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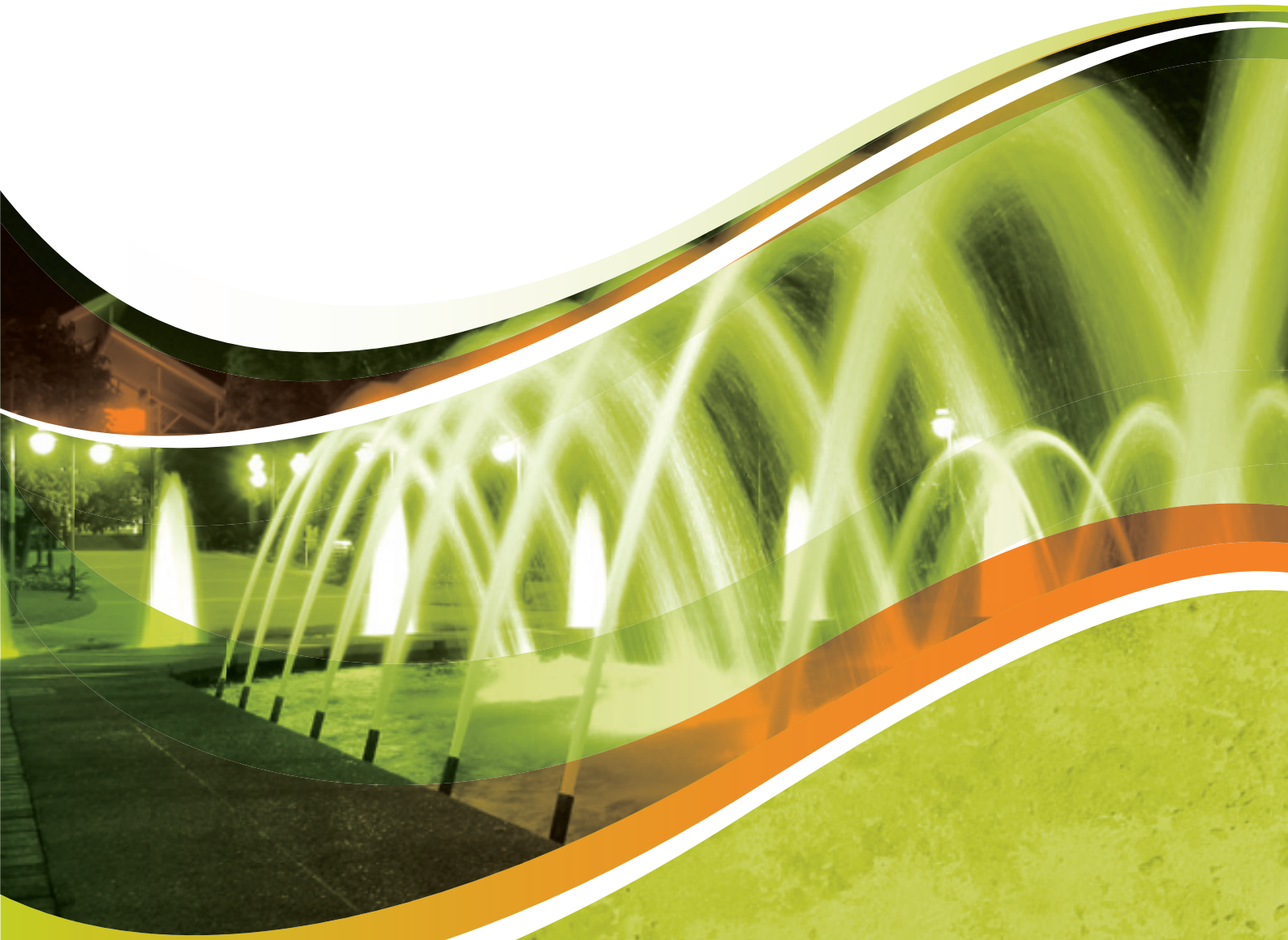
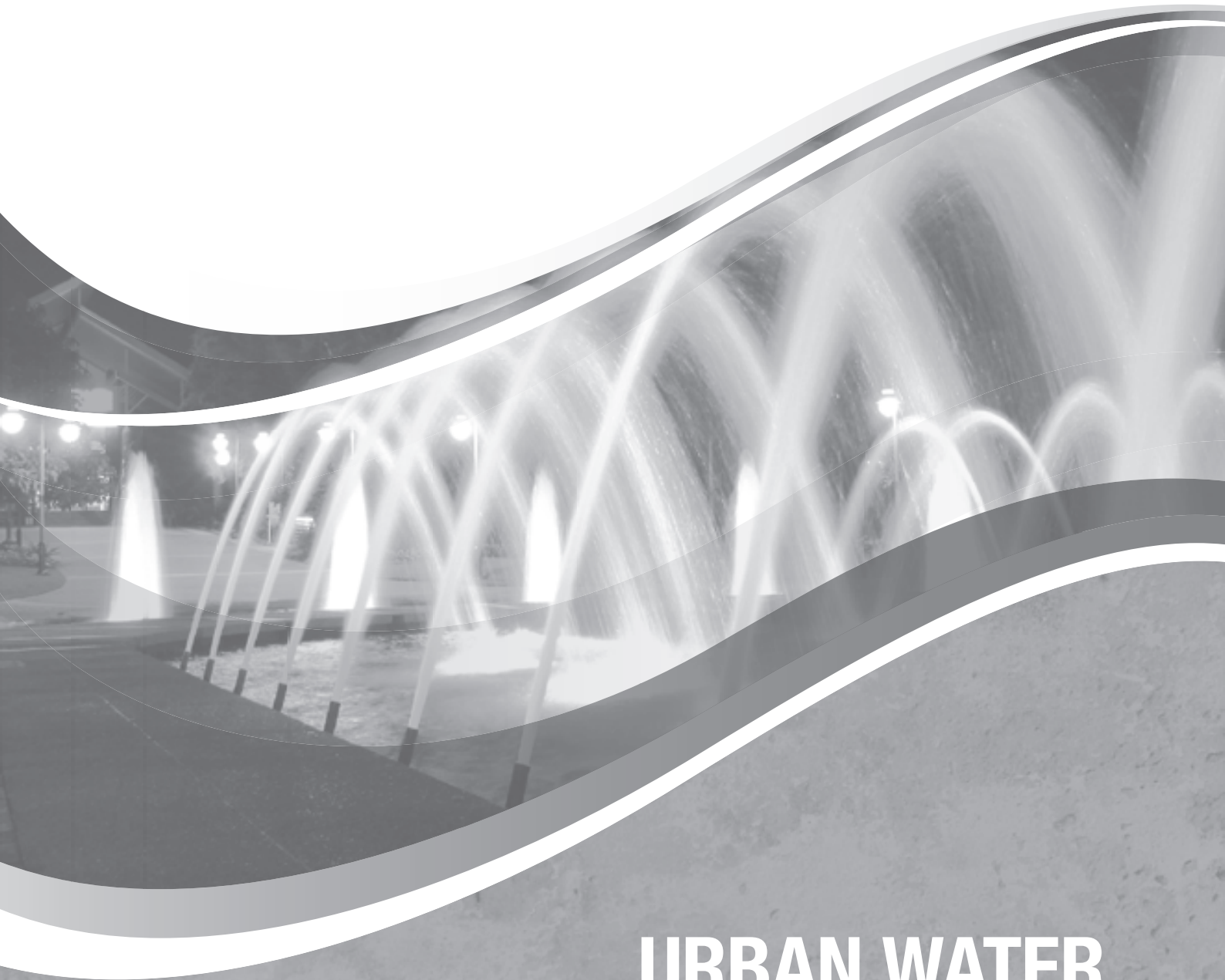


URBAN WATER

in Australia: future directions

2011



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Foreword by the Chair

The National Water Commission is pleased to release the report *Urban water in Australia: future directions*. Its aim is to catalyse an informed and practical discussion of the national priorities for urban water, leading to a sound and coherent program of action. The recommendations in the report seek to ensure that urban water is managed using an efficient, adaptive, resilient and customer-driven approach that can respond to the challenges of increasing population, concerns about the affordability of water services, and the impacts of climate change and extreme rainfall variability.

The era of national reforms, commenced in 1994, led to considerable improvements in the efficiency of water businesses' day-to-day operations. However, the arrangements in place proved unable to deal effectively with the climatic shocks affecting urban water in the past decade. As a result, governments intervened to restrict demand and then to boost supplies in a manner that has blurred ongoing accountability for supply security and raised questions about the transparency and cost-effectiveness of investment decisions.

The urban water sector also needs to keep pace with the realities of urban growth and the requirement for integrated water management, while becoming more customer-focused. The Commission believes there needs to be a move away from divisive debates about how individuals choose to use water to a position where customers are better able to express their unique preferences. We are also concerned that customers in regional and rural areas are not receiving adequate service and are exposed to water quality risks, particularly in New South Wales and Queensland

To give service providers the incentive and freedom to innovate, governments and regulators need to reconsider how they go about their business and how the sector is governed, including being more open to moving away from the government-owned monopoly water business model.

The urban water sector faces a number of cultural and organisational challenges. An ageing workforce means there is a risk of losing knowledge and expertise in managing urban water systems at the very time that the systems are becoming more complex to operate. However, the sector is also moving from an asset-focused culture to a customer-service culture. Implementing the recommendations of this review would provide an important platform to invigorate this culture change.

To this end, the national framework for driving urban water reform requires a sharper focus. The Council of Australian Governments has an important role to play in embracing change and establishing a more contemporary set of objectives for the sector. There is an opportunity for a concerted national approach to drive measurable results through the implementation of priority reforms that are tailored to the needs of jurisdictions and reflect the different requirements of major metropolitan areas and regional communities.

The Commission would like to thank the assessment report authors, reviewers and workshop participants for their contributions. We would also like to thank Element Solutions and Frontier Economics for their contributions to the project.

We welcome feedback on this report and look forward to working with governments and other stakeholders to further advance urban water reform in Australia.

Chloe Munro
Chair
7 April 2011

Contents

Executive summary

About this report

The Commission's 2007 and 2009 biennial assessments of progress in the implementation of the Intergovernmental Agreement on the National Water Initiative (NWI) raised concerns about the performance of the urban water sector (NWC 2007, 2009) and declared that the NWI did not give sufficiently clear guidance on the required direction for urban water reform.

To resolve this, and provide keystone input to governments' decisions on urban water policy, the Commission launched the Developing Future Directions for the Australian Urban Water Sector project in mid-2010.

This innovative project built an evidence base of direct engagement with over 50 Australian and international water management and policy experts. This report considers whether the sector's underlying institutional and policy settings need reshaping to improve performance now and in the future, and sets out the project's findings and recommendations.

Findings

Further change is needed to institutional and policy settings in the urban water sector

Australia's urban water sector has benefited greatly from its history of institutional and pricing reforms, which were articulated at a national level under the Council of Australian Governments (COAG) 1994 Water Reform Framework and the 2004 NWI. Those reforms provide a platform for further improvements and for more successfully addressing a range of contemporary challenges, including climatic variability, climate change, rapid population growth, rising costs and ageing network infrastructure.

During the 2000s, most of urban Australia experienced severe and prolonged drought. The initial responses largely focused on water conservation campaigns and demand-management programs, combined with increasingly severe and prolonged water restrictions. The unforeseen duration of the drought led governments to assume control of planning and investment in conditions of great urgency. Those interventions were marked by stop–start and hurried planning processes in which transparency and community and customer engagement were limited. While no city ran out of water, there were a number of close calls and the response imposed significant financial and non-financial costs on customers, the community, water businesses, taxpayers and the environment.

There is ongoing public disquiet about the choice of investments and concern about future impacts on customers' water bills.

The fundamental question is whether the scale of the reduction in inflows was the main, or only, reason why this point of crisis was reached, or whether deficiencies in the underlying policy and institutional arrangements were a contributing factor. There is evidence that there are ongoing inadequacies in:

+ the definition of water security objectives
+ institutional roles and responsibilities for supply–demand planning and investment
+ how policy and regulatory instruments (for example, pricing, water restrictions, demand management regulation, recycling targets, artificial policy barriers, government subsidies) are used to manage the supply–demand balance
+ planning assumptions, tools and processes (the drought accentuated the problems associated with planning on the basis of long-term averages rather than risks posed by sequences of low inflows).

There are opportunities to improve service delivery and the focus on customers

The water sector is out of step with other utilities in terms of genuine customer focus. Contributing factors include the following:

+ The urban water industry in Australia is made up of government-owned monopoly businesses, with very limited direct competition.
+ Customers in a number of regions do not yet benefit from fully independent economic regulation.
+ Major investment decisions made by governments remain beyond the scrutiny of economic regulators, even though those investments account for most increases in costs and hence price increases to customers.
+ In some cases, jurisdictions' approaches to regulation are inhibiting innovation by service providers.
+ The capacity and resourcing of service providers in some rural and regional areas is inadequate, particularly in New South Wales and Queensland.
+ Transparency, evaluation and customer engagement in establishing service levels are insufficient.

As a result, customers, governments and service providers are missing out on opportunities for win–win outcomes. All stakeholders in the sector need to focus on how to remove barriers to more competitive and flexible approaches, rather than on reasons why those approaches might not work.

Current regulation of water quality, public health and environmental outcomes is not cost-effective and creates barriers to integrated water management

Regulatory arrangements governing urban water quality with the aim of protecting public health and safety and the environment have served Australia well in the past, and our nation's drinking water is generally safe and of a very high quality.

However, there is concern about some matters:

+ Wastewater treatment and disposal standards are often overprescriptive, input focused, and set without enough consideration of the costs that they impose.
+ Uncertainty about regulatory obligations is resulting in different interpretations and conflict between water service providers and regulators, particularly in relation to environmental outcomes (for example, there is debate over whether the costs of greenhouse gas emissions offsets can be passed on to customers).
+ Frameworks for water quality regulation, particularly for integrated water management, are jeopardised by insufficient and diffuse technical expertise and inconsistent approaches to their implementation.

Confusion about the role of the urban water sector in delivering liveability outcomes is stalling progress

The urban water sector is receiving confused messages about its role in contributing to 'water sensitive' or 'liveable' cities. Opportunities to deliver integrated urban water cycle solutions and adopt water-sensitive urban design mean water planning is central to urban planning. However, institutional arrangements are generally not yet clear about the role of the sector in:

+ making decisions about and delivering broader public and environmental amenity services
+ agreeing on objectives and determining how to make trade-offs between costs and benefits that are inherently difficult to measure
+ determining who should pay for particular outcomes.

Confusion about roles is impeding progress across the board and creating coordination problems.

The lack of agreed objectives for the urban water sector is a fundamental barrier to change

There are widely divergent views on the future of urban water. The urban water sector is confronted with competing views on its boundaries and objectives, including about:

+ whether water conservation is a public policy objective in its own right or a contributor to economically efficient water use
+ whether customer choice is worthwhile and whether it has adverse equity impacts
+ how customer service and broader community and environmental outcomes are balanced against the costs of achieving them
+ how potential trade-offs between equity and efficiency should be addressed (particularly in relation to pricing)
+ the relative roles and appropriate use of centralised planning (by government) and decentralised decision-making by service providers, the market, or both
+ how sustainability is defined and achieved
+ how much the urban water industry should be responsible for broader objectives (encapsulated in the term 'liveable cities') in urban areas.

The Commission considers that the absence of a coherent set of objectives for the sector is a major barrier to reform: it leads to policies that are ineffective and costly, policies that operate at cross-purposes and confusion between means and ends, and it undermines accountability and transparency.

The Commission's recommendations

Objectives

The Commission suggests a national statement of objectives for the future direction of the urban water sector:

> The Australian urban water sector should provide secure, safe, healthy and reliable water-related services to urban communities in an economically efficient and sustainable manner.

More specifically, the sector should:

1. understand and meet the long-term interests of all water consumers in the price, quality, safety, reliability and security of supply of fit-for-purpose water and wastewater services through the efficient use of, and investment in, systems, assets and resources.
2. protect public health and the environment by ensuring that the impacts of the sector's operations and investments are managed cost-effectively in accordance with society's expectations and clearly defined obligations.
3. enhance its effective contribution to more liveable, sustainable and economically prosperous cities in circumstances where broader social, public health and environmental benefits and costs are clearly defined and assessed, or where customers or other parties are willing or explicitly obliged to pay for the outcomes.

To fulfil these objectives, the sector would have the following characteristics:

+ *Resilient*—having sufficient capacity to withstand external shocks to the system as a whole (such as those associated with the impacts of climate change).
+ *Flexible*—being able to identify and respond to changing and diverse customer and community needs in a smooth, timely and efficient manner.
+ *Efficient*—responding to incentives to deliver maximum overall benefit at least overall cost.
+ *Transparent*—building and maintaining a proactive culture of complete openness to stakeholders and the public about performance and decision making.
+ *Accountable*—being held responsible for clearly defined objectives and provided with rewards for good performance and sanctions for poor performance.
+ *Customer-focused*—not simply providing least-cost services, but understanding and meeting the diverse needs of all customers in differentiated ways and providing value for money.

Council of Australian Governments

To enable Australia to achieve these objectives, COAG should:

1. **Objectives:** adopt an agreed set of national objectives for the urban water sector and general principles to guide reform.
2. **National approach to implementation:** pursue priority actions for each jurisdiction that contribute materially to national urban water sector objectives, and use stronger incentives and an improved monitoring and evaluation framework to drive timely and effective implementation.

State and territory governments

In addition, jurisdictions need to act. In all jurisdictions:

3. **Objectives and accountabilities:** Governments should ensure that service providers, regulators and other parties have clear objectives and accountabilities, which align with specified roles, functions, resourcing and funding.
4. **Customer choice:** Governments, regulators and service providers should ensure that the urban water sector gives a greater voice to customers through exploring opportunities for customer choice in pricing and service delivery, improved engagement in objective setting and the determination of trade-offs, improved customer protection frameworks, and competition.
5. **Efficient pricing and economic regulation:** Governments and regulators should recommit to using pricing to promote economic efficiency; broaden the coverage of fully independent economic regulation across all urban water systems; and ensure that economic regulation is more flexible, to encourage innovation in price and service offerings and better reflect the value of water.
6. **Efficient supply–demand balance:** Governments should review and amend policy settings to ensure that there is a cohesive approach that allows an efficient portfolio of supply- and demand-side measures to emerge and evolve over time, without direct and ad hoc government intervention. Responsible agencies and service providers should adopt risk-based approaches to supply–demand planning. All parties should strive for greater transparency.
7. **Regional and rural areas:** Governments and service providers should undertake reforms in regional, rural and remote areas to ensure that there is sufficient organisational, financial, technical and managerial capacity to meet service delivery requirements and protect public health and the environment, particularly in New South Wales and Queensland.
8. **Markets and competition:** Governments, regulators and service providers should work actively towards a goal of more market-determined bulk water prices and other market-oriented options to promote efficiency and innovation, including through consideration of detailed implementation and transition arrangements.
9. **Efficient and effective regulation:** Governments and regulators should better embed mandatory benefit–cost analysis and community engagement in the regulation of public health and the environment (particularly for investment in wastewater systems) to ensure that obligations are cost-effective and reflect community expectations.
10. **Liveability and sustainability:** Governments and service providers should clarify the roles and responsibilities of service providers and other organisations in contributing to more liveable communities. Decisions related to liveable communities need to be supported by more appropriate funding arrangements, based on robust evaluation of the full benefits and costs.

Further supporting recommendations are outlined in the body of the report.

The benefits of implementing these recommendations

Implementation of these recommendations will produce major benefits to customers, taxpayers and the broader community, including improved customer satisfaction and value for money. The reforms will better ensure that water quality risks are managed as Australia adopts more integrated water management solutions, and will improve the resilience and adaptability of urban water systems in coping with climatic and other shocks.

The long-lasting benefits of the recommendations are difficult to quantify in monetary terms, particularly as many of these actions relate to improved risk management. It is expected that they will have substantial direct and flow-on productivity benefits by promoting more efficient water use and investment through the more efficient allocation of resources throughout the national economy. The Commission anticipates that the Productivity Commission's current inquiry in to Australia's urban water sector will provide more quantitative analysis of the economic benefits of reform.

While reform requires effort from governments, regulators and water service providers, they will also obtain major benefits:

+ Governments will have greater confidence and certainty that supply security and other planned outcomes are being achieved and that risks are being managed.
+ Governments and water businesses will be able to demonstrate performance achievements to customers and the community.
+ Decisions will be made with greater confidence and certainty due to improved information, tools and processes.
+ The sector as a whole will be more diverse and open to change, and better prepared to deal with known and unknown risks and future challenges.
+ Regulators will be able to perform their enforcement roles with greater clarity and confidence.
+ Water businesses will have greater flexibility and incentives to meet customer needs in the most cost-effective manner.

An important lesson from the earlier reform era is that significant change takes time. Given the heightened community and political debate about urban water, there is a need for governments, regulators and water service providers to prioritise and adequately resource a fresh cycle of policy and institutional reform effort with long-term benefits in mind.

