



**Australian Government**  
**Productivity Commission**

# Australia's Urban Water Sector

Productivity Commission  
Inquiry Report  
Volume 1

No. 55, 31 August 2011

© Commonwealth of Australia 2011

ISSN 1447-1329

ISBN 978-1-74037-372-2 (Volume 1)

ISBN 978-1-74037-373-9 (Volume 2)

ISBN 978-1-74037-374-6 (Set)

This work is copyright. Apart from any use as permitted under the *Copyright Act 1968*, the work may be reproduced in whole or in part for study or training purposes, subject to the inclusion of an acknowledgment of the source. Reproduction for commercial use or sale requires prior written permission from the Productivity Commission. Requests and inquiries concerning reproduction and rights should be addressed to Media and Publications (see below).

*This publication is available from the Productivity Commission website at [www.pc.gov.au](http://www.pc.gov.au). If you require part or all of this publication in a different format, please contact Media and Publications.*

**Publications Inquiries:**

Media and Publications  
Productivity Commission  
Locked Bag 2 Collins Street East  
Melbourne VIC 8003

Tel: (03) 9653 2244

Fax: (03) 9653 2303

Email: [maps@pc.gov.au](mailto:maps@pc.gov.au)

**General Inquiries:**

Tel: (03) 9653 2100 or (02) 6240 3200

**An appropriate citation for this paper is:**

Productivity Commission 2011, *Australia's Urban Water Sector*, Report No. 55, Final Inquiry Report, Canberra.

JEL code: Q and R.

***The Productivity Commission***

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website ([www.pc.gov.au](http://www.pc.gov.au)) or by contacting Media and Publications on (03) 9653 2244 or email: [maps@pc.gov.au](mailto:maps@pc.gov.au)



**Australian Government**  
**Productivity Commission**

***Melbourne Office***

Level 12, 530 Collins Street  
Melbourne VIC 3000  
Locked Bag 2 Collins Street East  
Melbourne VIC 8003

Telephone 03 9653 2100

Facsimile 03 9653 2199

***Canberra Office***

Telephone 02 6240 3200

[www.pc.gov.au](http://www.pc.gov.au)

31 August 2011

The Hon Bill Shorten  
Assistant Treasurer  
Parliament House  
CANBERRA ACT 2600

Dear Assistant Treasurer

In accordance with Section 11 of the *Productivity Commission Act 1998*, we have pleasure in submitting to you the Commission's final report into Australia's Urban Water Sector.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Wendy Craik', written over a white background.

Wendy Craik  
Presiding Commissioner

A handwritten signature in black ink, appearing to read 'Dr Warren Mundy', written over a white background.

Dr Warren Mundy  
Commissioner

---

## Terms of reference

### **Productivity Commission Inquiry into examining the case for microeconomic reform in Australia's urban water sector**

I, Nick Sherry, Assistant Treasurer, pursuant to Parts 2 and 3 of the *Productivity Commission Act 1998* hereby request that the Productivity Commission undertake an inquiry into examining the case for microeconomic reform in Australia's urban water sector.

#### **Background**

The urban water sector is responsible for providing sustainable, secure and safe drinking water and wastewater services. These services include: water harvesting; water manufacturing (e.g. desalination); storage; treatment and distribution; and wastewater removal and treatment. At times urban water utilities are also responsible for stormwater and flood mitigation services. Additionally, the sector has a role in encouraging the responsible use of water and water conservation. Urban water services are generally provided by state and territory government owned entities or by local councils.

In recent times, the ability of our urban water systems to meet demand for water in our cities and towns has been challenged by severe droughts, climate change, increasing urban populations and ageing water infrastructure. Ensuring long term water security requires effective arrangements that encourage timely investment in diversified water supplies and improve the efficiency of water use.

Reforms aimed at improving efficiency in the urban water sector began in the 1990s following the adoption of a water framework by the Council of Australian Governments (COAG) in 1994, which elevated better management of Australia's water resources to a national issue. Reform was further encouraged through the Intergovernmental Agreement on a National Water Initiative in 2004. In recognition of growing urban water supply challenges, the COAG national urban water reform framework was enhanced in November 2008.

While the urban water sector has made progress towards reforms, there is scope for further changes. This inquiry will assist COAG to advance urban water reforms in Australia by identifying pathways to achieve improved resource efficiency through reforms in arrangements that govern the urban water sector.

#### **Scope of the inquiry**

The Commission is to report within twelve months on:

1. Opportunities for efficiency gains in the structural, institutional, regulatory and other arrangements in the Australian urban water and wastewater sectors;
2. Options to achieve the efficiency gains identified in point 1. The options are to be subjected to a rigorous cost benefit analysis, including using quantitative assessments to the fullest extent possible, to identify:
  - a. the economic, social and environmental impacts;
  - b. the impacts on Australian governments, business and consumers; and
  - c. the propensity to facilitate supply and demand planning and decision-making in the medium and long term.
3. A proposed work program including implementation plans for the options, identifying:
  - a. practical actions that the Commonwealth, state and territory governments and local councils can undertake to implement options for reforms, including any transitional arrangements;

- 
- b. priority areas where greatest efficiency gains are evident and where early action is practicable; and
  - c. quantitative and qualitative indicators for efficiency gains in the urban water and wastewater sectors.

### **Considerations**

In conducting the inquiry, the Commission is to have regard to:

1. A definition of urban that encompasses cities, towns and regional centres / villages;
2. The importance of long term water security — taking into account changes in climate, population and economic activity — without compromising social, health and environmental outcomes;
3. The roles of the Commonwealth and state and territory and local governments with respect to urban water and wastewater policy, supply and management;
4. The different circumstances across Australia, including:
  - o Variability between water catchments, supply alternatives and demand;
  - o Relationships between urban water users and other water users, including consideration of water resource planning and allocation frameworks;
  - o Committed and planned investment to augment urban water supplies;
  - o Current urban water reforms, such as planning, pricing and third party access; and
  - o Emerging competition, including in the provision of water supply services.
5. Emerging water management practices, such as the integrated management of water, wastewater, recycled water and stormwater;
6. Lessons from reform in the rural water and natural resource management sectors and from overseas reform;
7. Lessons learnt from reforms in other utility sectors in the Australian economy. This should take into account differences in the intrinsic values of water compared to other products and operational differences between the industries, including product storage, availability, and transport costs;
8. The COAG 1994 reform outcomes, the national competition policy arrangements, the National Water Initiative provisions applying to urban water, the third party access provisions of the *Trade Practices Act Part IIIA*, competition and access regimes and the 2006 intergovernmental Competition and Infrastructure Reform Agreement; and
9. Current and recent review activity relating to urban water issues in Australia, including those undertaken by regulatory bodies.

In undertaking the inquiry, the Commission is to advertise nationally inviting submissions, hold public hearings, and consult with relevant Australian Government, state and territory government agencies, local government, water utilities, other key interest groups and affected parties.

The Commission is to provide both a draft and a final report. Both reports are to be published.

NICK SHERRY

[Received 22 July 2010]



---

# Contents

This report has two volumes. The first volume contains the terms of reference for the inquiry, key points, overview, recommendations and findings and the chapters of the report. The second volume contains the appendices and two technical supplements.

---

## Volume 1

<b>Letter of Transmittal</b>	<b>III</b>
<b>Terms of Reference</b>	<b>IV</b>
<b>Abbreviations</b>	<b>XI</b>
<b>Key points</b>	<b>XVI</b>
<b>Overview</b>	<b>XVII</b>
<b>Recommendations and findings</b>	<b>XLVII</b>
<b>1 Introduction</b>	<b>1</b>
1.1 Background to this inquiry	1
1.2 What has the Commission been asked to do?	3
1.3 Scope of the inquiry	4
1.4 The Commission's approach	4
1.5 Conduct of the inquiry	6
1.6 Guide to the report	8
<b>2 About Australia's urban water sector</b>	<b>11</b>
2.1 Supply of water, wastewater and stormwater services	12
2.2 Water consumption	20
2.3 Recent supply augmentation and demand management initiatives	24
2.4 Performance of the urban water sector	34
2.5 Structural, institutional, governance and regulatory arrangements	42
<b>3 Objectives for the urban water sector</b>	<b>53</b>

---

3.1	What objectives?	54
3.2	Economic efficiency as an overarching objective	67
<b>4</b>	<b>The role of governments</b>	<b>71</b>
4.1	Market provision	72
4.2	Government involvement	77
4.3	Conclusions	80
<b>5</b>	<b>Supply of water, wastewater and stormwater services</b>	<b>83</b>
5.1	Making better supply augmentation decisions	84
5.2	Improving system operations and asset management	112
5.3	Other opportunities in the supply of wastewater and stormwater services	116
5.4	Achieving integrated water cycle management	119
5.5	Scope for efficiency gains in regional urban areas	127
<b>6</b>	<b>Pricing of water, wastewater and stormwater</b>	<b>131</b>
6.1	Pricing of bulk water	133
6.2	Pricing of wastewater and stormwater services	140
6.3	Pricing of water and wastewater transmission and distribution networks	147
6.4	Final retail pricing	155
6.5	Assessment of NWI pricing principles	177
<b>7</b>	<b>Non-price demand management</b>	<b>181</b>
7.1	Water restrictions	182
7.2	Water use efficiency and conservation measures	195
<b>8</b>	<b>Achieving affordability and consumer protection objectives</b>	<b>203</b>
8.1	Affordability of water and wastewater services	204
8.2	Consumer policy framework	228
<b>9</b>	<b>Framework for reform</b>	<b>239</b>
9.1	Objectives for reform	240
9.2	Reform options	246
<b>10</b>	<b>Improving institutional arrangements</b>	<b>249</b>
10.1	Assigning roles and responsibilities	250

---

10.2	Framework for improving governance of utilities and regulators	252
10.3	Improving governance arrangements for utilities and regulators	258
10.4	A charter between governments and utilities	288
<b>11</b>	<b>Rethinking price regulation</b>	<b>295</b>
11.1	What is the rationale for prices oversight?	297
11.2	How significant are these problems likely to be?	302
11.3	Options for future prices oversight	310
11.4	Assessment of regulatory options	312
11.5	Future arrangements for prices oversight	321
11.6	Is there merit in a national economic regulator for the urban water sector?	324
11.7	Third party access regulation and licensing	326
<b>12</b>	<b>Structural options for large cities</b>	<b>331</b>
12.1	Competition, efficiency gains and structural reform	333
12.2	Option 1: Vertically-integrated water and wastewater utility	340
12.3	Option 2: Vertical and horizontal separation of the bulk water supply function	350
12.4	Option 3: Vertical and horizontal separation of the wastewater treatment function	357
12.5	Option 4: Horizontal separation of retail-distribution	361
12.6	Conclusion	374
<b>13</b>	<b>Reform in regional areas</b>	<b>377</b>
13.1	Regional water, wastewater and stormwater sector	378
13.2	Option 1: Horizontal aggregation	396
13.3	Option 2: Regional alliance	413
13.4	Option 3: Horizontal disaggregation	419
13.5	Other issues for regional areas	421
<b>14</b>	<b>Implementing reform and monitoring progress</b>	<b>429</b>
14.1	The reform package	430
14.2	The role of governments in implementing reform	433
14.3	Facilitating reform and monitoring progress	442

---

<b>References</b>	<b>445</b>
-------------------	------------

---

Volume 2

---

<b>A</b>	<b>Public consultation</b>	<b>1</b>
<b>B</b>	<b>Further information on Australia's urban water sector</b>	<b>13</b>
<b>C</b>	<b>Lessons from other water sectors</b>	<b>61</b>
<b>D</b>	<b>Lessons from reform in other utility sectors</b>	<b>83</b>
<b>E</b>	<b>Supply augmentation case studies</b>	<b>89</b>
<b>F</b>	<b>Portfolio managers, opportunity cost and tariffs</b>	<b>103</b>
<b>G</b>	<b>Competition and structural reform</b>	<b>113</b>
	<b>Technical supplement 1</b>	<b>133</b>
1	About this supplement	135
2	Modelling framework	139
3	Model calibration	147
4	Theory and results for basecase models of Melbourne & Perth	173
5	Policy scenarios and results	191
A	Introduction to modelling framework	215
B	Mathematics of the model	225
C	Sensitivity testing	235
D	Referee reports	239
	<b>Technical supplement 2</b>	<b>249</b>
	<b>References</b>	<b>283</b>

---

# Abbreviations

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ABS	Australian Bureau of Statistics
ACCAN	Australian Communications Consumer Action Network
ACCC	Australian Competition and Consumer Commission
ACG	Allen Consulting Group
ACOSS	Australian Council of Social Service
ADWG	Australian Drinking Water Guidelines
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AWA	Australian Water Association
BAE	Binding alliance entity
BASIX	Building Sustainability Index
CBA	Cost–benefit analysis
CHINS	Community Housing and Infrastructure Needs Survey
CIE	Centre for International Economics
CMA	Central Market Agency
COAG	Council of Australian Governments
CPI	Consumer Price Index
CSO	Community Service Obligation
CUAC	Consumer Utilities Advocacy Centre
DECCW	Department of Environment, Climate Change and Water (NSW)
DERM	Department of Environment and Resource Management (Qld)
DORC	Depreciated optimised replacement cost

---

DVA	Department of Veterans' Affairs (Cwlth)
EAV	Equivalent Annual Value
EPA	Environmental Protection Authority
EPBC Act	<i>Environmental Protection and Biodiversity Act 1999</i> (Cwlth)
ERA	Economic Regulation Authority
ERRR	Economic real rate of return
ESC	Essential Services Commission
ESCOSA	Essential Services Commission of South Australia
ESD	Ecologically sustainable development
FERC	Federal Energy Regulatory Commission (US)
FPC	Federal Power Commission (US)
GL	Gigalitres (equal to one thousand megalitres)
GTE	Government trading enterprise
GWCC	Goldenfields Water County Council (GWCC)
IBT	Inclining block tariff
ICEWaRM	International Centre of Excellence in Water Resources Management
ICRC	Independent Competition and Regulatory Commission
IPART	Independent Pricing and Regulatory Tribunal
IPE	Independent procurement entity
IWCM	Integrated Water Cycle Management
kL	Kilolitres (equal to one thousand litres)
LGAQ	Local Government Association of Queensland
LGSA NSW	Local Government and Shires Associations of NSW
LMWUA	Lower Macquarie Water Utilities Alliance
LRAC	Long-run average cost
LRMC	Long-run marginal cost
LWU	Local Water Utilities
MFP	Multifactor productivity
MJA	Marsden Jacob Associates
ML	Megalitres (Equal to one thousand kilolitres)

---

MVRC	Moonee Valley Racing Club
MWST	Ministerial Water and Sewerage Taskforce (Tas)
NCC	National Competition Council
NCP	National Competition Policy
NEM	National Electricity Market
NHMRC	National Health and Medical Research Council
NPAT	Net profit after tax
NRETAS	Department of Natural Resources, Environment, The Arts and Sport (NT)
NTE	Network transmission entity
NWC	National Water Commission
NWI	National Water Initiative
NWQMS	National Water Quality Management Strategy
OECD	Organisation for Economic Co-operation and Development
Ofwat	The Water Services Regulation Authority (UK)
OMA	Operating, maintenance and administration costs
OTTER	Office of the Tasmanian Economic Regulator
PC	Productivity Commission
PIAC	Public Interest Advocacy Centre
QCA	Queensland Competition Authority
QWC	Queensland Water Commission
RAPAD	Remote Area Planning and Development Board (Qld)
REROC	Riverina Eastern Regional Organisation of Councils
RIS	Regulatory impact statement
ROC	Regional Organisation of Councils
RWCC	Riverina Water Country Council
SCA	Sydney Catchment Authority
SDP	Sydney Desalination Plant Pty Ltd
SEQ	South-east Queensland
SEQWGM	South-east Queensland water grid manager
SRMC	Short-run marginal cost

---

SWIM	State-wide Water Information Management (Qld)
VCEC	Victorian Competition and Efficiency Commission
VIF	Variance inflation factors
VTS	Victorian Transmission System
WACC	Weighted average cost of capital
WACOSS	Western Australian Council of Social Services
WELS	Water Efficiency Labelling Scheme
WGM	Water grid manager
WICA	<i>Water Industry Competition Act 2006</i> (NSW)
WICS	Water Industry Commission for Scotland
WIST	Water Industry Skills Taskforce
WSAA	Water Services Association of Australia

---

# OVERVIEW

---

## Key points

- In recent times, the urban water sector has faced drought, growing populations and ageing assets.
- Governments have largely responded with prolonged and severe water restrictions and investments in desalination capacity.
- The costs to consumers and the community have been large.
  - Water restrictions are likely to have cost in excess of a billion dollars per year (nationally) from the lost value of consumption alone.
  - Inefficient supply augmentation in Melbourne and Perth, for example, could cost consumers and communities up to \$4.2 billion over 20 years.
  - Large government grants for infrastructure may have led to perverse outcomes.
- Conflicting objectives and unclear roles and responsibilities of governments, water utilities and regulators have led to inefficient allocation of water resources, misdirected investment, undue reliance on water restrictions and costly water conservation programs.
- Therefore, the largest gains are likely to come initially from establishing clear objectives, improving the performance of institutions with respect to roles and responsibilities, governance, regulation, competitive procurement of supply, and pricing, rather than trying to create a competitive market as in the electricity sector.
- To implement the recommended universal reforms, governments should:
  - clarify that the overarching objective for policy in the sector is the efficient provision of water, wastewater and stormwater services so as to maximise net benefits to the community
  - ensure that procurement, pricing and regulatory frameworks are aligned with the overarching objective and assigned to the appropriate organisation
  - put in place best practice arrangements for policy making, regulatory agencies, and water utilities
  - put in place performance monitoring of utilities and monitor progress on reform.
- The circumstances of each jurisdiction and region differ and there is not a ‘one size fits all’ solution to industry structure. In addition to recommended universal reforms, the Commission has set out:
  - four structural options for large metropolitan urban water systems
  - three options for small stand-alone regional systems.
- There is a role for COAG, but each government can proceed independently to implement the key reforms.
- Implementation of the reform package, with commitment by governments, will provide consumers with greater reliability of supply, greater choice of services at lower cost than otherwise and reduce the likelihood of costly and inconvenient restrictions.

---

# Overview

Following the agreement of COAG, the Australian Government has asked the Productivity Commission to examine the case for microeconomic reform in the urban water sector and to identify pathways to achieving improved resource allocation and efficiency.

The urban water sector is taken to include:

- planning, procuring and supplying water of appropriate quality to households and commercial users
- collecting, treating and disposing or recycling of wastewater (sewage and tradewaste)
- managing drainage and stormwater for flood mitigation, environmental protection, disposal or recycling purposes.

The terms of reference involve three main tasks. First, a requirement to identify opportunities for efficiency gains through changes to structural, institutional, regulatory, and other arrangements in the Australian urban water sector. Second, to provide options to achieve the identified efficiency gains, and quantitatively assess these options (to the extent possible). Third, propose a work program, including priority areas and implementation plans.

The origin of this inquiry can be traced to the COAG agreement of 2008 (box 1), with recent experiences in the sector creating further impetus for this inquiry.

The National Water Commission and Infrastructure Australia have recently released reports that cover some of the issues in this inquiry. The Commission has liaised with these organisations and drawn on their work where appropriate.

The urban water sector is diverse even though almost all utilities providing drinking water are controlled by State, Territory and Local Governments. The structural, institutional, governance and regulatory arrangements vary between jurisdictions and between metropolitan and regional areas. In 2008-09, there were 32 major urban, 51 non-major urban and 194 minor urban providers of water and wastewater services. Collectively, they had revenues of about \$10 billion. The structure of the sector has changed over the past two decades. In metropolitan areas, there has been

---

some vertical separation of the supply chain and corporatisation of utilities. In regional areas, most utilities are vertically integrated. In some jurisdictions, small regional utilities have been aggregated (with some of these corporatised).

**Box 1 History of urban water reform**

Water reform in Australia began in the early 1980s, notably with the appointment of Dr John Paterson as President and Chief Executive of the Hunter Water Board. In 1982, the Board implemented a user-pays water tariff for residential customers. In 1992, the Hunter District Water Board became the first major urban water authority in Australia to be corporatised.

Significant events in subsequent reform developments include:

- Industry Commission (1992) inquiry into water resources and wastewater disposal
- COAG (1994) strategic framework for water reform of the Australian water industry, developed by the Working Group on Water Resource Policy
- COAG (1995) National Competition Policy and Related Reforms, which included payments to jurisdictions that effectively implemented the strategic framework for water reform in the 1994 agreement
- COAG (2004) National Water Initiative and the establishment of the National Water Commission to assist with, and to assess progress on the implementation of, the water related reforms in the 1995 agreement and to progress additional agreed reforms
- COAG (2008) enhanced national urban water reform framework to improve the security of supply for urban water.

Water is sometimes perceived to be different from other utility services (electricity, gas, telecommunications and mail) because it is ‘essential for life’ and/or it exhibits common property characteristics. Understandably, there is also community anxiety about there being insufficient water to meet basic human and industry needs because of prolonged droughts. Consequently, there has been a high degree of political involvement in water issues and pressure to adopt objectives, policies and institutional arrangements that are different from those applied in other utility sectors.

Although considerable reform has occurred over the past three decades, the urban water sector has been under stress in recent times. This has mainly arisen from a lengthy period of drought and unexpectedly low inflows to dams, rivers and aquifers, followed most recently by heavy rain and floods in eastern Australia. Pressures from growth in demand and, until recently, reduced capacity to supply from existing rainfall dependent sources led to:

- 
- prolonged use of severe water restrictions and consumption targets
  - use of prescribed measures and/or subsidies to reduce the consumption of potable water from bulk sources of supply (such as rainwater tanks, low-flow shower heads and water recycling schemes for non-potable uses)
  - large investments in rainfall-independent supply capacity, usually associated with highly politicised decisions and/or consideration of a limited set of options.

Some regional areas have inadequate water quality, with ‘boil water’ notices being issued and exemptions granted for compliance with standards for the discharge of treated wastewater.

## **The key problems**

The Commission has identified a number of key causes of the problems in the urban water sector.

### **Conflicting and inappropriately assigned objectives and policies**

There is a lack of clarity and transparency about the way government objectives and policies are being applied in the urban water sector to service delivery, environmental, public health and social matters. Governments are assigning multiple objectives to their agencies, utilities and regulators, with inadequate guidance on how to make tradeoffs among them (box 2). This appears to be a particular issue for retailer–distributor utilities and regulators.

Moreover, some of the objectives assigned to economic regulators and utilities would be more appropriately assigned to health and environmental regulators or government departments.

### **Lack of clarity about roles, responsibilities and accountabilities**

Policies and decisions about pricing and supply have become too politicised and have not been focused on providing services at lowest *expected* cost. Often governments are influencing or making decisions in non-transparent ways. When undertaken, rigorous assessment of costs and benefits of options are often classified as Cabinet in confidence and not publicly available. These factors are leading to inadequate transparency about which institutions of government are responsible for procuring supply, and inadequate analyses of some decisions. For utilities, this

---

weakens the responsibility, accountability and incentives to deliver services in an economically efficient manner.

**Box 2 Multiple and conflicting objectives — an example**

Under its legislation, the Queensland Competition Authority has to have regard to the following matters when making a price determination:

- the need for efficient resource allocation
- the need to promote competition
- the protection of consumers from abuses of monopoly power
- decisions by the Ministers and Local Governments under part 3 about pricing practices of monopoly business activities involving the supply of water
- the legitimate business interests of the water supplier carrying on the monopoly water supply activity to which the determination relates
- in relation to the monopoly water supply activity
  - the cost of providing the activity in an efficient way, having regard to relevant interstate and international benchmarks
  - the actual cost of providing the activity
  - the quality of the activities constituting the water supply activity
  - the quality of the water being supplied
- the appropriate rate of return on water suppliers' assets
- the effect of inflation
- the impact on the environment of prices charged by the water supplier
- considerations of demand management
- social welfare and equity considerations, including community service obligations, the availability of goods and services to consumers and the social impact of pricing practices
- the need for pricing practices not to discourage socially desirable investment or innovation by water suppliers
- legislation and government policies relating to ecologically sustainable development
- legislation and government policies relating to occupational health and safety and industrial relations
- economic and regional development issues, including employment and investment growth.

Policy making and regulation are also being undertaken in a manner that is at odds with principles for best practice policy and regulation making (box 3).

---

**Box 3 Principles for best practice policy and regulation, based on Regulation Taskforce (2006)**

- Governments should not act to address ‘problems’ until a case for action has been clearly established. This should include establishing the nature of the problem and why actions additional to existing measures are needed, recognising that not all ‘problems’ will justify (additional) government action.
- A range of feasible policy and regulatory options need to be identified and their benefits and costs, including compliance costs, assessed within an appropriate framework.
- Only the option that generates the greatest net benefit for the community, taking into account all the impacts, should be adopted.
- Effective guidance should be provided to regulated parties and any relevant regulators to ensure that the policy intent of the regulation is clear, as well as the expected compliance requirements.
- Mechanisms are needed to ensure that policy and regulation remain relevant and effective over time.
- There needs to be effective consultation with affected parties at all stages of the policy and regulatory cycle.

**Too great a focus on water restrictions, water use efficiency and conservation**

The extensive use of water restrictions has been costly to consumers and the distributional consequences are likely to have been regressive with respect to income, even though restrictions have been tolerated by the community (box 4).

Generally, water use is relatively unresponsive to changes in price, indicating that consumers place a high value on water consumption. Numerous studies indicate that the net welfare costs of water restrictions can be large. Nationally, water restrictions are likely to have cost in excess of a billion dollars a year from the lost net value of consumption alone.

---

#### **Box 4 Consumer costs of prescribed water restrictions**

Some of the costs imposed on consumers from water restrictions include:

- loss of consumer welfare from forgone consumption
  - reduced amenity from the deterioration of lawns and gardens
  - inability of children to play under garden sprinklers and to use water toys
- costs to consumers of complying with restrictions
  - purchasing and installing new watering systems (for example, greywater systems and rainwater tanks)
  - the need to adopt inconvenient and labour-intensive methods of watering:
    - ... carrying 'greywater' in buckets from showers to outdoor plants
    - ... loss of sleep and/or leisure in order to water gardens in permitted time periods
    - ... having to water in the dark
    - ... cancelling or rearranging other activities in order to water gardens at permitted times
  - the need to drive cars to a car wash and paying to have them cleaned
  - increased damage (through cracking) to buildings, other structures and pipes.

The distributional consequences of these costs are not well understood, with some experiencing many of these costs and others only a few. However, it is likely that the distributional outcomes are regressive with respect to income.

Water restrictions impact on people beyond their homes. They experience loss of amenity from unwatered council parks (or they pay through their rates for high-cost recycled water to keep them green). Community sporting facilities can also be adversely affected because of the state of water-deprived sports grounds.

The Centre for International Economics estimated that the total welfare cost to the ACT community for stage 1 restrictions was \$5.2 million per year and \$209 million per year for stage 4 restrictions.

Grafton and Ward found that water restrictions in Sydney in 2004-05 resulted in aggregate welfare losses to consumers of about \$275 million (2010 dollars) relative to a volumetric price that would have ensured the same level of demand and a lower fixed charge.

Based on economic modelling undertaken by the Commission for this inquiry, the reduction in welfare to the community from stage 3a restrictions in Melbourne is estimated to be between \$420 and \$1500 million over a 10 year period, depending on modelling assumptions. This welfare loss understates the costs of restrictions as it does not capture the differential effect of restrictions for individual households. For example, some households that are prepared to pay a high price for additional water might have to forego consumption due to restrictions.

---

Many policies that prescribe water use efficiency and conservation are also costly because they lead to some consumers behaving in ways that do not align with their preferences. Where these measures are not justified based on rigorous cost–benefit analysis (of which there is little evidence), consumers can incur costs per unit of water saved that far outweigh the cost of supplying them with water through the reticulated system (box 5).

**Box 5      Illustration of costly water saving programs**

In 2005, Crase and Dollery examined subsidies paid in Melbourne to households for water-saving investments. They found that the cost per megalitre of water saved ranged from \$770 for AAA shower roses, to \$9069 for rainwater tanks and \$33 395 for AAA dishwashers. This compares with a supply price for water between \$750 and \$1300 per megalitre at the time of the study.

**Constraints on efficient water resource allocation and supply augmentation**

Constraints are being imposed on the operation of utilities that are unnecessarily distorting the allocation of water resources and increasing the cost of supply. This is leading to higher consumer prices, which could persist for decades.

Although some of the recent investment in desalination plants (table 1) might have been appropriate in the circumstances to maintain security of supply, there is sufficient evidence available to conclude that many projects could have been:

- deferred for a number of years
- smaller in scale
- replaced with investment in lower cost sources of water.

Lower cost sources of water supply have been available in several jurisdictions, such as rural–urban trade and aquifers, but large investments in desalination have been preferred.

Allowing voluntary trade between the rural and urban sectors can provide benefits to irrigators, urban water consumers and the community as a whole. Voluntary trading facilitates the efficient allocation of water from lower value uses to higher value uses, based on the willingness to buy and sell, and the cost of transport.

**Table 1 Desalination plants**

	<i>Initial capacity</i>	<i>Maximum expandable capacity</i>	<i>Initial (and expandable) capacity as a percentage of annual consumption in 2009-10</i>	<i>Initial investment</i>	<i>Completion date</i>
Units	GL/year	GL/year	%	\$m	
Sydney (Kurnell)	90	180	18 (36)	1 890	2010
Melbourne (Wonthaggi)	150	200	43 (57)	3 500	2012
South-east Queensland (Tugun)	49		25	1 200	2009
Adelaide (Port Stanvac)	100		80	1 830	2012
Perth (Kwinana)	45		18	387	2006
Perth (Binninyup)	100		40	1 400	2012
<b>Total</b>	<b>534</b>	<b>674</b>	<b>35 (45)</b>	<b>10 207</b>	

There are also likely to have been costs from proscribing some other potential sources of supply, such as indirect potable reuse. There are many instances of wastewater being treated and discharged into a river system used to supply downstream communities with potable water. For example, most of the wastewater from the ACT is treated and discharged into the Molonglo River, which then flows into the Murrumbidgee and Murray Rivers. This water is used to supply many cities and towns, including Wagga Wagga and Adelaide.

However, the planned indirect potable use of recycled water has so far been ruled out by governments in response to opposition by communities. This is despite the view of relevant health experts that recycled water is safe to drink provided it is properly treated. The National Water Commission has stated there are no public health barriers. Further, it is already used overseas (for example, in Singapore and the United States). Therefore, it is important that the community and decision makers are properly informed about the costs, benefits and risks to water consumers, so that the best choices can be made. Community consultation needs to be a component of decisions on supply augmentation.

Although it is difficult to estimate the costs of inefficient investment with precision, they appear to be large (box 6).

---

## **Box 6      Costs of misdirected investment**

The Commission has undertaken case-study modelling of Melbourne and Perth to identify the potential costs to consumers and the community (in net present value terms) of proceeding with desalination plants ahead of lower cost alternatives or of a larger scale ahead of time. These costs could be of the order of \$1.8 to \$2.4 billion for these two cities combined over a 10 year period and \$3.2 to \$4.2 billion over a 20 year period, depending on modelling assumptions.

Another example comes from a review in 2006 of plans to augment Sydney's water supply with a desalination plant. An expected saving of \$1.1 billion was estimated from committing to build the plant when dam storage was 30 per cent compared with a trigger of 48 per cent. Subsequently, the government committed to proceed when dam storage was 34 per cent (consistent with the official trigger level). However, the government signed the contract to proceed at a time when storages were at 57 per cent. Large savings are likely to have been available to the community if the government had taken and exercised an option to delay construction, even if this option incurred costs.

Subsidies provided by the Australian Government can also distort investment decisions. For example, in Adelaide, part of the explanation for the large investment in desalination capacity relative to demand (table 1) was a conditional grant of \$328 million provided by the Australian Government.

The Victorian Government has a policy to only use the newly constructed Sugarloaf Pipeline in the event of a 'critical human needs emergency', preferring instead to source water from the (soon to be commissioned) Wonthaggi desalination plant and new water recycling projects. Based on Commission modelling, the added cost to the community could be about \$312 million in present value terms over 20 years, and ranging between \$229 million and \$736 million, depending on modelling assumptions. Further, unnecessary costs could be incurred if the Victorian Government also proceeds with planned water recycling projects.

There is also evidence to suggest that better application of the 'real options' or adaptive approach to planning and delivering augmentation of supply (box 7) would have reduced the cost of supply augmentation, lowered prices to consumers, and avoided the need for restrictions in most cases.

For a number of regional water utilities, inadequate asset management is leading to water quality problems, such as failing to meet the standards of the Australian Drinking Water Guidelines and/or the issuing of 'boil water' alerts. Similar non-compliance issues exist with respect to wastewater discharge. These problems have arisen from deficient operational, maintenance and investment practices. Many non-metropolitan utilities service fewer than 10 000 connected properties, with some servicing fewer than 1000. A number of reports in recent years indicate that

---

inadequate water quality and asset management by small utilities are largely attributable to a lack of scale, and constraints on revenue and capital raising.

**Box 7      ‘Real options’ or adaptive planning and investment**

Making supply augmentation decisions efficiently while maintaining security of supply requires a sophisticated approach to dealing with risk and uncertainty associated with demand and supply, principally arising from the large variation in rainfall and climate change. Real options, or adaptive planning, incorporates into planning and water procurement processes:

- risk and the probabilities of different scenarios (such as rainfall and inflows)
- the value to consumers and suppliers of flexibly managing the timing and selection of supply and investments from a portfolio, as rainfall scenarios are revealed over time. The portfolio of options include:
  - supply augmentation
  - demand-side management, facilitated through an enhanced choice of service offerings available from water retailers.

The Commission’s modelling indicates that applying a real options approach could reduce the cost of supply for Melbourne and Perth collectively, by about \$1.1 billion over a 10 year period, compared with traditional approaches to planning and investment.

The real options approach can necessitate some costs being incurred early in order to keep options open in the future. For example, investments might be made to get potential projects ‘shovel ready’ or expenditures incurred on higher-priced water sources that do not involve large sunk costs (for example, pre-purchasing water from irrigators and storing it, if the risk of a sustained drought is emerging). Such investments will be efficient if the costs are more than offset by the benefits of increased flexibility to proceed with a project when required (with a shorter lead time) or to defer (because of increased rainfall).

Under traditional planning approaches, a supply augmentation, such as investment in large desalination capacity, is undertaken to cover all future supply risks (‘drought proofing’ supply). However, this approach ignores the risk that it will rain after the plant is commissioned and that it might not be used for a substantial period of time. Santa Barbara, California, built a desalination plant in 1991 during a prolonged drought; the drought ended before the plant was on-line, and the plant has been mothballed since construction.

The National Water Commission and the Water Services Association of Australia have endorsed the real options approach to planning and investment.

---

## Too great a focus on addressing affordability by distorting prices

Using inclining block tariffs that involve setting a low price for what some consider to be ‘essential’ water is complicated by the link between non-discretionary use and household size. The best illustration of the difficulty and subjectivity of the task of determining an entitlement to water at a low price is the large variation in the size of initial blocks chosen by policy makers. Current first tier (lowest price) blocks include 160 kilolitres (kL) in Melbourne, 150 kL in Perth, 255 kL in Brisbane, and 125 kL in Adelaide.

Furthermore, inclining block tariffs can result in inequitable outcomes. They disadvantage large households that have higher essential needs than smaller households.

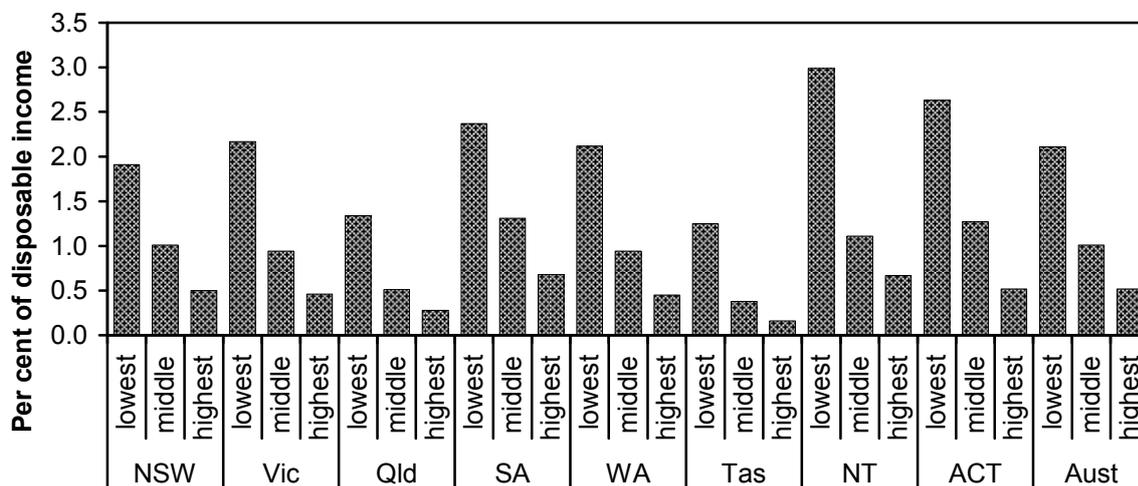
The available evidence, including the Commission’s own research, indicates that relatively few households experience payment difficulties because of the price of water and wastewater services. More households are experiencing difficulty paying for other services, particularly housing and electricity, which account for a larger proportion of their expenditure (figure 1). It is likely that the costs created by interfering with water pricing, particularly the volumetric rate, outweigh any benefits low-income households receive. Although access and affordability are important issues, distorting prices is not the best way to deal with them.

## A strong case for reform

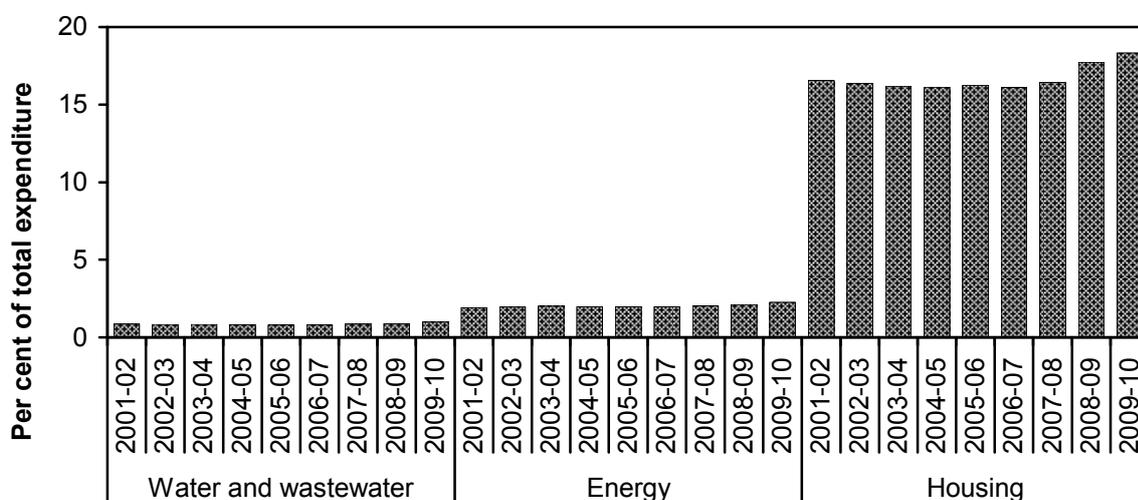
Based on the evidence, there is a strong case for microeconomic reform in the urban water sector. The fundamental problem in the sector is the lack of clarity about government objectives for guiding policy development and its implementation. Policies and decisions about pricing and supply have become too politicised and have not been focused on providing services at lowest *expected* cost. These factors are leading to inadequate transparency about which institutions of government are responsible for procuring supply, and inadequate analyses of some decisions. Deficiencies in the institutional and governance arrangements are, in turn, leading to policies and water supply decisions that are costly to consumers of water, wastewater and stormwater services.

**Figure 1 Household expenditure on water and wastewater, electricity and housing**

Panel A: Household expenditure on water and wastewater services by quintile of household disposable income, by jurisdiction, 2007-08



Panel B: Household expenditure on selected essential services, Australia



Many of the costs associated with past decisions are sunk and consumers and the community must now live with the consequences for decades to come, as evident from the recent and foreshadowed price increases in Sydney, Melbourne and Adelaide. Consequently, the gains to consumers and the community from implementing reform can only be modest in the short term, but will increase over time as demand for water increases and new supplies are needed. In any event, it is opportune to implement reform at this time while concerns about supply security have abated in most areas.

---

## A reform program in two streams

The overarching goal of reform is that water, wastewater and stormwater services be provided in ways that maximise net benefits to the community. This means striving to allocate water resources efficiently across the water cycle (figure 2) based on costs of supply and value to users, subject to public health and environmental requirements.

Some reforms should be adopted across all jurisdictions as a high priority, with other (structural) reforms applied following a case-by-case analysis of the costs and benefits.

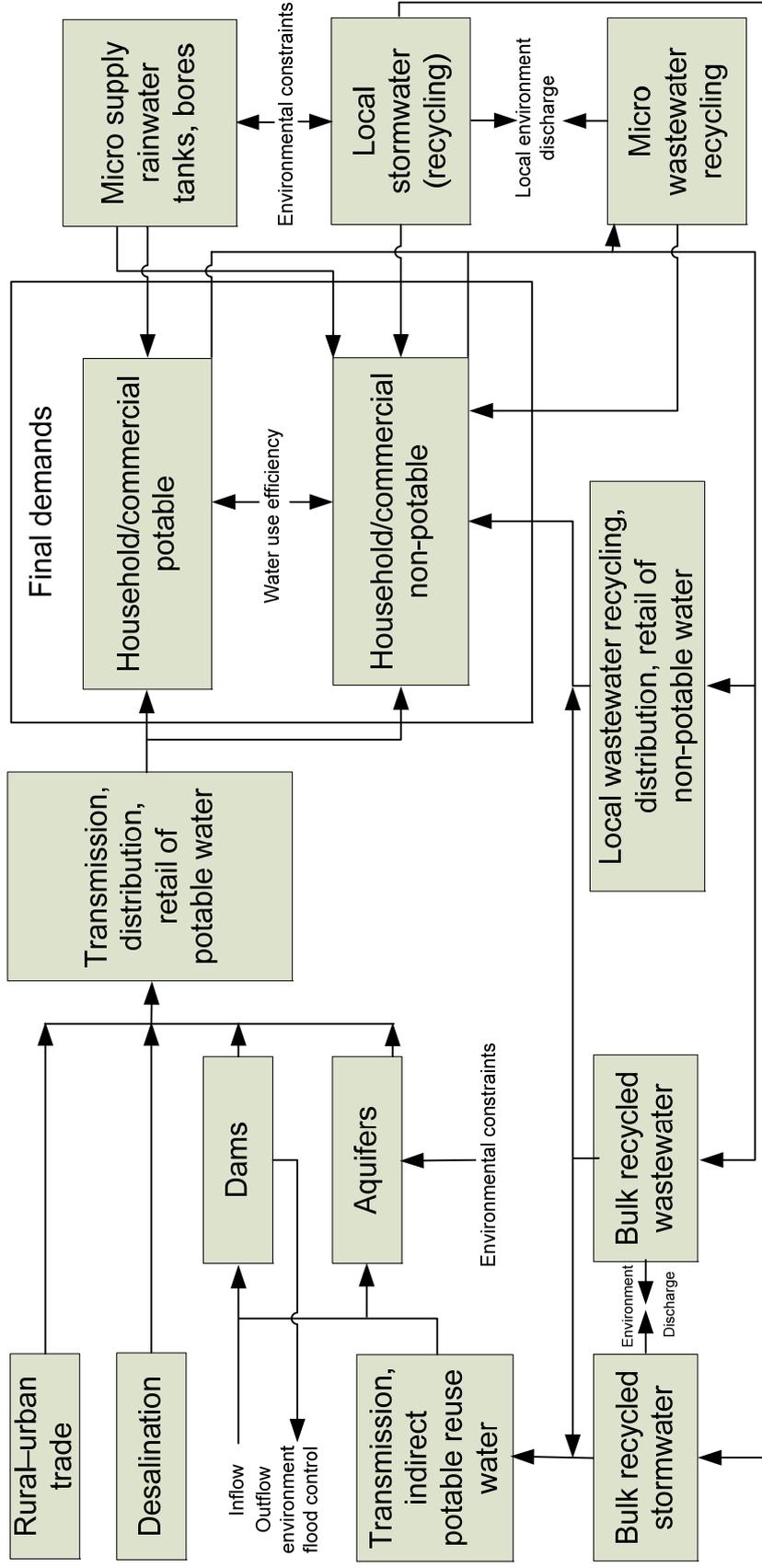
### 1 High priority reforms that are universally applicable

#### *Roles for governments*

It is the role of governments to create the conditions necessary for institutions undertaking policy making, regulatory and service delivery functions to operate efficiently. This means that governments should:

- set a clear overarching objective for the development and implementation of policy in the sector
- ensure that the policy frameworks and principles are consistent with the overarching objective in relation to:
  - public health and environmental protection
  - service delivery of potable water, non-potable water, wastewater, drainage and stormwater services
  - water property rights across the water cycle
- put in place best practice institutional, regulatory and governance arrangements in relation to:
  - economic, public health and environmental regulation
  - service delivery of potable water, non-potable water, wastewater and stormwater services.

Figure 2 Illustration of the integrated water cycle for urban water systems



---

Having established such an environment, it is important that governments (elected representatives) commit to, and support, the institutional arrangements and policies, particularly when alternatives might be politically expedient.

### *Setting the objective*

Governments should set an overarching objective of delivering water, wastewater and stormwater services in an economically efficient manner (box 8) so as to maximise net benefits to the community. The objective of economic efficiency should also guide policy development and regulation relating to public health and the environment. In addition, policy formation should be guided by the more rigorous application of the principles for best practice policy and regulation making (box 3).

#### **Box 8 Economic efficiency, broadly defined**

The concept of 'economic efficiency' encapsulates many of the more specific objectives that should be pursued in the urban water sector, including those related to water security, water quality, flood mitigation and the environment. It allows short-term and long-term environmental and social considerations to be integrated into policy making, as required by the principles of ecologically sustainable development. As such, it can also be used to guide the assessment of public health and environmental policies based on rigorous cost–benefit analysis. For example, in assessing the benefits of water quality standards, especially in relation to non-health critical aspects, the opportunity cost of various standards in terms of the price of water to consumers should also be a relevant consideration in the analysis.

In terms of the value of water consumed, consumers are usually best placed to make their own water use decisions. Water use that one person might regard as being of low value, might be of high value to another person.

Although there are consumer and political sensitivities about water policy and the provision of water services, independent cost–benefit analysis and other information should be provided to communities prior to decisions being made.

### *Institutional arrangements and governance*

Notwithstanding some progress, there is a need for greater clarity about the roles and responsibilities of institutions in the urban water sector. In particular, there is a need for clearer delineation between decisions most appropriately made by elected representatives (those regarding 'public interest' and policy considerations),

---

commercial decisions by water utilities regarding service delivery, those decisions most appropriately made by regulatory agencies, and those made by consumers.

Inadequate institutional arrangements for determining supply augmentation have been a significant factor in overinvestment in desalination capacity in recent years. These deficiencies have facilitated increasing politicisation of supply augmentation processes. It is, of course, important that governments seek to ensure their communities have adequate water security.

### *Procurement of supply and water resource allocation across the water cycle*

Based on the evidence before the Commission, and insights from its modelling, the largest gains to the community are likely to arise from achieving water security at a lower expected cost. This can be achieved by governments removing ‘policy bans’ on supply augmentation from certain sources, such as rural–urban trade and indirect potable reuse. Putting these options back on the table for consideration might not be easy. Negative community perceptions have become entrenched in the absence of high quality, publicly available, evidence about the costs, benefits, and risks of the choices available for supply augmentation.

However, all options should be evaluated based on their respective economic merit, subject to public health and environmental requirements. To gather public support for reconsideration of these policies, reliable information on the costs, benefits and risks of various supply augmentations should be publicly available so that the community is well informed about them and the tradeoffs well understood. Better community consultation is essential to this. Community attitudes might already be changing as consumers are now becoming aware of the increase in prices from recent inefficient augmentation decisions.

In addition, governments should direct their water utilities (as part of a charter discussed below) to adopt real options/adaptive planning approaches to procurement (box 7), to manage risk about rainfall and inflows and minimise the cost of supply in this inherently risky business.

### *Water restrictions*

Water restrictions are costly to consumers and should be reserved for ‘emergency’ situations. They should be an exception rather than the rule. The need to impose restrictions should be seen as a failure of the system. Restrictions might be the only practical option for some communities in dry regions where there is an on-going scarcity of potable water and augmentation of reticulated potable water is very

---

costly. Otherwise, water restrictions should be phased out and consumers allowed to choose from a menu of service (tariff) options.

### *Water use efficiency and conservation*

Some prescribed approaches to integrated water cycle management are inefficient. It is often assumed that it is in the interest of communities to increase recycling, reuse, water use efficiency and conservation without examining the full costs and benefits. Instead, the approach should be to create incentives and opportunities for recycling, reuse and conservation technologies where they are economically worthwhile and preferred by customers, by removing impediments to contestability and freeing up prices.

### *Pricing*

The application of flexible (scarcity-based) pricing at the retail level, based on the opportunity cost of supply, has potential to allocate water more efficiently in the short run to reduce the cost of supply in the long run. However, the benefits from prescribing a single two-part tariff for all consumers is likely to result in lower net benefits to consumers compared with providing a range of service tariff offerings to cater for differences in consumer preferences. All such service offerings would take into account the opportunity cost of supplying each service. Multiple service offerings would:

- give consumers choice, instead of having an ‘essential’ level of demand prescribed for them
- provide an opportunity for retailers to more efficiently manage demand as supply changes over time.

Therefore, the Commission sees merit in freeing up the pricing of water by retailers by encouraging them to have multiple service offerings (tariffs) subject to:

- providing a default ‘vanilla’ two-part tariff, with a single volumetric price and fixed service charge set for three to five years, and with guaranteed supply
- policy guidelines determined by governments
- normal application of competition and consumer protection laws
- there being appropriate consumer education programs
- support being provided to smaller utilities to develop tariff offerings appropriate to their customers.

---

The default tariff would cater for consumers who prefer secure supply and stable prices.

### *Affordability*

It is a given that all Australians have access to water services. Some low-income households may struggle to make payments to water utilities even though water services account for a small part of their expenditure (figure 1). Therefore, utilities should continue to have ‘hardship policies’ that apply to customers genuinely having difficulty paying their bills, for example, by allowing some customers to pay over time.

However, hardship policies do not directly address affordability. Further, the rising levels of financial hardship reported by community organisations are the result of price increases more generally (food, housing, petrol, other utility services) rather than increases in prices in the urban water sector. Policies should be designed to achieve access and affordability objectives at lowest cost to the community.

Assistance measures, such as social security for low income families and income tax assistance for families, are generally available to individuals and families. These measures are preferred for addressing affordability because they treat individuals in similar circumstances equitably and they support individuals and families in need.

When water specific assistance is provided, it should be through a rebate (concession) on the fixed service charge, which is also clearly identified as a community service obligation and funded by government.

To facilitate the effective and efficient provision of assistance to achieve affordability objectives, COAG should commission a review of concessions on all utility services across all levels of government.

### *Public health, environmental protection and economic regulation*

Regulation has an important role in protecting public health and the environment. However, there are costs associated with regulation, particularly when multiple regulators with differing objectives are involved. Transparency in following good regulatory practice can minimise these costs. In addition, good regulation creates incentives for utilities to find innovative ways to meet consumer demands while complying with public health and environmental constraints.

To reiterate, the application of the six principles of good policy and regulatory practice spelt out by the Regulation Taskforce in 2006 (box 3) provides a sound

---

basis for formulating regulatory policies impacting on the urban water sector. As noted above, it is the role of government to implement best practice institutional arrangements and policy setting to achieve the desired outcomes.

### *Service delivery by utilities*

There would be a significant payoff in assigning both the procurement of new supplies and the responsibility for service delivery to utilities that undertake retail–distribution, under a portfolio manager framework (box 9).

#### **Box 9 Portfolio manager, opportunity cost and tariffs**

Under the portfolio manager framework, a monopoly retailer–distributor is established with an obligation to serve customers and procure water to meet customer demands. The portfolio manager controls (but does not necessarily own or physically operate) the dispatch and transport of various sources of water supply in their portfolio (including changes to storage) from the bulk sources to consumers. To expand competition for the supply of bulk water services, the portfolio manager runs a competitive procurement process for the expansion of supply capacity.

In the absence of a market for water, the portfolio manager can estimate the opportunity cost of supplying a unit of water and implement flexible pricing that emulates an efficient market outcome. The opportunity cost is a dynamic forward looking concept, reflecting changes in the supply–demand balance. Mathematical programming models developed and applied in the energy sector can be adapted to the water industry, and are an appropriate tool for estimating the opportunity cost of supplying water over time as rainfall scenarios evolve.

The opportunity cost of supplying a unit of water can then be used to formulate a range of tariffs. This would allow consumers to express their preferences on security of supply and price stability, and provide an opportunity for the portfolio manager to manage demand more efficiently as water availability changes over time.

Responsibility for procurement and security of supply should be assigned to retail–distribution utilities because:

- they are best placed to understand consumer preferences and can develop service offerings based on the opportunity cost of supply
- they can facilitate contestability and competition for new water supplies and services from potential service providers
- commercial responsibility for efficient operation and procurement of supply strengthens commercial incentives, including the effective management of investment risk

- 
- it preserves many of the efficiencies inherent in a vertically integrated utility, even though vertical and horizontal separation of bulk supply and outsourcing of functions is possible
  - it can mitigate against the high cost of formal price control regulation and the potential for inefficiencies arising from government ownership of a monopoly, using competition for procurement of supply and other services.

These utilities might be owned by State and Territory Governments or one or more Local Governments. They would be responsible for providing their services in an economically efficient manner and meeting security of supply standards set by the government. It would not be the role of the utility to make judgments about health or environmental aspects. Rather, utilities should operate within the policy and regulatory settings determined by government, so that they meet the requirements in the most efficient way.

Governments should ensure that governance arrangements hold utilities responsible and accountable for performing their functions. Best practice governance arrangements are also relevant to Local Government service providers. Aspects of the governance arrangements should include:

- a charter with the shareholder government (box 10)
- public reporting of utility performance against the charter
- independent periodic review of the performance of the utility against the charter
- rewards and sanctions related to utility performance.

To strengthen independence, responsibility and accountability, governance arrangements (except for utilities embedded in Local Government) should include:

- full legal corporatisation of the utility with incorporation under the *Corporations Act 2001* (Cwlth)
- an independent board (appointed on merit).

---

**Box 10 Key elements of a charter between a government and its water utility**

- Obligation to serve (system reliability, security of supply and obligation to procure).
- Processes and procedures for choosing supply augmentation (transparent, tenders for supply, public consultation, and public reporting of the decision (including an audit of the decision by an independent body).
- Public health and environmental obligations.
- Principles for pricing and service offerings (including asset valuation and return on assets).
- Processes and procedures for setting prices that are transparent, involve public consultation, and public reporting of decisions (including a periodic review by an independent body).
- Borrowings and dividend policies.
- Customer service standards and hardship policies.
- Risk allocation (consumers, the government shareholder and private suppliers).
- Clearly specified and fully funded Community Service Obligations.
- Performance reporting against the charter.
- Performance reviews and sanctions for underperformance.

*Prices oversight*

The best practice governance arrangements for utilities would also guard against the misuse of market power by the government-owned monopoly retailer–distributor utility (box 11).

In addition, formal price setting controls are costly and can inhibit innovation and the discovery process about the services preferred by customers and more efficient ways of delivering them.

Therefore, the Commission does not see a role for formal price setting controls by economic regulators. Instead, utilities would be subject to price monitoring. After five years, a review would be undertaken to assess whether price monitoring should be abandoned and replaced by self reporting.

---

**Box 11      Scope for market power and excessive production costs**

The recommended governance arrangements for retailer–distributor utilities include:

- government ownership
- incorporation under the Corporations Act
- the adoption of the portfolio manager framework, which includes an important role for competitive procurement and outsourcing
- a charter between the government and the utility that includes a number of principles, and open and transparent processes and procedures, which are similar to those applied under economic regulation
- public reporting of performance against the charter
- rewards and sanctions related to utility performance.

Although designed to improve the general performance of urban water utilities, taken as a package, these arrangements would also minimise the risk that market power will be misused or that production costs will be excessive.

In addition, the Commission sees some attractions in using a consumer representative group as a way of encouraging market participants (the utility and its household and business customers) to discuss and discover the preferred services (and their pricing), and ways of efficiently delivering them. There are some precedents (box 12).

There are some important matters to be resolved, including the precise role of the representative group and selection of individual representatives of consumers (households and businesses).

A consumer representative group could be funded out of water utility charges to consumers, and buy in expert advice to assist it in its deliberations on complex pricing and procurement matters.

### *Consumer protection*

Currently, customers of small utilities and tenants may not have the same level of consumer protection as customers of large utilities and owner occupiers. There is scope for more consistent application of best practice arrangements. All water utility customers should have access to an independent dispute resolution process, preferably provided by a specialist utilities ombudsman.

---

### **Box 12 Consumer representative groups**

With increasing complexity, cost and time being the trend in the application of price setting regulation, some regulators in the United Kingdom are seeking ways to encourage consumers to have a greater role and responsibility in the process of discovering what customers want and what is efficient production and investment.

Examples of using consumer representatives as participants in utility pricing in the United States and Canada includes those overseen by the Federal Energy Regulatory Commission in the United States and the National Energy Board in Canada (both dealing with gas pipelines), and those facilitated by the Office of Public Counsel in Florida.

