivers of innovation for sustainability are found at all levels of organisations as well as through international associations. The OECD review of Australia's Environmental Performance was a timely reminder of further need for improvement.

At the organisational level, leadership by the CEO of the BCC in terms of setting targets, providing feedback on success stories and resetting the goals for 2026 are powerful reminders of work to be done. The agency and initiative of individuals within and across organisational boundaries can have a positive effect on how organisations create the possibility of new responses to changing environmental situations, locally within their business unit. In addition, management support is essential for individual intrapreneurial practices at the business unit level of organisations.

Actions by individuals as designers, as managers or as research and development managers can play an important influence in the approach of an organisation, public or private on the conversations and initiatives undertaken by business. Menzel et al. (2007) discuss the role of engineers as intrapreneurs within their firms, and their generation of new ideas, and solutions to

problem situations. Initiatives by local councils and their employees are important sources of innovation.

### **Limitations**

This overview of developments that requires sustainable practices of water use in a developed urban environment, has provided an indicative understanding rather than a thorough investigation of the phenomenon. The study was undertaken as a preliminary exploration of literature in this field, and to form a foundation for later research into systemic and entrepreneurial approaches to issues of sustainability and the influences of innovation and sustainability.

The Queensland Water Commission launched a Draft South East Queensland Strategy in late March 2008 to plan for the water needs of the region for the next fifty years which is open to discussion and comment and this development may well lead to new initiatives.

<http://www.qwc.qld.gov.au> .

### **Implications for innovation towards sustainability and further research**

Sustainability and innovation for sustainability have been firmly placed on national and international agendas as well as the agendas of public and private sector organisations and communities in this region of the country. This interest reflects in part, the growing attention and planning that is taking place in many developed communities.

This brief review of a local area facing a water crisis and the initiatives developed identified the involvement by multiple stakeholders. The importance of systemic approaches by multiple levels of governments to issues of sustainability and the influence of entrepreneurial abilities of individuals within public sector organisations, innovative practices within the organisation and the importance of research and development collaboration across organisational boundaries have been described. Other initiatives in construction and engineering by companies exacting responsible policies and practices will extend these processes.

These combinations of agency by informed individuals, encouraging innovative practices within their organisations and engaged in product development with private firms will be examined in further research in innovation towards sustainability in developed and developing contexts. In particular we will work towards the development of a framework for multiple forms of innovation in relation to sustainability capability development.

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## APPENDIX A: Brisbane Region Case study – Moving towards Sustainable Water Management

This case study discusses approaches leading towards sustainable water management of water issues in Brisbane and local catchments. It describes new procedures and initiatives which were introduced at multiple levels of government and new eco-efficient products sourced from a successful local business that has extensive international exports.

Australia had experienced many years of severe drought. Initiatives were developed at three levels of government and by local businesses to generate awareness and change in consumer practices towards eco-efficiency and sustainability by individuals and households. The following information is largely derived from websites as indicated.

### Commonwealth Government

Initiatives by the Commonwealth Government to respond to the water crisis were broadly based and included encouraging citizens to purchase and use more eco-efficient products with information about likely benefits, for example:

“By 2021 Australians could save more than \$600 million through reduced water and energy bills by simply choosing more efficient products. By 2021 it is estimated that using water efficient products will help to:

- Reduce domestic water use by five per cent or 87,200 megalitres each year.
- Save about 610,000 megalitres (more water than in Sydney Harbour).

Nearly half the water savings will come from more efficient washing machines, about 25 per cent from showers and 22 per cent from toilets.

By choosing to use more water-efficient products in the home, Australians will save water and cut down on water and energy bills.

A water-efficient washing machine may use only one-third the water of an inefficient model.

- An old-style single-flush toilet could use up to 12 litres of water per flush. A standard dual flush toilets use only three litres on a half-flush.
- A standard showerhead may use up to 25 litres of water per minute. A water-efficient showerhead might use as little as seven litres per minute”

<http://www.waterrating.gov.au/>

### State Government

The Queensland Government also encouraged its citizens to use the new water efficiency labelling scheme to reduce water consumption by up to five per cent and save money on water and energy bills. From July 2006, all new washing machines, dishwashers, toilets, showers and some types of taps and urinals will carry a star rating according to their water efficiency, with six stars being the most water efficient.