Figure 1: Roadmap to the report

Objectives	Supply security	Customer service	Public health and the environment	Liveability
	Economic efficiency and sustainability			
Characteristics	The urban water sector meets clear and agreed objectives (in the areas above) in a resilient, flexible, efficient, transparent, accountable and customer-focused manner			
Specific objective	+ Meet customers' needs for secure and reliable supplies, in a sustainable and efficient manner See section 2	+ Meet customers' other service needs efficiently See section 2	+ Managepublic health and environmental impacts efficiently and in accordance with community expectations See section 2	+ Contribute to community liveability objectives effectively and efficiently See section 2
Current performance	+ Met restricted demand through severe & prolonged drought + Several 'close calls' + Very high costs + High level of public debate, and reduction in public confidence See section 3.2	+ Widespread access to uniform levels of service which are generally high quality + Limited service differentiation + Poor asset condition in some areas See section 3.3	+ Major public health and environment risks and poor asset condition in some areas + Strong resource allocation framework + Barriers to recycling opportunities See section 3.4	+ Emerging but limited application of integrated solutions (water sensitive urban design, stormwater, recycling) + Widely divergent approaches across water service providers See section 3.5
Main factors determining current performance	+ Inadequate planning tools and processes to deal with variability + Institutional roles and responsibilities lack robustness under pressure + Over-reliance on central planning + Unclear objectives, including inadequately defined supply security objectives + Ineffective policies and policy barriers See section 3.2	+ Strong institutional framework (e.g. independent economic regulation) but not universally applied + Insufficient transparency + Lack of customer focus and choice in price / service level trade-offs + Limited competition and incentives for innovation + Competing equity and efficiency objectives See section 3.3	+ Regulatory system struggling to implement complex risk-based approaches + Some regulatory obligations lack transparency + Poor pricing practices and insufficient capacity and resources in regional areas + Institutional constraints in non-metro NSW and Queensland See section 3.4	+ Broader liveability objectives not clearly defined + Costs and benefits unclear and hard to assess + Role of water service providers unclear + Coordination is difficult + Gaps in broader urban planning + Inadequate cost-sharing arrangements + Conflicting views on roles and objectives See section 3.5
Current and future challenges	+ Rapid population growth and urban development in many areas + Extreme climatic variability, impact of climate change on inflows and other climatic events (e.g. bushfires, storms) + Increasing and divergent customer needs + Potentially major future investment needs in wastewater systems and network infrastructure + Increasing labour, capital and energy costs and need to manage high cost sources		+ Political and community pressure on water price increases + Competition from external sources + New technology + Skills shortage and ageing workforce + Greenhouse gas emissions + Pressures on urban amenity, urban waterway health, public health See section 2.2	
Primary recommendations	COAG should: + adopt an agreed set of national objectives for the urban water sector. + adopt an improved approach to urban water reform implementation. All jurisdictions should: + define more robust policy frameworks, rather than continual day-to-day involvement. + amend institutional roles and responsibilities to ensure that accountability under all foreseeable conditions. + adopt risk-based approaches to supply-demand planning. + review and change the suite of other policy settings influencing the supply-demand balance to ensure that an efficient portfolio of supply- and demand-side measures to emerges and evolves over time. + give a greater voice to customers. + recommit to using pricing to promote economic efficiency.		+ work actively towards a goal of more market-determined bulk water prices and other market-oriented options to promote efficiency and innovation. + undertake reforms in regional, rural and remote areas to ensure that there is sufficient organisational, financial, technical and managerial capacity to meet service delivery requirements and protect public health and the environment, particularly in NSW and Queensland. + better embed mandatory benefit-cost analysis and community engagement in the regulation of public health and the environment (particularly for investment in wastewater systems). + improve the sector's cost-effective contribution to more liveable communities through clearer definition of the roles and responsibilities of service providers and other organisations, more robust evaluation of the full benefits and costs, and better funding arrangements. See section 4 and section 5	

1 Introduction

1.1 The importance of urban water services in Australia

Urban water and wastewater services underpin public health and wellbeing, contribute to social development, and are a vital enabler of strong economic activity and growth across Australia. Sustainable management of urban water and wastewater systems helps protect the environmental health and biodiversity of water catchments, rivers and the marine environment, as well as the social and economic values that flow from the nation's natural assets.

Water services are so essential to everyday life that it is easy to forget the effort required to supply high-quality drinking water at the turn of a tap and reliable wastewater services at the flush of a toilet. The key feature of water resources in Australia is the variability of rainfall and runoff, both around the country and over time. Large investments in water and wastewater assets valued at over $100 billion[1] and the efforts of people, organisations and governments have been a feature of the development of the urban water sector since early European settlement and have helped to provide secure water services to our cities and towns in the context of such variability. They have also made Australia a leader in the development of reticulated wastewater systems and treatment technologies to protect public health, urban amenity and the environment.

1.2 Project background

The National Water Commission (the Commission) is an independent statutory authority required to undertake biennial assessments of progress in the implementation of the Intergovernmental Agreement on the National Water Initiative (NWI) and provide advice directly to the Commonwealth Minister for Water and the Council of Australian Governments (COAG) on actions required to better realise its objectives. The overarching objective of the NWI is to develop a 'nationally-compatible, market, regulatory and planning based system of managing surface and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes'.

The Commission's 2007 and 2009 biennial assessments raised concerns about the performance of the urban water sector (NWC 2007, 2009) and commented that the NWI did not give sufficiently clear guidance on the required direction for urban water reform. More generally, in its work over the past six years, the Commission has encountered widely divergent views on how well the policy and institutional settings in the urban water sector are performing, whether further reform is necessary, and, if so, the nature of those reforms.

In response, the Commission launched the Developing Future Directions for the Australian Urban Water Sector project in mid-2010 to identify the scope for further urban water policy reform, and to identify ways to better manage current and future challenges and opportunities to improve economic, social and environmental outcomes.

The project was designed to draw on objective evidence from divergent viewpoints and to seek out new ideas. The project team:

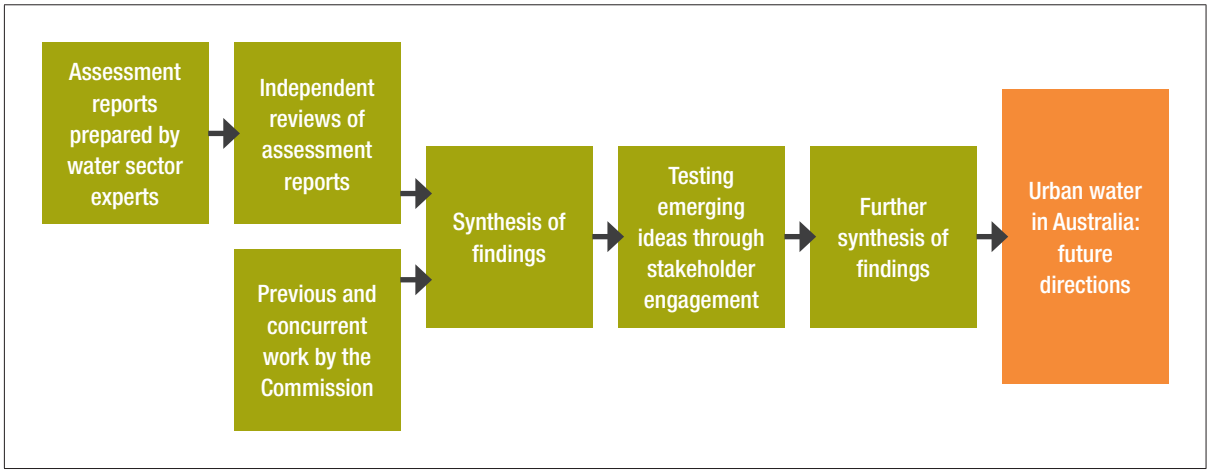
+ approached a cross-section of more than 30 respected water sector experts to document their individual thoughts on achievements, issues and options in key areas of the urban water sector (assessment reports)
+ engaged specialists from within and outside the water sector, including international experts, to independently review the assessment reports to provide additional and alternative ideas (review reports[2])
+ internally debated and consolidated the vast range of information and views and also looked at them in the context of other analysis and work by the Commission and other agencies
+ tested emerging ideas through a process of stakeholder engagement.

This report sets out the resulting views of the Commission. Further details of the process are in Appendix 1, and a list of contributors is in Appendix 2.

1 Written-down replacement cost of water and sewerage assets (2008–09), based on Water Services Association of Australia (WSAA) data for members (that is, not covering all urban water service providers).

2 Assessment and review reports are collectively referred to as 'contributor reports'. Selected unattributed quotes from contributor reports appear in this report.

Figure 2: Overview of the process



1.3 Purpose of this report

This report:

+ assesses the current performance of urban water policy and institutional settings across Australia against a set of clear objectives, and in the light of challenges and opportunities
+ makes recommendations on nationally important urban water policy issues to ensure that the sector is well placed to meet customer and community expectations in the future.

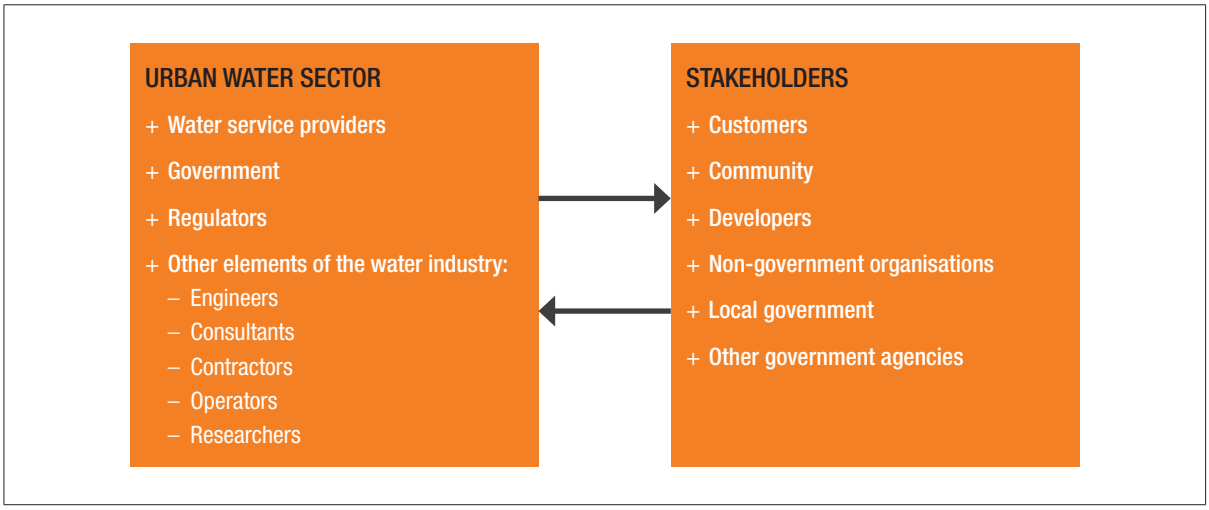
The report's recommendations are largely addressed to governments, as they are responsible for the policy directions, regulatory frameworks, ownership arrangements and institutional settings for the sector as a whole. The report does not provide jurisdiction-specific action plans or a detailed design for market-oriented or pro-competition reforms, which are both the subject of the current Productivity Commission inquiry into Australia's urban water sector (Productivity Commission 2011).

1.4 Scope and boundaries of the urban water sector

For the purposes of this report, the urban water sector covers large cities, smaller cities and towns, as well as smaller communities (including some Indigenous communities) that have reticulated water or wastewater systems and associated services. The sector covers water, wastewater, recycled water and stormwater harvesting services to customers, including supply, distribution, treatment, disposal and retailing.

The term 'urban water sector' refers broadly to participants involved in policy, regulation and delivery of urban water services, including governments, regulators (economic, public health, safety and environmental, water resource management) and water service providers (mainly government-owned water businesses and private sector suppliers) (see Figure 3). The urban water sector interacts with customers and the community, and with other organisations that influence urban water management (such as developers, local governments, urban planning agencies and other government agencies).

Figure 3: Urban water sector participants



The Commission has adopted a broad definition of the services provided by the urban water sector (see Figure 4). Those services include traditional water and wastewater services, but also integrated urban water cycle management. For example, stormwater and drainage management has traditionally been considered as a service provided by local governments, although opportunities for stormwater harvesting and use are emerging. The report also recognises that the sector is increasingly contributing to broader liveability outcomes in urban areas, for example through involvement in urban planning and water-sensitive urban design. As discussed throughout the report, the evolving boundaries of the sector, and interactions between internal and external actors, present both challenges and opportunities.

Figure 4: The expanding definition of urban water services

2 Objectives for the future

2.1 The Commission's proposed statement of objectives for the urban water sector

A successful Australian urban water sector will provide secure, safe, healthy and reliable water-related services to urban communities in an economically efficient and sustainable manner.

More specifically, the sector should:

1. understand and meet the long-term interests of all water consumers in the price, quality, safety, reliability and security of supply of fit-for-purpose water and wastewater services through the efficient use of, and investment in, systems, assets and resources.
2. protect public health and the environment by ensuring that the impacts of the sector's operations and investments are managed cost-effectively in accordance with society's expectations and clearly defined obligations.
3. enhance its effective contribution to more liveable, sustainable and economically prosperous cities in circumstances where broader social, public health and environmental benefits and costs are clearly defined and assessed, or where customers or other parties are willing or explicitly obliged to pay for the outcomes.

These three objectives address customer service needs, the management of the impacts of the sector on public health and the environment, and the potential for the sector to play a positive role in shaping the future of urban areas.

2.2 Challenges and opportunities

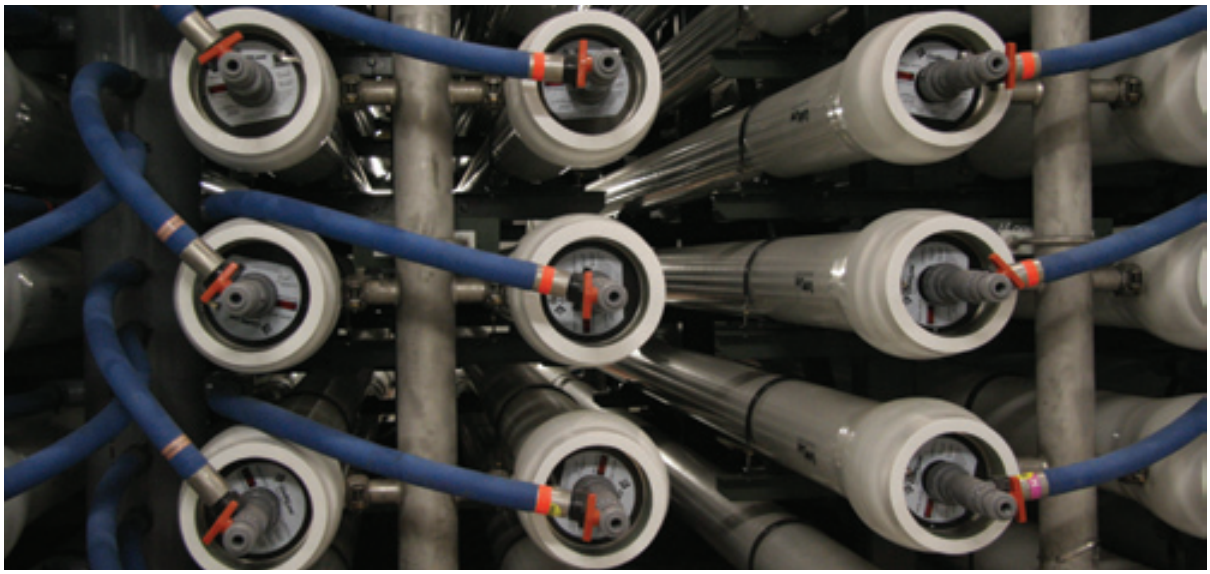
The most pressing challenges facing the sector are:

+ securing supply efficiently in the context of significant uncertainty about inflows to catchments and continuing growth in urban population
+ meeting customer and community expectations in an effective and efficient manner
+ maintaining effective wastewater services and maximising opportunities for efficient integrated water management (IWM) solutions without compromising public health and the environment.

> The overarching challenge can be summarised as being about balancing supply and demand efficiently and sustainably where there is increasing complexity and uncertainty.
>
> —Contributor report

> Drought and prolonged water restrictions in most capitals have made water security the focus of reform once again, along with affordability of water services.
>
> —Contributor report

More specifically, as identified in the contributors' papers, the sector faces many external and internal challenges in meeting customers' and the community's diverse and evolving water, wastewater and recycled water service requirements (see Box 1). These challenges are also opportunities—it is vital that the arrangements put in place for managing urban water allow the sector as a whole to respond to them in the best possible way.



Sydney desalination plant

Box 1: Challenges facing the urban water sector

While the precise nature and scale of the challenges vary around the country, they include the following:

+ *Catering for rapid population growth*: providing services to a growing population and rapidly expanding urbanised areas. The Water Services Association of Australia (WSAA) estimates that demand for water in the six major cities could increase by 40%–50%, from 1505 GL per year in 2009 to approximately 2100 GL per year by 2026 (WSAA 2010a).
+ *Managing impacts of climate variability and climate change*: managing and adapting not only to supply variability, but also to the potential impacts of climate change, which are likely to include the inundation of coastal infrastructure, flash flooding in urban areas, severe storms and more frequent bushfires (Hennessey et al. 2007).
+ *Managing current and future investment programs and associated cost increases*: The WSAA (2010a) notes that at least $10.5 billion is being spent on major water and wastewater projects underway or to begin in 2010–11 in Australian capital cities. Major investments are likely in the future, including in the wastewater sector, where investment needs are large. While demonstrating value for money to customers and regulators, the sector must decide whether to replace ageing infrastructure or to consider other options.
+ *Providing acceptable water and wastewater services in regional areas*: ensuring safe, reliable and cost-effective delivery of water and wastewater services in regional towns and remote and isolated communities.
+ *Optimising the use of and investment in a diverse portfolio of sources*: optimising the use of multiple climate-dependent and independent supply sources to balance security, cost and other network constraints.
+ *Managing energy use and greenhouse gas emissions*: managing energy usage and costs while taking advantage of opportunities to generate energy at wastewater treatment plants.
+ *Effectively harnessing technological development.* Technical advances are increasing the number and types of options available to meet customer water needs, particularly in the area of cost-effective water and wastewater treatment.
+ *Continuing to protect public health in the context of increased recycling*: managing the actual and perceived risks of greater interconnection between the water, wastewater and stormwater sides of the urban water sector and managing community concerns about the use of recycled water for drinking purposes.
+ *Dealing with an ageing workforce* in a sector that increasingly needs diverse and specialised skills and expertise (ICE WaRM 2008) and that may need to undergo significant culture change to become less engineering-oriented and more diverse and customer-centric.

2.3 Characteristics of a successful Australian urban water sector

A successful Australian urban water sector will achieve the Commission's objectives for the future, and meet contemporary challenges, in a resilient, flexible, efficient, transparent, accountable and customer-focused manner:

+ *Resilient*—having sufficient capacity to withstand external shocks to the system as a whole (such as those associated with the impacts of climate change).
+ *Flexible*—being able to identify and respond to changing and diverse customer and community needs in a smooth, timely and efficient manner.
+ *Efficient*—responding to incentives to deliver maximum overall benefit at least overall cost.
+ *Transparent*—building and maintaining a proactive culture of complete openness to stakeholders and the public about performance and decision making.
+ *Accountable*—being held responsible for clearly defined objectives and provided with rewards for good performance and sanctions for poor performance.
+ *Customer-focused*—not simply providing least-cost services, but understanding and meeting the diverse needs of all customers in differentiated ways and providing value for money.

> Perhaps the overarching need is … to provide for flexibility and adaptive management to facilitate adoption of the best and innovative solutions and new technologies to meet the needs of our customers.
>
> —Contributor report

An Australian urban water sector that achieves the objectives proposed by the Commission is one in which water supply is secure; customers are provided with value-for-money services and have the opportunity to express their values and preferences; public health and the environment are protected; and the sector contributes effectively to broader sustainability and liveability outcomes (Box 2).

Box 2: What will a successful Australian urban water sector look like?

The Commission's objectives require an urban water sector in which:

+ Water supply is secure
  - An efficient and secure portfolio of fit-for-purpose water service solutions emerges over time to meet clearly defined and measurable supply security objectives.
  - Roles and responsibilities of government, regulators and service providers, including for planning and security of supply, are clearly defined to ensure accountability for performance; policy, regulatory and service delivery roles are clearly separated.
  - Calls on taxpayer funds via government subsidies for capital infrastructure projects are limited to circumstances where there are demonstrable public benefits that would not otherwise be able to be funded by the customer base.
  - Supply options are not arbitrarily constrained or selected by political fiat.
  - Major investment decisions are made transparently and withstand the test of time.
  - The sector is well prepared to deal with extreme climatic events and other shocks.

Continued on next page...

Box 2 continued...

+ Customers are provided with value-for-money services and have the opportunity to express their values and preferences
  - Water and sewerage services are provided at the standards (quality, reliability etc.) customers require at the lowest long-term cost and there is sufficient evidence to demonstrate performance.
  - All customers (residential, commercial, industrial and other) are able to choose from a range of water service products at different prices.
  - Consumers do not feel guilty for using water to meet their daily needs and there is very limited recourse to water restrictions to balance supply and demand.
  - All people in urban areas have access to essential water and sewerage services, regardless of their means.
  - Pricing of water aims to achieve economic efficiency; it reflects the value of the resource, not just the cost of infrastructure and operations.
  - Equity requirements, such as protecting vulnerable customers, are addressed directly through customer protection frameworks and transparent community service obligations.
  - Natural monopoly elements of water and wastewater services are subject to effective, efficient and stable economic regulation applied in a way that promotes innovation and rewards efficiency.
  - Innovative approaches and new suppliers are able to freely enter and compete on a level playing field, subject to well-developed regulatory frameworks to safeguard public health, the environment and customers' interests.
  - Water service providers understand and have incentives to meet the diverse needs of their customers without facing unnecessary constraints; the industry is customer-driven and service-focused.
  - The sector as a whole is able to meet and balance the competing needs and values of customers and the broader public good, based on an informed and open policy dialogue.
+ Public health and the environment are protected
  - Public health is protected through consistent and effective risk-based regulation of drinking water quality, effluent discharge and recycled water.
  - Waterways, the marine environment and other environmental assets are protected and enhanced through cost-effective, risk-based and outcome-focused regulation and other policy instruments with clearly assigned accountabilities.
  - Environmental objectives and requirements are defined, measurable and achievable and are set based on customer and community input, with full recognition of the costs that they impose.
  - Environmental flows and allocation arrangements define specifically how resources will be shared under all possible inflow sequences.
  - IWM and alternative water sources, including decentralised and potentially privately owned solutions that are 'fit for purpose', are accepted and trusted by the public; regulation does not unnecessarily impede innovative IWM solutions, but such options stand or fall on their own merits.
+ The sector contributes effectively to broader sustainability and liveability outcomes
  - Urban water service providers have clearly defined objectives for their contribution to 'liveability' and look to relevant beneficiaries, not just urban water customers, to fund such broader public benefits.