The Office of Public Counsel is a consumer advocate created to provide representation for consumers in utility related matters. It participates in price setting proceedings before the Florida Public Service Commission and counties involving various utilities (including water and wastewater).

The Consumer Advocacy Panel assists Australian businesses and households to represent their interests in policy and regulatory decisions relating to the National Energy Market by providing grants to eligible groups.

### *Regulatory institutions*

In addition to governments clearly defining the roles of regulators and improving the guidance on the principles and frameworks regulators are to apply, it is also desirable to ensure that best practice institutional design, processes and procedures are adopted to make regulators responsible and accountable for their actions, such as:

- statutory independence of regulatory institutions
- merit appointment of independent regulators
- ensuring transparent decision making using public consultation processes and public reporting
- appeals process (courts or tribunals).

## **2 Structural reform — case-by-case assessment**

The economics of providing water services vary substantially across geographic regions (box 13). Water is heavy and, unlike other utility services, transport costs can escalate if pumping uphill and over long distances. Such factors have a significant bearing on the likely costs and benefits of structural options (such as the vertical and horizontal separation of the supply chain, including bulk supply

---

sources, wastewater treatment facilities, bulk water transmission and retail–distribution). For these reasons, the net benefits of structural reform should be considered on a case-by-case basis.

**Box 13 Major factors impacting on the economics of supply and demand**

The economic drivers of the water system include:

- source, location, abundance, and cost of developing, extracting and transporting water resources
- the variability of rainfall, storage inflows, storage capacity, and uncertainty about trends and extremes arising from climate change
- the demands on stormwater management systems
- the size of, and distance between, the urban centres for demand
- the service requirements and expectations of individual communities.

The structural reform options are set out in table 2. In metropolitan areas, option 1 is a vertically-integrated utility with the universally applicable reform package applied to it. Options 2 to 4 are aimed at strengthening the pressures for efficient water resource allocation and productivity by introducing progressively more contestability into elements of the integrated water cycle (figure 2).

In regional areas, there is less scope for contestability and so structural reforms are, in general, about tapping efficiency gains through addressing economies of scale issues.

*Large metropolitan utilities*

Vertical and horizontal separation of the bulk water supply function (option 2) strengthens competition and contestability for the supply of bulk water services (supply, treatment, transfer and storage) compared with option 1. Bulk water of different classes and from various sources would compete on merit and the lowest-cost combination of water supply would be used to satisfy new and existing demand. However, competing providers for new supplies and facilities would have greater confidence in the knowledge that their competitors are not also their client. Under the portfolio manager framework, the vertical and horizontal structural separation does not result in a significant loss of the economies inherent in a vertically-integrated utility because the retailer–distributor (portfolio manager) has operational control of dispatch, storage and transport decisions.

**Table 2 Structural reform options to consider**

<i>Reform</i>	<i>Description</i>
<b>Metropolitan areas</b>	
Vertically-integrated water utility (option 1)	Provide water and wastewater services at lowest expected cost, considering all available internal and external (bilateral contracting) options
Contestability in bulk water supply (option 2)	Vertical separation of the bulk water supply function Horizontal separation of bulk water service providers
Contestability in bulk water supply and wastewater treatment (option 3)	In addition to option 2 reforms: <ul style="list-style-type: none"> <li>• vertical separation of the wastewater treatment function</li> <li>• horizontal separation of wastewater treatment service providers</li> </ul>
Contestability in bulk water supply and wastewater treatment, and yardstick competition (and trade) in retail–distribution (option 4)	In addition to option 3 reforms: <ul style="list-style-type: none"> <li>• horizontal separation of retail–distribution function into regional geographic monopolies that could trade contracted services</li> <li>• shared transmission network service provider/grid manager</li> <li>• transmission services also procured using bilateral contracts</li> </ul>
<b>Regional urban areas in NSW and Qld (outside of south-east Qld)</b>	
Aggregate utilities to exploit economies of scale	Aggregated utilities could be organised as: <ul style="list-style-type: none"> <li>• county councils</li> <li>• regional water corporations</li> </ul>
Retain existing structure but provide some services centrally	Establish a regional alliance of utilities
<b>Regional urban areas in SA, WA and the NT</b>	
Disaggregation of jurisdiction-wide utilities	Options include: <ul style="list-style-type: none"> <li>• multiple regional water corporations</li> <li>• retain jurisdiction-wide utility but price according to geographic boundaries</li> </ul>

Option 3 extends competition and contestability to the wastewater treatment and discharge function, and provides strong incentives for innovation by wastewater treatment service providers, including the production of recycled wastewater products.

Disaggregation of a single retail–distribution utility into smaller (but still of efficient scale) geographic utilities (option 4) would support yardstick competition between utilities, and further strengthen innovation, competition and contestability between bulk water and wastewater treatment service providers, and facilitate a market for managerial expertise. However, system coordination and transaction costs start to increase with this model.

There is insufficient evidence at this time to conclude that creation of competitive urban water markets (as in the national electricity market) would have further net

---

benefits. Any market-based system must be able to meet security of supply standards expected by governments and consumers through investment in new sources of water. There are no real world examples of such competitive urban water markets.

Experience gained under the recommended reforms might provide insights into whether market developments could be beneficial.

### *Regional utilities*

The Commission is proposing several options for addressing economies of scale issues as a way of improving the performance of non-metropolitan utilities in New South Wales and Queensland (table 2). A number of utilities already successfully operate under these options. It is the Commission's view that none of these options should be prescribed. Rather, State and Territory Governments should support local communities to identify the option that best suits them.

The Commission is also suggesting that consideration be given to whether regional communities in South Australia, Western Australia and the Northern Territory would be better served by having one or more regional utilities, separate from the main metropolitan water supply task, in place of the current jurisdiction-wide utility model.

## **Implementing the reform package**

The roles of governments in implementing reform, along with indicative timetables, are set out in table 3.

### **What role for COAG?**

Agreement of all jurisdictions is not necessary for individual State and Territory Governments to pursue most of the reform program proposed by the Commission.

However, effective arrangements for integrating and coordinating policy and its implementation are fundamental to achieving successful reform of the urban water sector. The COAG process can help to facilitate this, as well as ensure a nationally consistent approach to reform, particularly when supported by a standardised framework for monitoring progress.

**Table 3 Roadmap for reform**

Action	Recommendation	End of calendar year					
		2012	2013	2014	2015	2016	2017
<b>COAG</b>							
Formulate new intergovernmental agreement	14.2	■					
Commission a review of concession arrangements	8.1						
Progress implementation of measures to support consumer advocacy as per 2008 Review of Australia's Consumer Policy Framework	8.3	■					
Conduct independent review of reform program	14.7						■
<b>State and Territory Governments</b>							
Universally applicable reforms — set overarching objective and restrict provision of subsidies	3.1, 5.3, 13.4, 14.3	■	■				
Universally applicable reforms — others	4.1, 5.1, 5.2, 5.4, 6.1, 6.2, 6.3, 6.4, 7.1, 7.2, 7.3, 8.2, 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 11.1, 14.3, 14.4	■	■				
Regularly review outcomes in Indigenous communities	13.5			■	■	■	■
Assess case for structural reform	12.1, 13.1, 13.2, 13.3			■			
Implement structural reform as appropriate	14.1			■	■		
<b>Australian Government</b>							
Universally applicable reforms — set overarching objective and restrict provision of subsidies	3.1, 5.3, 14.3	■					
Commission a review of National Access Regime	11.2	■					
<b>NWC/WSAA</b>							
NWC and/or WSAA to provide support to utilities to build capacity and expertise	14.5	■	■				
NWC to monitor reform progress	14.6			■	■		

---

COAG should put in place a new intergovernmental agreement on the reform program. The agreement would explicitly incorporate the universally applicable reforms and broad commitment to reviewing and implementing structural reform according to a specified timeline. It should specify the desired outcomes and priorities and, where appropriate, provide for interim targets and for adjustment to targets as new information emerges or where circumstances change.

In relation to the structural reform options, jurisdictions will need some flexibility to determine the most appropriate way forward. Determining the preferred option will require specific assessments, negotiations between State and Local Governments, and consultation with the industry and consumers.

COAG should also monitor progress in implementation of the agreement against the agreed timetable. The National Water Commission could perform this role. In addition, there is a role for the National Water Commission and/or Water Services Association of Australia to support utilities in building capacity and expertise in developing:

- methods to implement the real options approach to operations and investment
- methods to estimate the marginal opportunity cost of supply
- tariff design principles based on the marginal opportunity cost of supply.

### **State, Territory and Local Governments**

Governments should not delay reform until the new COAG agreement is put in place. Implementation of the reform package by each jurisdiction will generate benefits for their own communities (box 14).

#### **Box 14 Jurisdictional benefits from implementing reform**

Consumers in each jurisdiction will have:

- wider choice of services at a lower cost than otherwise
- greater reliability of a safe water supply
- reduced likelihood of costly and inconvenient restrictions
- greater opportunity for consultation regarding procurement of supply and pricing
- greater compliance with drinking water guidelines and standards for discharge of wastewater in some regional areas.

Communities in each jurisdiction will benefit more generally from the improvement in the economic performance of their urban water sector as a whole.

---

Earlier reform would deliver significant additional benefits to the community. It is also currently an opportune time to implement reform while there are no immediate concerns about security of supply in most jurisdictions (the situation in Western Australia is less clear).

### **Reviewing the reform package**

The Commission's reform package would improve the performance of Australia's urban water sector for the benefit of water consumers and the community as a whole. The Commission acknowledges, however, that all outcomes cannot be known with certainty, and circumstances can change over time. Therefore, there should be an independent public review of the impact of the new arrangements in five years, after the sector has had sufficient time to adjust to them.



---

# Recommendations and findings

## Chapter 3 — Objectives for the urban water sector

RECOMMENDATION 3.1

*The Australian, State and Territory Governments should articulate a common objective for the urban water sector in relevant policy documents along the following lines:*

*The primary objective of the urban water sector is to provide water, wastewater and stormwater services in an economically efficient manner so as to maximise net benefits to the community. This objective should be met by pursuing the following more specific objectives:*

- *achieving water security and reliability at lowest expected cost*
- *contributing to universal and affordable access to water and wastewater services*
- *contributing to public health, flood mitigation and environmental protection.*

*Economic efficiency should be defined broadly to include environmental, health and other costs and benefits that might not be priced in markets.*

## Chapter 4 — The role of governments

RECOMMENDATION 4.1

*It is the role of governments to create the conditions necessary for institutions to operate efficiently. Governments should:*

- *set objectives for the development of urban water policy and relevant objectives for each institution*
- *ensure that policy frameworks and principles in relation to public health, the environment and service delivery are consistent with the objectives*
- *define property rights for environmental and consumptive use water, including stormwater and wastewater*
- *appropriately assign roles and functions to institutions*

- 
- *put in place best practice institutional and governance arrangements for:*
    - *public health, environmental and economic regulation relating to the sector*
    - *service delivery of water, wastewater and stormwater services*
  - *provide ongoing commitment to the application of the arrangements.*

## **Chapter 5 — Supply of water, wastewater and stormwater services**

### RECOMMENDATION 5.1

*Any restrictions on water trading by regional urban water utilities should be independently reviewed and, if they cannot be shown to provide net public benefits, they should be removed.*

### RECOMMENDATION 5.2

*State and Territory Governments should adopt policy settings that require the costs, benefits and risks of all supply augmentation and demand management options to be considered using a real options (or adaptive management) approach.*

*Information on all augmentation options and their respective merits should be made publicly available and views of the community sought, especially regarding sensitive options like indirect potable reuse.*

*Bans on particular augmentation options (whether or not explicitly stated) should be removed, including those on rural–urban trade and indirect potable reuse.*

### RECOMMENDATION 5.3

*In general, the Australian, State and Territory Governments should cease providing subsidies for water, wastewater and stormwater infrastructure. The possible exceptions are where:*

- *infrastructure investment is required due to changes in environmental standards that impose a significant cost on a defined group and/or infringe a well defined ‘property right’*
- *a formal and transparent process has identified that a regional community should not be required to recover costs fully through water charges.*

### RECOMMENDATION 5.4

*Governments should ensure that the six principles of good regulatory practice, spelt out by the Regulation Taskforce, are applied when developing policy and regulation governing the urban water sector.*

*Integrated water cycle management initiatives are often driven by the assumption that it is always in the community's interest to increase water reuse and recycling, and to decrease reliance on centralised water supply systems. A preferred approach is to facilitate efficient recycling and reuse projects by removing barriers to integration (such as the absence of appropriate property rights for wastewater and stormwater and deficiencies in the analyses, and community awareness, of costs and benefits).*

## **Chapter 6 — Pricing of water, wastewater and stormwater**

*Upfront developer charges should be used where the incremental costs of development are well established and benefits accrue mainly to those in the development. Where, as in the case of urban infill, the benefits also accrue to incumbents, costs should be spread across all users through rates, taxes or the fixed part of a two-part tariff for water and wastewater services. Developers should be given the option of building the required infrastructure themselves where appropriate, subject to predetermined standards.*

*All new single and multi-unit dwellings should have separate water meters installed. The case for retro-fitting existing single and multi-unit dwellings with separate water metering technology should be assessed by utilities.*

*Utilities should charge tenants directly for both the fixed and volumetric charges where water is separately metered. Where this does not already occur, State and Territory Governments should consider whether transitional arrangements are required to ensure that savings to landlords are passed through to tenants.*

*Currently, the volumetric component of two-part tariffs is distorted by the prescription of inclining block tariffs, which create inefficiencies and inequities. Substantial efficiency gains are available from no longer prescribing inclining block tariff structures.*

---

FINDING 6.2

*Charging a uniform price for water over a large geographic region ('postage stamp' pricing), irrespective of the variation in costs of servicing individual locations within the region, leads to inefficiencies and inequities.*

*There is scope for efficiency gains in moving to location-specific pricing, particularly where cost differences within the 'postage stamp' region are large and easy to quantify.*

RECOMMENDATION 6.4

***Where metering is in place, charges should include a volumetric component using a two-part tariff.***

***Greater choice in tariff offerings should be available to water consumers. This would:***

- ***allow consumers to express their preferences on security of supply and price stability***
- ***provide an opportunity for water utilities to improve demand management as water availability changes over time.***

***These tariff offerings should be based on the marginal opportunity cost of supply, which includes:***

- ***the direct short-run marginal cost of supplying water***
- ***the value of any externalities***
- ***the scarcity value of water as supply and demand conditions change.***

FINDING 6.3

*The National Water Initiative pricing principles provide scope to implement pricing policies that are inconsistent with economic efficiency.*

## **Chapter 7 — Non-price demand management**

FINDING 7.1

*Water restrictions generate net welfare losses for households, businesses and the community. They deny consumers the opportunity to choose how to use water in the ways that are most valuable to them. The evidence suggests that:*

- ***the costs of restrictions are substantial***

- 
- *many consumers would prefer to incur a larger bill rather than be subject to restrictions on their use of water.*

RECOMMENDATION 7.1

*The prescribed use of water restrictions should be the exception, limited to emergencies and of short duration. Utilities, not governments, should make decisions on when to prescribe restrictions, subject to supply obligations set out in utility governance charters (recommendation 10.7).*

RECOMMENDATION 7.2

*Governments should not prescribe water use efficiency and conservation activities unless there is a market failure present and it is clearly established that the social benefits of intervention exceed the social costs.*

RECOMMENDATION 7.3

*Government education and information campaigns should be refocused to provide consumers with objective information on the costs and benefits of managing demand using prices, restrictions, water use efficiency and conservation measures.*

## **Chapter 8 — Achieving affordability and consumer protection objectives**

FINDING 8.1

*In Australia, per capita water consumption is well above generally agreed subsistence requirements and there is no need for an ‘essential’ volume of water to be determined by government, except in the case of an emergency arising from a failure of supply.*

FINDING 8.2

*Expenditure on water and wastewater services represents a small proportion of income, even for low-income groups. Price increases in water and wastewater services are likely to have had less impact on consumers than price increases of other essential goods and services such as energy, food and housing (for which expenditure represents a greater share of incomes).*

---

FINDING 8.3

*Current State, Territory and Local Government concession arrangements for water and wastewater services are inefficient and inequitable. Efficiency gains can be made by replacing or amending water and wastewater concessions with direct payments to targeted households or rebates on the fixed component of water and wastewater service bills.*

FINDING 8.4

*For low-income households, the affordability of water and wastewater services and other essential goods and services is most efficiently achieved through non-concession elements of Australia's tax and transfer payments system.*

RECOMMENDATION 8.1

***COAG should commission a review of concessions on utility services across all levels of government. The review should:***

- ***identify the most effective and efficient way of ensuring that the services of utilities are affordable for low-income consumers***
- ***assess the appropriateness of existing arrangements for providing concessions, including eligibility criteria***
- ***assess the merit of, and scope for, abolishing concessions and providing relevant assistance to low-income households using other elements of the tax and transfer payments system.***

FINDING 8.5

*It is in the interests of consumers for utilities to have well designed hardship policies that apply to customers having difficulty paying their bills. Such hardship policies could include payment extensions or payment plans. Other measures provided by governments to alleviate hardship for low-income and disadvantaged consumers in exceptional circumstances also have merit, including utility grant schemes (State and Territory Governments) and Centrepay (provided by Centrelink).*

RECOMMENDATION 8.2

***Governments should develop best practice consumer protection principles for retail–distribution utilities in consultation with consumer advocacy bodies and other interested parties. At a minimum, the guiding principles should include:***

- ***retail–distribution utilities having clearly defined service standards and provisions to assist consumers facing hardship***

- 
- *rights for tenants that are commensurate with those of owner occupiers*
  - *access to an independent dispute resolution process, preferably by a specialist utilities industry ombudsman.*

RECOMMENDATION 8.3

*COAG should progress implementation of measures to support consumer advocacy and research consistent with recommendation 11.3 of the Commission's 2008 Review of Australia's Consumer Policy Framework.*

## **Chapter 10 — Improving institutional arrangements**

RECOMMENDATION 10.1

*To strengthen independence, responsibility, accountability and transparency:*

- *directors of utilities should be appointed on merit, following a transparent selection process*
- *ministerial directions should be publicly disclosed at the time they are made and disclosed in the annual report*
- *utilities (except where embedded in Local Government) should be incorporated under the Corporations Act 2001 (Cwlth)*
- *directors and officers of utilities (except where the utility is embedded in Local Government) should be subject to the obligations under the Corporations Act.*

RECOMMENDATION 10.2

*Governments should review objectives currently given to water utilities and regulators, and remove those that would be more appropriately allocated to other agencies.*

*Where conflicting objectives are seen as unavoidable for utilities or regulators, guidance on how to prioritise objectives should be given through a governance charter for utilities or through the inclusion of an overarching objects clause in regulatory acts.*

RECOMMENDATION 10.3

*Retail–distribution utilities should be assigned responsibility for meeting security of supply standards and procuring water and wastewater services because:*

- *they are best placed to understand consumer preferences and can develop service offerings based on the opportunity cost of supply*

- 
- *they can facilitate contestability and competition for water and wastewater services from potential service providers*
  - *they would have commercial responsibility for efficient operation and procurement of supply, which strengthens commercial incentives and risk management of operations and investment*
  - *it can preserve many of the efficiencies inherent in a vertically-integrated utility, even though vertical and horizontal separation of bulk supply is possible*
  - *it can mitigate against the high cost of formal price control regulation and the potential for inefficiencies arising from government ownership through the use of competition for procurement of supply and other services.*

RECOMMENDATION 10.4

*Charters should require all water utilities to achieve full cost recovery (including a return on assets) within three years of a charter being implemented. Where achieving full cost recovery solely through customer charges is considered unachievable or undesirable given the costs of meeting the utility's social, health or environmental obligations, State or Territory Governments should provide explicit Community Service Obligation payments to utilities. Charters should require that utilities reduce reliance on Community Service Obligation payments over time where practicable.*

RECOMMENDATION 10.5

*Compliance with the Australian Drinking Water Guidelines (ADWG) (or equivalent regulations) should be a legislated requirement for all Australian urban water utilities. Specifically, utilities should be required to:*

- *develop, implement and adhere to an approved drinking water quality risk management plan*
- *comply with relevant standards for drinking water*
- *disclose (and report on) water quality information.*

*State and Territory Governments should ensure that each of these legislative obligations is consistent with the requirements of the ADWG.*

*Sanctions should apply if water utilities do not comply with these requirements, and directors or other accountable persons such as councillors should be personally liable for non-compliance.*

---

*Public provision of information on the microbiological and chemical quality of drinking water is critical. Where utility performance against these measures (as defined in the ADWG) is not already publicly reported on (for example, by the National Water Commission), utilities should report on these measures.*

*Performance reporting requirements against the proposed governance charter would represent a suitable mechanism for such reporting.*

RECOMMENDATION 10.6

*Governments should ensure that environmental and health regulators are more transparent and accountable in their decision making by:*

- *ensuring environmental and health regulators publish draft decisions for public comment (except in emergency situations)*
- *ensuring environmental and health regulators publish reasons for their decisions in a similar manner to economic regulators*
- *establishing merit review procedures administered by existing jurisdictional courts or tribunals.*

RECOMMENDATION 10.7

*State and Territory Governments should draw up charters for urban water utilities incorporating best practice governance arrangements and governments' requirements for the performance of utilities.*

*The charter would set out details about:*

- *obligations to serve (security of supply and obligation to procure)*
- *obligations regarding public health and the environment*
- *transparent processes and procedures for supply augmentation and economic assessments (public consultation, tenders for supply, public reporting of the decision, and monitoring of the process by an independent body)*
- *principles for pricing and service offerings*
- *transparent processes and procedures for setting prices that involve public consultation, public reporting of decisions and periodic review by an independent body*
- *borrowing and dividend policies*
- *customer service standard/hardship policies*
- *risk allocation (between consumers, the government shareholder and private suppliers)*
- *clearly specified and fully funded Community Service Obligations*

- 
- *annual performance reporting requirements and provision for independent reviews*
  - *sanctions for underperformance against the charter.*

*There should be public consultation regarding the contents of the charter. Independent economic regulators in each jurisdiction would also be well placed to provide advice to the government.*

*Independent economic regulators, or some other appropriate government agency, in each jurisdiction, could oversee reporting against the charter. Reporting against the charter should incorporate a variety of performance indicators across various aspects of water utilities' performance.*

## **Chapter 11 — Rethinking price regulation**

### RECOMMENDATION 11.1

*State and Territory Governments should move away from regulatory price setting to a price monitoring regime (where some form of prices oversight is considered necessary). Independent regulatory price setting should only be applied where it can be demonstrated that price monitoring and appropriate governance arrangements are unlikely to prevent misuse of market power.*

*Within five years of moving to a price monitoring regime, all State and Territory Governments should initiate independent reviews (not by regulatory agencies) to determine:*

- *whether water utilities are misusing their market power and, if they are, what action should be taken to deal with this*
- *whether ongoing price monitoring is likely to produce net benefits to the community and, therefore, whether it is still required. If such benefits can not be demonstrated, all price regulation should be abolished and replaced by a self-reporting regime to be overseen by an appropriate government agency in the relevant jurisdiction.*

*Rather than proceeding to implement a price setting regime, Queensland should continue with its interim price monitoring arrangements until it undertakes a review within five years of whether price regulation produces net benefits to the community.*

*The National Water Initiative pricing principles should be amended to make it clear that independent regulatory price setting, should not be applied unless it can be demonstrated that a more light-handed approach is unlikely to prevent the substantial misuse of market power.*

*The Australian Government should proceed with the scheduled independent review of the National Access Regime. This review should commence no later than 31 December 2012. The terms of reference should include an examination of the interaction between the national and state-based regimes, including those for the urban water sector.*

## Chapter 12 — Structural options for large cities

### RECOMMENDATION 12.1

*There is a range of structural reform options for urban water supply in Australia's large cities, including:*

- *Option 1 — a vertically-integrated utility with improved governance and processes*
- *Option 2 — vertical separation of the bulk water supply function from other elements of the supply chain, and horizontal separation of the bulk water supply function*
- *Option 3 — vertical and horizontal separation of the wastewater treatment function (in addition to option 2)*
- *Option 4 — horizontal separation of the retail–distribution function (in addition to option 3).*

*State and Territory Governments should undertake a detailed assessment of the full costs and benefits of undertaking structural reform by the end of 2013.*

## Chapter 13 — Reform in regional areas

### FINDING 13.1

*A significant number of regional water utilities in New South Wales, Victoria, Queensland and Tasmania are not fully recovering costs (including capital costs). Based on publicly available financial indicators, the incidence of underrecovery of costs is more pronounced than a number of government agencies suggest, due to the way that full cost recovery is defined and assessed by those agencies.*

### RECOMMENDATION 13.1

*The New South Wales Government should provide a formal response to the recommendations of the Armstrong and Gellatly inquiry as a matter of priority.*

---

RECOMMENDATION 13.2

*The Governments of New South Wales and Queensland should consider the merits of aggregation of regional water utilities, case-by-case, based on:*

- *identification of the affected utilities*
- *preferred grouping of utilities, in consultation with Local Governments, affected communities and other interested parties*
- *the relative merits of alternative organisational structures, including the county council and public corporation models.*

*Where the expected benefits of horizontal aggregation do not outweigh the costs, governments should consider the case for establishing regional alliances.*

RECOMMENDATION 13.3

*The Governments of South Australia, Western Australia and the Northern Territory should consider the costs and benefits of replacing the single, jurisdiction-wide public corporation model with a regional water corporation approach (horizontal disaggregation).*

*In assessing the costs and benefits, factors other than scale should be considered, including opportunities for yardstick competition, the proximity of utilities to the customers they serve, opportunities for more location-specific pricing arrangements and the effectiveness of water resource management and water system planning.*

RECOMMENDATION 13.4

*If State and Territory Governments choose to subsidise the provision of water supply and wastewater services in regional areas (consistent with recommendations 5.3 and 10.4), the relative merits of alternative supply options for these customers (including moving to a system of self-supply) should be considered.*

*The case for providing financial incentives to facilitate reform, and assistance for local councils adversely affected by reform, should be determined by State and Territory Governments. If assistance is provided, it should be transitory and limited to impacts resulting directly from reform implementation.*

*State and Territory Governments should undertake regular public reviews of water and wastewater outcomes in Indigenous communities. Water and wastewater services should be assessed against the same metrics that are used to measure service quality in non-Indigenous communities.*

## **Chapter 14 — Implementing reform and monitoring progress**

*The universally applicable reforms to policy, governance and institutions identified by the Commission should be the highest priority for all governments as they present the greatest scope for efficiency gains. These universally applicable reforms centre on:*

- *setting an overarching objective for government policy in the sector for the provision of water, wastewater and stormwater services in an economically efficient manner to maximise the net benefits to the community*
- *developing appropriate policies and principles that align with this objective*
- *assigning roles and responsibilities appropriately*
- *putting in place best practice institutional, regulatory and governance arrangements.*

*Governments should also assess the case for structural reform, and implement structural reform where appropriate. Assessments should be open and transparent and involve public consultation.*

*COAG should develop an intergovernmental agreement by the end of 2012 that commits each jurisdiction to implementing the universally applicable reforms identified by the Commission, and to implementing structural reform, with agreed deadlines for progress.*

*Some universally applicable reforms should be implemented by the end of 2012, including setting an objective for the sector and ceasing (except in limited circumstances) subsidy payments.*

*The other universally applicable reforms should be in place by the end of 2013.*

---

*A review of the case for structural reform should also be completed by the end of 2013 and, where a case in favour of structural reform is identified, the reform process should begin immediately thereafter and be completed by the end of 2015.*

RECOMMENDATION 14.4

*Agreement across all jurisdictions is not necessary for State and Territory Governments to pursue the recommendations made by the Commission, as most relate to implementation of best practice regionally. State and Territory Governments should immediately commence enacting universally applicable reforms unilaterally and reviewing the case for structural reform.*

RECOMMENDATION 14.5

*The National Water Commission and/or Water Services Association of Australia should provide ongoing support to utilities to build capacity and expertise in adopting a real options approach, determining a framework for calculating the marginal opportunity cost of water, and devising a range of retail tariff offerings.*

RECOMMENDATION 14.6

*Progress against COAG agreed water reforms should be subject to monitoring. The National Water Commission could perform this role.*

RECOMMENDATION 14.7

*An independent public review of the implementation of the reform package should take place after five years.*

---

# 1 Introduction

The Australian Government has asked the Commission to examine the case for microeconomic reform, and to identify pathways to achieving improved resource allocation and efficiency, in the urban water sector.

## 1.1 Background to this inquiry

Water reform began in the early 1980s, notably with the appointment of Dr John Paterson as President and Chief Executive of the Hunter Water Board. In 1982, the Board implemented water pricing reform, starting with a user-pays water tariff for residential customers. In 1992, the Hunter District Water Board became the first major urban water authority in Australia to be corporatised.

Other significant milestones for reform include the:

- Industry Commission (1992) inquiry into water resources and wastewater disposal
- COAG (1994) strategic framework for the efficient and sustainable reform of the Australian water industry, developed by the Working Group on Water Resource Policy
- COAG (1995) National Competition Policy and Related Reforms (NCP), which included payments to jurisdictions that effectively implemented the strategic framework for water reform in the 1994 agreement
- COAG (2004) National Water Initiative (NWI) and the establishment of a National Water Commission (NWC) to assist with, and to assess progress on the effective implementation of, the water related reforms in the 1995 agreement and to progress additional agreed reforms
- COAG (2008) enhanced national urban water reform framework to improve the security of supply for urban water.

The origin of this inquiry can be traced back to the COAG agreement in 2008 (bold dot point in box 1.1). The purpose of the inquiry is to assist COAG to advance urban water reform by identifying pathways to achieve improved resource efficiency through reform of arrangements that govern the urban water sector.

---

### Box 1.1 **Enhanced national urban water reform framework**

In 2008, COAG agreed to the following:

- adopt national urban water planning principles
- establish and publish the levels of service for metropolitan water supplies
- publish guidance to facilitate best practice scenario planning for climate variability
- finalise and adopt National Water Initiative pricing principles
- review consumer protection arrangements for services provided by water utilities
- investigate possible enhancements to pricing reform, including scarcity value of water and the valuation and recovery of environmental externalities
- explore the issue of establishing entitlements for recycling, stormwater and managed aquifer recharge
- promote the use of competition through an examination of barriers to third party access and the costs and benefits of establishing a nationally consistent regime
- **examine the case for a microeconomic reform agenda in the urban water sector**
- examine the role of improved urban water metering and billing practices in the allocation, use and management of water
- finalise a review of water restrictions in Australia
- investigate the establishment of a national clearing house for best practice urban water management
- investigate the development of a national system for reporting urban water consumption
- establish centres of excellence for recycling and desalination
- develop a strategy to improve water supply and wastewater services in remote communities.

*Source:* COAG (2008).

Although considerable reform has occurred over the past three decades, the urban water sector has been under stress in recent times. This has mainly arisen from a lengthy period of unexpectedly low rainfall and inflows to dams, rivers and aquifers, followed most recently by heavy rain and floods in eastern Australia. Pressures from growth in demand, ageing assets and reduced capacity to supply from existing rainfall dependent sources has led to:

- prolonged use of severe water restrictions and consumption targets

- 
- use of prescribed measures or subsidies to reduce the consumption of potable water from bulk sources of supply (rainwater tanks, low flow shower heads, water recycling schemes for non potable uses)
  - large investments in rainfall-independent supply augmentation (primarily desalination plants).

Water quality problems have also occurred in some regional areas (health quality of potable water and the environmental quality of discharged wastewater). In some regional areas, water quality issues have led to ‘boil water’ notices being issued and exemptions granted for compliance with standards for the discharge of treated wastewater.

The recent experiences in the sector have created further impetus for this inquiry.

## **1.2 What has the Commission been asked to do?**

Under the terms of reference, the Commission has been asked to:

- identify the opportunities for efficiency gains, which might be achieved through changes to structural, institutional, regulatory, and other arrangements in the Australian urban water and wastewater sectors
- provide options to achieve the identified efficiency gains, and quantitatively assess these options (to the fullest extent possible) to identify their:
  - economic, social and environmental impacts
  - impacts on Australian governments, business and consumers
  - propensity to facilitate supply and demand planning and decision-making in the medium and long term
- propose a work program including implementation plans for the options, identifying
  - practical actions that the Australian, State and Territory Governments and Local Governments can undertake to implement options for reforms, including any transitional arrangements
  - priority areas where the greatest efficiency gains are evident and where early action is practicable
  - quantitative and qualitative indicators that can be used to monitor changes in efficiency in the urban water and wastewater sectors.

---

## 1.3 Scope of the inquiry

Australia's urban water sector is responsible for providing three services to households and commercial and industrial businesses:

- potable water (bulk water harvesting and manufacturing, storage, treatment, transmission, distribution, and retail)
- wastewater (transmission and distribution of sewage and tradewaste, treatment, recycling and disposal)
- stormwater (transmission, distribution, treatment, recycling and disposal).

For the purpose of this inquiry, the scope of services is limited to cities, towns and settlements that are serviced using reticulated systems.

Historically, urban water services have been provided by government-owned businesses (State and Territory or Local Government), which have often been vertically-integrated regional monopolies (sometimes statewide monopolies).

Water utilities are also required to comply with government policies regarding environmental protection, water conservation, public health and economic regulation of government businesses, including:

- the supply of water of appropriate quality for environmental purposes, such as maintaining ecologically healthy wetlands and waterways (including in urban areas)
- water conservation and water use efficiency
- flood mitigation and possibly power generation
- the quality of recycled or disposed wastewater and stormwater
- the quality of potable and non-potable classes of water
- the operation of government-owned trading enterprises
- consumer prices
- social policies (discounts or subsidies to specific groups of consumers).

## 1.4 The Commission's approach

The Commission is taking the following approach to the inquiry:

- identifying and clarifying the policy objectives for the urban water sector

- 
- identifying the policy, institutional, structural and other impediments to achieving the objectives and assessing the potential benefits from overcoming them
  - examining the changes to policies, institutions, and industry structure that governments could implement to unlock the benefits
  - developing priorities for reform
  - developing a monitoring framework to assess progress on implementing reform.

Water is often perceived to be different from other utility services (electricity, gas, telecommunications and mail) because water is ‘essential for life’ and/or it exhibits common property characteristics. Further, as a consequence of prolonged droughts, there is understandable community anxiety about the consequences of there not being enough water to meet basic human and industry needs. This can lead to a high degree of political involvement in water issues and pressure to adopt objectives, policies and institutional arrangements that are different from those applied in other utility sectors. The Commission considers that, in adopting the same approach as it would when considering other utilities that also provide ‘essential services’, it will arrive at policy advice that deals with the challenges and legitimate concerns of the community in both regional and metropolitan areas.

On 28 July 2010, the United Nations adopted a resolution recognising access to clean water and sanitation as a human right although Australia abstained in this vote. The resolution is principally aimed at improving access to water and wastewater services in developing nations. In the context of this inquiry, it is expected that the reforms being proposed would comply with the human rights obligation. It is a role of government to decide on the most appropriate mix of policies that achieve its objectives for the urban water sector and provide the community with access to water and wastewater services.

The circumstances of the urban water sector vary across regions in terms of:

- source, location, abundance, and cost of developing, extracting and transporting water resources
- the variability of rainfall, storage inflows and demands on stormwater management systems and uncertainty about trends and extremes arising from climate change
- the size of, and distance between, urban centres for demand
- the service requirements and expectations of individual communities
- the capacity of consumers to pay
- the historical starting point in terms of industry structure.

---

In recognition of different circumstances across regions, the Commission has categorised its priorities for reform into:

- those that can be universally applied across all jurisdictions and regions
- those that are likely to depend on the specific circumstances of the jurisdiction or region.

The NWC and Infrastructure Australia have recently released studies that cover some of the issues being deliberated on in this inquiry. The Commission has liaised with these organisations and has drawn upon the work where appropriate.

The Commission has undertaken modelling to assist it in evaluating the case for microeconomic reform and to identify priorities for reform. In accordance with the general policy guidelines of the *Productivity Commission Act 1998* (Cwlth), the Commission appointed Professor Alan Woodland (University of New South Wales) and Professor John Freebairn (University of Melbourne) to a reference panel for the purpose of reporting on the modelling.

The Commission's modelling approach, together with some preliminary applications to Melbourne and Perth, were discussed at a modelling workshop on 1 February 2011. Participants included the two referees and representatives from academia, expert consultants that work in the sector, government officials and water utilities. The referee reports on the modelling used for the final report are included in a technical supplement, published in volume 2 of this report.

## **1.5 Conduct of the inquiry**

The terms of reference for this inquiry were received from the Assistant Treasurer on 22 July 2010.

The Commission has consulted widely with stakeholders, drawing on input from participants through visits, roundtable discussions, a modelling workshop, written submissions and public hearings (appendix A).

The inquiry was advertised in national and metropolitan newspapers (table 1.1), and the Commission promoted the inquiry on its website.

---

**Table 1.1 Print advertising for the new inquiry and public hearings**

<i>State/Territory</i>	<i>Publication</i>
New South Wales	The Australian Australian Financial Review The Sydney Morning Herald
Victoria	The Age
Queensland	The Courier-Mail
South Australia	Adelaide Advertiser
Western Australia	The West Australian
ACT	Canberra Times

An issues paper and circulars announcing public hearings were sent to interested parties.

The hearings and roundtables were held in various locations (table 1.2).

**Table 1.2 Schedule of all public hearings and roundtables**

<i>Location</i>	<i>Date</i>	
<b>Initial public hearings</b>		
Sydney	Tuesday	9 November 2010
Canberra	Monday	29 November 2010
Melbourne	Tuesday	30 November 2010
Adelaide	Tuesday	7 December 2010
Perth	Wednesday	8 December 2010
Hobart	Monday	13 December 2010
<b>Roundtables</b>		
Perth	Monday	18 October 2010
Sydney	Wednesday	20 October 2010
Melbourne	Wednesday	27 October 2010
Sydney (regional)	Thursday	2 December 2010
<b>Draft report hearings</b>		
Sydney	Tuesday	31 May 2011
Brisbane	Wednesday	1 June 2011
Canberra	Monday	6 June 2011
Melbourne	Friday	10 June 2011

Eighty-nine submissions were received in response to the issues paper and a further 78 were received in response to the draft report which was released in April 2011.

The Commission thanks all inquiry participants for meeting with Commissioners and staff, facilitating visits, participating in roundtables and hearings, making submissions to the inquiry, and providing information and data to enable the Commission to undertake its modelling.

---

## 1.6 Guide to the report

This report has two volumes. The first volume contains the terms of reference for the inquiry, key points, overview, recommendations and findings and chapters of the report. The second volume contains the appendixes and two technical supplements.

### Volume 1

Chapter 2 of this report provides an overview of the industry, putting into context the modern history of reform, current government policies, governance arrangements and industry structure.

Without a clear idea of the policy objectives for the urban water sector, the case for reform cannot be assessed or reform options designed. Chapter 3 examines the overarching objective for the sector. In Chapter 4, the roles of government and the principles that could guide the design of these roles are considered.

The scope for efficiency gains in the supply of water, wastewater and stormwater services is examined in chapter 5. The scope for efficiency gains through pricing and demand side management is considered in chapters 6 and 7. More effective and efficient ways of achieving distributional and consumer protection objectives are considered in chapter 8.

The Commission's overarching framework for reform of the urban water sector is outlined in chapter 9. Proposed universal reforms of institutions are set out in chapter 10, and a rethinking of economic regulation for the sector is detailed in chapter 11. Options for structural reform for utilities in large cities are discussed in chapter 12, and structural reform options for some smaller regional urban utilities are discussed in chapter 13.

Finally, the proposed reform priorities are summarised in chapter 14, along with a suggested timetable and framework for monitoring progress on the implementation of reform.

### Volume 2

Appendix A lists the participants that made submissions to the inquiry and the consultations conducted by the Commission, including public hearings and roundtables. Appendix B provides further detail on the nature of the urban water sector and current arrangements governing the sector. Lessons from reform in other

---

water sectors are summarised in appendix C and lessons from reform in other utility sectors are summarised in appendix D. Appendix E includes several case studies of supply augmentation completed around Australia, and appendix F provides further technical detail about the portfolio manager framework, the opportunity cost of supply and tariffs. Appendix G outlines the types of competition that can feasibly be applied to the urban water sector. Two technical supplements are also included in volume 2:

- partial equilibrium models of the urban water sectors in Melbourne and Perth
- insights into residential water consumption and expenditure using combined census and utility billing data.



---

## 2 About Australia's urban water sector

### Key points

- Australia's urban water sector comprises three sub-sectors — potable water, wastewater and stormwater (including drainage and flood mitigation).
- The sector is capital intensive with high fixed costs. Much of the costs are in water and wastewater transportation, rather than bulk supply.
- Traditionally, there has been heavy reliance on climate dependent sources of water, such as dams, rivers and aquifers. Water storages and inflows into these sources diminished in many jurisdictions over the past decade, due to decreased rainfall and increasing evaporation arising from drought and climate change.
- In recent years, most jurisdictions have invested in large climate-independent supply augmentation projects. It is expected that further major supply augmentations will not be required for at least 10 years in most major metropolitan areas.
- Many jurisdictions have also used non-price demand management measures, such as water restrictions, and water efficiency and conservation measures, to deal with water shortages. This has reinforced a longer-term trend of decreasing total and per capita water consumption.
- More recently, heavy rains have led to increased inflows in most parts of the country, with the notable exception of south-west Western Australia.
- The challenges brought about by the recent drought conditions have affected the financial and economic performance of the sector. Larger utilities generally perform better financially than smaller utilities.
- The structural, institutional, governance and regulatory arrangements of the sector vary across and within jurisdictions — especially between metropolitan and regional urban areas.
- The structural arrangements of the sector have been reformed over the past two decades. In some metropolitan areas, there has been a move towards vertical separation of the supply chain. In some regional urban areas, the move has been towards aggregation of utilities. Many utilities have also been corporatised.
- There has been a move towards more independence in the economic regulatory oversight of the urban water sector, as opposed to ministerial control. However, this is not the case in all jurisdictions.

---

In this inquiry, Australia’s urban water sector comprises three sub-sectors — potable water, wastewater and stormwater. The sector includes both the entities that supply these services and the institutions that govern and regulate them. The sector is diverse, and the picture is different not only across states and territories, but also within them.

An overview of Australia’s urban water sector is presented in this chapter. The supply of water, wastewater and stormwater services is discussed in section 2.1, including the supply chain through which services are provided and its cost structure, and sources of water and their characteristics. In section 2.2, the demand for water is examined, including consumption by urban users, and how this has changed over time. Increasing uncertainty around supply and demand has led to concerns about water security. In response, most jurisdictions have undertaken supply augmentation and demand management initiatives. These are summarised in section 2.3.

There has been ongoing reform in the urban water sector since the early 1990s which, together with the challenges brought about by drought in recent years, has affected the financial and economic performance of the sector (section 2.4) and led to changes in the structural, institutional, governance and regulatory arrangements (section 2.5).

More detail on information presented in this chapter is provided in appendix B.

## **2.1 Supply of water, wastewater and stormwater services**

This section includes a discussion of the supply chain for the provision of water, wastewater and stormwater services, the costs of providing water and wastewater services, sources of supply and the variability in water supply due to rainfall and inflow variability.

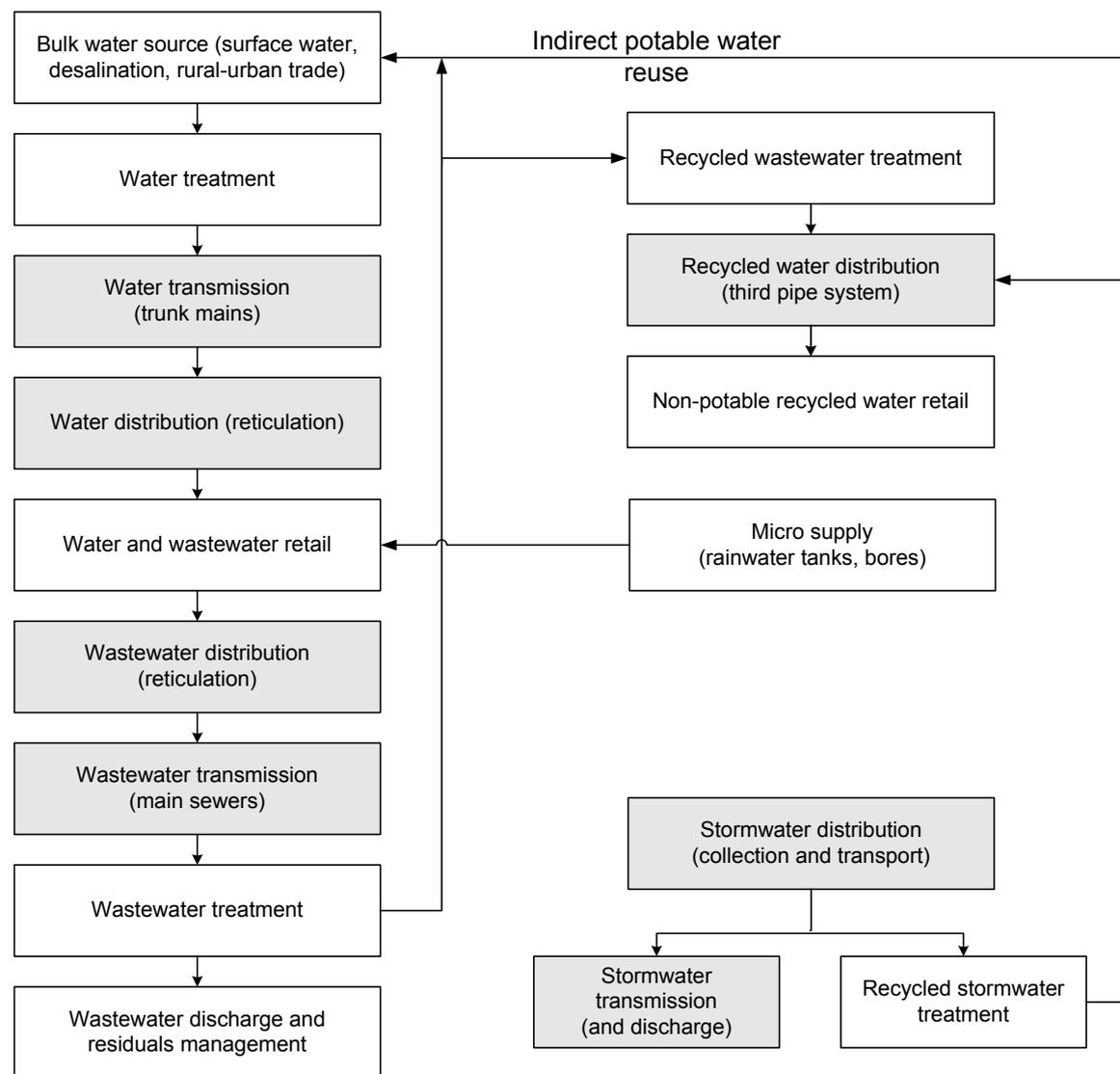
### **Supply chain and cost structure**

#### *Supply chain*

The supply chain for the urban water sector is shown in figure 2.1. The potable water sub-sector harvests and manufactures bulk water, stores water, treats water to a standard fit for human consumption, and transports water through transmission networks and then on to distribution networks for delivery to end users. The

wastewater sub-sector transports sewage and tradewaste from customers to where it is treated, and then either disposes of it or recycles it. The stormwater sub-sector collects stormwater run-off, and transports it to where it is either disposed of or recycled. Stormwater infrastructure and services also contribute to flood mitigation. Some dams have a dual purpose and assist with flood mitigation.

Figure 2.1 **Supply chain for water, wastewater and stormwater**<sup>a, b, c</sup>



<sup>a</sup> Shading indicates elements that have strong natural monopoly characteristics. <sup>b</sup> Stormwater includes all drainage services. <sup>c</sup> Non-potable recycled water is discharged from households via the standard wastewater distribution network.

Figure 2.1 also identifies those elements of the supply chain that have strong natural monopoly characteristics (that is, where it is most efficient to have only one entity supplying the markets needs) (chapter 4). Other elements are potentially contestable, as discussed in chapter 12.

---

The types and classes of water are summarised in box 2.1.

**Box 2.1      Types and classes of water**

Water can be treated to different levels suitable for different purposes and can be classed as potable and non-potable.

**Potable water**

Potable water is treated to a level suitable for human consumption. It is supplied through the main reticulated water system in Australia.

The *Australian Drinking Water Guidelines* provide guidance to the industry on what constitutes good quality drinking water. They advocate a risk management approach, and address acceptable water quality and health risks posed by different substances. They also provide guidance on monitoring programs and performance assessment of water supply systems (NHMRC 2004).

**Non-potable water**

Non-potable water can include either untreated water, or water that is treated to a lower standard than potable water.

*Recycled water*

Recycled water is water taken from a waste stream — usually wastewater or stormwater — and treated for use in a new activity (Melbourne Water ndb). Recycled water is being increasingly used for both residential and industrial non-potable uses. It can be treated to different classes, with higher classes having a wider range of possible uses. Although there is some variation across jurisdictions in the activities for which different classes of water can be used (and these are routinely subject to review), they are broadly similar. As an example, Victoria's classes for urban uses are:

- Class A: Uses include residential garden watering, toilet flushing and irrigation of municipal parks and sportsgrounds.
- Class B: Urban uses are confined to those with restricted public access and closed industrial systems.
- Class C: Urban uses are confined to those with restricted public access, and industrial systems with no potential work exposure. (EPA Victoria 2003)

The *Australian Guidelines for Water Recycling* provide guidance to the industry on how to safely recycle water for use, using a risk management framework. They cover topics such as greywater, wastewater and stormwater recycling, augmentation of drinking water supplies and managing aquifer recharge (EPHC 2011; NRMMC, EPHC and AHMC 2008).

Recycling of wastewater and stormwater is increasing. However, other than the limited introduction of recycled water to the City of Oranges' dam (section 2.3),

---

recycled water has been kept separate from the potable water supply in Australia to date. It is instead used for non-potable purposes or discharged to the environment. However, there are cases of both direct and indirect potable reuse internationally. For example, Singapore recycles treated wastewater for potable and non-potable uses. Recycled water meets 30 per cent of Singapore's water demand, however the majority is used in non-potable activities (PUB 2010, 2011). In addition, about 40 per cent of the Las Vegas Valley's water resources are sourced through indirect potable reuse (Porter nd) (chapter 5).

### *Cost structure of the water and wastewater industries*

The costs of providing water and wastewater services vary along the supply chain. In addition, the breakdown of costs along the supply chain will vary between locations and utilities due to a number of factors:

- Nature of primary sources — affects the costs of extracting water.
- Geography and topography — influences transportation costs. Pumping water longer distances, or up hills, will increase costs.
- Health and environmental requirements — more stringent requirements might result in higher treatment costs.
- Degree of treatment — treatment to a higher standard is more expensive.
- Number of connections/growth in connections — a higher number of connections will generally increase costs.
- Asset life cycles — more recently constructed assets such as distribution systems might be cheaper to maintain than older assets.

Table 2.1 provides a breakdown of the share of a typical \$1000 water and wastewater bill in Sydney.

Transport of water and wastewater accounts for the highest proportion of costs in Sydney (37 per cent). This is in contrast to other utilities such as gas and electricity where transport costs are relatively low (Schott, Wilson and Walkom 2008).

Wastewater treatment and disposal is also a major cost. It accounts for about a third of costs in Sydney. The Water Services Association of Australia (WSAA) (sub. 29) noted that wastewater services overall account for more than half of the urban water sector's cost base.

Bulk water supply and treatment together account for just under 30 per cent of water and wastewater supply costs in Sydney. In Melbourne, bulk water supply and treatment costs account for about 56 per cent of the water component of an average

residential water bill for Yarra Valley Water’s customers (Yarra Valley Water, sub. 19).

**Table 2.1 Breakdown of water and wastewater supply chain costs attributable to a typical \$1000 Sydney household bill**

<i>Activity</i>	<i>Share of bill (%)</i>
Bulk water supply <sup>a</sup>	20
Water treatment	7
Water transport and distribution	23
Water and wastewater retailing	3
Wastewater transport	14
Wastewater treatment and disposal	33

<sup>a</sup> Half of this relates to dam water and the other half to desalination.

*Source:* Sydney Water (sub. 21).

Retail accounts for only a small proportion of costs in Sydney at 3 per cent. This is similar to other places, such as Perth (less than 5 per cent of total costs) and Melbourne (about 6 per cent of City West Water’s operating costs) (VCEC 2008).

In addition to the costs of urban water and wastewater supply varying along the supply chain, the split between capital and operating costs also varies along the supply chain. This is discussed in box 2.2.

## **Water supply**

### *Sources of supply*

Australia has a high dependence on surface water relative to other bulk water sources for its urban water supply (table 2.2). In 2009-10, surface water accounted for over 80 per cent of total water supplied by utilities in metropolitan New South Wales, Victoria, Queensland, South Australia, Tasmania and the ACT. Dams were the primary source of surface water in all of these areas except for metropolitan Tasmania, which sourced its water from the Derwent River, and Adelaide, which sources a significant proportion of its water from the Murray River (and dams in the same water system) (NWC and WSAA 2011; PC 2008d).

Of those areas that sourced a significant proportion of their water from non-surface water sources (NWC and WSAA 2011):

- 
- the Northern Territory and regional urban New South Wales sourced a significant proportion from groundwater (30 per cent and 15 per cent respectively) (New South Wales Government, sub. DR146)
  - Western Australia sourced a significant proportion from groundwater (mainly through aquifers) (42 per cent) and desalination (10 per cent)
  - South Australia sourced a high proportion from recycled water (14 per cent).

### **Box 2.2 Capital and operating costs**

The water and wastewater industries are capital intensive, and have relatively high fixed costs. For example, in Western Australia, about two-thirds of the cost of urban water supply relates to the upfront capital cost (Department of Water (WA), sub. 38).

The capital intensity of activities along the supply chain varies. Bulk water supply has high capital costs as it requires large, lumpy investments in infrastructure such as dams, pipelines and desalination plants. Bulk water operating costs are relatively small and include the costs of extracting (or, in the case of desalination, manufacturing) water and pumping it to treatment plants. The operating costs of bulk water supply might rise in coming years. This is due to new supply augmentation options such as desalination having relatively high operating costs, compared with traditional supply sources such as dams (Australian Academy of Technological Sciences and Engineering, sub. 34). However, the diversity of supply sources between areas means this might not be the case everywhere.

Water and wastewater treatment typically involves higher operating costs relative to other parts of the supply chain. These costs increase with level of treatment employed (particularly with respect to energy).

Water, wastewater and stormwater transportation through large transmission and distribution networks has very high capital costs relative to operating costs and, as a result, is often described as a natural monopoly. The main operating cost associated with transport is pumping.

Retail is likely to have a high proportion of operating costs relative to other activities in the supply chain, and low capital costs. The main driver of retail costs is the number of connections, and includes the cost of billing, meter reading and dealing with customer complaints.

Energy is one of the largest operating costs for urban water utilities. Energy is mainly used for the pumping and treatment of water, with pumping water from distant locations significantly contributing to energy use. Energy is also a significant cost of desalination, and contributes to desalination having relatively high operating costs compared with traditional supply sources. The proportion of energy used in different activities along the supply chain varies greatly between areas (Kenway et al. 2008).

**Table 2.2 Sources of urban water by jurisdiction for utilities with greater than 10 000 connections, 2009-10<sup>a, b, c</sup>**

Per cent of total water sourced

Area	Total water sourced	Surface water	Groundwater	Desalination	Recycled water	Bulk water purchased <sup>d</sup>
	GL	%	%	%	%	%
NSW – metro	692.3	94.2	1.0	2.9	1.9	-
NSW – regional urban	311.0	66.9	14.8	-	2.6	15.8
Vic	615.8	87.6	4.1	-	3.8	4.6
Qld	435.4	86.5	3.1	5.3	5.1	-
SA	177.2	83.9	2.0	-	14.0	0.1
WA	309.5	47.1	42.3	10.4	1.8	3.8
Tas – metro	43.2	100.0	-	-	-	-
NT	52.5	68.3	29.7	-	2.0	-
ACT	49.6	91.4	-	-	8.6	-
<b>Total</b>	<b>2686.4</b>	<b>81.1</b>	<b>9.0</b>	<b>2.8</b>	<b>3.8</b>	<b>3.3</b>

<sup>a</sup> Regional urban New South Wales and metropolitan Tasmania figures are for 2008-09. <sup>b</sup> Regional urban New South Wales figure includes all regional urban utilities. <sup>c</sup> Totals might not add as a result of rounding.

<sup>d</sup> The total volume of water (including recycled water) purchased from another utility or entity outside the utility's geographic area of responsibility. Water subsequently exported has been removed.

Sources: adapted from New South Wales Government (sub. DR146); NSW Office of Water (2010b); NWC and WSAA (2010a; 2011).

Apart from the data for regional urban New South Wales, which comes from the *2008-09 NSW Water Supply and Sewerage Benchmarking report* and covers all of New South Wales' regional urban utilities, the data presented come from the annual *National Performance Report*, prepared by the National Water Commission and WSAA. Utilities with under 10 000 connected properties are not included in this report. As a result, the data might not give a complete picture of the water supply in states such as Queensland, South Australia, Western Australia and Tasmania. In regional urban areas of these states, water supply sources might differ from those in the capital cities, due to factors such as geography and size of communities limiting the supply sources available. For example, desalination is unlikely to be an option for many areas due to the high cost of transporting water inland from coastal areas. As a result, inland urban areas are unlikely to have the same diversification in supply that coastal areas can achieve.

Australia experiences high variability in rainfall and inflows and has a heavy reliance on surface water. As a result, its dam storage capacity is large by international standards (ABS 2010c). Dam storage capacity is lower in cities such as Adelaide, Perth and Hobart (table 2.3), where alternative sources of supply have been historically available — groundwater in the case of Perth, and river water in Adelaide and Hobart. Much of Adelaide's river water comes from the Hume and

Dartmouth dams located in the Murray-Darling Basin. Given the recent investment in new sources of supply, dam capacity has diminished value as an indicator of total supply capacity.