"The expected uptake of water efficient products means that by 2021 Queensland will be saving an estimated 18,836 megalitres of water per year - the equivalent of 9418 Olympic sized swimming pools."

"By simply choosing more efficient appliances, consumers can also save about \$110 per year on water and energy bills through reduced water use and water heating costs".

Mr Mickel said the legislation is part of a national approach called the Water Efficiency Labelling and Standards Scheme (WELS). The WELS initiative had the potential to reduce Queensland's per-capita water consumption, which in turn could:

- \* reduce water demand on catchments;
- \* defer building new dams and water supply infrastructure;
- \* reduce household water consumption and water heating bills;
- \* reduce water and effluent discharge to waterways;
- \* lower sewage and water supply treatment and pumping costs for local governments; and
- \* decrease Queensland's greenhouse gas emissions through reductions in hot water usage.

The WELS scheme would replace the voluntary National Water Conservation Rating and Labelling Scheme (commonly known as the AAA scheme), administered by the Water Services Association of Australia.

"Manufacturers will have until 1 July, 2006 to comply and the labelling scheme will apply to the use of designated products in residential, commercial and industrial buildings and allows for the scheme to be broadened covering additional products,"

[http://www.build.qld.gov.au/smart\\_housing/pdf/smarthousing/updates/2006\\_jan.pdf](http://www.build.qld.gov.au/smart_housing/pdf/smarthousing/updates/2006_jan.pdf)

The Queensland Government provided subsidies and rebate schemes for rainwater tanks, dual flush toilets and showerheads, clothes washing machines, swimming pool covers, greywater systems and garden product. Restrictions regarding domestic use of water have been in place for many years and were slowly tightened. Residents were encouraged to limit their domestic water use to 140litres of water per day and businesses were also encouraged to limit their water use where practicable.

<http://www.nrw.qld.gov.au/water/>

## **Local Government**

At the Local Government Level, the projection that Brisbane's water supply would run dry by 2025 was taken very seriously and a number of initiatives were developed including:

- Online information about water related services for homes and business
- Information about water meters, how to read them and how to check for leaks
- Information which encouraged the consumer to be actively involved in monitoring their own water use and comparing that with the average water use of their suburb
- Subsidies for rainwater tanks

Water re-use schemes were negotiated with regulatory bodies and industry as a major strategy for conserving the water supply to avoid wasting high-quality treated water on industrial activities that could use water of a lower grade. This initiative also reduced the unnecessary discharge of industrial waste water into Moreton Bay, saving 18 000 Megalitres of potable water each year and improved water quality in Moreton Bay by reducing discharges of nitrogen and phosphorus by 18%.

[http://www.brisbane.qld.gov.au/bccwr/environment/documents/case-study-atc-water-recycling\\_final.pdf](http://www.brisbane.qld.gov.au/bccwr/environment/documents/case-study-atc-water-recycling_final.pdf)

## **"Leaders in Environmental ingenuity"**

Caroma, a local business describes itself as Australia's foremost designer, manufacturer, importer and distributor of domestic and commercial sanitaryware and bathroom products. Caroma is at the forefront of product innovation and is the market leader in reduced flush water efficient sanitaryware. Caroma is a wholly owned subsidiary of GWA International Limited, a Brisbane based, Australian owned company, with diverse interests including Sebel Furniture, Rover Mowers, Dux Water Heaters, Dorf Tapware, Clark Sinks and Gainsborough Hardware. GWA employs more than 2000 people.

Caroma's history of design and product leadership has been achieved by a total commitment to research and development in all areas of quality, aesthetics and technical excellence. Through constant innovation, Caroma continually provides the most comprehensive range of reliable, high quality, smart and stylish bathroom products in Australia.