3 Status assessment of urban water in Australia

This section assesses whether the current policy settings and institutional arrangements in the Australian urban water sector are likely to meet the Commission's proposed objectives now and in the future. It considers how well placed the sector is to:

+ secure supply in an economically efficient manner
+ meet customers' expectations
+ protect public health and the environment efficiently
+ contribute effectively to broader sustainability and liveability.

Based on this assessment, the Commission's overall view is that, while the earlier era of reforms has been extremely beneficial, the sector needs to change:

+ Current arrangements to ensure supply security are not fully suited to Australia's climatic conditions and suffer from unclear accountabilities.
+ There are opportunities to improve service delivery and complete the switch to being genuinely focused on customers.
+ Water quality regulation for the protection of public health and the environment is not cost-effective and creates barriers to integrated water management (IWM).
+ The sector's contribution towards broader sustainability and liveability needs to be better defined and responsibility properly allocated.

3.1 Earlier reforms

The urban water sector in Australia has progressively developed since European settlement. It is important to note that today's urban water industry has been through some profound reforms over a 30 year period, to a point where contemporary businesses bear little resemblance to their precursors.

Australia's urban water systems evolved from the late 19th century, developing a strong engineering culture with a focus on technical performance. By the 1980s, prices were based mainly on the rateable value of properties served; cross-subsidies were rife; water businesses regulated their own prices and, in some cases, environmental performance; metering of consumption was not universal and, where it was in place, only 'excess' consumption was billed; and most capital works were undertaken by deploying day labour. A consensus began to emerge in states and territories that this situation was not sustainable, and a process of reform began, driven partly by growing community concerns about environmental impacts and growing challenges involving capital investments.

In the early 1990s, a number of problems were recognised as nationally significant (Industry Commission 1992, Neal 1993):

+ Water was being used without regard to its cost of supply, leading to consumption levels that, if left unchecked, would require costly investments in new supply capacity.
+ The under-recovery of the costs of service provision was resulting in deferred asset refurbishment.
+ The absence of incentives to provide appropriate levels of service at the lowest possible cost allowed inefficiencies.
+ Resource allocation policies and wastewater management practices were resulting in environmental degradation.

These problems, combined with broader recognition by governments and the community of the need to manage water resources efficiently and sustainably, drove the development and implementation of the first major coordinated national reform efforts. The 1994 COAG water reform agenda was part of a broader era of micro-economic reform known as the National Competition Policy (NCP) reforms. The NCP reforms aimed to harness competitive forces to increase efficiency and community welfare in response to concerns about Australia's overall economic performance and productivity (Commonwealth of Australia 1993).

The reform programs were heavily influenced by the 1993 Hilmer report to COAG, which raised significant concerns about the performance and efficiency of government-owned utility industries (such as electricity, gas and water) and the impact of some inefficiencies on national productivity (Hilmer et al. 1993). As a result, institutional separation of policy setting, service delivery and regulatory enforcement was a key element of the 1994 reform package, in addition to pricing and market-oriented water resource allocation reforms (see Appendix 3). Under the new model, governments were to articulate clear, measurable and coherent policy objectives and provide water service providers with the autonomy and incentive to deliver. In return, service providers were to be transparent and accountable by clearly demonstrating performance to customers, government, regulators, shareholders and the community.

> The guts of the reform model, under NCP and other reforms, has been the separation of policy, regulation and service provision: establishing corporate structures for service provision which encourage commercial behaviour; and protecting consumer interests through competition where possible, and regulation of natural monopolies.
>
> —Contributor report

In recognition of continuing water-related challenges, particularly in the Murray–Darling Basin, the NWI (2004) set out a more detailed and ambitious reform agenda aimed at optimising the economic, social and environmental outcomes associated with water in urban and rural areas.

Implementation of those reforms has transformed the urban water sector. While the precise approach to reform varied across jurisdictions, key outcomes include the following:

+ Urban water pricing is generally more transparent and cost reflective, and inefficient and inequitable cross-subsidies have been largely removed, leading to signals for more efficient water use than in the past (NWC 2011).
+ Generally, water service providers are now more financially sustainable and able to invest in new and existing assets (NWC 2011).
+ Major improvements have been implemented in the economic, environmental, public health and customer protection regulatory frameworks (for example, the Australian Drinking Water Quality Guidelines).
+ While the ownership of the water utilities has remained in public hands, the private sector now plays a role as a provider of inputs, which encourages efficiency, although direct competition is very limited.

By the early 2000s, the urban water sector was demonstrably more efficient, sustainable, accountable and transparent than it had been 20 years before. The early reforms therefore were extremely valuable and represented worthwhile steps towards achieving the objectives outlined in Section 2. The Commission is acutely aware of the need to acknowledge these achievements and to build on their strengths: the sector is far better positioned to manage future challenges than it would otherwise have been. However, it also needs to be recognised that reforms have been unevenly applied and that there remains unfinished business that constrains the sector's efficiency, transparency and performance. A detailed assessment of progress is provided in the Commission's 2009 biennial assessment (NWC 2009) and in the following sections.

> The enormously impressive knowledge base developed over the last 15 years (itself a result of the reform process) shows clear progress and subtleties, and shows how the next generation of reforms need to deepen and build on the very successful competition policy-era reforms.
>
> —Contributor report

The question now is how well placed the sector is to manage future challenges not necessarily foreseen by the earlier reform agenda, which focused largely on reducing the costs of service delivery.

3.2 Achieving water security efficiently

The millennium drought and 2011 floods in eastern Australia have starkly shown that uncertainty about inflows to catchments is a critical issue for the sector. Managing variability in supply efficiently and effectively is a primary challenge for the sector now and in the future. To do so, the sector needs to be resilient and have enough capacity to withstand external shocks, such as those associated with the impacts of climate change.

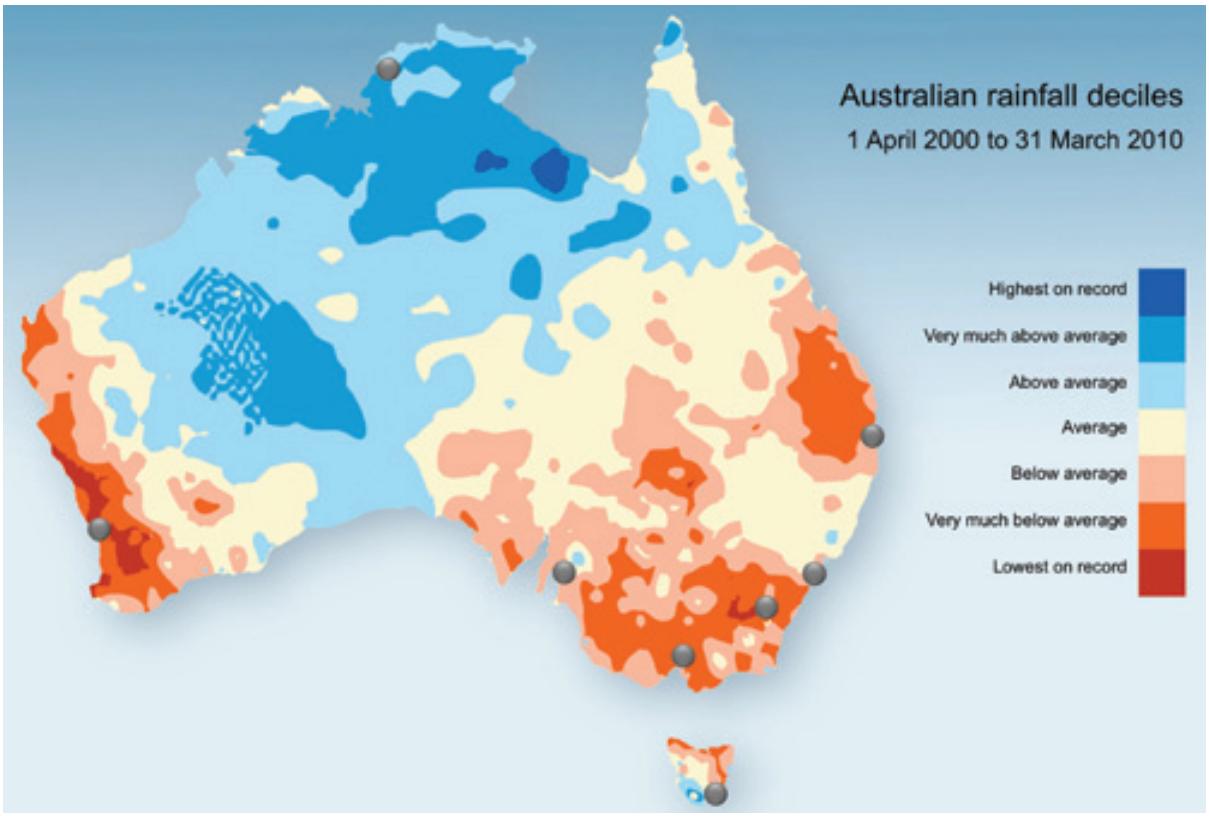
One important question is whether the arrangements that now exist would enable any future water supply crisis to be managed responsively and cost-effectively. An obvious way of assessing how well placed the sector is to achieve security of supply efficiently is to examine the experience of the severe and prolonged drought over the past decade and how the sector (including water businesses, regulators and governments) responded to it. However, the Commission recognises that it is inappropriate to use the benefits of hindsight to evaluate decisions made under uncertainty. For example, a decision to invest in a desalination plant may be based on the best available information and assessments of alternative options. If it then rains, the decision was not necessarily a bad one.

In a world of risk, it is important to judge and learn from the decision-making processes and the policy settings in place at the time, not just the outcomes. Therefore, the prime objective of this assessment is not to undertake an ex-post assessment of decisions made under conditions of uncertainty. Instead, it is to examine the underlying policy and institutional settings.

3.2.1 Background on the millennium drought and the response to it

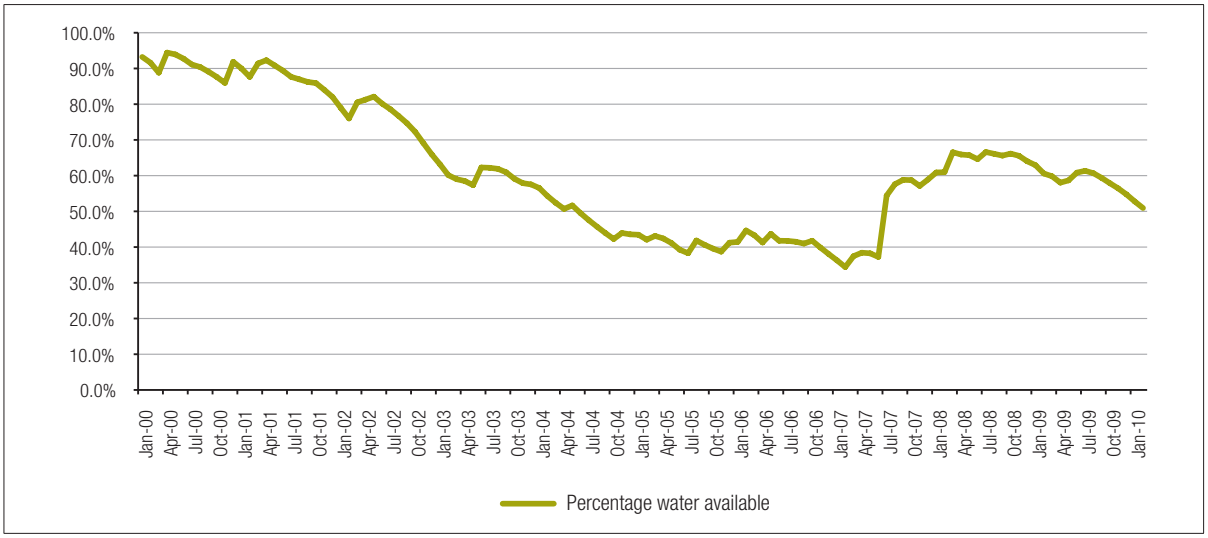
The drought saw rainfall decrease dramatically across Australia's main urban centres (Figure 5). Sequences of low inflows over multiple years meant that storage levels in urban water systems dropped significantly. For example, Sydney's storage levels dropped from 90% in 2001 to approximately 30% in 2007 (Figure 6). In some cases, falls in storage levels were more rapid. For example, south-eastern Queensland's storage levels dropped from 100% in 2001 to less than 17% in 2007. In addition, while Melbourne is considered to have an extremely reliable system, the volume of water in storage dropped by 20% of total capacity in just one year (2006), and to below 30% of total capacity at its lowest point (Melbourne Water 2011). In many cities, there were concerns that the drought might represent a step-change reduction in inflows, potentially influenced by climate change; rainfall patterns in Perth demonstrate a marked reduction since the 1970s (Figure 7).

Figure 5: Rainfall across Australia, 1 April 2000 to 31 March 2010



Source: BoM (2010a).

Figure 6: Sydney's total dam storage level (%)

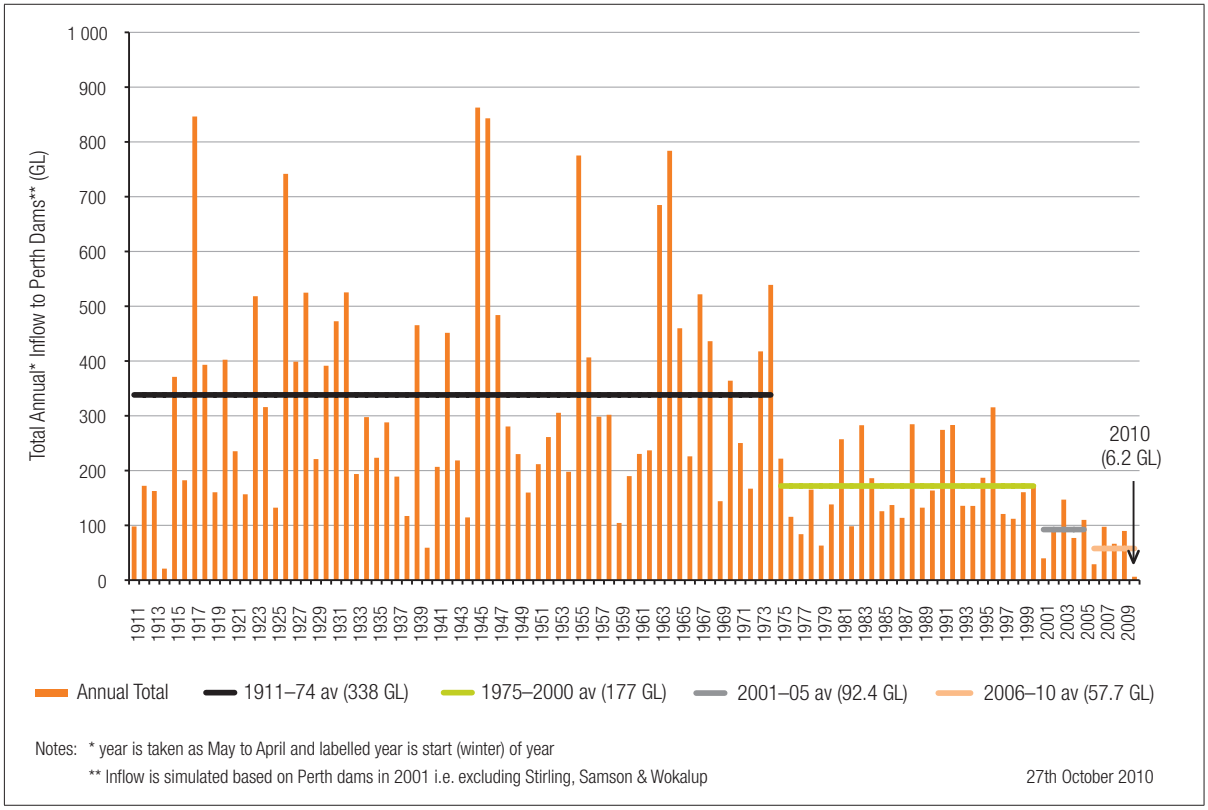


Source: Data provided by the Sydney Catchment Authority, 2011.

While specific responses to the drought varied across Australia, they generally focused on water conservation campaigns and demand-management programs, combined with increasingly severe and prolonged restrictions on outdoor water use. In combination, those measures were effective in significantly reducing demand. However, as the drought deepened, the risk of relying solely on rainfall-dependent sources was increasing. Decisions were made to invest in major supply augmentations, particularly desalination plants and other sources that diversified supplies. The recent report card of the Water Services Association of Australia (WSAA) stated that the industry was overseeing projects with a value greater than $14 billion during 2009–10 (WSAA 2010a).

Drought conditions eased across much of Australia's eastern seaboard due to a La Niña weather system during 2010. For example, Melbourne's storages jumped from less than 35% of capacity to 54% in the eight months from June 2010 (Melbourne Water 2011). In many other cities, such as Canberra and Brisbane, storages are full and spilling (Seqwater 2011, ACTEW 2011). Much of eastern Australia was subject to major floods in early 2011, most notably south-eastern Queensland, where flooding affected thousands of people and businesses. However, the drought is continuing in Perth, which experienced record low inflows in 2010 (Water Corporation 2011; see also Figure 7).

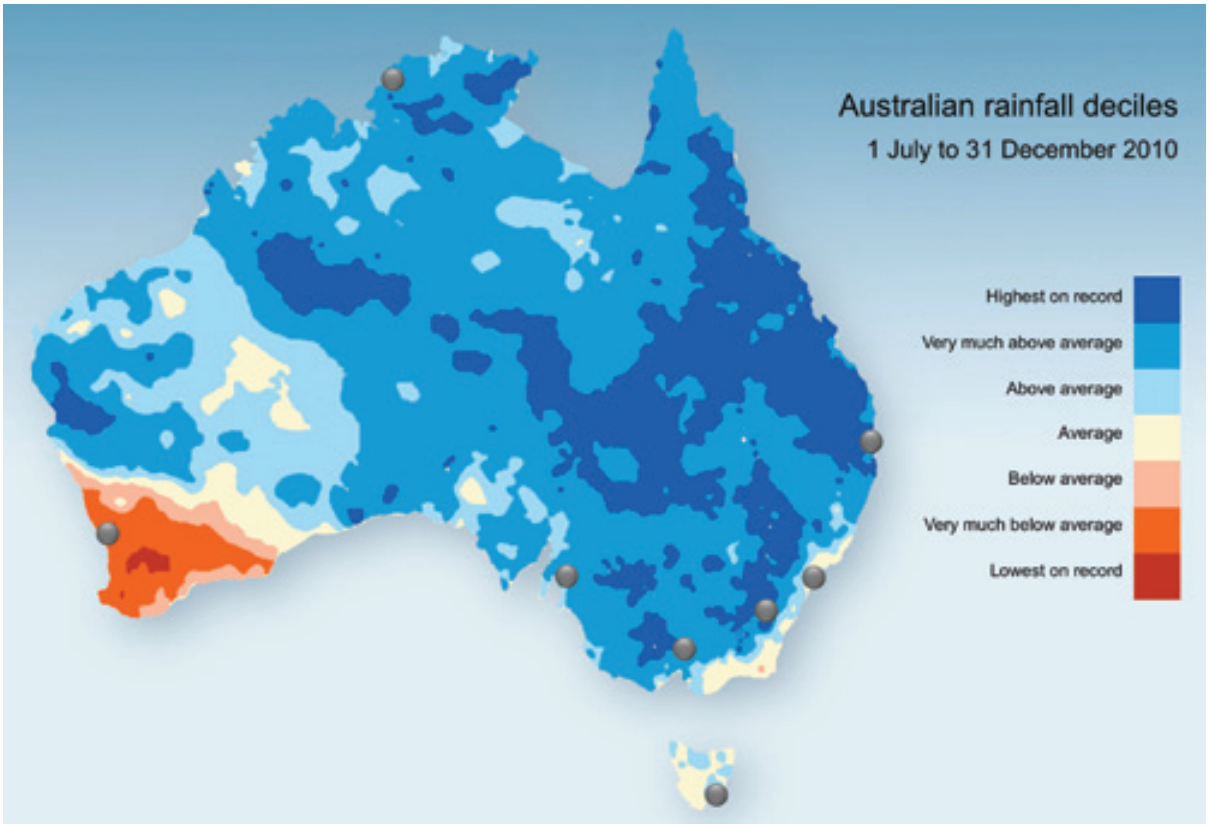
Figure 7: Inflows in Perth, 1911 to 2010 (GL)



Source: Data provided by Water Corporation, 2011.

The main lesson from the past 10 years is a greater appreciation of extreme climatic variability in Australia and what it means for urban water management. The drought has fundamentally changed the way that the sector thinks about the security of supplies from rainfall-dependent sources. It has underscored the risks associated with planning, managing and investing on the basis of long-term averages when supply security depends on actual rainfall that is extremely volatile year on year, and over multiyear periods.

Figure 8: Rainfall across Australia, 1 July to 31 December 2010



Source: BoM (2010b).

3.2.2 Outcomes associated with the response to the drought

Notwithstanding the difficulties experienced and the best efforts of a huge number of people, there is strong evidence that the prevailing decision-making processes, policy settings and institutional arrangements led to questionable outcomes in the economically efficient provision of secure water services during the drought.

Again, pointing out those questionable outcomes is not to blame anyone in particular. There was a crisis that required a response, and that response was duly made. However, the evidence presented below, along with the following assessment of underlying causes, demonstrates the need for changes in the way that the sector as a whole manages extreme climate variability and questions of new investment in the future.

> It is now clear to everyone that a more explicit, thought-through process for dealing with uncertainty must be developed and implemented … you have to judge risk-management frameworks by processes and not by results.
>
> —Contributor report

Security of supply

Despite the duration and severity of the drought, the responses by governments and the water industry ensured that no city ran out of water. Recent investments have helped to secure supply, at least in the short to medium term. However, there were a number of close calls, including for the New South Wales town of Goulburn (population 20 000), which reached a low of 12% of storage capacity (Goulburn Mulwaree Council 2009), and south-eastern Queensland (population 2.8 million), which reached 16.7% and had only about 230 days of water supply left (Seqwater 2011).[3] While no city ran out of water, that does not mean that designed levels of reliability were achieved. Although such standards are typically not very clearly defined, the restrictions that were imposed on customers went well beyond the planning parameters in their severity and frequency.

