

Water Utilities of the Future

*Australia's experience in
starting the transition*

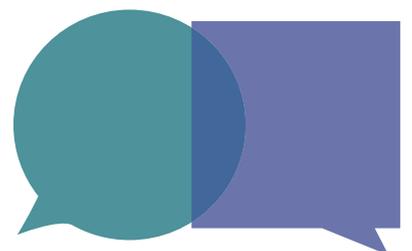


CRC for
Water Sensitive Cities



Australian Government
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Innovation and Science

Business
Cooperative Research
Centres Programme



ThinkTank

CRC for Water Sensitive Cities

Water Utilities of the Future – Australia's experience in starting the transition

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Foreword

Viable urban areas need access to safe, reliable and affordable water and sanitation services. Water is critical to all life—it sustains our communities, our economy and the environment on which we depend. Given this, water utilities are a critical part of our cities—delivering services today and helping maintain our future health, wellbeing and prosperity.

But, water utilities around the world are facing significant challenges:

- Population and urbanisation are increasing, but the capacity of the planet’s natural capital to provide a clean and reliable source of water for, and to assimilate the waste and pollution generated by, this growing population is declining.
- A changing climate is creating greater water insecurity, and culminating in greater severity and frequency of flood, drought and extreme temperature conditions.
- Economic constraints are limiting government, business and households’ ability to pay for the investment needed to maintain the levels of service they expect.

The Australian experience shows it is unlikely that the traditional urban water management paradigm can meet

the challenges facing our cities in the 21st century. We need ‘utilities of the future’.

Around the world, much effort has been made to envisage the roles and functions of urban water utilities of the future. As this vision becomes clearer, so too has the size and breadth of action needed to achieve it. Transitioning to a utility of the future will see water utilities:

- partner with the public, private and community sectors to develop new business models that provide a broader array of solutions to a more informed community
- foster greater collaboration in developing proofs-of-concept for policy and regulatory reforms that fundamentally redefine ‘business as usual’
- enhance utility customer service culture, efficiency and effectiveness.

No doubt this transformation is challenging, but there is much utilities can and indeed are doing. This paper draws on research undertaken by the Cooperative Research Centre for Water Sensitive Cities and practical case studies to show what water utilities can do TODAY. Sections 1 and 2 outline the challenges facing urban communities and key elements of a future vision for water utilities. Section 3 discusses the pathways utilities can use to transition to that future vision.

Section 4 (and Attachment 2) presents Australian examples of where water utilities are playing a leadership role in broader city planning, through their advocacy, their whole-of-system perspective and technical excellence, as well as their investment in community engagement and industry capability. These are Australian examples, but they address global challenges. Contexts may differ in other countries, but the lessons are relevant.

The CRCWSC welcomes any feedback on the ideas expressed below¹, particularly relating to international or Australian case studies that could be included in future editions of this paper.

¹ Comments and feedback are welcome and can be sent to info@crcwsc.org.au

1. The Challenge

The 21st century is the century of cities and urbanisation. The proportion of the world’s population living in urban environments surpassed that living in rural environments early this century. This trend continues and we expect around 70 per cent of the world’s population to live in urbanised environments by 2050.

As these urban communities grow so too does their demand for resources and their impact on the environment both within the city itself, and more broadly. The challenge for the water utilities is to not only continue to meet basic human needs but to also meet community expectations that utilities play a greater role in assuring cities’ future liveability, resilience and economic performance.

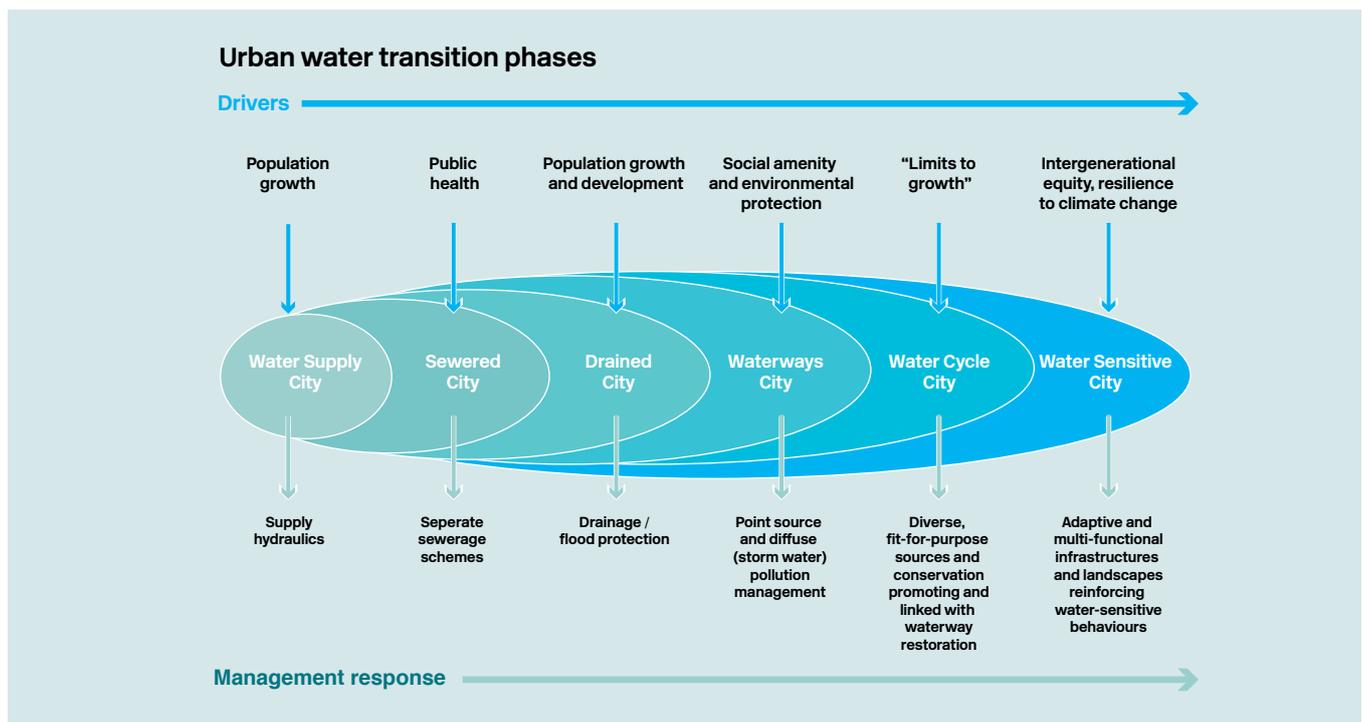
Utilities are responding to these challenges by continuing a long term trend in urban water management—from managing water for life to managing water for life and liveability (Figure 1; Attachment 1).

However, a range of factors are exacerbating the challenge for water utilities. Figure 2 shows some examples of the Australian experience but these issues are felt worldwide. The World Bank’s Water Scarce Cities program noted:

Many cities, regions, and countries around the world are faced with a trifecta of pressures: rapid urban population growth, economic expansion, and competing demands. These forces of change are tightening the availability of water resources in areas where tackling water scarcity is already a critical challenge.

In addition, other factors such as pollution, sub-optimal water management practices and climate change are also negatively impacting the health of urban water systems.²

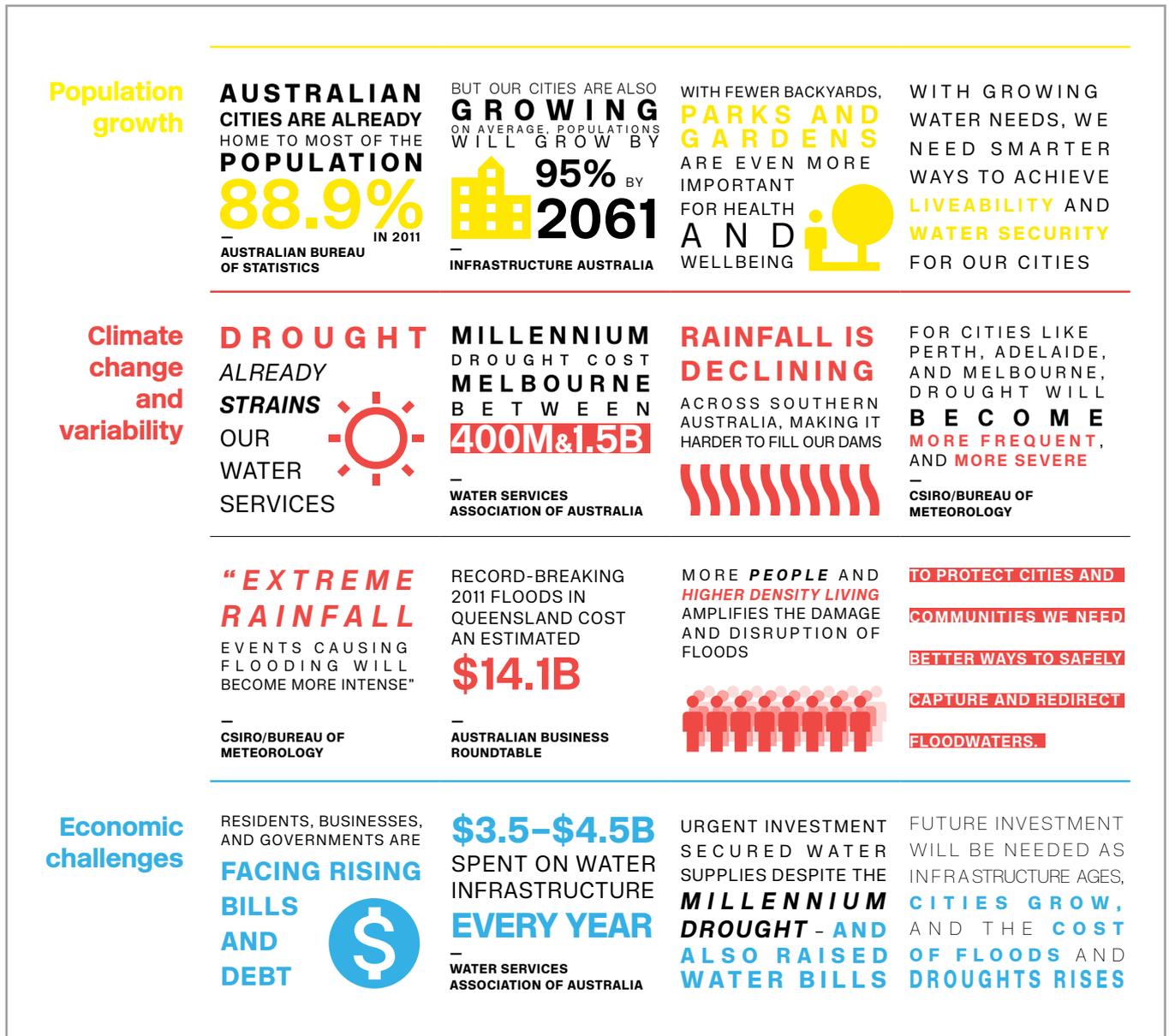
Figure 1: Urban water transition phases.