Caroma focused its R&D efforts in extending its highly successful Smartflush® dual flush sanitaryware and W.E.T.® (Water Efficient Tapware) technology into most product ranges on offer to the market. Concurrently, extensive R&D work has been undertaken by the company to ensure that all products are in compliance with the Federal Government's WELS (Water Efficiency Labelling and Standards Scheme) that by legislation, commenced on 1 July 2006.

Caroma Dorf recently launched two new urinals that are the undisputed leaders in water saving technology. The Caroma Cube 0.8 litre Smartflush® Urinal is Australia's first 6-star rated urinal and uses up to 60% less water compared to standard 2 litre single stall models. The Caroma H2Zero Cube Urinal transforms the way you think about waterless urinals and heralds a major breakthrough in waterless technology. This product is the first truly viable and sustainable high performance waterless option.

In recent years, Australia has experienced some of the worst droughts on record. Combine this with growing urbanisation and it's clear to see why demands on our precious water reserves are greater than ever before. Governments, water authorities and the wider community are striving for dramatic long-term solutions. And as water restrictions tighten, it's a timely reminder that we need to work together in order to preserve this resource for a sustainable future.

An Australian first, Caroma Smartflush® sets the benchmark for reducing water usage when it comes to toilet suites. Delivering dramatic improvements in the amount of water required per flush, Smartflush® toilet suites use only 4.5 litres for a full flush and 3 litres for reduced flush mode. The result is significant savings compared to older toilets which use up to 11 litres per flush – savings that add up to 35,000 litres of water every year for the average Australian home” <http://www.caroma.com.au/company/index.html>

#### **Leading 5-Star Water-Saving innovation**

Caroma takes another step forward in water-saving innovation with the launch of Australia's first 5-star rated toilet suite. The Profile™ Toilet Suite with Integrated Hand Basin is the first of its kind, incorporating a unique integrated dual-flush push button and spout combination designed to lower total bathroom water usage

#### **Lowering Water Consumption in the Bathroom**

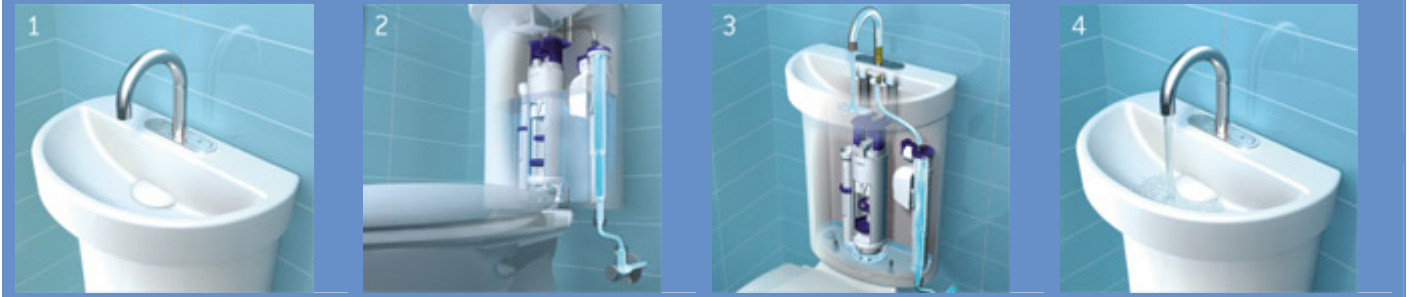
Fresh water is first used for hand washing and then flows into cistern to ultimately flush the toilet, saving the water normally used if a separate basin is used for hand washing. The toilet suite features award-winning Smartflush® water saving technology and the result is 10% greater savings in total bathroom water usage than market leading Smartflush® technology with even greater savings when compared to single flush 11L or standard 6/3L dual-flush toilet suites used in combination with separate hand basin

This Caroma technology has been successfully independently tested and refined over a ten year period and tests validate the water-saving capabilities of this innovative product. Extensive field trials have been conducted to ensure the presence of soapy water in the cistern has no adverse effect on internal cistern operating componentry

Ergonomic Space Saving Design maximises hand washing area and features a landing at the back to accommodate a liquid soap dispenser. Cistern and hand basin configuration are designed to ensure lid and seat will remain upright when lifted.