Security of supply in both the short and the longer term was also achieved via a range of other demand-management and supply-side options, which also imposed significant financial and other costs (as detailed below). Of course, the issue is not that responding to the drought entailed costs, but whether the options chosen were the least-cost way of managing risk. The following sections examine the costs that were incurred.

Costs of water restrictions

Mandatory water restrictions on outdoor use had severe impacts on customers, water businesses and communities. There have been numerous economic studies of the costs of water restrictions (see SRG 2011). The Productivity Commission (2008) estimated that water restrictions were costing in the order of $1 billion annually across Australia.

+ The burden of restrictions and other mandatory measures falls more heavily on the household sector. Restrictions may have heavier impacts on the relatively poor, as they are less able to afford alternatives to mitigate the effects of restrictions (for example, rainwater tanks). As some contributors to this report noted, many customers' willingness to pay to avoid restrictions during drought is very high—some were paying up to $15 per kilolitre to cart in water.
+ The community suffered loss of amenity and recreational opportunity through damage to public parks, gardens and sportsgrounds.
+ The business sector was adversely affected by restrictions, particularly the nursery and garden industry and the pool and spa industry.
+ There are costs in administering a restrictions regime. For example, the Centre for International Economics estimated that the cost of administering restrictions in Sydney (net of revenue collected in fines) was around $10 million, or more than $5 per household, for Level 3 restrictions (CIE 2010).
+ Restrictions can also be a source of conflict in the community—evidence of instances of 'restrictions rage' was reported in the media.[4]

Costs to non-residential customers

Industrial customers were also asked to bear some of the burden in reducing demand. As well as adhering to water restrictions, large water users were required to undertake wateruse efficiency audits and other demand-management activities in several jurisdictions. For example, in Victoria it is now mandatory for all non-residential customers using more than 10 million litres of water per year to develop a water management action plan (a 'water MAP') to demonstrate how they will use water more efficiently in the future.

While in many cases such requirements may result in changes to production processes that yield cost-effective water savings and commercial benefits to the enterprise, they can also impose inefficient costs on business. Undertaking a water plan may also add to the regulatory burden (for example, see SRG 2011). In some cases, water savings initiatives implemented by industrial users have been directly co-funded by water businesses, often underpinned by state or Australian Government contributions.

> Water is usually only one of many inputs in the production of outputs … Thus, to target only one input will inevitably result in poor input selection. For instance, elaborate capital investments at the household and commercial level can, in some cases, be used to offset water inputs, but this does not guarantee a low-cost means of production.
>
> —Contributor report

3 At 2005 unrestricted consumption levels; does not include any consideration of minimum operational volumes, and does not factor in population growth (*www.seqwater.com.au/public/dam-levels*).

4 *The Australian*, 15 December 2008, 'Man pleads guilty to water rage manslaughter', *www.theaustralian.com.au/news/nation/man-guilty-of-water-rage-manslaughter/story-e6frg6nf-1111118320138* (accessed 14 March 2011).

Costs of alternative sources of private supply

Ongoing water restrictions prompted many households to invest in rainwater collection tanks and private bores, although some may have had other reasons for investing in rainwater tanks (ABS 2007). Marsden Jacob Associates estimates capital costs of $2 600 for 2 kilolitre tanks and up to about $4 775 for 20 kilolitre tanks, and nominal yearly operational costs of $20. In the past three years, urban water users have installed an average of 225 000 tanks per year (MJA 2007).[5] On this basis, SRG (2011) estimated that costs of between $700 million and $1 billion per year have been incurred. While this investment has helped to secure supplies, particularly for garden use, Marsden Jacob Associates has also revealed that the cost-effectiveness of rainwater tanks is poor in many areas, and that they are not a reliable source of supply MJA 2007).

SRG (2011) also estimated the costs of private bores to be in the range of $100 million to $500 million per year. Again, this is not to say that bore installation was entirely ineffective; however, many households were denied access to potentially more cost-effective options to secure their supplies. The costs of private bores are not only financial. Due to inadequate groundwater management in many areas, there are likely to be impacts on third parties and the environment from increased groundwater use (for example in Perth, where there are very many private bores).

High water prices to customers due to large supply-side investments

As noted above, a large part of the response to drought was the construction of a number of major supply augmentations, including desalination plants. To pay for those major capital investments, customers' water bills have increased significantly and will continue to do so for many years. For example, over the period from 2008–09 to 2011–12, household bills are due to rise in real terms by around 8% per year in Sydney and by up to 13% per year in Melbourne (SRG 2011). In Melbourne, this means average water bills are expected to double over the current fiveyear regulatory period. In many places, it is no longer true to say that water is a small contribution to the cost of living compared with other utilities, such as gas and electricity. Nationally, the average residential water and sewerage bill is around $770 per year, or just over 1% of average household disposable income. However, in some areas, the average bill is well over $1 000 (SRG 2011). Sydney Water (2010a) stated that the number of its customers seeking financial assistance has grown by more than 20% in the past two years.

Costs to taxpayers

The response to the drought also saw a major increase in direct government funding of water supply augmentations and demand-management programs. The Australian Government's National Urban Water and Desalination Plan alone provided substantial funding for desalination, water recycling, and stormwater harvesting and reuse projects to improve water supply security, primarily in large cities. As part of the plan, the Commonwealth has committed funding of $328 million for the Adelaide Desalination Plant (DSEWPAC 2011).

At the state level, taxpayers also bore some of the costs of the water security investments. For example, in Queensland some of the costs of the South East Queensland Water Grid were effectively transferred to taxpayers via the government's decision not to require a commercial rate of return on the assets (NWC 2009). Such subsidies represent a significant amount of money not available for other purposes (such as health, education and roads) and a level of funding that may not be fiscally sustainable into the future.

> Before the drought, regulators and urban water managers (like their counterparts in most parts of the world) focused primarily on 'where the costs were' and thus paid relatively little attention to their bulk supplies. As the drought deepened and progressed, it suddenly became clear that whereas the water market facilitated an orderly adjustment in rural areas, suddenly the cities were faced with the threat of running out of water. The micro-economic reforms had not equipped the urban sector to deal with this problem. Without an organizing set of principles, the result was a set of panic decisions to ensure that the cities did not run dry. Quite understandably and appropriately, the focus was on both demand and supply measures which could rapidly close the suddenly-yawning gap between demand and supply. Understandably little attention was paid to costs—the costs to users who were forced to give up water, even for activities that they valued very highly (like saving old trees and keeping soil wet so that houses did not crack); and the fiscal costs of providing insurance through very expensive desalination and reuse schemes.
>
> —Contributor report

5 ABS (2007) and ABS (2010b) show that the number of households using rainwater tanks grew from 1.56 million to 2.24 million from March 2007 to March 2010, and that capital city households made up about threequarters of that growth. The number of households using bores or wells also grew to include 26 800 additional capital city households.

Increased risks to waterway health

Responses to the drought involved broader costs to the community, including for environmental outcomes. For example, river health was placed at greater risk due to unplanned reductions in environmental flows:

+ In Victoria, the qualification of rights to secure urban supplies in Melbourne during the drought reduced planned environmental flows in the Yarra and Thomson rivers. Environment Victoria (2011) noted 'The 17 GL (billion litres) Environmental Entitlement created for the Yarra River by the Bracks Government in 2006 is yet to be delivered. It was qualified the very next year, and the Yarra's legal share of its own water was redirected for use in Melbourne's homes and industry. Historical minimum passing flows were also reduced in order to meet consumer water demands. It wasn't until 2010 that this long-promised water was made available to the Yarra.'
+ In Western Australia, annual abstraction of groundwater from the Gnangara Mound for urban water supply in Perth has regularly exceeded the maximum target levels outlined by the Department of Water (ERA 2009).
+ In New South Wales, the state government has previously recognised that use of the Shoalhaven scheme as a drought reserve supply can stress the Shoalhaven River in times of extended low river flow. However, from April 2003 to June 2006 the scheme supplied around 410 GL of water, or approximately 25% of greater Sydney's system demand (Sydney Catchment Authority 2006).

3.2.3 Overview of the underlying drivers of these outcomes

Arguably, governments and water businesses responded to a water shortage of unexpected proportions with the limited options available to them at the time. However, the more fundamental question is whether the scale of the reduction in inflows was the main, or only, reason why governments found themselves in crisis mode, or whether deficiencies in the underlying policy and institutional arrangements were a contributing factor. If the latter proposition is true, and the same underlying arrangements remain in place, there is no reason to expect that the urban water sector will not find itself in reactive crisis mode again at some time in the future.

Based on the Commission's synthesis of the contributor reports and the analysis below, the underlying institutional arrangements and policy settings are not well suited to deal with the challenge of investing efficiently to ensure security of supply under major climatic uncertainty. Problems relate to inadequacies in:

+ institutional roles and responsibilities for planning and investment
+ planning tools and processes and the definition of security-of-supply objectives
+ the mix of policy and regulatory instruments affecting the supply–demand balance.

Evidence of these shortcomings is examined in detail in the following sections, drawing on the contributor reports and other sources.

3.2.4 Institutional arrangements for planning and investment

Under the 1994 COAG framework, the jurisdictions agreed to clearly separate policy, regulatory and service delivery functions. Under this model, governments should articulate clear, measurable and coherent policy objectives and provide water businesses with flexible policy tools and the autonomy and incentive to deliver. In return, service providers should be transparent and accountable and should clearly demonstrate performance to customers, government, regulators, shareholders and the community.

While the drought was severe and prolonged, governments intervened in planning and investment decisions, which were made outside the normal processes and institutional roles and responsibilities. Those interventions had a number of implications at the time, and have resulted in ongoing uncertainty about the roles and responsibilities of various parties. For example, in its recent review of urban water security strategies for Infrastructure Australia, PricewaterhouseCoopers found that:

> Under current arrangements, in all States and Territories, there is dispersed responsibility for achieving security of supply, including formal planning and procurement processes. This has resulted in instances of poor coordination, duplication of processes, and the preparation of plans by water businesses that are not fully consistent with government objectives. Further, not all water supply and demand management options are properly and fully considered, and some 'gold plating' of infrastructure capacity arguably is occurring. (PWC 2010)

> When push comes to shove (particularly during the drought), we haven't necessarily achieved the agreed separation of policy, regulation and service delivery functions that was key to the COAG and NCP reforms.
>
> —Contributor report

> Before many of the institutional separation reforms were undertaken, the government resource management agencies, councils and water boards often had conflicting functions of water service providers, regulators and planners. However it would appear that in moving to separate the water businesses, the responsibilities for planning future supplies were not clearly articulated. The focus on institutional, pricing, and entitlements reform was to the detriment of policy clarity on planning in some ways, aggravated by significant growth and changes in water supplies that were not anticipated based on the historical records.
>
> —Contributor report

> It appears that over time the autonomy of boards and management of water agencies has been wound back and increasingly their decisions and actions are being fettered and limited by political directions. These directions are at times leading to sub-optimal investment outcomes which are imposing costs on water consumers.
>
> —Contributor report

Where governments made investment decisions, those decisions were generally outside the purview of independent economic regulators, which limited the regulators' ability to ensure that investments were prudent and efficient, despite the fact that the investments account for most increases in costs and hence price increases to customers. One example of a highly debatable investment decision, which has since been abandoned, concerned the Tillegra Dam in New South Wales (see Box 3). In other areas, the new Victorian Government has committed to shutting down the North–South (Sugarloaf) Pipeline (a rural–urban interconnector), while the Queensland Government changed its approach to the use of recycled water in the South East Queensland Water Grid. While these may partly be responses to improved water availability, they also reflect changing political considerations.

Many contributors pointed out that one of the main reasons that governments intervened was the absence of an effective framework for managing security-of-supply risk and the absence of measurable objectives that would provide a signal for risk-based investments. Without a fundamental rethink of supply security objectives, future actions may be expensive, ineffective or expose society to unacceptably high levels of risk.

> A very large investment program is being implemented. The institutional framework for investment planning does not give confidence that objectives are clear, a wide range of options is considered and least cost solutions are being adopted … Investment planning and decision-making could be strengthened through clear and efficient standards for supply security and through more transparent approaches to investment planning and decision-making.
>
> —Contributor report

Overall, the current institutional arrangements governing the urban water sector are not sufficiently resilient to manage future supply security challenges in a timely and cost-effective way.

Box 3: Tillegra Dam

The Independent Pricing and Regulatory Tribunal (IPART), the economic regulator in New South Wales, was unable to question the decision made by the New South Wales Government to invest in the Tillegra Dam as part of the Hunter Water Corporation water price determination. The Minister for Water directed IPART to include in the maximum price to customers an amount for the efficient cost of the government's decision to bring forward the construction of the 450 GL dam (IPART 2009). IPART deferred 60% of those costs to future periods.

The New South Wales Government recently decided to abandon plans to build the Tillegra Dam, following significant public opposition to the project and the refusal of the planning application by the state's Planning Minister. The minister based his decision on concerns about potential impacts on the environment and licensed water users in the area, and on insufficient need for the dam as a bulk supply source, given other options (NSW Government 2010).

IPART recently provided advice to the Minister for Water on refunding money already collected from customers and adjusting future prices (IPART 2011).

3.2.5 Planning tools and processes

The traditional approach to urban water planning in Australia has tended to involve government and/or government-owned water businesses determining the nature and timing of the next bulk supply augmentation (for example, the next dam) based on predictions of longterm growth in demand associated with population growth and on historical inflow data. Restrictions were the main approach to dealing with short-term scarcity.

By the early 2000s, increased public awareness of the environmental and social impacts of different water supply options had increased the focus on public consultation on water supply planning and investment. Reflecting those concerns, several governments and businesses made a concerted effort to make planning processes more open and transparent to the public (for example, Government of South Australia 2005, WSCMA 2002), including considering a range of non-traditional options. However, most of the plans remained long term in their focus and did not adequately consider flexible strategies to manage the risk of sequences of low inflows. Options were often evaluated on the basis of levelised cost ($/kL), which did not adequately consider the reliability benefits of diversified non-rainfall-dependent sources, and how they contributed to the existing portfolio of options. As discussed below, many flexible options (such as rural–urban water trading) were 'off the table', and there was a tendency to favour demand-management and conservation programs in the hope that the drought would end without requiring major investment. The preference for demand management also reflected the prevailing belief that water conservation was an objective in its own right.

As drought conditions continued into the 2000s, however, several cities were confronted with severe threats to water security. Governments stepped in and made major investments (for example, in desalination and water grids) to secure urban supplies, and often did so outside normal planning processes. Transparency and community consultation were forsaken as the threat of running out of water loomed, and decisions needed to be made quickly. For example, in a review of planning for water infrastructure in Victoria in 2008, the Victorian Auditor-General (2008) was particularly critical of the process underpinning the state water plan. While acknowledging that the timelines for completing the plan were extremely tight and therefore required the streamlining of normal project development processes, the Auditor-General nevertheless observed that the plan was finalised with minimal stakeholder consultation and that inadequate levels of rigour were applied to estimate the costs, benefits and risks associated with the key projects. The Commission has previously stated that it believes that this assessment is indicative of responses in several other jurisdictions (NWC 2009).

Drought conditions caused governments to revert to a highly centralised approach to planning and investment, which favoured large-scale solutions. As augmentation choices were time constrained, the options available were limited to those that could be implemented quickly and guarantee supply. As noted by PricewaterhouseCoopers in its report to Infrastructure Australia, this may have resulted in missed opportunities for options that produce greater net economic, social and environmental benefits, including opportunities for more IWM:

> There has been a tendency for water businesses, with support of governments, to select expensive and lumpy infrastructure projects (in terms of the additional volume produced) that possibly represent a form of gold plating, or departure from the least cost solution. The alternative of combining multiples of smaller projects appears to have figured less prominently as a supply solution, despite the capacity of this approach to provide greater flexibility in terms of being 'dispatched' if and when they are needed. (PWC 2010)

Most importantly, once governments decided to invest, a prudent risk management approach of staging investments according to defined triggers was not adopted. Planning processes were stop–start, and time had simply run out. Decisions were highly politicised, and the process resulted in significant community disquiet and concern.

> Recent experience suggests that the eastern part of Australia was largely caught unprepared by the recent drought. There is also anecdotal evidence to suggest that in some cases decisions on strategies to secure water were delayed to the extent that the lead times necessary to implement them effectively expired thus rendering further consideration of such options not feasible. Moreover, there appear to have been instances of where works were undertaken not because they represented value for money but because they could give the appearance of action.
>
> —Contributor report

Contributors noted that a potential barrier to the robust implementation of portfolio planning approaches is the imposition of inappropriate constraints and assumptions. The Economic Regulation Authority of Western Australia expressed concerns that the Water Corporation planned its investments based on a worst-case scenario, rather than considering a range of possible inflow scenarios and planning to manage outcomes adaptively (ERA 2008). In the ACT, the Independent Competition and Regulatory Commission was recently critical of the approach to assessing the enlargement of the Cotter Dam on the grounds that the decision was based on climate change outcomes at the extreme end of the CSIRO-estimated range, rather than a risk-based approach (ICRC 2010). It also noted that no consideration seemed to have been given to not proceeding with the dam or to delaying investment in favour of other options (such as water transfer projects).

Since the drought, there have clearly been concerted efforts to improve urban water planning techniques and processes to make them more risk-based. Since 2004, for example, the New South Wales Government has moved to align the Sydney Metropolitan Water Plan with the concept of adaptive management through the adoption of readiness strategies, and has sought to assess options using a portfolio approach based on risk-weighted costs as opposed to developing options to meet a long-term supply–demand deficit (White et al. 2006).

The Commission notes that a set of national urban water planning principles has already been published by COAG. The challenge is to develop processes and techniques for applying those principles to urban water planning in practice.

3.2.6 Other policy and regulatory settings

A range of other policy and regulatory settings adversely affected the response to the drought and continue to limit the ability of the sector to balance supply and demand efficiently. They include:

+ policy bans on some supply and demand options
+ inflexible pricing arrangements that do not reflect the value of water
+ increasing recourse to government subsidies for infrastructure projects
+ an excessive focus on restrictions and some expensive forms of demand management
+ targets, regulation and subsidies for particular options
+ regulatory and institutional impediments to alternative sources and competition.

These issues show that there is room for major improvements in the policy settings that together influence the supply–demand balance. In addition to specific issues associated with each of these instruments, the Commission is concerned that they do not work together cohesively.

Policy bans on some supply and demand options

There is evidence of barriers to the consideration of all potential options to improve security of supply. Policy barriers have restricted the choice of supply-side options, including rural–urban water trading and intercatchment transfers, new dams and indirect potable reuse. For example, the Victorian White Paper, *Our Water, Our Future*, ruled out certain supply options, including new dams, indirect potable reuse and trade between Melbourne and northern Victoria (Victorian Government 2004). These factors can potentially distort the composition of a city's supply and demand portfolio away from the least-cost solution.

One of the most significant constraints is the impediments to trade or transfer water between catchments, which means that urban water authorities forgo the opportunity to secure relatively lowcost water or security of supply options. A recent example is the decision by the Victorian Government that the recently completed Sugarloaf Pipeline will be shut down and transfer water to Melbourne only under emergency circumstances. The pipeline cost approximately $1 billion, funded by Melbourne water customers. Limiting its use in this way effectively means that other more costly options will probably need to be adopted to maintain the pre-existing level of security of supply for Melbourne, or that the city's security of supply is reduced.

While rural–urban trading is not possible in all cities, Young et al. (2006) estimated that substantial reductions in urban prices would come from rural–urban trading, with a benefit to GDP of around 0.6%. Crase et al. (2007) noted that it is possible to purchase perpetual water access rights in Victoria for around $1200 per megalitre, which, when combined with annual delivery charges of $50 per megalitre, is substantially less than manufactured alternatives (although allowance would also need to be made for any treatment required).

Another option that has been ruled out by a number of state governments is indirect potable reuse, in which purified water from wastewater and other sources is reinjected into an existing water source to be further treated and reused. Indirect potable reuse is technically possible for a range of locations and can be competitive relative to alternative supply options, particularly where there are no significant physical alternatives, such as the seawater required for desalination. It is also more secure than dam water. In a comprehensive review, Khan and Roser (2007) concluded that indirect potable water reuse is a safe supply source, noting that 'the level of stringency applied to planned indirect potable water recycling schemes is well beyond that which is common international practice and already occurs in water supplies in Sydney, Brisbane and Melbourne.' Despite its potential advantages, there has been significant political and some community opposition to its adoption. A proposal to increase potable water supplies at Cooby Dam near Toowoomba was rejected by 62% of voters in a referendum after residents gathered signatures to petitions against the proposal. While community preferences should be recognised, the Commission is concerned that indirect potable reuse has become overpoliticised and that the full cost of alternative solutions has not been made transparent.

The Commission is convinced that taking certain supply or demand options off the table has increased the costs of achieving urban water security, in some cases significantly.

> Reluctance to countenance indirect potable reuse substantially increases the cost of the recycling supply options available for consideration in the portfolio (as these typically require third pipe systems). Similarly, constraints on rural–urban trade mean that higher cost supply options are required to meet urban demand.
>
> —Contributor report

Inflexible pricing arrangements that do not signal the value of water

While prices are the principal means by which supply and demand for most goods and services are brought into balance, that has not been the case in the urban water sector (see NWC 2011, Frontier Economics 2011b).

> Water has tremendous value. We all know that without it we cannot live, and we cannot grow the food we need to eat.
> The worlds' ecological web which maintains all life on earth depends on fresh water. Water is a key input to almost every industrial and economic activity. Past failures to assign water its true economic value have led to wasteful and damaging use of the resource. One of the most profound developments of recent decades is the realization that water is in fact an economic good, supporting almost every economic activity, and needs to be treated as such.
>
> —Contributor report

The need to signal to customers the costs of their water consumption was a fundamental component of the earlier national urban water reforms and is widely regarded as having played a major part in deferring the need for augmentation of supply capacity, which would have been required if demand had been left unchecked. Before then, customers faced low or zero prices for each additional kilolitre they consumed, and therefore little incentive to curb their consumption.