Source: Brown et al. 2009; Wong 2016.

²See <http://www.worldbank.org/en/news/feature/2017/05/15/water-scarce-cities-initiative>.

Figure 2: Urban water challenges and threats to the liveability and resilience in Australian cities



Source: CRCWSC 2017b.

These are large and complex challenges, which need collaboration at several levels:

- on local, national and international scales
- across public, private and community institutions, and
- across areas of technical expertise.

Further, data is often incomplete, decision support systems are imperfect and funding is limited.

But while significant, these challenges are not insurmountable, and water utilities can help address them.

2. A Future Vision

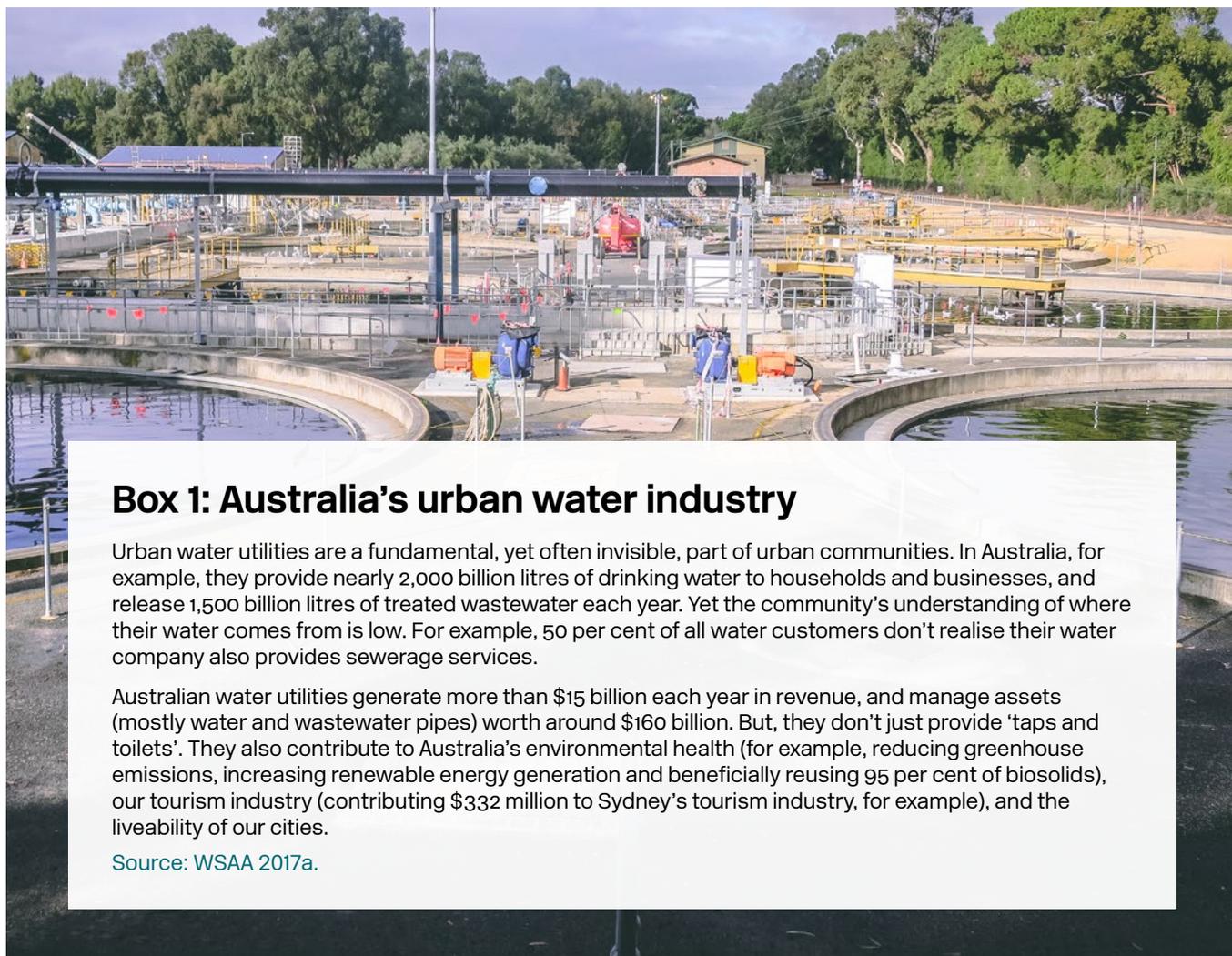
Water utilities play a critical role in our cities today and in maintaining future health, wellbeing and prosperity (Box 1). Changing community expectations mean urban water utilities must increasingly account for their customers' broader aspirations (such as liveable communities, environmental health and resilience to climate change), not just deliver efficient traditional 'taps and toilets' services. At the same time, utilities must consider how delivering these additional services will affect customer prices, service efficiency, and the best use of existing assets.

In recent years, the concept of integrated water management (IWM) has emerged as way of managing water services to maximise economic, social and environmental benefits. It draws on the view that the traditional approach to managing water—compartmentalising water supply, sewerage and stormwater services—produced conflicting and sometimes inefficient water management and liveability outcomes.

This compartmentalisation is both physical (in terms of infrastructure) and institutional (in terms of responsibility for providing, operating and maintaining services). Over time, it led to philosophical silos and created system boundaries.

As the name implies, IWM involves integrating the various water services, in terms of both the physical system, as well as the many people and organisations who create, maintain, and are served by urban water systems.

Australian and international evidence shows many water utilities, regional authorities and local councils recognise the limitations of the traditional water management approach, and are already addressing liveability challenges through IWM. Numerous reports, conferences and workshops outline aspirational visions of the utility of the future that embrace IWM (Box 2).



Box 1: Australia's urban water industry

Urban water utilities are a fundamental, yet often invisible, part of urban communities. In Australia, for example, they provide nearly 2,000 billion litres of drinking water to households and businesses, and release 1,500 billion litres of treated wastewater each year. Yet the community's understanding of where their water comes from is low. For example, 50 per cent of all water customers don't realise their water company also provides sewerage services.

Australian water utilities generate more than \$15 billion each year in revenue, and manage assets (mostly water and wastewater pipes) worth around \$160 billion. But, they don't just provide 'taps and toilets'. They also contribute to Australia's environmental health (for example, reducing greenhouse emissions, increasing renewable energy generation and beneficially reusing 95 per cent of biosolids), our tourism industry (contributing \$332 million to Sydney's tourism industry, for example), and the liveability of our cities.

Source: WSAA 2017a.

Box 2: What is a water utility of the future?

A range of reports discuss scenarios for the future water utilities, highlighting change enablers and constraints:

- WSAA 2017, Next gen urban water: The role of urban water in vibrant and prosperous communities, Occasional paper 32, Melbourne, <https://www.wsaa.asn.au/publication/next-gen-urban-water-role-urban-water-vibrant-and-prosperous-communities>.
- NACWA, WERF, WEF 2013, The water resources utility of the future—A blueprint for action, https://www.wef.org/globalassets/assets-wef/direct-download-library/public/03---resources/waterresourcesutilityofthefuture_blueprintforaction_final.pdf
- NWC 2014, Urban water futures, Canberra, <http://webarchive.nla.gov.au/gov/20160615061247/http://www.nwc.gov.au/publications/topic/water-industry/urban-water-futures>.
- ATSE 2012, Sustainable water management—Securing Australia’s future in a green economy, Melbourne, <https://www.atse.org.au/content/publications/reports/natural-resources/sustainable-water-management.aspx>.
- IWA, What is a utility of the future, <https://www.youtube.com/watch?v=-tNZ7oulQ6M>
- IWA 2016 Smart Water Utilities: Complexity Made Simple <http://www.iwapublishing.com/books/9781780407579/smart-water-utilities-complexity-made-simple>



These studies highlight several issues. First, water is not an undifferentiated commodity any more. Fit-for-purpose water sourcing and production, and valuing secondary benefits are important value proposition considerations. Increasingly, water services must reflect community expectations, which means the water utilities of the future cannot assess water resources projects through a narrow service cost minimisation lens. Rather, they must consider wider system cost-benefit tradeoffs, and capture broader nonmarket economic impacts.

Second, it is likely that expectations will differ within and between communities. Our cities are complex, and so is the concept of liveability, embracing water security, transport infrastructure, personal safety and amenity, among other things. And, it is likely that the relative importance of these features will vary between communities.

Despite these differences, visions for utilities of the future include common features. Specifically, these utilities:

- manage urban water sustainably, and enhance liveability
- partner in local economic development
- foster evolving urban spaces that are appropriately serviced
- collaborate with other organisations to plan and deliver services
- use advances in intelligent networks and operations to improve productivity
- seek the least cost, highest community return solutions at catchment scale
- focus on customer value
- are agile organisations with robust commercial capability.

3. Making the Transition

There is increasing consensus that the business models of the past will not meet the challenges of the future. However, looking around the world there is no such thing as a 'standard' water utility, so there is no corresponding 'standard' transition pathway.

As in other parts of the world, Australian water utilities range in size and scope:

- Some utilities have a narrow scope of activities (for example, water supply and sewerage management), while others have a broader remit that also includes activities such as stormwater collection and river health management, and solid waste management.
- Some utilities are owned by state governments, some are owned by local governments, while some are privately owned. They vary in size and their access to financial and human resources.
- They operate under different environmental, economic and health regulatory frameworks and within different political settings.