**Table 2.3 Storage capacity of dams supplying capital cities**

<i>Capital city</i>	<i>Storage capacity (as at July 2010) (GL)</i>	<i>Total water supplied 2009-10 (GL)</i>	<i>No. of years supply when full (based on water supplied in 2009-10)</i>
Sydney	2 581.9	505.7	5.1
Melbourne	1 812.2	348.8	5.2
Brisbane & south-east Queensland	2 070.5	198.6 <sup>a</sup>	10.4
Adelaide	197.4	125.8	1.6
Perth	580.8	249.6	2.3
Hobart	3.6	43.2 <sup>b</sup>	0.1
Darwin	285.5	34.9	8.2
Canberra	205.5	41.6	4.9

<sup>a</sup> Figure includes water supplied to Brisbane, Gold Coast, Ipswich and Logan. <sup>b</sup> Hobart figure is for 2008-09, and is total water sourced, not supplied.

Sources: BOM (2011b); NWC and WSAA (2010a; 2011).

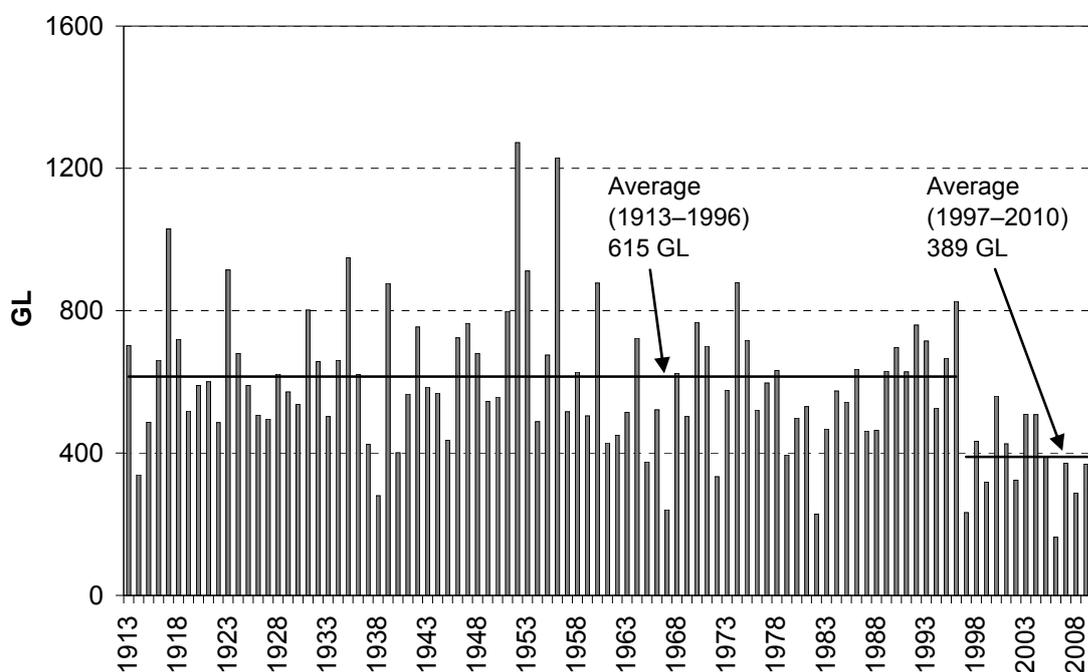
### *Variability in rainfall and inflows*

Australia's rainfall is highly variable and, therefore, inflows into storages both over time and space are also highly variable. Rainfall is also highly variable by international standards, with Australia experiencing greater variability than any other continental region (Smith 1998, cited in ABS 2010d).

Not only does Australia have highly variable rainfall, but until recently many places have experienced significantly below average rainfall and increased evaporation sustained over a number of years. This led to a disproportionately large reduction in inflows and low dam storage levels in many places<sup>1</sup>. For example, the average annual inflow into four of Melbourne's large dams was 389 GL for the period 1997–2010, much lower than the average of 615 GL for 1913–1996 (figure 2.2). Dam storages in Melbourne hit a record low of 25 per cent in June 2009. However, rainfall and inflows improved in 2010 (although they were still below the 1913–1996 average), and storages were about 60 per cent at July 2011 (Melbourne Water 2011b). (Trends in rainfall and inflows for Sydney, south-east Queensland and Perth are included in appendix B.)

<sup>1</sup> The relationship between rainfall and inflows is not linear, with a reduction in rainfall usually translating into an even greater reduction in inflows due to evaporation, topography and retention of water in soil (ABS 2010f).

Figure 2.2 Annual inflows at Melbourne's major reservoirs 1913–2010<sup>a</sup>



<sup>a</sup> Thompson, Upper Yarra, O'Shannassy and Maroondah Reservoirs.

Source: Melbourne Water (2011b).

As well as Melbourne, in the past year or two, rainfall, inflows and storages have increased again in many parts of Australia, with the notable exception of south-west Western Australia.

Apparent changes in climate have led to concerns about increased uncertainty in rainfall and inflows, and increasing difficulty in predicting future supply. As a result, many jurisdictions have invested heavily in supply augmentation, particularly 'climate independent' sources of supply such as desalination and recycling (section 2.3).

## 2.2 Water consumption

In this section, trends in total water consumption are presented, followed by further detail on household consumption, international comparisons and expected future demand.

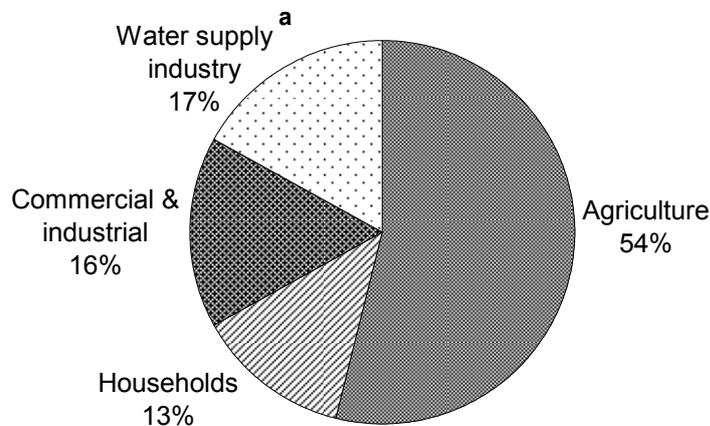
---

## Total water consumption

Australia's total water consumption, including non-urban/rural consumption, has decreased in recent years. In 2008-09 total water consumption was 14 101 GL, down 35 per cent from 2000-01. The main driver of this decrease was a 50 per cent reduction in consumption by agricultural activities (ABS 2010d). Nonetheless, agriculture still accounts for the largest share of Australia's total water consumption, at just over 50 per cent (figure 2.3).

Figure 2.3 **Share of total water consumption in Australia by users, 2008-09**

---



---

<sup>a</sup> Includes sewerage and drainage services and water losses; excludes the supply of water to other users.

Source: ABS (2010d).

Households account for 13 per cent of total water consumption, a little less than commercial and industrial users (17 per cent). The remainder of total water consumption is accounted for by the water supply industry itself (17 per cent). This includes water consumed in the process of supplying water and sewage and drainage services, and water losses. Losses in distribution are the largest component of the water supply industry's consumption (ABS 2010d).

Although the volume of water consumption might appear large, it equates to only a small share of Australia's rainfall. In 2004-05, total water consumption was only 0.7 per cent of total Australia-wide rainfall for that period (ABS 2006b).

The key drivers of demand for water and wastewater are outlined in box 2.3.

---

### Box 2.3 The nature of demand for water and wastewater

Demand for urban water can take the form of a final good, where water is desired in its own right, or an intermediate good, where water is used as an input into the production of another good or service.

Households purchase water as a final good, and demand is determined by the preferences of those households for water and other goods and services. There are two components of household demand — essential (non-discretionary) and non-essential (discretionary) uses. There is no clear definition of what constitutes essential water demand (chapter 8).

Productivity Commission econometric analysis indicates household size and income are the most influential determinants of household water consumption. Other possible contributing factors include the climate, household composition, housing tenure status, educational attainment, occupation and skill levels (technical supplement 2).

In contrast to household demand, commercial and industrial users purchase water as an intermediate good. This demand is 'derived' from the demand for other goods and services which are produced using water, and is influenced by the technologies used in the production process. The largest commercial and industrial users of urban water are the mining, electricity and gas, and food and beverage manufacturing industries (ABS 2010d). Using water to maintain public areas such as parks, gardens and recreational ovals can also be considered as intermediate uses toward the final public good of public amenity.

The demand for wastewater is linked to the volume of water consumed. The demand for household sewerage services is related to indoor water usage in bathrooms, laundries and kitchens. Demand for industrial tradewaste services is influenced by the nature of industrial production processes, which determine the quantity and quality of tradewaste and in turn, the level of treatment required.

*Source:* Baumann, Boland and Hanemann (1998).

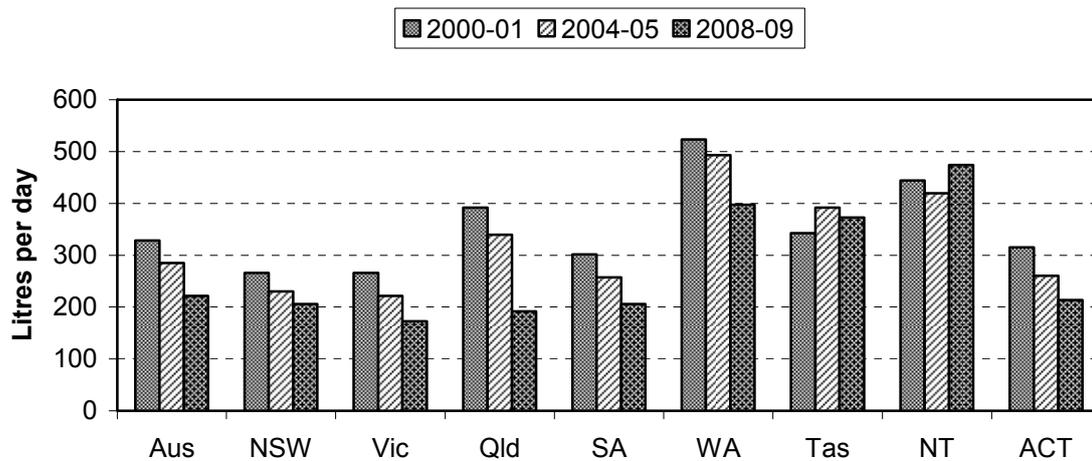
## Household consumption

Despite steady population growth, Australia-wide household water consumption has decreased by 22 per cent between 2000-01 and 2008-09. This appears to be part of an even longer-term trend. For example, in Sydney, total water supplied decreased by about 24 per cent between 1990-91 and 2009-10, and per capita water consumption appears to have been trending downwards since the 1980s (Sydney Water 2010b).

According to the ABS Water Account, per capita household consumption Australia-wide was 221 litres per day in 2008-09, down from 329 litres per day in 2000-01 (figure 2.4). Most jurisdictions have seen similar declines except for

Tasmania and the Northern Territory, where per capita consumption was higher in 2008-09 than in 2000-01. Western Australia, Tasmania and the Northern Territory are the highest per capita users of water (ABS 2010d). Reasons for this higher per capita use are likely to vary between these jurisdictions. WSAA (2010a) noted Perth's high residential water consumption reflects its hot summers, less stringent water restrictions and sandy soils.

Figure 2.4 Per capita household consumption by jurisdiction



Sources: adapted from ABS (2006b; 2010d).

A relatively high proportion of household water is used outdoors. For example, about 30 per cent of water used by Sydney households is used for outdoor activities, such as lawn and garden watering, filling and maintaining pools and car washing. In Perth, the share of water use outdoors is about 44 per cent. Lawn and garden watering tends to be the highest overall use activity, followed by showering (Schott, Wilson and Walkom 2008; Water Corporation 2010).

### International comparisons

Australia's per capita water consumption is high by international standards. In 2008, it was amongst the highest of OECD countries (OECD 2011b). In contrast, the price Australians pay for water is in the mid-range of OECD countries (OECD 2010). Given the recent declines in per capita water consumption, and the recent and future increases in water prices (section 2.3), Australia's position, relative to the OECD average, might have since changed.

---

## **Future demand**

Recent research suggests demand for water in Australia's six largest capital cities might increase in the long term. WSAA (2010a) found that despite water consumption decreasing in recent years, and water prices and use of water efficiency and conservation measures increasing, water consumption could increase by 600 GL or about 40 per cent by 2026, and 1000 GL or about 66 per cent by 2056, based on current population trends.

## **2.3 Recent supply augmentation and demand management initiatives**

In response to climate change and drought, many jurisdictions have invested in supply augmentation to manage the uncertainty associated with rainfall. They have also used demand management tools to bring demand in line with the reduced supply of recent years.

### **Supply augmentation**

Investment in supply augmentation has increased in recent years, ranging from the installation of rainwater tanks and greywater systems to the construction of large desalination plants. The combined capital expenditure program of 30 of Australia's largest water utilities is approximately \$30 billion over the period 2005-06 to 2011-12 (WSAA 2009b). This section outlines some of the larger supply augmentation projects initiated by both government and water utilities in recent years.

#### *Desalination plants*

Desalination is a climate independent source of water, making it a more certain supply source than surface water and groundwater alternatives. Jurisdictions have invested heavily in desalination plants in recent years to service capital cities (table 2.4). Many smaller desalination plants have also been built to service private users, often mining operations, such as the Sino Iron Project's desalination plant (CITIC Pacific Mining 2010).

The capacity and cost of the desalination plants vary greatly. Perth and south-east Queensland have constructed smaller desalination plants (between 45 and 49 GL) costing \$387 million and \$1.2 billion respectively. In contrast, Melbourne's desalination plant has a capacity of 150 GL and is expected to initially cost about

\$3.5 billion. It has been reported that Melbourne’s plant will be the largest in the Southern Hemisphere (Miller and Schneiders 2010).

**Table 2.4 Large desalination plants**

<i>Location (project)</i>	<i>Initial investment<sup>a</sup></i>	<i>Capacity</i>	<i>Maximum expandable capacity</i>	<i>Initial (and expandable capacity as a percentage total water supplied in 2009-10)</i>	<i>Completion date</i>
	\$m	GL/year	GL/year	%	
Sydney (Kurnell)	1 890	90	180	18 (36)	2010
Melbourne (Wonthaggi)	3 500	150	Up to 200	43 (57)	2012
South-east Queensland (Tugun)	1 200	49		25	2009
Adelaide (Port Stanvac)	1 830	100		80	2012
Perth (Kwinana)	387	45		18	2006
Perth (Binningup)	1 400	100		40	2012

<sup>a</sup> Costs were incurred in different years, therefore are not directly comparable.

Sources: ABC News (2011); Costa (2010); Gallop (2005); Hinchliffe (2010); Partnerships Victoria (2010); SA Water (2011c); Sydney Water (sub. 21); Water Corporation (ndb); WSAA (2010b).

## *Dams*

There has been less reliance on dams in recent years to augment supply. Some reasons for this might include:

- they are dependent on rainfall
- there are fewer options available
- the opportunity cost of the land might have increased
- the community might have changed its view on environmental impacts of dam construction, such as the impact on native fauna and flora, and on significant ecosystems and processes.

Two dam proposals have not gone ahead in recent years. The Traveston Dam (on the Mary River in Queensland) was not approved by the Australian Government Environment Minister (ABC News 2009). The Tillegra Dam (near Dungog) was not approved by the New South Wales Government due to uncertainty of environmental impacts, potential impacts on licensed water users and insufficient justification for the dam (NSW Government 2010a).

Nevertheless, there are dam-related projects currently underway. Significant projects include the upgrading of the Hinze Dam, which serves south-east

Queensland. This will almost double its storage capacity from 161 GL to 310 GL, and is due to be completed in December 2011 (table 2.5). An enlargement of Canberra's Cotter Dam is also underway, which will increase its capacity from 4 GL to 78 GL. The project is expected to be completed in late 2011.

**Table 2.5 Large dam projects**

<i>Location</i>	<i>Project</i>	<i>Estimated cost<sup>a</sup></i>	<i>Capacity</i>	<i>Completion date</i>
		\$m	GL/year	
Melbourne	Tarago Reservoir reconnection and upgrade	97 <sup>b</sup>	37.5	2009
South-east Queensland	Upgrade of Hinze Dam	395	310 <sup>c</sup>	2011
	Wyaralong Dam	348	103	2011
Canberra	Expansion of Cotter Dam	363	78 <sup>d</sup>	2011

<sup>a</sup> Costs were incurred in different years, therefore are not directly comparable. <sup>b</sup> Cost of the water treatment plant needed to reconnect the reservoir. <sup>c</sup> Expansion from initial capacity of 161 GL. <sup>d</sup> Expansion from initial capacity of 4 GL.

*Sources:* ACTEW (2010a); Melbourne Water (nda); Queensland Water Infrastructure (nd); Seqwater (2009); WSAA (2010b).

### *Water recycling*

Water recycling has increased in recent years. In 2009-10, the volume of water recycled by urban utilities with greater than 10 000 connections was 245 GL, up from 160 GL in 2005-06 (NWC and WSAA 2011).

Water recycling involves recycling wastewater or stormwater. Recycled water is currently used in Australia for non-potable activities, including industrial purposes (with some industrial users having on-site reuse), for watering green public spaces such as parks and sporting fields, and agriculture. Recycled water is also delivered by water utilities to households in some new residential developments for non-potable uses via a third pipe system.

Although recycled water is not generally used to augment potable supplies, Orange's stormwater scheme has been used to augment potable supplies, for indirect potable reuse (discussed below).

### *Wastewater recycling*

Australia's largest wastewater recycling project is the Western Corridor Recycled Water Scheme in south-east Queensland (table 2.6). It comprises three advanced water treatment plants that treat wastewater to supply power stations and industry. It

is expected to supply about 36 GL per year for urban use. Recycled water might also be used to replenish Wivenhoe Dam for indirect potable reuse when south-east Queensland's water storages fall below 40 per cent (QWC 2010b).

**Table 2.6 Large water recycling projects**

<i>Location</i>	<i>Project</i>	<i>Estimated cost<sup>a</sup></i>	<i>Supply/ Capacity</i>	<i>Completion date</i>
		\$m	GL/year	
Sydney	St Mary's Replacement Flows Project	250	18	2010
	Rouse Hill Water Recycling Scheme	60 <sup>b</sup>	4.7	2008
	Rosehill-Camellia Recycled Water Scheme	100	4 <sup>c</sup>	2011
Wollongong	Wollongong Water Recycling Plant	25	>7.3	2006
Melbourne	Eastern Treatment Plant – Tertiary Upgrade	380		2012
South-east Queensland	Western Corridor Recycled Water Project	2 600	36 <sup>d</sup>	2008
	Murrumba Downs Sewage Treatment Plant	197	11 <sup>e</sup>	2010
Adelaide	Glenelg to Adelaide Park Lands Recycled Water Project	76	5.5	2010
Perth	Kwinana Recycled Water Scheme	28	6	2004
	Alkimos Wastewater Treatment Plant Stage 1 and Quinns Main Sewer	336	7.3	2010

<sup>a</sup> Costs were incurred in different years, therefore are not directly comparable. <sup>b</sup> Cost of the upgrade only. <sup>c</sup> Can be expanded to 7 GL. <sup>d</sup> Expected supply for urban water use. Total capacity is expected to be greater. <sup>e</sup> Based on 4 ML per day.

*Sources:* GHD (2009); Glenelg to Adelaide Parklands Recycled Water Project (nd); NWC and WSAA (2011); QWC (2010b); Sydney Water (2006; 2009; 2010c; ndc; ndd); Unity Water (nd); Water Corporation (2008a; nda); WSAA (2008b; 2009b; 2010b).

One of Australia's largest residential water recycling schemes is the Rouse Hill Water Recycling Scheme in Sydney's north-west. Treated wastewater is distributed via a third pipe for toilet flushing, laundry washing and outdoor uses. Currently 19 000 homes are involved and eventually it will service 36 000 homes. The plant will treat about 4.7 GL of wastewater each year for reuse (Sydney Water 2010a).

### *Stormwater recycling*

One of Australia's earliest stormwater recycling projects is the City of Salisbury's stormwater harvesting project (table 2.7). It involves treating stormwater through a series of wetlands, which can then be distributed to households for use via a third pipe system, used for irrigation and industrial uses, or stored in aquifers. Currently the system can provide 8 GL a year of non-potable water (City of Salisbury, sub. 10; trans., p. 246).

**Table 2.7 Large stormwater harvesting projects**

<i>Location</i>	<i>Project</i>	<i>Estimated cost<sup>a</sup></i>	<i>Supply/ Capacity</i>	<i>Completion date</i>
		\$m	GL/year	
Adelaide	City of Salisbury's stormwater harvesting project	43.5 <sup>b</sup>	8.0	Initial project completed
		30.0	2.2	
	City of Onkaparinga's Water Proofing the South Stage 2	63.0	2.4	2013
	City of Charles Sturt's Water Proofing the West Stage 1			2013
Orange	Orange Stormwater Harvesting Scheme <sup>c</sup>	5.0	2.1	2009

<sup>a</sup> Costs were incurred in different years, therefore are not directly comparable. <sup>b</sup> Includes Australian Government funding of \$6.5 million and Local Government expenditure of \$37 million. Not the full cost of the project. <sup>c</sup> The Orange scheme includes the Blackmans Swamp Creek Scheme and the Ploughmans Creek Scheme, which is not yet completed. Numbers are for the Blackmans Swamp Creek Scheme.

*Sources:* City of Charles Sturt (nd); City of Onkaparinga (2010a; 2010b); City of Salisbury (trans., p. 246); Department for Water (2011b); DSEWPC (2010a); Orange City Council (2009a); Wong (2008); Wong, Rann and Maywald (2009).

Orange in New South Wales also harvests stormwater, through the Blackmans Swamp Creek Stormwater Harvesting Scheme and the Ploughmans Creek Stormwater Harvesting Scheme, which is currently under construction. The Blackmans Swamp Creek scheme is capable of supplying up to 40 per cent of Orange's water needs alone. It has been used to indirectly augment the city's water supply when dam levels were low. Under its emergency licence, the scheme can only be used when Orange's combined water supply is below 50 per cent. The Council has applied for a full licence for the source (New South Wales Government, sub. DR146; Nicholson 2011; Orange City Council 2009a; 2009b; 2010).

### *Rural–urban transfers*

Transfers of water from rural to urban areas have increased in recent years. Transfers can be categorised as either:

- trades — water providers purchase water, usually by purchasing allocations or entitlements, from other water providers or users
- non-price transfers — these can include administratively reallocating water among different users, indirect purchases, such as funding infrastructure upgrades in exchange for water, and borrowing water held in storage and paying it back later (PC 2008d).

---

A relatively small amount of water for agricultural use can represent a relatively large amount of water for urban users. However, there are barriers to rural–urban trade, including policy bans and other institutional barriers (chapter 5), and that many urban water systems are not connected to rural systems.

SA Water has been an active purchaser of water. In 2008-09, SA Water purchased 106 GL of temporary water for critical human needs, and 60 GL was purchased in 2009-10 (Caica 2010; Maywald 2009).

Although most rural–urban water trades involve urban water utilities, a pilot scheme in northern Victoria allowed urban water users to trade directly with rural water providers. Utilities in northern Victoria, including Coliban Water, allowed urban water users to buy temporary water (allocations) on the open market and the regional urban utility delivered it through its infrastructure (Coliban Water 2009).

One of the most substantial non-price transfers of water involves the Sugarloaf Pipeline. Completed in 2010, and costing \$750 million, this pipeline connects the Goulburn River to Sugarloaf Reservoir, and was expected to supply 75 GL of water to Melbourne each year when used, depending on its share of savings achieved under stage 1 of the Northern Victoria Irrigation Renewal Project (Victorian Government 2010a). The Victorian Government has determined the pipeline is not to be used except in the case of critical human need for water in metropolitan Melbourne (Melbourne Water 2011c).

### *Rainwater tanks and greywater recycling by households*

The number of households with a rainwater tank has increased in recent years. The ABS (2010b) found 32 per cent of Australian households surveyed in March 2010 that were suitable for a rainwater tank (for example, had ample space) had one, compared with 24 per cent in 2007. This varied greatly between states from 57 per cent in South Australia to 16 per cent in Western Australia. Regional urban and rural households were more likely to have a rainwater tank than those in capital cities. For many households in non-metropolitan areas, rainwater tanks might be their only source of supply.

Reasons for the increased installation of rainwater tanks have included government incentives, rebates and mandatory requirements, and water restrictions and conservation initiatives (discussed below). For example, of the households in Queensland that have installed a rainwater tank, 20 per cent report a government rebate or incentive was the reason, the highest of any state in Australia (ABS 2010b).

---

Greywater recycling is another source of water for Australian households, with 28 per cent of households surveyed in March 2010 reporting using it (ABS 2010b). This varies between jurisdictions, with 43 per cent of Victorian households using greywater, compared with 8 per cent in the Northern Territory.

Given the large investment in supply augmentation and the increased rainfall in many areas in the past couple of years, many areas are no longer facing a water scarcity challenge, and will not need another large supply augmentation for many years. For example, scenario analysis conducted for south-east Queensland predicted the next supply augmentation will not be needed until about the mid-2020s, depending on assumptions about population growth, climate change and consumption being maintained below 200 litres per person per day (QWC 2010b). In addition, modelling undertaken for Sydney suggests supply will not exceed demand until 2028 (O’Dea and Cooper 2008). The challenge that is now facing some places, particularly large urban areas, is how to efficiently fund and manage their varied and diversified sources of supply (chapter 5).

## **Demand management**

Along with investment in supply augmentation, many places around Australia have also undertaken demand management. Demand management refers to the modification of the level and timing of water usage through various methods. Demand management can take two main forms — price and non-price.

### *Pricing*

A summary of how prices are set in each jurisdiction is presented later in this chapter (section 2.5). This section focuses on the way pricing has been adjusted as a means of managing demand. Although prices have been used in only a limited sense to manage demand, there have been some major changes to pricing.

First, there has been a movement towards metering of water consumption. In the past, water was charged as a fixed rate on property values. With the introduction of metering, most jurisdictions have moved to consumption-based pricing, through a two-part tariff, which involves a fixed charge and one or more per unit volumetric prices. The volumetric component of the tariff has been increasing relative to the fixed component (table 2.8). The main exceptions are Melbourne, where the fixed component has been relatively low since at least the early 2000s, at about 40 per cent, and Darwin.

**Table 2.8 Fixed water and sewerage charges as a share of the total household water bill in capital cities<sup>a</sup>**

<i>Capital city</i>	<i>30 June 2001</i>	<i>30 June 2009</i>
Sydney	67	63
Melbourne – City West Water	40	41
Melbourne – South East Water	37	39
Melbourne – Yarra Valley Water	40	40
Brisbane	70	64
Adelaide	61	57
Perth	56	54
Darwin	71	76
Canberra	85	59

<sup>a</sup> Based on consumption of 200 kL.

Source: Engineers Australia (sub. 4).

Second, most jurisdictions have adopted inclining block tariffs for the structure of the volumetric component of prices (table 2.9). With inclining block tariffs, the volumetric component of water prices increases with increased usage — as more water is used and the threshold or tier is reached, the price per unit of water increases as the user moves to the higher tier of prices. Although most jurisdictions currently have inclining block tariffs, some are moving away from them. Inclining block tariffs in Sydney have recently been abandoned in favour of a single volumetric price, and the number of blocks in Perth will be reduced from six to three in coming years.

Third, the level of water prices has increased in recent years (table 2.9), due to factors including the need to pay off large supply augmentation projects, the move to full cost recovery, replacing ageing assets, maintenance catch up, and general inflationary pressures. The price increases have been relatively large in some places and this is likely to continue in coming years, with prices set to increase by as much as 20 per cent a year.

### *Non-price demand management*

Non-price measures are the most commonly used demand management tool, and include water restrictions, and water efficiency and water conservation measures. These measures can be mandatory, or encouraged on a voluntary basis.

### *Water restrictions*

Water restrictions have been used extensively in both metropolitan and regional urban areas in recent years. Water restrictions were heavily relied on during the

drought, increasing in severity as the water supply situation worsened. For example, in Sydney, voluntary low level restrictions were introduced in November 2002 when dam levels were about 70 per cent. By June 2005, when dam levels were about 40 per cent, Sydney was on mandatory level three restrictions, limiting when and how hoses could be used (Sydney Water, sub. 21).

**Table 2.9 Residential pricing structure and price path in capital cities and select large regional urban areas**

<i>Urban area</i>	<i>Tariff structure</i>	<i>Price setting period</i>	<i>Real average annual bill increase over price setting period (%)</i>
Sydney	Two-part tariff with single usage charge	2008-09 to 2011-12	7.7
Newcastle	Two-part tariff with single usage charge	2009-10 to 2012-13	6.9
Melbourne	Two-part tariff with three inclining blocks	2009-10 to 2012-13	City West Water: 10.9 South East Water: 12.1 Yarra Valley Water: 13.2
Geelong	Two-part tariff with single usage charge	2008-09 to 2012-13	7.5
Brisbane	Two-part tariff with three inclining blocks	Yearly (2011-12)	2011-12: 2.7 (nominal)
Gold Coast	Two-part tariff with three inclining blocks	Yearly (2011-12)	2011-12: 2.7 (nominal)
Adelaide	Two-part tariff, with three inclining blocks	Yearly (2011-12)	Water: 26.3 (nominal) Sewerage: 5.5 (nominal)
Perth	Two-part tariff with six <sup>a</sup> inclining blocks	2009-10 to 2011-12	Water: 10.0 <sup>b</sup> Sewerage: 2.0 <sup>b</sup>
Bunbury	Two-part tariff with five inclining blocks	2009-10 to 2012-13	Water: 17.0 <sup>a</sup> (nominal)
Hobart	Single usage charge	2009-10 to 2011-12	Capped at 10.0 (nominal)
Launceston	Two-part tariff with single usage charge (where metered)	2009-10 to 2011-12	Capped at 10.0 (nominal)
Darwin	Two-part tariff with single usage charge	2009-10 to 2011-12	20.0 (nominal)
Canberra	Two-part tariff with two inclining blocks	2009-10 to 2012-13	Water: 1.0 Sewerage: 4.8

<sup>a</sup> From 2012-13 Perth will move to 3 inclining blocks. <sup>b</sup> Economic Regulation Authority's recommendation.

Sources: Barwon Water (2011); Ben Lomond Water (2010); Bligh (2011); ERA (2009); Giddings (2011); IPART (2009b); NWC (2011b); NWC and WSAA (2010a); PWC (2010); South Australian Government (2011); WSAA (2010b; sub. 29).

Restrictions have also been used extensively in regional urban areas. For example, 61 per cent of local water utilities in New South Wales have imposed water restrictions as a result of severe drought conditions (Local Government and Shires Associations of NSW, sub. 63).

---

As a result of recent rain, the level of restrictions has been downgraded in many areas, and some have removed them altogether. However, many places, such as Sydney and Brisbane, have replaced these with permanent low level restrictions (WSAA 2010b).

### *Water efficiency and water conservation measures*

Water efficiency and water conservation measures have been used extensively in recent years to manage demand. Water efficiency measures aim to reduce water consumption, while maintaining the level of output or outcome delivered. Water conservation measures also aim for a reduction in water consumption, but might also reduce the level of output or outcome delivered (chapter 7).

Water efficiency and water conservation measures have been aimed at both households and business. Measures aimed at households have included:

- voluntary targets for individual and household water consumption, such as Victoria's *Target 155* campaign, which encouraged individuals to limit their water consumption to 155 litres per day (Victorian Government 2011)
- education and information campaigns, such as the *Water Efficiency Labelling and Standards Scheme*, which involves labelling a range of appliances with ratings on their water efficiency, to encourage households to buy more water-efficient products (Australian Government 2010b)
- mandatory and non-mandatory guidelines for water efficiency in new homes, such as New South Wales' *Building Sustainability Index* or BASIX, which aims to make new homes more efficient by reducing the amount of water and energy used (BASIX nda)
- rebates and other incentives, such as South Australia's *H<sub>2</sub>OME* rebate scheme, which provides a range of rebates for products installed in and outside the home, including shower heads and washing machines (Office for Water Security 2011).

These water use efficiency and conservation measures are likely to have been effective in reducing household consumption. The *Environmental Issues: Water Use and Conservation Survey* (ABS 2010b) found that, over the 12 months to March 2010, 80 per cent of households had taken at least one step to save water. The most common way to save water was to decrease the amount used in the garden (62 per cent of households) and in the bathroom (59 per cent).

Measures aimed at businesses have included:

- mandatory water plans, such as Victoria's waterMAP initiative, under which all non-household customers that consume more than 10 ML of water a year are

---

required to develop a water management action plan (waterMAP), demonstrating how they will use water more efficiently (Office of Water 2010)

- utilities working with businesses to save water, such as Sydney Water's *Every Drop Counts Business* program, through which Sydney Water works with businesses to help them reduce their water usage and business costs (Sydney Water nda).

According to the *Energy, Water and Environment Management, 2008-09* survey (ABS 2010a), about 22 per cent of Australian businesses reported having undertaken some type of water management practice. Of businesses employing over 200 people, about 60 per cent reported undertaking at least one water management activity.

## 2.4 Performance of the urban water sector

This section includes information on the financial and economic performance of the urban water sector, and information on employment.

### Financial performance

In its reports on the *Financial Performance of Government Trading Enterprises*, the Commission assessed the financial performance of large urban water utilities that were Government Trading Enterprises (GTEs). Over the period 2000-01 to 2006-07, the performance of the major urban water GTEs combined, as measured by operating profit before tax, improved overall. In addition, dividends paid to government also increased. However, the combined utilities' return on assets decreased over this period, from about 5.8 per cent in 2000-01 to 4.9 per cent in 2006-07 (PC 2006a; 2008b).

In this section, indicators of financial performance, including changes in real<sup>2</sup> terms in expenditure, income, profit, dividends and rates of return over the period 2005-06 to 2009-10, are presented. This information is sourced from the 2009-10 National Performance Report (NWC and WSAA 2011).

---

<sup>2</sup> Base year is 2009-10. Previous years data is adjusted using the eight-state average consumer price index for the reporting year (NWC and WSAA 2010b).

---

### *Operating expenditure*

Operating expenditure has increased in recent years, with average operating costs per property increasing for all utility groups over the period 2005-06 to 2009-10 (table 2.10). Operating costs of larger utilities have increased by a relatively greater amount than for smaller utilities. Reasons for the increasing operating costs might be the increased cost of operating new capital equipment (such as desalination plants and recycling schemes) and higher energy costs (NWC and WSAA 2011).

**Table 2.10 Average water and sewerage operating expenditure per property by utility size**

Dollars

<i>Utility size by number of connected properties</i>	<i>2005-06</i>	<i>2006-07</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>
100 000+	468	487	517	561	594
50 000 to 100 000	614	660	650	694	703
20 000 to 50 000	690	692	720	685	742
10 000 to 20 000	801	809	815	842	867

*Source:* adapted from NWC and WSAA (2011).

Average operating costs per property of smaller utilities is higher than that of larger utilities. This could be due to smaller utilities not having the same economies of scale (NWC and WSAA 2010a). These economies might come from larger utilities being able to spread fixed costs over a larger number of customers and potentially having higher operating efficiency (due to a greater capacity to attract and retain skilled staff, undertake asset management and meet health and environmental regulations). However, due to the diversity of operating environments it is difficult to tell the extent to which smaller utilities have underperformed relative to larger utilities.

### *Capital expenditure*

Capital expenditure has increased over the past few years (table 2.11). For example, capital expenditure per property for major utilities more than doubled between 2005-06 and 2009-10. The large increase in capital expenditure has been driven by the large investments in supply augmentation undertaken by most jurisdictions (NWC and WSAA 2010a). However, capital expenditure decreased between 2008-09 and 2009-10, with total capital expenditure of all reporting utilities falling from \$7.2 billion to \$6.7 billion (NWC and WSAA 2011).

As much of the planned large supply augmentations have been, or soon will be, completed, capital expenditure might decrease in coming years. For example, total

capital expenditure for Melbourne Water and the three retailer–distributors in metropolitan Melbourne is expected to decrease over the period 2009-10 to 2012-2013 from \$1.6 billion to \$540.5 million, with a large proportion of this decrease attributed to the completion of supply augmentation-related projects such as the Sugarloaf Pipeline and the tertiary upgrade of the Eastern Treatment Plant (ESC 2009b; Melbourne Water 2008a).

**Table 2.11 Average water and sewerage capital expenditure per property by utility size**

Dollars

<i>Utility size by number of connected properties</i>	<i>2005-06</i>	<i>2006-07</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>
100 000+	360	412	483	677	741
50 000 to 100 000	445	899	956	878	635
20 000 to 50 000	490	862	1 102	1 014	842
10 000 to 20 000	1 202	1 116	831	922	975

*Source:* adapted from NWC and WSAA (2011).

### *Income*

Income per property has increased over the period 2005-06 to 2009-10 (table 2.12). Income per property of utilities is generally greater for smaller utilities than for larger utilities. This could reflect higher costs due to a lack of scale economies, which is partially offset by lower levels of cost recovery by smaller utilities (discussed in chapter 13).

**Table 2.12 Average income per property by utility size**

Dollars

<i>Utility size by number of connected properties</i>	<i>2005-06</i>	<i>2006-07</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>
100 000+	1 074	1 078	1 057	1 177	1 232
50 000 to 100 000	1 178	1 160	1 216	1 175	1 301
20 000 to 50 000	1 213	1 186	1 273	1 246	1 354
10 000 to 20 000	1 252	1 348	1 369	1 373	1 418

*Source:* adapted from NWC and WSAA (2011).

### *Net profit after tax*

The net profit after tax (NPAT) of water utilities that reported in all years between 2005-06 and 2009-10 increased significantly between 2008-09 and 2009-10, after a significant decrease in previous years (table 2.13). According to the 2008-09

*National Performance Report*, the decrease in previous years was driven by a combination of reduced revenue associated with lower water usage and higher capital and operating costs (NWC and WSAA 2010a). The main driver of the increase between 2008-09 and 2009-10 was increased water prices relative to costs (NWC and WSAA 2011).

**Table 2.13 Total NPAT by group size and NPAT ratio by utility size**

<i>Utility size by number of connected properties</i>	<i>NPAT (\$ million)</i>					<i>NPAT ratio (%)<sup>a</sup></i>	
	<i>2005-06</i>	<i>2006-07</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>	<i>2008-09</i>	<i>2009-10</i>
100 000+	1 487	1 455	1 161	1 133	1 521	14	16
50 000 to 100 000	64	54	37	-2	62	-6	5
20 000 to 50 000	79	69	5	-22	49	-2	7
10 000 to 20 000	46	78	51	29	39	6	10
<b>Total</b>	<b>1 676</b>	<b>1 656</b>	<b>1 254</b>	<b>1 138</b>	<b>1 671</b>		

<sup>a</sup> NPAT ratio is calculated by dividing NPAT by income.

Source: adapted from NWC and WSAA (2011).

The average NPAT ratio (calculated by dividing NPAT by income) also increased between 2008-09 and 2009-10, which indicates profit increased by a greater amount than income.

### *Dividends*

The total dividends payable by utility size increased over the period 2007-08 to 2009-10 (table 2.14). Dividends increased by a relatively greater amount for non-major utilities compared to major utilities, where they have remained relatively steady. The dividend payout ratio (dividends payable divided by NPAT) decreased between 2007-08 and 2009-10. The number of non-major utilities paying dividends is low in comparison to major utilities. Although all but one of the major utilities had dividends payable in all three years, most of the small utilities did not pay dividends, and this number increases as the utility size gets smaller.

Of the 35 utilities with under 50 000 connections that reported on dividends, only five reported paying a dividend in 2009-10. Dividend policy is generally set by owners (State or Local Governments), and dividends payable will reflect profitability, cost recovery levels, financing capacity, accounting practices and future cash requirements. Utilities might not pay a dividend for a number of reasons, including they are not sufficiently profitable or are conserving cash for future investment. Utilities in regional urban New South Wales cannot pay a

dividend if they do not meet the *Best-Practice Management of Water Supply and Sewerage Guidelines* (Department of Water and Energy 2007).

**Table 2.14 Total dividends and average dividend payout ratio by utility size**

Utility size by number of connected properties	Total dividends (\$000)			Average dividend payout ratio (%)		
	2007-08	2008-09	2009-10	2007-08	2008-09	2009-10
100 000+	1 042 309	1 011 403	1 137 620	75.3	68.7	66.7
50 000 to 100 000	43 922	52 052	82 901	93.7	53.2	44.8
20 000 to 50 000	2 329	10 027	13 241	11.2	-25.3 <sup>a</sup>	10
10 000 to 20 000	1 359	1 075	1 404	17.4	0.3	0.5

<sup>a</sup> This number is negative due to Shoalhaven's dividend payout ratio being negative, which is a consequence of its dividend policy. The sewerage side of the business recorded a profit and paid a dividend, while the water side recorded a net loss. Therefore the sewerage dividend, divided by the combined net profit has resulted in a large negative dividend payout ratio.

Source: adapted from NWC and WSAA (2011).

### *Economic real rate of return*

The median economic real rate of return<sup>3</sup> has decreased over the period 2005-06 to 2009-10 (table 2.15). Overall, larger utilities have a higher median rate of return than smaller utilities, and all the major utilities have earned a positive rate of return. This is not the case for non-major utilities, with the range indicating that some utilities with less than 50 000 connections have been experiencing negative real rates of return. Economic real rates of return for utilities with less than 10 000 connections are not presented in the *National Performance Report*. The Commission's view of appropriate rates of return is discussed in chapters 10 and 13.

## **Economic performance**

Although important, financial indicators only give an indication of one facet of urban water utilities' performance. Therefore, judging overall performance based solely on financial indicators is somewhat misleading. This sections looks at other indicators of performance — trends in productivity and employment.

<sup>3</sup> In the National Performance Report, the economic real rate of return is calculated as revenue minus operating expenses (operation, maintenance and administrative expenses plus the current cost of depreciation) divided by the written down replacement cost of operational assets (NWC and WSAA 2010b).

**Table 2.15 Median and range of economic real rate of return by utility size**  
Per cent

<i>Utility size by number of connected properties</i>	<i>2005-06</i>	<i>2006-07</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>
100 000+	5.0 (3.0–6.0)	3.0 (1.0–6.0)	3.0 (1.0–6.0)	2.0 (1.0–10.0)	3.0 (0.0–36.0)
50 000 to 100 000	1.5 (-2.0–5.0)	1.5 (-1.0–5.0)	0.5 (-2.0–11.0)	1.0 (-1.0–7.0)	1.0 (-1.0–9.0)
20 000 to 50 000	2.5 (-1.0–11.0)	2.0 (0.0–7.0)	1.5 (0.0–9.0)	1.0 (-2.0–6.0)	1.0 (-3.0–5.0)
10 000 to 20 000	3.0 (-2.0–8.0)	1.0 (-2.0–12.0)	1.0 (-2.0–10.0)	1.0 (-2.0–6.0)	1.5 (-3.0–8.0)

Source: adapted from NWC and WSAA (2011).

### *Multifactor productivity*

The multifactor productivity (MFP)<sup>4</sup> of both the urban and rural water sectors has declined over the past decade after strong growth from the mid 1980s to the mid 1990s (figure 2.5). The decline is likely due to a number of factors, including:

- the recent drought
- the recent investment in supply augmentation
- increased water and wastewater treatment standards.

The recent drought has affected the ability of utilities to deliver water to consumers. This, as well as the demand management initiatives undertaken, reduced the output of the urban and rural water sectors, putting downward pressure on MFP (Topp and Kulys, forthcoming).

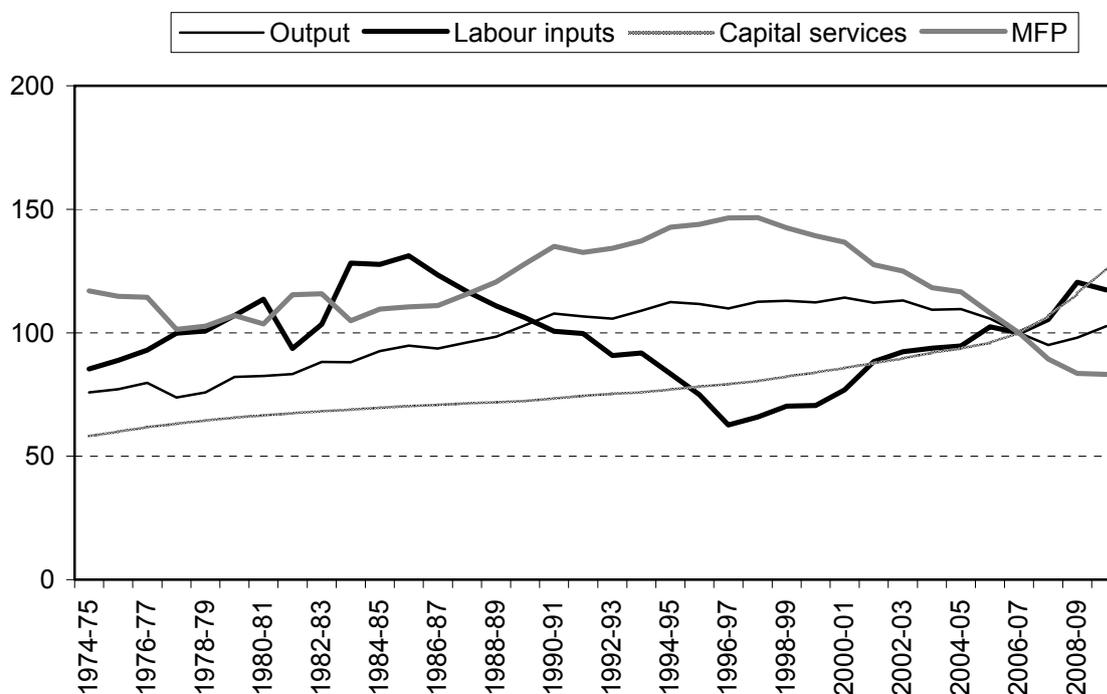
In addition, the recent investment in supply augmentation could have contributed to the decrease in productivity. As discussed earlier, much of the recent investment has been in non-traditional sources of supply such as desalination and recycling, which are more expensive than traditional sources such as dams. This has increased the long-run marginal cost of supply. As well, many of these large supply augmentation projects take significant time to build, resulting in a lag between the increase in inputs, and the corresponding increase in output (Topp and Kulys, forthcoming).

In recent years, treatment standards for water and wastewater have risen, which has likely resulted in increased labour and capital requirements, putting downward pressure on MFP (Topp and Kulys, forthcoming).

<sup>4</sup> MFP is a measure of the amount of output from a combined unit of capital and labour (Barnes 2011)

**Figure 2.5 Output, inputs and MFP in Water Supply, Sewerage and Drainage Services, 1974-75 to 2008-09<sup>a</sup>**

Index 2006-07 = 100



<sup>a</sup> This chart is sourced from a forthcoming Productivity Commission Staff Working Paper, and may be subject to revision.

Source: Topp and Kulys (forthcoming).

Topp and Kulys (forthcoming) have estimated that drought and improvements in wastewater treatment quality could potentially explain about 75 per cent of the decline in MFP since 1997-98.

### *Relative productivity of utilities*

There have been attempts to measure the relative productivity of Australian urban water utilities. For example, Woodbury and Dollery (2004) measured the relative efficiency of regional urban water utilities in New South Wales in 1999 and 2000 using data envelopment analysis<sup>5</sup> (DEA). They found there was scope to improve their relative efficiency by about 27 per cent in 1999 and 2000. They also found that total factor productivity increased only slightly over the period 1997-98 to 1999-00.

<sup>5</sup> Data envelopment analysis is a quantitative technique that combines all the input and output information of the organisation into a single measure of productive efficiency (Woodbury and Dollery (2004)).

---

Coelli and Walding (2005) measured the relative efficiency of the largest 18 water utilities in Australia over the period 1995-96 to 2003-04 using DEA. They found that the average business could have reduced inputs used by 9.6 per cent without reducing output. Total factor productivity declined by an average 1.2 per cent per year over the period. However, they emphasised their results were sensitive to the measures used, and that better quality data were needed.

Byrnes et al. (2009) examined the relative efficiency of regional urban utilities' wastewater services in New South Wales and Victoria over the period July 2000 to June 2004 using DEA. The authors found Victorian utilities of a similar size to those in New South Wales were more technically efficient. In a similar study that focused on water service provision rather than wastewater service provision (Byrnes et al 2010), they found that Victorian water utilities were 13 per cent more efficient than similarly sized New South Wales utilities. They also found that the larger Victorian utilities had relatively better managerial efficiency, and that water restrictions are likely to reduce relative efficiency.

## **Employment**

The number of people employed in the urban and rural water sectors has increased in recent years, after a large decline over the previous two decades (figure 2.6).

The decrease in employment between the mid 1980s and early 2000s could be due to efficiency improvements, such as elimination of excess staffing, rationalising of the non-core business activities, and the corporatisation of utilities (Sydney Water, sub. 21).

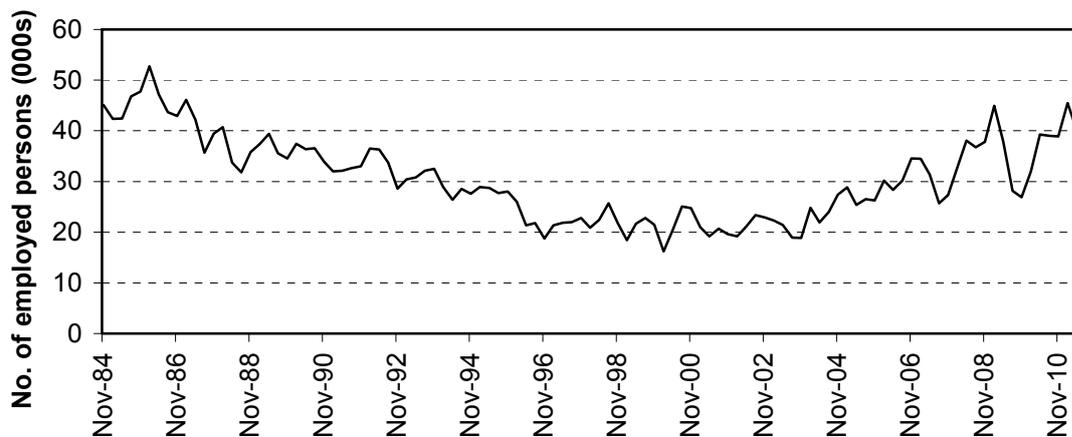
The increase in employment in the sector in recent years could be the result of increased investment in supply augmentation and maintenance and upgrades of capital equipment, requiring an increase in workers. In addition, higher standards for wastewater treatment and recycling, and the need to train replacements for pending retirees, might have increased employment levels.

Much of the employment in the water industry in recent years is in the private sector, because of increased use of outsourcing. Outsourcing is used extensively by the urban water sector with a high proportion of both capital and operating expenditure being outsourced. For example, the Melbourne retailer–distributors outsource close to 100 per cent of their capital expenditure (WSAA, sub. 29).

The employment data presented above are sourced from the ABS Labour Force Survey. There are classification issues with this survey which might result in the number of employees being under or overstated. For example, under the ANZSCO

classifications used in the Labour Force Survey, Wastewater Operators are classified as Machine Fitters (WSAA, trans., p. 685). In addition, the data are for both the urban and rural water industries. The Commission is unaware of what share each makes up of total employment.

**Figure 2.6 Number of persons employed full time in water supply, sewerage and drainage services**  
November 1984 to May 2011



Source: ABS (2011b).

There is currently a skills shortage in the urban water industry, which is expected to worsen over the coming years (for example, WSAA 2008 cited in Armstrong and Gellatly 2008). More information on this can be found in chapter 13.

## 2.5 Structural, institutional, governance and regulatory arrangements

The urban water sector's administrative arrangements vary by jurisdiction and within jurisdictions, particularly between metropolitan and regional urban areas. The structural, institutional, governance and regulatory arrangements of Australia's urban water sector are discussed in this section. Appendix B provides more detail on the arrangements for each jurisdiction.

### Ownership and structure of the supply chain

The structure of the urban water industry varies across states, and between metropolitan and regional urban areas (table 2.16). Traditionally, urban water and wastewater services have been supplied by vertically-integrated government-owned

---

monopolies. This remains the case in South Australia<sup>6</sup>, Western Australia<sup>7</sup>, the Northern Territory and the ACT, where utilities are also jurisdiction-wide. Stormwater services have traditionally been provided by a combination of local councils and water utilities.

Significant structural and ownership reform has taken place in recent years in some jurisdictions, which has changed the urban water supply structure. Since the 1990s, most metropolitan utilities have been corporatised, as have utilities in regional urban areas of Victoria and Tasmania. In the metropolitan areas of Sydney, Melbourne and south-east Queensland, structural reform has led to vertical separation of the bulk supply and retail–distribution functions of the supply chain.

In Sydney, the Sydney Catchment Authority is responsible for bulk water supply (except the desalination plant), and delivery of bulk water to treatment plants. Sydney Water is responsible for the water (and wastewater) treatment, and the transmission, distribution and retail functions of water and wastewater. A subsidiary of Sydney Water, Sydney Desalination Pty Ltd, owns the Kurnell desalination plant (New South Wales Government, sub. 65; Sydney Water, sub. 21).

Melbourne has one bulk supplier, Melbourne Water — which is also responsible for the transmission network — and three retailer–distributors, City West Water, South East Water and Yarra Valley Water, which each service a different area of Melbourne. The operation of the Wonthaggi desalination plant has been contracted out to a private company (Office of Water 2011).

In south-east Queensland, Seqwater is responsible for bulk water supplies, while a separate entity Linkwater owns all the major pipelines. The South-east Queensland water grid manager operates the newly constructed water grid. Three Local Government-owned retailer–distributors, Allconnex Water, Queensland Urban Utilities and Unity Water, serve different areas of south-east Queensland (Department of Environment and Resource Management (Qld), sub. 60). In 2011, the Queensland Government repealed sections of the legislation establishing the retailer-distributors, allowing Local Governments to return to the previous structure of Local Government directly providing services if they wish (Bligh 2011). Gold Coast City Council voted to leave Allconnex Water in July 2011 and intends to go back to providing water and wastewater services directly (Kippen 2011).

---

<sup>6</sup> Except for some small Local Government suppliers such as Coober Pedy.

<sup>7</sup> Except for the areas Bunbury, Busselton, Dampier, Paraburdoo and Tom Price, and some other small Local Government areas.

**Table 2.16 Urban water supply and service arrangements**

<i>Jurisdiction</i>	<i>Bulk supply</i>	<i>Water retail</i>	<i>Wastewater retail</i>	<i>Stormwater</i>
New South Wales	Sydney Catchment Authority Sydney Desalination Pty Ltd (subsidiary of Sydney Water) State Water Corporation	Sydney Water Hunter Water Gosford Wyong Joint Water Authority 105 local water utilities	Sydney Water Hunter Water Gosford Wyong Joint Water Authority 105 Local water utilities	Sydney Water Hunter Water Gosford Wyong Joint Water Authority Local Governments
Victoria	Melbourne Water 13 regional urban water utilities	Yarra Valley Water South East Water City West Water 13 regional urban water businesses	Yarra Valley Water South East Water City West Water 13 regional urban water businesses	Melbourne Water Local Governments
Queensland	Seqwater Sun Water Local Government-owned providers SA Water	Queensland Urban Utilities Allconnex Water Unitywater 71 local water utilities SA Water Small Local Government providers	Queensland Urban Utilities Allconnex Water Unitywater 71 local water utilities SA Water Small Local Government providers	73 Local Governments Local Governments Natural Resource Management Boards
Western Australia	Water Corporation Busselton Water Aqwest Water (Bunbury) Local Government providers	Water Corporation Busselton Water Aqwest Water (Bunbury) Hamersley Iron Pty Ltd <sup>a</sup>	Water Corporation Hamersley Iron Pty Ltd Some Local Government providers	Water Corporation Local Governments
Tasmania	Southern Water Ben Lomond Water Cradle Mountain Water	Southern Water Ben Lomond Water Cradle Mountain Water	Southern Water Ben Lomond Water Cradle Mountain Water	8 Local Government – Drainage Trusts
Northern Territory	Power and Water Corporation	Power and Water Corporation	Power and Water Corporation	Department of Lands and Planning Local Governments
ACT	ACTEW	ACTEW	ACTEW	Roads ACT

<sup>a</sup> Hamersley Iron Pty Ltd is a private company that provides water and wastewater services to Dampier, Paraburdoo and Tom Price.

Sources: Department of Water (WA) (sub. DR122); NWC (2009b); PWC (2010); Queensland Water Directorate (sub. DR138); QWC (2010b); Sydney Water (sub. 21).

---

The private sector is becoming increasingly involved in urban water supply. For example, the provision of water and wastewater services, including operations, maintenance and project management and procurement, to Adelaide is contracted out to two private entities (SA Water 2011d). In the ACT, ACTEW outsources operation and maintenance of the water and wastewater network to ActewAGL (ACTEW Corporation, trans., p. 81). In Sydney, among other places, treatment plants are owned and operated by private companies (New South Wales Government, sub. 65). Many of the large desalination plants around Australia are built and managed by private businesses in partnership with government.

In regional urban areas, the level of government ownership of utilities varies. Regional urban utilities in Queensland, New South Wales and Tasmania are mostly Local Government-owned, and regional urban utilities in Victoria are State Government-owned. Although likely not as prevalent as in metropolitan areas, there is private sector involvement in regional urban areas, such as in the construction and/or operation of treatment plants (Shoalhaven City Council, sub. 15; Wagga Wagga City Council, sub. 54).