As urban water pricing evolved and economic regulators were tasked with overseeing prices charged by urban water businesses, a standard approach to setting prices developed. It involved a two-part tariff, with a volumetric component for water consumed based on the long-run marginal cost of supply and a fixed component designed to enable a water business to recover its total efficient costs over the regulatory period (given forecast demand and customer numbers). The long-run marginal cost of supply represents the per kilolitre cost of bringing forward the planned supply augmentation capital program to accommodate demand growth over the long term. The prices for both the volumetric and the fixed components of the two-part tariff were set at the start of the period and were designed to give the business an incentive to secure efficiencies that lowered its costs of supply by being able to retain them, at least for a time.

That approach to pricing worked well enough when applied to an industry in a 'steady state': monopoly water businesses providing a uniform product with a largely guaranteed supply of water available and new supply augmentations largely driven by long-term population growth. However, when the drought hit, that approach to pricing did not allow prices to readily respond to fluctuations in available supply. Regulated water prices based on the longrun marginal cost did not reflect the true value of water. This effective underpricing of water did not provide a signal for efficient water use during times of scarcity, and necessitated blunter mechanisms to manage demand. Underpricing of potable water during times of shortage also does little to encourage the takeup of alternative sources, such as recycled water, that could help to bridge the gap between supply and demand.

Recognising that prices could play a useful role in helping to conserve water, some governments, service providers and regulators introduced inclining block tariffs under which the per unit price of water increased as a household's water consumption rose, but consumption of the first block of water (deemed to be 'non-discretionary') was charged at a relatively low price. Such tiered tariffs were commonly justified by regulators as ensuring that all customers had access to at least a basic amount of water at reasonable cost, while penalising those who consumed water at what were seen as excessive levels. However, in practice, the tariffs were not well placed to achieve either their equity or their efficiency objectives. The low first tier meant that a considerable proportion of all water consumed continued to be underpriced (including for those on high incomes), while the high tier water prices applied to only a small proportion of water consumed, including that consumed by large low-income families. Moreover, prices for the high tiers have been retained, even after the water scarcity has subsided—for example, in the ACT, a top tier price of $4 per kilolitre remains in place even as the dams are spilling (NWC 2011).

> Governments have tended to use water pricing regimes to achieve equity, environmental, revenue and economic efficiency objectives simultaneously. This approach violates a golden rule in policy development … to avoid conflicts, use a separate instrument to achieve each objective and, once an instrument is assigned to one objective, don't try to use it to achieve another objective.
>
> —Contributor report

A number of other aspects of the current pricing arrangements appear to forgo opportunities to use prices to help balance supply and demand efficiently. For example, many tenants still receive no price signals for their water use, as their water bills are still paid by their landlords. In addition, the inability of customers to choose between different price and service offerings prevents them from signalling their willingness to pay for different levels of reliability (see further discussion below). Moreover, the tendency for economic regulators to prescribe specific tariff structures seems to inhibit the emergence of such options (see NWC 2011). As the WSAA has noted in its submission to the Productivity Commission inquiry:

> IPART's price determination for Sydney Water provides little scope for Sydney Water to negotiate with its large commercial customers, or indeed derive more tailored pricing for certain groups of residential users. A better pricing model would focus more on the appropriate level of cost recovery overall from a basket of services, rather than a highly prescriptive tariff structure. (WSAA 2010b)

The Commission considers that the current inflexible approaches to the pricing of water impede the efficient achievement of supply–demand balance. While movement towards more flexible pricing approaches that better signal the scarcity value of water is not necessarily simple, the apparent lack of willingness by most of the industry and regulators to rigorously explore or even consider such options is also a source of concern.

Increasing recourse to government subsidies for infrastructure projects

The earlier era of urban water reforms generally led to the establishment of financially viable water businesses able to borrow and fund major capital programs. However, in recent years there has been an increasing tendency for government to fund water infrastructure projects directly.[6] This creates a number of adverse incentives:

+ Subsidies undermine the incentive for water businesses to plan and invest efficiently. Instead, they may have an incentive to reduce investment and wait until it is subsidised by government.
+ Government subsidies reduce the rigour and incentive for efficiency in major investment decisions. Many have been provided for particular options that are unlikely to be part of the most cost-effective portfolio of options to balance supply and demand.
+ Subsidies distort price signals for customers, and inefficient investments create future liabilities for asset replacement and ongoing maintenance.
+ Subsidised investments are generally not subject to regulatory oversight of their prudency.
+ Subsidies are simply not required in almost all metropolitan urban water systems. The industry itself has called for an end to subsidies for new infrastructure (WSAA 2010b).
+ Commonwealth subsidies can create tension between the jurisdictions about the distribution of such funds across the country.

> There is already anecdotal evidence in some jurisdictions to suggest that not all costs related to the recent rounds of supply and drought security measures are to be incorporated into the prices that consumers will pay. In some recent cases, governments (including the Commonwealth) have explicitly subsidised investments in the urban water industry. Such subsidies can distort investment decisions. Subsidies are inconsistent with the full cost recovery objective, distort comparisons across jurisdictions and have the potential to encourage the over-consumption of water.
>
> —Contributor report

6 'Direct funding' includes not only the provision by government of up-front capital to finance projects (which are then ultimately funded by customers), but also government contributions to cover part or all of the cost of an investment. In such cases, those costs are not recovered from customers.

Excessive focus on restrictions and concerns about the cost-effectiveness of some demand-management measures

As the drought deepened, there was a growing if perhaps belated realisation that restrictions and demand management were not going to be sufficient on their own. There has been major debate, starkly reflected in the contributed papers for this project, on the costs and benefits of restrictions. Some see restrictions as enabling people to contribute positively to conservation. Those contributors also see restrictions as equitable sharing of the burden of saving water; one suggested that 'restrictions treat everyone equally'.

> The arguments I have seen rejecting restrictions have been principally put by economists … These simplistic views of restrictions assume social costs and seem to ignore the social benefits, e.g. the enjoyment of hand watering the garden that many people have; feeling good about helping conserve water; being part of a solution, and so on, all of which can't be quantified in dollars and hence do not appear in economic analyses.
>
> —Contributor report

> Restrictions have strong support in the community as they support people's conservation values and ethics. In fact, restrictions force people to behave in ways they know they should. Further, restrictions are a more equality driven means of demand management as everyone is affected similarly, regardless of socio-economic status.
>
> —Contributor report

Others see water restrictions as highly costly, inequitable, evidence of planning failure, and against the desires of customers.

> I start from the premise … that the maintenance of water restrictions over an extended period is an explicit sign of policy failure, not an acceptable/inevitable component of demand management for which governments can take credit.
>
> —Contributor report

A possible middle ground saw restrictions as a potential backstop option in the event of major shortages.

> We agree that restrictions play an important backstop role as an insurance or readiness option in the event of unanticipated declines in yield and should continue to do so. However, their cost, including the wider social cost on customers, needs to be recognised and compared to other options when assessing the least cost portfolio.
>
> —Contributor report

The divergent views on restrictions and other technical wateruse efficiency measures highlight a broader debate about whether water conservation is an objective in and of itself, or whether water should be used efficiently (that is, in a way that recognises the benefits and costs of water use). The Commission has previously stated that the NWI objective to promote water use efficiency and innovation:

> … does not imply that the goal is to minimise water use per se, or to adopt water conservation and demand management programs or water-efficient appliances and production technologies regardless of cost … Rather, consistent with the overarching objective of the NWI, the Commission sees the objective as to facilitate a level and pattern of water use and related investment that maximises economic, social and environmental benefits. (NWC 2009)

An excessive focus on technical wateruse efficiency can impose high costs and prevent us maximising the value to society of our water resources because it ignores the fact that water is only one input into goods and services that people value. Many water saving measures are cost-effective and have a legitimate and valuable role in the mix of policy tools. However, there are also examples of technical wateruse efficiency programs that have very high costs per kilolitre saved and require the use of additional energy and other resources.

In the Commission's view, demand management has an important role to play, but its costs and benefits need to be assessed alongside other options such as supply augmentation. However, as a quite distinct measure, mandatory water restrictions should not be seen as a standard response to short-term water shortages.

Targets, regulation or subsidies for particular options

Another feature of the arrangements for urban water in recent years has been the imposition of targets and/or regulatory mandates in favour of particular technologies or supply or demand measures. They include:

+ Subsidies for rainwater tanks and other technological measures that were often higher cost than new supply options:
  - The Productivity Commission (2008) reported a rebate scheme for dishwashers that saved water at a cost of $30 per kilolitre.
  - In its latest submission for its operating licence, Sydney Water estimated that the levelised costs to Sydney Water alone of some of its water efficiency programs exceeded in some instances the estimated longrun marginal cost of water of around $2.00/kL. For example, between 2002–03 and 2009–10 the rebate for water tanks cost Sydney Water $2.86/kL and the rebate for washing machines cost it $2.98/kL, in addition to the costs borne by the customer (Sydney Water 2010b).
+ Setting of targets for particular technologies, such as targets for the proportion of water supplied by recycling schemes:
  - The costs of recycling vary substantially depending on local conditions. Marsden Jacob Associates noted that the levelised cost of different recycling schemes ranged from close to $0/kL (for use on golf courses) to over $3.00/kL for some schemes in major metropolitan areas, and estimated that the 'total economic costs of [meeting] a 30% national target for recycled water is $3.2bn' (MJA 2008). Government support and encouragement of recycling may have resulted in the takeup of recycling schemes that are inefficient compared to alternatives.

While balancing supply and demand requires considering the full costs and benefits of all potential supply and demand options, prescriptive regulation or subsidies for particular measures are likely to increase the overall costs of achieving supply security.

Impediments to alternative sources / integrated water management

It is now widely accepted that balancing supply and demand efficiently requires consideration of a diverse range of sources, including traditional potable sources as well as new or alternative sources, such as recycled water and stormwater harvesting and reuse. A number of concerns have been raised, including in contributions to this project, that there are impediments to investment in and the takeup of alternative sources. Those concerns are discussed elsewhere in this report, but include:

+ cumbersome regulatory and approvals processes
+ lack of frameworks for the competitive entry of new suppliers
+ uncertainty about the property rights to some sources in the urban water cycle (see Frontier Economics 2008)
+ institutional barriers to IWM
+ inadequate evaluation and consideration of the full benefits and costs of IWM options.

3.3 Providing value for money to customers

While the drought has captured public attention, the urban water sector also faces a broader set of challenges in providing value-for-money services to customers. Providing value for money is not only about minimising cost—it requires setting the right levels of service.

> We are now in an era where customers are paying more and more each year for their water … As customers pay more, they will increasingly demand better value for money. This applies to individual customers as well as the community-as-a-whole. They will want to know what value they are getting for their money from their service providers. (Ben-David 2010)

Until the past few years, water and wastewater bills were steady or increasing slowly and made up a minor proportion of typical household expenditure and most businesses' costs. This reflected the focus of the earlier reforms on achieving productivity efficiencies through measures such as the introduction of independent economic regulation and the outsourcing of a range of functions. At the same time, the overall standard of services was generally improving. A March 2007 survey (ABS 2007) reported that the large majority of surveyed households (84.9%) had no major problems with their water services.[7] However, satisfaction with services varied, and total water and sewerage complaints were substantially higher in smaller regional utilities than in larger capital city utilities. In 2008–09, the complaint rate was 3.8% for the smallest utilities, compared to 0.8% for major city utilities. Notably, utilities with a corporatised structure tend to have lower complaint rates across all utility size bands (SRG 2011).

However, the question remains as to how to ensure that customers receive maximum value for money and continue to do so in the future in the light of rising bills and increased customer expectations. This will depend critically on the incentives associated with some important underlying features of the sector, including:

+ industry structure and competition
+ economic regulation
+ price and service trade-offs and scope for customer choice.

The following sections examine these features.

3.3.1 Industry structure and competition

At present, the urban water industry in Australia consists almost entirely of government-owned monopoly businesses, with limited direct competition. One issue is whether the form, governance arrangements and scale of existing water businesses are conducive to the provision of the services that customers want at the lowest possible cost.

As noted in Section 3.1, the earlier 1994 COAG reforms involved clearly separating policy, regulation and service delivery functions to ensure clear incentives and accountabilities for water businesses, and the Commission is concerned that there has been some movement away from those institutional and governance principles. The absence of institutional reform in non-metropolitan New South Wales and Queensland is clearly limiting service level performance and transparency in these areas, and creating public health and environmental risks (see Section 3.4.3).

While the industry is dominated by large integrated government-owned monopolies, there is nevertheless some use of competitive forces in the supply of urban water and related services. In particular, the private sector has become increasingly involved in the industry via a range of contractual arrangements, predominantly for the competitive provision of inputs. Contracting out has been undertaken with a view to increasing the efficiency of service provision. Virtually all capital construction on behalf of water utilities in Australian capital cities is already undertaken by the private sector, and many of their operations are also outsourced in a variety of forms (WSAA 2006). For example, SA Water contracts out the operation, maintenance and management of the entire Adelaide water supply and wastewater system.

Comparative competition is also used in the industry. Where it is used, firms do not directly compete for customers but are incentivised to perform better as a result of comparisons with other businesses by regulators, customers and other stakeholders, based on performance measures. For example, all major water service providers can be compared on a number of performance measures from their contributions to the Commission's *National Performance Reports*. Small providers (in New South Wales, Queensland and Western Australia) are also subject to some comparative benchmarking by the state government departments.

7 Identified problems included inadequate or low pressure (7.0%), fluctuating pressure (4.3%), supply disruptions (5.7%) and other problems with water supply (0.8%).

Currently, the strongest form of comparative competition in Australia is in Melbourne, where services are geographically split between three reasonably similar retail utilities. This enables the public and the Victorian economic regulator, the Essential Services Commission (ESC), to directly compare their performance. In 2007, the ESC noted that comparative competition had worked to improve performance and in particular to 'encourage management teams to innovate to improve service delivery relative to other businesses'. In the years following the disaggregation, the performance of many Melbourne retailers improved significantly on many measurable customer performance metrics, including customer complaints, water quality compliance and the speed with which unplanned interruptions and sewer spills were rectified (ESC 2007).

To date, however, there has been very little direct competition in the market for the supply of water and wastewater services to customers. Customers have generally had little choice about their supplier, the source of their water or its level of security. Some competitive reforms have been introduced more recently, including some disaggregation of contestable and noncontestable activities, the introduction of licensing arrangements to allow new entry, and some progress in the direction of effective thirdparty access.

Thirdparty access is required to allow potential entrants access to essential monopoly infrastructure needed to supply services. In 2006, the New South Wales Government introduced the *Water Industry Competition Act 2006*. The Act incorporates a licensing regime for private sector participation, a thirdparty access regime, and binding arbitration of sewer mining disputes. Some further work has been undertaken on thirdparty access regimes elsewhere. In Victoria, the ESC completed a review of a state-based access regime for water and sewerage in 2009.

Despite this progress, there have been no successful applications for third-party access to increase competition in the urban water and wastewater sector. There are still significant barriers to firms seeking access. Perhaps the most significant issue is the difficulty in obtaining access to bulk water. For example, in Sydney, the Water Industry Competition Act effectively requires new entrants to use a new source of supply. Uncertainty about rights to the resource at other stages of the urban water cycle may also be an impediment, particularly for stormwater and wastewater (see Frontier Economics 2008).

> The primary issue in the provision of water services is to identify mechanisms that encourage greater efficiency and reliability of both supply and use. Although there can be considerable debate, this is likely to be achieved by greater competitiveness in the supply of water services, and clearer market signals covering water use. Australia does not have a good track record in either of these areas.
>
> —Contributor report

The Commission considers that there is considerable merit in further exploring the scope for harnessing competitive forces in the sector to drive efficiency, innovation and customer focus.

3.3.2 Economic regulation

Economic regulation aims to reproduce the disciplines otherwise provided by competition to ensure that monopoly businesses do not earn monopoly profits or provide substandard services, but are still able to cover the efficient costs of operating and maintaining the network assets. In the context of utility industries such as water, regulatory functions typically entail:

+ determination or oversight of the prices and service levels provided by monopoly suppliers
+ licensing of suppliers as a means of monitoring and enforcing compliance with those service levels and prices
+ overseeing competition in contestable elements of the industries (for example, through the regulation of third-party access to essential facilities).

Economic regulation in one form or another has been imposed on the water sector in all states. The Commission considers that the scrutiny and oversight of water businesses by independent economic regulators has been and continues to be a major driver of improved productivity and service standards among water businesses.

One indicator of the gains from stronger economic regulation (that is, powers to control prices) is the difference between regulated revenue proposed by water businesses and that approved by the regulator. Price determinations by the ESC (2005–06 to 2007–08) and IPART (2005–06 to 2008–09) provide several examples where the revenue approved by the regulator was significantly below that proposed by the water businesses, including:

+ Sydney Water (1.95% or $122 million)
+ Melbourne Water (5.52% or $86 million)
+ Gippsland Water (9.67% or $17 million) (see NWC 2011).

This suggests that there were significant cost savings in delivering the required services. The financial benefits from increased scrutiny by economic regulators in places such as Victoria and New South Wales could amount to millions of dollars over a regulatory period for a single water business.

However, the Commission continues to be concerned that customers in many urban systems do not yet benefit from independent economic regulation. Many contributors and workshop participants raised the lack of full coverage of independent economic regulation as a critical problem that needs to be addressed.

> Regulatory arrangements across the country remain relatively disparate. Only in the ACT, Victoria and NSW have full and independent regulatory arrangements for both urban and rural water, including price-setting processes, been in place for any length of time. No other jurisdictions have independent price setting arrangements at present, although transition to independent regulatory arrangements are in place in Tasmania, South Australia and Queensland. Western Australia and the Northern Territory still operate under an arrangement whereby key elements of the regulatory framework are driven by government.
>
> —Contributor report

Another gap in the coverage of economic regulators relates to the scrutiny of major investment decisions made by governments (such as water security investments made in response to the drought), notwithstanding that those decisions account for most of the increase in costs and hence price increases to customers.

While economic regulation is a major driver of better value for money for customers, it is important that the way it is applied does not inadvertently discourage innovation in meeting customers' needs. As discussed in Section 3.2.7, one area in which it may currently do so is where regulators take a handson role in determining the specific tariff structures and levels that water businesses must apply.

3.3.3 Price and service trade-offs and scope for customer choice

Maintaining and improving levels of service can entail major costs in water and wastewater assets, which are then passed on to customers. The optimal balance between service level and cost will obviously vary from place to place as the underlying costs and benefits vary. Therefore, the essential requirement is for transparency and engagement in making decisions, including better understanding of the willingness of customers and the community to pay for given levels of service.

> A decision about a service standard has implications for cost—and it is critical that there is a clear alignment of accountability for decisions about standards and the pricing implications. This goes not only to service standards set by the businesses, but also by the regulators.
>
> —Contributor report

While setting this balance has always been a critical part of urban water management, many of the future challenges, such as ageing infrastructure, rapid urban population growth, changing customer needs and rising costs, mean that getting it right in the future will be increasingly difficult. The Commission believes that there is inadequate transparency, evaluation and customer engagement in relation to trade-offs between service standards and the costs of achieving them, and room for significant improvement. For example, several contributors contended that the way customers are engaged can be improved to give them greater voice.

> Current engagement practices tend to be very traditional consultation and market research approaches (largely one way communication to comment on the preferred proposal) and fail to utilise emerging methods of engagement using new media, citizen juries, choice modelling, agent based modelling, learning alliances and a range of other engagement techniques.
>
> —Contributor report

More fundamentally, the Commission is concerned that the urban water sector is currently not providing customers with choice about their levels of service. There are limited incentives and opportunities for water service providers to provide tailored customer offerings and service choices to customers, which inhibits their ability to deliver value for money.

> Currently, there is limited scope for urban water users to express their water using preferences, other than through technological choices that circumvent the control of water utilities. For example, if bore water is available and water users have a preference for unrestricted garden watering, they may install a pump, acquire the necessary licenses and thus maintain or improve their household amenity. Similarly, builders of new homes can opt for a range of technologies, such as grey-water recycling systems, that bestow more flexibility on the home owner. Perhaps ironically, many of these options are far more costly than if supply augmentation was to occur at the utility level and customers were then offered choice though different tariff structures and supply contracts.
>
> —Contributor report

Some views from the sector on the level of service to be provided appear to be based on the assumption that there is a homogeneous customer voice or that 'majority rules' should apply, rather than the accommodation of different views or preferences. In 2010, Sydney Water commissioned a customer values survey that clearly shows the divergent expectations and needs of residential customers, as well as a desire for choice. While 39% expected Sydney Water to meet their basic needs for water and wastewater supply and maintenance, the remaining 61% had higher expectations of their service provider. Choice was prioritised by 36% of customers who wanted choice in either efficient usage or price control, and onequarter of customers surveyed had a future focus and expected Sydney Water to have a clear, core mission and deliver to a greater good in some way (Sydney Water, unpublished). Similarly, a study by Cooper et al. (2010) found that customers displayed a wide range of attitudes towards water restrictions.

There is ample evidence of pent-up demand for choice at the customer level when it comes to water supply options. The sticking point appears to be the undue influence of state and federal agencies that rein in the potential for local responsiveness.

—Contributor report

While many contributors promoted the role of differentiated customer offerings, others expressed concern about the distributional impacts of allowing customer choice. For example, there was significant debate about whether choice would undermine the role of restrictions in socialising conservation effort and place the burden of demand management on disadvantaged customers. The Commission believes that enabling choice does not necessarily undermine other objectives, and that customer protection frameworks and hardship policies should be used to meet equity objectives. In fact, contributors' reports pointed out that regulatory reforms in many areas have greatly enhanced the customer protection frameworks to ensure access to a minimum level of essential services. Furthermore, the Commission observes that applying the same rules equally to all customers does not necessarily imply equity because the costs that are imposed are not uniform and not necessarily positively correlated with income.

In Victoria, the independent regulator, the Essential Services Commission (ESC), has recognised the importance of balancing the interests of consumers and water businesses. It should be noted that this has not come at the expense of water reform, with Victoria acknowledged as a leader in this area. The Victorian example illustrates the potential for the reform to proceed concurrently with the strengthening of consumer protections and engagement of consumers.

—Contributor report

Overall, given the absence of choice and the lack of customer focus, the Commission believes that the current arrangements are insufficient to meet the proposed objectives in the future.