## SIMPLE AND EASY TO USE

Everything about the integrated Profile™ system functions like a normal toilet suite with the only difference being the cistern is filled in a different way.



Full and half flush buttons control the flushing of the toilet suite and activate the flow of water through the basin spout. The basin spout features an aerated flow which is set at the ideal flow rate for optimum use. Ideal for small bathroom spaces, this latest innovation from Caroma integrates a toilet suite, basin and tapware into a single, compact unit

Hygienic and Low Maintenance: Hygiene is assured with the water for hand washing flowing directly from the utilities water supply before it is then used to fill the cistern tank. Apart from the filling of the cistern via the spout and basin, the toilet operates normally. Both the Profile™ toilet suite and integrated hand basin can be easily maintained using regular household cleaners.

Full detail at <http://www.caroma.com.au/products/data/tsu/profile/main.html>

**APPENDIX B:** Extract from Brisbane Water Innovation and Strategy Action Plan.  
<http://www.awa.asn.au/Content/NavigationMenu2/ResourceCenter/AssetManagement/StrategicAM/Brisbane.pdf>

Figure 1: Innovation in a living organisation using the metaphor of a tree.

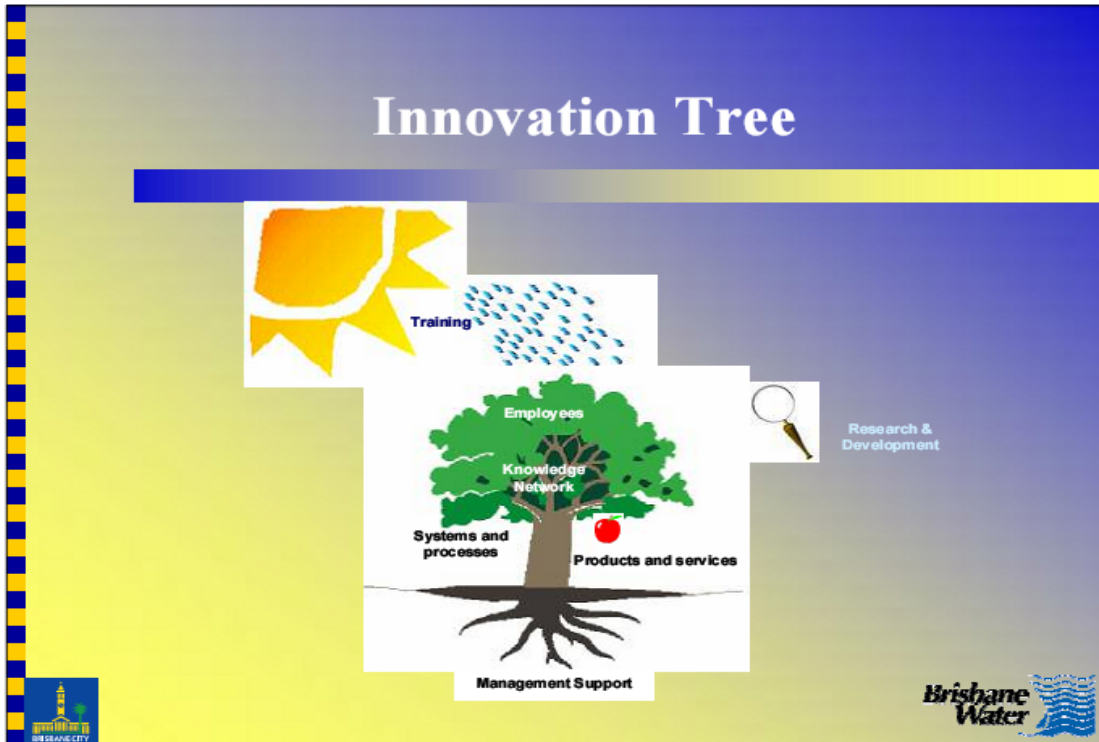


Figure 2: Centrality of management support for Innovation in Brisbane Water