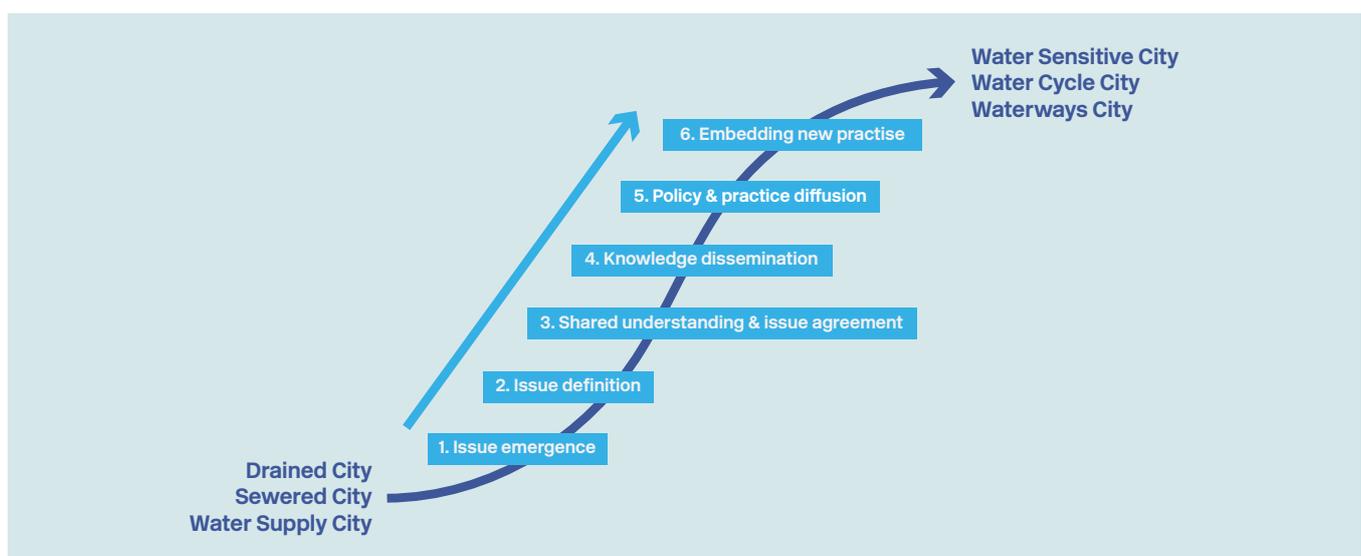
Given these differences, each utility will follow its own specific pathway as it becomes a utility of the future. However, CRCWSC research identified common stages of successful transition (Figure 3).

Research and experience shows water utilities in Australia are taking proactive steps to make the transition to a future ready approach including:

- changing their internal operations and culture, to improve core service delivery, adopt new business models, show leadership and advocacy relating to new technologies and approaches, and increase the quality and depth of their community engagement
- partnering with other organisations in new ways to pool resources and experience, better manage risk, build capability and drive innovation. These activities can be partnerships among current and new services, such as other water and non-water utilities (for example, energy providers), community organisations, local governments and private businesses.
- influencing their authorising environment (that is, the legislation, regulations, policies and institutional settings that empower or constrain actions) to foster innovation and empower action.

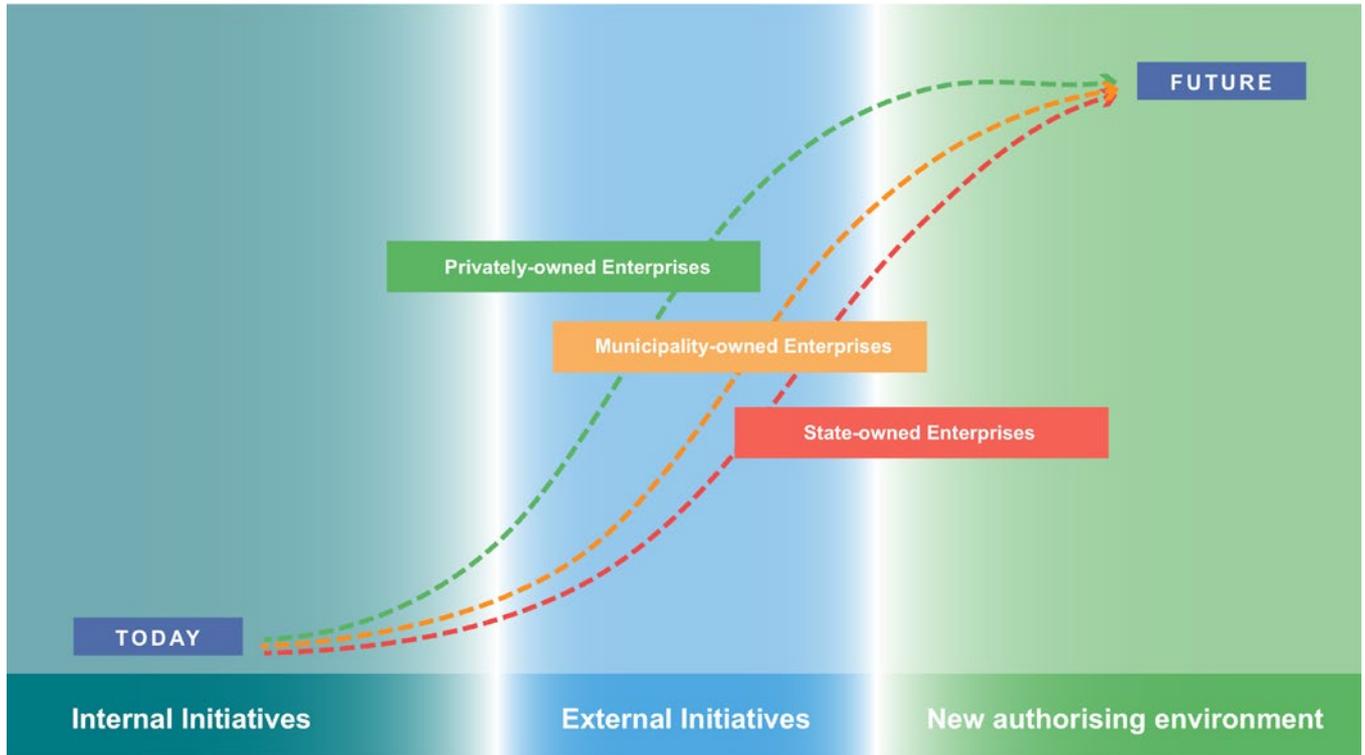
In practice, utilities must identify opportunities to take action across these three domains simultaneously (and they can be mutually reinforcing), but Figure 4 shows them sequentially to reflect the likely temporal characteristics of these initiatives to translate effort into impact.

Figure 3: Common features of transitioning to the utility of the future



Source: Brown, Rogers and Werbeloff 2016.

Figure 4: Transitioning to a utility of the future



Adopting new approaches and changing organisational culture involves cost and risk, while establishing and maintaining external partnerships takes time and effort. But, these actions are essential for systemic change. Plus, utilities have the formal and informal power to play a significant leadership role.

Changing regulations and policy settings can be a significant undertaking requiring sustained commitment, and usually, the utility can only influence, not determine, the outcome. But again, these changes are essential for authorising, scaling up and embedding new practice. Further, even though shifting the authorising environment may take time, the utility can do much in the interim to deliver community benefit and build momentum for more systemic change.

The next section illustrates some of the strategic steps undertaken by leading utilities in Australia. It is by no means an exhaustive list and has been collated to show examples of initiatives water utilities can take on TODAY, regardless of the apparent constraints of size, ownership or their operating and authorising environment.

Examples of the Australian experiences in transitioning towards water utilities of the future are presented for three types of water enterprises: wholly state-owned enterprises (the most prevalent in Australia); local or regional municipal government owned utilities; and privately-owned water utilities.

4. Progress and opportunities

Large state-owned enterprises (SOE)

Responsibility for water and sewerage services in most Australian cities rests with large state-owned enterprises (SOEs) that operate as a corporation with a sole shareholder (the State). These SOEs exhibit some common features:

- Many (particularly those in existing urban areas) have significant scale, managing large, historical assets.
- Business operations are generally financially strong, because they focus on parts of the water cycle that can be readily priced (usually water and sewerage services and maybe some drainage and waterway activities) and, therefore charged to consumers.
- They operate as monopolies, with clearly defined service areas.
- An independent government agency regulates prices and service standards. Independent regulators also monitor and enforce compliance with public health and environmental standards.³

SOEs' size, technical and financial strength, and often strong reputation give them opportunities to be significant catalysts for change. But, as publicly owned entities, SOEs are also guided by government policies and an operating licence or 'statement of obligation'. Licences and their obligations can vary significantly, affecting SOEs' ability to transition to the utility of the future for several reasons. First, some licences limit SOEs' operation to a relatively narrow definition of water services. Such licences may constrain SOEs' ability to identify and deliver new products and services.

By contrast, other SOEs are subject to vaguely defined and aspirational requirements (for example, 'to act in an environmentally sustainable manner'). This approach gives SOEs flexibility to enhance their existing services or expand their range of activities. But, it can also create tension between government expectations, the willingness of pricing regulators to approve prices necessary to fund the related expenditures and the willingness of customers to pay the approved prices.

Second, large publicly owned utilities can also be subject to short term political considerations that may impede long term transitional initiatives. This is particularly so if the utility does not maintain operational performance or has not built community support for significant future investments.

Within this context, many SOEs in Australia are taking clear steps now to position themselves as utilities of the future. Figure 5 illustrates examples of initiatives already underway.

However, CRCWSC research identified common stages of successful transition (Figure 3).

³For more information, see <https://www.accc.gov.au/about-us/consultative-committees/utility-regulators-forum>.

Figure 5: State-owned enterprises—some examples



Within existing authorising environments, SOEs can find progressive internal and external initiatives to:

- increase the efficiency and innovation in core services
- undertake research and demonstration to acquire the necessary proof-of-concept to support alternative approaches to water services (even if outside the current servicing remit)
- develop new business models for non-traditional activities, and
- form partnerships with stakeholder organisations in delivering integrated services.