Regional urban areas in Victoria, Queensland and Tasmania have also undergone structural reform. In the 1990s, Victoria amalgamated over 140 Local Government-owned utilities into 15 State Government-owned vertically-integrated utilities. This number was further reduced to 13 (Armstrong and Gellatly 2008). Regional urban Queensland underwent reform in 2008, when the number of local councils was reduced through amalgamations from 157 to 73. As a result, the number of regional urban water suppliers was reduced to 71 (DERM, sub. 60). Tasmania has moved away from three Local Government-owned bulk suppliers and local councils providing water beyond the bulk supply point, to three Local Government-owned vertically-integrated water utilities, Southern Water, Ben Lomond Water and Cradle Mountain Water.

As can be seen in table 2.16, there is a large difference in the number of utilities servicing jurisdictions. For example, although the Northern Territory has only one metropolitan and regional urban utility (Power and Water Corporation), New South Wales has over 100 utilities, most Local Government-owned and operated.

## **Institutions and governance**

Apart from the providers of water, many institutions govern and oversee the water sector. These include:

- 
- Australian Government institutions, which seek to influence policy development and reform, and protect matters of national environmental significance
  - State and Territory Governments, which oversee the water industry in their respective jurisdictions and are responsible for policy, planning and sometimes regulatory functions
  - regulators (discussed below).

### *Council of Australian Governments*

The Council of Australian Governments (COAG) has been involved in water reform over the past couple of decades through a number of agreements, including the 1994 COAG water reform framework, 1995 National Competition Policy, the 2004 National Water Initiative (NWI), and the 2008 enhanced urban water reform framework (chapter 1).

In 2004, COAG agreed to the NWI. The NWI builds on the 1994 agreement and National Competition Policy, and is intended to ‘extend the reform agenda to more fully realise the benefits intended by COAG in 1994’ (COAG 2004, p. 1). It has actions and outcomes for reforming both the urban and rural water sectors. The outcomes related to urban water reform are outlined in box 2.4.

#### **Box 2.4 National Water Initiative — urban water reform outcomes**

The Parties agree that the outcome for urban water reform is to:

- i) provide healthy, safe and reliable water supplies
- ii) increase water use efficiency in domestic and commercial settings
- iii) encourage the re-use and recycling of wastewater where cost effective
- iv) facilitate water trading between and within the urban and rural sectors
- v) encourage innovation in water supply sourcing, treatment, storage and discharge
- vi) achieve improved pricing for *metropolitan* water [consistent with earlier paragraphs].

*Source:* COAG (2004, p. 19).

In 2008, COAG agreed to an enhanced urban water reform framework to improve the security of urban water, due to slow reform progress and the NWI not being seen to include enough on urban water reform.

---

## *Australian Government*

The Australian Government plays a role in overseeing and encouraging reform of the urban water sector. The Australian Government takes the lead on many policy initiatives, including *Water for the Future*, where the Government is investing \$12.9 billion over ten years to address four priority areas:

- Taking action on climate change.
- Using water wisely.
- Securing water supplies.
- Supporting healthy rivers and waterways (NWC 2009b).

The Australian Government also funds and coordinates other programs including the *Water Efficiency and Labelling Scheme*, and has helped to fund some large infrastructure projects, including the Adelaide desalination plant, through subsidy programs such as the National Urban Water and Desalination Plan and the National Water Security Program for Cities and Towns (DSEWPC 2010b). The Commonwealth Department of Sustainability, Environment, Water, Population and Communities is responsible for coordinating most of the Australian Government's water initiatives. In addition to these water specific initiatives, a number of other water-related projects, such as small stormwater harvesting projects, have been funded out of general grants programs such as the Regional and Local Community Infrastructure Program (Australian Government 2009a).

The Australian Government oversees the National Water Quality Management Strategy, which provides a national approach to improving water quality in waterways. Under this strategy Australian Government agencies have developed the Australian Drinking Water Guidelines and the Australian Guidelines on Water Recycling (box 2.1) (DSEWPC 2011c). The Australian Government administers the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act), which protects matters of national environmental significance and was the legislation that prevented the construction of Traveston Dam.

## *National Water Commission*

The National Water Commission is an Australian Government body established in 2004 to drive reform under the NWI. It is responsible for advising COAG and the Australian Government on national water issues and progress under the NWI. It undertakes biennial assessments of progress made under the NWI and publishes position statements on water reform issues (NWC 2011a).

---

## State and Territory Governments

The overall governance of the water sector in each jurisdiction is usually undertaken by State and Territory Government departments. Table 2.17 lists the key government departments in each jurisdiction. These departments are generally responsible for the policy, planning and management, and sometimes regulation, of the water sector in their respective jurisdiction. Their responsibilities vary from jurisdiction to jurisdiction, but overall are quite similar. For example, the urban water planning and management activities undertaken by the New South Wales Office of Water are representative of many of the functions undertaken by the equivalent departments in other states and territories (New South Wales Government, sub. 65):

- determining allocation volumes
- developing statutory water sharing plans
- negotiating interstate and national water agreements
- approving the extraction and use of water
- policies and procedures for water trading
- coordinating metropolitan and regional urban water policy
- monitoring the quantity, quality and health of water sources and extractions.

**Table 2.17 Key State and Territory Government departments involved in metropolitan water planning and management**

<i>Jurisdiction</i>	<i>Department</i>	<i>Examples of key plans and policy documents</i>
New South Wales	Department of Primary Industries (NSW Office of Water)	Metropolitan Water Plan
Victoria	Department of Sustainability and Environment (Office of Water)	Our Water Our Future 2004 Next stage of the plan 2007
Queensland	Department of Environment and Resource Management	South East Queensland Water Strategy 2010
South Australia	Department for Water	Water for Good 2009
Western Australia	Department of Water	
Tasmania	Department of Primary Industries, Parks, Water and Environment	
Northern Territory	Department of Natural Resources, Environment, The Arts and Sport	
ACT	Department of Territory and Municipal Services (Office of Sustainability: Water Policy Unit)	Think Water, Act Water – a strategy for sustainable water resource management

Source: NWC (2009b).

---

Other entities often involved in water planning and management include water utilities and economic regulators (discussed below). Usually more than one state or territory department is involved in the urban water sector in each jurisdiction, such as:

- health departments, which are usually in charge of drinking water and recycled water management and regulation
- environmental protection authorities, which are often involved in environmental regulation related to water
- treasury departments, which are often involved in budgets, Community Service Obligations, borrowing controls and dividend policy
- the ministers themselves, which are sometimes responsible for setting water prices and other key decisions.

## **Regulatory arrangements**

The urban water sector's regulatory arrangements vary considerably by jurisdiction. The main regulatory arrangements are discussed in this section, including economic, health and environmental regulation.

### *Economic regulation*

Economic regulation of the water sector generally refers to three main areas — pricing, third party access and licensing.

### *Pricing*

Approaches to water pricing vary greatly by jurisdiction, including who sets prices (box 2.5), how prices are set, how widely they are applied and how long they are applied for.

Prices are generally set by independent economic regulators (in metropolitan New South Wales, Victoria and the ACT), or State or Local Governments. Corporatised utilities rarely determine the prices of their services. Where prices are set by either the State Government or independent regulators, prices are generally set for a period of 3 to 4 years (table 2.9). The independent economic regulators set prices through a transparent process, which can include calling for submissions and draft and final price determinations. Independent economic regulators set prices to recover costs, including a return on capital. In recent price determinations, a rate of return of about 5 to 7.5 per cent has been set (PWC 2010).

---

### Box 2.5 **Who sets water prices?**

New South Wales — the Independent Pricing and Regulatory Tribunal sets urban water prices in Sydney, the Hunter, Gosford, Wyong and Broken Hill. Non-metropolitan local water utilities set their own prices.

Victoria — the Essential Services Commission sets water prices Victoria-wide.

Queensland — in south-east Queensland, the State Government sets bulk water prices and the three retailer–distributors set retail prices. However, recently the State Government has capped increases in retail prices. From 2013, it has been proposed that the Queensland Competition Authority will set prices in south-east Queensland, however, arrangements have not been finalised.

South Australia — the South Australian Cabinet currently sets urban water prices. The Essential Services Commission of South Australia will set prices for July 2013 onwards.

Western Australia — the Minister for Water sets urban water prices after receiving advice from the Economic Regulation Authority.

Tasmania — the three Local Government-owned water corporations set urban retail water prices. The State Government has capped increases in retail prices until the Office of the Tasmanian Economic Regulator becomes responsible for pricing from July 2012.

Northern Territory — the Treasurer sets prices Northern Territory-wide.

ACT — the Independent Competition and Regulatory Commission set water prices.

*Sources:* Department of Water (WA) (sub. DR122); Giddings (2011); NWC (2009b); OTTER (2010b); QCA (2010b); Queensland Government (sub. DR167); QWC (2010a); South Australian Government (sub. 52).

Where governments set prices, the economic regulator often still plays some role in price setting. For example, in South Australia, the Essential Services Commission of South Australia reviews price setting policies, and in Western Australia, the Economic Regulation Authority makes price recommendations to the Western Australian Government.

In regional urban areas of New South Wales and Queensland, prices are set by the water utilities themselves, according to guidelines issued by the New South Wales Office of Water and the Queensland Competition Authority (NSW Office of Water 2010d; QCA 2009). More information on pricing is presented in chapter 6.

#### *Third party access arrangements*

Third party access involves a party other than the incumbent service provider accessing natural monopoly-type infrastructure to provide services. Arrangements

---

exist under the National Access Regime in Part IIIA of the *Competition and Consumer Act 2010* (Cwlth) (formerly the Trade Practices Act) to enable access when the owner of the infrastructure will not provide it on acceptable terms and conditions. Access to water infrastructure can be sought through this regime. For access to be granted, however, the service first needs to be declared by the National Competition Council. To be declared the service needs to be, among other things, of national significance. This could make it difficult for the private sector to get access to infrastructure in smaller areas (National Competition Council, sub. 12).

There have been two applications for the declaration of water services under the National Access Regime, both in New South Wales, one of which was successful. The declaration in this case was sought by Services Sydney Pty Ltd (box 2.6).

**Box 2.6 Services Sydney case for declaration of water services**

In March 2004, Services Sydney Pty Ltd applied to the National Competition Council for a recommendation of declaration of some services provided by Sydney Water's sewerage distribution network. Services Sydney intended to provide wastewater collection services using Sydney Water's network to help transport the wastewater, then recycle it and supply the recycled water for non-potable use.

In December 2004, the National Competition Council recommended to the Premier of New South Wales that six sewage interconnection and transportation services provided by Sydney Water be declared for a period of 50 years. The Premier was deemed to have decided not to declare the services, as after 60 days of receiving the National Competition Council's recommendation the Premier had not published a decision.

Services Sydney sought review of the Premier's deemed decision by the Australian Competition Tribunal, and in December 2005 the tribunal handed down its decision to set aside the Premier's deemed decision and to declare the services for a period of 50 years.

*Source:* National Competition Council (sub. 12).

Some states have implemented, or are considering implementing, state-based third party access regimes for water. New South Wales has introduced its own third party access regime through the *Water Industry Competition Act 2006*. This regime allows the private sector to access publicly-owned infrastructure in the areas of operation of Sydney Water and Hunter Water (IPART 2008c).

Queensland has a third party access regime that applies to water and other utilities and transport infrastructure, under the *Queensland Competition Authority Act 1997*. Third party access arrangements for water are being considered in Victoria and South Australia (South Australian Government, sub. 79; ESC 2009a).

---

## *Licensing*

Most water and wastewater service providers are required to hold licenses. This includes water utilities in most jurisdictions and, in some places, such as metropolitan Sydney, private providers of stand-alone systems (such as new residential developments with a third pipe system). Licenses generally set out the conditions under which the service provider can operate, and the requirements they must meet. Requirements can include standards of service, obligations to serve a certain area, ways of dealing with customer complaints and reporting requirements.

In most jurisdictions, the economic regulator has a role in licensing, including administering licences and monitoring the performance of license holders.

## *Environment and health regulation*

Environment and health regulation is undertaken by State and Territory Governments. Entities involved include health departments, which are often involved in regulating drinking water and recycled water quality, and environment departments and environmental protection authorities, which often regulate activities relating to environmental health, such as wastewater discharge to the environment, and the amount of water that can be extracted from environmentally sensitive sources. Regulation will often include setting minimum standards and requirements, and monitoring and publishing compliance with requirements. In some jurisdictions, utilities require specific licences from these government bodies. Regulatory processes and requirements, particularly those related to recycled water, can vary between jurisdictions.

The Australian Government also plays a role in environment and health regulation. For example, the Department of Sustainability, Environment, Water, Population and Communities administers the EPBC Act. The Act provides a legal framework for protecting and managing matters of national environmental significance, including important flora, fauna, ecological communities and heritage places.

Australian Government entities, the National Health and Medical Research Council and the Natural Resource Management Ministerial Council have developed the Australian Drinking Water Guidelines, which are used to form the basis for drinking water safety and quality in most metropolitan and regional urban areas. In addition, these entities along with the Environmental Protection and Heritage Council have developed the Australian Guidelines for Water Recycling, which support a nationally consistent approach to recycling (box 2.1) (SA Health, sub. DR117).

---

## 3 Objectives for the urban water sector

### Key points

- Governments should set an overarching objective for the urban water sector of delivering water, wastewater and stormwater services in an economically efficient manner so as to maximise net benefits to the community.
- The concept of maximising net benefits to the community encapsulates most of the more specific objectives that should be pursued in the urban water sector, including those related to water security, public health, flood mitigation and the environment. It can also be used, through the application of a number of quantitative and qualitative techniques, to guide the tradeoffs that need to be made between these objectives, as required by ecologically sustainable development principles.
- Universal and affordable access to water and wastewater services should be a government objective for both efficiency and equity reasons. The urban water sector can contribute to this objective by ensuring that service delivery costs are no higher than necessary. Beyond this, ensuring access to affordable water services for low-income households is generally best addressed through measures that are outside the urban water sector, such as the social security and taxation systems.
- Contributing to good public health outcomes remains an important objective for the urban water sector.
- In most cases, environmental policy should determine the weight given to environmental impacts associated with the urban water sector. It is the role of water utilities to respond to the constraints and incentives created by policy in ways that impose the lowest cost on consumers.
- Consumers are usually best placed to make their own water use decisions. A water use that one person might regard as being of low value, might be of high value to someone else. Concepts of 'wasteful' or 'inappropriate' water use should be avoided.
- Increasing water use efficiency, water conservation and recycling are not appropriate objectives in their own right because in some circumstances this reduces overall benefits to the community.

Without clear objectives for the urban water sector the case for reform cannot be assessed or reform options designed. Ultimately, the purpose of reform is to deliver benefits to the community by more fully meeting objectives. This chapter examines

---

possible objectives for the sector and reaches conclusions about their merits and about how tradeoffs between objectives should be made.

The urban water sector is taken to include the delivery of the following services for urban areas:

- planning, procuring and supplying water of appropriate quality to households, businesses and other consumers (for example, hospitals)
- supplying water for amenity and environmental purposes within urban areas
- collecting, treating and disposing of wastewater
- managing stormwater for flood mitigation and other purposes.

The sector also includes sector-specific regulation (including of prices, supply reliability standards and water quality standards) and urban water policy (for example, programs that promote water use efficiency).

Outcomes for the sector also depend on a range of outside influences. For example:

- affordability of water for low-income households depends not only on water prices, but on the social security and taxation systems, and general economic conditions
- the ability of the sector to supply water and to dispose of wastewater and stormwater is affected by general environment policy.

An important aspect of this chapter, therefore, is to consider what objectives are best met by decisions taken within the urban water sector and what objectives should be left to other spheres of policy.

### **3.1 What objectives?**

A range of possible objectives for the urban water sector put forward by inquiry participants and other commentators is considered below.

#### **Water security and reliability**

Water security can be defined as ensuring that water users have continual access to supplies of suitable quality water. High variability in rainfall and inflows to rivers have long been a major challenge to managing water security in Australia. Extremely low inflows occurred over most of the last decade in parts of Australia, and there are prospects that climate change may reduce river and dam inflows, and/or increase their variability, into the future.

---

There are three main types of actions that can be taken to increase water security. These are:

- investing in supply augmentations that add to available water supplies (for example, building wastewater recycling plants, desalination plants or dams)
- developing options that allow extra water to be made available at short notice if needed (for example, planning and obtaining regulatory approvals for an investment in water supply infrastructure, or entering into options contracts to buy irrigation water)
- reducing water consumption through demand management activities so that more water is available to meet future needs (for example, increasing prices when water is relatively scarce, water restrictions or campaigns appealing to the community to conserve water).

Complete failure to maintain water security could result in there being no water for the reticulated water supply system. If this eventuated in a small community the situation might be able to be managed by bringing in water by road, rail or ship. These options, however, would be profoundly difficult for larger towns and cities and so such a situation should be avoided at virtually any cost. Less catastrophic failure to properly manage water security involves the community incurring costs that are higher than necessary to have continual access to water.

There are two main types of costs involved. First, the costs of building, maintaining and operating water supply infrastructure (including the environmental costs associated with this). Second, the loss of benefit experienced by water users when they curtail their water use in response to prices and/or restrictions.

Achieving water security at lowest expected cost should be an objective for the sector. This does not imply that any particular mix of the above types of actions should be used, as each has its own costs and benefits. For example, demand management activities often do not require large capital investments (a relative benefit) but they do entail people forgoing using water in ways that may have benefited them (a cost). The approach taken, therefore, should be governed by the costs and benefits of different options. Consumers' willingness to pay for water, and their attitude to risk, should play a central role in assessing options (box 3.1).

This way of understanding water security is different from the 'supply-focused' perspective that is sometimes taken. Under a supply-focused approach it is predominantly supply augmentations (sometimes in concert with water efficiency/conservation measures) that are seen as increasing water security, with water restrictions used as a 'backstop' measure when augmentations have failed to achieve the required level of supply.

### Box 3.1 **Achieving water security at lowest expected cost with and without risk aversion**

Strictly speaking, achieving water security *at lowest cost* would involve making decisions about supply augmentation and demand management that perfectly match subsequent patterns of rainfall and inflows. So for example, not building a desalination plant if subsequent years are going to be wet. Achieving this with certainty is clearly infeasible as it requires knowledge of the future that is unobtainable (at least with present weather forecasting technology). Setting the objective of achieving water security *at lowest expected cost* is done in recognition of the inherent uncertainty surrounding decision making.

The following stylised example illustrates the concept of achieving water security at lowest expected cost. Suppose a decision must be made about whether to proceed with a supply augmentation and there is uncertainty about future rainfall. Assume that:

- there are five possible future rainfall scenarios; the three central ones each have a probability of just below one-third and the two extreme scenarios each have probabilities of only 2 per cent
- regardless of the augmentation decision or the rainfall scenario, water security will be maintained — in the drier scenarios this will be achieved by progressively increasing water prices
- there will be a positive payoff to the community from proceeding with the investment under the drier scenarios and a negative payoff for the others (see table below).

<i>Scenario</i>	<i>Probability (%)</i>	<i>Augmentation payoff (\$ mil)</i>
Extreme wet	2	-120
Wet	32	-70
Average	32	-10
Dry	32	+50
Extreme dry	2	+100
Expected payoff		-10

Taking the probability of each scenario into account, the expected payoff of the augmentation is negative (the expected payoff is calculated by summing the probability times the payoff for each scenario). Accordingly, if a lowest expected cost approach to water security is taken, and there is no risk aversion, a decision would be made not to proceed with the augmentation.

If there is risk aversion, however, this could change the decision. Suppose for example, that the water users were presented with the above information and they each had strong concerns about the high water prices that would result if the augmentation were not built and the ‘extreme dry’ scenario eventuated. It might be that in aggregate they would be prepared to pay say \$12 million to avoid this risk and be assured of more stable water prices. Taking this risk aversion into account, a lowest expected cost approach to water security would require a decision to proceed with the augmentation.

---

A distinction is sometimes made between water security and service reliability. Where this is done, the former relates to having enough water, while the latter is about being able to deliver water services to customers. As such, a reliability objective focuses attention on the infrastructure and operations needed to deliver services to customers. Reliability is important for both water and wastewater services.

### **Controlling costs**

More broadly, ensuring that the cost of supplying water, wastewater and stormwater services is not higher than necessary is an important objective for the urban water sector. Achieving this requires that:

- whatever level of service that is provided is supplied at the lowest possible expected cost (for example, using low-cost sources of water in preference to higher-cost sources, other things being equal)
- the level of service provided is not higher than can be justified by the value consumers place on the service (for example, treatment processes to improve the appearance or taste of water should be undertaken only where the benefits to customers (as measured by their willingness to pay for improvements) exceed the costs).

### **Universal and affordable access**

Water provision and wastewater removal are essential services and are important for public health. Because of this, a number of inquiry participants argued that universal and affordable access to these services should be an important government objective. For example, the Public Interest Advocacy Centre canvassed Australia's human rights obligations to ensure that everyone has access to water and concluded:

In practical terms, [Australia's obligations to protect, promote and fulfil human rights] ... means that the Australian Government must ensure that all households are able to afford to purchase an appropriate quantity and quality of water. (sub. 61, p. 3)

The Commission agrees that universal and affordable access to water and wastewater services should be a government objective. This does not mean, however, that the government should always take responsibility for providing these services. For example, where someone chooses to build a house in a location that would be most efficiently served by distributed systems, such as a rainwater tank and a septic system, they should generally provide these themselves. Whether this is affordable for them is something they would take into account when deciding whether to build in that location.

---

One way that the urban water sector can pursue this objective is through controlling costs, as discussed above. This has the potential to keep costs down for the entire community, including low-income and disadvantaged groups. A variety of other possible means focus more on achieving what some might consider to be a more equitable distribution of costs across different groups. These include:

- using a pricing structure that includes an initial allocation of water at a low volumetric price, possibly zero
- uniform (or ‘postage stamp’) pricing across regions
- using water restrictions and other non-price demand management measures in lieu of higher prices during times of high water scarcity.

Governments also seek to assist particular groups, such as the unemployed and others on low incomes, through means outside the urban water sector. These means include: progressive rates of income tax; social security payments; providing concessions on some goods and services (including water); and consumer protection laws.

There is a question, therefore, about what is the best mix of means for pursuing the objective of universal and affordable access to water and wastewater services. It is certainly the case that governments should ensure that the cost of supplying water and wastewater services is not higher than necessary for the community as a whole. Beyond this, there would seem to be advantages in using methods that are outside the urban water sector, rather than distorting water prices away from their efficient level.

For example, providing financial assistance, such as social security payments, allows people to spend this money in the way that they consider will benefit them most. As such, they are a more flexible form of assistance than can be provided through water pricing.

In certain circumstances, however, there may be arguments in favour of using pricing and other arrangements in the urban water sector to influence affordability and access (for example, for remote communities, including Indigenous communities). Chapter 8 considers these arguments.

## **Public health**

Access to clean water for drinking and washing, and reliable wastewater services are vital for public health. Indeed, the history of government involvement in urban water supply systems is very much tied up with public health concerns. Improvements in the standard of urban water and wastewater systems during the

---

nineteenth and the first half of the twentieth century played a major role in reducing the prevalence of diseases such as typhoid and cholera in various countries (Barzilay, Weinberg and Eley 1999).

While gains in public health made in the distant past are often taken for granted in developed countries such as Australia, contributing to good public health outcomes remains an important objective for the urban water sector. Achieving this objective involves managing risks to public health, for example, the risk that people will get sick from ingesting water that contains microbial and/or chemical hazards.

The National Water Commission reported:

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. (NWC 2011c, p. 32)

There is, however, evidence that health risks are not always well managed in some regional areas (chapter 5). More broadly, the diversification of water supply sources, particularly increased water recycling, is making the management of health risks more complex.

Managing health risks efficiently does not usually involve eliminating all risks entirely. Consider a situation where there are large benefits available from developing a fit-for-purpose recycled water product for garden watering, toilet flushing and other uses. A risk eliminating approach might specify that the quality of such water needs to be comparable to that of potable water on the grounds that a small number of people might drink it. Such a requirement might make the project uneconomic, meaning that a large benefit is lost in order to eliminate what may have been a very small risk.

## **Environmental protection, sustainability and amenity**

A range of environmental issues relate to urban water and the question of objectives needs to be considered for each.

### *Allocating water between urban and environmental uses*

Water can either be allocated for consumptive use (in agricultural production or urban areas) or environmental use. Irrigators and urban water users benefit from the use of water and can express this in their willingness to pay for it. By contrast, the benefits that occur from environmental use, such as maintenance of the health of water-dependent ecosystems, often accrue to the community as a whole (that is,

---

they are said to be ‘public goods’). While some individuals put money towards environmental watering (for example, through donations to organisations such as Healthy Rivers Australia and the Australian Conservation Foundation), such private provision is likely to understate the value people put on environmental outcomes, given this public good aspect.

Because of this, governments have a role in allocating water to the environment in a way that reflects judgments about the value of water for environmental use relative to consumptive use. The National Water Initiative recognises this role and stipulates that it be pursued through water planning (box 3.2). This water planning function is part of broader water policy, rather than being strictly an urban water policy function. Accordingly, environmental water allocations should be largely determined outside the urban water sector. Therefore, striking the right balance between consumptive and environmental uses of water is not an objective that should be set for the urban water sector. The urban water sector’s role in this process should be to:

- provide information on the value of water for urban use to the planning process that determines this balance
- operate effectively and efficiently within the constraints imposed by the environmental water allocations that are set.

### **Box 3.2 National Water Initiative: allocating water between consumptive and environmental uses**

The National Water Initiative includes the following paragraphs relating to the allocation of water between consumptive and environmental uses:

36. Recognising that settling the trade-offs between competing outcomes for water systems will involve judgements informed by best available science, socio-economic analysis and community input, statutory water plans will be prepared for surface water and groundwater management units in which entitlements are issued ... . Water planning is an important mechanism to assist governments and the community to determine water management and allocation decisions to meet productive, environmental and social objectives.

37. Broadly, water planning by States and Territories will provide for:

- i) secure ecological outcomes by describing the environmental and other public benefit outcomes for water systems and defining the appropriate water management arrangements to achieve those outcomes; and
- ii) resource security outcomes by determining the shares in the consumptive pool and the rules to allocate water during the life of the plan.

*Source:* COAG (2004, p. 7).

---

### *Environmental services and amenity from water in the urban landscape*

Water contributes to people's enjoyment of urban landscapes in many ways. Green gardens (public and private), parks, playing fields, and urban waterways and wetlands can contribute significantly to urban amenity. The urban water sector can influence these types of outcomes through management of the water supply and wastewater systems, and through management of stormwater. For example, by implementing stormwater reuse projects that supply water to irrigate public parks or using urban wetlands to help filter stormwater.

In the Commission's view, the urban water sector has an important role to play in finding innovative ways to deliver water services that enhance environmental services and amenity in urban landscapes. It does not, however, regard the sector as always being in the best position to determine what outcomes should be pursued. Maintaining environmentally healthy urban waterways is a legitimate objective for stormwater management. When it comes to land-based outcomes, however, whoever is responsible for managing the land in question will normally be best placed to take responsibility. Depending on the circumstance, this could be Local Governments, park managers, State Government environment departments or residential gardeners. Accordingly, the role for the urban water sector is to be an efficient, cooperative and innovative supplier of fit-for-purpose water products to meet these outdoor watering demands.

### *Environmental impacts associated with water supply options*

Different water supply options can have different environmental impacts, both negative and positive. For example:

- dam construction can result in the loss of valued ecosystems and impairment of ecological processes
- desalination plants use electricity that may be sourced from generators that emit greenhouse gases
- stormwater recycling may reduce the level of pollutants reaching waterways.

In some cases, the option that is best from a financial perspective will also be the best environmentally. However, this will not always be the case and so it is important that differences in environmental performance are taken into account in supply augmentation decisions. The option that is lowest cost after environmental values are factored in should be chosen.

In general, environmental policy should determine the weight that should be given to particular environmental impacts associated with water supply options and

---

possibly what economic value should be placed on these (such as establishing a price for greenhouse gas emissions). This is because the same or similar environmental impacts arise in other contexts and it is desirable that they are dealt with consistently across all sectors. For example, there are benefits in taking a consistent approach to reducing greenhouse gas emissions, as outlined in box 3.3. The role of the urban water sector should be to respond effectively and efficiently to the regulations and incentives provided through environmental policy.

**Box 3.3 Advantages of taking an economywide approach to reducing greenhouse gas emissions**

Human-induced climate change is a global problem that can only be effectively mitigated by many countries reducing their greenhouse gas emissions. The Australian Government has set a target of reducing emissions by 5 per cent by 2020 (relative to the year 2000) and has agreed to make bigger cuts, conditional on the commitments made by other countries.

There is a wide range of policy instruments that could be used to achieve Australia's national target. The Commission, and many other researchers, have concluded that putting a price on emissions, either through an emissions trading scheme or a tax, is the optimal method because it is likely to achieve the target at the lowest cost to the community (PC 2008e). There are also advantages in the trading scheme or tax covering the widest range of sources of emissions, and sectors of the economy, as is feasible.

Putting a price on emissions across the economy achieves the target at lowest cost by creating an incentive for all abatement opportunities that cost less than the emissions price to be implemented. By contrast, having a patchwork of different policy instruments that apply to particular sectors, and particular abatement opportunities, but not others tends to result in some high-cost abatement opportunities being taken up, while other low-cost opportunities are not. Empirical work shows that abatement costs can be much higher than necessary under a patchwork approach (PC 2011a).

In the urban water sector, considerable attention has been given to the greenhouse gas emissions associated with the energy used by desalination plants. In some cases, including in Sydney, Melbourne, south-east Queensland and Perth, it has been decided that renewable (and low emission) sources of energy will be developed to offset the energy use of desalination plants. These are examples of sector-specific policies that may result in unnecessarily high abatement costs.

An economywide price on emissions has the potential to influence the supply augmentation options that are chosen in the urban water sector. This is because it tends to make energy prices higher than they would otherwise be (the environmental cost of emissions become 'internalised' in energy prices). This in turn makes energy-intensive augmentation options, like desalination, less attractive than they would otherwise be.

---

Water catchments that are used for urban supply are somewhat of a special case in that their management can influence water yield and quality, as well as biodiversity conservation, agricultural production and wood production. How catchments are managed can have large consequences for water supply systems, as illustrated by the example of catchments that supply New York City (box 3.4).

**Box 3.4 Management of catchments supplying New York City**

Historically, the Catskills' catchments have supplied New York City with high quality water with little contamination due to the natural filtration processes of the ecosystems on the banks of streams, rivers, lakes, and reservoirs. However, increasing housing developments and pollution from vehicles and agriculture threatened water quality in the region. By 1996, New York City faced a choice: either it could build water filtration systems to clean its water supply or the city could protect the Catskills' catchments to ensure high-quality drinking water.

A decision was taken to protect the Catskills' catchments and this decision is supported by cost-benefit analysis. It has been estimated that the total cost of building and operating a filtration system was in the range of US\$6 to \$8 billion. In comparison, the total cost for protecting the water provision service of the Catskills through land purchases and regulations to control development and land use in the catchments has been estimated at US\$1 to \$1.5 billion.

*Source:* Barbier and Heal (2006).

The overall government objective should be that catchments are managed in a way that maximises the net benefits to the community, taking into account all of the values that they can provide. The role that the urban water sector should play in this, however, is less clear. At one extreme the sector could own and have sole responsibility for managing catchments — in which case the sector would need to be assigned the overall government objective. At the other, catchments could be entirely owned and managed by government land management agencies and/or private interests — in which case the urban water sector's role would be confined to seeking to influence management to improve water-related outcomes.

*Environmental impacts associated with wastewater treatment and disposal*

The environmental impacts from wastewater and stormwater disposal depend on the quality and quantity of the water and the characteristics of the receiving environment. Managing these impacts is rightly seen as a matter for the urban water sector as wastewater discharge arises predominantly from the sector. As with public health, the objective should not be to eliminate all impacts and risks entirely, but rather to reduce environmental impacts wherever the expected benefits to the

---

community of doing so exceed the expected costs. This balancing task is not one for the providers of water services, but rather the appropriate regulator or minister as part of a transparent and objective process (chapter 10 considers such roles and responsibilities in more detail).

In many cases the waterways that receive wastewater from the urban sector also receive pollutants from other sources, such as agriculture. For example, runoff from farms may contain sediments, nutrients, chemicals and dissolved salts. Regulation of urban wastewater and stormwater disposal, therefore, needs to be coordinated with regulation of these other sources. The aim should be to achieve desired environmental outcomes at lowest cost.

### **Flood mitigation**

The urban water sector contributes to flood mitigation in two main ways. First, the primary purpose of stormwater services is to provide drainage so as to reduce the prevalence of localised flooding in urban areas. Second, dams that supply water to urban areas may also provide flood mitigation services by holding back water that might otherwise cause flooding in downstream areas. To accommodate this dual role, dam management strategies may be developed that effectively assign a proportion of the dam's capacity to water supply and the remainder to flood mitigation.

It is appropriate, therefore, that the urban water sector be assigned a flood mitigation objective. There are, however, a range of activities needed for effective flood mitigation that are conducted outside the sector. For example, decisions on what types of development to allow in areas that may be affected by floods.

### **Water use efficiency and water conservation**

Water use efficiency is sometimes put forward as an appropriate objective for the urban water sector. For example, the National Water Initiative specifies that urban water reform should 'increase water use efficiency in domestic and commercial settings' (COAG 2004, p. 19).

Improving water use efficiency is maintaining or increasing the level of useful output or outcome delivered, while reducing water consumption. For example, if two dishwashers do an equally good job of cleaning dishes the one that uses less water has a higher water use efficiency.

---

While increasing a form of efficiency sounds like a good thing to do, it is not always in the community's interests to increase water use efficiency. This is because reducing water use may entail using more of other valuable resources, such as energy, materials or labour. For example, a commercial car wash might be more water efficient than home car washing, but involve greater energy use. Whether such tradeoffs are worth making depends on the value of the water saved relative to the value of the extra resources used.

Sometimes water use efficiency is measured based on the amount of reticulated potable water that is used, making water recycling a means of increasing efficiency. The value of the extra resources used for recycling (for example, the materials and labour needed to install a rainwater tank or build and operate a recycling plant) can be considerable, as discussed in chapter 5.

In commenting on what he saw as the misplaced emphasis on water use efficiency in the National Water Initiative and elsewhere, Lin Crase stated:

... 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. To simply assume that water use efficiency is superior to the efficient use of all inputs belies the expansive economic literature in this field. (Crase and O'Keefe, sub. 5, attachment, p. 2)

The Commission strongly agrees that governments should pursue the efficient use of all inputs/resources within the economy. Seeking to increase water use efficiency without considering the implications of this for the use of other resources runs counter to this objective and, therefore, should not be encouraged by government policy. A distinction needs to be drawn between water use efficiency — which is only sometimes desirable — and water use that is economically efficient (more on this later). The Commission interprets the term 'resource efficiency' in the inquiry terms of reference as being equivalent to economic efficiency.

A concept related to water use efficiency is water conservation. Water conservation is sometimes defined to mean essentially the same thing as water use efficiency, but where it has a separate meaning it may be defined as: a reduction in water use that also causes a reduction in the level of useful output or outcome. Under this definition, watering a vegetable garden less is a water conservation practice if it reduces the yield of vegetables and a water use efficiency practice if it does not.

In the same way that water use efficiency is sometimes promoted regardless of the implications for the use of other resources, water conservation is sometimes encouraged or mandated regardless of the value of the output or outcome forgone. For example, mandating that sports fields cannot be properly watered even where this results in games being cancelled or injuries being sustained.

---

The Australian Conservation Foundation argued that water conservation enjoyed widespread public support and democratic legitimacy and, therefore, should not be rejected as an explicit objective (sub. DR128). The problem with this position is that water conservation means different things to different people and so it is difficult to know what is being supported.

The Commission has provided a definition that specifies that water conservation entails using less water and giving up something of value. Using less water has benefits (the saved water can be kept in store for future needs or released to enhance environmental flows) but it also has costs (for example, gardens that enhance urban amenity may deteriorate). The Commission's position is that these benefits and costs should be weighed up, rather than assuming that water conservation is intrinsically desirable. This 'weighing up' should involve both democratic and market-based processes, as explained in chapter 4.

To extend an analogy used by Henry Ergas, putting less fruit on a pavlova could be described as conserving fruit or being 'fruit efficient' (Ergas 2009). Using these terms, however, does not change the fact that many people would prefer, and be prepared to pay for, a more plentiful topping. It is much the same with water. In general, there would seem to be no good reason for governments to override these preferences.

### **Commercial viability and dividends to government**

An objective that is sometimes set is for government-owned water businesses to maintain ongoing commercial viability and pay dividends to governments that reflect a commercial return on capital.

In sectors where private businesses operate in competitive markets the ongoing commercial viability of individual businesses is not guaranteed. Businesses that do not keep pace with innovations and other efficiency gains made by rival firms are likely to decline and may cease to operate. Because innovation can deliver cost savings and product improvements this process generally benefits the community, even though the owners of businesses that decline may suffer losses.

Since the 1990s, governments have sought to place government-owned urban water businesses and other government trading enterprises on a more commercial footing, for example by corporatising them. The motivation for this has been to try to generate some of the efficiency gains observed in competitive markets, even though the opportunities for actual competition are often limited by natural monopoly characteristics.

---

The Commission has previously observed:

... governments have sought to give government trading enterprises a greater commercial focus and facilitate competitive neutrality by exposing them to capital market disciplines and regulations similar to those faced by private sector businesses. (PC 2007a, p. 152)

There is a possible tension between the role of governments in promoting efficiency in the sector and their position as owners of water businesses, and therefore the beneficiary of dividend payments. For example, where private sector businesses are able to successfully compete with the incumbent government-owned business in the provision of some services this may reduce the capacity of the incumbent to pay dividends. On the one hand, governments should welcome this development where it signals that efficiency gains are being achieved. On the other, declining dividends make it harder for governments to achieve budgetary targets.

In general, the overall interests of the community are best served when governments resolve this tension by focusing on promoting efficiency rather than ensuring that dividend payments are always maintained at a particular level. That is, there should be an expectation that government water businesses earn a normal commercial return from which dividends can be paid (otherwise capital allocation may be distorted), but not that dividends are maintained at a set level regardless of circumstances. Because of this, the objective of government-owned water businesses maintaining commercial viability and paying dividends should be pursued only to the extent that it is consistent with promoting efficiency.

### **3.2 Economic efficiency as an overarching objective**

It can be seen from the above discussion that there are several valid objectives for the urban water sector. This means that tradeoffs between objectives are inevitable and there can also be tradeoffs within objectives. Water security can be pursued through supply augmentation or demand management — each approach has advantages and disadvantages. Public health risks and environmental impacts associated with the urban water sector can be reduced, but this comes at a cost.

The concept of economic efficiency provides a framework for making these tradeoffs in a way that produces the best overall outcomes for the community. Economic efficiency is related to cost–benefit analysis in that a proposal that is shown to have benefits to the community that exceed costs is also one that improves economic efficiency. The concept has three dimensions as outlined in box 3.5.

---

### Box 3.5 Dimensions to economic efficiency

Overall efficiency requires the pursuit of productive, allocative and dynamic efficiency.

**Productive efficiency** requires that goods and services be produced at the lowest possible cost. For example, where there are several possible methods for producing a given quantity of water (of equal quality and reliability) the method that has the lowest cost offers the highest productive efficiency.

**Allocative efficiency** requires that the set of goods and services produced from the available resources is the set that maximises value to consumers. In this context, 'resources' includes the available water as well as the labour, energy and capital used to deliver water and remove and treat wastewater. The efficient allocation of these resources provides the mix of goods and services, including environmental outcomes, that maximises society's wellbeing.

**Dynamic efficiency** requires that investments that are expected to produce more efficient production possibilities in the future (as technology evolves and the availability of inputs changes) are made whenever the expected benefits to consumers exceed the costs. Examples include investments in research and development and in upgrading the technology used in water supply systems. It is also the case that some reform options might create an environment that is more conducive to ongoing innovation in the water sector, and dynamic efficiency requires that this be taken into account.

For economic efficiency to be useful in determining how tradeoffs are made it needs to be defined broadly to include environmental and other costs and benefits that are not traded in markets. This allows short-term and long-term environmental and social considerations to be integrated into decision making, as required by the principles of ecologically sustainable development.

Ideally, this involves estimating the monetary value of changes in environmental and health outcomes, although other methods are available and this is an area of ongoing policy development. Different estimates and approaches can and should be debated prior to decisions being taken. As discussed in chapter 10, it should generally be governments (elected representatives) that make the final judgment, not water utilities.

With the possible exception of 'universal and affordable access', all of the valid objectives for the urban water sector discussed above can be encapsulated by the concept of economic efficiency. This possible exception arises because there are both equity and efficiency arguments for providing universal and affordable access and economic efficiency does not encapsulate the equity dimension (that is, how costs and benefits are distributed across different groups).

---

As discussed above, however, it is likely that most distributional issues are best dealt with outside the urban water sector through, for example, the taxation and social security systems. If this were accepted, then a single objective of delivering water, wastewater and stormwater services in an economically efficient manner would be appropriate for the urban water sector. If it is not, then the economic efficiency of the sector remains of primary importance, but some reduction in efficiency might be accepted where this is necessary to satisfy affordability objectives. However, this reduction should be no more than is necessary.

Chapters 5 to 8 of this report demonstrate that many of the current deficiencies in the urban water sector are at least partly due to a failure to make tradeoffs between multiple objectives in a way that maximises net benefits to the community. This suggests that adopting an overarching objective of economic efficiency in service delivery has the potential to be a catalyst for positive change that delivers real benefits to water users.

In the draft report, the Commission followed this line of argument to its logical conclusion of recommending that governments set an objective focusing on economic efficiency. There were several inquiry participants that, while not necessarily disagreeing with this, felt that there was value in also referring to public health, environmental outcomes and other more specific matters in a statement of objectives (National Centre of Excellence in Desalination, sub. DR110; SA Health, sub. DR117, and WSAA, sub. DR145). The Commission accepts this argument and has revised the draft recommendation accordingly. This revised recommendation is similar in meaning to the National Water Commission's proposed national statement of objectives (NWC 2011c).

RECOMMENDATION 3.1

***The Australian, State and Territory Governments should articulate a common objective for the urban water sector in relevant policy documents along the following lines:***

***The primary objective of the urban water sector is to provide water, wastewater and stormwater services in an economically efficient manner so as to maximise net benefits to the community. This objective should be met by pursuing the following more specific objectives:***

- ***achieving water security and reliability at lowest expected cost***
- ***contributing to universal and affordable access to water and wastewater services***
- ***contributing to public health, flood mitigation and environmental protection.***

---

*Economic efficiency should be defined broadly to include environmental, health and other costs and benefits that might not be priced in markets.*

This objective should apply to the urban water sector as a whole and is not appropriate as an objective for water utilities. This is because pursuing this objective requires difficult judgments to be made about the value that the community places on environmental outcomes and avoiding health risks. As argued in chapter 4, elected representatives are best placed to make these judgments. Chapter 10 considers objectives for water utilities.

---

## 4 The role of governments

### Key points

- At present governments play a dominant role in the urban water sector. Whether markets should play a greater role is examined in this report.
- Under certain conditions market provision of goods and services can promote economic efficiency. However, markets can perform poorly where there are so called 'market failures'.
- There are many areas of market failure (including natural monopoly elements of the supply chain, health and environmental externalities and public goods) in the urban water sector.
- There are various measures that governments can implement to address market failures. Some of these influence the way markets operate (for example, regulation), while others replace markets (government service provision).
- These government responses can improve outcomes, but they also have the potential to introduce new sources of inefficiency. In some cases the 'cure' can be worse than the 'disease'.
- Given the prevalence of market failures it is clear that governments should continue to play a substantial role in the urban water sector.
  - This role needs to be carefully designed, with clear separation of policy, regulatory and service delivery functions.
  - There may be some scope for markets to assume a greater role within the framework established by governments.

The previous chapter concluded that the primary objective of the urban water sector should be to provide water, wastewater and stormwater services in an economically efficient manner so as to maximise net benefits to the community. This requires economic efficiency to be broadly defined to include security, health, affordability and environmental dimensions. In deciding how to pursue this objective there is a fundamental choice about the respective roles that markets and governments should play.

The term 'government' covers elected representatives (ministers, other members of parliament and Local Government councillors), government departments, regulators and government-owned water utilities. This chapter is concerned primarily with the

---

aggregate role of all these entities relative to the role of markets. It does, however, consider some high-level issues as to how this aggregate role should be assigned, and in particular, the appropriate role of elected representatives.

At present governments play a dominant role in the sector, in that they:

- set objectives
- develop policies
- regulate prices, health standards and environmental standards
- invest in and provide water, wastewater and stormwater services to consumers.

By contrast, the role assigned to markets is mainly limited to the provision of inputs. For example, the tasks of building and operating desalination plants, or providing maintenance or meter-reading services are often outsourced through competitive processes. Decisions to build new infrastructure are made mostly through central planning processes, rather than markets.

This chapter puts to one side the current configuration of the sector to examine the underlying principles that should guide the design of the role of governments.

## **4.1 Market provision**

Under certain conditions market provision of goods and services can promote economic efficiency. Experience from the electricity sector in Australia shows that reforms that introduce a greater role for competitive markets can achieve substantial efficiency gains (appendix D). Because of this, an important task for this inquiry is to examine the case for introducing market-based reforms in the urban water sector. Markets, however, can perform poorly where there are so-called ‘market failures’. There are several sources of market failure in the urban water sector as outlined below.

### **Natural monopoly elements of the supply chain**

Natural monopoly occurs where it is more efficient for one business to supply all of a market’s needs than it would be for two or more businesses to do so. Natural monopolies are often the result of economies of scale and scope in production that result in the average cost of production falling as output increases (ERA 2008a).

Conditions of natural monopoly create the potential for a profit maximising firm to set prices higher and the level of output lower than would occur under a more

---

competitive market. This decreases allocative efficiency, which results in a loss in net benefits to the community.

In addition, natural monopolies do not face as strong incentives to minimise costs as competitive businesses. Accordingly, a monopoly might not achieve the minimum costs that are technically feasible (this is sometimes referred to as X-inefficiency). Monopolies can also choose to underprice some services and overprice others, either to prevent the entry of competitors or to advantage some classes of customers (to the detriment of other customers) (IPART, sub. DR118).

Governments can seek to remedy these inefficiencies through government ownership of monopolies (and specification of relevant guidelines/obligations) or through price and access regulation. The existence of a monopoly is a necessary but not sufficient condition for the application of some form of price regulation in the urban water sector. What is required to determine whether regulation is necessary (and if so, in what form) is an analysis of the long-run incentives, and ability, of utilities to undersupply the market or otherwise exploit their market power.

Bulk water transmission and distribution and wastewater/stormwater distribution and transport exhibit strong natural monopoly characteristics (chapter 2). It would clearly be inefficient to have two or more providers that each had their own system of pipes running down every street. This is the main reason, along with public health concerns, that water and wastewater services have historically been provided by vertically-integrated monopolies.

A lesson from reform in other utility sectors, however, is that the existence of natural monopoly elements of the supply chain does not preclude competition in the other elements. As explained by Frontier Economics:

The big idea underpinning competitive reforms in the utility sector is that the institutional arrangements for the physical network infrastructure can be separated from those for the underlying product or resource.

This means that, provided access can be provided to the natural monopoly elements of the supply networks, the commodity itself (e.g. electricity, gas) can be traded across these networks. This enables competition in the potentially contestable functions (e.g. electricity generation, retail supply). (Frontier Economics 2008c, p. 28)

If there were to be a fundamental shift towards a greater role for markets in the urban water sector it is likely to be through this type of separation. Reforms already undertaken in the rural water sector show that much more efficient allocation of a given water resource can result (appendix C). However, urban water markets would need not only to allocate a fixed quantity of water, but also to bring forth investment in supply augmentation (for example, new desalination plants, dams and recycling plants) in a way which achieved water security.

---

As discussed in chapter 3, urban water security needs to be maintained at virtually any cost and so there would need to be a high degree of confidence that markets could deliver on this before such reforms were made. The challenges are substantial, given that:

- the depth of competition in bulk water supply is likely to be much less than in, say, electricity generation, if only because of the high cost of transporting water over very large distances
- investments in supply augmentation are often large-scale, have long lead times and need to be undertaken in the presence of a high degree of uncertainty about future climate-driven supply
- there could be substantial pressures on governments to intervene in the operation of markets during periods of scarcity when prices increase, and anticipation of such intervention could deter investment (LECG 2011)
- a fully competitive urban water market (with ‘in-the-market’ competition for both customers and bulk water) does not currently exist anywhere in the world.

Later chapters consider these issues further.

## **Health externalities**

In the days before network systems for the collection, transport and disposal of sewage became the norm, significant health (and amenity) problems arose from household’s attempts at local disposal. Only brief reflection on this situation is necessary to gain the insight that households benefit not only from an effective service that removes their own wastewater, they benefit from their neighbours having this service as well. This is also true for the provision of water, because washing in clean water helps reduce the spread of disease in the community.

Economists describe this phenomena as an ‘externality’. An externality occurs where an activity or transaction imposes benefits or costs on others that are not direct parties to the transaction. Accordingly, water and wastewater services can be said to produce positive externalities.

If the provision of water and wastewater services were left entirely to markets it might be expected that the vast majority of households and businesses would choose to purchase these services. Due to financial hardship or other cause, however, a small proportion might not. Even if other households were prepared to meet the costs associated with providing the service to this group, it may not be possible for them to arrange for, or compel, this consumption. Accordingly, there is an efficiency rationale for governments to take action to prevent the negative

---

externality effects on the remainder of the population. (Governments may, of course, also decide to take action out of concern for the particular households involved.)

There are various types of action governments can take. These range from legal prohibitions on unauthorised disposal of wastewater to positive actions to ensure that universal and affordable access to water and wastewater services is provided. As with all instances of government intervention in response to a market failure, there is a need to examine the costs and benefits of the intervention to ensure that it will actually improve overall outcomes.

### **Environmental externalities**

There are also environmental externalities associated with water and wastewater services. As discussed in chapter 3, some of the environmental impacts associated with the urban water sector are best addressed outside the sector and others inside the sector. Of the latter, the most important relates to wastewater and stormwater disposal.

A commercial provider of wastewater services would normally try to meet the needs of its customers at minimum cost. Customer needs relate mainly to the removal of wastewater and do not necessarily extend to ensuring that it is treated and disposed of in an environmentally sensitive way. There may be a tendency, therefore, for the provider to save on treatment costs and thereby fail to protect the environment to the extent that reflects community preferences. The negative externality here can include losses:

- experienced by recreational users and others that care about degradation of the affected environment
- resulting from impairment of commercially important environmental services (for example, breeding grounds for commercially important fish species being polluted)
- experienced by downstream water users (for example, additional treatment costs or negative health effects).

Because of this externality, market outcomes may be inefficient and there is a possibility that government action may be able to produce net benefits to the community. That is, a government may be able to implement measures that impose costs (for example, for greater levels of treatment) that are less than the benefits (for example, the value that the community places on the resulting environmental improvement). The types of actions that can be taken include regulating discharge

---

standards, taxing pollution, subsidising remediation and defining property rights over the right to pollute (for example, through tradeable emission permits that establish a price for the right to pollute).

## **Environmental and other public goods**

As discussed in chapter 3, the urban water sector can enhance amenity and environmental services within urban landscapes through the management of water. Commonly, the beneficiaries of this are the large proportion of the population who enjoy green parks, gardens and other public spaces. The sector is, therefore, often providing these services to the broader community rather than to individual water users that can express their demand for water in a market. Such services are sometimes called ‘public goods’ meaning that their provision for one person means that they are available to all people at no additional cost.

The enhanced amenity of lush, green parks is a public good, because the cost of providing them is the same regardless of whether one or a thousand people gain enjoyment from them, and because it is usually deemed impractical or undesirable to exclude anyone from using them.

Stormwater services are also largely a public good. People living in low-lying areas may benefit the most from the reduction in floods resulting from these services, but everyone benefits to some extent from having well drained roads and public spaces.

Public goods tend to be underprovided by private markets because non-excludability and indivisibility make it difficult to get people to pay for them. This market failure can be addressed by governments making judgments about the community’s demand for public goods and providing them where warranted. In the case of environmental services and amenity from water in the urban landscape, it is managers of the public land in question that are generally best placed to do this.

## **Information failures concerning water use efficiency**

Economic efficiency requires the efficient use of all resources, including water. Provided that water users face efficient prices they can, in general, be expected to use water efficiently. Sometimes, however, this will not occur because people lack information about efficient water use.

For example, someone might water their garden in the heat of the day because they are not aware that this will be less effective than watering in the early morning. This contrasts with someone who knows about evaporation but chooses to water

---

mid-afternoon because this is the most convenient time for them, given other commitments. The former is economically inefficient water use, while the latter is efficient. A consumer, behaving efficiently, will not necessarily seek to minimise their water use.

Where information problems result in economically inefficient water use there may be a role for governments in supplying information or verifying market-supplied information. For example, by publishing water savings tips or ensuring that water using appliances carry information about water use at the point of sale. There are costs associated with such programs and this needs to be considered in deciding whether government action is warranted.

### **Water property right issues**

The efficient functioning of markets in any sector requires clear and enforceable property rights to be in place. Because water falls from the sky and moves through the landscape, defining property rights for water is a particularly challenging task for governments. For example, decisions on whether land owners have the right to harvest and store water in dams need to be cognisant of the fact that this can impinge on the rights of downstream water users. Similar issues can arise for wastewater and stormwater in urban areas. Allowing trade in water rights can enhance efficiency by allowing water to move to its highest value use.

## **4.2 Government involvement**

As discussed above, governments can respond to market failures in a variety of ways, including by:

- providing the service directly
- regulating market activity
- using price incentives
- providing information
- deciding to take no action (for example, on the basis that there are no available options that can produce an excess of benefits over costs).

Best practice policy making demands that all of the available options are properly assessed to determine which is expected to produce the best overall outcome for the community. It is important in doing this to appreciate that government actions to address market failures can have unintended consequences and introduce new

---

sources of inefficiency. Just as markets can fail to achieve efficiency in predictable ways, so too can governments. As Weimar and Vining (1992, p.112) argue ‘[p]ublic policy ... should be informed not only by an understanding of market failure but of *government failure* as well’.

While the theory of ‘government failure’ is not as developed as the theory of market failure, it does provide some useful insights into inefficiencies that might arise from governments providing, or otherwise being involved in, urban water services.

### **Rent seeking**

Where governments face different options for how to provide or regulate a service it is common that the vast majority of the community will be only slightly affected by the decision taken, while a small minority stand to gain or lose significantly. Making an efficient decision requires that both diffuse and concentrated interests are taken into account, but the political process can err by giving undue weight to the latter.

The reason for this is that those strongly affected by a decision are most likely to be motivated to lobby for their preferred outcome, a practice known as rent seeking. For example, while the vast majority of water users might benefit slightly from some urban water being purchased from irrigators, it may be that the strongest lobbying would come from a relatively small number of businesses in irrigation areas that may face significant costs.

### **Limited time horizons**

Decisions about the supply of urban water services often have long-term consequences because of the generally long-lived nature of assets in the sector. Accordingly, a consistent approach to factoring in costs and benefits over many years is a prerequisite for efficient decision making. The political process may work against such an approach being taken because the electoral cycle can result in an undue emphasis being placed on short-term costs and benefits.

### **Public agendas**

Achieving efficiency in the urban water sector is complex and involves collating and analysing vast amounts of information. Because of this, it is unlikely that most voters will devote the time and resources needed to be fully informed on either the recent performance of government service provision or on the urban water policies

---

each party takes to an election. In this environment the media can play a useful role in summarising issues and airing informed opinions.

There is the potential, however, for public agendas to be run through the media that promote approaches that are not in the overall interests of the community. Good policy proposals do not always come out ahead in media debates and this can create incentives for political parties to adopt popular but inefficient policies.

An additional issue is that the public interest is served by ministers being prepared to abandon past positions when new information indicates a change is warranted. The potential for a change in position to be portrayed in the media as a sign of error or weakness may make ministers more reluctant to do this.

### **Weak incentives for efficiency and innovation in government agencies**

Government agencies that deliver services such as water have weaker incentives to minimise costs and seek out new and better ways of doing things compared to their private sector counterparts, for two main reasons. First, private businesses that do not minimise costs may be driven out of business by more efficient rivals or disciplined by the capital market in a range of ways. Government agencies, including ones that are corporatised, do not face market tests for survival. Second, the profit motive is a powerful driver of efficiency and innovation for private businesses, but does not operate in the same way for government agencies. Where a government agency is also a monopoly service provider these problems can be compounded by X-inefficiency.

Government departments and regulators may also have relatively weak incentives to undertake their functions efficiently. Further, relevant data on the efficiency of these agencies is likely to be much less tractable than that which is available for water utilities, providing a greater potential for inefficiencies to remain undetected.

### **Addressing these problems**

Australian governments have, across a variety of policy areas, recognised these problems and undertaken some reforms to try to overcome them. One important step is to clearly separate the policy, regulatory and service delivery functions. The policy function should reside with elected representatives to allow voters to hold them accountable for policy decisions and their implementation. In other words, when consumers are unable to express their preferences through markets, it is for elected representatives, not regulators or bureaucrats, to determine the community's preferences.

---

One reform that has merit is to allocate service provision and regulatory functions to government-owned entities that are subject to governance arrangements designed to ensure:

- clear objectives (both commercial and non-commercial)
- managerial autonomy, with ad hoc government directions either eliminated or allowed only through transparent processes
- performance monitoring and other means are used to achieve transparency and accountability.