Sydney, Australia

3.4 Public health and the environment

Regulatory arrangements governing urban water quality to protect public health and safety and the environment have served Australia well, and our nation's drinking water is generally safe and of a high quality. Many utilities have improved performance in the management of sewage overflows, and increased treatment standards have led to fewer damaging discharges of wastewater to the environment. Despite that, the Commission believes that current arrangements are insufficient to meet its proposed objectives now and in the future, as water quality risk management has become much more complex. The Commission has found that:

+ there is inadequate transparency, evaluation and customer engagement in relation to trade-offs between regulatory obligations and the costs of achieving them
+ current frameworks and processes for water quality regulation are unlikely to be able to deal with future challenges and are inhibiting IWM and the take-up of innovative decentralised solutions
+ public health, the environment and basic levels of service in regional and rural areas, particularly in New South Wales and Queensland, are at risk from inadequate processes, skills shortages and poor pricing policies.

This section examines each of these issues.

3.4.1 Balancing regulatory obligations with cost

Customers and the community are increasingly concerned about the environmental impacts of the urban water sector. Meanwhile, new technology is creating opportunities to use water in a fit-for-purpose manner, but also creates additional requirements to ensure that public health is adequately protected. Customers are also concerned about rising costs evident in their water bills. There is clearly a need to balance cost with these environmental and public health objectives. Beyond a point, enhancing environmental or public health standards could cost more than the value to society of those enhancements. Conversely, cost cutting to make bills more affordable is clearly unwarranted if it involves excessive risks to public health or the environment.

In the Commission's view, the optimisation of economic, social and environmental outcomes sought under the NWI implies that the imposition of environmental or public health regulation or associated investments should not go beyond the point at which the costs exceed the benefits. The Commission therefore strongly supports clear, risk-based, proportionate and cost-effective regulation of existing and emerging sources of water to protect public health and the environment. Again, the important requirement is for transparency and engagement in making decisions, including better understanding of the willingness of customers and the community to pay for outcomes.

There is evidence to suggest that the processes to determine tradeoffs between costs and regulatory obligations need to be improved, as does the specification of regulatory requirements. Issues raised by contributors included:

+ wastewater treatment and disposal regulations being set without sufficient regard to the benefits that will be obtained and the costs that are imposed (that is, input-based regulation driving major investment needs in infrastructure upgrades and replacement)
+ lack of clarity about roles and responsibilities for waterway health, and the absence of clear, measurable and achievable objectives
+ uncertainty about regulatory obligations, resulting in different interpretations and conflict between water service providers and regulators, particularly in relation to environmental sustainability (for example, whether the costs of greenhouse gas emissions offsets can be passed on to customers).

Given the future challenges facing the sector, cost-effective regulation will be increasingly difficult to design and the stakes will be much higher. There is a major risk that regulatory requirements will drive inefficient expenditure, particularly in wastewater management systems over the next decade.

> Particularly at a time when utility bills are increasing significantly, it is important to ensure that the regulatory effort is coordinated. In particular, there needs to be an economic assessment of environmental standards to ensure the community receives value for money and understands the cost/environmental trade off.
>
> —Contributor report

3.4.2 Water quality regulation, including for integrated water management

Despite Australia's good performance in water quality management, the Commission's recent review of water quality regulation (PWC 2011) found that recent developments raise serious doubts about the ability of the existing arrangements to meet current and future challenges. Along with new institutional arrangements (such as third-party access) and new market players, there are more diversified urban water sources; greater interconnection between water, wastewater and stormwater; and increasingly complex treatment systems (such as sewer mining, water recycling, stormwater harvesting, greywater reuse and managed aquifer recharge).

The Commission's review found that regulatory gaps are emerging, innovation is sometimes being stifled, and some decisions are being made without a full appreciation of the longer term risks and costs. The existing arrangements and multiplicity of agencies scatter scarce technical expertise among multiple jurisdictions and multiple agencies. As a result, many have questioned whether regulators now possess enough technical expertise to ensure that risks are properly managed. In addition, the complexity of approval processes was seen to be impeding potentially worthwhile projects (PWC 2011).

Some of those consulted for the water quality review questioned the need for reform. Given Australia's performance to date in providing high-quality fitfor-purpose water, this is not surprising. Without reform, however, it appears likely that problems will become more prevalent because technical capacity and expertise are not being harnessed effectively and efficiently across Australia (PWC 2011). In the future, urban water quality will also be increasingly at risk as a result of climate change, which may increase the frequency and severity of algal blooms, bushfires, storms and floods—all of which can have impacts on water quality. Without action, the Commission is not confident that public health and the environment will be adequately protected or that cost-effective opportunities for IWM will emerge.

> The conclusion that can be drawn from these reviews is that within Australia national guidelines are not being applied consistently, the roles and responsibilities of agencies vary from formal to informal, and there is a lack of transparency in decision making. There is also concern that the inconsistency in the regulatory approaches to recycled water in different jurisdictions is creating a barrier to industry.
>
> —Contributor report

3.4.3 Public health and environmental risks in regional and rural areas

In 2009, 6.4 million Australians lived in regional and rural urban areas (ABS 2010a). The level of water and wastewater services in the non-metropolitan urban areas varies by location.

While many of the challenges in rural and regional Australia are the same as those facing the urban water sector generally (for example, dealing with climate change and tightening environmental and public health standards in response to community expectations), the regional providers face particularly acute challenges in managing and replacing ageing water infrastructure under various severe constraints. As the Local Government Association of Queensland recently stated, 'these challenges and policy drivers will continue to impact the industry through the next decade and many councils are not well positioned to find solutions individually under current arrangements for managing water services' (LGAQ 2011).

In recent years a number of other reports (ATSE 2007, AECOM 2011) have raised major concerns about the standard of urban water services provided in rural and regional areas, particularly in relation to water supply planning, public health and safety risks. Some regional areas have reported patchy compliance with drinking water guidelines (PWC 2011). In its report for Infrastructure Australia, AECOM (2011) found that water utilities servicing regional communities (particularly smaller water utilities) struggle to implement and comply with the Australian Drinking Water Guidelines due to:

+ their comparatively fewer human and financial resources
+ the relatively lower availability of technical knowledge and expertise
+ strong competition for skilled employees in regional areas
+ inadequate infrastructure to treat water and preserve water quality
+ poor processes for the operation and maintenance of existing treatment infrastructure
+ lack of reporting and insufficient institutional incentive for utilities to comply with guidelines and licence requirements.

> In some parts of Australia significant aspects of one or both of these two elements of institutional support and technical rigour for water supply planning were largely absent. This situation must be remedied if urban water supplies are to be adequately maintained in the face of uncertainties about future water availability and demand. (ATSE 2007)

A review of water and sewerage services in Tasmania in 2008–09 (OTTER 2010) found the following:

+ Thirty-two per cent of the drinking water systems in Tasmania were inadequately sampled by some councils as water suppliers (and therefore the level of bacteriological compliance was not able to be determined).
+ Nine per cent of systems were not bacteriologically compliant. Three temporary 'boil water' alerts were used to manage public health during system failures. Such warnings have the potential to be riskier to public health than permanent 'boil water' alerts because they are temporary and less likely to be noted by consumers.
+ Across Tasmania, the compliance of regulated wastewater treatment plants with specified emissions limits was unsatisfactory, at an average compliance level of about 80%.
+ State-wide, only six out of 78 regulated wastewater treatment plants achieved consistent environmental compliance for the entire reporting period. This is compounded by the fact that many of them were assessed against old permit conditions that do not adequately reflect modern technology standards.

AECOM (2011) found that:

> [M]any utilities servicing regional towns are not recouping the costs of supplying water, let alone providing for capital improvements. Many are charging prices significantly lower than in major urban areas, where economies of scale would be likely to mean lower cost.

In regional New South Wales, mandated requirements to recover large proportions of revenue through variable charges mean that many local water utilities must bear significant revenue risk, particularly during times of water restrictions. Without further pricing reforms, many of those utilities will be financially unsustainable, assets will continue to decline and water quality and security will be jeopardised.

While there are issues to be addressed across regional and rural Australia, the Commission is particularly concerned about the risks to human health in non-metropolitan Queensland and New South Wales. While improved processes, training and pricing could address problems in many other areas, there are concerns that smaller utilities in New South Wales and Queensland require institutional reform and independent economic regulation before further substantial progress is likely.

AECOM (2011) also found that:

> [U]nder current pricing practices, funds are transferred from utilities to the government, often at the expense of new infrastructure, repair and replacement. Water utilities that are operated as part of the local government structure experience rate pegging, reducing their ability to recover the cost of supplying water to consumers.

In New South Wales, local councils reported that their water supply and sewerage revenue can be up to 35% of total revenue (Armstrong and Gellatly 2009). For such smaller water utilities not covered by the National Water Commission's *National Performance Reports* (those with fewer than 10 000 connections), AECOM (2011) found that reporting is patchy and inconsistent, making it virtually impossible to present a national picture of water quality and water security outcomes for those living in Australia's smaller regional towns. Similar data gaps for Queensland are due to a widespread lack of reporting, which is currently being addressed with the introduction of the Queensland *Water Supply Safety and Reliability Act 2008* and recent governance reforms.

> The regional NSW water industry suffers from fragmentation, too many water authorities and lack of financial transparency, particularly in the general purpose councils … Of those councils [102] involved in the delivery of water and sewer services, the vast majority operate within the broader council. While funding is theoretically tied for water and sewerage, this 'embedding' inevitably results in resources being diverted from the core water and sewerage services, which further exacerbates funding and resourcing issues.
>
> —Contributor report

The Commission recognises that there are broader issues preventing performance improvement, such as caps on council rate increases in New South Wales and the fact that water services provide an important revenue source for local councils. However, the Commission believes that much can be learned from the recent reforms in Tasmania and previous reforms in Victoria over several decades. Tasmania faced institutional barriers to reform similar to those in Queensland and New South Wales, but has now implemented changes to place the industry on a more sustainable basis.

3.5 Contributing to liveable cities

An important emerging issue for the urban water sector is how it might best contribute to 'water sensitive' or 'liveable' cities. The current adoption of water-sensitive cities concepts by the urban water sector is variable: some service providers embrace the concept while others are more hesitant. While this emerging area provides major opportunities for innovation and change, there are a number of challenges in:

+ defining the concepts and their application
+ agreeing on objectives and determining how to make trade-offs between costs and benefits that are inherently difficult to measure
+ agreeing on how far urban water policymakers and water businesses are responsible for broader liveability outcomes
+ addressing institutional and regulatory barriers
+ determining who should pay for certain outcomes.

The Commission believes that the sector is well placed to contribute more effectively to the adoption of water-sensitive cities concepts through the adoption of a robust and customer-focused framework.

3.5.1 Definition and concepts

The emerging concepts of water-sensitive cities and liveable cities recognise the opportunities presented by integrated urban water cycle solutions (for example, across water supply, wastewater and stormwater) to enhance the sustainability and liveability of our urban landscapes.

Some contributors highlighted concerns about inconsistencies and lack of clarity in the definition of water-sensitive cities. As identified by one contributor, there is 'no common or agreed understanding on the definition' of water-sensitive cities, but there are 'a few emerging descriptions'. While they are widely recognised as an important objective of urban water management, there are widely differing interpretations of what 'sustainability' means and how it can be measured, and no working definition of 'liveability'.

> There is a lack of clarity regarding concepts, such as water sensitive cities and WSUD [water sensitive urban design], and what each concept actually involves. For example, in 1999, WSUD was largely promoted as an engineering treatment for stormwater management, however, it is now considered as a more holistic concept akin to IWM and addressing 'all water streams in the urban water cycle'. It is highly likely that our understanding of the concepts will continue to evolve and this will bring challenges with implementation and assessment of the concepts.
>
> —Contributor report

> While the term 'resilient' would appear to be well defined, the same cannot be said for 'liveability', particularly when used in a definition that also requires the end result to be 'sustainable'. While many Australian cities rank very highly in international 'liveability' reports … the high 'ecological footprint' of these cities makes them far from being sustainable.
>
> —Contributor report

> Inconsistent definitions, interpretation and application make it more difficult to measure and assess the contribution of water sensitive cities in terms of the broader Australian urban water reform agenda at this time.
>
> —Contributor report

The concept of water-sensitive cities is an aspirational one, in that no city has yet achieved that status, but it is seen as the next step in an evolution from cities focused on water supply, drainage, and the water cycle.

The term 'water sensitive city' is referenced but not defined in the NWI (2004). Monash University (2011) defines a water-sensitive city as a city:

> where water's journey through the urban landscape is managed with regard for its rural origins, coastal destinations and spiritual significance. A philosophy of flexibility in supply and use to meet all users' needs underpins the collection and movement of water, and the technologies to facilitate the physical movement of water are designs that manifest these ideals visually for all to acknowledge and appreciate.

Monash (2011) identifies three principles for a water-sensitive city:

+ *cities as water supply catchments*: access to water through a diversity of sources at a diversity of supply scales
+ *cities providing ecosystem services*: the built environment functions to supplement and support the function of the natural environment
+ *cities comprising water sensitive communities*: sociopolitical capital for sustainability exists and citizens' decision-making and behaviours are water sensitive.

3.5.2 Objectives of water-sensitive cities and the benefits and costs of approaches to achieving them

Key questions are: What are the underlying objectives of more liveable and sustainable cities? How can they be best achieved? How do they change the way we manage water?

> With the planned population growth in each state or territory, the urban water industry in each city needs to be thinking about future supply augmentation. Increasingly there is interest in other approaches that provide additional benefits to the city such as waterway protection and improvements in 'liveability'. Typically these alternatives involve non-traditional water sources at a range of scales, including fully decentralised options at local or household levels.
>
> —Contributor report

The Commission believes that water-sensitive cities should be pursued within the current approach embedded in the NWI: water and other resources should be used in an optimal manner to generate economic, social and environmental benefits. Essentially, this requires that the full benefits of any option (be it 'traditional' or 'new') or policy measure outweigh the costs, with due consideration of risk and uncertainty. Water-sensitive cities approaches would then be seen as optimising outcomes from a broader set of options and values across the urban water cycle. This initially creates a major challenge in defining liveability and sustainability outcomes or benefits in meaningful and measurable ways.

In practice, the Commission is concerned that water-sensitive cities objectives are often focused on a limited range of policy instruments (mainly planning and strong prescriptive regulation) and types of options (mainly decentralised solutions, demand management and recycling). In addition, water-sensitive cities are often linked to inappropriate objectives, such as maximum utilisation of particular sources of water regardless of cost, or water selfsufficiency for cities (for example, see LVMAC 2011).

> No city is an island in terms of global, national and regional capital and labour stocks and flows. Resource flows, such as water, stormwater and wastewater also need to be considered within a broader state and/or regional catchment approach and not constrained to selected local catchments. The emergence of water trading, urban water grids and new water sources, such as desalination, can form part of a water sensitive cities approach if the concept is defined broadly enough to accommodate these solutions …
>
> —Contributor report

> Targeting an efficient and sustainable water system, would suggest more an 'optimising' of the capture and use of rainfall (and other sources of water) rather than 'maximising' any one source. Further, it will seldom be efficient to treat all water as a potentially valuable resource because of the relative costs and benefits of different water sources and options.
>
> —Contributor report

> Due consideration of all relevant costs and benefits will allow for water sensitive cities and other urban water management responses to be appropriately assessed in terms of meeting urban water priorities and maintaining other important urban values, such as amenity and open space.
>
> —Contributor report

Another barrier to effectively achieving water-sensitive cities is the absence of adequate frameworks for measuring and valuing the full benefits and costs of water-related measures designed to improve liveability. An initial challenge lies in the technical assessment of the likely outcomes attributable to specific actions, such as the possible benefits of stormwater projects on urban heat island effects (see CWSC 2011). One contributor suggested that many water-sensitive cities values 'are poorly understood and are not incorporated into investment decision making which continues to focus on "least cost" approaches'. However, as another contributor pointed out, the problem may also relate to difficulties in valuing non-market environmental and social impacts, stating 'The problem is not with "least cost" approaches, which should continue, but more what values, and what benefits and costs are being considered in decision making on future urban water solutions.'

The Commission considers that further applied work needs to be undertaken to better understand the full benefits and costs of water-sensitive cities options (for example, those associated with the values of improving urban waterway health).

3.5.3 Role of water service providers

Many see the environmental objective of the urban water sector as being to manage the environmental impacts of water collection, use and wastewater treatment and disposal through the clear specification of environmental requirements that are agreed by the community and an effective mix of policy tools to achieve those outcomes at least cost. However, some contributors envisage a fundamental reshaping of the urban water industry into one based on an ethos of sustainability.

> It is undoubtedly true that 'urban water management should meet the aims of protecting public health and safety, providing secure and reliable water services, being environmentally sustainable and achieving economic efficiency'. However there is an additional and higher level imperative that the urban water sector must now consider which relates to the role that the sector should play in achieving resilient and liveable cities.
>
> —Contributor report

Urban water service providers can clearly make a contribution to the liveability of Australian cities, but the urban water sector is not the only contributor to liveability. Therefore, liveability might be better seen as a broader societal objective (along with sustainability and economic growth) that is influenced by a range of factors, many of which are beyond the control of the urban water sector as a whole. If the sector's contribution to water-sensitive cities is to be effective and efficient, there is a need for the expected contribution of urban water service providers to those outcomes to be more measurable. The challenge to be met by the urban water sector is to manage its contribution to liveability and sustainability without losing focus on its core role of providing value-for-money services to customers.

Wingecarribee catchment area (photo courtesy of CSIRO)

3.5.4 Institutional and regulatory barriers

There are several potential benefits from a more integrated approach to management of the urban water cycle, including through water-sensitive urban design. However, as discussed above, there are also regulatory barriers to the adoption of cost-effective IWM solutions, and further work is required to address any existing inappropriate regulatory barriers to new and alternative solutions. From an institutional perspective, the pursuit of more water-sensitive cities requires greater coordination among a number of organisations (for example, regulators, developers, local councils and urban planners). While there are successful examples of that coordination, it has largely been due to the informal working relationships and expertise of various individuals working in the field. Broader integration can be difficult because of the number of organisations involved, each with its own objectives, skills and accountabilities.

There is much more work to be done to develop institutional arrangements that enable decentralised and integrated solutions to compete on an equal footing with centralised solutions requiring less coordination. As discussed above, improved planning processes may contribute to the early identification and assessment of cost-effective IWM options.

3.5.5 Funding and cost-sharing

There is an important challenge in determining appropriate cost-sharing arrangements for water-sensitive cities options. Currently, many projects are funded by the wider water customer base and governments. In pursuing a broader range of benefits, it is important to understand who the beneficiaries are and to develop appropriate cost-sharing arrangements. For example, it is appropriate that the customer base contributes to projects in proportion to the benefits that the projects provide in securing supplies to the whole of the urban water system (for example, through a recycled water project that offsets potable demand) or in avoiding system augmentation and asset maintenance and renewal costs. However, other benefits of water-sensitive cities projects may be private and attributable to a localised set of beneficiaries, such as the amenity and recreational benefits of urban wetlands in new housing estates, which are likely to be captured by developers and reflected in land values. The case for the broader customer base to contribute to those outcomes is dubious.

> It is not clear as to how water sensitive cities options will be funded now or into the future, and how these costs will be efficiently allocated between the beneficiaries of water sensitive cities.
>
> —Contributor report

4 Recommendations

This section outlines the Commission's recommendations, which aim to give effect to the objectives by addressing the issues identified in Section 3. The Commission has deliberately avoided delving into the detailed action plans that might be required in particular jurisdictions and urban settings and recognises that priorities and solutions will vary across Australia. It is also aware that the effectiveness of existing arrangements varies among jurisdictions and that in some cases some recommendations have already been fully or partially met. There may also be 'low hanging fruit' that can deliver major benefits at relatively low cost in some areas (for example, by enabling access to existing water markets), while more substantive change is required in others.

Many current urban water issues have been identified by the sector, some lessons from the drought have been learned, and some changes are now being considered and implemented.

However, substantial change is required if Australia's urban water sector is to meet customer and community expectations in the future. The earlier reform era taught us that significant change takes time. Therefore a fresh cycle of policy and institutional reform effort with long-term benefits in mind is needed.

4.1 Establishing overarching objectives for success

As discussed in Section 3, passionate debate about specific types of reforms (evident in the contributions to this project) relates to fundamental differences in the interpretation of the objectives and differences over how competing objectives should be balanced. The Commission is concerned that lack of consensus about what the sector is trying to achieve is severely limiting its ability to make progress, and is convinced that defining and then committing to a clearer set of objectives could resolve many problems and empower change.

The main examples of passionate divergences in opinion across the sector include:

+ whether water conservation is a public policy objective in its own right or a contributor to economically efficient water use and investment
+ whether customer choice is worthwhile and whether it has adverse equity impacts
+ how sustainability is defined and achieved
+ how customer service and broader community and environmental outcomes are balanced against the costs of achieving them
+ how potential trade-offs between equity and efficiency should be addressed (particularly in relation to pricing)
+ whether the sector should adopt centralised planning (by government) or decentralised (service provider and market-oriented) solutions
+ how far the urban water industry should be responsible for broader objectives in urban areas (encapsulated in the term 'liveable cities').

Before this review, the Commission did not fully appreciate the divergence in views or the implications of those views for urban water reform. The Commission considers that the lack of a coherent set of objectives is a major barrier to reform because it leads to policies that are ineffective and costly, policies that operate at cross-purposes, confusion between means and ends, and the undermining of accountability and transparency.

In initiating this project, the Commission proposed the objective that 'urban water management should aim to protect public health and safety, provide secure and reliable water services, be environmentally sustainable and achieve economic efficiency'. While there was no major disagreement with that statement from the contributors, it was interpreted differently by some and seen as insufficient by others. A strong message was that it should go beyond a single sentence statement. Based on that feedback, the Commission's suggested objectives outlined in Section 2 represent an attempt to develop a more coherent statement of urban water objectives in the context of the challenges that lie ahead.

The Commission believes that its objectives provide a tractable guide for policy design and implementation to meet future challenges. However, a very important question is how the debate about objectives is conducted, by whom, and how apparently irreconcilable differences are settled. The Commission believes that there is a role for COAG to agree on the objectives for urban water addressing the issues raised above. There is unlikely to ever be a complete consensus, but the Commission believes that broader debate on the objectives is an essential first step to future reform.