SOEs are also undertaking the research, engagement and advocacy needed to support broader public policy, legislative and regulatory change.

Examples of each of the above are provided below with more detailed case studies included in Attachment 2.

Efficiency and innovation in core services

A significant body of evidence shows Australian SOEs are transforming from within, to better deliver their core services. Technological, financial and cultural commitment to innovation are common elements in these transformations.

SOEs are using automation and digital technology to improve their traditional water utility services. South East Water, for example, is using pressure sewers controlled by sensors to schedule transfers of sewage from new service areas into the existing trunk system (Case study 1, Attachment 2). This pressurised sewer system overcomes construction problems, responds to environmental constraints, smooths peak discharges and improves operational efficiency.



South East Water is using technology to improve sewerage system efficiency on Victoria's Mornington Peninsula. Image supplied by South East Water.



WA Water Corporation's smart meters make billing more efficient, provide information about water use and help the utility detect leaks. Image supplied by WA Water Corporation.

Similarly, the WA Water Corporation is using smart water meters and big data diagnostics to better manage water utilisation in Kalgoorlie (Case study 2). WA Water Corporation used information from the smart meters to develop a behaviour change campaign, to influence customer demand, particularly during warmer months. The smart meters also help the utility detect leaks.

Securing a diversity of water sources is an important strategy to increase water supply security. SOEs are using technology to increase their range of water supply sources, and make water supplies more resilient. Utilities around the country have invested significantly in climate independent desalination plants, (for example WSAA 2013). SOEs are also using technology to reuse recycled water and harness stormwater. WA Water Corporation undertook extensive trials before moving to use treated wastewater to replenish groundwater, as an option for securing Perth's water supply (Case study 3). Similarly, Yarra Valley Water played an important role in trialing and promoting stormwater harvesting (see Case study 5 below) as a valuable water resource.

As well as demonstrating how technology can diversify water supply sources, Case study 3 also highlights that community engagement is critical for applying innovative technology successfully. It explains the many ways the WA Water Corporation sought to engage the community and influence perceptions.



WA Water Corporation trialed replenishing Perth's water supply with treated wastewater. Image supplied by WA Water Corporation.

In addition to changing organisational systems and processes, SOEs are also transforming the organisational cultures that support collaboration and fuel innovation. For example, during one of Melbourne's worst droughts, most of the city's water utilities and related government agencies actively changed their culture and embedded a commitment to collaboration and achievement (Case study 4). This cultural change helped drive the shifts in attitudes to innovation, risk, trust and delegation needed to respond effectively to an extreme climatic event.



Cultural change in Melbourne's water utilities and stakeholders enabled the city to respond effectively to the millennium drought. Image supplied by Melbourne Water.

Activism, demonstration and proof-of-concept

Often, having a good idea or innovative technology is not enough. Regulations, community perceptions or institutional risk aversion can all get in the way of practical action. SOEs need robust research, monitoring and analysis, effective engagement, as well as commitment and resilience to implement a good idea. Yarra Valley Water provided strong and sustained advocacy for using stormwater in the Kalkallo development, for example. This project is now an important precedent for using stormwater more broadly across Melbourne (Case study 5), although CRCWSC research also highlighted the time and cost that can be required to achieve this (McCallum 2016).



Yarra Valley Water trialed harvesting and treating stormwater to potable standards at Kalkallo. Image supplied by Yarra Valley Water.

New business models

New technologies and organisational cultures open to change mean utilities are seizing opportunities to develop new products and services, outside their traditional remit. Yarra Valley Water, for example, is now converting what was considered a waste stream (biosolids) into a valuable product (energy) (Case study 6). A purpose-built waste-to-energy facility generates enough biogas to run the energy plant and the wastewater treatment plant.



Yarra Valley Water's waste-to-energy facility converts biosolids to biogas. Image supplied by Yarra Valley Water.

SOEs are also partnering with the private sector and developing new business models. South East Water, for example, is partnering with the development industry to introduce technology into new land developments and move beyond the traditional service boundary to manage assets on the property (Case study 7).



The AquaRevo urban development—a collaboration between Villawood Properties and South East Water—demonstrates the practical applications of water sensitive approaches.



Community aspirations for Elster Creek were represented in an architectural exhibition, which brought together organisational stakeholders and the community.

Working with community

Community support is a critical enabler for both city transition and utility transition. The Australian experience is littered with examples of when failing to engage the community effectively has halted or delayed large investments, or seen them underused.

As cities and utilities change, so too does the community's role. Initially, communities were passive—utilities informed communities about decisions made in their interests or on their behalf. Over time, communities have become more active—utilities now engage communities earlier, more openly and with a focus on outcome rather than assets. In a water sensitive city, communities and utilities are partners, setting the vision and delivering services that fulfil that vision. Melbourne Water worked with municipal councils and communities, to develop a plan that reduced the risk of flooding in Elwood (in Melbourne), for example (Case study 8). This flood management plan reflected community ideas and aspirations.

Similarly, Yarra Valley Water has introduced an immersive citizen jury process, to balance the service levels customers desire with the resulting impact on price (Case study 9).



A citizen jury helped Yarra Valley Water find the balance between price and service that is fair for everyone. Image supplied by Yarra Valley Water.



Melbourne's retail water companies helped customers change their behaviour, by exchanging inefficient showerheads and toilets.

Demand responses during drought and extreme flooding events also illustrate the power of an effectively engaged community. Melbourne's water retail companies engaged with customers to reduce demand during the millennium drought, for example (Case study 10). The companies set and communicated a clearly defined water consumption target, empowered community action, and reported regularly on progress.

Utilities of the future work with the community in new ways and engage externally, for example, by listening more closely to stakeholders and by partnering with other organisations. State-based utilities will retain custody of the resources at their disposal (indeed, ownership is constitutionally prescribed in some states). But already, some are developing new public-private and community partnerships and delivery models to support greater community value, rather than simply minimising cost and risk. Communities in Melbourne can apply to use Melbourne Water land for community-building activities (Case study 11). The community benefits from improved access to open spaces, while Melbourne Water improves its assets and its capacity to engage and service the community.



Melbourne Water uses its Our Space, Your Place app to increase community access to its assets. Image supplied by Melbourne Water



The Clearwater capacity building program was part of efforts by Melbourne Water to support broader action to reduce stormwater pollution.

Building industry capacity to effect change

SOEs can influence their authorising environment, by demonstrating the benefits of new approaches. They can use their size and power (formal and informal) to influence both governments and the community, by mainstreaming new approaches and building industry capacity. Building wider industry capacity is also critical for delivering outcomes in a changed authorising environment.

Melbourne Water, for example, used its influence, to encourage State Government agencies, local governments and other water utilities to see stormwater as a resource (Case study 12). It did not have a formal remit, but Melbourne Water recognised it could take a strategic role in reducing stormwater pollution into Melbourne's waterways and Port Phillip Bay.

Municipal government entities

Changing the authorising environment—urban water policy reform

Water utilities can drive change in their authorising environment that scales up, speeds up and locks in water sensitive transitions. As illustrated in the previous case studies, Australian water utilities are doing this by:

- conducting scientific research and engaging with the community, to promote informed public discussion of water management issues and create a strong base for policy, community and regulator support
- delivering pilot and demonstration projects that become exemplars and proof-of-concept, ultimately providing the evidence for policy change
- building industry capacity so that water sensitive city opportunities are delivered efficiently and perform to specification.

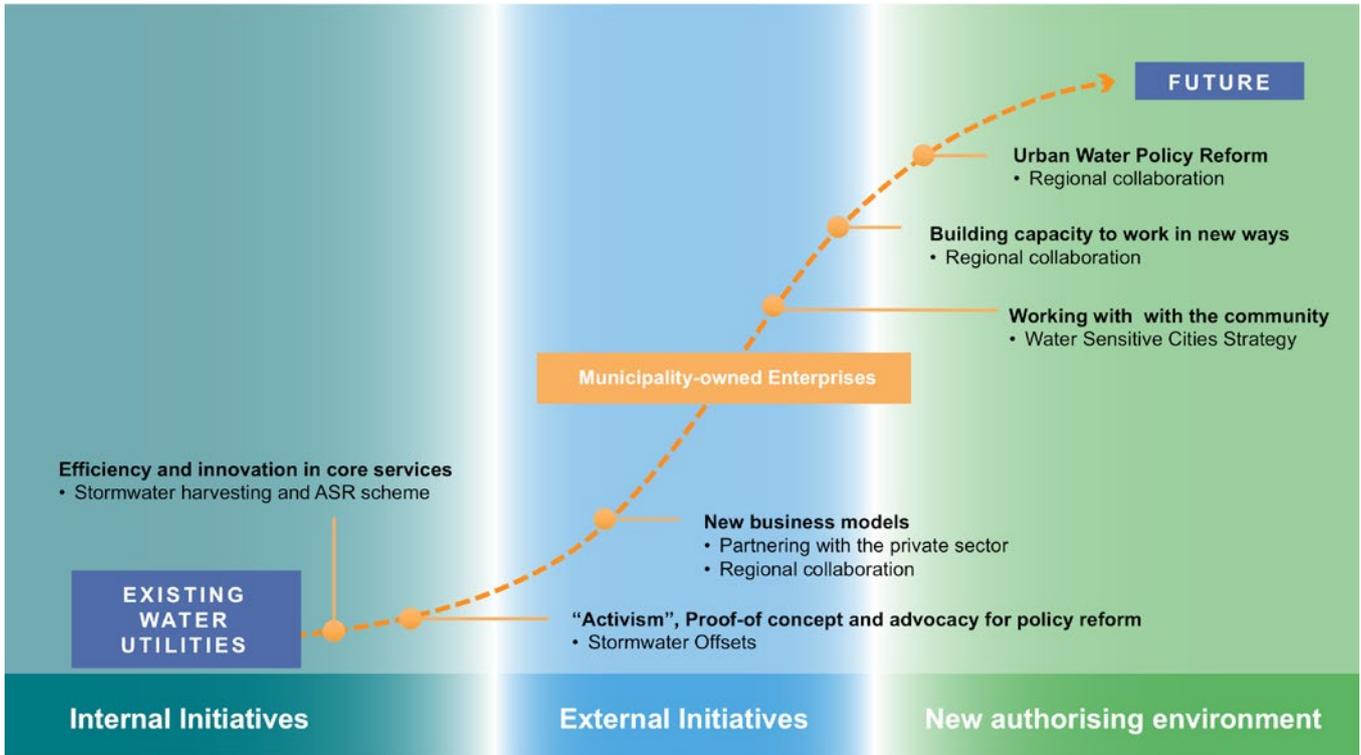
The Victorian Government's current policy on managing water—Water for Victoria (Case study 13)—illustrates how utilities can influence their authorising environment over time. The policy builds on over 15–20 years of research, collaboration, investment and advocacy. It draws on early innovations and proof-of-concept delivered by Melbourne water utilities such as the Lynbrook Estate water sensitive urban design (WSUD) scheme (Melbourne Water) and the Kalkallo stormwater harvest scheme (Yarra Valley Water). The policy provides a mechanism that transforms what was once perceived as innovative and risky into standard practice, and that authorises the next wave of innovation and collaboration.