This type of reform can at least partially overcome many of the problems discussed above, provided they operate as intended. There are, however, likely to be residual inefficiencies, mainly because:

- there may continue to be some perceived or actual government pressure on the entities to make politically expedient decisions
- incentives for efficiency and innovation will continue to be weaker than for private businesses operating in a competitive environment
- performance monitoring imposes costs and is an imperfect means of achieving the accountability of non-elected officials.

There is also merit in reviewing the tasks assigned to regulators to ensure that they are appropriate. For example, price regulation may be warranted where there is a serious risk of abuse of market power, but is not generally appropriate as a means of ensuring that urban water providers fully recover costs (chapter 11).

### **4.3 Conclusions**

There is a range of market failures that have the potential to cause significant inefficiencies in the urban water sector. There are various ways that governments can respond to these failures, but these remedies can also introduce new sources of inefficiency. Reform proposals for the sector, therefore, need to take into account both possible market failures and government failures.

Given the prevalence of market failures it is clear that governments should continue to play a substantial role in the urban water sector. In particular, there is a role for elected representatives to set objectives, develop policy frameworks, define property rights for water, and put institutional and governance arrangements in place.

---

*It is the role of governments to create the conditions necessary for institutions to operate efficiently. Governments should:*

- *set objectives for the development of urban water policy and relevant objectives for each institution*
- *ensure that policy frameworks and principles in relation to public health, the environment and service delivery are consistent with the objectives*
- *define property rights for environmental and consumptive use water, including stormwater and wastewater*
- *appropriately assign roles and functions to institutions*
- *put in place best practice institutional and governance arrangements for:*
  - *public health, environmental and economic regulation relating to the sector*
  - *service delivery of water, wastewater and stormwater services*
- *provide ongoing commitment to the application of the arrangements.*

The principles-based discussion in this chapter can not fully resolve the question of what role governments should play in the urban water sector, particularly in the area of service delivery. It is necessary to also examine the evidence on the quantum and sources of inefficiencies within the sector at present. This is done in chapters 5 to 8. Later chapters return to the role of government and provide guidance on designing institutional and governance arrangements for regulation and service delivery so as to overcome market failures and government failures to the maximum extent possible. Options that assign an increased role for markets within a framework established by governments are also considered.



---

## 5 Supply of water, wastewater and stormwater services

### Key points

- Inefficient water supply augmentation in recent years in Melbourne and Perth has cost the community of the order of \$3.1 to \$4.2 billion over a 20 year period, based on modelling by the Commission. There is also evidence that augmentation in Adelaide and Sydney in recent years has imposed substantial unnecessary costs.
- The scope for efficiency gains through making better supply augmentation decisions over the next 10 years will be less than in recent years because some cities now have surplus capacity and so are unlikely to make major augmentation investments for some time.
  - Even so, the scope for efficiency gains is still large and will increase over time.
  - The main impediments to these gains being realised are implicit or explicit policy bans on particular options, unclear roles and responsibilities for making augmentation decisions and targets/subsidies for water recycling and reuse.
- System operations and asset management in the urban water sector have become considerably more efficient over the past decade or two, in part due to the contracting out of operational tasks and capital projects.
- There is scope for efficiency gains from introducing greater competition in the urban water sector but these are inherently difficult to estimate.
- Some current approaches to integrated water cycle management are inefficient because they assume that greater recycling and reuse is in the community's interests, without examining costs and benefits.
  - A better approach would be to facilitate efficient recycling and reuse projects by removing impediments to integration (such as lack of appropriate property rights for wastewater and stormwater).
- Factors such as low population densities and low and/or highly variable water availability make the task of delivering water and wastewater services to many regional areas inherently difficult and costly. Nonetheless, substantial efficiency gains could be achieved through some form of amalgamation or alliance between small regional water utilities. There may also be a case for disaggregating utilities that service very large geographic areas, but structural changes need to be tested on a case-by-case basis.

---

This chapter examines the scope for efficiency gains in the supply of water, wastewater and stormwater services, and the impediments that are preventing these gains from being realised. Where there are impediments that can be removed by changing government policies, recommendations for this are made. Impediments that relate to institutional, governance, regulatory and structural arrangements are identified, but recommendations on these are left to chapters 10 to 13.

The scope for efficiency gains is considered in relation to:

- making better supply augmentation decisions (section 5.1)
- improving system operations and asset management — covering general issues across the water, wastewater and stormwater sub-sectors (section 5.2)
- opportunities in the supply of wastewater and stormwater services — covering issues that are specific to wastewater and stormwater services (section 5.3)
- achieving integrated water cycle management — covering coordination between the water, wastewater and stormwater sub-sectors (section 5.4)
- scope for efficiency gains in regional urban areas — covering specific issues for regional areas (section 5.5).

## **5.1 Making better supply augmentation decisions**

It is a role of governments to undertake water planning that allocates water between environmental and consumptive uses, and establishes clear and enforceable property rights (chapter 4). The urban water sector needs to work within water plan rules when planning augmentations to urban water supply systems. For example, water required to meet minimum environmental flow rules is not available to the sector.

Making the best possible supply augmentation decisions is important for the overall efficiency of the urban water sector because the costs involved are substantial and there is often a wide range of feasible choices that may produce very different outcomes. The consequences for consumers of poor decisions have recently become evident through price increases in a number of jurisdictions. This section examines the scope for efficiency gains in three important aspects of supply augmentation decision making.

### **Considering supply and demand options together**

Achieving water security at lowest expected cost requires that supply augmentation and demand management be considered together. Crase and O’Keefe observed that

---

‘... uncoupling demand and supply choices can result in serious violations to economic efficiency’ (sub. 5, attachment, p. 1). This is because supply augmentations and demand management activities are both means for increasing the quantity of water that is available to meet future requirements.

Until recent decades, the approach taken to supply augmentation planning in Australia largely ignored the benefits of considering supply and demand options together. In general, supply augmentations were designed to meet a fixed demand projection based on population growth estimates and trends in household, commercial and industrial consumption. The main demand management option used was water restrictions, which played a ‘backstop’ role during droughts.

More recently, jurisdictions have agreed to adopt the National Urban Water Planning Principles (box 5.1). One of these principles is to ‘[c]onsider the full portfolio of water supply and demand options’, which is explained as meaning:

Selection of options for the portfolio should be made through a robust and transparent comparison of all demand and supply options, examining the social, environmental and economic costs and benefits and taking into account the specific water system characteristics. The aim is to optimise the economic, social and environmental outcomes and reduce system reliability risks, recognising that in most cases there is no one option that will provide a total solution. Readiness options should also be identified as part of contingency planning. (DSEWPC 2009)

### **Box 5.1 National Urban Water Planning Principles**

As part of the national urban water reform framework developed by COAG in 2009, jurisdictions agreed to adopt the National Urban Water Planning Principles. These principles are as follows.

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.

*Source:* DSEWPC (2009).

---

While this principle is sound, it is necessary to examine whether it is reflected in current practice.

### *Current situation*

Current urban water strategies reveal that jurisdictions are generally not considering supply augmentation and demand management options together in a way that leads to a lowest expected cost balancing of supply and demand. The approach that is commonly taken has evolved from the traditional approach described above. The supply augmentation task is now not simply determined based on fixed demand projections, rather targets are set for modifying demand, which reduces the supply augmentation task. Box 5.2 describes this approach as it has been applied in Victoria.

This approach is deficient for three reasons. First, supply augmentation and demand management are not generally being determined according to their relative net benefits. It is assumed that increasing water conservation, water use efficiency and water reuse/recycling is the lowest cost option up to a certain point, but there is often little sound analysis to support this. Much of the analysis that is done has been criticised for being simplistic and overly optimistic as to the water savings that can be achieved (Beatty, Coombes and Kozorovski 2009). The benefits that consumers derive from the use of water are also often ignored (chapter 7).

This is not to suggest that there are no opportunities to increase water use efficiency that are cost effective. Evidence presented by Sydney Water (sub. 21) and the Institute for Sustainable Futures (sub. DR137) demonstrates that there are. The issue is that targets are often set for demand reduction without sound analysis to back them up.

Second, there is insufficient recognition that the value of water saved through conservation and water use efficiency can vary over time as dam levels and the costs of supply augmentation change. The same targets apply whether dams are at low levels or are full to overflowing (although temporary water restrictions are used as an additional demand management option during periods of acute water scarcity).

Third, there has been a reluctance to use flexible retail pricing and multiple tariff options, which are potentially efficient demand management options (chapter 6).

Some water utilities appear to have a sound understanding of the appropriate role for demand management activities. For example, Sydney Water stated:

What we have learned through the last decade is a portfolio approach to balancing supply and demand of water, and we have basically looked at how to get supply and

---

demand in balance, subject to getting enough volume at the lowest combination of costs and with the appropriate reliability. So we have looked at each of our options, which in broad terms are dams, desalination, recycled water and water efficiency measures. But within those there's a number of different schemes and we have tried to balance our approach to all of those, to balance supply and demand, but choose the ones that give us volume, reliability and least cost combinations. (trans., p. 93)

In the main, the greatest inefficiencies appear to arise where these sorts of judgments by water utilities are overridden by government-imposed targets or augmentation decisions.

Some jurisdictions, however, are moving towards an approach that is more consistent with the National Urban Water Planning Principles. In Victoria, for example, the recently released *Draft Sustainable Water Strategy for Gippsland Region* explicitly takes into account the cost effectiveness of demand management options (box 5.2).

#### **Box 5.2 Demand management in Victorian water strategies**

The Victorian Government prepares 10 year Sustainable Water Strategies for four regions. The current strategy for the Central region, that encompasses Melbourne and surrounding regional areas, was released in 2006. It states:

The best way to live within our water means is to stop water wastage and to try and use less water at home, work and play.

Our starting point must be to ensure that we place a high value on water by conserving it wherever we can and using it as efficiently as possible. As water resources become scarcer, water will become more valuable. Water conservation is the only remaining low-cost option for securing water supply. (DSE 2006, p. 38)

The strategy goes on to set water conservation targets as follows:

The Government requires water authorities throughout the Central Region to work with the community to reduce total per capita water usage by at least 25 per cent by 2015, increasing to 30 per cent by 2020. The basis of comparison is the 1990's average water use. (DSE 2006, p. 39)

The more recently released draft Sustainable Water Strategy for Gippsland region (which includes a number of urban centres, including Traralgon, Sale and Bairnsdale) signals a move away from targets:

Conservation targets have been an important mechanism for kick-starting water saving efforts and for providing information to communities on conservation and efficiency measures and achievements. In future, water conservation and efficiency measures will focus on balancing supply and demand into the longer term, taking into account cost effectiveness, system reliability, available and fit for purpose supplies. (DSE 2010, p. 72)

---

### *Scope for efficiency gains*

The scope for efficiency gains through better integration of demand management options within water supply planning is likely to be substantial. Positive steps have been taken in some jurisdictions but there is still substantial scope for improvement. The potential gains are a subset of the gains available from improving demand management for water and wastewater more generally. Accordingly, quantitative estimates are left to chapters 6 and 7.

### *Impediments to achieving these gains*

The main barrier to achieving these gains is the view among many policy makers that water conservation and water use efficiency are objectives that should be pursued in their own right (chapter 3). The need to refocus water conservation and water efficiency policy is explained further in chapter 7.

Another impediment is that the responsibility for setting targets and implementing demand management options is often spread across a range of entities, including water utilities, Australian, State and Territory Government departments (sometimes with a role for both water and planning departments) and Local Governments. This makes it difficult to fully integrate demand management options within water supply planning.

## **Considering all supply augmentation options**

Different supply augmentation options have different attributes such as degree of rainfall dependence, capital cost, operating cost, greenhouse gas emissions and impact on native vegetation. It is important that options are not ruled in or out on the basis of one negative or positive attribute. Achieving efficient supply augmentation requires that all of the costs and benefits of each option are considered (and compared with demand management options, as discussed above).

As technology has developed, the range of feasible options has expanded to include seawater desalination and various wastewater and stormwater reuse/recycling options, in addition to rivers, dams and groundwater. It is also increasingly being recognised that an urban water system's available supplies can be increased by creating physical connections to rural systems and other urban systems.

---

### *Current situation*

In recent years, commentators have expressed concern that supply augmentation decisions have been made without transparent consideration of the costs and benefits of all available options. For example, the National Water Commission (NWC) has stated:

... the Commission believes that barriers to the adoption of some cost-effective new and alternative sources remain. The Commission is of the strong view that, rather than outright policy bans, options should be selected through a robust, open-minded and transparent comparison of all options, examining the social, environmental and economic costs and benefits and taking into account the specific water system characteristics, in consultation with the community. (NWC 2009a, p. 236)

The Australian Water Association also argued that ‘... analyses are frequently undermined by subsidisation of supply options or the imposition of policy bans’ (sub. 42, p. 8). Similarly, the Business Council of Australia contended that ‘it is not always clear that governments have been prepared to select from the full list of [supply augmentation] options or have chosen the lowest cost options for supply’ (sub. 66, p. 3).

The potential inefficiencies from policy bans and subsidies are obviously greater during periods, such as the past few years, when investment levels in supply augmentation are high.

While most jurisdictions have planning processes that allow for the consideration of a range of supply augmentation options, there is evidence of options being rejected or given preference without transparent consideration of costs and benefits, as discussed below.

### *Scope for efficiency gains*

The scope for efficiency gains from ensuring that all supply augmentation options are properly considered is illustrated below using some examples. It should not be inferred from these examples that the Commission has a general preference for options such as rural–urban trade or indirect potable reuse, or is opposed to desalination, new dams or non-potable recycling. It is likely that each of these options will be appropriate in some circumstances.

### *Restrictions on purchasing rural water for urban use*

For some cities and towns, urban water demand can be met by purchasing rural water from irrigators. Professor John Quiggin (sub. 26, p. 2) contended that

---

‘[w]here it is technologically feasible, purchase of water from irrigation is likely to be the least-cost option’.

Allowing trade in water between the rural and urban sectors generally provides benefits for irrigators, urban water users and the community more broadly. As with other trades that are freely entered into, both the buyer and seller are made better off. The community benefits because trade allows water to move from lower to higher value uses (where value is expressed through willingness to pay). Trade within the rural sector has assisted irrigators to adjust to changing circumstances, particularly during drought (appendix C). Removing restrictions on rural–urban trade has the potential to provide further benefits.

Various arguments have been made opposing rural–urban trade in water, but these do not usually consider costs and benefits to the entire community. The three main arguments are considered below.

First, is the argument that rural–urban trade would reduce food production and food security. Although some rural water is used to produce cotton, wine and other non-food products, rural to urban trade would be likely to reduce food production by irrigators unless irrigators improve their water use efficiency. However, the value of water for food production determines the price that irrigators are willing to pay for it. Where the urban water sector is willing to pay a higher price, it can be inferred that trade will allow water to be reallocated to a higher value use. While a kilogram of rice or a litre of milk is of value, for many people so too is creating an attractive garden or not rushing their shower. Where irrigators have a higher willingness to pay, trade may go in the other direction, from the urban water sector to irrigators.

Second, it is sometimes argued that such trade will impose costs on irrigators. However, the Commission has found that there are both benefits and costs for irrigators (PC 2010a). The entry of new (urban) buyers into a rural water market will tend to make the price of water higher than it would otherwise be. Irrigators that own water entitlements benefit from this, whether or not they choose to sell some of their entitlements. Irrigators looking to purchase entitlements or seasonal allocations may be worse off, as they may have to pay a higher price. Another consideration is that trade to urban areas may leave fewer irrigators to share the fixed costs associated with irrigation infrastructure. However, these costs would be offset by the termination fees that are levied on departing irrigators (PC 2010a).

Third, there is concern that allowing trade will disadvantage regional communities that rely on the irrigation sector. As previously stated by the Commission:

---

In addition to the direct impacts on irrigators, there could be indirect impacts on regional businesses that service irrigated agriculture and that are likely to experience a reduction in demand for their services if there is a contraction in irrigated agriculture due to reduced supply or higher cost of irrigation water. These negative impacts may lead to flow-on effects, where other businesses providing inputs into the production of the initially-affected business are also adversely affected. (PC 2010a, p. 99)

These flow-on effects may produce net financial and social costs for particular regions, but these are likely to be modest in most cases because:

- urban water use is often small compared to rural use and so a small proportion of rural water can make a large contribution to urban supplies (for example, the 100 gegalitre (GL) annual capacity of the Sugarloaf (Goulburn River-Melbourne) pipeline is equivalent to around 7 per cent of high reliability water entitlements under Goulburn Murray Water (DSE 2011c))
- water trade allows water to be sourced from those that value it least, such as irrigators that are easily able to reconfigure their businesses to use less water and those whose production per megalitre of water is relatively low
- many regional economies have diversified over recent decades and now rely less on agriculture (Stayner 1996; PC 2005d).

Even so, it is appropriate for governments to take the potential for negative effects on regional communities into account. These should, however, be weighed up against the potentially large benefits that can result from allowing rural–urban trade. In the Commission’s view, governments should allow trade and assist individuals and communities to adjust to the resulting change, rather than seek to preserve the status quo. As with all water trades, environmental impacts from rural–urban trades (which may be positive or negative) need to be managed.

At a high level, governments appear to have accepted that allowing trade is desirable, as evidenced by them agreeing to ‘facilitate water trading between and within the urban and rural sectors’ as part of the National Water Initiative (NWI) (COAG 2004, p. 19). Some progress has occurred in this regard, as there are examples of trades and other transfers between irrigators and the urban water sector (chapter 2). However, despite the commitments entered into through the NWI, unwarranted restrictions on, and impediments to, rural–urban water trading remain.

For example, the South Australian Government decided to construct a desalination plant to augment water supplies for Adelaide in preference to relying on rural–urban trade. The Australian Government provided funding of \$328 million on the condition that the plants capacity was expanded from 50 to 100 GL per year. Analysis based on the limited information available to the Commission suggests

---

that opting instead for purchasing water entitlements from the Murray-Darling Basin would have:

- generated a capital saving of as much as \$1.6 billion
- produced substantial savings in operating costs
- significantly increased flexibility, given the option of selling surplus allocations to irrigators in some years (appendix E).

On the other hand, entitlements generally yield a more variable annual quantity of water than a desalination plant and this can create risks to water security. The Commission's assessment, however, is that these risks could be managed at a reasonably low cost (appendix E). Accordingly, while the desalination option would be likely to provide less variable supply than purchasing entitlements, this advantage appears not to be significant enough to overcome its cost and flexibility disadvantages. The fact that a desalination plant was preferred suggests that there might have been an implicit government veto on continuing with the purchasing option, due to its political sensitivity. Despite significant Australian Government subsidies, South Australians are starting to see the consequence of this decision, with water prices increasing by an average of 26 per cent from July 2011 (SA Water 2011g).

It appears that the Australian Government's intervention to double the plant's capacity was at least partly motivated by the objective of securing environmental water to help meet the anticipated requirements of the Murray-Darling Basin Plan (appendix E). The Commission's assessment is that the desalination plant is an inefficient supply augmentation for Adelaide, but that it is an even more inefficient way to (indirectly) provide environmental water (appendix E). Accordingly, the Australian Government's intervention is likely to impose a higher cost on the community than was necessary.

In responding to the draft report, the South Australian Government (sub. DR132) said that desalination was the best overall value for money supply option, but has not provided analysis to support this claim (appendix E).

In Victoria, the previous government built a pipeline connecting the Goulburn River system to the Sugarloaf Dam, which is part of Melbourne's water supply system. The intention was to transfer up to 75 GL per year to Melbourne, with this water representing a share of water savings resulting from government funded upgrades to irrigation infrastructure. On one hand, this project was a significant step towards removing the costly separation that has existed between rural and urban water. On the other, the method used to source the water — indirect purchase through funding irrigation infrastructure upgrades — has been found to be generally less cost

---

effective than the alternative of purchasing the water from willing sellers (PC 2010a). In addition, the decision to cap the volume at 75 GL per year, well below the pipe's capacity, unnecessarily constrained the net benefits available from rural–urban transfers.

The Sugarloaf pipeline project, which cost \$750 million, was completed and commenced transporting water in 2010. There was a change of government in Victoria in late 2010 and the new government's policy is to shut down the pipeline and only use it in the event of a 'critical human needs emergency' (Austin 2010). An election policy document states:

The Liberal Nationals Coalition has always maintained that the pipeline is destined to become a very expensive white elephant and with Melbourne's storages rapidly filling, it would seem this will soon be true. When Melbourne Water requires water from the pipeline it is highly likely the Goulburn catchment will be in a worse drought than the Melbourne catchments. (Liberal Victoria and the Nationals for Regional Victoria 2010, p. 6)

The claim that the pipeline is likely to become a 'white elephant' is difficult to reconcile with plans outlined in the same document to increase recycled water production by an amount greater than the pipeline's capacity. If the pipeline is unnecessary so too is increased water recycling. Also, contrary to what the document implies, the pipeline is able to contribute to Melbourne's water supply during droughts by utilising whatever seasonal allocations are made, carrying over water in dams and by purchasing on the temporary water market if needed.

Modelling by the Commission has been used to estimate the cost to the community of the decision to not use the Sugarloaf pipeline. The central estimate is that costs over the next 20 years equate to \$312 million in present value terms, with a minimum estimate of \$229 million and a maximum of \$736 million (technical supplement 1). This modelling does not factor in use of the pipeline in a critical human needs emergency, as allowed under current policy. However, this does not make a material difference to the estimates because the modelling incorporates optimal supply augmentation and demand management actions that effectively reduce the chances of such an emergency to extremely low levels.

The examples above illustrate that there are restrictions on rural–urban trade that impede efficient resource allocation. In addition, there are impediments to water trading generally, which can affect trade within the rural sector as well as rural–urban trade. Prominent among these is the 4 per cent limit on annual trade of water entitlements out of irrigation areas, which is most commonly binding in Victoria. The Commission has previously recommended that this limit be eliminated as soon as possible, rather than be phased out by 2014 as currently scheduled (PC 2010a).

---

### *Restrictions on trading administratively allocated urban water entitlements*

Water entitlements or licences are commonly provided to regional urban water utilities (and some metropolitan utilities) as part of water planning processes. For example, in New South Wales, local water utility licences are issued for particular cities and towns. These entitlements or licences generally have a very high level of security with allocations generally only falling below 100 per cent after several years of drought.

Wagga Wagga City Council argued that most cities and towns in New South Wales had a larger entitlement than they ‘reasonably’ required (as assessed by a State Government process), and that there were inequities in the distribution of these entitlements:

... some towns have very restricted entitlements, [and] struggle to stay within them, and other towns seem to have very excessively high entitlements. (trans., p. 657)

In some cases there are restrictions on trading urban water entitlements, and associated allocations, that do not apply to other types of entitlements. For example, in New South Wales local water utility licence allocations can only be sold to other urban water utilities, and then only under certain circumstances:

A utility is required to demonstrate its water supply security before it is permitted to trade. The utility is only permitted to trade a component of its demonstrated water savings. (NSW Government, sub. DR146, pp. 31–2)

These restrictions severely constrain the opportunities to trade water. For example, urban water utilities that have excess water for reasons other than that they have undertaken water saving measures are prevented from selling.

Such restrictions can result in an inefficient allocation of water resources by placing utilities in a ‘use it or lose it’ situation. That is, where towns are prevented from selling excess water they might instead put it to low-value use in preference to leaving it unused. These inefficiencies will tend to be greater where the administrative allocation of water to cities and towns does not match well with their requirements.

Governments may implement trading restrictions in order to prevent irresponsible trading by utilities that could threaten urban water security. In general, however, it would seem preferable to hold water utilities accountable for their actions and give them greater flexibility in managing water.

Restrictions may also be motivated by wanting to prevent cities and towns profiting from having administrative allocations that significantly exceed their needs. Where this is the case, the preferred action would be to review administrative allocations to

---

make sure they do not exceed reasonable needs and are equitable across the jurisdiction. Utilities should then, in general, be free to buy and sell water as needed, including to meet increased demand resulting from population growth.

RECOMMENDATION 5.1

***Any restrictions on water trading by regional urban water utilities should be independently reviewed and, if they cannot be shown to provide net public benefits, they should be removed.***

#### *Prohibition on indirect potable reuse*

There are many instances, in Australia and elsewhere, of wastewater being treated and discharged to a river system that supplies downstream communities with potable water. This practice is known as *unplanned indirect potable reuse*. For example, most of the ACT's wastewater is treated and discharged into the Molongolo River, which flows into the Murrumbidgee River which in turn flows into the Murray River. Along the way this water forms part of the water supply for many cities and towns, including Wagga Wagga and Adelaide.

Introducing treated sewage into a waterway that is subsequently used for potable use downstream causes health risks that need to be managed at both the discharge and reuse sites. Failure to do this has caused major health problems, particularly (but not exclusively) in developing countries (Professor Peter Collignon, sub. DR98). It would appear, however, that these risks are being managed satisfactorily in the large majority of urban water systems in Australia and that the community is accepting of current practice. Water quality problems are experienced in some regional areas (discussed later) and it is possible that upstream sewage discharge contributes to these, along with pollutants from other sources, such as livestock.

In contrast, *planned indirect potable reuse* is less common and remains contentious. Indeed, the NWC reports that New South Wales, Victoria and South Australia have policy bans that preclude the use of this option (NWC 2010b), despite these states utilising unplanned potable use of recycled water originally sourced from the ACT and elsewhere. In Queensland, three advanced water treatment plants have been built that have the capacity to supply south-east Queensland with drinking water, but, at least partly to save on operating costs, they are only to be used for this purpose when dam levels fall below 40 per cent (Queensland Government nd; Department of Environment and Resource Management, sub. 60). Recycling was also proposed for Toowoomba, but government support for this project was withdrawn following community opposition (box 5.3).

---

### Box 5.3 Toowoomba recycled water proposal

Toowoomba is located 127 kilometres west of Brisbane in the headwaters of the Darling River. It is one of Australia's largest inland cities, with a population of 95 000. The population of the greater Toowoomba region is 135 000.

In the face of declining dam levels in the early 2000s, Toowoomba City Council began to assess various options for augmenting supply. These options included new dams, water produced from coal seam gas operations, groundwater and piping water from the Brisbane River system. For cost, environmental and reliability reasons, planned indirect potable reuse of wastewater was identified as a preferred option. The environmental benefits related mainly to reduced nutrient and salt exports to the Darling River.

This option involved building an advanced water treatment plant (using reverse osmosis technology) to process more than 5000 megalitres of wastewater sourced from the city's wastewater treatment plant. Most of this water was to be piped to an existing dam to become part of the city's potable water supply, with some lower quality water being used for other purposes, including coal washing and irrigated agriculture. The estimated cost of the project was \$68 million and Council sought part-funding from the Australian Government's Water Smart Australia program in 2005.

There was fierce debate about this proposal in Toowoomba. People opposing the project ran a high-profile public campaign warning of possible public health risks, even though the plant was to produce water of a higher quality than the existing supply. This campaign reportedly extended to measures such as displaying babies' bottles with toilet paper in them.

According to the then mayor, the Australian Government took the unusual step of requiring that a poll be held to gauge the level of support for the project in Toowoomba before a decision on funding would be made. The poll was held in July 2006. The vote in favour of the project was 38 per cent, with 62 per cent opposed. In light of this result the project did not proceed.

Subsequently, a 38 kilometre pipeline was constructed to transport water from Wivenhoe Dam (Brisbane's main dam) to Cressbrook Dam near Toowoomba at a cost of \$187 million.

*Sources:* Toowoomba City Council (2005); Diane Thorley, trans., pp. 419–31.

The viability of planned indirect potable reuse has increased due to the development of technologies, such as reverse osmosis, that are able to treat stormwater and wastewater to a standard that makes it suitable for human consumption. Because the consequences of undetected failure of these technologies are high, it is generally considered preferable to add the treated water to dams or aquifers prior to distributing it to water users. Making use indirect in these ways can assist in managing public health risks through dilution, allowing natural processes to reduce pathogens over time, and enabling monitoring to be undertaken prior to consumption.

---

A range of science and health experts have concluded that the risks associated with planned indirect potable reuse can be managed satisfactorily. For example:

- Following health and other assessments, indirect potable reuse schemes have been introduced in the United States, Singapore and other countries, and an Australian review found that ‘[d]espite more than forty years experience, no clear deleterious health effects from planned indirect potable recycling schemes have been observed’ (Khan and Roser 2007, p. 3).
- An expert health panel concluded that a reverse osmosis-based water purification plant was a feasible option for Canberra, subject to stringent health and safety requirements (Expert Panel on Health 2007).
- Australian guidelines for water recycling for potable use have been developed with input from health experts, and these are designed to assure water quality at point of use by consumers (EPHC, NHMRC and NRMCC 2008).

Dr David Cunliffe, the principal water quality adviser with SA Health, indicated to the Commission that indirect potable reuse can be implemented safely, provided these guidelines were followed (trans., p. 767). There are, however, some health experts that oppose potable reuse of wastewater in most circumstances, because they regard the risks as being too high. For example, Professor Peter Collignon stated:

While technically feasible, even if done with the currently optimal processes available (i.e. multiple barriers including reverse osmosis membrane), the community needs to be very wary. It should be a ‘last resort’ option for many reasons, but especially because of the potential ‘catastrophic’ public health implications if something in this complex and ‘very high risk’ process goes wrong. (sub. DR98, p. 4)

In the Commission’s view, the concerns raised by Professor Collignon, and other inquiry participants such as Laurence Jones (sub. DR135), underscore the need for rigorous risk management processes to be used, but the conclusions drawn by expert water quality and health reviews indicate that banning indirect potable reuse schemes, or treating them as a last resort option, is not warranted.

A major advantage of using recycled water for potable rather than non-potable use is that separate distribution infrastructure is not required. Recycling to potable standard is, however, generally quite costly and so this option will not be appropriate in areas that have low-cost alternatives.

The cost of indirect potable reuse relative to seawater desalination will vary from place to place, due to factors such as distance and pumping requirements for transporting treated water to a suitable dam. In general, plant operating costs are likely to be lower for indirect potable reuse as wastewater has a lower salt

---

concentration than seawater and this means less energy is required to drive the reverse osmosis process (WSAA, trans., p. 676). Increasing stringency of discharge standards for treated wastewater also means that the incremental cost of further treatment to potable standard is likely to have declined over time. On the other hand, monitoring and other costs associated with managing health risks will generally be higher for indirect potable reuse. As well as costs, community attitudes should also be taken into account.

It could be argued that governments that impose policy bans on indirect potable reuse are responding appropriately to the health and other concerns of the community. It would appear, however, that the weight of scientific evidence is that the risks of using recycled water for drinking purposes can be satisfactorily managed (NWC 2010b). Given this, the Commission is in agreement with the NWC that rather than impose outright policy bans:

... decisions on whether to use recycling for drinking purposes should objectively consider the risks, the costs and the benefits through a transparent and participatory process. (NWC 2010b, p. 1)

#### *Prohibition on using an aquifer*

In 2005, the WA Water Corporation stated that it was actively pursuing three new sources of supply for the Integrated Water Supply Scheme, which supplies Perth and other areas of Western Australia (Water Corporation 2005). The first two of these, the Kwinana desalination plant and a water trade with Harvey Water were subsequently implemented. The Water Corporation planned to complete the third — utilisation of the south-west Yarragadee aquifer to supply 45 GL per year — by late 2009.

In 2007, the then Premier announced that a second seawater desalination plant would be Western Australia's next major water source and that the Water Corporation's plan to utilise the south-west Yarragadee aquifer would be shelved (Carpenter 2007). The aquifer option had by that stage 'effectively received environmental approval' (Carpenter 2007).

The Commission estimates that building the second desalination plant was more costly to the community than utilising the south-west Yarragadee aquifer by between \$241 to \$335 million over a 20 year period, depending on modelling assumptions (technical supplement 1). This is quite similar to the Water Corporation's own estimate of \$360 million, even though they used a quite different calculation method (sub. DR151, p. 2).

---

The important question is whether this additional cost was warranted given environmental and social factors not built into the above estimates, or is an unnecessary cost imposed on Western Australians for no good reason.

Water Corporation argued that the financial costs were known at the time and the decision by the Western Australian Government reflects their valuation of the social and environmental values (sub. DR151). Peter Lane (sub. DR92) also argued that there were environmental reasons not to proceed with the aquifer option.

Further information provided by Water Corporation indicates that the aquifer proposal was designed to minimise environmental impacts so as to gain approval from the Environmental Protection Authority (EPA) Western Australia. The EPA Western Australia had advised that the proposal could proceed provided:

- suitable monitoring and environmental management plans were implemented
- no further allocations were made from the aquifer prior to the South West Groundwater Areas Management Plan being completed and approved (EPA Western Australia 2006).

With environmental issues having been addressed in this way, it appears that the Government's decision was made on social grounds:

I think probably when you look at where they made the decision it's probably — you could put it under the social benefits heading was where they were making the assessment. ... there was a fairly strong campaign from the local community about keeping the water in the south-west for the future benefit of that region rather than bringing it to Perth. (Water Corporation, trans., p. 781)

This suggests that the decision had a similar rationale to the decisions to restrict rural–urban trade discussed above. Rather than prohibit the use of an aquifer for a particular purpose in this way, it would be preferable to:

- place environmentally sustainable limits on the use of the aquifer
- put arrangements in place that allowed this water to be allocated to its highest value use.

If this had been done, it seems likely that the Water Corporation's original plan to utilise the south-west Yarragadee aquifer to supply Perth and other areas would have proceeded in preference to the second desalination plant. The Commission's modelling estimates indicate that this would have been a less costly outcome, although the cost difference is quite small relative to the examples given in this chapter for some other cities.

---

The Commission modelling referred to above compares investment in desalination with utilising the south-west Yarragadee aquifer at a given point in time. Other modelling by the Commission examines building on these efficiency gains by taking a more flexible approach to the timing of investments and allowing the development of other possible supply sources as needed (for example, the north-west metropolitan coastal groundwater scheme). This shows a flexible strategy in which the south-west Yarragadee and other aquifers could be utilised as being \$468 to \$557 million less costly over a 20 year period than a fixed strategy of building the second desalination plant and placing a policy ban on the south-west Yarragadee aquifer.

#### *Unwarranted preference given to water reuse and recycling for non-potable use*

The Australian, State and Territory Governments often give preference to supply augmentations that involve reusing or recycling water for non-potable uses by subsidising them or mandating their use. Although reuse and recycling options can provide benefits in addition to water supply, the Commission's view is that the preference given to these options is in many cases not justified by these additional benefits. Evidence and analysis of this issue are presented later in the section on integrated water cycle management, and this suggests that the costs to the community of unwarranted preference being given to water reuse and recycling for non-potable use are substantial.

#### *Impediments to achieving these gains*

One impediment to achieving gains from considering the costs, benefits and risks of all supply augmentation options is the existence of implicit and explicit policy bans on certain options.

#### RECOMMENDATION 5.2

***State and Territory Governments should adopt policy settings that require the costs, benefits and risks of all supply augmentation and demand management options to be considered using a real options (or adaptive management) approach.***

***Information on all augmentation options and their respective merits should be made publicly available and views of the community sought, especially regarding sensitive options like indirect potable reuse.***

***Bans on particular augmentation options (whether or not explicitly stated) should be removed, including those on rural–urban trade and indirect potable reuse.***

---

A further impediment is government subsidies for particular supply augmentation options. This involves both small-scale augmentations, like rainwater tanks (discussed in the later section on integrated water cycle management) and larger-scale augmentations.

There is a range of programs that provide subsidies for larger-scale supply augmentations and for other urban water infrastructure. The Australian Government provides subsidies through the following water-specific programs:

- National Urban Water and Desalination Plan
- National Water Security Plan for Cities and Towns
- Water Smart Australia
- Strengthening Basin Communities.

Further detail on these programs is included in box 5.4. This box shows that the reuse and recycling options referred to earlier feature heavily in the programs funded, but that subsidies have also been provided for desalination plants, pipelines, water treatment plants and other water and wastewater infrastructure. Australian Government funding for water recycling projects is also provided through more generic infrastructure programs, such as the Green Precincts Fund.

State and Territory Governments also provide subsidies for supply augmentations and for other urban water infrastructure. For example, they have co-funded some of the projects listed in box 5.4 and some jurisdictions also provide subsidies to regional water utilities (Midcoast Water, sub. 51).

The Australian Water Association reported:

Sustainable urban water management demands that all sources of water be considered equally. Governments have tended, however, to subsidise some water supplies over others. Rainwater tanks have commonly been subsidised and more recently major infrastructure projects have been subsidised, notably the desalination plant in South Australia and various other desalination and stormwater reuse initiatives. Where this occurs, a water source may be brought on line earlier than necessary, building unnecessary supply into a system at considerable cost to the community. (sub. 42, p. 17)

The Independent Pricing and Regulatory Tribunal (IPART) argued:

I think there have been some recent cases where government at all levels have rushed in to subsidise urban water infrastructure and you might wonder about the wisdom of that, or whether that's not actually distorting what infrastructure gets built or moving us away from the most efficient ways of meeting people's water needs. (trans., p. 25)

---

## Box 5.4 **Australian Government subsidies for supply augmentations and other water infrastructure**

### **National Urban Water and Desalination Plan**

This program provides grants for desalination plants and recycling and stormwater harvesting infrastructure. It was announced in 2008 as a \$1 billion program. Under the program, \$20 million has also been allocated to each of two National Centres of Excellence to support innovative technologies in desalination and water recycling. Other grants made under the program include (amounts are rounded):

- \$328 million for the 100 GL per year Adelaide Desalination Plant
- \$64 million to the Department for Water (SA) to coordinate the delivery of seven projects, including a stormwater harvesting project in the City of Salisbury
- \$30 million for the Glenelg to Adelaide parklands water recycling project
- \$18 million for the southern seawater desalination plant in Western Australia.

### **National Water Security Plan for Cities and Towns**

Funding of \$255 million has been committed through this program for projects that save water and reduce water losses in cities and towns with populations of less than 50 000. Grants made include:

- \$52 million to improve water and wastewater services in 17 Indigenous communities in remote areas (in various jurisdictions)
- \$20 million for the Rockhampton to Gladstone pipeline (Queensland)
- \$10 million for a rollout of water meters in Tasmania.

### **Water Smart Australia**

This is a \$1.6 billion program, with funding over seven years until 2011. The program has provided funding for a wide range of infrastructure projects to benefit irrigators, urban water systems and the environment. Grants for urban projects include:

- \$408 million for the Western Corridor recycling project (Queensland)
- \$115 million for the Goldfields 'superpipe' to Bendigo and Ballarat (Victoria)
- \$80 million for the Mardi Mangrove link project for pump stations and pipelines to increase water security for the Central Coast region (NSW)
- \$46 million for the Mackay wastewater recycling project (Queensland).

### **Strengthening Basin Communities**

This is a \$200 million program that provides grants to Local Governments in the Murray-Darling Basin to assist in communitywide planning for a future with less water and to support projects that improve water security by reducing demand on potable water supplies. An example of the latter type of grant is \$9 million to secure the water supply to Lake Cargelligo, Murrin Bridge, Tullibigeal and Kikiora townships (NSW).

*Sources:* DSEWPC (2010b); Swan and Wong (2008).

---

Midcoast Water commented specifically on the Water Smart Australia program:

- The majority of the projects provided [with] funding subsidies ... should have been funded by the commercial pricing of the water utilities.
- Few of the projects demonstrate innovation that would lead to the improved future performance of the water industry and its service provision.
- Much of the funding went to projects that had already been committed to by councils and had funding plans in place. The result is that infrastructure is being built which is not being funded by the users under a transparent commercial arrangement that reflects the true cost.
- The outcome of the vast majority of funding has been to reinforce the old 'hand-out' mentality of many local governments thereby eroding the benefits of the 1994 COAG water reforms. (sub. 51, p. 16)

The Commission broadly agrees with the arguments made by these participants. Such subsidies can not only distort the choice of augmentation, but also result in them being made at the wrong time or scale. Where water utilities fund augmentations and other infrastructure projects, they generally have the discipline of knowing that costs will need to be recovered through water charges and they may also be required to justify their actions to an economic regulator. By contrast, the funding guidelines for government programs that provide subsidies provide a weaker form of discipline and may actually preclude the most efficient option from being selected. For example, the guidelines for the National Urban Water and Desalination Plan:

- specify that only projects that involve desalination, recycling or stormwater harvesting are eligible for funding, even though another type of augmentation may be more efficient
- state that project proposals should include a cost–benefit analysis, but do not require analysis comparing the project to other options (DEWHA 2008).

A further problem with subsidies is that they can result in consumers not paying the full cost of water, which can lead to inefficiently high consumption. The provision of subsidies is also inconsistent with the cost recovery objectives for urban water outlined in the NWI. As argued by the NWC:

Government subsidisation of urban and rural water infrastructure investments has constituted a step backwards from the commitment to price water according to the true cost of the resource, capital assets and service delivery. (NWC 2011b, p. iii)

A possible argument in favour of subsidies is that they can be used to promote better environmental outcomes. For example, a subsidy might secure the use of a supply augmentation option that has better environmental performance than the one that might have been chosen otherwise.

---

In the Commission's view, however, it is generally preferable for governments to ensure that water utilities and stormwater managers face environmental constraints and incentives that result in environmental matters being appropriately factored into their decisions, rather than using subsidies. For example:

- setting wastewater discharge standards that need to be met through improved treatment and/or recycling of wastewater
- where national greenhouse gas emission reduction targets have been set, ensuring that electricity prices have the environmental costs associated with emissions built into them, thereby creating a financial disincentive to using emissions-intensive augmentation options.

This approach has the potential to lead to better investment decisions and result in the price of water services being appropriately influenced by their environmental costs (that is, the externality is internalised). In some cases, this might result in a water utility and a stormwater manager jointly funding a project that provides benefits to each. For example, a stormwater reuse project might provide both a source of water, and lower the flood risk and environmental damage caused by stormwater.

Where a policy decision is taken to increase the stringency of environmental standards there may, however, be a case for providing subsidies as a form of structural adjustment assistance. The Commission has previously concluded that the case for such assistance is strongest where policy changes:

- impose a clear and sizeable burden on a specific group in the community (particularly if the affected group is relatively disadvantaged);
- deliver benefits mainly to relatively advantaged groups in the community; and/or
- are largely unanticipated (they occur with limited notice) and involve material changes to a well defined and defensible 'property right'. (PC 2001d, pp. 62–5)

There might be a case for assistance, for example, where the stringency of wastewater discharge standards is increased to protect an environmental asset that is valued by the broader community (such as the Great Barrier Reef). While the benefits of this would accrue to the broader community, the costs (for example, for upgrading wastewater treatment plants) might fall primarily on a relatively small defined group and the costs per person could be high. In this situation, assistance could be provided in the form of a subsidy for a proportion of the extra costs for meeting the new discharge standards.

There is also a case for subsidies in some regional areas, as discussed in chapter 13.

*In general, the Australian, State and Territory Governments should cease providing subsidies for water, wastewater and stormwater infrastructure. The possible exceptions are where:*

- *infrastructure investment is required due to changes in environmental standards that impose a significant cost on a defined group and/or infringe a well defined ‘property right’*
- *a formal and transparent process has identified that a regional community should not be required to recover costs fully through water charges.*

The draft report recommendation that subsidies should generally not be provided was supported by many inquiry participants, including Infrastructure Australia (sub. DR107), Queensland Water Directorate (sub. DR138), the NSW Government (sub. DR146) and the Australian Water Association (sub. DR157). Since the draft report was released the budget for the National Urban Water and Desalination Plan for 2011-12 was reduced by \$86 million, which in the Commission’s view is a modest but positive development (Australian Government 2011b).

A final impediment to achieving these gains is the existence of institutional, governance and structural arrangements that do not promote the selection of supply augmentation options based on costs and benefits. For example, water utilities are often given a range of conflicting objectives and this can prevent them from focusing on finding lowest expected cost solutions. Also, utilities may have little incentive to look beyond options developed ‘in-house’ and so innovative proposals by the private sector may not be sufficiently encouraged or considered. Chapters 10 and 12 put forward reform options designed to overcome these impediments.

## **Taking a real options approach**

*What is a real options approach?*

Making supply augmentation decisions efficiently requires a sophisticated approach to dealing with uncertainty. There is large uncertainty about future water supply, as well as some uncertainty about future demand. No one knows how wet the next one, five or 20 years will be, and therefore how much water will flow into urban water supply dams. The historic record for many parts of Australia shows great variability in rainfall, but the prospect of ongoing climate change means that the range of possible future outcomes is wider still. For example, current projections indicate that the southern Murray-Darling Basin is likely to become drier by 2030, but the

---

possibility that it will become wetter can not be ruled out (CSIRO 2008). More extreme weather events are predicted (CSIRO 2008).

An important aspect of dealing with this uncertainty is recognising that as time elapses some uncertainties are resolved. Dam inflows over the next 12 months are uncertain, but in a year's time they are a known fact. It follows from this that there can be a value in being able to delay major investment decisions until more information becomes available. One way that this can be done is by not committing to investments earlier than necessary. Another is by taking actions that enable decisions to be delayed in a way that does not threaten water security. For example, doing preparatory work to reduce the lead time for bringing a supply augmentation on stream. In some cases this value can be large and certainly worth funding.

The 'real options' approach to investment under uncertainty has been developed over the past 20 or 30 years and has been applied in a wide range of contexts. In many instances taking this approach is complex; however, the basic idea can be illustrated using a simpler example, such as deciding which house to buy (box 5.5).

#### **Box 5.5 Real options and buying a house**

Imagine that a young couple have decided to buy a house. A modest two bedroom house would meet their current needs, but they intend having children and so are likely to need more room later on. They are, however, uncertain how many children they will have and how they will want to live as a family (for example, whether they will want two living spaces). Their future level of income is also uncertain.

One approach they could take is to buy a house that is big enough to meet their maximum future space requirements. Taking a real options approach, however, might entail purchasing a smaller house that is capable of being extended later on. While this might not be the most cost-effective option for meeting either their current needs or their maximum likely future needs, it might be cost effective overall, given the uncertainties.

Because houses can be bought and sold, the advantage of taking a real options approach is likely to be less pronounced than in the urban water context. A desalination plant that proves to be bigger than required cannot be sold.

Where a major supply augmentation can be safely deferred for a year or two the subsequent pattern of rainfall can result in it not being needed for a decade or more, which provides a major cost saving. An example of the type of situation that a real options approach may be able to avoid is provided by Grafton and Ward:

Santa Barbara, California, built a desalination plant during a 1991 drought; the drought ended before the plant was on-line, and the plant has been mothballed since construction. (Grafton and Ward 2010, p. 1)

---

Under a conventional approach, a fixed supply augmentation plan is developed taking into account future climatic and other uncertainties. Under a real options approach, there is no fixed plan, rather decisions are made over time depending on actual outcomes.

As stated in Borison et al. (2008):

Real options is now being applied by managers in both the public and private sectors as a way of thinking, a specialized analytic tool for evaluating complex investments, and an organizational process for guiding strategy. (Borison et al. 2008, p. 8)

Adopting real options as a way of thinking is the first step. Achieving the potential offered by real options, however, requires that specialised analytical tools be developed and then used by organisations responsible for making augmentation decisions. A range of analytical tools have been developed using different methodologies. Borison et al. (2008) identify the ‘risk-adjusted decision tree method’ as appropriate for urban water resource planning. This is the method that has been adopted by the Commission for the modelling undertaken for this inquiry (technical supplement 1).

### *Current situation*

The urban water sector has been giving increasing attention to real options approaches to supply planning. Evidence for this includes:

- the Water Services Association of Australia (WSAA) commissioning a study into the approach (Borison et al. 2008)
- increasing recognition of the importance of adaptive management, a concept related to real options, in urban water plans (for example, NSW Office of Water 2010c)
- ACTEW (sub. 45) reported that the approach it takes to supply augmentation decision making is consistent with real options analysis.

It would appear, however, that this attention has not yet translated into widespread changes to the way supply augmentation decisions are made. ACIL Tasman, which has been active in articulating the benefits of a real options approach to the urban water sector, reported:

Source planning in many jurisdictions ... is predicated on an approach that seeks an approximately *least cost strategy under one assumed forward scenario regarding climate change and demand*, coupled with stress testing to ensure that the strategy is robust enough to deal with the assumed ‘worst case scenario’. This typically means planning a strategy that is reasonably cost effective in relation to *either the worst case scenario or a highly conservative, low inflow scenario*. (ACIL Tasman 2007a, p. viii)

---

This contrasts with a real options approach that considers all plausible future scenarios and seeks to achieve a lowest expected cost means of balancing supply and demand.

As discussed later, in some cases where utilities have made progress towards implementing a real options approach this has been frustrated by governments making augmentation decisions, subsidising projects and setting water conservation targets.

### *Scope for efficiency gains*

There is no point in bringing the wisdom of hindsight to supply augmentation decisions, for example, by claiming that an existing desalination plant did not need to be built because subsequent rainfall has filled dams. The best that can be achieved is for decisions to be made that enable supply and demand to be balanced at lowest *expected* cost. An inefficient augmentation decision is one that can be demonstrated to have not met this test. And an inefficient approach to making decisions is one that can be shown to perform less well against this test than another feasible approach.

### *Melbourne example*

The Victorian Government released a water plan in 2007 that involved two major augmentations to Melbourne's water supply system — a desalination plant with a 150 GL per year capacity (capable of expansion to 200 GL) and the pipeline connecting the Goulburn River system to the Sugarloaf Dam, discussed earlier (Victorian Government 2007). The combined initial capacity of these augmentations is equivalent to about 64 per cent of Melbourne's water consumption in 2009-10.

Simultaneously committing to two such large supply augmentations can be seen as the antithesis of a real options approach. Such a plan seems to seek to answer the question 'what can we do now to achieve water security, assuming the worst case scenario eventuates?'. By contrast, a real options approach asks 'how can we make decisions over time to achieve water security at lowest expected cost, given uncertainties about future inflows?'.

Modelling by the Commission estimates the excess cost to the community of this plan relative to an optimal strategy to be \$2.7 to \$3.7 billion over a 20 year period (in net present value terms), depending on modelling assumptions (technical supplement 1). These estimates include costs associated with having a fixed plan

---

rather than taking a real options approach, and of choosing desalination when lower cost augmentations were available. The modelling assumes that all investments are efficiently financed.

To isolate the benefits of real options, the Commission also modelled the best possible 10 year fixed plan, starting in 2007, for augmentation of Melbourne's water supply and compared this with an optimal real options strategy. The resulting estimate is that the cost advantage of the real options strategy is about \$900 million over 10 years (technical supplement 1).

The inefficiencies associated with supply augmentations over the next few years is likely to be lower than in recent years for the simple reason that, with surplus capacity coming on stream, it seems unlikely that such major augmentation investments will be made. However, the current Victorian Government went to the last election with a policy of setting recycling targets that would require consumption of recycled water to increase by 135 GL by 2030. While this might not require substantial investment in new recycling plants, as water from Melbourne's wastewater treatment plants could be used, it would require infrastructure to be built to distribute non-potable water, which is costly.

Committing to such ambitious recycling targets over 20 years, regardless of future rainfall, is fundamentally inconsistent with a real options approach and could impose a high (and unnecessary) cost on the community. Even if inflows to dams fall by 30 per cent from the long-term average, modelling by the Commission suggests that no further augmentations (recycling or other sources) to Melbourne's water supply will be required for at least the next 20 years (assuming efficient pricing).

### *Sydney example*

The New South Wales *Metropolitan Water Plan 2006*, developed using an adaptive management (or real options) approach, stipulated that construction of a desalination plant would be initiated when dam levels were around 30 per cent. The plan also stated that the trigger should be monitored and adaptively modified. In the lead up the 2007 state election, with dam levels at 34 per cent, the NSW Government announced that a plant would be built. The opposition leader announced plans for a wastewater recycling plant in preference to desalination. The incumbent government was returned at the election and, subsequently, contracts for a desalination plant were signed when dam levels were at 57 per cent.

Appendix E provides analysis of this supply augmentation decision. The conclusion reached is that, while it may well have been prudent to call for tenders when dam

---

levels were at 34 per cent, a genuine real options approach would have been likely to keep open the option of deciding not to proceed in the event that dam levels rose during the tender process. Analysis by other researchers suggests that the expected cost to Sydneysiders of not doing this was substantial (appendix E).

This example indicates that political involvement in supply augmentation decisions can be a barrier to taking a real options approach and minimising expected costs. The NSW Government commitment to building the desalination plant meant that a later decision to defer the investment would have amounted to breaking an election promise. It seems reasonable to conclude that there would have been a political cost to doing this, making deferral a less attractive option than it would otherwise be. It is unclear, however, whether this actually influenced the decision to proceed with the Sydney desalination plant.

In the Commission's view, it is likely that deferral of the Sydney desalination plant in 2007 would have produced an expected gain in efficiency. The process followed to identify a 90 GL per year (expandable to 180 GL) desalination plant as the next major augmentation, however, seems to have been sound, given that:

- Sydney does not have access to the lower cost options available to other cities, such as Melbourne, Adelaide and Perth
- the plant's capacity is equivalent to 18 per cent of Sydney's 2009-10 consumption (with the flexibility to expand later if needed), far more modest than for Adelaide and Melbourne.

#### *Impediments to achieving these gains*

In the Commission's view, there are several impediments to realising the gains available from taking a real options approach to supply augmentation. First, are current institutional and governance arrangements, that in most jurisdictions are characterised by:

- absence of clarity over the roles and responsibilities of cabinet, ministers, government departments and water utilities, which can cause delays and uncertainties that erode the benefits available from a real options approach
- inappropriate political involvement in decision making that can bring with it an undue level of risk aversion and other incentives that work against achieving a lowest expected cost balancing of supply and demand.

Chapter 10 sets out institutional and governance reforms designed to overcome these deficiencies and prevent the need for crisis responses, which have been common in the past (Brian Head, sub. 8). Implementing these reforms is necessary

---

for progress to be made. There are, however, other impediments to be overcome relating to the technical complexity of real options and to regulation.

A sound understanding of, and technical capacity in, applying a real options approach is needed for success. Some water utilities are starting to grapple with these issues, as illustrated by the following statement by Coliban Water:

We ... need to consider the cost of drawing down storages. I think it's this ... point which represents the very significant change in thinking, compared to the way water businesses have operated in the past. Historically water would have been considered valueless or even valued at net cost. (trans., p. 198)

Understanding the economic value of water in storage is one of the key aspects of applying a real options approach.

Where real options thinking is not applied, decisions are sometimes guided by a perceived imperative to diversify supply sources, increase supplies from rainfall independent sources or conserve water. For example, the South Australian Government has set a key objective of '[d]iversifying Adelaide's water supply, especially away from climate dependent sources' (sub. DR132, p. 1). Diversifying sources is sometimes warranted and sometimes not. What needs to be appreciated is that real options analysis incorporates the value of diversification, rainfall independence and water conservation in a structured and integrated way.

Achieving this integrated approach requires specialised analytical tools to be developed and used in making augmentation decisions, and only limited progress has been made on this. In the Commission's view, there is a need to build capacity in the application of a real options approach within the sector. A recommendation on how to achieve this is included in chapter 14.

Regulation can also impede the use of a real options approach. Delays and uncertainties in gaining approvals from environmental and health regulators and other government agencies can mean that some options become unviable. For example, ACTEW reported that uncertainties about time frames for gaining environmental approvals, and approvals for interstate water trades, effectively narrowed their range of options (trans., pp. 83–4).

Also, economic regulation can be an impediment, as explained by WSAA:

Real options modelling can be complex, relying on judgments on the probability and consequences of uncertain future events. Independent regulatory interrogation of planning assumptions can therefore present difficulties. Regulators also may be reluctant to allow for recovery of costs incurred in progressing options which ultimately do not proceed, notwithstanding these preparatory expenditures may have been prudent when considering all relevant factors. (sub. DR145, p. 4)

---

The Economic Regulation Authority (WA), however, argued that economic regulation should not hinder a real options approach by service providers:

As long as the assumptions, uncertainties, impacts and costs of each decision are clearly set out, a regulator should have no problem in approving an options approach, particularly when it could lead to considerable cost savings with little impact on down-side risks. (sub. DR140, p. 5)

In the Commission's view, economic regulators should have no problem in providing in-principle approval for a real options approach being taken. The practical application of this, however, would greatly increase the complexity of regulatory price setting, and this would be likely to create uncertainties and other difficulties for water utilities. Chapters 10 and 11 propose reforms to overcome these problems.

## **5.2 Improving system operations and asset management**

The previous section examined the scope for efficiency gains through making better supply augmentation decisions. This is of course only one aspect of the urban water sector. Decisions must also be made about other matters, such as building and upgrading water treatment plants, and maintaining and expanding water pipe networks. In addition, there are operational dimensions of water businesses. This section, and the following two, examine the scope for efficiency gains in these other aspects of the sector.

### **More efficient system operations**

Reform of other utility sectors, such as electricity, has produced substantial gains in operational/productive efficiency in past decades by, for example, allowing labour use to be reduced while output was maintained or increased (appendix D). A valid question is whether similar gains are possible in the urban water sector, given that it has to date undergone less fundamental reform than other utility sectors.

However, while there has been only limited structural reform in the urban water sector, greater commercialisation and outsourcing has occurred and this has increased efficiency over the past decade or two. For example, Sydney Water stated:

Corporatisation in the late 1980s and early 1990s began a process of continuous improvement in the water industry. ...

---

By way of illustration, in 1980 Sydney Water had nearly 14 000 staff. In 2009-10, Sydney Water had 2987 staff. (sub. 21, p. 12)

Over 80 per cent of Sydney Water's total expenditure over the five years up to 2009-10 was delivered by external sources (that is, outsourced), with competitive processes used to select private sector providers for many major categories of expenditure (Sydney Water, sub. 21).

In relation to overall efficiency, IPART argued:

The NSW metropolitan water industry made significant efficiency gains throughout the 1990s and early 2000s. For example, Sydney Water's operating costs were less in 2005 than they were in 1993, measured in real terms.