Primary recommendation

COAG should adopt an agreed set of national objectives for the urban water sector and general principles to guide reform.

Supporting recommendations

1. Customers and the community should be engaged in the process of developing an agreed set of objectives.
2. COAG should periodically review the appropriateness of the objectives every five to 10 years.

These recommendations would help to address current uncertainty about the future direction of the urban water sector.

4.2 Institutional roles and responsibilities

Because climatic variability is an integral component of urban water management, and large investment decisions are likely to be made in response to future inflows, jurisdictions need to ensure that roles and responsibilities are clearly defined and not susceptible to ad hoc and opaque changes in times of stress. They also need to ensure that the arrangements provide certainty and flexibility, and encourage efficiency.

> Getting the optimal mix of instruments and working out who is best placed to do what is at the heart of the policy and institutional challenge for the urban water sector.
>
> —Contributor report

In reviewing and redefining the full range institutional roles and responsibilities, jurisdictions should implement reforms that build on the underlying principles of the COAG 1994 Water Reform Framework, the NWI and other essential elements of good institutional design, including:

+ assigning roles, responsibilities and risks to those best placed to deal with them
+ ensuring that there are strong incentives and accountabilities driving performance towards objectives
+ ensuring transparency in relation to performance and decisions
+ aligning accountability and control
+ removing conflicts of interest
+ ensuring that organisations have the capacity to deliver without being adversely constrained by external factors.

There was very strong agreement by the contributors, and at the stakeholder workshop, that the roles of government, regulators and water businesses in supply–demand planning and investment should be clarified. The Commission supports greater separation of planning from government policymaking, through either centralised approaches (such as independent government planning and procurement bodies) or decentralised or devolved approaches (for example, firmly assigning responsibility for meeting a government-defined supply security standard to water service providers, or developing market-oriented approaches). Governments could also consider the role of planning at different levels (for example, the potential for broader integrated water resource plans combined with more specific water security plans developed by service providers).

The Commission believes that governments can give the community greater confidence and certainty that supplies can be secured by defining robust minimum security standards or objectives and regularly monitoring the achievement of those standards by service providers. This would reduce the political and economic risk associated with water supply decisions. Having clearly defined stepin roles for government during emergencies would add further certainty—although it should be remembered that droughts and floods are part of business as usual in Australia and institutional arrangements should be resilient to climatic variability.

Primary recommendation

Governments should ensure that service providers, regulators and other parties have clear objectives and accountabilities, which align with clearly specified roles, functions, resourcing and funding.

Supporting recommendations

1. Jurisdictions should review the full range of current roles and responsibilities in the urban water sector to assess their clarity and consistency with long-term supply security, efficiency and other objectives and report publicly and to COAG by the start of 2013. The assessment should particularly consider:
   - roles and responsibilities for urban water planning
   - how current arrangements function under extreme climatic scenarios and other unforeseen events.
2. Jurisdictions should clarify and amend roles and responsibilities to provide accountability for efficient and effective performance, including by:
   - establishing specific, measurable and achievable standards for supply security, environmental sustainability, flood management, waterway health, public health and other objectives in a transparent, risk-based and effective manner
   - clearly defining government's emergency step-in powers in service delivery, investment and pricing
   - considering other recommendations of this report concerning institutional roles and responsibilities (see recommendations in sections 4.3, 4.6, 4.7 and 4.9).
3. Jurisdictions should improve the transparency of performance monitoring of policy objectives, obligations and standards to provide governments and communities with confidence and certainty that objectives and criteria are being met.
4. Jurisdictions should improve information management across governments, water service providers, regulators and customers and improve public access to water resources data and other information in the urban sector. For example, the main data used in supply–demand planning and investment decisions should be made public to ensure that decisions are open to external scrutiny.

These recommendations would help the sector better meet customer and community needs in a resilient, accountable and transparent manner. They would help to depoliticise investment decisions and increase economic efficiency, particularly in investment and the use of new supply sources, thus driving down costs to customers without jeopardising security of supply.

In redefining institutional roles and responsibilities, jurisdictions should duly consider the potential for more market-oriented approaches, other complementary improvements in policy settings (for example, more flexible pricing) and more choice for customers in making tradeoffs between service levels and price. Other specific elements of institutional reform addressed in the remainder of this section should also be considered (for example, in relation to economic regulation, supply security, urban water service provision by local councils in New South Wales and Queensland, and sustainability and liveability).

4.3 Customer and community expectations

4.3.1 The voice of the customer in policy and planning

One important result of hurried and stop–start planning during the drought was that community and customer engagement and transparency were significantly reduced. This led to ongoing disquiet about the choice of investments and concern about future impacts on customers' water bills. In more recent planning and policy processes, jurisdictions and water businesses have improved consultation. However, the Commission believes that there are further opportunities to improve customer engagement in planning and policy, including through better funding of customer representative bodies.

> By firmly grounding community engagement processes on best practice (e.g. committing to openness, fairness, transparency) and a real willingness to engage with change in a truly open way, community respect will only grow.
>
> —Contributor report

4.3.2 Customer choice

Australia needs to move away from divisive debates about how individuals choose to use water to allow customers to better express their unique preferences. As found in Section 3, under the current arrangements there are limited capacity and incentive for water businesses to be responsive to the differing needs of individual customers (including residential, commercial, industrial and other customers).

Moving away from decisions 'for the good of the customer base as a whole' to recognising that customers have different needs is likely to increase customer satisfaction and promote innovation, particularly in the context of rising water bills. For example, Yarra Valley Water in Victoria has recently flagged the idea of providing customers with a range of price and service offerings, including services that involve choice based on environmental attributes.[8] The Commission strongly supports innovative thinking that allows customers to choose the level of water use they are willing to pay for.

> There is no one generic voice of the customer. Customers are diverse. In consumer markets, there are a variety of different customer groups with diverse needs, and this is also the case in urban water management. These diverse voices must be considered, reconciled and balanced to develop truly successful urban water reforms.
>
> —Contributor report

One area of potential differentiation lies in enabling customers to make their own decisions about their preferred level of supply security. Such options may be particularly useful in areas where there is access to desalination, other manufactured water sources or rural water markets. Differentiated service offerings can result in win–win outcomes:

+ Customers who value water security could pay much less than the costs of alternative means of securing supply (for example, carting water, groundwater bores, and rainwater tanks in areas that do not have suitable rainfall).
+ Water businesses can recover the full costs of providing additional supply security and can better manage risks to their portfolio of options to manage risk cost-effectively.
+ Remaining customers can be made better off, or at least no worse off, in terms of price and supply reliability.

The Commission recognises that this approach is challenging for many in the sector, particularly as it could affect the role of universal water restrictions. However, as discussed below, the Commission has concerns about the costs of water restrictions and believes that they should be used only in exceptional circumstances.

8 *The Age*, 22 September 2011, 'Water pricing choices to flow', *www.theage.com.au/environment/water-issues/water-pricing-choices-to-flow-20100921-15lea.html* (accessed 14 March 2011).

4.3.3 Customer protection frameworks

Protecting disadvantaged customers and ensuring universal access to a basic level of essential services is an important element of the Commission's objectives for the sector. More effective customer protection frameworks are required in many jurisdictions. However, it is also important that equity objectives are pursued in a way that does not unnecessarily compromise the achievement of other objectives, particularly using pricing to achieve economic efficiency (see further discussion on pricing below).

4.3.4 Seeking out new types of 'customers'

The Commission believes that the urban water sector could benefit from widening its definition of potential customers to encompass those with responsibility for or interest in public health and broader environmental and social outcomes. For example, parties such as local governments, developers, catchment management organisations, health departments and others may purchase outcomes and services directly from water service providers to contribute to their particular commercial and policy goals, rather than those activities being funded by water customers. As discussed below, identifying the beneficiaries of particular actions or investments (particularly for IWM) and developing appropriate funding mechanisms are the keys to achieving more liveable cities (see Section 4.9).

Primary recommendation

Governments, regulators and service providers should ensure that the urban water sector gives a greater voice to customers through exploring opportunities for customer choice in pricing and service delivery, improved engagement in objective setting and the determination of trade-offs, improved customer protection frameworks, and competition.

Supporting recommendations

1. Arrangements should be developed whereby customers are able to pay for different levels of supply security.
2. Customers should be better informed and further engaged in planning and policy processes, and the public should be better informed about trade-offs between levels of service and other outcomes and the costs they entail.
3. All customer service standards should be set transparently, supported by benefit–cost analysis, and assessed by independent economic regulators.
4. Effective and transparent customer protection frameworks should be established in all jurisdictions. COAG should commission a report to benchmark customer protection frameworks across Australia by the middle of 2012.
5. Jurisdictions should fund urban water customer and community advisory bodies to enable increased customer engagement in policy, regulation and service delivery. Those bodies should have responsibility for promoting the interests of all urban water customers and consumers across Australia, not solely the interests of disadvantaged customers.

These recommendations would help the sector make the most of existing opportunities to better meet customer needs and provide value-for-money services.

4.4 Pricing and economic regulation

4.4.1 The role of pricing

A fundamental element of the earlier reforms was to ensure that prices enabled the recovery of the efficient costs of water services and provided a signal for efficient water use. Other tools, such as customer protection frameworks, transparent community service obligations and broader welfare policies, have been used to ensure universal access to essential water and wastewater services in major cities and in regional, rural and remote areas.

The Commission has recently undertaken a national review of water pricing reform, which found that, while the water sector has made great progress towards the objectives of pricing reform (for example, economic efficiency and financial viability), progress has slowed or even reversed under pressure from drought. Many governments have intervened directly in price-setting processes and attempted to achieve multiple distributional, affordability, conservation and efficiency objectives (NWC 2011).

Given the challenges ahead for the urban water sector, the Commission believes that a fundamental tenet of the earlier reform programs—that pricing should be used primarily to achieve economic efficiency—needs to be reaffirmed. The Commission is confident that the legitimate needs of disadvantaged customers can be addressed through best-practice customer protection frameworks. Trying to use pricing to achieve too many objectives may result in none of them being achieved very well.

4.4.2 Independent economic regulation

Independent economic regulation is a vital prerequisite for a principled and effective approach to urban water pricing. However, as found in Section 3, not all urban systems benefit from independent economic regulation. Despite recent progress in Tasmania, South Australia and south-eastern Queensland, full implementation is needed to protect customers from monopoly pricing, promote efficient pricing and investment, and ensure that service standards are met. In some other states, economic regulators need to be given stronger powers to periodically determine appropriate price controls. A near-unanimous recommendation arising from contributors and stakeholders was that independent economic regulation should be in place across all urban systems in Australia. That view echoed the Commission's previous biennial assessments.

The principles of economic regulation should be consistent among jurisdictions. The small size of some service providers, such as in non-metropolitan Queensland and New South Wales, should not be a barrier to independent economic regulation. However, it may necessitate a more light-handed and less resource-intensive form of regulation in the short term, although in the long run those entities are probably unsustainably small and should be restructured for efficiency and effectiveness. The tiered approach proposed by the Australian Competition and Consumer Commission (2009) for the regulation of different irrigation infrastructure operators in the Murray–Darling Basin is an example of a proportionate regulatory approach. In the Commission's view, even light-handed independent approaches are far superior to governments directly setting prices.

While strongly supporting independent economic regulation as a prerequisite for effective and efficient pricing and viable water businesses, the Commission also recommends that regulatory regimes be reshaped to reflect the status of the industry and the objectives for urban water service. For example, price controls (allowing flexibility in tariff structures) are more appropriate than prescriptive price setting. Regulators could usefully make a step-back assessment of whether their approaches support an efficient and adaptive water sector in the face of its emerging challenges, perhaps along the lines of the current review being undertaken by Ofwat, the water services economic regulator in the United Kingdom.

4.4.3 Price signals for the value of water

The current approach to volumetric pricing, which is typically based on long-run marginal cost pricing and frequently involves inclining block tariffs, was not effective in balancing supply and demand during the drought. Rigid and inflexible pricing does not cope well with the variability in Australia's urban water systems. More recently, it has also resulted in perverse outcomes, such as customers facing very high price signals even when storages are spilling.

Ultimately, the Commission believes that the urban water sector should have efficient price signals for the water resource that encourage optimal investment and the use of alternative sources. Such price signals could be set either administratively or by a market, although more research and detailed policy design work are needed to develop workable solutions suited to local circumstances. Such pricing reforms would also need to be complemented by necessary regulatory and institutional reform to be fully effective. Moreover, any future pricing strategy and its role in balancing supply and demand must also be communicated effectively to customers and the community (see NWC 2011, Frontier Economics 2011ab).

Cataract Dam, Sydney

4.4.4 Full cost recovery and government subsidies

As noted in Section 3, in recent years there has been a move away from the principle of recovering the full efficient costs from customers, particularly through government subsidies for capital works. The Commission sees significant benefits in a committed movement away from the provision of government subsidies in the future.

Primary recommendation

Governments and regulators should recommit to using pricing to promote economic efficiency; broaden the coverage of fully independent economic regulation across all urban water systems; and ensure that economic regulation is more flexible, to encourage innovation in price and service offerings and better reflect the value of water.

Supporting recommendations

1. Independent economic regulation should be applied across all urban water systems, but changes should be made to ensure that regulators do not stifle the development of more flexible and innovative tariff structures and service offerings.
2. Governments, regulators and water service providers should further investigate alternatives to long-run marginal cost pricing and inclining block tariffs to provide more flexible and efficient price signals of the value of the resource.
3. Australian Government and state government subsidies should be limited to circumstances in which there are demonstrable public benefits that would not otherwise be able to be funded by the customer base. Subsidies should not fund infrastructure projects in metropolitan areas.
4. As required under existing reform agreements, governments should continue to transparently report on community service obligations for urban water systems, and efforts should be made to move to full cost recovery over time.

These recommendations would increase economic efficiency in investment, sourcing decisions and water use by customers.

4.5 Planning and other policy settings affecting the supply–demand balance

The drought has underscored the risks associated with planning, managing and investing on the basis of long-term averages when supply security depends on rainfall that is extremely volatile from year to year and over multiyear periods. While an important issue for supply–demand planning and investment is to clarify roles and responsibilities (see Section 4.2), there is also an imperative to improve planning processes and techniques and to address a range of other policy settings that affect the balance between supply and demand.

There was strong general agreement from many contributors that:

+ there should be clear and measurable supply security objectives
+ there should be no artificial policy bans, including on rural–urban water trading, dams and indirect potable recycling
+ the national urban water planning principles are appropriate and should be complied with (see Box 4)
+ new and improved planning tools are required, particularly through a portfolio optimisation approach to investment under uncertainty.

In the Commission's view, responsible agencies and businesses should adopt adaptive and risk-based approaches to supply–demand planning and investment that define how supplies will be secured at the least economic, social and environmental cost under the full range of inflow scenarios. They should also continually demonstrate that clearly defined supply security objectives are being achieved, within a framework set by governments. Pursuing this will require improved data, processes, tools and information flows.

> A portfolio real options approach to planning is in the process of being adopted in most Australian states and territories, with some states being quite well advanced. Given the uncertainty which faces most water businesses, it provides an opportunity to ensure that investment decisions are unbiased and make the best use of available information. However, robust application of the process can be technically demanding, and it is important that artificial constraints are not imposed on the options available for assessment.
>
> —Contributor report

However, planning is not the only instrument affecting the balance between supply and demand. Changes need to be made to a range of other policy settings, such as water restrictions, regulatory demand-management measures, recycling targets, access to water markets and environmental flow regimes, to ensure that there is a strong, cohesive, resilient and efficient approach to balancing supply and demand. For example, the Commission believes it is now time for recycled water projects to stand on their own merits. In addition, indirect potable recycling cannot be a viable option without extensive community engagement well in advance of the investment decision. Therefore, the Commission encourages a proactive approach to that issue.

Box 4: National urban water planning principles

COAG has agreed to the following principles to facilitate optimal urban water planning outcomes:

1. Deliver urban water supplies in accordance with agreed levels of service.
2. Base urban water planning on the best information available at the time and invest in acquiring information on an ongoing basis to continually improve the knowledge base.
3. Adopt a partnership approach so that stakeholders are able to make an informed contribution to urban water planning, including consideration of the appropriate supply–demand balance.
4. Manage water in the urban context on a whole-of-water-cycle basis.
5. Consider the full portfolio of water supply and demand options.
6. Develop and manage urban water supplies within sustainable limits.
7. Use pricing and markets, where efficient and feasible, to help achieve planned urban water supply–demand balance.
8. Periodically review urban water plans.

Primary recommendation

Governments should review and amend policy settings to ensure that there is a cohesive approach that allows an efficient portfolio of supply- and demand-side measures to emerge and evolve over time, without direct and ad hoc government intervention. Responsible agencies and service providers should adopt risk-based approaches to supply–demand planning. All parties should strive for greater transparency.

Supporting recommendations

1. Each jurisdiction should develop and publicly report on its measurable minimum urban water security objectives, which should be set based on engagement with the community. Supply–demand plans should demonstrate how those security standards can be met under the full range of inflows, including by outlining triggers for new investment in response to changing supply and demand conditions.
2. Governments and service providers should reduce the current heavy reliance on water restrictions and ensure that efficient and flexible risk-based strategies are in place for securing supply during extreme climatic events.
3. Governments should implement the national urban water planning principles, and compliance with the principles should be assessed independently and reported publicly.
4. Governments should remove all policy and legislative barriers to the even-handed consideration of recycled water and potable reuse, new dams, and rural–urban and intercatchment water trading. This should include facilitating water trading by urban water service providers (and potentially by large customers).
5. Each jurisdiction should review the full cost, effectiveness and future role of water restrictions and other mandatory demand-management schemes, particularly in the context of new supply sources in major metropolitan areas and recommended institutional reforms. The results of those reviews should be reported publicly.
6. Governments should move away from predetermined recycling targets and other input-based regulation. Any regulatory requirements aimed at reducing demand or improving technical water-use efficiency should be subjected to a publicly reported assessment of their full costs and benefits. In general, output-based regulatory requirements should be favoured over input-based approaches to give water service providers and other affected parties flexibility in meeting underlying objectives efficiently.
7. Governments should develop transparent operating procedures outlining how flows for the environment and other public benefits in major urban catchments are to be managed under all inflow sequences, and the conditions upon which ministers may intervene to provide critical human needs. Relevant urban water service providers should be assigned NWI-compliant water access entitlements for surface and groundwater sources.

These recommendations would promote the balancing of supply and demand at least cost, contribute to environmental sustainability, and increase the confidence of customers and the community.

4.6 Service provision in rural and regional areas, particularly in New South Wales and Queensland

As demonstrated in Section 3, there are major concerns about the standard of urban water services provided in rural and regional areas, particularly in relation to public health and safety risks. There are particular concerns about the institutional arrangements for and capacity of local council service provision in New South Wales and Queensland.

Due to the nature of the problems and in the context of the future challenges facing the sector, the Commission is convinced that structural and institutional reform of local council service provision in New South Wales and Queensland is urgently needed. However, the Commission acknowledges that a range of models and transitional approaches may be appropriate, and does not recommend a particular model.

As stated in the 2009 biennial assessment (Finding 11.15):

> mindful of the steadily rising technical sophistication of water supply operations, further reform is required for regional water utilities (particularly smaller utilities) to improve their planning, reporting and pricing functions and ensure that the financial and specialist technical resources are available to enable the provision of cost-effective, safe and reliable water supplies into the future. For example, structural/organisational reforms (for example, aggregation and shared service models) and regulatory reforms may warrant further consideration in some rural and regional areas, particularly where services are currently provided by local government authorities.

Primary recommendation

Governments and service providers should undertake reforms in regional, rural and remote areas to ensure that there is sufficient organisational, financial, technical and managerial capacity to meet service delivery requirements and protect public health and the environment, particularly in New South Wales and Queensland.

Supporting recommendation

1. The New South Wales and Queensland governments should implement institutional and structural changes in non-metropolitan urban water systems as a matter of urgency to meet the interests of customers and protect public health and the environment.

(See also the recommendations in relation to institutional roles and responsibilities above and water quality regulation below.)

These recommendations would improve service delivery and better protect public health and the environment.

Myponga Dam, South Australia

4.7 Markets and competition

The urban water sector is currently dominated by large government monopoly service providers and by central planning and regulation, with much less emphasis on the use of market-based approaches. The Commission believes there is potential to reconsider this mix and that there should be a greater role for markets and competition in the future, along with improved pricing.

While there will always be a role for planning and regulation, market-oriented approaches and better pricing have a number of characteristics that may help to better achieve the underlying policy objectives in an increasingly complex and uncertain operating environment. Those features include flexibility, responsiveness to customer needs, and strong efficiency properties.

There was much discussion in the assessment and review reports about the potential for more market-oriented approaches and competition to drive improved efficiency and service performance. The Commission's synthesis has revealed that there is debate about:

+ the size of the benefits of reform, particularly when considering the costs associated with the natural monopoly elements of the industry
+ the forms of competition that are most suitable
+ the benefits to customers and the potential negative impacts of competition on customers, particularly disadvantaged customers.

However, there is broad agreement that:

+ competition is a means to an end (that is, improved economic efficiency through innovation, flexibility and accountability), not an end in itself
+ the most significant potential gains lie in driving dynamic and allocative efficiency in bulk supply procurement, investment and long-term system optimisation under uncertainty
+ any market-oriented reform of bulk water supplies must ensure security of supply and be complemented by effective customer protection frameworks and other regulatory arrangements
+ there is no one-size-fits-all market solution, and a nationally connected urban water market is not economically viable
+ the benefits and costs of any pro-competition reforms need to be fully assessed
+ a phased approach to implementation may be required to manage costs and risks
+ third-party access to water and wastewater infrastructure and licensing regimes for new entrants could play a positive role in encouraging efficiency and innovation without requiring fundamental institutional change, if implemented well
+ the methods adopted for competition and third-party access must be consistent with the protection of customers and of public health and safety
+ more sophisticated market-based options are most suited to the larger metropolitan cities
+ there may be simple alternatives or 'low hanging fruit' available in some places (for example, through rural–urban trading)
+ increased competition does not require the privatisation of water service providers
+ further work is required to consider detailed design and practical implementation issues.