As well as large SOE water utilities, Australia also has a significant number of municipal government owned water and environment management entities. These locally integrated entities are often smaller in scale and are common in rural and regional areas. New South Wales has more than 100 municipal government owned water and sewerage service providers in rural and regional areas, for example. In Queensland, all service providers, large and small, are owned by municipal governments and operate within local government policy and priorities.

In this model, city or regional groups of local governments manage the entire water cycle (including local drainage and waterways). Often, they also manage other related sectors such as local parks, urban planning and solid waste management, creating integrated water management entities. As a result municipally-owned water utilities often have significant opportunities for synergistically linking water management and community aspirations for locally defined liveability.

The Australian experience shows geographic location, size and ownership are not barriers to applying water sensitive principles that deliver a better result for communities (Figure 6). The CRCWSC's work focuses mainly on cities, but ample evidence suggests municipally-owned authorities are introducing the same innovations. In fact, local ownership and close community connection can be an advantage.

Figure 6: Municipally-owned enterprises—examples



The City of Salisbury manages more than 50 constructed wetlands and treats approximately 8 gigalitres of stormwater each year. Photo of Springbank Waters, Burton, City of Salisbury. Image supplied by City of Salisbury.

Efficiency and innovation in core services

Smaller municipal water utilities are taking advantage of innovative ways to better use their existing infrastructure to deliver services. Mackay Regional Council in Queensland, for example, introduced digital communications technology, to track consumption and then manage demand for water, particularly during peak periods (Case study 15, discussed below).

Activism, proof-of-concept and advocacy for policy reform

Smaller scale utilities can often respond to the needs of their local communities and industry by applying new approaches. The City of Salisbury responded to increased water demand from industry and the community by managing harvested stormwater and wastewater. This water services parks, schools, industry and residential properties (Case study 14).

New business models

Sometimes the smaller scale and regional location of municipally-owned utilities can constrain resources, so innovative utilities partner with the private sector to overcome size, financial and geographic constraints, working with others to drive innovation. Mackay Regional Council, for example, partnered with a technology start-up, which owns and operates automated meter reading technology (Case study 15). The council uses information from these meters to manage demand from customers and network losses.

Building industry capacity

New business models are also building industry capacity. Regional alliances provide an opportunity for local governments to retain 'economies of scope' with other municipal activities while promoting more integrated regional planning and advocacy, scale economies in procurement and service delivery, and enhanced technical capability. Examples include the Outback Regional Water Alliance in Queensland and water service alliances in New South Wales.

Working with the community

Local and regional entities can take advantage of their breadth of services and connection with their local community. Gold Coast Water and Gold Coast City Council, for example, used community workshops to develop an agreed vision of the future, and then prioritise actions to realise that vision (Case study 16).



Stakeholders from State Government agencies, local government, universities, community groups and indigenous groups used the Water Sensitive Cities Index to envisage a Water Sensitive Gold Coast.

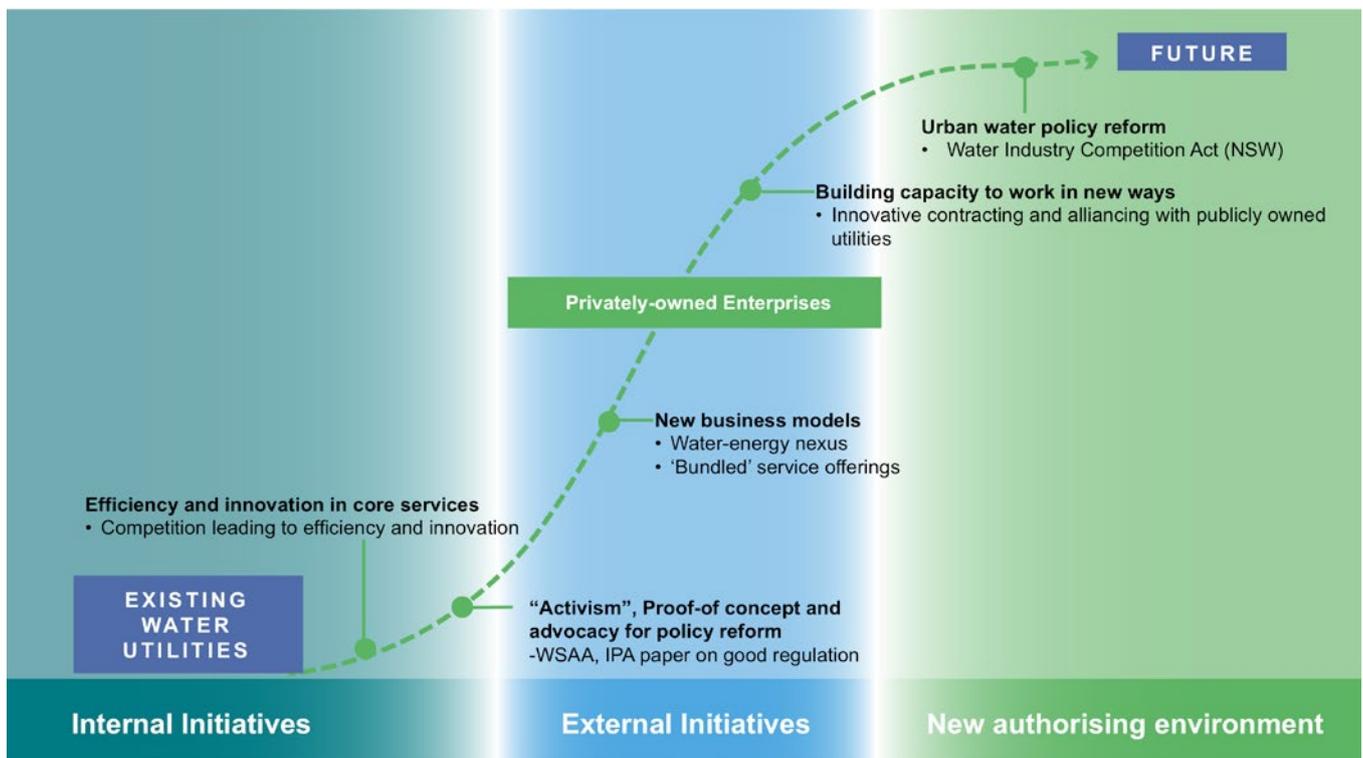
Private sector enterprises

Currently, a large fully privatised urban water authority, like those in the United Kingdom, does not exist in Australia. However, the private sector plays an important role in most elements of the urban water cycle. This contribution can range from traditional outsourcing of individual projects or components of service planning and delivery, through to very large public-private partnerships and concession arrangements.

The role of the private sector in planning and delivering future utility services and water sensitive cities will vary across jurisdictions. But, when communities and governments have clear objectives to increase private sector involvement and appropriate safeguards for community and environmental interests, scope exists for more innovation in how the private sector contributes to water provision in Australia.

Figure 7 illustrates some of the ways private sector enterprises are contributing to Australia’s urban water sector.

Figure 7: Private sector enterprises—examples



Efficiency and innovation in core services

National competition policy reforms undertaken in the urban water sector since the 1990s have driven significant improvements in efficiency and service quality. The Productivity Commission estimated institutional and pricing reforms in the urban water sector raised gross domestic product by about 0.35 per cent. Further, if maintained, these gains would represent an annual economic gain of over \$5 billion.

Significant reforms include corporatising public water utilities and improving pricing and economic regulation, as well as:

- opening up potentially competitive elements of service delivery
- promoting competitive neutrality between public and private providers
- improving the economic, environmental and public health regulation of natural monopolies.

Innovation in contracting and procurement, particularly among large utilities, has also improved service cost, quality and risk management.

Activism, proof-of-concept and advocacy for policy reform

Private sector participation in the Australia water sector has improved, but scope for further reform remains. For example, through the Water Services Association of Australia (the peak body that supports the Australian urban water industry) and Infrastructure Partnerships Australia (IPA) (Australia's peak infrastructure body), water utilities examined the current regulatory framework for Australia's urban water providers, and recommended changes to optimise community outcomes. These changes focused on three areas:

- better economic regulation
- appropriate opportunities to deploy competition
- clear governance arrangements (Case study 17).

New business models

In most Australian jurisdictions, structural reform and privatisation requires extensive community engagement and significant changes in regulation and legislation.

A more likely short to medium term opportunity is private sector service provision within, or on the fringe of, an existing SOE service area. These services could include traditional water related services, as well as some non traditional water services and/or non-water services (such as hot water, power, digital communications, waste services, etc.)

To date, most examples of private utility services are in urban infill projects, particularly high-density developments, where dual pipes are feasible, space is limited, there are few fixed piping assets, and consumers are willing to pay for a simple model that addresses installation, operation and maintenance. Other examples include peri-urban or outer urban developments, where scope exists for water collection, dual pipe systems, stormwater capture at scale etc.

Typically, private utility service provision has occurred on a relatively small scale and has offered an integrated suite of services. Flow Systems, for example, provides drinking water, recycled water, wastewater, embedded energy and hot water systems to greenfield and urban infill communities (Case study 18).