However, the water industry has not sustained those gains in recent years. Costs have increased driven in part by higher standards; funding of otherwise nonfinancial recycled water schemes; and major capital additions to improve security of supply. Much of this increase reflects increased capital works. (sub. 58, p. 8)

Notably, the factors that IPART cite as being responsible for cost increases relate to supply augmentation decisions (which, as discussed earlier, have been influenced by the NSW Government) and regulation of standards (for example, wastewater discharge standards), rather than water utility performance in managing and operating the system.

Coliban Water reported:

Over the last decade, Coliban Water has exposed many of its functions to the discipline of the market by contracting out core services through a range of fit for purpose approaches including Build, Own, Operate schemes. Customers have benefited as this approach has driven down costs and driven up standards of service by making outputs an explicit contractual obligation. (sub. 73, p. 2)

WSAA provided evidence that the practice of contracting out (or outsourcing) of both operating tasks and capital projects is the norm among large water utilities (table 5.1).

Outsourcing can help to drive efficiency through the incentives it creates for businesses to lower their costs in order to be profitable in an environment where they must secure contracts through competitive processes. However, as IPART argued, competitive tendering arrangements:

... help minimise the costs for a given solution but do not ensure that the adopted solution is the most efficient or that the institutional arrangements underlying service delivery are efficient. (sub. 58, p. 9)

**Table 5.1 Proportion of expenditure outsourced, 2009-10<sup>a</sup>**

<i>Water utility</i>	<i>Operating expenditure (%)</i>	<i>Capital expenditure (%)</i>
Water Corporation (WA)	30	93
Sydney Water	72	94
Sydney Catchment Authority	64	99
Melbourne Water	73	100
South East Water (Victoria)	42	90
Yarra Valley Water (Victoria)	58	98
Hunter Water (NSW)	65	100
SA Water	65	94

<sup>a</sup> WSAA provided data for outsourcing by ACTEW that has not been included here. This is because much of their outsourcing is to ActewAGL, a related entity, and so the data are not comparable.

Source: WSAA sub. 29, p. 31.

Outsourcing can create efficiency enhancing competition among prospective suppliers, but does not increase competitive pressures on water utilities. In the urban water sector these pressures are low relative to those in other utility sectors, such as electricity and gas, although in all these sectors there are natural monopoly elements that limit the role of competition. Accordingly, there may be scope for efficiency gains through pro-competitive reforms in the sector, although these are inherently difficult to estimate. As Ruff and Swier argued:

... after competitive reform occurs, innovative ideas and processes ‘come out of the woodwork’ to change – and usually improve – the sector in ways nobody predicted. (sub. 47, p. 4)

In summary, the urban water sector has become more efficient over the past decade or two due to past reforms and increased outsourcing. Given what has already been achieved, the scope for further gains in the efficiency of system operations may be relatively modest, although the scope will vary from place to place. Further gains may, however, be achievable from reforms that introduce greater levels of competition. Chapter 12 considers this issue further.

## **Improving asset management**

IPART identified a range of asset management tasks for the urban water sector, including:

- asset inventory
- asset planning incorporating both business and technical risk assessments
- maintenance of adequate records and robust and reliable data
- asset replacement, rehabilitation, augmentation, creation/acquisition and/or substitution (asset and non-asset substitutions)

- 
- management of service provision, including contracts
  - monitoring and condition assessment
  - proactive and reactive maintenance
  - operations
  - training and resourcing
  - contingency planning covering both emergency management and business continuity
  - asset rationalisation and disposal. (sub. 58, p. 16)

Given that the urban water sector is highly capital intensive, efficient management of assets is crucial to overall efficiency. Inefficiencies in the management of assets can result in unnecessary costs, for example from:

- using larger than necessary water and sewerage pipes (allowing for the fact that having spare pipe capacity to allow for future increases in use is often a sound strategy, given the high cost of later upgrades)
- laying pipes in an inefficient manner
- incurring water losses due to leaks, or having to replace pipes due to a failure to properly maintain them
- maintaining reliability standards at a level that is higher than is justified by the incremental costs and benefits.

Inefficient asset management can also lead to inadequate levels of service (for example, providing unsafe drinking water due to a failure to upgrade treatment plants) and poor environmental outcomes (for example, from groundwater contamination due to leaking sewerage pipes). Efficient service provision requires that assets are neither replaced prematurely nor belatedly.

The evidence on the scope for efficiency gains through improved asset management is both sparse and mixed.<sup>1</sup> WSAA provided evidence that at least some large Australian urban water utilities perform well relative to their international counterparts:

The 2008 Asset Management project incorporating 42 participants from Australia, New Zealand, Abu Dhabi, Sultanate of Oman, Canada, China and United States was co-sponsored by the International Water Association (IWA), and delivered through a consultant consortium led by GHD Pty Ltd and including Marchmont Hill Consulting and CH2MHill. ...

---

<sup>1</sup> This is leaving aside asset management relating to supply augmentation decisions, which was dealt with earlier in this chapter.

---

Australia was identified as a world leader in Asset Management scoring at a ‘mature’ level of asset management practice, with the Middle East, Hong Kong and North America characterised as ‘developing’ and ‘established’. (sub. 29, p. 31)

Increasing outsourcing of capital projects through competitive processes has likely been responsible for efficiency gains over recent years. However, as discussed earlier there are limitations to what can be achieved through outsourcing and it is possible that there are further efficiency gains that could only be achieved through pro-competitive reforms that increase incentives for efficiency and innovation.

In addition, there is scope to increase the efficiency of asset management in some regional areas, as discussed in section 5.5.

Overall, system operations and asset management in the urban water sector have become more efficient over the past decade or two due to the commercialisation of water utilities and increasing use of competitive outsourcing. However, further gains may be achievable, given that incentives for increased efficiency and innovation in the sector are still weak relative to other utility sectors.

### **5.3 Other opportunities in the supply of wastewater and stormwater services**

This section addresses opportunities for efficiency gains that are specific to the wastewater and stormwater sub-sectors. Opportunities that relate to improving the coordination of these sub-sectors with water supply are left to the following section on integrated water cycle management.

#### **Wastewater**

##### *Reducing regulatory burdens*

While reducing regulatory burdens is an issue across the urban water sector, some inquiry participants identified wastewater discharge standards as particularly important in this regard (IPART, sub. 58; WSAA, sub. 29; Sydney Water, trans., pp. 101–2). IPART reported that increasingly stringent requirements were being placed on urban water utilities and that this was driving up costs. It argued that standards should only be increased where the benefits exceeded the costs and that there was a need to ensure that all options for achieving particular environmental outcomes were explored (sub. 58).

---

The Commission agrees with this assessment and considers that there are likely to be significant efficiency gains from improved environmental regulation of wastewater discharge. The key to achieving these gains is rigorous application of the six principles of good regulatory practice developed by the Regulation Taskforce and endorsed by the Australian Government. These principles, slightly modified to be consistent with the terminology used in this report, are set out in box 5.6. These principles are applicable to all aspects of policy and regulation in the urban water sector.

RECOMMENDATION 5.4

***Governments should ensure that the six principles of good regulatory practice, spelt out by the Regulation Taskforce, are applied when developing policy and regulation governing the urban water sector.***

**Box 5.6 Principles for best practice policy and regulation**

- Governments should not act to address ‘problems’ until a case for action has been clearly established. This should include establishing the nature of the problem and why actions additional to existing measures are needed, recognising that not all ‘problems’ will justify (additional) government action.
- A range of feasible policy and regulatory options need to be identified and their benefits and costs, including compliance costs, assessed within an appropriate framework.
- Only the option that generates the greatest net benefit for the community, taking into account all the impacts, should be adopted.
- Effective guidance should be provided to regulated parties and any relevant regulators to ensure that the policy intent of the regulation is clear, as well as the expected compliance requirements.
- Mechanisms are needed to ensure that policy and regulation remain relevant and effective over time.
- There needs to be effective consultation with affected parties at all stages of the policy and regulatory cycle.

Source: Regulation Taskforce (2006).

***Emerging opportunities***

Management of wastewater has traditionally focused entirely on collection, treatment and disposal. These remain core functions, but there is increasing

---

recognition that there may be opportunities to create saleable products from wastewater. Recycled water is one example (considered in the next section), but there are others such as energy and nutrients. Sydney Water commented on these opportunities as well as the emergence of cost saving technologies in wastewater treatment:

Emerging technologies, particularly in wastewater treatment, may result in future cost efficiencies. These may include the adoption of nano-technology and advanced microbiological processes in Sydney Water's treatment systems, improvements in nutrient capture from wastewater, and likely improvements over time in energy efficiency and energy recovery. (sub. 21, p. 12)

The extent to which efficiency gains can be made from exploiting these opportunities in future depends on factors such as the rate of technological advance and whether a greenhouse gas emissions tax or trading scheme is introduced.

## **Stormwater**

### *Meeting flood mitigation objectives*

Some inquiry participants and other commentators argued that increasing pressure was being placed on stormwater infrastructure, particularly from infill development, and that more investment was needed to meet flood mitigation objectives. For example, the City of Salisbury stated:

Because flooding is an infrequent event, and difficult to predict [investment in stormwater infrastructure] has been underfunded and the systems under-maintained. Much of the existing drainage system was constructed to standards of protection which are now considered inadequate. No system for funding the upgrading of these works has been devised. The effect of climate change, to increase the severity of rainfall events and hence flooding, compounds this shortfall. (sub. 10, p. 2)

Assessment by Engineers Australia concluded that major changes are required for stormwater infrastructure in Australia to be fit for its current and future purpose (Engineers Australia 2010b). It rated stormwater infrastructure as being at a lower overall standard than either potable water or wastewater infrastructure.

Institutional arrangements for the management of stormwater vary across Australia (chapter 2) and it is likely also that the adequacy of existing infrastructure varies across jurisdictions and regions. Where inadequacies exist, the main impediment to improvement appears to be inadequate coordination of stormwater management undertaken by individual Local Governments with broader system requirements. For example, the Australian Water Association reported:

---

Stormwater systems in Sydney are under the jurisdiction of numerous councils and other organisations such as Sydney Water and NSW Maritime. A single drain may be the responsibility of several councils and other agencies making development of a maintenance strategy or optimisation of the asset for community benefit next to impossible. Similar problems may exist in other jurisdictions. (sub. DR157, p. 6)

Stormwater management involves actions at the allotment, Local Government and broader regional levels. Effective coordination is required to ensure that efficient combination of actions are undertaken. For example, in some cases constructing a series of small wetlands that detain and filter stormwater may be a more efficient flood mitigation strategy than upgrading main drains. Pricing and other approaches to achieving better coordination are discussed in chapters 6 and 12.

### *Improving environmental outcomes*

The primary purpose of stormwater services is local flood mitigation; however, they also influence environmental and amenity outcomes in urban areas. For example:

- slowing the flow of stormwater through urban landscapes can improve the environmental health of urban waterways
- various management practices, such as filtering stormwater through vegetation, can reduce the quantity of nutrients and other pollutants entering waterways
- opting for a vegetated stormwater solution (for example, a constructed wetland) over an engineered system can have environmental and amenity benefits.

Recycling is one approach that can be used to improve the environmental outcomes from managing stormwater. In the Commission's view there is an overemphasis on this approach and, at times, an insufficient focus on actually improving environmental outcomes. Targets are often set for recycling, but less attention is given to attaining desired environmental improvements in a cost-effective way. Research into using market-based mechanisms for this purpose suggests that significant efficiency gains may be achievable (Nemes et al. 2010). The following section explains why focusing on increasing recycling can produce inefficiencies.

## **5.4 Achieving integrated water cycle management**

Integrated water management, integrated water cycle management, water sensitive cities and water sensitive urban design are terms that are often used interchangeably. Engineers Australia reported:

Integrated water cycle management was initially called water sensitive urban design. State and local government regulators and the stormwater industry have seen water

---

sensitive urban design as primarily dealing with stormwater matters instead of a holistic concept. This is the only reason for a distinction being drawn ... (sub. 4, p. 5)

It defines integrated water cycle management as:

... a holistic multi-dimensional approach to urban water management where all water resources are used optimally based on the fit for use concept. Water quality and water quantity for all streams of water, including potable water, wastewater and stormwater, are managed together to meet economic, social and environmental objectives in accordance with sustainable development principles. (Engineers Australia, sub. 4, p. 5)

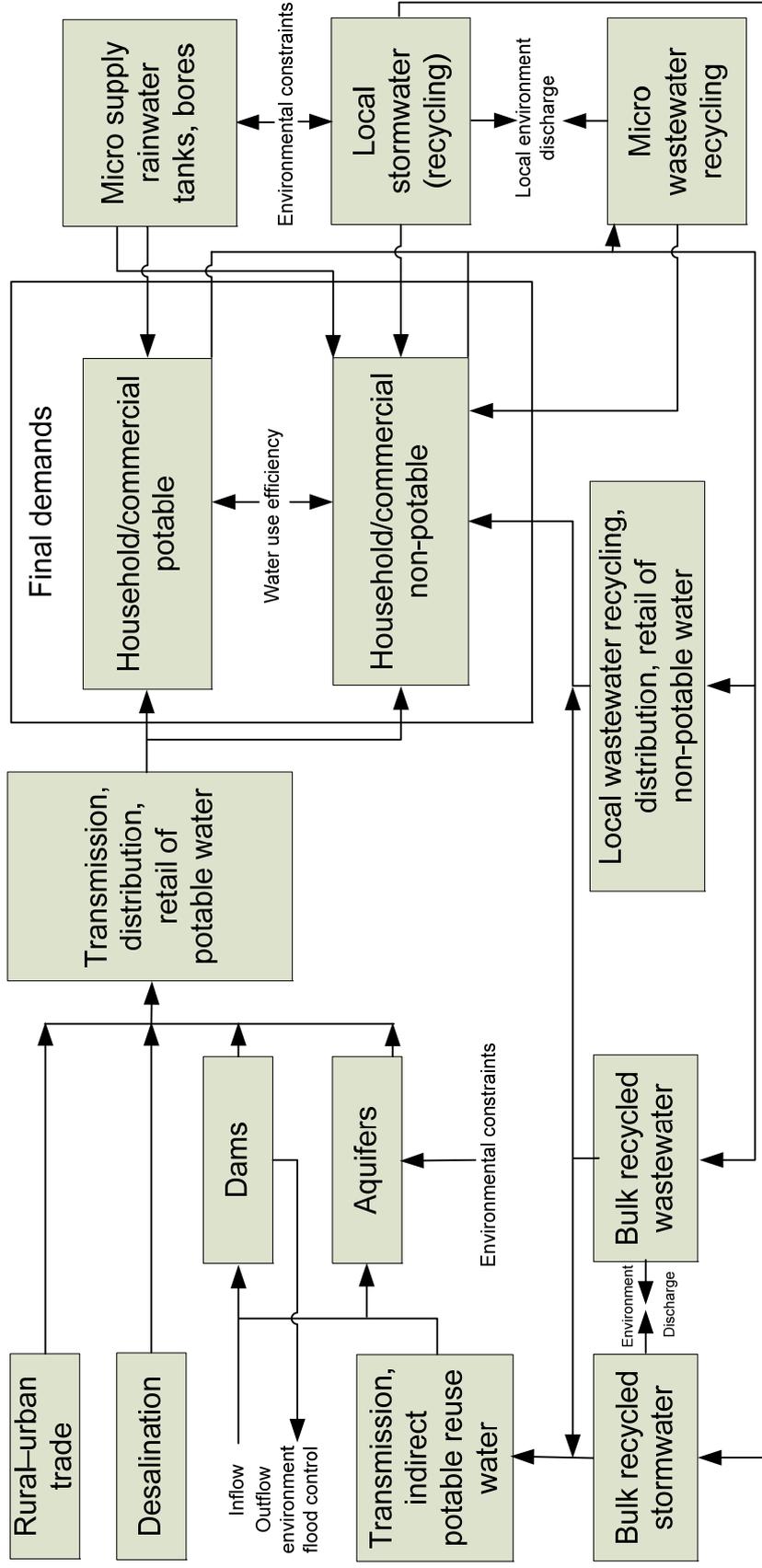
A strong theme in the literature on integrated water cycle management is that traditional approaches that focus separately on water supply, wastewater and stormwater services can produce poor outcomes because interrelationships are ignored. For example, focusing on stormwater harvesting and reuse solely as a water supply option, ignores the avoided costs and environmental benefits that can result from reducing the volume of stormwater. Figure 5.1 provides an illustration of the integrated water cycle for urban water systems.

## **Current situation**

Governments have implemented a range of policy measures that are at least partly aimed to improve integrated water cycle management and/or water sensitive urban design. These include:

- requiring new dwellings to be designed to use less potable water (for example, the BASIX scheme in New South Wales)
- adopting stormwater and/or wastewater recycling targets (for example, the current Victorian Government went to the 2010 state election with a policy to '[e]stablish a target of 200 billion litres by 2030 of water to be substituted with water drawn from rainwater, treated stormwater or recycled water' (Liberal Victoria and the Nationals for Regional Victoria 2010, p. 18))
- subsidising water recycling projects (box 5.4)
- requiring water utilities to develop integrated water cycle management strategies (for example, regional utilities in New South Wales are required to do this (NSW Government, sub. 65)).

Figure 5.1 Illustration of the integrated water cycle for urban water systems



---

A number of inquiry participants gave details of projects they saw as representing good practice in integrated water cycle management (box 5.7). Those putting forward these examples tended to highlight the fact they involved recycling or reuse of water, without providing evidence that the benefits of the project outweighed the cost. The Salisbury stormwater reuse project is somewhat of an exception in that it has reportedly successfully mitigated a clearly identified environmental problem.

**Box 5.7 Integrated water cycle management examples**

- Western Corridor Recycled Water Scheme: comprises three plants that treat sewage effluent to purified recycled water standard for industrial use and potentially to supplement potable water supplies for south-east Queensland. The scheme has the capacity to supply 232 megalitres (ML) of water per day (which suggested an annual capacity of over 80 GL). Twenty-five GL was supplied to the region's power stations from August 2007 to September 2009 (Department of Environment and Resource Management, sub. 60; Queensland Government nd).
- Pimpama/Coomera Dual Reticulation Scheme: under this scheme urban demand is met from reticulated town water, rainwater and class A+ treated sewage for external use and toilet flushing. The class A+ recycled water is provided from the Pimpama Recycled Water Treatment Plant, which has a capacity of 9 ML per day (which suggests an annual capacity of around 3 GL) (Department of Environment and Resource Management, sub. 60; Degremont nd).
- Doncaster Hill Urban Village: in which recycled and treated stormwater and sewage are to be delivered to residential apartments through a third pipe system. Compared to conventional servicing, it is expected that potable water consumption will be reduced by 64 per cent, wastewater exports by 53 per cent and stormwater exports by 42 per cent (Yarra Valley Water, sub. 19).
- Orange City Council's Blackmans Swamp Stormwater Harvesting Scheme: is an indirect-to-potable project. The scheme is capable of providing between 1.3 to 2.1 GL of water into Orange's potable water supply each year, enough to meet up to 40 per cent of the city's total water needs (Local Government Association of NSW & Shires Association of NSW, sub. 63).
- Rosehill Recycled Water Scheme: is a private sector project that will supply recycled water for industry and irrigation in western Sydney. Parts of a disused gas main network are being incorporated into the scheme's 20 kilometre recycled water transportation network. The scheme is due to commence in mid 2011, with initial production levels of 4.7 GL, which may be increased over time (AquaNet, sub. 49).
- Salisbury stormwater reuse: The City of Salisbury in northern Adelaide has systems in place to provide over 8 GL per year of non-potable water for parkland irrigation, industry and residential use. Initial efforts to harvest stormwater by Council were motivated by the desire to prevent pollution entering the Barker Inlet and damaging mangroves (City of Salisbury, sub. 10; Hains 2009).

---

Notwithstanding these initiatives, some inquiry participants argued that there was still much to be done to fully realise the potential of integrated water cycle management (Engineers Australia, sub. 4; City of Salisbury, sub. 10; Centre for Water Sensitive Cities, sub. 75).

## **Scope for efficiency gains**

There are broadly two types of efficiency gains available from better integrated and coordinated water management. First, gains from removing unwarranted impediments to water reuse and recycling. Second, gains from redesigning or eliminating government actions that promote inefficient water reuse and recycling. The net result from realising these gains would be that reuse and recycling would be undertaken where it produces net benefits to the community.

### *Removing impediments*

There are undoubtedly instances where a more integrated approach to urban water management would produce efficiency gains through increased recycling to provide fit-for-purpose water products. The types of gains that may be achieved include:

- reducing the scale and cost of water, wastewater and stormwater infrastructure through the use of distributed systems that reduce the load on this infrastructure
- improved environmental outcomes, for example, by reducing the quantity of sediment and nutrients entering sensitive waterways.

It is difficult to quantify these potential efficiency gains; however, quantification is not necessary to make progress. In the Commission's view, the best approach is to identify the impediments to good outcomes and to take cost-effective action to address them.

One impediment is regulatory inconsistency across jurisdictions that can stifle the development of innovative recycling solutions, including the use of greywater and other distributed systems. Such inconsistencies persist even though Australian Guidelines for Water Recycling have been developed. Nubian Water Systems stated:

Regulation is possibly the greatest impediment to distributed systems making a contribution to achieving the objectives. There are multiple layers of regulation in each state with little uniformity, in policy and guidelines, among the states. In some cases state guidelines are opposed and with inexplicable rationale. (sub. 11, p. 3)

Nubian Water Systems provided examples of perceived inconsistencies such as differences in the nature and responsibilities of the various regulators (including

---

Local Governments) across jurisdictions, and different rules adopted for provision of recycled water (sub. 11). For example:

In Victoria, commercial and multi-dwelling greywater treatment systems cannot be used to provide recycled water for toilet flushing if the system has a capacity of less than 5000 litres per day. This is because the Victorian regulators perceive small systems to be high risk, while in Queensland, commercial greywater treatment systems with a capacity of less than 3000 litres per day, can be used to provide recycled water for toilet flushing ... . This is because the Queensland regulators perceive small systems to have relatively low risk. (sub. 11, p. 3)

There is a need to achieve a greater level of consistency across jurisdictions in all aspects of water quality regulation and to ensure that the principles of good regulatory practice are followed (box 5.6). A recent study on regulation of water quality commissioned by the NWC, proposed ‘creating new cross-jurisdictional arrangements to facilitate greater consistency and coordination in the regulation of urban water quality across Australia’ (PWC 2011, p. 5). Greater harmonisation was seen as reducing the costs associated with regulation for sector participants and regulators, and potentially breaking down fragmentation of markets based on state and territory boundaries. The Commission is broadly supportive of PWC’s proposals and of the NWC’s plans to take this work forward.

Another impediment is unclear property right arrangements for stormwater and wastewater that can create uncertainty and discourage investment in water recycling projects (box 5.8). As stated in chapter 4, it is a role of governments to define property rights for water, including stormwater and wastewater.

There are a range of other impediments to efficient recycling projects that are best addressed by reforms to institutional and governance arrangements. The main such impediments are set out below, while the necessary reforms are proposed in chapters 10 to 13.

- There is sometimes a failure to factor in financial costs and benefits accruing across the entire water cycle, either because several organisations are involved or different functions are considered in isolation within one organisation (City of Sydney, sub. DR124). The potential for such failures to occur is most prevalent when urban developments are being planned. South East Water highlighted the importance of integration in planning between Local Governments, planning agencies and water businesses to prevent this occurring (sub. DR149).
- There is sometimes a failure to properly factor environmental considerations into urban water management decisions.
- Inefficient pricing of potable water can prevent efficient recycling projects from being commercially viable.

---

**Box 5.8 Property right arrangements for wastewater and stormwater**

Well designed property rights facilitate efficient management of water, which benefits the community. Rights for both consumptive uses and environmental uses of water are needed.

In the rural context, irrigators often hold a water right, such as a licence or an entitlement and some of these are tradeable. These rights give individual irrigators a degree of protection from being adversely affected by the water use of others. Without such protection, investing in an irrigation business would be much more uncertain and people would be less likely to do it. Those that did invest could find their business ruined by people upstream taking all the water. Tradeable water rights allow water to be allocated to those that can put it to its highest value use.

In urban areas, property rights for wastewater and stormwater have been given much less attention because this water has been seen as a problem to be managed, rather than as a potentially valuable resource. With interest in water recycling and reuse increasing, there is the potential for problems, such as underinvestment and inefficient resource allocation, to emerge.

Frontier Economics (2008b) studied these issues in detail and came to a range of conclusions with which the Commission agrees, including the following.

**Wastewater**

- Where the proportion of wastewater being recycled is relatively low, property rights-related problems are unlikely to arise, but over time allocation mechanisms may be required to provide secure access to the resource.
- Simple approaches, such as providing secure access to existing sewer mining operators and allowing new entrants only where this does not compromise existing operations may be suitable, at least as an interim measure.
- In inland areas, treated wastewater discharged into local waterways can be environmentally beneficial. Wastewater recycling can reduce these environmental flows, and this may need to be addressed through property right arrangements.

**Stormwater**

- Stormwater can flow through the drainage assets of more than one Local Government (or other stormwater manager). This means that secure access to water for reuse in 'downstream' Local Government areas can be compromised by the actions of 'upstream' Local Governments.
- Institutional and planning changes that allow a whole-of-catchment perspective to be taken on stormwater issues may be a useful first step to achieving appropriate resource security for stormwater reuse projects.
- In some cases it may be beneficial to introduce basic access licences and allocation rules (akin to those that currently exist in some unregulated river systems).

---

### *Avoiding inefficient reuse and recycling*

There is a tendency among some proponents of integrated water cycle management and water sensitive urban design to assume that increased reuse and recycling and decreased reliance on centralised water supply systems are always in the community's interests. For example, Wong (2006, p. 1.2) states '[t]he objectives of water sensitive urban design include ... reducing potable water demand through water efficient appliances, rainwater and greywater reuse'. There were also a number of inquiry participants whose support for mandatory rainwater tanks and the like appear to be based on similar assumptions (Aqua Piovana, sub. 2; Environmental Defenders Office (SA), sub. 39; Neil Nicholas, sub. 88; and Save Byrill Creek Campaign, sub. DR125;).

Such assumptions appear to have had a significant influence on government policy, as evidenced by the widespread adoption of water recycling targets and subsidies, and mandatory requirements for new dwellings to be designed to use less potable water. For example, the Victorian Government's targets referred to earlier appear to be influenced by a parliamentary committee inquiry report that stated:

The Committee acknowledges that significant challenges are associated with developing and implementing recycled water schemes (e.g. demand and cost). However, given that only one-quarter of treated wastewater is recycled, the Committee believes that considerable potential exists to increase the volume of water recycling at Melbourne's sewage treatment plants. Accordingly the Committee recommends that ... The Victorian Government set enforceable water recycling and reuse targets. (Environment and Natural Resources Committee 2009, p. 173)

Although severe drought over recent years may partly explain this way of thinking about reuse and recycling, it is one that is likely to lead to poor outcomes. Demand and cost should not be regarded simply as challenges to be overcome in meeting an arbitrarily determined target. They are important determinants of whether particular reuse and recycling projects make the community better off. It is not enough to identify a potential source of water that appears to be 'wasted', it is necessary to also examine the costs and benefits of utilising that water.

A feature of many current policies is that they promote or mandate water reuse or recycling activities consistently across a broad geographic area, even though their benefits may vary widely depending on the local circumstances. Yarra Valley Water argued:

... I want to talk about ... this issue about decentralised versus centralised infrastructure, that's also a major debate in the industry, and also cities of the future or integrated water management seem to be catchcries at the moment. We have done a lot of work in that regard at Yarra Valley Water ... and the conclusion we have come to is there certainly isn't a one-size-fits-all, that what works in one area will not work in

---

another area, and that's not just physical constraints but by looking at environmental impacts. So having blanket rules that you see in a lot of jurisdictions — ... every home should have this facility or that facility, a rainwater tank for example — [which] doesn't stack up when you look at a sophisticated environmental analysis which is trying to look at alternatives and the overall impacts on the environment. (trans., p. 220)

FINDING 5.1

*Integrated water cycle management initiatives are often driven by the assumption that it is always in the community's interest to increase water reuse and recycling, and to decrease reliance on centralised water supply systems. A preferred approach is to facilitate efficient recycling and reuse projects by removing barriers to integration (such as the absence of appropriate property rights for wastewater and stormwater and deficiencies in the analyses, and community awareness, of costs and benefits).*

The scope to achieve efficiency gains through redesigning or eliminating policies that promote inefficient reuse and recycling, relates to measures for rainwater tanks, greywater systems, third pipe recycling systems and the like. Appendix E provides analysis that indicates that the potential efficiency gains from reforming policies that encourage the installation of rainwater tanks alone may amount to tens of millions of dollars annually.

Some progress in achieving these gains has been made recently with the winding back of rainwater tank rebates offered by the Australian Government and the South Australian Government (appendix E). The most significant inefficiencies that remain are from mandatory requirements to install rainwater tanks or other 'water saving' devices in new dwellings. Such requirements apply in New South Wales, Queensland and South Australia, despite there being credible analysis suggesting that, in most circumstances, the community is made worse off by the installation of rainwater tanks being made mandatory (appendix E).

## **5.5 Scope for efficiency gains in regional urban areas**

In broad terms, the opportunities for efficiency gains discussed in the earlier sections of this chapter apply to both metropolitan and regional urban areas. There are, however, some opportunities that are less or more significant for regional areas compared to metropolitan areas. For example:

- decisions to build seawater desalination plants appear to have resulted in major inefficiencies in some metropolitan areas but this has not been the case in regional areas (where such plants are only rarely considered feasible)

- 
- restrictions on purchasing water from irrigators for urban use are generally less prevalent in regional areas and so the scope for efficiency gains from removing them is less
  - a significant number of regional water utilities fail to meet the water quality standards of the Australian Drinking Water Guidelines and/or issue ‘boil water’ alerts, whereas this is rare in metropolitan areas (Armstrong and Gellatly 2008; Local Government Association of Tasmania, sub. 64)
  - it would appear that inefficient asset management is particularly prevalent in some regional areas, due to a shortage of staff with appropriate skills and experience and/or lack of financial resources to undertake asset upgrades (Midcoast Water, sub. 51; Kempsey Shire Council, sub. 30; Tasmanian Water and Sewerage Corporations, sub. 43; AWA 2008).

On the latter two points the Tasmanian Water and Sewerage Corporations reported that reforms in that state were driven mainly by ‘concern at the state of water and sewerage assets and the adverse public health and environmental outcomes that were being observed as a result of infrastructure deficiencies’ (sub. 43, p. 3). The Local Government Association of Tasmania (sub. 64) stated that prior to reform, 70 per cent of council-run water utilities had no strategic asset management plan.

In considering the scope for efficiency gains in regional urban areas it should be recognised that factors such as population density, population growth, proximity to metropolitan areas and the endowment of water resources strongly influence the costs and challenges of providing urban water services. These factors vary greatly across regional areas, for example, there are:

- coastal areas that have relatively high population densities, are growing and are close to a capital city (for example, Geelong, Mandurah, the Gold Coast and the Sunshine Coast)
- areas that share the above characteristics, but are more distant from a capital city, making interconnection of water supply systems less economic (for example, Port Macquarie and Cairns)
- inland cities and towns that are close to major rivers and whose urban water supply system shares infrastructure with the irrigation sector (for example, Albury, Wodonga, Mildura and Renmark)
- areas that are proximate to, or share water resources with, major industrial or resource projects and facilities that have significant water needs (for example, Gladstone and Karratha)

- 
- regions with reasonably low population densities that are remote from both capital cities and major irrigation industries (for example, north-west Tasmania, and the Eyre Peninsula)
  - remote regions that have very low population densities, with isolated communities, including Indigenous communities, that rely on reticulated water supply systems (for example, much of the Northern Territory).

Because of this diversity it is not valid to simply observe differences in costs or service levels between regions and draw conclusions about the performance of regional water utilities. For example, NWC and WSAA (2010a) shows that water and sewerage operating costs per property tend to increase as the size of water utilities decrease. There is no easy way to tell, however, the extent to which this is due to small utilities facing a more difficult operating environment and the extent to which it is due to them underperforming relative to larger utilities (if at all).

There is, however, evidence to suggest that substantial efficiency gains could be achieved by some form of amalgamation or alliance between small regional water utilities, which could be combined with governance reforms (chapter 13). This opportunity exists mainly in parts of New South Wales and Queensland, as other jurisdictions, including Victoria and Tasmania, have already implemented reforms to aggregate small utilities. It is striking that there are 177 urban water utilities that service regional New South Wales and Queensland (chapter 13), and only about 30 that service the remainder of Australia (chapter 2). Many utilities in regional New South Wales and Queensland service fewer than 10 000 connected properties, with some servicing fewer than 1000.

Many small water utilities, however, are operated by Local Governments and it is possible that their remaining functions would become less efficient if water were separated out into larger regional entities. That is, the removal of water services from Local Governments may reduce their economies of scope. The reform challenge, therefore, is to more fully exploit economies of scale, while recognising possible impacts on the efficiency of Local Government. Chapter 13 assesses the available evidence and makes recommendations for reform.

At the other end of the spectrum, the vast majority of South Australia, Western Australia and the Northern Territory are each serviced by one water utility. In these cases, there may be diseconomies of scale currently present and other benefits may flow from disaggregation, a proposition that is also tested in chapter 13.



---

## 6 Pricing of water, wastewater and stormwater

### Key points

- Pricing plays an important role in providing the signals that guide behaviour on both the demand and supply sides of the urban water sector.
- All elements of the urban water supply chain need to be priced in a way that reflects the efficient cost of providing those services to consumers.
- Pricing bulk water according to the marginal opportunity cost of supply (flexible bulk water pricing) would facilitate better allocation of water resources and investment decisions by ensuring that bulk prices respond to changes in demand and supply.
- Recycled water should be subject to the same efficient pricing principles as potable water. This will ensure that efficient signals are sent to consumers on costs of consuming recycled water, and to suppliers on the viability of investments in recycled wastewater and stormwater schemes.
- There could be scope to enhance the efficiency of the utilisation of water transmission infrastructure by pricing these services in line with flexible pricing principles under some circumstances. Efficiency gains could also be realised by ensuring that developer charges for the provision of water and wastewater infrastructure to new sites better reflect the costs involved.
- The efficiency of retail prices could be improved through:
  - more comprehensive use of consumption-based pricing, including the direct charging of water usage to tenants where water is separately metered, and installing separate water meters in all new dwellings
  - moving away from mandatory inclining block tariffs
  - moving to more location-specific pricing that reflects the costs of service provision in different locations, where justified by a cost–benefit analysis.
- Introducing flexibility into retail pricing would enable utilities to better manage demand in line with changes in water availability, and achieve water security at least expected cost. Flexibility would not need to be introduced in a prescribed way. The Commission’s preferred approach is one where utilities provide consumers with a choice of tariff offerings (based on the marginal opportunity cost of water), allowing consumers to express their preferences on security of supply and price stability.
- The National Water Initiative pricing principles provide too much flexibility in implementing pricing policies that are not necessarily in line with the principles of economically efficient pricing.

---

Pricing is a mechanism that allocates resources within the economy. It provides the signals that guide behaviour on both the demand and supply sides.

On the demand side, prices ration the use of existing scarce resources. (Non-price tools such as restrictions, and water use efficiency and conservation measures, are another way to manage demand. These are discussed in chapter 7.) To maximise benefits to the community, prices need to reflect the efficient costs of providing a good or service. When prices unnecessarily exceed costs, they act as a tax on consumers. Households are left with less income for other uses, and the competitiveness of businesses is reduced. When prices are below costs, consumption is being subsidised. This encourages excess consumption, places pressure on existing capacity, and brings forward the need to expand capacity.

On the supply side, prices induce production and signal the need for investment in capacity. Prices also provide utilities with revenue to recover the costs incurred in service provision. For a business to continue operating in the long run, prices need to be sufficient to generate enough revenue to enable both capital and operating costs to be recovered. This includes an appropriate risk weighted return to investors, interest payments on debt, labour, purchases of other inputs into production, and the cost of any externalities (BIE 1995). When revenue does not cover costs, there will not be adequate incentives for utilities to undertake efficient investment in either upgrading or augmenting infrastructure.

In this chapter, the efficient pricing of each element of the urban water supply chain is examined, according to its cost structure and demand and supply characteristics. This provides a benchmark against which current pricing arrangements can be assessed and, in turn, the scope for efficiency gains from reform can be determined.

Each element of the supply chain is treated as distinct, even if multiple elements are in practice supplied by the same entity. This is because the price of each supply chain element needs to be transparent even when there is a single provider of water and wastewater services. In addition, the focus is on the principles of efficient pricing which hold irrespective of the ownership of utilities and the prevailing structural and regulatory arrangements, which are discussed in chapters 10–13.

In section 6.1, bulk water pricing is examined, and a case is made for pricing according to the marginal opportunity cost of supply. The pricing of wastewater and stormwater services is discussed in section 6.2, including pricing issues associated with recycling. Pricing of the water and wastewater transmission and distribution networks is discussed in section 6.3. Developer charges associated with the expansion of networks to service new customers are also examined. Final retail prices are analysed in section 6.4, including the merits of inclining block tariffs and

---

postage stamp pricing, and the desirability and feasibility of introducing more consumer choice. Section 6.5 provides an assessment of the current National Water Initiative (NWI) pricing principles.

## 6.1 Pricing of bulk water

In this report, bulk water refers to the extraction of water from bulk supply sources (or, in the case of desalination, manufacturing of water), as well as the storage, treatment and transfer of water to the shared transmission network.

### Current bulk water pricing approaches

Approaches to pricing bulk water differ across and within jurisdictions. A key distinction can be made in the pricing approach for those urban water systems where bulk water is vertically separate from the retail–distribution function. This occurs in Melbourne, Sydney and south-east Queensland (box 6.1).

Most other metropolitan and regional urban water systems are serviced by vertically-integrated water providers:<sup>1</sup>

- Bulk water forms part of final retail price determinations in the statewide utilities in South Australia, Western Australia, the Northern Territory and the ACT, and in the Hunter Valley, Broken Hill and those regional urban areas of Victoria not serviced by Melbourne Water.<sup>2</sup>
  - In the ACT, a Water Abstraction Charge is set by the ACT Government and payable by ACTEW Corporation. The charge is designed to account for the costs of catchment maintenance and Government expenditure, the scarcity value of water, and the costs to the environment from the flow of water downstream (ActewAGL 2011).
- In regional urban areas in New South Wales and Queensland (excluding the south-east region), neither bulk nor retail prices are regulated. Final prices are set by utilities annually according to guidelines<sup>3</sup>, and the bulk water component is determined internally within the vertically-integrated utility.

---

<sup>1</sup> Exceptions to this include some regional urban utilities in Queensland that source bulk water from Sunwater or Water Boards (Queensland Water Directorate, sub. DR138).

<sup>2</sup> From 2012, this will also occur in Tasmania, when independent economic regulation of prices is introduced (Southern Water, trans., p. 400).

<sup>3</sup> The guidelines are provided by the Office of Water in New South Wales, and set out in the *Local Government Act 2009* (Qld) and the Queensland Competition Authority's pricing principles in Queensland.

---

**Box 6.1 Bulk water pricing in Melbourne, Sydney and south-east Queensland**

- Melbourne Water's bulk water charges are regulated by the Victorian Essential Services Commission and set every four years. Bulk water is priced as a two-part tariff. The volumetric charge to the five retailer–distributors serviced by Melbourne Water is set in accordance with Melbourne Water's long-run marginal cost (LRMC), and the fixed charge is set as the residual to ensure cost recovery.
- Bulk water charges for Sydney Catchment Authority (SCA) are set by the Independent Pricing and Regulatory Tribunal (IPART) every three years.<sup>4</sup> Volumetric prices are set in reference to LRMC, and account for about two-thirds of SCA's revenue. Sydney Water is also charged a fixed water service fee as a residual to meet the annual revenue requirement of SCA (IPART 2009a). The two Local Government utilities supplied by SCA (Shoalhaven City Council and Wingecarribee Shire Council) are not charged a fixed component.
  - The Sydney Desalination Plant Pty Ltd (SDP) is a wholly owned subsidiary of Sydney Water. In May 2011, the relevant Minister declared SDP to be a monopoly under s. 51 of the *Water Industry Competition Act 2006* (NSW). This requires IPART to regulate the prices that Sydney Water pays for water from SDP. In reaching its determination on prices for the services provided by SDP, the Minister has required IPART to ensure that 'the structure of prices should encourage SDP to be financially indifferent as to whether or not it supplies water' (Pearce 2011, p. 1). IPART has released an issues paper and will publish its pricing determination in October 2011 (IPART 2011d).
- Bulk water charges in south-east Queensland are set by the Queensland Government. Only a volumetric component is charged. The Government set a 10 year price path starting from 2008, targeting a 4 per cent rate of return (lower than the 7 per cent recommended by the Queensland Water Commission) (Council of Mayors, sub. 77). The price path was then adjusted down in December 2010.
  - The Queensland Competition Authority will take over price determination from 1 July 2013 (QCA 2010a).

## Scope for efficiency gains

As explained in chapter 5, large efficiency gains could be achieved from improving the allocation of water resources and using lower cost supply augmentations. To fully realise these gains, bulk water prices need to reflect:

- the optimal allocation of water between periods of time using dam storages and inflows

---

<sup>4</sup> Water treatment is not included in SCA's bulk water charges. Treatment is conducted by private parties in Sydney. Treatment charges form part of Sydney Water's retail tariff determination.

- 
- efficient signals on the size, timing and utilisation of supply augmentations, in the presence of risk about future inflows
  - the cost of supplying capacity.

This can be achieved by pricing bulk water according to the marginal opportunity cost of supply (Littlechild 1970).

*What is the marginal opportunity cost of supply?*

In economics, the concept of opportunity cost is used to refer to the value of a resource in its best alternative use. This is the cost to society of using the resource (FAO 2004).

The marginal opportunity cost of water has three components:

1. the marginal direct cost of water — this refers to the variable operating costs (short-run marginal costs (SRMC)) of extracting water
2. the cost of externalities — this is the net value of any losses and gains in welfare that water use imposes on individuals other than those engaged in the activity
3. the scarcity value of water — this relates to the value of the opportunity foregone by using water in the present period rather than in the future, and the increased future costs that occur as a consequence of current use (such as higher extraction charges) (FAO 2004).

Pricing bulk water according to the marginal opportunity cost of supply will cause prices to adjust to the demand–supply balance, because the opportunity cost increases as current (and expected future) water availability decreases. In this sense, the opportunity cost of supplying a unit of water is a dynamic concept.

This describes what many refer to as ‘flexible’ or ‘scarcity’ pricing of bulk water. All of these terms essentially describe the same thing — a price that varies in line with movements in the current and expected future demand–supply balance.

With flexible pricing of bulk water, price increases will arise from:

- actual or expected decreases in water availability due to lower rainfall
- an increase in environmental allocation
- actual or expected increases in demand
- population growth.

---

Insufficient investment in new capacity to meet demand growth, or time lags in recognising the need for new capacity, can also lead to scarcity and, therefore, price increases (Frontier Economics 2011a).

In the presence of a well functioning urban water market, the market clearing price would reflect the marginal opportunity cost of supply. In the absence of a market, the marginal opportunity cost needs to be calculated by the retailer–distributor. Appendix F outlines a method for estimating the marginal opportunity cost of supply in the absence of a market, based on the portfolio manager approach discussed in chapters 10 and 12.

### *What are the efficiency gains from flexible pricing of bulk water?*

Long-run marginal cost (LRMC) pricing is a static concept. It involves a price with a mark-up over SRMC that is averaged and fixed over long time periods, and reflects the incremental costs of bringing forward the next supply augmentation to meet forecast demand. LRMC estimates do change, but only slowly, as new sources of supply come on line, and in response to changes in construction costs.

Being a static concept, LRMC pricing does not take account of changes in water availability. As such:

- When water is scarce, LRMC significantly underprices water because it fails to reflect the opportunity cost of current water consumption, which will at times be greater than the LRMC. This leads to over consumption of water and will tend to bring forward investment in supply augmentation.
- At times of high inflows, water is abundant and a price based on LRMC is too high. This will cause some consumers to forgo water consumption that they would have valued and will delay investment in supply augmentation that would benefit the community.

As noted by the Independent Competition and Regulatory Commission (ICRC) (sub. DR148), LRMC pricing also assumes that demand and supply are known with certainty, and that investments in capacity are made optimally. However, this is not the case in the urban water sector where there is a high degree of uncertainty involved in relation to rainfall events and, therefore, using LRMC pricing can lead to inefficient outcomes (Sibly 2006b). Frontier Economics, in its report for the National Water Commission (NWC) on administered scarcity pricing, said:

The LRMC approach to pricing has focused on providing a smoothed long-term pricing signal to customers. An implicit assumption is that the service is being provided by a monopoly supplier, and its availability is determined solely by the supply capacity, which will need to be augmented when demand grows to take up all of the existing

---

capacity. While this may be a reasonable assumption for many services — and for water when the supply is reliable, it is increasingly recognised that this may not hold for water supply in Australia. (Frontier Economics 2011a, p. 6)

LRMC is also inconsistent with the real options approach to supply and planning (chapter 5). A real options approach requires a ‘wait and see’ approach to investment in supply augmentation, whereas LRMC assumes that the next supply augmentation is known at all times.

Flexible pricing based on the marginal opportunity cost of supply allows prices to vary in line with changes in the demand–supply balance, and helps utilities achieve water security at least expected cost. Essentially, a flexible pricing approach better prices the water resource itself, whereas a LRMC price focuses on pricing the infrastructure used to supply that water (Frontier Economics 2011a). Flexible pricing sends more appropriate signals about when to draw on various water sources within a diverse portfolio, leading to a more efficient allocation of water resources. It also sends more appropriate signals on when and how to invest in new sources of supply, leading to increased dynamic efficiency.

Flexible pricing is not only consistent with a real options approach to investment and planning, but it is a requirement for the full efficiency gains of a real options approach to be realised — the two go hand in hand.

By pricing bulk water according to the marginal opportunity cost of supply, flexible pricing also reflects the costs of complying with environmental regulations and enforcing property rights. In doing so, it ensures that the value of externalities is internalised in the price, and no additional ‘externality’ charge or tax is required.

As noted by Frontier Economics (2011b, p. 11) in its report for the NWC on externality pricing: ‘there is ... potential for improved pricing and recovery of efficient costs of water planning and management activities to form an alternative to externality pricing’.<sup>5</sup>

### *Concerns with flexible pricing of bulk water*

In submissions to the draft report, concern was expressed about how a more flexible pricing approach to bulk water would affect utilities. For example, the Water Services Association of Australia (WSAA) said:

---

<sup>5</sup> The report also notes that efficient tariffs will be most effective in managing externalities where environmental regulations are aligned with the community’s values (Frontier Economics 2011b).

---

Exposed to a cost-recovery risk related to uncertain future inflows and extended periods of SRMC-based prices, what risk premium (over current relatively low regulatory returns) would a bulk utility require to encourage it to invest in new source augmentation? (sub. DR145, p. 7)

In addition, the New South Wales Government expressed concerns about:

- the appropriate management of revenues that exceed a utility's efficient operating costs
- dealing with the implications for bulk water service providers, such as ensuring the bulk water service providers receive adequate revenue
- implications on distribution–retail utilities and on water customers
- implications for new investment due to increased uncertainty regarding returns on investment. (sub. DR146, p. 13)

Under the Commission's model of reform, contractual arrangements could ensure that the returns to bulk water service providers are independent of rainfall variability, and achieve cost recovery. The retail–distribution utilities would take on the risk around supply and demand, and price variability. This would be managed by them in line with the portfolio manager model, which is outlined in chapter 12 and appendix F. The returns expected by the bulk water service provider on augmentation investments will be lower than if they were required to take on the supply and demand risk.

Because there is only ever one bulk water price (reflecting the unique marginal opportunity cost of water at prevailing supply and demand conditions), there are times when economic rents will be earned on low cost bulk water sources that cannot be expanded, such as dams. Economic rents refer to returns over and above the efficient recovery of costs for a given bulk water source. Ultimately it is the role of governments to decide how these rents should be distributed (chapter 12).

WSAA also expressed concern that:

... if the scarcity price is quarantined to the bulk sector, then WSAA is unconvinced that it could have a meaningful impact on end-user water demand, and this disconnect between bulk and retail water prices would create significant demand risk for distributor–retailers — assuming a vertically-separated industry structure. (sub. DR145, p. 7)

Scarcity pricing could be implemented at the bulk level and not at the retail level, without compromising retailer–distributors' ability to manage demand side risk. Section 6.4 and appendix F detail how this could take place by offering consumers greater choice in tariff offerings. In addition, Frontier Economics stated in its report:

---

Administered scarcity pricing (or bulk markets) at the wholesale level could be applied in conjunction with scarcity pricing at the retail level but could also be applied without applying scarcity pricing at the retail level. As in the electricity sector, water retailers could manage some of the volatility in wholesale prices and smooth retail prices to customers. (Frontier Economics 2011a, p. 38)

## **Impediments to achieving these efficiency gains**

### *Price regulation*

A major impediment to pricing bulk water at the marginal opportunity cost of supply is the regulated price setting environment existing in some jurisdictions. In this environment, prices are set for several years at a time at the LRMC of supply. For flexible pricing to operate effectively, bulk water prices need to move in line with changes in the demand–supply balance.

A regulated form of flexible pricing is an option (Frontier Economics 2011a). For example, Independent Pricing and Regulatory Tribunal (IPART) has indicated that it will investigate flexible pricing as part of the 2012 review of Sydney Catchment Authority's (SCA) prices (IPART 2011e). However, IPART's ability to implement flexible pricing for SCA is likely to be affected by the recent New South Wales Government determination requiring IPART to ensure that prices for Sydney Desalination Plant (SDP) encourage SDP to be financially indifferent as to whether or not it supplies water. In response to a question on how the determination would affect prices for SCA, IPART said:

I think the relevant consideration there is that, moving forward, there are going to be alternative sources of bulk water in Sydney. I think the issues for the catchment authority is that we have a fairly large component of their revenue being recovered for the variable charge, but their revenues will be more variable in future because the amount of water they take will be more variable in future. I guess there's a question of risk allocation there and whether ultimately, a move towards greater reliance on a fixed charge for the Sydney Catchment Authority is appropriate, so I think that's an issue that does deserve consideration. (trans., p. 453)

Notwithstanding this, it is the Commission's view that regulated flexible pricing would lead to time consuming and costly regulatory processes. Taken together, government ownership, an appropriate governance framework, a price monitoring regime and competition for the market in bulk water supply would be sufficient to allow flexible pricing whilst maintaining oversight of potential abuse of market power if there was concern of this occurring. This issue is discussed in chapter 11.

---

## *Complexity*

Implementing flexible pricing for bulk water will represent a significant shift from current practices. Utilities are likely to encounter increased complexity in their operations, and will need to build expertise.

The tools to determine the dynamic opportunity cost of supply are readily available and widely used in other sectors such as gas and electricity. There is scope for the water industry to adapt these tools and frameworks to the urban water industry, particularly under the portfolio manager model. Appendix F details how utilities can use mathematical programming techniques to calculate the marginal opportunity cost of water based on ex ante analysis, using the best available supply cost data and demand forecasts.

The water industry needs to be comfortable about applying these tools in order to achieve the efficiency gains associated with moving to flexible pricing. There is a case for assistance to be provided to them to facilitate this process (chapter 14). In addition, in order to assess the practicality of these tools and provide proof of concept, a number of utilities could trial the application of the marginal opportunity cost framework outlined in this report. This will provide experience in the application of these frameworks.

## **6.2 Pricing of wastewater and stormwater services**

This section analyses the efficient pricing of wastewater treatment and disposal, stormwater services, and recycled wastewater and stormwater.

Wastewater, as defined in this inquiry, comprises sewage from households and tradewaste for industrial businesses. The pricing of the network infrastructure related to wastewater is discussed in section 6.3.

Stormwater services refer to the collection, transmission and discharge of stormwater. The stormwater system includes the local drainage (distribution) system that collects stormwater, and the stormwater transmission network infrastructure, such as main drains, rivers and creeks.

---

## Current pricing practices

### *Wastewater*

Household sewage services tend to be charged as a single fixed periodic charge on either a per property basis or meter size basis (ESC 2007). The exceptions are in Victoria, where some retailers charge a two-part tariff for sewage. The volumetric component is set according to a formula based on assumptions about the volume of water coming into a property that is discharged to the sewer system (ESC 2009b).

Tradewaste charges typically comprise fixed one-off and annual fees, such as application and agreement fees, as well as volumetric charges based on the volume and composition of tradewaste discharge.

### *Stormwater*

Stormwater services tend to be priced as fixed periodic charges. The following tends to hold in most areas across the country:

- Local councils manage stormwater collection and distribution. Local councils might also discharge stormwater directly into the local environment, and in doing so must comply with relevant environmental regulations. Households and businesses pay for these services through their local council rates.
- As an alternative to local discharge, local councils can arrange for discharge of stormwater via the shared transmission network. Households and businesses are generally charged for transmission and discharge services directly by utilities. Transmission assets are usually managed by utilities or relevant government agencies. These entities are also subject to relevant environmental regulations:
  - In the case of *natural* stormwater transmission assets (such as rivers and creeks) compliance with these regulations is achieved at the point of injection (councils must ensure that stormwater injected into the asset meets relevant environmental standards as this action constitutes discharge into the environment).
- For other transmission infrastructure (such as large pipes and drains), local councils could potentially inject non-compliant stormwater into the system. In this instance, the asset operator (as the entity responsible for regulatory compliance) would need to ensure that the stormwater is treated to a compliant level before it is discharged into the environment (chapter 12).

---

## Scope for efficiency gains

### *Wastewater*

The cost structure of the bulk wastewater sector is similar to the bulk potable water sector. It has variable costs associated with treatment and pumping of wastewater, and fixed costs associated with the related treatment plant infrastructure.

Variable treatment and pumping costs for wastewater can be considerable, giving rise to a possible efficiency case for volumetric charging of wastewater. However, the costs and benefits of doing so need to be weighed up. Volume-based charging is likely to be of most benefit where disposal costs are high or there are significant differences in the levels of demand for wastewater services by different users.

### *Household sewage*

Volumetric charging of household sewage would require separate wastewater metering in households. Retro-fitting these is likely to be prohibitively expensive. The costs might not be as severe in new developments. Whether the benefits of metering outweigh the costs is a decision best left to utilities to investigate. However, Frontier Economics, in its review of externality pricing, stated:

Moving to measured volumetric charges for residential wastewater would require massive investment in measurement and monitoring, potentially for very little benefit. (Frontier Economics 2011b, p. 27)

A less costly option to enhance efficiency might be to price sewage according to the relationship between water supplied and sewage discharged. This is done by some retailer–distributors in Victoria, where the sewage disposal charge usually averages about 70 per cent of metered water use.

For this approach to be economically efficient, the relationship between water use and sewage discharge needs to hold tightly. However, because some households water their gardens and fill their pools while others do not, the ratio of water supplied to water returned to the wastewater system will vary across consumers. Therefore, trying to build into the volumetric charge a component of price to reflect the variable cost of sewage would have efficiency implications. The cost of fitting meters to separately monitor outdoor or indoor use, for example, would also be very costly and might, in fact, approach the cost of metering the sewage directly, without providing the benefits of doing so.

The three major Victorian metropolitan retailer–distributors have proposed combining their existing volumetric charges for water and sewage into a single

---

charge, because the volumetric sewage charge is not well understood by the public, and because customers see water and sewage use as one decision and rarely differentiate between ‘water in’ and ‘water out’ (ESC 2007; Yarra Valley Water, trans. p. 754).

In general, it is unlikely that demand for domestic sewage services can be influenced by price to the same degree as demand for water overall, given that households have less scope to adjust their use of indoor (as opposed to outdoor) water in response to price changes, which is what determines wastewater production (IC 1992).

Given this, and the high costs involved in installing household sewage meters, it is most efficient to price household sewage as a fixed charge, as it is currently. If metering technology advances to reduce the cost of installing sewage meters, or if installation costs are significantly less expensive in greenfield developments, there could be a case for volumetric charging of sewage. Utilities are best placed to weigh up the costs and benefits of doing so.

### *Tradewaste*

Load-based pricing of tradewaste reflects the cost drivers of treatment, disposal and management of tradewaste.

Where the costs of measuring load factors do not outweigh the benefits, there are efficiency gains from moving to more load-based pricing of tradewaste. It signals to customers the costs of discharging to the wastewater system compared with waste minimisation and on-site treatment. Charging industrial users the full cost of the tradewaste they generate can provide incentives for them to find the least-cost way to manage tradewaste, including the possibility of investing in on-site treatment.

Greater reliance on load-based pricing of tradewaste can also improve the management of externalities associated with tradewaste discharges by reducing the need for costly and potentially inefficient prescriptive regulations that set uniform discharge levels across sources to manage pollutants (Frontier Economics 2011b).

Load-based pricing of tradewaste is likely to be most relevant for large industrial users, because:

- the benefits of sending a price signal are likely to be greatest, given that treatment costs are likely to be highest

- 
- the costs of implementation are likely to be low as large users already tend to have metering in place to meet regulatory and licensing obligations (NWC 2011b).

With improvements in measurement techniques, new and lower cost opportunities for measuring the contaminants in different tradewaste are likely to become available. This might facilitate more refined differential charging systems for tradewaste of different pollution loads (Freebairn 2008).

### *Stormwater*

There are few variable costs in providing stormwater services. For example, treatment primarily involves little more than screening of stormwater outlets or passage through natural or artificial wetlands (IPART, sub. 58). As such, fixed charges are more appropriate than volumetric charges.

There is little scope for efficiency gains in changing the way that stormwater services provided by local councils (distribution and local discharge) are paid for by households and businesses through local council rates.