The Commission believes that the introduction of state-based third-party access regimes and licensing regimes are noregrets options that can be accommodated within the current institutional framework to encourage innovation, efficiency, sustainability and improved public health and safety, and that they should be developed in all states in a consistent manner. As stated in the 2009 biennial assessment (Finding 11.16), 'the Commission welcomes steps in some jurisdictions to introduce effective third-party access regimes … The Commission encourages other jurisdictions to follow suit …'

The Commission recognises that the right models will vary between jurisdictions and systems. In some places, enabling rural–urban trading might be sufficient; in others, more developed market approaches might be required. Importantly, moving towards more market-oriented approaches requires new thinking by policymakers, industry and regulators. All stakeholders in the sector need to focus on how to remove barriers to more competitive and flexible approaches, rather than on reasons why they might not work.

Primary recommendation

Governments, regulators and service providers should work actively towards a goal of more market-determined bulk water prices and other market-oriented options to promote efficiency and innovation, including through consideration of detailed implementation and transition arrangements.

Supporting recommendations

1. All states should develop third party access regimes for water and wastewater infrastructure by 2015. At the same time, they should examine options for introducing contestable resource access rights, including for wastewater and other potential sources of 'new' water, where there is currently uncertainty.
2. All states should develop licensing regimes for water, wastewater and recycled water service providers by 2015 that encourage competition while ensuring that justifiable customer, environmental and public health protections are in place.
3. All vertically integrated urban water service providers should implement accounting ringfencing to better understand the costs of the contestable and noncontestable elements of the sector.
4. Jurisdictions should undertake detailed design work on a range of market-oriented options to identify preferred approaches, address implementation issues and determine appropriate transition arrangements.
   - Customer and community views should be taken into account in this process.
   - The initial focus should be on the potential to develop market-determined price signals for bulk supplies in a manner that promotes efficient water use and investment while ensuring security of supply.

These recommendations aim to improve the economic efficiency of the urban water sector and to encourage innovation, including by enabling new and alternative sources to compete on their own merits with more traditional, centralised supply sources.

4.8 Water quality regulation and wastewater discharge standards

Contributors to this project stressed that regulatory obligations are major drivers of future investment needs, particularly in the wastewater sector. However, it is not clear that those obligations are cost-effective or reflect the community's willingness to pay for particular outcomes.

The Commission recommends that jurisdictions ensure that regulation is outcome rather than input focused, targeted at clearly defined objectives, risk-based, proportionate and cost-effective. Customers and the community should be provided with transparent information about the costs of meeting various regulatory obligations and standards.

More generally, as stated in Section 3.4.2, the Commission's recent review of water quality regulation in Australia by PricewaterhouseCoopers has found that regulatory arrangements governing urban water quality in Australia are complex and involve a large number of agencies. Regulatory gaps are emerging, innovation is being stifled, and some decisions are being made without a full appreciation of the longer term risks and costs. While providing maximum allowance for local circumstances, the existing arrangements scatter scarce technical expertise among multiple jurisdictions and agencies.

The Commission's review of water quality regulation sets out elements of a bestpractice framework for managing risks through regulation, and uses that framework and the views of stakeholders to identify and assess several options for reform. The review's final recommendations should be considered by COAG upon their release.

Primary recommendation

Governments and regulators should better embed mandatory benefit–cost analysis and community engagement in the regulation of public health and the environment (particularly for investment in wastewater systems) to ensure that obligations are costeffective and reflect community expectations.

Supporting recommendations

1. All jurisdictions should review the existing regulatory obligations driving current and future investment in wastewater networks and wastewater treatment and disposal.
   - Trade-offs between public health and environmental outcomes and the costs of attaining particular outcomes should be made transparent, and changes should be made where current standards are unclear or not in accordance with the community's willingness to pay.
   - Risk management plans should be developed to demonstrate how regulatory obligations and service levels associated with wastewater systems can be met under extreme climatic events.
2. COAG should consider the recommendations of the Commission's forthcoming national review of water quality regulation.

These recommendations will better protect public health and the environment from water quality risks.

4.9 Water-sensitive cities and liveability in urban areas

There are a number of potential benefits from a more integrated approach to the management of the urban water cycle (water, wastewater and stormwater), including through water-sensitive urban design. However integration can be difficult due to the number of organisations involved, each with their own objectives, skills and accountabilities.

Individual water service providers are building business models and engaging with other stakeholders to develop water-sensitive cities. In many cases, they are operating ahead of the current policy frameworks. The Commission believes there is an emerging need for governments to develop clear and cohesive institutional frameworks for integrated urban resource planning and management and to clarify the roles and responsibilities of all parties, including urban water service providers. Urban water service providers certainly require a 'seat at the table', but should not be held responsible for achieving 'liveable cities' because they do not control all the relevant instruments, and because that responsibility may reduce their focus on and accountability for delivering core services to customers. As stated by the WSAA (2009), the industry should 'maintain focus on its primary function which is to supply safe and reliable drinking water and sewerage services'.

In developing the institutional arrangements, the Commission believes it is also important to understand where increased coordination and integration are likely to yield the most significant benefits at lowest cost (in both a geographic and a functional sense). For example, contributor papers suggest that the most cost-effective application of IWM concepts is in new residential developments and growth areas, due to the significant costs of retrofitting existing infrastructure.

Realising water-sensitive cities requires improved methodologies and assessment frameworks to quantify the full costs, benefits and risks associated with new and alternative sources (including the avoided costs of infrastructure upgrades, system security benefits, and environmental and social impacts). The aim should be to enable integrated and decentralised options to compete on an equal footing with more traditional options.

While the Commission supports approaches to improve the integration of planning functions across urban areas and for water, wastewater and stormwater, this does not mean that particular decentralised and other solutions should be pursued without regard to cost. In accordance with the national urban water planning principles, truly integrated water management requires a balanced and evidence-based approach to considering all options. The focus should therefore be on removing any unjustified impediments to the adoption of new and alternative solutions (for example, cumbersome regulatory processes, underpricing of potable water and artificial policy bans), rather than subsidising or mandating non-traditional options.

The Commission also believes that there is an opportunity for the urban water sector to extend the definition of its customer base. In relation to IWM options with multiple benefits that accrue to various parties (for example, landholders, developers, local governments, public health and the environment), it is important to determine who should pay for particular outcomes. For example, there may be a case for local governments or taxpayers more broadly to pay for the urban amenity and recreational benefits of improved public open space. Similarly, there might be a case for developers, private landholders or both to contribute to the costs of urban wetlands or recycling projects in proportion with the benefits they obtain.

> Who will pay for water sensitive cities approaches and what will be the pricing and charging mechanisms is an area for further research and analysis with strong linkages to improving overall pricing and incentives.
>
> —Contributor report

Hinze Dam, South East Queensland

Primary recommendation

Governments and service providers should clarify the roles and responsibilities of service providers and other organisations in contributing to more liveable communities. Decisions related to liveable communities need to be supported by more appropriate funding arrangements, based on robust evaluation of the full benefits and costs.

Supporting recommendations

1. Jurisdictions should define how interactions within and outside the urban water sector should be managed (for example, the role of water businesses in broader integrated urban planning processes at various levels).
2. All IWM options should be identified and assessed based on their full economic, social and environmental costs and benefits, including the contribution they make to securing supply. Detailed results of those assessments should be released publicly.
3. Where IWM solutions have multiple benefits in urban areas, efforts should be made to value those benefits and obtain funding directly from the beneficiaries or responsible government departments at all levels, reflecting the distribution of public and private benefits (for example, health or environment departments paying for public benefits).

These recommendations will improve environmental, public health and amenity outcomes in urban areas and allow IWM options to contribute cost-effectively to both supply–demand balance and broader public objectives.

5 Implications for the national approach to reform

While the recommendations in this report are expected to have major benefits and should be implemented by jurisdictions in their own right, national leadership and direction setting through COAG will deliver material benefits for all parties implementing urban water reforms. The implementation of national urban water reform agreements has been slow and partial. An improved implementation and coordination framework is required to turn ideas into action and ensure that the full benefits of reform are captured in a timely manner across the country.

5.1 The national interest in urban water and the case for a nationally coordinated approach

Urban water reform can make an important contribution to generating national economic productivity gains at a time when there is renewed need for them. This primary driver for nationally coordinated action in urban water remains the same as it was in the early 1990s when the initial round of COAG reforms was agreed. However, the challenges and opportunities to improve nationally significant social, economic and environmental outcomes in urban areas have evolved considerably in the past decade.

A national approach to urban water reform can:

+ help Australia meet current and ongoing challenges that have national implications, such as climate change and rapid population growth
+ drive reform in important but challenging policy areas where multiple competing interests are involved
+ establish a benchmark for best practice, to which individual jurisdictions can aspire and against which they can be assessed
+ promote shared understanding of urban water issues across Australian communities (for example, many of those issues are similar among the major metropolitan cities or among rural communities, but not between those two groups)
+ reduce the cost of competitive entry into multiple jurisdictions through economies of scale and scope, and reduced compliance costs from harmonised regulation
+ address emerging cross-border issues arising from the increasing connectivity of urban systems (for example, from Melbourne, Canberra and Adelaide to water markets in the southern Murray–Darling Basin)
+ assist in the dissemination of knowledge and the development of consistent terminology
+ ensure that, once implemented, beneficial reforms can endure political change.

A national approach to reform is consistent with jurisdictions retaining prime responsibility for urban water management and its reform. However, this assessment shows that, in many cases, it is the policies of jurisdictional governments that need change. It is also clear that many sound recommendations for reform made by various groups over the past five years have not been actioned.

To address these matters, there is a role for national leadership and direction. For example, the Water Services Association of Australia's 2009 vision paper recommended that COAG undertake a number of actions:

> In publishing the urban water industry's vision for a sustainable future, WSAA hopes that a common vision with all Australian stakeholders can be developed and, through this process, generate a strategic program of actions that will be undertaken by the industry and Australian governments to achieve this common vision. (WSAA 2009)

Furthermore, as stated in the Treasury's 2010 briefing to the incoming federal government:

> Without further reform of water pricing, trading and infrastructure, poor water policy will increasingly undermine economic growth, inflate the costs of sustaining even moderate population growth and result in even further irreparable environmental damage … Long-term sustainability in urban and rural water use will require a new, ambitious reform agenda, in partnership with the States, with binding performance-oriented timetables. (Commonwealth Treasury 2010)

Photographer: Michael Bell

5.2 The effectiveness of the current approach

Despite the in-principle case for national direction, concerns have arisen about the effectiveness of the urban water elements of the NWI as set out in 2004. They include widespread recognition that the urban water reform agenda defined in the NWI was insufficient, particularly in the context of the subsequent drought. The Commission's *2007 Biennial assessment* referred to the 'currently limited scope of the urban water reform actions', and the *2009 Biennial assessment* stated that 'new challenges which were not as evident when the NWI was signed have presented themselves':

+ The urban water actions largely comprised a limited set of short-term initiatives and focused on technical wateruse efficiency.
+ Some actions that can have major impacts on the efficiency and security of urban water supply have not been fully implemented (for example, Clause 90 (iv) of the NWI, which states that there should be no artificial barriers to rural–urban water trading).
+ Some of the actions required under the NWI have been diluted or altered during implementation. For example, some states adopted pricing arrangements that were technically compliant with the requirement for independent review of price setting but clearly did not meet the underlying objectives that the NWI clause sought to achieve.

In the past few years, the national urban water reform agenda has become fragmented. For example, a number of supplements to the agenda have been agreed through COAG (such as new NWI pricing principles and national urban water planning principles), but it is not clear how those commitments fit into a broader cohesive agenda; nor is it clear what outcomes those actions aim to achieve. The additions have no defined monitoring or compliance framework. Some actions are perhaps too detailed to warrant investigation at the national level, but some useful agreed actions have simply not been implemented. In addition, concerns have been expressed that a 'lowest common denominator' approach has been adopted in order to obtain consensus (that is, the new NWI pricing principles include many principles that have already been met and tend towards documenting current practice rather than best practice).

Outside of the COAG reform framework, the Australian Government has funded urban water projects (for example, through its $1 billion National Urban Water and Desalination Plan), despite the fact that the principles of the COAG 1994 framework emphasise cost recovery from customers and movement away from such subsidies, particularly in metropolitan areas where water businesses have the capacity to invest and customers have the capacity to pay.

Overall, there is a view among jurisdictions that the national approach has not been a significant driver of reform in urban water in recent years. Instead, the reforms that have occurred have been largely instigated by the states, driven by water scarcity and fiscal pressures. However, it is broadly acknowledged that the earlier 1994 COAG framework did provide significant impetus for reform. As one of the contributors to this process pointed out, those reforms worked effectively because policymakers adopted a principled yet pragmatic approach to implementing agreed reforms.

5.3 Characteristics of an improved national approach

A new national framework should provide a comprehensive platform for reform over the next 10–20 years and give effect to the recommendations outlined in this report. There is a strong case for COAG to adopt an agreed national set of specific objectives for the urban water sector based on those outlined in Section 2, as well as high-level principles to guide future changes in policy settings and institutional arrangements.

In improving the effectiveness of the national approach to implementation, governments should adopt an approach that:

+ focuses on the achievement of clearly specified objectives (that is, ends rather than means)
+ utilises tailored jurisdiction-specific implementation plans to identify priority reform actions that will make a material contribution to achieving the objectives across jurisdictions and within metropolitan and non-metropolitan urban systems
+ contains commitments that are not overprescriptive but are specific enough to ensure that reform occurs
+ has a strong implementation monitoring framework with incentives for performance and independent and credible assessment mechanisms
+ is adaptive, with rolling implementation plans that are living documents to ensure that they are flexible and remain relevant (for example, revised every 3–4 years)
+ involves scheduled periodic overall reviews of the outcomes and the appropriateness of the objectives and principles (for example, every 10 years).

Importantly, a national approach does not require uniform policies or methods, as circumstances and histories vary between jurisdictions. Rather, there is a need to focus on the achievement of well-defined and measurable outcomes.

The Commission acknowledges the strong view of workshop participants that Australian Government involvement would be substantially more effective if accompanied by financial incentives. Participants saw financial incentives as very effective in encouraging reform in the 1990s and felt that financial incentives would address common concerns in the jurisdictions about inadequate resourcing for reform effort, and compliance and reporting costs.

While generally agreeing with that view, the Commission emphasises that the recommendations outlined in this report are all worth implementing on their own merits. Any attempt to link incentives to accomplishments strengthens the need for discipline and rigour in defining the reform commitments, and requires an independent and credible assessor of performance. Care is needed to ensure that payments do not reward poor past performance. In addition, while payments should be based on achieving measurable outcomes, confounding factors and long timelags might create challenges in defining such measures adequately.

Primary recommendation

COAG should pursue priority actions for each jurisdiction that contribute materially to national urban water sector objectives, and use stronger incentives and an improved monitoring and evaluation framework to drive timely and effective implementation.

Supporting recommendations

1. If the Australian Government is providing financial incentives to support COAG reform, the incentives should not be provided as direct contributions to water-related infrastructure.

Appendices

Appendix 1: An innovative process: Developing future directions for the urban water sector

This appendix summarises the delivery of the National Water Commission's Developing Future Directions for the Australian Urban Water Sector project.

Overview

The Commission is an independent statutory authority that is required to undertake biennial assessments of progress in the implementation of the National Water Initiative (NWI) and provide advice on actions required to better realise the NWI's objectives and planned outcomes.

The Commission's 2007 and 2009 biennial assessments raised concerns about the performance of the urban water sector, including in relation to the planning and institutional arrangements in place to optimally balance supply and demand. There are divergent views across the sector about how well the industry is performing more broadly, whether further reform is necessary, and, if so, the nature of those reforms.

In response, the Commission launched the Developing Future Directions for the Australian Urban Water Sector project in early 2010 to identify the scope for further reform in the urban water sector, and to identify ways to help the sector perform and better manage future risks and challenges. The scope of the project included:

+ the development of short assessment reports on aspects of urban sector performance by respected water sector experts
+ independent reviews of the assessment reports by specialists, to provide additional and alternative ideas
+ the incorporation of previous and concurrent work by the Commission and other agencies
+ testing emerging ideas through a managed process of sectoral engagement
+ a process to synthesise findings and make them available publicly.

A similar process successfully identified reform needs in other sectors, including the Victorian electricity and gas sectors. The process is designed to:

+ provide intellectual leadership while being consultative
+ draw on objective evidence and analysis
+ take account of divergent opinions
+ seek out new and innovative ideas
+ ensure that propositions are carefully tested.

Project steering committee

A project steering committee was responsible for project direction, advocacy and providing advice to the project team. Members of the committee were:

+ Ms Sally Farrier – Chair (Commissioner, National Water Commission)
+ Mr James Cameron (Acting Chair, National Water Commission) (from October 2010)
+ Ms Erin Cini (Project Manager, Element Solutions)
+ Mr Chris Davis (Commissioner, National Water Commission)
+ Mr Will Fargher (General Manager, Water Markets and Efficiency Group, National Water Commission)
+ Mr Ken Matthews AO (Former Chair and CEO, National Water Commission) (until October 2010)
+ Ms Chloe Munro (Chair, National Water Commission)

The project steering committee was assisted by a drafting team including Mr Michael Woolston and Mr Chris Olszak from Frontier Economics.

Assessment reports

Short assessment reports were prepared by selected water industry experts on a carefully defined range of topics. After peer recommendations, the Commission invited input from knowledgeable and respected subject-matter experts with the ability to communicate evidence-based opinion. This was an efficient way to obtain input from a range of parties within a short timeframe.

The Commission identified 15 topic areas to stimulate the identification of opportunities for the urban water sector:

1. Challenges facing urban water supply and demand
2. Institutional arrangements
3. Regulation
4. Pricing and economic reform
5. Legal frameworks and property rights
6. Business models
7. Opportunity for competition
8. Planning and investment
9. Voice of the customer
10. Organisation and industry operation, culture, skills and capacity
11. Water-sensitive cities and water-sensitive urban design
12. Supply optimisation
13. Demand management, water-use efficiency and restrictions
14. Community engagement
15. Externalities.

At least two urban water experts were invited to prepare an assessment report on each topic. In total, 25 reports on the 15 topics were prepared. The assessment reports were structured to cover the following content:

+ *Context*—the current context for, and status of, relevant aspects of urban water reform related to the topic area
+ *Barriers*—current and future influences on and/or constraints to reform
+ *Opportunities*—the opportunities for reform and innovation, as well as the pathways to achieving the opportunities
+ *Recommendations*—actions required to achieve water reform objectives, including estimated timeframes for implementation.

The assessment report brief was for authors to consider their topics in a national context, although examples of local or regional issues and opportunities were encouraged. For guidance, the Commission suggested that the objective of the urban water sector should be to 'protect public health and safety, provide secure and reliable water services, be environmentally sustainable and achieve economic efficiency'.

Independent reviews

The assessment reports were reviewed and critiqued by independent reviewers, who were consultants, academics and water reform practitioners based in Australia or overseas. The aim was to ensure open and transparent review and to allow an opportunity for innovation to be injected into the reports.

The independent reviewers were given the assessment reports and additional stimulus material for the topic they reviewed. There were multiple reviews of each topic. In total, the Commission received 32 independent reviews from Australian and international contributors.

Synthesis

The synthesis drafting team brought together the contributions of more than 50 individuals and organisations. In addition to information generated by this project, previous and concurrent work by the Commission and other agencies was integrated, including the Commission's work on the National Review of Urban Water Quality Regulation project, competition and pricing work, and previous work by Infrastructure Australia, the Productivity Commission, and the Department of Sustainability, Environment, Water, Population and Communities. A list of contributors is in Appendix 2.

The Commission synthesised the findings into an interim report.

Workshop

The project steering committee presented the interim report at a project stakeholder engagement workshop in Canberra on Wednesday 2 February 2011. The workshop provided an excellent opportunity to test emerging ideas and led to a number of important refinements to this final report.

Appendix 2: List of contributors

The Commission acknowledges the work of contributors to this project and thanks them for their contributions.

Assessment reports

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Appendix 3: Important elements of the 1994 COAG Water Reform Framework

Cost recovery and pricing reform

+ A restructuring of water tariffs based on the principles of consumption-based pricing, full cost recovery (including a rate of return on assets and externalities), cross-subsidies between customer classes being reduced or eliminated, and remaining subsidies made transparent.
+ A specific requirement in the urban sector for the introduction of two-part tariffs for urban water services, consisting of an access fee and a volumetric fee based on usage.

Institutional reform

+ Adoption of an integrated catchment management approach to water resource management.
+ The institutional separation of the roles of resources management, standard-setting and regulatory enforcement, and service provision.
+ The need for water services to be delivered as efficiently as possible and for further development of interagency comparisons of performance, and service providers seeking to achieve international best practice.
+ Particularly in metropolitan areas, service delivery organisations with a commercial focus, whether achieved by contracting out, corporatised entities or privatised bodies.

Water allocation and trade

+ Jurisdictional implementation of comprehensive systems of water allocations/entitlements, and the separation of water property rights from land title.
+ Facilitation of trading so that water should be used to maximise its contribution to the national income and welfare within the social, physical and ecological constraints of catchments.

The environment and water quality

+ Allocation systems to provide for the environment as a legitimate user of water, and substantial progress on allocations for the environment in stressed or overallocated rivers by 1998.

Public consultation and consultation

+ Public consultation by government agencies and service deliverers when change and/or new initiatives involving water resources are contemplated.
+ Jurisdictions to individually and jointly develop public education programs on water use and the need for, and benefits from, reform.
+ Water agencies to develop public education programs illustrating the cause-and-effect relationship between infrastructure performance, standards of service and related costs, with a view to promoting levels of service that represent best value for money for the community.

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Abbreviations and acronyms

COAG	Council of Australian Governments
IPART	Independent Pricing and Regulatory Tribunal (New South Wales)
IWM	integrated water management
NCP	National Competition Policy
NWI	National Water Initiative
WSAA	Water Services Association of Australia
WSUD	water sensitive urban design