This bundled offering normally involves design and installation, operation and monitoring, and maintenance. Generally, the private provider links to a regional utility's water supply scheme, sewer system and (in some cases) to a private power network, but aims to minimise take-off from these sources. Rather, these sources provide back up. Current examples suggest private operators use economies of scope to offset the loss of scale economies most SOEs enjoy.

5. Summary and conclusions

Urban water policy reform

As illustrated above, private water businesses have and will need to continue to play a key role in advocating for and delivering the benefits of industry reform and utility evolution. They can bring technical excellence, practical knowhow, and innovation critical for reform that leads to community value.

Creating the regulatory framework that allows for—and indeed encourages—increased private sector participation offers significant potential benefits including greater choice and value for customers and the wider community. Realising these benefits requires an appropriate governance framework that puts the long term interests of the community at its core. This framework includes the following key elements:

- An overarching vision, clear policy direction and long term strategy for the city ensures the services offered by individual participants align with government and communities priorities, including overall system resilience, efficiency and equity.
- Clearly articulated community and environmental outcomes are protected through robust licensing, pricing and regulation that is agnostic about ownership (that is, supports publicly and privately owned providers). This framework also includes appropriate safeguards, such as supplier of last resort and step in provisions.
- Clearly defined property rights, predictability in regulatory enforcement and appropriate appeals mechanisms provide certainty for investment.

Most Australian states address the above issues to varying degrees (Case study 19). However existing utilities must decide whether they see greater private sector involvement as an opportunity to proactively engage, or a threat to be resisted. The answer may vary from one situation to the next, but it must be based on the long term interests of the community.

Water utilities and the communities they service face supply pressures from rapid population growth, climate change and demands for affordable services.

It is increasingly unlikely that water utilities can address these challenges using the traditional urban water management paradigm. All utilities should examine what they can do TODAY, to position their organisation to transition to a water 'utility of the future'. Many Australian water utilities have recognised this need for change, and are already becoming utilities of the future via internal and external initiatives. Over the past 10 years, Australian water utilities have demonstrated how they can work within their current authorising environment to advance their aspirations, while also undertaking initiatives to foster a progressive change in their authorising environment. They are using new technology and new partnerships to improve efficiency, expanding their range of products and services, and improving customer engagement. The case studies presented serve as implemented exemplars to motivate utilities globally to start taking actions—no matter how small—in positioning and transitioning into utilities for the 21st century.

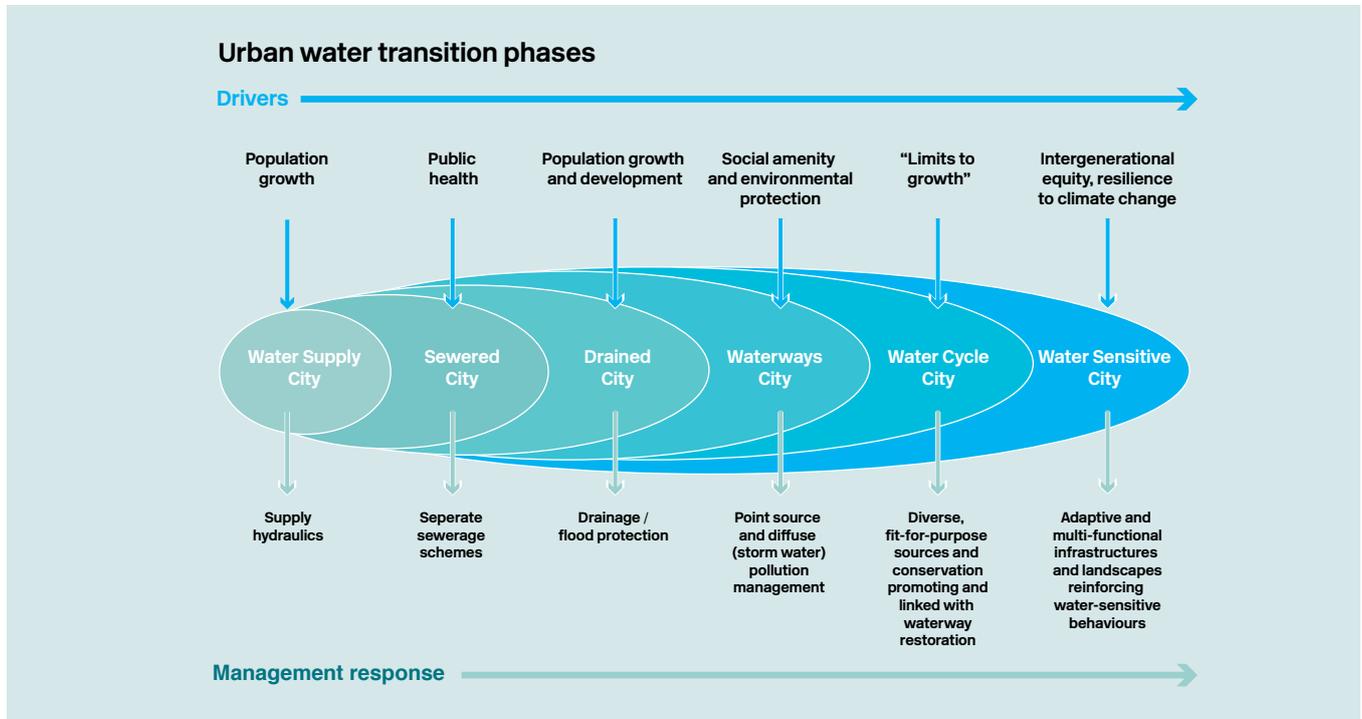
The many case studies demonstrate that these actions will generate lasting change. However, they also require a commitment to new perspectives, new partnerships and courage to embrace new approaches. For those who have commenced the transition, there is still more to do, to make these actions and behaviours the new 'business as usual'.

- First, utilities must keep transforming themselves internally—embedding a culture of change, integrating existing services, identifying new services and products, and building community engagement capacity.
- Second, they must keep engaging with external bodies—other water utilities, other service utilities, private sector providers and community groups, to identify and deliver services and generate community value.
- And third, they must keep influencing their authorising environment—demonstrating how new services and delivery methods can benefit both providers and the community, and developing and maintaining community support.

Attachment 1: The evolution of water utilities

Brown et al. (2009) identified six water management regimes, which can be presented as a continuum (Figure).

Figure 1: Urban water transition phases.



The first three regimes represent the historical development of water utilities:

- Water supply city—provides clean and reliable water supplies
- Sewered city—improves public health outcomes
- Drained city—protects the city from flooding.

These regimes delivered an increasingly wider range of services, but have common features:

- Utilities (usually government owned) deliver services via large centralised infrastructure.
- Service administration/governance is generally siloed, both within water utilities (that is, little integration between clean water, sewerage and stormwater services) and between water utilities and other utilities (such as energy providers and waste managers).
- Utilities make water decisions for communities, generally without consulting those communities. And, people know little about where their water comes from and how it’s managed (that is, their water literacy is low).

The next three regimes recognise the opportunities of working with communities and others to manage the entire water cycle. They also address issues such as environmental damage and threats to water supply security (created in part by the previous three regimes):

- Waterway city—Water utilities address environmental health concerns by considering waterway health (such as managing point source and diffuse water pollution and by restoring waterways to more natural forms). Governance and regulation become more risk based and outcome focused. Utilities engage more with communities, to identify people’s needs and preferences for services.
- Water cycle city—Utilities address concerns about water supply security by identifying other water sources and managing pollution (for example, by reusing wastewater and harvesting stormwater). Utilities focus on community value, not just least cost.
- Water sensitive city—Water is embedded as a critical element of city planning. Infrastructure is adaptive and multi-functional, communities partner with utilities to deliver services, and governance supports accountability and collaboration.

Source: Wong 2016.

Attachment 2: Case studies

Case study 1: Improving the efficiency of existing networks

Pressure sewers in south eastern Melbourne

South East Water is using new technology to overcome wastewater pollution from septic systems on the Mornington Peninsula, a problem that is often at its worst during busy holiday periods. The peninsula's sandy soils allow dirty water from septic tanks to seep into the groundwater, bays and beaches. These soils also prohibit South East Water from using a conventional gravity sewer.

So instead, South East Water is rolling out one of the largest pressure sewer constructions in Australia, covering 16,500 properties. The system comprises:

- a boundary kit, which connects each property to the sewer network
- a pump and tank unit installed on each property
- a property service line, which connects the boundary kit to the pumping unit and sewer network
- an innovative OneBox® remote control and monitoring unit, which is telemetrically connected to South East Water's operations centre.

This modern pressure sewer system reduces wastewater pollution released into the environment, and allows South East Water to better use its existing mains sewer network.

Sources: South East Water 2017; Future Water 2015.

Case study 2: Using digital technology to deliver better services

Smart metres leading to water savings

The WA Water Corporation is installing smart water meters to improve billing efficiencies. But as well as making billing more efficient, the Water Corporation is analysing data from the meters to detect leaks and better understand customers' water use behaviours in remote Western Australian towns.

With input from the CRCWSC researchers and data from its smart meter network in Kalgoorlie, the Water Corporation has been conducting a behaviour change campaign, aimed at reducing water use during the warmer months when demand peaks. Two years after initial deployment, the smart metering solution has helped the utility reduce annual water supply by over 800 million litres.

Source: CRCWSC 2016a.

Attachment 2: Case studies

Case study 3: Diversifying and integrating water sources

Aquifer recharge and community engagement

Prolonged drought and lower rainfall prompted the WA Water Corporation to consider innovative options for securing Perth's water supply. International evidence suggested replenishing groundwater with treated wastewater was a viable option technologically. The Water Corporation needed to demonstrate that this novel water supply option could operate within Western Australia's water licensing and regulatory arrangements, and that the community would approve.

The Water Corporation commenced a groundwater replenishment trial, involving treating wastewater via several advanced treatment processes, including ultrafiltration, reverse osmosis and ultraviolet disinfection prior to injection into groundwater aquifers. The groundwater is extracted after a number of years, treated again and then added to the existing water distribution system. The trial demonstrated the treatment train consistently met water quality guidelines, protecting people's health and the environment.