Where local councils transport stormwater to shared transmission networks operated by utilities or jurisdictional entities, coordination problems can arise (chapter 5). Pricing reform is one option for addressing these problems. There might be efficiency gains from levying charges for these services on local councils (who could then recover the costs from households) rather than charging households directly. Sending a price signal to local councils on the cost of water transmission and discharge could provide them with an incentive to manage their stormwater distribution infrastructure efficiently and to recycle their stormwater where cost effective (discussed below). For example, in the event stormwater is discharged via large pipes or drains, the transmission charge could vary depending on the level of pollutants in the stormwater injected by local councils. Alternatively, there might be benefits in charging councils for transmission services based on the maximum expected peak flows from each council during heavy rainfall events. These options are discussed in more detail in chapter 12.

For pricing to be effective in better managing shared stormwater transmission infrastructure, it is crucial that property rights are clearly articulated and well defined (chapter 5).

---

## Recycling of wastewater and stormwater

The NWI called for the states and territories to develop pricing policies for recycled water and stormwater by the end of 2006, that are ‘congruent with pricing policies for potable water, and stimulate efficient water use no matter what the source’ (COAG 2004, p. 14). The 2010 NWI pricing principles then provided further guidance to assist the states and territories to meet this commitment (COAG 2010).

In New South Wales, IPART regulates the price for mandatory recycling schemes. Voluntary recycled water schemes are subject to high-level pricing principles.

In Victoria, recycled water prices are regulated through a mix of scheduled prices and pricing principles. The pricing principles apply where recycled water services are provided to large non-residential or unique customers. Prices for third-pipe recycled water services must be reflected in the businesses’ proposed tariff schedules and are subject to the annual price approval process.

In South Australia, the Essential Services Commission of South Australia (ESCOSA) is in the process of advising the State Treasurer on the form of economic regulation that should be applied to recycled water in South Australia (ESCOSA 2010). A light-handed ‘pricing principles’ approach is being considered.

In most jurisdictions, low volumetric prices are charged for recycled water — it is usually priced below or at the same level as water from traditional sources, even though the cost of supplying it is usually higher. For example, in Sydney, the recycled water usage charge for the Rouse Hill Development Area is set at 80 per cent of the potable water usage charge. This is designed to encourage the development and use of the recycled water (IPART 2006b). In South Australia, recycled water is charged at 75 per cent of the second tier water price, which applies for water use above 30 kilolitres (kL) a quarter (SA Water nd).

### *Scope for efficiency gains in pricing recycled water*

The principles for pricing recycled wastewater and stormwater are no different from those for potable water. Essentially, prices should reflect the marginal opportunity cost of supplying the water to users.

A key issue is the assignment of the costs of treating wastewater and stormwater to a higher standard than that required for discharge into the environment. A user pays approach is one option, where those who use the recycled water pay.

---

A broader approach is a beneficiary pays approach. This was advocated in a report by the Centre for International Economics (CIE) commissioned by the NWC, and adopted in the NWC pricing principles:

In many cases, determining who should pay for products or services, a beneficiary pays approach — which is broader than a user pays approach — should be used in order to acknowledge that benefits accrue to others beyond the direct customer base being supplied with recycled water. Sewer dischargers and potable water users (other than those also supplied with recycled water) may be such beneficiaries who can also be appropriately charged, since they may enjoy the benefit of avoided or deferred costs that would otherwise fall on them for recovery in the absence of a recycling scheme. The beneficiary pays approach underscores the fact that recycling schemes can have system-wide cost impacts, and benefits can accrue to other users as a result. (CIE 2010a, p. xii)

The beneficiary pays approach has also been adopted by IPART:

The Tribunal has decided that the total costs of a recycled water scheme should be shared between the direct users of the recycled water and other water or sewerage customers. The contribution of the former should reflect their willingness to pay for recycled water, while the contribution of the latter should be no more than the amount of avoided or deferred costs generated by the scheme. (IPART 2006a, p. 33)

It is the Commission's view that clarity on who should pay for the costs involved in recycled wastewater and stormwater will be best achieved once property rights over water, wastewater and stormwater are clearly articulated (chapter 5).

Irrespective of the allocation of costs, recycled water should not be charged at a price lower than the SRMC of supplying it. Doing so creates incentives for the excessive use of recycled water. It sends the wrong signals to consumers on the consumption of recycled water, and to suppliers on the viability of investments in recycled wastewater and stormwater schemes. As part of the portfolio of supply options available for utilities to draw on, recycled water should be subject to the same pricing principles as other bulk water sources.

The NWC has noted:

... the absence of clear, agreed and efficient pricing policies has contributed to governments seeking to promote recycling and stormwater reuse through non-price mechanisms. For example, several jurisdictions have adopted explicit recycling/reuse targets and provided subsidies for projects involving alternative water sources. ... concerns have been raised about the transparency and efficiency of such investments. Clearer recycled and stormwater reuse pricing policies may help to address some of these concerns. (NWC 2011b, p. 34)

As noted in chapter 5, it is the Commission's view that there is scope for efficiency gains from redesigning or eliminating policies that promote inefficient reuse and

---

recycling. The Commission sees efficient pricing of recycled water as a key element to realising these gains.

### *Impediments to achieving these gains*

The main impediments to achieving the gains associated with better pricing of recycled water include:

- lack of clarity of property rights over wastewater and stormwater (chapter 5)
- State and Territory Government mandated targets for recycled water, which result in potentially unviable recycling schemes going ahead, and underpricing to encourage use of the recycled water produced by those schemes (chapter 5).

## **6.3 Pricing of water and wastewater transmission and distribution networks**

This section deals with the efficient pricing of the water and wastewater transmission and distribution networks. Transmission networks consist of the large main trunk pipes that transport water from treatment plants to distribution networks, and wastewater from wastewater distribution networks to wastewater treatment plants. Distribution (reticulation) networks consist of the smaller pipes that transport water from the transmission pipes to final users, and wastewater from households and businesses to wastewater transmission pipes.

### **Current pricing practices**

- Melbourne Water owns and operates the water and wastewater transmission networks. Prices are regulated by the Essential Services Commission (ESC), and determined every 4 years. A two-part tariff is in place. The volumetric component is set according to LRMC and the fixed charge is set as a residual.
  - The water and wastewater distribution networks are owned and operated by the retailer–distributors. The price is regulated and forms part of their final price determination.
- Sydney Water owns and operates the water and wastewater transmission and distribution networks, and charges are regulated by IPART and form part of Sydney Water’s retail price determination.
- In south-east Queensland, water transmission is part of the government set bulk water price path. Water distribution, and wastewater transmission and distribution, are part of final retail prices.

- 
- In Western Australia and South Australia, prices for transmission and distribution networks form part of the final retail prices set by the respective State Governments.
  - In regional urban areas, water is provided by vertically-integrated entities, and transmission and distribution network costs form part of the final retail price.

### **Scope for efficiency gains in pricing of networks**

The transmission and distribution networks account for a significant proportion of the total cost of supplying water and wastewater services to consumers.

In many cases, it is uneconomic to duplicate this infrastructure, and it can be characterised as natural monopoly infrastructure (chapter 4). For water transmission pipes, however, it might at times be economic to incrementally expand capacity by replacing or duplicating them.

#### *Transmission*

The variable operating costs of utilising the transmission network are small compared with the fixed capital costs, and are mostly attributable to the pumping costs of transporting water and wastewater through the system.

Where there are large economies of scale present, the capital costs are driven by the pipeline capacity required to service expected peak volumes over the life of the asset, and pipelines will be built to ensure excess capacity for many years.

However, a greater number of connections to the pipe will increase the volume of water and wastewater going through the pipe so that, over time, they might need to be upgraded or expanded. This implies that the capital costs are ultimately driven by volumes and, therefore, they should be recovered through a volumetric price. In this case, pricing at SRMC is not the preferred approach. Variable operating costs are very low, and businesses would therefore struggle to recover their capital costs and would have little incentive to maintain the infrastructure. Flexible pricing will not be practicable either as capital costs would only be recovered when capacity is constrained, and this might not occur for very long periods of time.

The residual could be recovered through a fixed charge to recover the capital costs, but this would result in most of the charges being levied through the fixed component. To ensure that those placing higher demands on the shared capacity of the infrastructure pay a higher proportion of the capacity costs, they would need to be levied according to volumes where possible. To do so while still ensuring cost

---

recovery, a long-run cost methodology — either LRMC or long-run average cost — could be implemented. Where a volumetric LRMC price is not feasible (for example, where wastewater is not metered) a fixed price that varies according to the expected contribution of users to peak demand would be the most efficient solution.

At times it might be efficient for transmission pipes to be constructed incrementally, rather than with a lot of spare capacity. This is most likely for water transmission pipes, where it might be cheaper to build smaller pipes and expand or duplicate them if and when the capacity of existing pipes becomes binding (due to investment in supply augmentation or increases in demand). Such an approach could allow better capacity utilisation of the water transmission pipes and better investment decisions with respect to the size and timing of water transmission infrastructure, when compared with the alternative of building pipelines with significant excess capacity to service expected peak demand over the entire life of the asset.

In this case, a flexible price that varies in line with the utilisation of the water transmission pipeline would be appropriate. When the pipeline is constrained, the price would increase and more of the capital costs would be recovered. When there is excess capacity, the price would fall to no lower than the SRMC of pumping water through the pipeline. Such a pricing mechanism would result in efficient capacity utilisation of both bulk water and transmission capacity.

In summary, there could be scope for efficiency gains from pricing water transmission according to flexible pricing principles where water transmission pipes are built incrementally. Where they are instead built with significant excess capacity, LRMC pricing is likely to be more efficient. Utilities are best placed to weigh up the costs and benefits of these alternative approaches to pricing transmission infrastructure, on a case-by-case basis.

### *Distribution*

Distribution network costs are driven by the number of customers, more so than the volume of water and wastewater travelling through the pipes. Volumes will ebb and flow over time but there is likely to be excess capacity over the life of the asset, since they are built to service the peak expected demand of the customers serviced. Once laid, therefore, distribution pipes are unlikely to need upgrading or expanding.

As the capital costs are largely independent of the volume of water and wastewater travelling through the distribution network, a volumetric charge is not appropriate. Costs should instead be priced as a fixed charge on a connection basis. As this is generally the current practice, there is little scope for efficiency gains in changing the way that transmission and distribution infrastructure is priced.

---

## Developer charges

Developer charges are up-front charges that water utilities levy on developers for the infrastructure costs of providing or upgrading water supply, sewerage and drainage facilities for new developments. Expansion of the transmission and distribution network infrastructure will drive most of the need for developer charges, but the concept is also relevant for bulk water infrastructure.

Developer charges serve two purposes (Frontier Economics 2008a):

- Price signalling — to encourage efficient patterns of development by signalling to developers the infrastructure costs associated with development in different locations.
- Cost recovery — a means of recovering the costs incurred in extending or upgrading infrastructure.

Developer charges are applied and collected in different ways across Australia. They are set as part of the planning process and their payment effectively becomes a condition of final approval. The payment can be in the form of cash, land, buildings or works in kind (PC 2011c). Some of the evidence on current developer charges across jurisdictions is summarised in box 6.2.

### *Scope for efficiency gains*

Developer charges can enhance efficiency by conveying location-based, differential price signals for infrastructure. In doing so, developer charges encourage efficient decisions on the location, nature and timing of development, by signalling the costs of those developments (Frontier Economics 2008a). As noted by Australia's Future Tax System Review Panel:

In principle, efficient provision of infrastructure would be encouraged where its users pay for the construction of infrastructure that would be avoidable (that is, not needed) if the development did not proceed. By levying infrastructure charges that reflect these costs, State and Local Governments provide signals to develop housing in ways and places of greatest value. (Australia's Future Tax System Review Panel 2009, p. 423)

There are, however, difficulties with estimating the appropriate level of developer charges so that they actually send efficient pricing signals. Some participants expressed concern with the efficiency of developer charges in their current form. For example, according to Yarra Valley Water:

... charges do not provide signals as to where it is more efficient to develop (i.e. does not distinguish where development would require cheaper/more expensive infrastructure). ... scheduled charges should be set on a development area basis with each area containing 'like' and adjacent water supply zones or sewer catchments. This

---

would ensure that all incremental development within an area will contribute an equal amount to the cost of providing facilities to the area. (sub. DR115, p. 33)

## **Box 6.2 Developer charges**

Evidence on developer charges in Australia includes the following:

### **New South Wales**

- In December 2008, the New South Wales Government set the maximum developer charge for water and sewerage for Sydney Water and Hunter Water at zero. Local Government water authorities can still levy developer charges (IPART, sub. 58).
- Developer charges in regional urban New South Wales are set by local water utilities in accordance with best practice requirements developed by the NSW Office of Water and reviewed by IPART (LGSA NSW, sub. DR154; Water Directorate (NSW), sub. DR121).

### **Victoria**

- Charges are based on lot size, and levied on a per title property basis. Charges include a contribution to capacity provided in advance of growth (sunk costs), and a contribution per service towards the cost of investment in future infrastructure that varies with the size of the development (Yarra Valley Water, sub. DR115).

### **Queensland**

- In May 2011, the Queensland Government capped developer charges (covering all infrastructure, not just water) as part of a strategy to improve housing affordability (Council of Mayors (SEQ), sub. DR159; Queensland Water Directorate, sub. DR138).
- An AEC Group (2009) report found that the level of infrastructure charges levied in a number of Local Governments in Queensland were well below the actual costs incurred in providing infrastructure to service new developments. It reported that in many instances, the level of cost recovery from infrastructure charges is only in the order of 50–70 per cent.

### **Western Australia**

- Developer charges are uniform across Western Australia (Department of Water (WA), sub. DR122).

### **Others**

- There is no formal development contribution scheme in South Australia and Tasmania (where developers may negotiate agreements with Local Governments) (PC 2011d). In the ACT, ACTEW can levy a capital contribution charge on developers, but has not chosen to do so (ACTEW Corporation, sub. DR119).

---

The Australian Water Association said:

In some jurisdictions economic regulators have imposed constraints on water authorities seeking reimbursement for what is described as ‘sunk infrastructure’. This has the potential to cause inefficiencies in the provision of trunk water and sewer infrastructure. The issue arises where the first developer in a growth area is requested to construct a new water or sewer main, where the main is sized to cater for a number of developments that will occur subsequently. Past practice has been for the authority to reimburse the developer for the additional capacity (ie the capacity above that necessary to cater for the developer’s subdivision) and then recover contributions from subsequent developers which connect to the water or sewer main. This process has been criticized by some state economic regulators on the basis that it is recovering costs of ‘sunk infrastructure’. (sub. DR157, p. 7)

Efficient charging regimes for infrastructure development were discussed at length in the Commission’s 2004 inquiry into First Home Ownership and are discussed further in PC (2011c). Broadly, the appropriate allocation of capital costs hinges on the extent to which infrastructure provides services to those in a particular location, relative to the community more widely. Key findings of the 2004 inquiry report include that developer charges should:

- relate specifically to the directly attributable costs being incurred at that location, and not the sunk costs of common shared infrastructure
- be itemised by service type (such as water, wastewater or drainage) and infrastructure type (such as transmission or distribution system)
- avoid over recovery of the efficient costs incurred by the service provider, to avoid ‘gold-plating’ infrastructure and double charging for infrastructure through both developer charges and recurrent charges.

Developer charges might also need to account for the environmental externalities associated with development (chapter 5). For example, developers might need to pay fees for the increased level of nitrogen discharged into waterways due to increased stormwater run-off from urban development.

There is also the question of whether developer charges should be set periodically on an ‘across utility’ basis, or be specific to the development in question. Where there are large differences in costs across developments, it might be more efficient to levy developer charges on a case-by-case basis.

Difficulties can arise in setting developer charges when developments occur as urban infill, compared with when they occur in greenfield sites. The location-specific costs of expanding networks for greenfield developments are easier to isolate and measure. This is an important issue to resolve given the high proportion of growth accounted for by urban infill. For example, according to

---

Sydney Water (sub. 21), up to 80 per cent of development is accounted for by urban infill.

In its 2004 inquiry into First Home Ownership, the Commission proposed the following principles for allocating capital costs (PC 2004a):

- Upfront charges should be used to finance major shared infrastructure, such as trunk infrastructure, for new developments where the incremental costs associated with each development can be well established and where such increments are likely to vary across developments.
- Infill development where system-wide components need upgrading or augmentation that provide comparable benefits to incumbents should be funded out of borrowings and recovered through rates or taxes (or the fixed element in periodic utility charges).
- For local drainage, it is efficient for developers to construct them, dedicate them to local government and pass the full costs on to residents (through higher land purchase prices) on the principle of beneficiary pays.

The latter point provides an alternative to imposing developer charges. Developers could build the required infrastructure according to standards set by the utility. The developer could then retain ownership of the infrastructure and operate it, or transfer it to the utility once the development has been completed. This option is available in many jurisdictions for minor works located within the development (City of Wanneroo, sub. DR150; LGSA NSW, sub. DR154; Yarra Valley Water, sub. DR115).

Giving developers the option to build the infrastructure themselves might have advantages associated with encouraging innovation and improving dynamic efficiency, as developers seek ways of minimising the cost of production and paying less than the level of developer charges. Developer charges would need to be adjusted accordingly to remove the cost of those elements constructed by developers. In addition, appropriate standards for design and construction need to be in place to ensure the quality of the infrastructure, and warranties are required for quality assurance and maintenance. In the case where the developer maintains operational control, there would also need to be provisions to deal with situations where the entity becomes financially distressed or changes ownership. Clarity over the roles and responsibilities of utilities, developers and Local Governments would also be required (for example, concerns in Western Australia were expressed by the City of Wanneroo, sub. DR150).

---

RECOMMENDATION 6.1

*Upfront developer charges should be used where the incremental costs of development are well established and benefits accrue mainly to those in the development. Where, as in the case of urban infill, the benefits also accrue to incumbents, costs should be spread across all users through rates, taxes or the fixed part of a two-part tariff for water and wastewater services. Developers should be given the option of building the required infrastructure themselves where appropriate, subject to predetermined standards.*

*Impediments to achieving these gains*

One potential impediment to achieving the gains associated with more efficient developer charges could be the desire for Local Governments to promote urban development in the areas that they service, therefore providing them with an incentive to undercharge developers to ensure that development proceeds.

There might also be resistance from utilities to allowing developers to incorporate innovative solutions to water and wastewater provision.

According to Yarra Valley Water:

Water companies may argue for high charges that provide a relatively stable income stream and reduces the quantum of price increases to its general customer base. Developers with land holdings in areas that are expensive to service may argue for charges to be averaged across the water company's area (sub. DR115, p. 34)

Political intervention is another impediment, such as the New South Wales decision to abolish developer charges levied by Sydney Water and Hunter Water, and the Queensland Government's decision to cap infrastructure charges. According to IPART, the New South Wales Government's decision to cease water and sewerage infrastructure charges levied by Sydney Water and Hunter Water:

... creates a number of funding issues for new infrastructure and has implications for who bears the costs of servicing new developments ... Waiving the collection of some developer charges but not others is likely to distort efficient investment, as developers will have more incentive to develop in areas where the charges have been set to zero. (IPART 2011c, p. 66)

Commenting on the policy developments in Queensland, the Council of Mayors (SEQ) said 'this will have a significant impact on Council and water utility companies' capacity to deliver water and sewerage infrastructure and services to cater for population growth' (sub. DR159, p. 16).

---

## 6.4 Final retail pricing

Retail prices are essentially a pass-through to residential and business consumers of the price of each element along the water and wastewater supply chain, together with a retail margin. To be efficient, therefore, retail prices need to reflect the sum of all the efficient prices for bulk water, transmission, distribution, wastewater and stormwater. As described above, when priced efficiently, some of these will be passed on as fixed charges, and others as volumetric charges to reflect those costs that vary with greater quantities consumed (table 6.1).

Retail-specific costs need to be added to these charges. Retail costs are those associated with administering customer accounts, including billing, meter reading and responding to customer complaints (IPART 2007a). These costs tend to vary by customer rather than by the quantity of water consumed. As such, they should be levied as a fixed charge set equal to the marginal cost per customer served (Baumann, Boland and Hanemann 1998).

This efficient pricing structure holds even with a vertically-integrated utility — each element still needs to be priced efficiently and those prices need to be transparent.

This section examines some features of current final retail pricing structures, such as inclining block tariffs and postage stamp pricing, and assesses the scope for efficiency gains in reforming the way that retail prices are charged.

**Table 6.1 Fixed and volumetric components of efficient retail prices**

<b>Water</b>	
Bulk water (including recycled water sources)	Volumetric
Water transmission	Volumetric
Water distribution	Fixed
<b>Wastewater</b>	
Wastewater services	Fixed or volumetric
Wastewater transmission	Fixed or volumetric
Wastewater distribution	Fixed
<b>Retail margin</b>	Fixed

### Current retail pricing practices

As outlined in chapter 2, water prices tend to be set by regulators or governments in metropolitan areas, as well as regional urban areas in Victoria, South Australia and Western Australia. In most regional urban areas in New South Wales, and in most

---

regions of Queensland, prices are determined by Local Government-owned utilities in accordance with guidelines.

### *Two-part tariffs and inclining block tariffs*

Retail prices are usually characterised by a two-part tariff. The volumetric charge tends to be set at the LRMC of supply, and the fixed charge as a residual to achieve cost recovery.

An inclining block tariff (IBT) for the volumetric component is common, where the price increases as successively higher blocks of water are consumed within a billing period. The first block tends to be set at or below LRMC to provide an amount of essential water at low cost to assist low-income households. Subsequent blocks are set at or above LRMC to provide incentives for water conservation (ESC 2007). Sometimes, the prices of each block reflects the range of estimates of LRMC (ERA 2009; ESC 2007).

Inclining block tariff arrangements currently exist in some areas of all states and territories, except the Northern Territory. However, the size, number and price of blocks vary significantly (chapter 2). In 2008, Sydney moved from an IBT to a single volumetric rate. The requirement for non-metropolitan utilities in New South Wales to use IBTs was removed in March 2011, and utilities are now encouraged to use a flat volumetric pricing structure (NSW Government, sub. DR146).

In some regions, including Brisbane, South Australia and Western Australia, IBTs have also been applied to the volumetric charges paid by commercial water users, including an initial block of low priced water (ESC 2007).

### *Metering*

Not all consumers face a volumetric price for the water they consume. In some areas water is charged as a fixed rate based on property values or on an allowance basis, such as in Townsville. In other places such as in remote housing in Indigenous communities in the Northern Territory, there is no charge at all.<sup>6</sup>

Tenants in most States do not face a volumetric (nor a fixed) charge for the water they consume. Water bills are paid by landlords on their behalf. There are some exceptions:

---

<sup>6</sup> In Tasmania, water meters are currently being rolled out to unmetered properties. This project is scheduled for completion by June 2012. A \$10 million grant was provided to this project by the Australian Government under the *Water for the Future* initiative (Farrell 2010).

- 
- In Victoria, tenants must pay the volumetric component of water bills if their dwelling is separately metered. Landlords pay fixed charges.
  - In New South Wales, landlords can charge tenants for water use if the premises has water efficient appliances and is separately metered (NSW Government, sub. 65).
  - In Queensland, landlords can pass on bills to tenants provided that water is individually metered and fitted with water efficient devices, and the tenancy agreement states that the tenant must pay for water consumption (Residential Tenancies Authority 2010).

In most multi-unit dwellings in Australia, water is not separately metered. The volumetric component of bills is split evenly among residents, leading to cross-subsidisation. In some places, such as Melbourne, unit owners get charged directly by utilities. In others, such as Sydney, utilities generally bill strata corporations for total usage and this is recovered from owners through strata fees.

#### *Postage stamp pricing*

Under current pricing arrangements, all water utilities apply uniform tariffs to geographic areas of varying sizes to some degree, regardless of the actual costs of serving individual customers within those areas. This is known as ‘postage stamp pricing’ (or ‘uniform pricing’).

Postage stamp pricing is applied at a range of levels, from virtually an entire state or territory (South Australia and the Northern Territory), to areas that cover a single system (some regional urban areas in New South Wales and Victoria). In Western Australia, there has been some movement away from statewide pricing.<sup>7</sup>

### **Scope for efficiency gains in changes to retail pricing**

#### *More widespread consumption-based pricing*

The move away from fixed charges for water to two-part tariffs with a metered volumetric component has been an important one, as it has signalled to consumers the cost of their consumption decisions.

---

<sup>7</sup> Commercial and high use residential customers are now being transitioned towards cost reflective prices, up to a cap of \$5.94 per kL (2010-11 prices). A statewide tariff cap policy applies to country residential customers with lower consumption, where charges are capped at metropolitan residential rates (Department of Water (WA), sub. 38).

---

The benefits of consumption-based pricing through a two-part tariff are widely recognised. IPART (sub. 58) quotes international results showing that the installation of meters resulted in annual reductions in water consumption of between 12 and 35 per cent, and significantly larger reductions during peak summer months. According to WSAA:

... pricing is necessarily part of an efficient and effective overall strategy for managing water usage, and clearly moves to consumption-based pricing have been significant in reinforcing to customers the ‘value’ of water services. (sub. 29, p. 17).

As outlined above, there are still areas of Australia where water consumers do not face a volumetric price. Where there is metering in place but no variable charging, such as in Townsville where consumers can opt for an allowance-based tariff, two-part tariffs with a volumetric price that varies in line with water consumption should be introduced.

Where no metering is in place, the costs of installing meters need to be weighed against the benefits of doing so in terms of sending better signals to consumers about their consumption decisions. In some regional urban areas, there might not be a net benefit. According to the Local Government Association of Queensland ‘the cost and ongoing maintenance of introducing metering may be problematic especially in areas where inappropriate economies of scale exist’ (sub. 20, p. 16). Where a net benefit is identified, however, meters should be installed.

Similarly, where water is not *separately* metered in multi-unit dwellings, the costs and benefits of retro-fitting existing buildings, and fitting new dwellings with separate meters, need to be assessed. Although it might be too costly to retro-fit existing multi-unit dwellings with separate meters (NSW Government, sub. DR146; WSAA, sub. DR145), it is the Commission’s view that the case for installing separate meters in new multi-unit developments is strong. This view was supported by many participants (Shoalhaven City Council, sub. DR147; Tenants Advice Service, sub. DR103; Tenants Union of NSW, sub. DR129; Water Factory Company, sub. DR123; WSAA, sub. DR145). Separate metering in new multi-unit developments is especially important given the trend towards high density housing which will result in an increasing share of households not subject to efficient price signals.

Some jurisdictions are already examining the case for separate water metering in multi-unit dwellings. With about 40 per cent of households in the greater Sydney area not paying water usage charges due to shared metering, the New South Wales Government stated:

Recognising that sending direct price signals to as many water customers as possible will help promote more efficient water use and reduce pressure on supplies, Sydney

---

Water has undertaken a trial to examine the costs and benefits of individual metering in multi-unit apartment buildings. (sub. 65, p. 20)

In New South Wales, the *Best-Practice Management Water Supply and Sewerage Guidelines 2007*, which apply to non-metropolitan water utilities, require the individual metering of new multi-unit residential developments (NSW Government, sub. DR146). The Guidelines also state that local water utilities should encourage separate metering of existing multi-unit residential developments, where cost-effective (NSW Government, sub. 65).

As discussed above, utilities could also look into the costs and benefits of installing wastewater meters in new developments.

RECOMMENDATION 6.2

***All new single and multi-unit dwellings should have separate water meters installed. The case for retro-fitting existing single and multi-unit dwellings with separate water metering technology should be assessed by utilities.***

There is no clear justification for landlords, rather than tenants, paying for water usage in those states and territories where water is separately metered. Tenants pay bills for other utilities such as electricity, gas and telecommunications, and it is difficult to see a case for treating water differently. In any event, where tenants do not pay for water directly, they generally pay for it through higher rents. It would be more economically efficient for tenants in separately metered properties to face water consumption charges directly, and more administratively simple for them to also pay for the fixed charge component of water and wastewater bills directly, rather than pay through rents.

Where utilities currently bill strata corporations of multi-unit buildings (such as in Sydney), rather than owners, there is a case for changing this arrangement so that residents (be they tenants or owner occupiers) are billed directly by utilities.

Several participants expressed support for directly charging tenants for water consumption where it is separately metered, on the basis that it would:

- ensure that tenants are covered by the rights and obligations afforded to customers of utilities, (Tenants Advice Service, sub. DR103; Tenants Union of NSW, sub. DR129)
- improve access to concessions (WACOSS, sub. DR160) (chapter 8).

Charging tenants of separately metered properties for water and wastewater does not detract from the importance of affordability issues for low-income earners. On balance it is the Commission's view that tenants will be at least no worse off, as

---

rents should be reduced to reflect the change. It is also likely that tenants will be better off from being charged directly where separate metering is in place, as they will have the opportunity to benefit from any savings associated with reducing water consumption.

However, where this does not already occur, it might be necessary for State and Territory Governments to put in place transitional arrangements to ensure that savings to landlords are passed through to tenants. Participants emphasised the importance of such arrangements, on the basis that landlords tend not to pass on savings to tenants and would therefore need to be compelled to do so (Tenants Union of NSW, sub. DR129; Yarra Valley Water, sub. DR115).

To the extent that affordability concerns remain, these are best dealt with directly through the general taxation and transfer system (chapter 8).

#### RECOMMENDATION 6.3

***Utilities should charge tenants directly for both the fixed and volumetric charges where water is separately metered. Where this does not already occur, State and Territory Governments should consider whether transitional arrangements are required to ensure that savings to landlords are passed through to tenants.***

#### *Flat rather than inclining block structures*

The use of IBTs for the volumetric component of final retail prices means that if one tier reflects the marginal cost of supplying water, then water consumed in other tiers is being priced above or below marginal cost (O’Dea and Cooper 2008). By doing this in a prescribed way that does not account for differences across consumers in the quantities they consume and the value they place on water consumption, IBTs invariably result in efficiency losses compared with flat volumetric pricing. This is well understood by the NWC, which strongly supports a move to flat volumetric rates (NWC 2011b), and economic regulators. In its 2007 review of tariff structures in Victoria, the ESC noted:

Generally, IBTs set the first tier price below marginal cost and prices for subsequent tiers above marginal costs — IBTs may not, therefore, provide accurate signals to customers about supply costs. Households with consumption falling within the first block may have little incentive to use water efficiently because the volumetric charge is lower than marginal cost. Conversely, households with consumption falling within the final block will be facing a volumetric charge that may be significantly above marginal cost. (ESC 2007, p. 35)

IPART (sub. 58) also expressed this view, and moved from a two-tier IBT to a flat volumetric price for Sydney in 2008.

---

In theory, IBTs could be used as a way of distributing the rents that can accrue on cheaper sources of water, like dam water, while maintaining an efficient price signal for consumption at the margin. However, this relies on all users facing an efficient marginal price, which is impractical since water users have different levels of demand for water (Brennan 2006).

Not only do flat volumetric rates enhance economic efficiency, they are also more administratively simple to implement and easier for consumers to understand. Having multiple blocks, especially more than two or three blocks, makes the tariff structure unnecessarily complicated and difficult to understand. It also calls into question the rigour behind the calculation of the threshold levels of each block.

Several participants, including the Consumer Utilities Advocacy Centre (CUAC) (sub. DR143), South East Water (sub. DR149) and Yarra Valley Water (sub. DR115), expressed support for a move to flat volumetric tariffs.

The size of the efficiency gains from moving to flat volumetric charges will depend on the design of the inclining block tariff structure currently in place. Generally, the gains to be achieved will be greater:

- the larger the number of consumers facing marginal prices that are not equal to marginal cost
- the larger the difference between the marginal price paid by consumers and the marginal cost.

#### *Affordability concerns associated with adopting flat volumetric rates*

One of the primary reasons cited in support of an IBT structure is that it can achieve affordability objectives by providing an essential amount of water at a low or affordable price. In New South Wales, an IPART survey found that 63 per cent of respondents believed IBTs were fairer than the (then current) two-part tariff (quoted in Sibly 2006b). Some submissions to this inquiry expressed support for IBTs on this basis:

- Anglicare supports ... an inclining block tariff, with the first tariff block kept at an at-cost or below-cost price (or even free) to ensure a minimum level of service is available for everyone at a minimal price. (Anglicare Tasmania, sub. 44, p. 4)
- ... IAL [Irrigation Australia Limited] supports the use of block tariffs in pricing frameworks that includes a block to protect base human needs with the next block set at the long run marginal cost of water secured from new infrastructure or the next cost-effective demand management measure. This approach adequately deals with issues of equity through the lower block price ... (Irrigation Australia, sub. DR112, p. 6)

---

This support for using IBTs to address affordability issues could be an impediment to moving to a flat volumetric rate.

Using IBTs to achieve affordability objectives is, however, problematic. If all households had the same level of non-discretionary water use, a two-tier IBT could be designed such that an initial block equal to the essential water requirement could be set below marginal cost, and all discretionary water use would fall into a subsequent block priced at marginal cost, without distorting consumption or reducing economic efficiency.

However, it is very difficult to define what essential water requirements are (chapter 8). Even if they could be clearly defined, the essential water requirements of households vary greatly according to household size and other factors. For example, a house with six occupants can reasonably be expected to have higher essential water needs than a single occupant household.

Given the impracticality of adjusting IBTs for household size, IBTs disadvantage large households that face a higher marginal price (technical supplement 2). The Economic Regulation Authority in its review of tariffs in Western Australia stated:

Households with a large number of occupants are more likely to have higher water usage and would be more adversely impacted by inclining block tariffs than households with fewer occupants (all else being equal). (ERA 2009, p. 38)

Tooth and Sibly also explain how IBTs can disadvantage small users:

The IBT structure provides water at discounted rates for consumption up to a tier level ('discounted tier level'). The value of this discount is greatest to those who consume at least the amount of the discounted tier level — that is, the value of the discount is smallest for small users. ... To preserve cost recovery, fixed charges need to be higher than they would be under a simple two-part tariff. The implication is that under IBT rate structures, relative to a simple two-part tariff, small users will be financially worse off because they get a small volume discount but pay higher fixed charges. (sub. DR153, p. 2)

It is the Commission's view that consumers are best placed to determine their uses of water. An efficient flat volumetric rate allows them to do so, rather than an 'essential' level of demand being prescribed for them (Sibly 2006b). Declaring on behalf of consumers what is and is not essential usage distorts their consumption decisions and leads to inefficiencies.

Although in support of flat volumetric tariffs, some participants have argued that a move to flat rates will need to be supported by assistance to those disadvantaged by the change, and should be transitioned over several years (CUAC, sub. DR143; South East Water, sub. DR149; WSAA, sub. DR145).

---

The Commission does not expect the distributional consequences of a move to a flat volumetric tariff to be large. The Commission is not aware of affordability concerns arising from the move to a flat rate in Sydney in 2008. Nonetheless, where there are concerns about affordability of water for low-income earners, it is the Commission's view that these are best dealt with through the general taxation and transfer system (chapter 8).

FINDING 6.1

*Currently, the volumetric component of two-part tariffs is distorted by the prescription of inclining block tariffs, which create inefficiencies and inequities. Substantial efficiency gains are available from no longer prescribing inclining block tariff structures.*

***Moving away from postage stamp pricing***

The costs of servicing water and wastewater customers differ over geographic ranges. For example, the marginal cost of supplying water in systems that rely on a dam might be lower than systems that use groundwater, due to the pumping costs involved. A water utility might incur additional costs in pumping water against gravity to serve residents of a suburb situated on a hill as opposed to those in a neighbouring suburb who live in a lower lying area. Users located further away from treatment plants will also be more costly to service.

Postage stamp pricing ignores these cost differences. Some consumers face prices greater than the costs of servicing them, and these users subsidise the rest. The cross-subsidies created by postage stamp pricing were noted by some participants (NSW Government, sub. DR146; Queensland Water Directorate, sub. DR138).

Where postage stamp pricing results in prices that differ significantly from marginal costs, it will result in efficiency losses (Frontier Economics 2008a). These efficiency losses are likely to be greater the larger the area and number of systems covered by the uniform tariff.

The alternative to postage stamp pricing is location-specific (or 'nodal') pricing, where prices reflect the differences in marginal costs of supplying different users. (Developer charges, on the other hand, aim to recover the differential infrastructure costs across locations.)

The efficiency benefits from location-specific pricing need to be weighed against the cost of determining and implementing more cost-reflective prices. This has been recognised in the NWI pricing principles:

---

Water charges should be differentiated by the cost of servicing different customers (for example, on the basis of location and service standards) where there are benefits in doing so and where it can be shown that these benefits outweigh the costs of identifying differences and the equity advantages of alternatives. Differential pricing may be achieved by upfront contributions, including developer charges. (COAG 2010, p. 11)

The costs of location-based pricing will increase as the number of unique prices charged increases. The benefits will be greater the larger the cost differences within existing postage stamp boundaries. In its draft report submission, WSAA noted:

... it is impractical to isolate for each individual customer the exact share of network costs related to service delivery. Inevitably, some averaging and subjective cost allocation assumptions are required. ... Locationally-differentiated charges are likely to be most relevant in very large networks where there are demonstrable spatial differences in supply costs, able to be calculated robustly, and where other network and customer characteristics mean that the benefits of a more complex (and costly) pricing system are sufficient to outweigh the costs. (sub. DR145, pp. 9 & 11)

It is the Commission's view that the level of cross-subsidisation involved in postage stamp pricing needs to be minimised. This can be achieved by:

- reducing the coverage of a postage stamp price to geographical areas containing less variation in costs of supply
- setting the level of the postage stamp price at the cost of servicing the majority of users within the postage stamp boundary, and funding provision to higher-cost areas with direct and transparent government subsidies (Community Service Obligations) (chapters 10 and 13).

Utilities should determine the geographical boundaries across which location-specific pricing should be introduced within the urban water systems they service.

### *Equity and affordability concerns associated with adopting more location-specific pricing*

Support has been expressed for postage stamp pricing on the basis that it is more equitable to share costs of water and wastewater services across a large number of users. This point was highlighted by some participants:

- ... 'postage stamp' pricing is contrary to efficient pricing, but is widely practised because many consumers would view it as unfair if they were to pay a higher volumetric price than another consumer for what appears to be an identical product delivered by the same supplier. (Grafton, sub. 22, p. 9)

- 
- Consumers expressed the view that water is a basic social right and strongly supported postage stamp pricing — even in areas where prices would decrease under area-based differential pricing. (Sydney Water, sub. 21, p. 20)

However, others consider that postage stamp pricing is inequitable because of the cross-subsidisation of high-cost customers by lower-cost customers. This view was expressed by the Australian Water Association:

Postage stamp pricing is likely to be inefficient (as at least some will be paying more than the cost of supply) and to promote unjustifiable cross-subsidies (as it is not clear that those who benefit from postage stamp pricing are those least able to pay ...). (sub. 42, p. 19)

In addition, Rockhampton Regional Council said:

Postage stamp pricing is not equitable as it provides the opportunity for cross-subsidisation with the consumers in the more urbanised schemes assisting in maintaining a lower price for the smaller scheme consumers despite, quite often, the costs per unit being far higher in the smaller schemes. (sub. 33, p. 9)

Concerns have also been raised about the impact of removing postage stamp pricing on low-income customers (NSW Government, sub. DR146; WACOSS, sub. DR160; WSAA, sub. DR 145;). For example, CUAC said:

... water is often more expensive to supply in areas that also have a concentration of people on low incomes. In Victoria, for example, consumers in non-metropolitan areas (and in some of the state's most socio-economically disadvantaged regions, such as Gippsland) tend to pay higher prices for water and sewerage services. When postage stamp pricing is removed, measures should be put in place to ensure continuing universal access where prices rise significantly. (sub. 46, p. 8)

In the Commission's view, postage stamp pricing is inequitable as those living in low-cost areas are subsidising those in high-cost areas.

Postage stamp pricing will not always necessarily translate to metropolitan users subsidising regional urban users. With the growing costs of sourcing water in metropolitan areas due to the drought and the need to seek more expensive sources of water such as desalination, relatively sparsely populated regions might now be at a relative cost advantage in sourcing water and this might result in regional urban users subsidising metropolitan users. For example, recently announced statewide price increases in South Australia have been driven by increased costs from construction of the Adelaide desalination plant (DTF 2011).

Nor will postage stamp pricing necessarily translate to high-income earners subsidising the provision of water and wastewater to low-income earners. A person's geographical location does not necessarily reflect their ability to pay for water and wastewater services. For example, postage stamp pricing can

---

disadvantage low-income earners living in low-cost metropolitan cities or suburbs (such as Redfern), who subsidise wealthy residents living in more distant, high-cost locations (such as St Ives).

It is the Commission's view that prices, particularly volumetric prices, should be set efficiently according to the marginal cost of provision where there is a net benefit from doing so. Affordability concerns are best dealt with outside of the pricing system. This issue is discussed further in chapters 8 and 13.

FINDING 6.2

*Charging a uniform price for water over a large geographic region ('postage stamp' pricing), irrespective of the variation in costs of servicing individual locations within the region, leads to inefficiencies and inequities.*

*There is scope for efficiency gains in moving to location-specific pricing, particularly where cost differences within the 'postage stamp' region are large and easy to quantify.*

*Introducing consumer choice in tariff offerings*

The benefits of pricing bulk water according to the marginal opportunity cost of supply were outlined in section 6.1. These benefits include a more efficient allocation of water resources and more efficient supply augmentation decisions.

The pass through to household and business consumers of the marginal opportunity cost of supplying water is what many refer to as retail 'scarcity' pricing. In this report, the Commission refers to the one-for-one pass through of the marginal opportunity cost of supply to consumers as 'flexible retail pricing'.

By passing on the marginal opportunity cost of supply to final consumers, flexible pricing would yield additional benefits from better managing demand, compared with a LRMC pricing approach. LRMC pricing does not send signals to consumers about the relative availability of water. As noted by the NWC:

LRMC prices signal the future costs of capacity augmentation to meet growth over the longer term but do not respond to changes in water availability. Volumetric pricing based on LRMC is unlikely to provide customers and suppliers with the most efficient forward-looking price signal in situations where dam inflows are highly uncertain and variable. (NWC 2011b, p. 85)

Flexible pricing, on the other hand, would ensure that consumers receive signals on the opportunity cost of supply, so that during times of water scarcity they have incentives to conserve water, and during times of abundance they are not deprived

---

of valued water use. This would enable utilities to meet their security of supply objectives at least expected cost, without the need for restrictions which generate significant economic costs (chapter 7).

The Commission modelled a comparison between flexible pricing and LRMC pricing. In the model, LRMC pricing was approximated as a ‘smoothed’ pricing policy that applied to prices paid by consumers that is set every four years. This approach captures the key cost of a smoothed pricing regime within a regulatory price setting period — consumers do not face higher prices for water during times of scarcity or lower prices when there is abundance of supply.<sup>8</sup>

The modelling results show that smoothed pricing in Melbourne and Perth reduces net social welfare by about \$110 million over a 10 year period. This occurs because prices are on average higher than under flexible pricing, and this makes consumers worse off. Prices are higher because suppliers have to cope with variable inflows without the assistance of consumers, who do not change consumption. Suppliers might see that in some possible future drier scenarios, supply augmentation needs to occur to supply enough water. However, the price that is required to make the supply augmentation viable must also be applied in the case that rather than being dry, it rains. This leads to a higher than necessary average price for consumers.

The modelling results also show that investment is more risky under the smoothed pricing scenario because while consumers face a relatively predictable pricing environment with prices being set in advance, water suppliers need to deal with variable inflows without any assistance from consumers.

The gains from flexible pricing have also been estimated by Grafton and Ward (2010) for Sydney. Their results indicate:

... the welfare costs of supply-inflexible volumetric water pricing generates large welfare losses in excess of a billion dollars due to on-going water restrictions and premature supply augmentation. However, these losses could be avoided if dynamically efficient volumetric pricing were to be adopted by price regulators or water utilities in response to variability in water availability. (Grafton and Ward 2010, p. 1)

Their results are significantly higher than the Commission’s results as they combine the losses from fixing prices, forcing investment in desalination (chapter 5) and imposing restrictions (chapter 7). The Commission models these aspects separately.

---

<sup>8</sup> In the modelling, the smoothed pricing regime is assumed to constrain only consumer prices. Investment decisions and supply are optimally determined, subject to the distortion in consumption induced by imposing smoothed prices.

---

Although, in the strictest sense, ‘flexible’ retail pricing refers to the one-for-one pass through of the marginal opportunity cost of water to consumers, there are many ways in which flexible pricing can be implemented — it does not need to be introduced in a prescribed way. Ideas have been put forward for implementing flexible pricing (box 6.3), each of which attempts to deal with some of the concerns raised with flexible pricing (discussed below).

The Commission favours an approach where utilities have the flexibility to offer a range of tariffs to consumers. In doing so, utilities would not simply pass through one-for-one the marginal opportunity cost of water to all consumers. Rather, they would match the risk characteristics of their customer portfolio with their bulk water supply portfolio. Utilities would still base the tariff options on the marginal opportunity cost of supply so that they can manage demand according to changes in the demand–supply balance, but the way the opportunity cost is reflected in retail tariffs would vary.

### **Box 6.3 Options for operationalising flexible retail pricing**

ABARE (in Hughes et al. 2008) suggests that pricing could be implemented with a set of stages similar to that used for water restrictions. A number of price stages could be defined, each corresponding to a different level of scarcity. The ABARE model results illustrate that a staged price system would result in a minimal loss of efficiency relative to a more flexible price system. According to ABARE, determining a price that achieves a given change in quantity is not necessarily a more difficult problem than developing a list of restrictions that achieves the same result. In addition, scarcity pricing has the advantage of more flexibility regarding the number of scarcity stages chosen.

To deal with the difficulties low-income users might face and improve the stability of financial returns to water utilities, Tooth and Sibly (sub. DR153) propose an approach where additional revenues from a higher volumetric price are used to reduce fixed charges paid by households. They note that this approach is still consistent with principles of efficient pricing as well as cost recovery, and show that it can lower bills for small users during a drought compared with bills under restrictions (depending on how the excess revenue is redistributed).

The report on scarcity pricing by Frontier Economics (2011a) for the NWC summarises a range of other methods for implementing scarcity pricing. Although each of these assume that scarcity pricing would be administered by a regulator rather than left in the hands of utilities, some of these could also be applied in the absence of regulation.

---

Some examples of tariff options are presented in box 6.4. These refer to the water consumption component of bills.<sup>9</sup> Utilities would still also charge consumers for the other fixed and volumetric price components of water and wastewater services (as summarised in table 6.1).

**Box 6.4 Example tariff options**

- A simple default fixed price tariff — the volumetric charge would be fixed over the contracted period (this could be several years) and customers would have guaranteed supply (without any risk of restrictions) at this price. The volumetric component would be charged at a premium to lock in guaranteed supply at a fixed price, to account for the fact that the utility cannot vary supply to these customers in line with changes in water availability.
  - This tariff option would be suitable for those customers that prefer stable prices and guaranteed supply, and minimal departure from current pricing arrangements.
- A fully flexible tariff — the volumetric charge would vary from period to period to reflect the marginal opportunity cost of water. Consumers would have the opportunity to take advantage of using more water when prices are low, and cutting back consumption when prices are higher. The utility would be able to manage bulk water supply risk by simply passing on the marginal opportunity cost of water to these customers.
  - This tariff option would be suitable for those customers that want guaranteed supply, but want to face a variable price that gives them opportunity to alter their behaviour in response to price.
- A partially fixed price tariff — this would be a combination of the default and flexible tariff options. A contracted quantity of water would be provided at a fixed volumetric price. Units consumed above the contracted quantity would be priced at the marginal opportunity cost of water.
  - This option could suit consumers that want price stability over a defined quantity (for example, what they perceive their ‘essential’ water needs to be), but are willing to accept price volatility beyond that.
- ‘Interruptible’ tariffs — customers would contract to restrict consumption during times of scarcity. The timing of restrictions would be at the discretion of the utility, subject to trigger conditions agreed to by customers. In return for restricting consumption, customers would receive a discount.
  - This tariff option would suit those customers that do not require guaranteed supply and prefer restrictions during times of scarcity. It might be particularly relevant for industrial customers.

---

<sup>9</sup> This would include the water transmission component where utilities choose to price water transmission services according to flexible pricing principles (section 6.3).

---

This approach is a broad interpretation of flexible pricing. It gives utilities flexibility to manage risks around demand and inflow variability over time in the way that best allows them to achieve water security at least expected cost. It also gives household and business consumers the opportunity to exercise their preferences with regard to security of supply and price stability, and hence maximises their welfare.

The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) considered that a multiple tariff approach ‘may introduce inefficiencies in the allocation of water relative to a system involving a single price’ (sub. DR166, p. 1). However, the Commission’s analysis shows that this approach to retail pricing results in no loss in efficiency when compared with charging all customers a fully flexible tariff (appendix F).

### *Responsiveness of demand*

A commonly cited concern with using price to manage demand is that consumers are not very responsive to changes in price, and that the signal sent through flexible pricing will therefore be ineffective in managing demand when water is scarce (Institute of Public Affairs, sub. DR93; IPART sub. 58; Schott, Wilson and Walkom 2008; WSAA, sub. DR145).

Studies have estimated the responsiveness of demand to changes in price in Australia, and generally found that demand is relatively inelastic (box 6.5). However, it is difficult to draw conclusions about the price elasticity of demand for water, not only because estimates to date vary widely, but also because the price mechanism in Australia has been suppressed due to the widespread use of restrictions and campaigns promoting water use efficiency and conservation. As noted by the New South Wales Government (sub. DR146), further empirical work is required on estimating the elasticity of demand for water in Australia.

Furthermore, there is no unique elasticity of demand for water — many factors can affect the elasticity of demand. For example:

- household demand for outdoor water use is more elastic than demand for indoor use, because outdoor water use tends to be more discretionary (Brennan 2006)
- demand in the long run is more elastic than in the short run because over longer periods of time, consumers can modify behaviour and install water saving technologies in response to higher water prices (Abrams et al. 2011; Worthington, sub. DR109; PC 2008d)
- investment in water efficient appliances reduces the elasticity because it limits the scope for further reductions in water use (Abrams et al. 2011)

- as prices rise and water becomes a larger share of the total budget, the price elasticity will increase (Abrams et al. 2011; Australian Conservation Foundation, sub. DR128; PC 2008d;)
- demand will be more elastic the easier prices are to understand and the more clearly they are communicated to consumers (Bonbright, Danielsen and Kamerschen 1988)
- demand will be more elastic the shorter the delay between consumption and billing (Australian Conservation Foundation, sub. DR128).

### **Box 6.5 Estimates of the price elasticity of demand for water**

The responsiveness of demand to a change in price is measured by the price elasticity of demand — the percentage reduction in demand from a one per cent increase in price. Demand is more elastic the greater the absolute value of the elasticity — an elasticity estimate of -0.8 is more elastic than an value of -0.1. Australian estimates of the elasticity of demand for water include:

- Abrams et al. (2011) estimated a short-run price elasticity of demand for Sydney of -0.09 at a nominal price of \$2.00 per kL, and a long-run elasticity of -0.18.
- Warner (1996, cited in Abram et al. 2011) estimated a nominal price elasticity for Sydney of -0.127.
- Grafton and Kompas (2007) estimated a nominal short-run price elasticity for Sydney of -0.352, and real short-run elasticity of -0.418.
- Graham and Scott (1997, cited in Hughes et al. 2008) estimated the price elasticity of residential water demand in the ACT to be in the range of -0.15 to -0.39.
- Hoffman, Worthington and Higgs (2006) estimated an elasticity in Brisbane of between -0.51 and -0.59 in the short run, and between -1.17 and -1.44 in the long run.
- Thomas and Syme (1988) estimated a price elasticity for Perth of about -0.2.

Xayavong, Burton and White (2008) estimated an indoor elasticity for Perth of between -0.7 and -0.94, and an outdoor elasticity of between -1.3 and -1.45.

Therefore, although demand for water is relatively inelastic on average, there is at least some scope to use prices to affect demand for some classes of urban water users and for some urban uses (Olmstead and Stavins 2007; PC 2008d). There are also reforms to pricing that could enhance the responsiveness of demand to a change in price (box 6.6).

According to some participants, the fact that the elasticity of demand is uncertain is problematic, as it makes the reduction in demand that would occur in response to

---

price difficult to estimate (NSW Government, sub. DR146; WSAA, sub. DR145; Wyong Shire Council, sub. DR114).

## **Box 6.6 Measures to increase the elasticity of demand**

### **More frequent billing**

A relatively low cost way to increase the responsiveness of demand is to increase the frequency with which households are billed (WACOSS, sub. DR160). Currently, residential bills are issued quarterly in most jurisdictions, so households pay for the water they use up to three or four months after the time of consumption. A more contemporaneous relationship between usage and billing could make households more aware of how their usage affects the amount they pay for water.

Rolling out smart meters would be another way of monitoring usage and allowing consumers to respond in real time (Ian Macauley, sub. DR127). Although they have the advantage of preventing the cost of more frequent manual meter readings, a comprehensive roll out of smart meters would be very costly and unlikely to outweigh the benefits (ICRC, sub. DR148; Wyong Shire Council, sub. DR114). Future advances in technology might, however, one day render this efficient (WSAA, sub. 29).

### **More comprehensive charging across the user base**

Another way to increase the aggregate response to changes in price is to move to more comprehensive consumption-based pricing, as discussed above. This ensures that more customers face a volumetric price for the water they consume.

### **Educating consumers on water prices**

Consumers will be more responsive to price changes if they understand the tariff structure. Educating them on how water is charged and how prices relate to consumption is another way to increase responsiveness (NWC 2011b). It is also important to implement a form of pricing that is transparent and simple to understand. In response to the draft report, some participants emphasised the need for information and education to support a move to relying more on price to manage demand (Melbourne Water, sub. DR156; Queensland Water Directorate, sub. DR138).

### **Removing permanent restrictions and mandatory conservation measures**

To the extent that users have already reduced their consumption in response to ongoing restrictions and conservation campaigns, there might be little scope left to reduce demand further if scarcity re-emerges. This suggests that, even if restrictions are removed and conservation campaigns phased out (chapter 7), it might take some time for this behavioural pattern to be unwound, and for pricing signals to work their way through to encouraging more consumption when water is in abundance.

Concerns about the elasticity of demand, in the Commission's view, are not an impediment to the success of using prices to achieve water security at least expected

---

cost. Although an inelastic demand will result in a small change in demand for a given price change, and the magnitude of the change in demand might be uncertain, this does not make it inferior to other tools such as restrictions (ABARES, sub. DR166). An inelastic demand indicates that consumers place a high value on additional water consumption. This suggests that the welfare of society would be larger if supply were augmented to satisfy demand, rather than restrict demand. Indeed, the more inelastic demand is, the greater the costs to the community of restricting demand and not allowing flexible prices to signal the need for investment in supply augmentation (chapter 7).

In this sense, the Commission agrees with comments by Frontier Economics that prices are crucial in sending signals on both the supply and demand side:

The principal policy instrument used to achieve ... reductions in demand has been water use restrictions. Under this paradigm it is natural to see scarcity pricing as an alternative to water use restrictions and to ask what sort of scarcity price might be required to achieve pre-defined demand volume reductions. Assessment of scarcity pricing would therefore consider the efficacy of price signals in influencing customer consumption behaviour to achieve these reductions in demand. This in turn focuses the debate on the price elasticity of demand for water and the potentially significant price increases that might be required to achieve a given reduction in demand seen as necessary to safeguard future water supply from the dams. Notably, this approach focuses exclusively on the demand side; it does not ascribe a role to pricing in stimulating supply, which is seen as being centrally determined. (Frontier Economics 2011a)

Contrary to some claims in submissions to the draft report (ICRC, sub. DR148; NSW Government, sub. DR146; WSAA, sub. DR145; Wyong Shire Council, sub. DR114), current billing and metering practices are not a major impediment to the success of flexible pricing. Under the Commission's proposed consumer choice model of pricing, price changes for customers could occur relatively infrequently. Even for those on a flexible tariff, levels of storage are likely to change only gradually, particularly when they are falling, suggesting that price changes could occur quarterly, if not more infrequently (Frontier Economics, 2011a).

### *Community preferences*

Participants have emphasised the community's preference for the use of restrictions over price, and therefore question the appropriateness of relying more on prices to manage demand (Australian Conservation Foundation, sub. DR128; WSAA, sub. DR145; Yarra Valley Water, sub. DR115).

However, the evidence is not clear cut. Several studies have shown that many consumers would be willing to pay a higher water bill to avoid restrictions

---

(chapter 7). In addition, many participants expressed support for using prices to manage demand, and for introducing more choice for consumers in tariff offerings (City of Wanneroo, sub. DR150; Economic Regulation Authority, sub. DR140; NSW Government, sub. DR146; Water Factory Company, sub. DR123; Yarra Valley Water, sub. DR115). For example, WSAA said:

Allowing and supporting utilities to negotiate with their customers and offer differentiated water and wastewater products, better suited to different customers needs and individual circumstances, offers perhaps even more scope for efficiency gains than would security-related pricing flexibility alone. (sub. DR145, p. 9)

In addition, South East Water said:

Tariff design ... should be flexible and South East Water anticipates proposing a transition from an IBT to a flat volumetric water tariff and considering the benefits of choice in the longer term. (sub. DR149, p. 13)

South East Water and Yarra Valley Water have both flagged the possibility of introducing a range of tariffs, including:

- ‘green’ tariffs to offset the energy used in supplying water
- ‘unrestricted’ tariffs where customers incur a premium for guaranteed supply
- ‘hardship’ tariffs with more frequent billing to manage affordability
- ‘scarcity’ tariffs
- ‘community’ tariffs, where a portion of the bill goes towards maintaining water supply for sportsgrounds (South East Water, sub. DR149; Yarra Valley Water, sub. DR115).