At the same time, the Water Corporation implemented an extensive community engagement program, which led to wide community and industry acceptance of this additional source of water for the city. The community engagement program included:

- conducting an open transparent trial
- anticipating potential developments and distracting influences, and preparing mitigation or management procedures
- investing significant amounts of time and financial resources in communication and engagement activities, such as:
 - face-to-face engagement via community forums and an educational facility built at the treatment facility for tours and open days
 - a website
 - newsletters
 - a social media campaign.

Sources: Bettini and Head 2015; WA Water Corporation 2017.

Case study 4: Establishing a culture of collaboration and innovation

Managing the millennium drought

During the early 2000s, most of Melbourne's water utilities and some related departments and regulatory agencies undertook significant culture change programs. These programs focused on changing institutional culture, to develop open, supportive and achievement oriented approaches. This change occurred during the city's worst drought on record, and at a time when inter and intra organisation collaboration was critical.

Significant and sustained senior leadership commitment was critical to effecting change, particularly in modelling and rewarding changed behaviours. Organisational time and financial commitment was also substantial. While results varied, many agencies experienced improvements in attitudes to risk, innovation, trust and delegation. These shifts were instrumental to the utility, government, regulatory and community innovation that enabled the city to respond effectively to the millennium drought.

A more supportive environment also helped staff wellbeing, retention and collaboration during a period of considerable stress and change. Adopting a common assessment tool across organisations (the Human Synergistics Organisational Cultural Index) provided a common language to improve communications and momentum for change.

Sources: Human Synergistics 2016; Melbourne Water 2013.

Attachment 2: Case studies

Case study 5: Pushing the boundaries

Kalkallo stormwater harvesting scheme

Yarra Valley Water instigated an estate-wide scale stormwater harvesting scheme at Kalkallo. The technologies adopted are not necessarily new, but how they are combined in Kalkallo is unique. It is the first large scale development to recycle stormwater for potential potable use in Australia.

The key innovation is treating stormwater to a standard suitable for direct injection into potable supplies, using a precinct scale catchment and modest storage times. Proof-of-concept alone is insufficient. Ultimately convincing the relevant regulatory authority was always going to be the key challenge—stormwater to potable standard has not been done before anywhere in Australia. Kalkallo's direct contribution to the estate's water supply is likely to be modest, because it was conceived as a case study to test the concept's viability, rather than as a scaled implementation of a new technology.

Stormwater reuse at such a scale would enable a far greater proportion of stormwater to be reused than is possible through current non-potable uses. This project provided a platform for illustrating the significant environmental benefits arising from reduced stormwater pollution and flow control. Further, the project proved whether or not the potable reuse of stormwater was both technically viable and possible within existing regulatory frameworks.

Sources: McCallum 2016; MAB 2009.

Case study 6: Developing new service lines

Green waste to energy

Yarra Valley Water developed a purpose-built waste-to-energy facility to manage the biosolids from its existing sewage treatment plant in Aurora. It also capitalises on the business's knowledge and experience of biosolid/digester operation.

The facility provides the community with an environmentally friendly disposal solution for commercial organic waste, by diverting 33,000 tonnes of commercial food waste from landfill each year. It generates enough biogas to run both the energy plant and the wastewater treatment plant, and surplus energy is exported to the electricity grid. The business also offsets some of the capital and operating expenditure outlays via gate fees from waste the plant receives.

Source: WSAA 2017a.

Attachment 2: Case studies

Case study 7: Partnering for innovative servicing solutions

Innovation in land development

AquaRevo is a collaboration between South East Water and Villawood Properties to create a unique residential development. Homes will include water saving features that reflect South East Water’s significant in-house research and development:

- a high-tech rain-to-hot water system for bathing and showering that includes screening, filtering, treatment and temperature sensing devices
- a pressure sewer system that pumps wastewater to a water recycling plant within the estate, treats the water to class A standard, and sends it back to each home for use in the garden, toilet or washing machine
- rainwater tanks with technology that receives weather forecasts, then releases water before heavy rainfall to minimise overflows or flooding in local waterways
- a OneBox® device that controls the water technology in each home, remotely monitors

Sources: [CRCWSC 2017a](#); [South East Water 2017](#).

Case study 8: Involving communities in decision making

Elster Creek

Melbourne Water worked with four local municipalities and their communities, to take a whole-of-catchment approach to improving flood management across the catchment, including the inner city suburb of Elwood.

Elwood is built on swamp land, with a history of canal works and drainage that allowed early settlement of the precinct. Elster Creek is the precinct’s major waterway. Over time, urbanisation and increasing urban density, both within the precinct and in the upstream catchment, have made the area increasingly susceptible to both pluvial and fluvial flooding.

Contemporary practice relies on infrastructure solutions and building the downstream community’s capacity to plan, respond and recover from flood episodes. But, Melbourne Water wanted to develop a plan that reduced the risk of flooding in the first place.

A community envisioning process facilitated by the CRCWSC improved community understanding about the causes and consequences of flooding. This process also empowered communities, who worked with Melbourne Water and the municipal councils to develop a flood management strategy for Elwood. Stakeholders worked together to further develop community ideas and aspirations, which were then represented in an architectural exhibition. This exhibition catalysed collaboration among the many organisational stakeholders and the community.

Initiatives being pursued as a result of this process include the potential for co-funding flood mitigation works, prioritising and coordinating capital works across municipalities, harmonising flood detention design standards and developing a basin-wide modelling capability.

Melbourne Water and the four councils have also created a CEO forum and Working Group to support progress over 12–18 months, including a range of community engagement initiatives.

Sources: [CRCWSC 2016b](#); [CRCWSC 2017c](#).

Attachment 2: Case studies

Case study 9: Involving communities in decision making

Citizen jury

Delivering new services often involves incurring more costs, so water utilities must balance service delivery and price. For its most recent pricing review, Yarra Valley Water implemented a new approach to understanding its customers' desire for new services and their willingness to pay for these services.

It replaced traditional approaches (such as market research and willingness to pay studies) with a citizen's jury. This immersive process saw a representative group of 35 customers receive evidence and deliberate over a five day period on the following question:

'We need to find a balance between price and service which is fair for everyone. How should we do this?'

The jury received presentations and materials across a range of issues and could call internal and external experts for further insights. At the end of the process, the jury was empowered to make recommendations on behalf of the community to Yarra Valley Water, which will help the business finalise its submission to the pricing regulator.

Yarra Valley Water benefits from this approach, because investments align with community/customer expectations. Customers and the community also benefit because decisions reflect their wants and needs, and they have trust in the outcomes.

Sources: WSAA 2017a; Yarra Valley Water 2017.

Case study 10: Mobilising community action

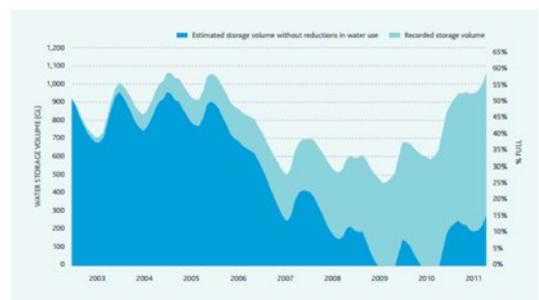
Drought response in Melbourne

The millennium drought, spanning 1997 to 2009, had a major impact on water supplies and communities across the country.

Melbourne was no exception, experiencing what was at least a one in 500 year event (based on Melbourne's recorded history). In 2006, for example, storage inflows were around 30 per cent below the previous lowest recorded level. Water volumes fell rapidly, and without a timely response, the city would have been in significant trouble. But, large supply side solutions take time. Water efficiency and reuse measures as well as temporary qualification of environmental flow releases were a critical and timely element of the overall response.

The city's retail water companies (City West Water, Yarra Valley Water and South East Water) and the Victorian Government led a range of water efficiency measures, which provided a strong demand side response without which demand would have exceeded supply (Figure).

Figure:
Melbourne's water storages during the Millennium Drought with and without water savings



These demand savings were achieved through actions including:

1. a clearly defined and communicated water consumption target
2. support to foster the desired behaviour (for example, utilities exchanged more than 460,000 free water efficient showerheads and 4,500 inefficient toilets)
3. ongoing communication and engagement, to report on progress and reward action.
4. non residential water efficiency programs.

Source: Melbourne Water 2017.

Attachment 2: Case studies

Case study 11: Increasing access to create community value

Our Space Your Place

As Victoria's second largest land holder, Melbourne Water was looking for ways to better use its existing resources and create community value. So it developed the 'Our Space, Your Place' application, to help connect communities with land to bring their project ideas to life.

Historically, Melbourne Water took a public safety approach to managing its assets, often by restricting access. Now, while public safety is still paramount, community and not-for-profit groups can apply to use Melbourne Water land for a range of community-building activities, such as community gardens, pop-up parks or events, murals or public art.

This project demonstrates how a cultural change within an organisation and working with the community can create value, for both the organisation and others. The community benefits from improved access to open spaces in an increasingly urbanised environment, and better health and wellbeing (both physical and mental). Melbourne Water benefits by improving its asset utilisation, and building internal capacity to engage and service the community.

Sources: WSAA 2017a; Melbourne Water, 2018

Case study 12: Building industry capacity

Stormwater quality and flood management

Contemporary urban water management is a multi-sectoral endeavour. The conventional urban water governance framework fragments the roles and responsibilities for delivering water supply, sewerage, drainage and water environment protection services.

In Melbourne, stakeholders recognised stormwater as a diffuse source of environmental pollution that has a detrimental effect on the ecological health of receiving waters. But, managing stormwater quality was the responsibility of environment protection services, not water providers.

Melbourne Water changed that perception in the early 1980s, when it encouraged stakeholders to manage stormwater as a resource. In particular, it fostered integrated management of urban stormwater for drainage and improved stormwater quality.

It did not have a clear formal remit, but Melbourne Water recognised the strategic role it could take in introducing stormwater quality improvement measures and water sensitive urban design metropolitan-wide. Its goal was to reduce stormwater pollution into Melbourne's waterways and ultimately Port Phillip Bay.

Melbourne Water helped develop and influence metropolitan-wide stormwater management policies, objectives and management targets. It hosted a capacity building program, Clearwater, to help local governments and private sector land developers comply with these policies.

It also introduced a drainage scheme and stormwater quality offset program associated with its construction program of regional stormwater quality wetlands.

Sources: Brown and Clarke 2007; Clearwater 2017.

Attachment 2: Case studies

Case study 13: Facilitating integrated water management

Water for Victoria

The Victorian Government's current policy on water management—Water for Victoria—creates incentives and opportunities for integrated water management. The policy aims to improve liveability and resilience of Victorian towns and cities, via strategic actions such as:

- using diverse water sources to protect public spaces, including maintaining priority spaces during drought and promoting urban cooling
- exploring all drinking and non-drinking water sources and using each source appropriately to protect human health
- investing in wastewater, such as working with local government to better manage onsite domestic wastewater, and exploring opportunities for resource recovery from wastewater or other sources of organics
- improving stormwater management for greener environments and healthier waterways, by exploring legislative, regulatory, financial and market-based options
- working across government to ensure planning for water-related benefits is part of all future major projects and relevant government strategies and initiatives
- requiring water corporations incorporate integrated water management in all their planning, including urban water strategies
- putting integrated water management into practice, by developing a common economic evaluation framework, which can account for different planning scales, local conditions and the multiple benefits of proposed investments.

Source: [Victorian Department of Environment, Land, Water and Planning 2016](#).

Case study 14: Activism, proof-of-concept and advocacy for policy reform

Stormwater harvesting

An early focus on restoring degraded environment in the early 1990s led the City Council of Salisbury, in South Australia, to innovate with large scale stormwater treatment. The city uses constructed wetlands to treat stormwater, which is then harvested and injected into groundwater aquifer for storage.

The Parafield Stormwater Harvesting Facility started by supplying non-potable water for industry use, supplying one of Australia's largest wool processing companies with fresh water to wash its wool. The city then expanded its stormwater harvesting scheme, to provide high quality recycled water throughout Salisbury and beyond.

Salisbury Water (the water utility created by the council) manages harvested stormwater, as well as wastewater from a nearby wastewater treatment plant. This water services municipal parks and reserves, schools, industry and new residential properties, including a community of 10,000 residents, a university and around 5,000 employees in several high-technology businesses.

Salisbury now has more than 50 constructed wetlands covering 600 hectares and treats approximately 8 gigalitres of stormwater annually that is then injected into aquifers.

Source: [City of Salisbury 2017](#).

Attachment 2: Case studies

Case study 15: Partnering with private sector to overcome constraints to innovation

Demand side options for managing peak periods

Mackay Regional Council adopted an innovative approach to manage the effects rapid population growth were having on its water system, including partnering with private sector providers. The traditional response—increasing capacity by building more infrastructure—resulted in unsustainable increases in water tariffs.

So, the council identified non-capital solutions to address increasing demand. However, these demand side options needed detailed data on consumption and network losses. And customers needed access to this data, for demand management strategies to be effective.

The council addressed the first issue—obtaining consumption data—by introducing automated meter reading (AMR) technology. These digital readers provide information about residents water use, and can also identify network losses (from leaks, for example). But rather than develop the network itself, the council partnered with a technology start-up, and procured the communications technology as a service. That is, the technology supplier owns and operates the network.

The council addressed the second issue—influencing community and customers' water use—by giving the community and customers access to information on their use, via the My H2O customer portal. It also launched a social media campaign, to build awareness of water as an important and urgent issue, and to address specific behaviours. It used a targeted campaign to explain the effects of outdoor watering during the dry season, for example.

The council estimates these measures reduced peak demand by 10 per cent, which in turn delayed capital expenditures by 4–5 years.

Sources: Utility Magazine 2016; Daily Mercury 2015; Industry Queensland 2016.

Case study 16: Implementing a shared WSC vision

A Water Sensitive Gold Coast

Bringing together diverse perspectives is challenging, but it is also crucial to how cities define their water sensitive city (WSC) vision, and develop successful transition strategies for realising that vision. Gold Coast Water sits within the Gold Coast City Council, and together these organisations are leading a project to identify a 50 year vision and strategy for a Water Sensitive Gold Coast.

The rapidly growing Gold Coast region of Queensland has experienced the significant economic, environmental and community impact of both drought and flooding.

Informed by the CRCWSC's WSC Index tool, these organisations used workshops to understand the current context, agree on a future vision, benchmark progress against other cities, and develop priority actions. The workshops brought people together, and created space for participants to develop the integrated water management approach needed for a water sensitive future. Participants could develop a shared understanding of aspirations, issues, and opportunities for accelerating the Gold Coast's Water Sensitive City transition.

Participants included representatives from City of Gold Coast Council, Seqwater, the International WaterCentre, the University of Queensland's Global Change Institute, Griffith University, Healthy Land and Water, State Government, the Gold Coast Catchment Association, and community and local Indigenous groups.

Source: CRCWSC project report due for publication March 2018.

Attachment 2: Case studies

Case Study 17: Striving for more effective regulation

Recommendations to remove regulatory constraints

In November 2015, public and privately owned water sector businesses joined forces to publish a consensus view on the 'structural and regulatory reforms Australia can undertake to avoid urgent and costly decisions that will otherwise be required in the future'.

The report prepared through the Water Services Association of Australia and Infrastructure Partnerships Australia acknowledged the many ways private providers currently contribute to Australia's urban water sector. However, water utilities consider the current regulatory frameworks constrain these arrangements, by dictating the degree to which private investment and competition can develop. WSAA and IPA made the following recommendations to improve the regulatory framework for urban water:

- better economic regulation—including clear requirements for regulators to act in the long term interests of customers and consider the viability of water businesses; strong incentives for efficiencies and genuine customer engagement; and a review and appeals mechanisms for water businesses and other stakeholders
- appropriate opportunities to deploy competition—actively pursue frameworks that promote appropriate and efficient competition, including allowing for private sector providers
- clear governance arrangements—frameworks that provide competitive neutrality between existing and new suppliers, make wider policy outcomes explicit and identify who is responsible for security of supply.

An improved regulatory environment benefits:

- customers, who can expect lower bills and better services
- the economy, which endures lower input costs for water and wastewater services
- the environment, which enjoys transparent signals for sustainable management and use.

Source: WSAA and IPA 2015.

Attachment 2: Case studies

Case study 18: Integrated water services

Leveraging economies of scope by offering bundled services

Flow Systems illustrates how a privately-owned utility has the corporate flexibility to innovate in integrated utility services. It took advantage of the *Water Industry Competition Act 2006* to encourage competition in the water industry and foster innovative recycling projects and dynamic efficiency in providing water and wastewater services. Flow established a sustainable multi-utility business, which provides drinking water, recycled water, wastewater services, embedded energy networks, and hot water systems to greenfield and urban infill communities.

Flow operates in New South Wales and Queensland as the local water and energy utility for 400 communities, including more than 28,500 dwellings and 800,000m² of commercial retail space. One of its flagship projects is the 5.8 hectare mixed-use development at Central Park Sydney near Sydney's CBD, supplying water and energy utility services to 3,000 residences and 65,000 m² of retail and commercial space.

By bundling water and energy utility services, Flow exploits the water-energy nexus with an onsite central thermal trigeneration plant and an onsite membrane bioreactor (MBR) and reverse osmosis (RO) recycled water facility (the world's largest in the basement of a residential building). Flow delivers water of differing quality via multiple sustainable pipelines within the precinct. Households and businesses can use recycled water for 40–70 per cent of their water use activities, such as toilet flushing, washing machine use, irrigation, green-wall watering and air cooling. Residents and commercial operators are charged the same rate for water and electricity as others in the city using centralised infrastructure.

The Flow business case centres on the significant value add associated with bundling water and energy services, and minimising/optimising the trunk infrastructure required for water and energy services and infrastructure augmentation (such as new or upgrades to treatment plants or substations).

This district approach to infrastructure extracts revenues from multiple water services—wastewater, recycled water and tradewaste. It significantly reduces drinking water consumption and the charges paid to Sydney Water, generating a more affordable water service for customers. The recycled water costs less than drinking water and is largely used more.

Flow's eight-step purification process is revolutionising the way water is recycled in Australia. Combining the natural organic anaerobic digestion processes with membranes, filtration and reverse osmosis, Flow eliminates smells and makes the ultraviolet critical control point effectively redundant, because water exceeds Australian recycled water standards. Using this water for air cooling also improves the efficiency and extends the life span of onsite chillers, compared with drinking water which contains more salts.

Sources: New South Wales Department of Primary Industries 2017; Central Park Sydney 2017.

Attachment 2: Case studies

Case study 19: Disruption changing regulation

Water Industry Competition Act 2006 (NSW)

Under Australian Competition Law in Australia, it is possible to gain a legal right to negotiate fair commercial terms to use the spare capacity in natural monopoly assets.

Extensively used in other utility services (for example, rail, gas, ports), there has been limited interest in seeking access to water assets. An exception is Services Sydney (a privately owned venture), which sought access to large trunk infrastructure assets owned by Sydney Water in 2004.

Services Sydney proposed offering a higher level of treatment and increased level of water recycling than Sydney Water, which aligned with community and government priorities at the time. Sydney Water challenged the Services Sydney proposal, and the resulting legal processes involved commitment of significant resources from both parties.

At the same time, the New South Wales Government was considering changes at the state level. The Services Sydney proposal was not implemented, but it was a significant factor in the State Government introducing new legislation, the *Water Industry Competition Act 2006* (WICA), which made private sector entry and competition much easier.

New business models have emerged under WICA, such as the Flow Systems Central Park project. WICA has also supported development on Sydney's fringe, as well as outsourcing and selling recycled water services in Newcastle.

Importantly, WICA recognised access to assets was not enough to assure community benefit. WICA and the associated regulations are reviewed and refined regularly, to ensure appropriate consumer, public health and environmental safe guards are in place (including issues like supplier of last resort) to promote fair competition that is in the interests of the community.

Sources: Allens 2014; New South Wales Department of Primary Industries 2017; IPART 2017.

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Essential Participants



Environment,
Land, Water
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Government of **Western Australia**
Department of **Water and Environmental Regulation**



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