In the Commission’s view, consumers need objective information on the costs and benefits of using price versus non-price measures to manage demand so that they can decide for themselves how and when to consume and save water (chapter 7). Introducing consumer choice in service offerings will allow them to do so — if they prefer restrictions during drought, they can exercise that preference using an interruptible tariff at a discounted price. If they value water use irrespective of climatic conditions, they can opt for a fixed price tariff and pay a premium.

### *Affordability and equity concerns*

Participants have expressed concerns that, under a system of flexible retail pricing, low-income households would face higher water prices in times of scarcity, making water less affordable and disadvantaging low income earners (Public Interest Advocacy Centre, sub. 61; CUAC, sub. 46; Wagga Wagga City Council,

---

sub. DR116; Water Directorate (NSW), sub. DR121; Wyong Shire Council, sub. DR114).

The modelling conducted by the Commission indicates that under flexible pricing in Melbourne and Perth:

- the price of water on average across all modelled rainfall scenarios is \$1.35 per kL in Melbourne and \$0.87 per kL in Perth
- in 90 per cent of scenarios the price of water always stays below \$1.70 per kL in both Melbourne and Perth
- prices are on average lower under flexible pricing than they are when prices are fixed over several years (technical supplement 1).

In addition, flexible pricing could be introduced in a way that minimises the effect on low-income earners, through rebates on the fixed charge component of bills (box 6.3).

Concern has also been expressed over the potential for volatile prices under flexible pricing. For example, Sydney Water's research (sub. 21) indicates that consumers value stability in water pricing.

It is not clear that flexible pricing would lead to outcomes that are any more uncertain than those that currently exist. This point was made by ACTEW:

While price certainty may be valued by some users, the uncertainty created by drought will inevitably emerge somewhere in the system. Under the current approach to drought (temporary water use restrictions), this uncertainty arises through the triggering and duration of quantitative restrictions. This is in turn a form of price uncertainty, as water use restrictions increase the effective cost of water to users. (sub. 45, p. 3)

In any event, under the Commission's proposed introduction of increased consumer choice, price volatility will not be of concern to consumers that opt for the default, fixed price tariff, which represents little departure from the current pricing structure.

The Commission agrees with participants that the distributional effects of retail tariff reform need to be assessed (Yarra Valley Water, sub. DR115; Melbourne Water, sub. DR156; WACOSS, sub. DR160). Where there are concerns about affordability, it is the Commission's view these are best addressed outside the urban water sector (chapter 8).

### *Impediments to introducing greater consumer choice*

One impediment to introducing consumer choice is the current regulatory regime. In many cases regulators set retail prices with reference to the LRMC. In regional New

---

South Wales, local water utilities are subject to rules that specify the share of revenue that must be raised through a volumetric tariff (75 per cent for larger utilities, and 50 per cent for smaller utilities) (Shoalhaven City Council, sub. DR147; Wagga Wagga City Council, sub. DR116).

As with bulk water pricing, a regulated form of flexible retail pricing that offers consumers a choice of tariffs is an option (Frontier Economics 2011a). However, it is the Commission's view that taken together, government ownership, an appropriate governance framework, a price monitoring regime and competition for the market in bulk water supply would be sufficient to allow flexible pricing whilst maintaining oversight of potential abuse of market power if there was concern of this occurring (chapter 11).

As with measuring the marginal opportunity cost of supply, it is likely that utilities will need to develop expertise for translating this into retail tariff options in a way that does not compromise efficiency (appendix F). There is a case for assistance to be provided to them to facilitate this process (chapter 14).

In addition, to assess the practicality of these tools and provide proof of concept, some utilities could trial the application of greater consumer choice. Trials were supported by several participants, including Shoalhaven City Council (sub. DR147), NSW Government (sub. DR146), CUAC (sub. DR143), WSAA (sub. DR145), the Australian Water Association (sub. DR157) and Melbourne Water (sub. DR156).

Some have argued that reforms to pricing will confuse consumers, and introduce unnecessary complexity and uncertainty (CUAC, sub. DR143; Melbourne Water, sub. DR156; Wagga Wagga City Council, sub. DR116). This highlights the need for tariff options to be easy to understand and clearly communicated. The move to consumer choice will also need to be supported by research into consumer preferences, as emphasised by several participants (CUAC, sub. DR143; NSW Government, sub. DR146; WSAA, sub. DR145), to ensure that the tariff options presented accurately reflect the preferences of consumers.

#### RECOMMENDATION 6.4

***Where metering is in place, charges should include a volumetric component using a two-part tariff.***

***Greater choice in tariff offerings should be available to water consumers. This would:***

- ***allow consumers to express their preferences on security of supply and price stability***

- 
- *provide an opportunity for water utilities to improve demand management as water availability changes over time.*

*These tariff offerings should be based on the marginal opportunity cost of supply, which includes:*

- *the direct short-run marginal cost of supplying water*
- *the value of any externalities*
- *the scarcity value of water as supply and demand conditions change.*

There might be circumstances where multiple tariffs might not be appropriate, such as for some communities in dry regions where there is on-going scarcity of potable water and augmentation of reticulated potable water is very costly (chapter 7). Flexible arrangements will allow utilities to implement tariff arrangements that best suit the community. The Commission's recommendation does not imply that the provision of multiple tariff options is compulsory.

## **6.5 Assessment of NWI pricing principles**

Under the NWI, governments made commitments to best practice water pricing. A stocktake on approaches to water charging was prepared by the Steering Group on Water Charges in 2007. This led to a set of refreshed pricing principles that were agreed on by all jurisdictions to assist states and territories to achieve consistency in water charges as required by the NWI. These took effect in 2010.

The Commission has identified several shortcomings in the pricing principles that represent a departure from efficient pricing:

- The pricing principles support a LRMC approach to setting volumetric charges, and make no reference to pricing water according to its relative scarcity.
- The principles do not provide for consumer choice in tariff offerings.
- The principles do not limit the ability of governments to address equity issues related to the provision of water services through pricing structures. This gives the states and territories (and, potentially, locally elected representatives) the capacity to require utilities to depart from efficient pricing principles.
  - For example, the principles state that on economic efficiency grounds water usage charges should comprise only a single (flat) charge but that more than one tier can be used to pursue other objectives such equity and conservation. As discussed above, IBTs distort efficient pricing signals.
- The principles promote the use of permanent water saving rules which are not necessarily in the interests of the community (chapter 7).

- The principles do not cover pricing of wastewater services (NWC 2011b).
- The principles on cost recovery are flawed (chapter 10).

More generally, commitment to the agreed pricing principles has been variable across jurisdictions (NWC 2011b). Queensland is one recent example where the State Government (with the tacit support of the Australian Government) appears to have backed away from its commitments (box 6.7).

The NWC expressed its support for the Commission’s draft recommendation that the NWI pricing principles provide scope for inefficient pricing practices. The NWC stated that it is:

... supportive of a revised set of national pricing principles and objectives that: are focused on the primary objective of economic efficiency; are not overly or inappropriately prescriptive; and are complemented by an effective monitoring and compliance framework, and reform actions tailored to the needs of each jurisdiction. (sub. DR130, p. 7)

#### **Box 6.7 Water pricing in Townsville**

In 2010, Townsville moved from an allocation-based pricing system to a two-part tariff. Under the allocation-based system, households paid a fixed amount of \$638 for 772 kL of water. Consumption above this quantity was charged at \$2.12 per kL. Under the two-part tariff, households were required to pay a \$454 annual service charge and a water consumption charge of 65 cents per kL.

Townsville City Council made this decision believing that consumption-based pricing was a requirement of the updated *Local Government Act 2009* (Qld), and that a two-part tariff would meet Queensland Competition Authority regulatory guidelines and the NWI Pricing Principles.

There was significant community concern in response to the change. In March 2011, the decision was reversed after the Queensland State Government and the Australian Government advised that Townsville was not required to move to a two-part tariff to meet best practice pricing principles. Individual consumers now have the choice of staying with the two-part tariff or reverting back to the allocation-based system.

*Sources:* Baskin (2010); Diehm (2010); Matheson (2011); Townsville City Council (2010); Tyrell (2010).

In its review of pricing reform, the NWC identified ‘some aspects of the new NWI pricing principles that are not consistent with the principles of economic efficiency’, and cited IBTs and LRMC pricing as two examples (NWC 2011b, p. 50). It also expressed concerns over a lack of commitment to pricing reform by some jurisdictions, a ‘lowest common denominator’ approach to pricing reform, and indications that some actions required under the NWI have been diluted or altered during implementation (NWC 2011b).

---

Under the Commission’s proposed model of reform, the efficient pricing principles outlined in this chapter would be set out in charters created by governments to give utilities guidance on performing a range of tasks, including price setting (chapter 10).

FINDING 6.3

*The National Water Initiative pricing principles provide scope to implement pricing policies that are inconsistent with economic efficiency.*



---

## 7 Non-price demand management

### Key points

- Mandatory restrictions generate costs to households, businesses and the community by denying consumers the opportunity to choose how to use water in the ways that are most valuable to them.
  - Quantitative estimates indicate that the net welfare costs of mandatory restrictions are significant and can amount to several hundred million dollars per jurisdiction per year.
  - Although there has been community support for restrictions, evidence also suggests that many consumers are prepared to pay a higher water bill to avoid being subject to water restrictions.
- Similarly, policies that prescribe water use efficiency and conservation, or use moral suasion to encourage consumers to save water through education campaigns, can be costly because they lead to some consumers behaving in ways that do not align with their preferences.
- Allowing consumers to exercise choice in their water consumption behaviour will ensure that water resources are allocated in a way that maximises the benefits to the community.
- Mandatory restrictions should be limited to times of emergency water shortages. Utilities, not governments, should be responsible for their imposition.
- Governments should not prescribe water use efficiency and conservation activities.
  - Where there is a market failure, there might be a case for government intervention to promote water use efficiency and conservation, but only if it is clearly established that the social benefits of intervention exceed the social costs. Information provision, such as the Water Efficiency Labelling Scheme initiative, is likely to be the best form of intervention.
- Education campaigns should be refocused to provide more balanced information to consumers on the costs and benefits of water saving activities, as well as the relative merits of using prices, restrictions and water use efficiency and conservation measures to manage demand.

Demand management in the urban water sector refers to the modification of the level and timing of water usage through various methods, including price and non-price tools. Pricing was discussed in chapter 6. This chapter focuses on

---

non-price demand management tools, and the efficiency gains to be achieved by changing the way that these tools are used. Non-price demand management tools include water restrictions, and water efficiency, conservation and education programs.

In section 7.1, the economic costs and benefits of water restrictions are examined, and the scope for efficiency gains from limiting the use of mandatory restrictions to emergency and extreme circumstances is outlined. The scope for efficiency gains from refocusing the way that measures are implemented by governments to promote water use efficiency and conservation is discussed in section 7.2.

## **7.1 Water restrictions**

Restrictions have been the preferred approach in Australia for managing demand in times of scarcity due to drought and/or climate change. Although restrictions began as a voluntary measure in most places, they were mandated as the severity of drought increased. They were also intended to be a temporary measure, but high level restrictions were in place for a prolonged period in some areas.

In 2007, about 80 per cent of Australian urban residents were subject to prescribed restrictions (ACG 2007) and according to a recent report, 69 per cent of 101 surveyed regional towns were under some form of water restrictions in 2009 (Infrastructure Australia, sub. 62). These figures are likely to have decreased in the past year as restrictions have been eased in most areas. However, in many cases permanent ‘low level’ restrictions continue as part of ongoing water conservation strategies (chapter 2).

Restrictions have also been placed on non-residential users in most states and territories, with the notable exception of Perth (Institute for Sustainable Futures and ACIL Tasman 2009).

Rather than limit the absolute quantity of water that can be consumed, restrictions usually constrain uses of water, methods of garden watering and/or the timing of water use (Brennan, Tapsuwan and Ingram 2007). At the household level, restrictions tend to focus on outdoor uses, as they are easier to enforce than restrictions within the home. Outdoor restrictions are also seen as more equitable than indoor restrictions as outdoor use is believed to represent the more discretionary component of demand.

---

The extent to which sanctions for violating mandatory restrictions have been put in place and enforced varies.<sup>1</sup> Nevertheless, moral suasion through government-initiated appeals and education campaigns has played a major role in encouraging households to comply with restrictions (Aisbett and Steinhauser, sub. DR141; Cooper, Crase and Burton, sub. 28). As was highlighted by Lin Crase, moral suasion can even pressure individuals to conserve water when they are not required to:

In most jurisdictions some dispensation [from water restrictions] is made for the elderly although many are reluctant to seek relief for fear of the community backlash and a determination to share in the community's 'pain'. (Crase and O'Keefe, sub. 5, attachment, p. 5)

## **Scope for efficiency gains**

Long-run marginal cost (LRMC) pricing of water undervalues water during temporary periods of reduced supply (chapter 6). In the absence of an effective price signal, mandatory restrictions have been necessary to reduce demand when water is scarce. In this section, the costs and benefits of restrictions are outlined and an assessment is made of the scope for efficiency gains from changing the way that restrictions are used to manage demand.

### *Costs of mandatory restrictions*

Mandatory restrictions are a costly way of managing demand when compared with the alternative of using efficient prices (chapter 6). Any policy that restricts consumption in a prescribed way imposes real economic costs on households, businesses and the community. The Water Services Association of Australia (WSAA) stated:

... many restrictions impose a significant cost on customers and the community – examples include customer inconvenience, degradation of sporting facilities, creation of a bias for high-cost self supply options such as rainwater tanks – and therefore, are not in WSAA's view an appropriate permanent or long term solution. (sub. 29, p. 19)

The costs of mandatory restrictions are often hidden, and many are not financial costs.

---

<sup>1</sup> No breach of urban water restrictions has led to a fine in Victoria (Cooper 2010 quoted in Crase and O'Keefe sub. 5) but numerous fines have been applied in New South Wales, Queensland and Perth (Institute for Sustainable Futures and ACIL Tasman 2009). Under the New South Wales *Local Government Act 1993*, local council water utilities in New South Wales cannot mandate and enforce restrictions except during a drought or emergency. Permanent water saving rules are not enforceable.

---

### *Costs to households*

Many of the costs of restrictions are borne by denying households the opportunity to choose how to use water in the ways that are most valuable to them. Mandatory restrictions force all consumers to constrain outdoor water use in the same way even though some, such as avid gardeners, might value outdoor water use more than others, such as those living in high rise apartments. This leads to significant costs for those users that would be willing to pay for additional water, and an inefficient allocation of water resources.

Comments along these lines were made by Lin Crase:

The notion that urban water customers have differing demands should of itself not be particularly remarkable. However, the current policy setting runs contrary to this view. Outdoor water restrictions are equally stringent on residents in high-rise apartments with no outdoor space and suburban dwellers with the demands of a vegetable patch, all in the name of equity. Watering times are also rostered with no consideration of the hours available to different householders to hand-water portions of their garden. (Crase and O’Keefe, sub. 5, attachment, p. 5)

Similarly, WSAA stated:

The demand for water (responsiveness to price and need for supply security, for example) will differ substantially across and within customers groups. ... Clearly, some consumers are less willing or able to reduce their water usage in the short term more than others, irrespective of price. Examples include ... residential users who have invested in gardens and landscaping. (sub. 29, p. 15)

Box 7.1 lists some of the financial and non-financial costs of mandatory restrictions to households. Aside from these, restrictions can also induce inefficient and costly investment in private water storages (such as rainwater tanks) as an alternative water source (ACG 2009). As outlined in appendix E, this can be a very expensive augmentation option. For instance, a common 2000 litre household rainwater tank costing about \$1500 to \$2000 holds about \$4 worth of water at current mains water prices.

In addition, mandatory restrictions can result in perverse incentives for deliberate excessive use of indoor drinking-quality water through showers, baths and water tanks to generate additional ‘greywater’ for use outdoors on lawns and gardens (ACG 2009).

---

### *Costs to businesses*

Businesses that are intensive users of water and are subject to mandatory water restrictions can experience an increase in production costs as they seek alternative sources of water (Institute for Sustainable Futures and ACIL Tasman 2009).

Those businesses that sell water-intensive products might experience a reduction in sales. Industries that could be particularly negatively affected include the nursery, turf, pool and spa industries. However, there will not necessarily be a net loss, as consumers spending less on water intensive products might spend more on other goods and services (including water-saving products) (CIE 2008).

#### **Box 7.1 Costs to households of mandatory water restrictions**

The requirement to reduce outdoor water demand in prescribed ways leads to the following financial and non-financial costs to households:

- Time and inconvenience costs associated with having to water gardens at permitted times (ACG 2007).
- The sacrifice of water-based de-stressing activities such as long showers, playing in the pool or having a spa (Colmar Brunton Social Research 2008).
- Loss of amenity from private gardens and pools and degradation of those assets (Colmar Brunton Social Research 2008).
  - Dr Terence Dwyer (sub. 74, p. 1) stated that: ‘as a result of water restrictions we have lost 3 trees, the garden has been trashed and its value severely diminished (both in terms of use and thousands of dollars in restoration costs)’.
- Private property damage from dry soil causing cracking and movement of houses (Waterwise, sub. DR113).
- Loss of real estate value of homes due to dead or dying gardens, or the decreased aesthetic value of neighbourhoods (Colmar Brunton Social Research 2008).
- ‘Over watering’ of gardens during the allowable watering times to compensate for restricted times of use (Brennan, Tapsuwan and Ingram 2007).
- Confusion over the complexity of the arrangements, such as which days of the week and times of the day watering is allowed, and when odd/even house numbers are permitted to use water.
- Costs associated with purchasing and installing new watering systems as changes occur in allowed methods of watering.
  - These costs are exacerbated when there is uncertainty about the triggers for implementing different levels of restrictions, the nature of different levels of restrictions and the likely frequency with which they are expected to be implemented (Irrigation Australia, sub. 14).

---

### *Costs to the community*

Mandatory restrictions can reduce community welfare through a loss of amenity associated with less green open space, including unwatered council parks and reduced access to community sport and recreational facilities.<sup>2</sup>

According to Irrigation Australia (sub. DR112), this loss of amenity can lead to other social problems including increased health issues, such as depression and obesity. Poorer quality sporting fields can also lead to risk of injury from sporting activities (Colmar Brunton Social Research 2008).

Mandatory restrictions can also have environmental impacts through a loss of green open space, including:

- reduced cooling effects on buildings, requiring greater energy consumption
- diminished urban stormwater management, as green open spaces slow runoff after rainfall and filter pollutants
- distorted soil structure and soil erosion (CRCIF 2008).

A lack of green open space can also reduce property values, and cause damage to buildings, other structures and pipes through cracking.

It has been argued that mandatory restrictions can also lead to a reduction in social cohesion arising from households being encouraged to report neighbours that do not comply (Institute for Sustainable Futures and ACIL Tasman 2009). A study by Cooper (2010, quoted in Crase and O’Keefe, sub. 5) found that about 20 per cent of customers would actually be willing to pay an additional water charge to prevent other water users accessing the water market in order to alleviate the burden of water restrictions.

### *Costs to utilities and State and Territory Governments*

Restrictions can be financially costly for governments and utilities to administer. Restrictions require advertising campaigns to communicate the rules under different levels of restrictions. Where mandatory, there are also monitoring and enforcement costs involved (CIE 2008).

Using restrictions rather than prices to manage demand also limits the volume of water that can be sold by utilities and, over time, constrains the revenue available to pursue future supply augmentation (Crase and O’Keefe, sub. 5).

---

<sup>2</sup> Alternatively, households may have to pay through their council rates for high-cost recycled water to keep parks and sports grounds green.

---

### *Benefits of restrictions*

Restrictions also entail some benefits. They are effective in reducing demand and have, in general, been supported by the community. Participants have also argued that restrictions are equitable and benefit the environment.

### *Restrictions are effective*

Water restrictions (combined with price increases and water use efficiency and conservation measures (section 7.2)) have been effective in reducing the demand for water (NWC 2011b). Total household consumption in Australia has decreased by 22 per cent since 2000-01 (chapter 2).

In support of the effectiveness of restrictions in reducing demand, the New South Wales Government stated:

Temporary drought restrictions have been effective in reducing water use during periods of severe droughts. Restricting outdoor water use was a key element in securing greater Sydney's water supply during the recent drought. Between the introduction of Level 1 restrictions in October 2003 and the introduction of permanent Water Wise Rules to replace Level 3 restrictions in June 2009, restrictions saved an estimated 575 billion litres, more than the amount of water used in greater Sydney in 2009-10. (sub. DR146, p. 7)

Furthermore, the Council of Mayors (SEQ) said:

Prior to the recent drought, in 2004-05, SEQ households were using on average 282 litres of water per person/day, compared to 215 in Sydney and 195 in Melbourne. By 2008-09 this had fallen to 143 litres per person/day. Even with the removal of water restrictions, consumption had crept up to only around 160–180 litres per person/day. There have been permanent changes in behaviour in SEQ. These are for the better. (sub. DR159, p. 25)

In the Commission's view, mandatory water restrictions are of most benefit when a quick response is needed, such as during times of emergency (discussed further below). During emergencies, the price mechanism can be too slow to yield the change in demand required. Comments along these lines were made by Melbourne Water:

Melbourne Water notes that the key issue which must be considered is the responsiveness of the supply side to emergency situations and scarcity prices (i.e. will the response be timely enough to generate adequate supply). In times of serious water scarcity, water resource managers and system operators require increased certainty as to the expected demand reductions of outcomes and to this end restrictions provide an effective, and community supported option for conserving available supplies. (sub. DR156, p. 35)

---

However, the need to appropriately manage the supply–demand balance in the face of declining dam levels is not such an emergency. Such circumstances develop over time and are capable of being avoided by the adoption of the frameworks set out by the Commission in this report. The recent drought-induced restrictions, particularly in metropolitan areas, should be seen as a failure of the sector, including governments, to properly provide for community needs (discussed below).

### *Community support for water saving activities*

There is evidence that restrictions and other measures to reduce water use have been valued by the community. There was a strong change in behaviour and a high level of compliance even during periods of stringent restrictions.

Many submissions in response to the Commission’s draft report emphasised that restrictions are highly valued by the community and that this provides a reason for restrictions to remain the key tool to manage demand rather than prices (for example, Australian Conservation Foundation, sub. DR128; CUAC, sub. DR143; Institute for Sustainable Futures, sub. DR137; and Yarra Valley Water, sub. DR115).

According to Yarra Valley Water, its customers:

...express a preference for restrictions and demand management over pricing solutions to controlling the supply/demand balance. (sub. DR115, p. 9)

According to the Consumer Utilities Advocacy Centre:

Community attitude surveys typically show popular acceptance of water restrictions. For example, a survey by IPART in 2003 found that around 63 per cent of people were willing to have water restrictions once each year. A later survey in 2007 found that 80 per cent of participants were in ‘total support’ of the restrictions in place in Sydney at that time, and nearly 70 per cent ‘were in total support of restrictions remaining in place for the foreseeable future’. (sub. 46, p. 6)

One reason given to explain the community support for restrictions is that water saving activities give individuals a sense of community spirit and solidarity by working together to achieve a common purpose. This is in contrast to assertions that water restrictions diminish social cohesion (discussed above). According to a report by the Institute for Sustainable Futures and ACIL Tasman (2009), anecdotal evidence suggests that the experience of drought and drought response has been a unifying force in communities, and acted as a common cultural reference and talking point.

The Australian Conservation Foundation stated:

---

The very broad public support for water restrictions suggests that many people derive psychological benefit from being part of a broad social response to water scarcity, in which they can see exactly how they are doing their bit. (sub. DR128, p. 6)

Although some individuals might derive utility from restricting their water consumption to benefit the wider community, there is evidence to suggest that parts of the community do not share this preference and would be willing to pay a higher water bill to avoid restricting their water consumption (box 7.2). For example, according to results from one study:

Contrary to the implied value of ‘saving water’ that dominates popular thinking, these results reveal that particular segments within society actually value not being subject to water restrictions. (Cooper, Crase and Burton, sub. 28, p. 25)

### **Box 7.2 Studies on the willingness to pay to avoid restrictions**

Examples of studies that have estimated the willingness of consumers to pay to avoid restrictions include the following:

- Allen Consulting Group (2007, quoted in CIE 2010b) found that households in south-east Queensland were willing to pay an additional \$132 per annum to reduce the frequency of level 4 restrictions from 50 per cent of the time to 20 per cent of the time, and an additional \$190 per annum to remove the need for level 2 (or worse) restrictions.
- Cooper, Crase and Burton (sub. 28) found that respondents in New South Wales and Victoria with a lawn were willing to pay \$152 to avoid restrictions compared to those without who were willing to pay \$98. Respondents from water rich cities generally had a lower willingness to pay range. Those with a higher income had a higher willingness to pay to avoid water restrictions. Notably, participants with a higher income indicated a willingness to pay value of \$181 from the conservative perspective, with the upper bound estimating a willingness to pay value of \$291.
- Gordon et al. (2001, quoted in Brennan Tapsuwan and Ingram 2007), using a choice modelling exercise, found that consumers were willing to pay an extra \$150 per year on their water bill for a more ‘voluntary based’ demand management approach (including incentive schemes for greywater recycling and efficiency regulations on new buildings) rather than prescribed restrictions aimed at achieving the same demand reduction.
- In another choice modelling study, Hensher, Shore and Train (2006) found that households in Canberra were on average willing to pay up to \$239 extra on their water bill to move from stage 3 restrictions (complete sprinkler bans) that apply every day and last all year to a situation where there are no restrictions at all. Households were not willing to pay to avoid level 1 and 2 restrictions. At the time of the study, level 1 restrictions were in place.

---

In addition, a survey by Colmar Brunton Social Research (2008) conducted in the ACT indicates that 56 per cent of respondents preferred that individual households were able to choose water plans to suit their needs and budgets, rather than the same blanket restrictions applying to all households at all times.

Market research conducted on behalf of Yarra Valley Water found that the idea of an unrestricted tariff, where customers can pay a premium to avoid restrictions (but not permanent water saving rules), got a mixed reaction, but at least some respondents found it to be an attractive option (Yarra Valley Water, sub. DR115).

Tooth and Sibly have also questioned whether surveys that purport to show community support for restrictions adequately test support for alternatives to restrictions. In their submission they said:

When water is priced below its true value (as was the case during drought) then greater water use by one consumer places a burden on others. As a result, when water is under priced, we would expect people who are not heavily burdened by restrictions to be in favour of them. Even respondents heavily burdened by restrictions may be in favour of them if they perceive the alternative is greater spending on augmenting supply. Unfortunately there are not surveys (at least published) that test the alternative of restrictions to an efficient pricing approach with cost recovery. (sub. DR153, p. 5)

Another reason for community support for restrictions is that they are seen by many as an equitable tool for dealing with water shortages because the losses from rationing a shortage of water are shared equally by all households. This, it is argued, is more equitable than using price to manage demand, where those that can afford to buy more have access to larger amounts of water than poorer households (Colmar Brunton Social Research 2008). The Western Australian Council of Social Service stated:

If the Commission is to recommend dealing with demand management purely through pricing mechanisms, then it must also include within this recommendation that the cost of additional water supply augmentation is met wholly by those customers consciously choosing to consume higher levels of water for non-discretionary purposes. It would be decidedly unjust to recommend a price-orientated demand management strategy which may result in low income households paying an increased amount for drinking and bathing water, in order to allow other households the freedom of choice to partake in water intensive leisure activities. (sub. DR160, p. 13)

In addition, Lloyd Werner from the Water Corporation was quoted in *The West Australian* as saying ‘You could end up with the millionaire leaving his tap on every day because he can afford to, and the pensioner with a brown lawn’ (Wright 2011).

However, there are some ways in which mandatory restrictions do not affect all water users equally:

- 
- Restrictions disadvantage those that value outdoor water use most. The disadvantaged include gardeners, families with children that play under sprinklers, users of outdoor sports venues, and businesses that sell water intensive goods and services. In contrast, those that value indoor use more, including apartment dwellers with no outdoor demand, are hardly affected (Edwards 2006).
  - There can be large costs to circumventing restrictions, such as installing rainwater tanks, installing bores or grey water reuse systems, and having to go to the carwash or local pool. These costs might be insurmountable for low-income households. High-income households can more readily circumvent restrictions, in a similar way to high-income households having the financial means to buy more water than low-income households when prices are high (PC 2008d).

### *Environmental benefits*

Some argue that restrictions (and conservation and water use efficiency) are good for the environment because, for example, less water is taken out of rivers, or less energy is used manufacturing water from desalination plants (see Midcoast Water, sub. DR104; Stormwater NSW, sub. DR111). The New South Wales Government said:

In addition to reducing pressure on potable supplies, demand management can also deliver positive environmental benefits, such as reducing the amount of energy used by hot water systems and for pumping water to deliver it to customers and reducing wastewater volumes and associated pumping and treatment costs. (sub. 65, p. 13)

As explained in chapter 3, it is the Commission's view that environmental objectives are best pursued directly, outside of the urban water sector.

### **Assessment of the costs and benefits**

The key consideration for the Commission is to weigh up the costs and benefits of using mandatory restrictions (with current price settings) as the key tool for managing demand, compared with using an efficient price mechanism without restrictions (chapter 6).

It is the Commission's view that consumer choice is always economically superior to restrictions. Not all consumers have the same preferences for using less water. Those with a preference to restrict their water usage should be able to do so, but this should be voluntary. Similarly, those preferring to use more water should be permitted to do so. Allowing consumers to exercise choice in their water consumption behaviour, and utilities to exercise choice in how best to achieve their

---

security of supply objectives, will ensure that water resources are allocated in a way that maximises the benefits to the community.

The Commission accepts that water restrictions have been effective in reducing demand during the recent drought conditions affecting much of Australia. However, the Commission considers that the costs imposed on the community by mandating restrictions (including permanent low level restrictions) will almost always outweigh the benefits. This is supported by the economic modelling conducted by the Commission for this inquiry and other attempts to quantify the welfare effects of prescribed restrictions put in place in Australia in recent years (box 7.3).

The Commission estimates that the equivalent of level 3a restrictions in Melbourne would create a net welfare loss in that city of between \$400 million and \$1.5 billion over a 10 year period, depending on inflow and elasticity assumptions (technical supplement 1). This is relative to a flexible pricing scenario that does not contain water restrictions, and instead uses prices to reduce demand in times of scarcity.

#### **Box 7.3 Quantitative estimates of the welfare effect of restrictions**

- The CIE (2008) found that the total annual welfare cost of restrictions in the ACT ranges from \$5.2 million for stage 1 restrictions, to \$209 million for stage 4 restrictions.
  - The total cost of restrictions to households ranged from \$4.5 million for stage 1 restrictions, to \$115 million for stage 4 restrictions.
  - The cost to ACTEW and the ACT Government of lost profits, reduced revenue and administrative costs from advertising, monitoring and enforcing restrictions ranges from \$0.7 million to \$23.8 million.
- Grafton and Ward (2008, quoted in Grafton and Ward 2010) found that restrictions resulted in aggregate welfare losses in Sydney equal to about \$275 million (2010 dollars) in 2004-05, relative to what would have occurred if the volumetric price of water had been increased to achieve the same level of consumption
  - In its 2008 research paper, the Commission used this figure to estimate that the aggregate welfare cost of water restrictions to Australian households then subject to restrictions was about \$900 million (PC 2008d).
- In a study on restrictions in Perth, Brennan, Tapsuwan and Ingram (2007) estimated that the per household welfare costs of a sprinkler restriction are less than \$100 per season when mild sprinkler restrictions are in place (two days per week), and range between \$347 and \$870 per season when a complete sprinkler ban is in place, depending on the opportunity cost of time assumed.

This estimated welfare loss is likely to be a lower bound on the actual costs of restrictions, because in the Commission's modelling, restrictions are applied at the

---

aggregate household, not individual household, level. Applying restrictions at the aggregate household level enables water to be used outdoor by those households that value it highest, and consumption to be reduced by households that attach a low value to outdoor uses. In reality, restrictions are more costly than this, as they apply to each household individually, binding the level of use regardless of how highly those uses are valued.

The Commission's modelling also shows that the use of mandatory restrictions can result in higher prices on average than a scenario where they are not used. This is because, under a welfare maximising scenario, investment in supply augmentation is brought forward in order to avoid restrictions which have high welfare costs due to a relatively inelastic demand for water (technical supplement 1).

The net costs of restrictions are greater the more inelastic demand is with respect to price. An inelastic demand indicates that consumers on average place a high value on consuming water, suggesting that in most cases the best policy response to a water shortage is for investment in supply capacity to take place (signalled by a flexible pricing mechanism), not to restrict valued water consumption. This is supported by sensitivity analysis of the Commission's modelling results (technical supplement 1).

Over the past few years, the community has shown resilience in its response to mandatory water restrictions. Support for restrictions by the community helped to manage scarce water supplies during the recent drought. However, consumers only needed to comply with restrictions for so long because supply was not augmented appropriately in response to low inflows.

#### *When are restrictions appropriate?*

Instead of being prescribed and imposed by governments, the Commission considers that restrictions should be considered as one of a suite of voluntary options available to a utility to achieve water security at lowest expected cost. These options include augmenting supply, raising prices, and providing financial incentives (for example, through available tariff structures (chapter 6)) for customers to restrict consumption.

In this sense, the Commission agrees with the views expressed in submissions to the draft report that restrictions can be one tool to help manage demand, as part of a real options approach (Institute for Sustainable Futures, sub. DR137; NSW Government, sub. DR146; South East Water, sub. DR149; Yarra Valley Water, sub. DR115).

---

However, it is the Commission's view that restrictions should almost always be implemented on a voluntary basis. The need to resort to costly mandatory restrictions should be limited to emergency situations, where the benefits of restrictions are most likely to outweigh the costs (Quiggin, sub. 26). There are two situations that might warrant prescribed restrictions:

- A sudden and unpredictable emergency such as a technical failure in the supply chain. In these cases, it would not be possible to wait for the price mechanism to reduce demand, since prices are usually set for a given period (Sibly 2006). Due to lags in the billing cycle, price changes might take several months to take full effect. Prescribed restrictions would be in place for a short period only — they would be removed once the emergency situation was resolved.
- For some communities in dry regions where there is an on-going scarcity of potable water and augmentation of reticulated potable water is very costly.

In each of these two cases, it is the Commission's view that the decision to impose mandatory restrictions should rest with utilities as part of achieving water security at lowest expected cost. Decisions to mandate restrictions should not be made by governments. Utilities should make these decisions subject to supply obligations set out in their governance charters (chapter 10). Appropriate mechanisms would need to be in place to give utilities the power to prescribe and enforce restrictions (chapter 10).

At all other times, restrictions should be voluntary and prices should be used to manage demand. Under the Commission's model of tariff options (chapter 6), consumers would be able to express their preferences for reliability, restrictions and price stability, and water would be allocated in a way that maximises the net benefits to consumers.

#### FINDING 7.1

*Water restrictions generate net welfare losses for households, businesses and the community. They deny consumers the opportunity to choose how to use water in the ways that are most valuable to them. The evidence suggests that:*

- *the costs of restrictions are substantial*
- *many consumers would prefer to incur a larger bill rather than be subject to restrictions on their use of water.*

*The prescribed use of water restrictions should be the exception, limited to emergencies and of short duration. Utilities, not governments, should make decisions on when to prescribe restrictions, subject to supply obligations set out in utility governance charters (recommendation 10.7).*

There is some concern in the community that moving away from a reliance on restrictions to flexible prices and tariff choice might negatively impact on the affordability of water and wastewater services for low-income earners (chapter 6). The Commission considers that affordability objectives are best achieved through the tax and transfer system and outside the urban water sector (chapter 8).

## **7.2 Water use efficiency and conservation measures**

Water use efficiency measures aim to reduce water consumption while at the same time maintaining or increasing the level of useful output or outcome delivered. For example, if two dishwashers do an equally good job of cleaning dishes, the one that uses less water has a higher water use efficiency.

The term water conservation can be used to mean much the same as water use efficiency (chapter 3). Where it is used differently, it can be defined as a reduction in water use that also causes a reduction in the level of useful output or outcome delivered.

Chapter 2 outlines the range of water use efficiency and conservation measures initiated across the country. Many of these measures came about because of State and Territory Government-set targets for utilities to reduce per capita water usage (for example, the Victorian Government's conservation target of reducing total per capita water usage by 25 per cent by 2015, increasing to 30 per cent by 2020 (DSE 2006)).

As with restrictions, there is evidence that water use efficiency, conservation and education programs have been effective in reducing demand during recent droughts. For example, Sydney Water estimates that water conservation activities over the past 10 years have reduced total residential water use by about 30 gegalitres or about 9 per cent of demand (Abrams et al. 2011).

Having been in place for several years, it is thought by some that there is now little scope left for further improvement in water use efficiency as discretionary demand has decreased to such low levels (for example, Sydney Water, sub. 21).

---

## Scope for efficiency gains from refocusing water use efficiency and conservation measures

Some participants expressed their support for mandatory water use efficiency and conservation measures (Doug Hall, trans. p. 364; Institute for Sustainable Futures, sub. DR137; Waterwise Systems, sub. DR113; Wyong Shire Council, sub. DR114). The Water Factory Company submitted:

Like energy efficiency, there is now an onus on users to manage water use in a sustainable way. This is essential if we are to protect our environment and instil best practice behaviour. ... Our recommendation is that governments and regulators mandate water use efficiency and conservation activities ... (sub. DR123, p. 16)

However, reducing water consumption through water use efficiency and conservation is not always advantageous. To assess whether or not a water use efficiency or conservation measure is worth pursuing, the costs and benefits need to be compared.

In some cases, greater water use efficiency can be of net benefit for a water utility or for consumers to undertake on a voluntary basis. For example, water use efficiency programs can reduce supply costs for utilities when the reduction in revenue from selling less water is more than offset by the savings induced by avoiding the need to upgrade or expand capacity. For households, water use efficiency can be beneficial when the lower water bill outweighs the cost to them of installing more water efficient appliances.

The costs of undertaking water use efficiency and conservation measures can, however, be substantial. These include not only the direct financial costs of investing in water saving appliances, but also the costs from using more of other valuable resources, such as energy, materials or labour, to achieve a given reduction in water. Tradeoffs need to be made between using available resources to reduce water use, and using them to undertake other activities. Whether such tradeoffs are worth making depends on the value of the water saved relative to the value of the extra resources used.

Prescribed water use efficiency and conservation measures dictate how these tradeoffs should take place instead of leaving them in the hands of water users. For example, prescribing the use of water efficient appliances in buildings obliges all consumers to use water efficient appliances. However, for some consumers it will be more cost effective to buy a cheap but not very water efficient appliance as they use it so little that the cost savings from the smaller amount of water used will never outweigh the upfront capital costs.

---

Although not prescribing water savings, government-initiated education campaigns use moral suasion to encourage consumers to make choices that they otherwise would not. They do this by sending a very strong message to consumers that using less water is always a good thing. This point was made by Lin Crase:

... the heavy emphasis on narrow concepts such as water use efficiency has already created within government and community circles a view that less water use by the urban sector constitutes a superior state under any circumstance. ... The expansive effort to promote water use efficiency as dogma has resulted in urban water use being almost demonised. (Crase and O’Keefe, sub. 5, attachment, pp. 6, 9)

By restricting consumer choice, policies that either prescribe or encourage (through moral suasion) water savings lead to inefficiencies. Lin Crase observed:

Water is usually only one of many inputs in the production of outputs, including in household settings. Complementary inputs are also a requirement (e.g. the labour required to hand-water plants). Thus, to target only one input will inevitably result in poor input selection. ... To simply assume that water use efficiency is superior to the efficient use of all inputs belies the expansive economic literature in this field. Moreover, to place water use efficiency above overall economic efficiency seems an even greater misjudgement. Some outputs produced at the household and commercial level will be water-intensive and have few options for input substitution. Moreover, these same outputs may also be highly valued and in that context households and commercial enterprises will accept the necessity for increased water use and willingly carry the related costs. (Crase and O’Keefe, sub. 5, attachment, p. 2)

Inefficiencies also arise because the government inevitably has to ‘pick winners’ when it decides which water saving technologies are used. Unless this decision is based on a rigorous cost–benefit analysis and unless there are market failures present (discussed below), inefficiencies will arise. For example, Crase and Dollery (2005) examined subsidies paid in Melbourne on water-saving investments for households and found the cost per megalitre of water saved ranged from \$770 for AAA shower roses, to \$9069 for rainwater tanks, and to \$33 395 for AAA dishwashers. This compares with a price of between \$750 and \$1300 per megalitre at the time.

In addition, the Department of Water (WA) said in its submission:

Other non-price demand management measures implemented by the Western Australian Government include a water efficiency rebate program which ran from February 2003 to June 2009. An assessment of costs per kilolitre of water saved during the program indicated that most rebate products were more expensive than the alternative of producing more potable water. (sub. 38, p. 8)

Prescribed water use efficiency measures can also have equity implications. Some measures target certain households or industries and not others, and their burden might not be uniformly or equitably distributed across the community. For example,

---

prescribed building requirements (such as BASIX in New South Wales) apply only to new residential developments and renovations above a certain value. These increase the costs for some home owners and not others (Institute of Public Affairs, sub. DR 93).

In the Commission's view, water conservation for its own sake deprives the community of valued water use. If individuals have a preference to engage in water conservation activities and it is cost effective for them to do so, then they should be allowed to act upon their preference. But those that do not share such a preference for saving water should not be made to engage in the same behaviour — for them, the benefit derived from consuming water will be greater than the prevailing price. As long as water use efficiency and conservation activities are voluntary, individuals and businesses can decide for themselves.

In this sense, the Commission agrees with participants that there is a place for water use efficiency and conservation measures as a tool to manage demand (Academy of the Social Sciences in Australia, sub. 41; H<sub>2</sub>O Organiser, sub. DR94; Institute for Sustainable Futures, sub. DR137; Melbourne Water, sub. DR156; Midcoast Water, sub. DR104; South East Water, sub. 149; Water Corporation, sub. 151). However, in the absence of market failures (see below) these measures should be voluntary and, as discussed in chapter 5, should be considered with other demand management and supply augmentation options and judged on their relative net benefits.

### *Market failures could give rise to the need for government intervention*

There are circumstances in which producers and consumers might not always seek greater water use efficiency, even when it is of net benefit to them to do so. This can be due to market failures associated with imperfect information and split incentives.

#### *Imperfect information*

Markets work best when consumers and producers have sufficient information about technologies and services to make choices that will maximise their welfare and profit respectively.

Markets might fail to provide sufficient information due to:

- The public good characteristics of information — information can be used many times over without reducing what is available to others. It can also be difficult to exclude its use by others, even if they do not pay for it.

- 
- This decreases the incentives for private providers to supply such information, especially where that information is not product specific and, therefore, is unlikely to give them a marketing advantage over their competitors.
  - Information not being available equally to all — this typically occurs where producers have more information about the water use efficiency of their products than their consumers.
    - This information asymmetry could persist because sellers have an incentive to promote products as water efficient even when they are not. If consumers think this is the case, then they will be unwilling to pay a premium for actual higher water efficiency. This will in turn lead to only poorer quality products being supplied to the market. As a result, markets might undersupply cost-effective water-efficient technologies.

### *Split incentives*

Split incentives in the urban water sector arise when the person purchasing a water-efficient product is different from the person that benefits from it, and the incentives facing the purchaser differ from those of the user.

This problem can occur in real estate markets, where it is sometimes called the landlord–tenant problem. Landlords might not have strong incentives to install more water-efficient appliances if they cannot get sufficient benefit in the form of higher rents to recoup the costs involved.

This is currently unlikely to be much of a problem for water where landlords pay water bills on behalf of their tenants in most states and territories (the exceptions are in parts of Victoria, New South Wales and Queensland (chapter 6)). This gives landlords the scope to benefit over time from reduced water bills. If, however, the situation changes to one where more tenants pay their water bills, as recommended by the Commission (chapter 6), split incentives would become more of an issue. Not only would landlords have limited incentives to invest in water-efficient appliances, but so would tenants. Tenants might be prohibited from replacing appliances, or they might not be confident that they will be able to recoup the savings (through lower water bills) over the lifetime of their tenancy.

Owner occupiers could also have a reduced incentive to invest in water conserving features if these features are unlikely to be recognised when the building is sold — that is, if the improvements are not capitalised into the value of the building. In this case, an owner will only invest in those features that are likely to repay themselves over the remaining duration of their occupancy. If they live in a multi-unit dwelling

---

where water is not separately metered, the incentives will be diminished further as owner occupiers will be unable to accrue the full savings from their reduction in water consumption due to cross subsidisation among units.

### *Government intervention to deal with market failures*

The market failures associated with information provision and, to a lesser extent, split incentives, might provide some rationale for government intervention (Quiggin, sub. 26). However, the presence of market failure does not of itself warrant government intervention. Intervention can be costly and introduces its own distortions, especially if the intervention is poorly targeted (chapter 4). Intervention is only warranted when it produces net benefits to the community.

The method and extent to which governments intervene should depend on the nature of the problem and the relative cost effectiveness of the various policy options. Intervention is best achieved by targeting the market failure as directly as possible.

The Water Efficiency Labelling Scheme (WELS) is an example of a successful intervention aimed at addressing the imperfect information problem by providing information on the water use efficiency of specific appliances. WELS was initially a voluntary scheme but was prescribed in 2006 (Australian Government 2011a). It is a joint Commonwealth and State and Territory Government initiative.

A 2009 survey of the WELS scheme undertaken on behalf of the Department of the Environment, Water, Heritage and the Arts found that 56 per cent of household and non-household consumers were aware of WELS. Of this 56 per cent:

- 78 per cent claimed that WELS was credible
- 92 per cent said WELS helped to a ‘moderate’ or ‘great extent’ in purchase decisions of water-using appliances (only 8 per cent said it did not help)
- 80 per cent said it helped compare water consumption
- 72 per cent said it helped compare water efficiency
- 46 and 47 per cent said it helped compare running costs and environmental impact, respectively (George Wilkenfeld and Associates 2010).

Intervention through information provision is a less costly form of intervention than those that prescribe water use efficiency and conservation activities. As noted above, prescribed measures lead to costly inefficiencies.

In summary, it is the Commission’s view that there is no role for Government in prescribing water use efficiency and conservation measures such as water saving

---

targets for water utilities, or the use of appliances including dual flush toilets, rainwater tanks and greywater systems (chapter 5). Where there is a market failure present, information provision is most likely to be the least-cost form of intervention. In all cases, however, it needs to be clearly established that the benefits of intervention to address the market failure outweigh the costs.

RECOMMENDATION 7.2

***Governments should not prescribe water use efficiency and conservation activities unless there is a market failure present and it is clearly established that the social benefits of intervention exceed the social costs.***

Following the strong public advocacy of water saving behaviour through information and education campaigns, it will be very difficult to reverse the message that saving water is always in the interests of the community. According to Lin Crase:

At the national level (i.e. NWI) the water use efficiency mantra needs to be reconsidered and recrafted. This will be a formidable task given the momentum developed around the notion of ‘saving every last drop’. Nevertheless, unless this is tackled the objective of optimising supply in the longer term will be unattainable. It is difficult to see this being accomplished in less than 10 years. ... much needs to be done to re-shape community thinking about urban water use. (Crase and O’Keefe, sub. 5, attachment, pp. 8–9)

In the Commission’s view, there is a strong case for governments to provide more balanced information on the costs and benefits of water savings activities, as well as the relative merits of using prices, restrictions and water use efficiency and conservation measures to manage demand. Presenting consumers with the facts will enable them to make objective choices that are aligned with their individual preferences.

The Queensland Water Directorate said:

Generally, refocussing information on broader efficiency measures taking into account relative costs and benefits is strongly supported. Such a campaign would need a degree of centralisation to save on communication costs and ensure efficiency of messages, but would also need to be flexible enough to take into account the diversity of situations, climatic conditions and community issues across a state such as Queensland. (sub. DR138, p. 22)

The New South Wales Government stated:

NSW notes the importance of evaluating the array of issues involved with introducing flexible pricing on their merits. In this regard, the NSW Government acknowledges the view that over the past decade arguments against pricing reform have tended to be over-emphasised, while the level of rigour applied to understanding the direct and

---

indirect costs imposed by non-price demand management measures has tended to be under-emphasised. (sub. DR146, p. 13)

RECOMMENDATION 7.3

*Government education and information campaigns should be refocused to provide consumers with objective information on the costs and benefits of managing demand using prices, restrictions, water use efficiency and conservation measures.*

---

## 8 Achieving affordability and consumer protection objectives

### Key points

- In Australia, per capita water consumption is well above generally agreed subsistence requirements and there is no need for an 'essential' volume of water to be determined by governments, except in the case of an emergency arising from a failure of supply.
- Expenditure on water and wastewater services represents a small proportion of income, including for low-income groups. Relatively few households have difficulty paying water and wastewater bills.
- Recent price increases for water and wastewater services are likely to have had less detrimental effect on consumers than price increases of some other essential goods and services such as energy, housing and food.
- Affordability objectives for water and wastewater services are most efficiently achieved through non-concession elements of Australia's tax and transfer system.
- Current government concessions for water and wastewater services are inefficient and inequitable. It would be more efficient to replace or amend concessions with direct payments to targeted households or rebates on the fixed component of water and wastewater service bills.
- If water and wastewater concessions are deemed necessary, they should be funded by governments through transparent Community Service Obligations.
- Hardship policies outlining the standards for water utilities when dealing with customers facing payment difficulties, and other measures to alleviate hardship for low-income and disadvantaged consumers in exceptional circumstances, such as utility grant schemes and alternative payment methods, have merit.
- Consumer advocacy plays an important role in ensuring that policy makers and regulators are informed about consumer preferences. Regulatory and policy decision making would benefit from greater resources in this area. Government sponsored advocacy should represent the interests of all consumers.
- All water and wastewater service customers should have access to an independent dispute resolution process, preferably by a specialist utilities industry ombudsman.

---

The Commission accepts that universal and affordable access to safe water and wastewater services should be a government objective for both equity and efficiency reasons (chapter 3). The benefits of achieving universal and affordable access to water are likely to include:

- a higher standard of living and quality of life
- better sanitation, prevention of disease and improved public health outcomes
- greater social inclusion and cohesion, greater upward social mobility and self-sufficiency.

As such, it is important that:

- an adequate level of consumption of these services be affordable for all individuals and households
- consumers be protected from poor levels of service
- service delivery meets consumer preferences at least cost.

This chapter explains how affordability (section 8.1) and consumer protection objectives (section 8.2) can be achieved effectively and efficiently.

## **8.1 Affordability of water and wastewater services**

Water and wastewater are essential services, and will be consumed by households in adequate amounts if they are affordable.

### **What level of access and use is required?**

Given that access to some level of water and wastewater services is necessary, how much access is required? On the whole, inquiry participants expressed the view that the essential requirement did not extend to an unlimited amount of water (and, by extension, wastewater services) and a households' requirement differed depending on its characteristics. The Consumer Utilities Advocacy Centre (CUAC) stated:

In discussion of access to water, reference is often made to a 'minimum acceptable' or 'essential' level of access. This distinction recognises that consumers are not entitled to an unlimited or excessive supply of water. (sub. 46, p. 2)

The Public Interest Advocacy Centre (PIAC) submitted:

... households with residents that need water for medical purposes, such as kidney dialysis; households with a large number of members, including families with children; and households that accommodate transitory populations, such as Indigenous

---

Australians ... would reasonably be expected to consume large quantities of water to secure an adequate standard of living. (sub. 61, p. 7)

Opinions of what constitutes essential water use are likely to depend on what type of water using activities and their frequency are considered essential. For example, CUAC stated, 'in a highly developed country like Australia, a level of water use beyond that needed to meet basic survival needs is necessary to social participation and inclusion' (sub. 46, p. 2), and 'we don't want a society where entire groups of people can't, say, have a modest garden' (trans., p. 236).

#### *Evidence on minimum acceptable use*

In Australia, inclining block tariffs are used to provide a certain amount of water at a low rate to assist low-income households while providing incentives to reduce use at higher consumption levels. However, the size of the initial block in inclining block tariff regimes in Australia varies considerably (chapter 6). In relation to quantifying 'essential' water requirements, CUAC stated that 'there needs to be a lot more work done to establish what that might be' (trans., p. 236).

Much of the published research on essential water requirements is aimed at informing service provision by relief organisations following natural disasters, or in developing countries.

In a study of water access, use and health outcomes prepared for the World Health Organization, Howard and Bartram (2003) found that access to 100 litres of water per person per day (36.5 kilolitres (kL) per year) or more provided continuously to a dwelling through multiple taps is a minimum requirement to ensure all consumption and hygiene needs are met. This includes water for drinking, preparing food, bathing, laundering and sanitation.

Gleick (2006) found that 80 litres of water per person per day (30 kL per year), was sufficient to satisfy basic water needs using water piped directly to a house, including the toilet. Falkenmark (1991, quoted in Gleick 2006) cited 100 litres per person per day as the typical household water demand in water scarce regions.

These estimates are small relative to Australia's average household consumption (in 2008-09) of about 220 litres per person per day (80.5 kL per year) (NWC 2011d) but not much less than the average consumption in some other developed countries or some areas of Australia during water restrictions. In Belgium, average water consumption in 2008 was 105 litres per person per day (Eureau 2009) and in 2009-10 residents of Melbourne under level 3a water restrictions used 148 litres per person per day (Melbourne Water 2010).

---

The Commission's own analysis of per capita water consumption indicates that although people living in some Australian Census collection districts<sup>1</sup> consumed about the level identified by Howard and Bartram as the minimum optimal amount (100 litres per person per day) in 2009-10, the vast majority consumed much more (technical supplement 2).

In its draft report, the Commission found that there is no need for governments to define a minimum essential requirement for water in a developed country like Australia, in which the level of consumption exceeds all definitions of subsistence or minimum acceptable amounts of water use. In addition to being unnecessary, it would also be difficult to do given that the amount of essential water use required at the household level (relevant for metering purposes) is determined in part by the number of persons in a household.

In its submission to the draft report, the Western Australian Council of Social Service (WACOSS) disagreed with the Commission's finding in this respect, stating:

... the purpose of determining an essential volume of water would be to ensure that households who do not have the financial capacity to consume above non-discretionary levels are able to afford access to water in order to meet basic needs such as bathing and hygiene, washing, cooking and drinking. It is difficult to comprehend how the average consumption behaviour of the general population would influence the merit (or otherwise) of determining an essential volume of water to ensure vulnerable or disadvantaged consumers are able to maintain essential water services. (sub. DR160, p. 14)

In comparing estimates of minimum essential use with average levels of use in Australia, the Commission wished to show that water use in Australia is typically above a minimum acceptable level. The Commission considers that defining an essential volume of water is only of use where the capacity to provide this level of water is constrained, and further that it is more important to ensure that typical volumes of water consumption, rather than minimal levels of consumption, are affordable by all households. This is the focus of the rest of this chapter.

The New South Wales Government also noted:

... in some instances there is a need for Governments to determine an 'essential' volume of water, such as when planning alternative services when the existing supply is reduced or restricted (for example when carting water to a community with a 'failed supply' during drought, or when the normal supply is cut during natural disasters). (sub. DR146, p. 20)

---

<sup>1</sup> Census collection districts are the smallest geographical area for which the ABS publishes Census data and are equivalent to 250 households on average.

---

The Commission accepts that in exceptional circumstances, where water supplies are insecure or have failed, and extreme rationing of water is deemed to be in the public interest, then governments might need to determine an essential water requirement. The Commission has therefore clarified its finding in this area.

FINDING 8.1

*In Australia, per capita water consumption is well above generally agreed subsistence requirements and there is no need for an 'essential' volume of water to be determined by government, except in the case of an emergency arising from a failure of supply.*

### **How affordable are water and wastewater services?**

Prices for water and wastewater services have increased significantly in recent years and are forecast to rise further in the next few years to finance investment in infrastructure (chapter 2).

In this inquiry, the Commission has heard that some Australian households find it difficult to pay for water and wastewater services, and to make ends meet more generally. This is consistent with wider community commentary on growing cost of living pressures (box 8.1).

The Tasmanian Council of Social Service stated:

Our members report that people living on low incomes are finding it increasingly difficult to meet the basic costs of living as housing, energy, food, transport and other costs rise. (sub. 13, p. 2)

Anglicare Tasmania, commenting on the effect of expected price increases for water and wastewater services in Tasmania, submitted:

Anglicare is extremely concerned about the effect these price increases will have on people on low incomes, particularly as the cost of living more generally is increasing and people are coming under sustained pressure from rising electricity prices, rising food prices and an ongoing shortage of affordable housing. (sub. 44, p. 2)

The affordability of water and wastewater services depends not just on the cost of these services but also on incomes, the cost of other essential goods and services, and the ability to budget for water and wastewater bills and pay for them when they become due.

---

### Box 8.1 **Commentary on cost of living pressures**

A number of community service and other organisations have commented on the rising cost of living and its impact on low-income and disadvantaged groups.

The Energy and Water Ombudsman (Victoria):

Our case trends point to increasing financial hardship. In 2009-10, customers raised 28% more issues about payment difficulties than in 2008-09. We helped negotiate 2,473 payment plans, 31% more than in 2008-09 and 143% more than four years ago, when we first began to collate this information. (EWOV 2010, p. 33)

The Energy and Water Ombudsman NSW:

At our outreach events, community workers reported that utility price increases continued to be a great concern for low-income households and customers living on a fixed income. Some community workers were also experiencing increased demand for their services from a new group of clients who were employed but struggling to meet their housing costs and utility bills. (EWON 2010, p. 2)

The South Australian Council of Social Service:

Recent price rises for electricity — and now water and rates — are combining with rapid increases in the cost of housing to make a decent standard of living simply unaffordable for many low income South Australians. Energy represents a significant expenditure item and a point of financial stress. Lower income households spend a much greater proportion of income on energy expenses than other people, even when the government concessions are taken into account. Water costs in South Australia are set to continue rising well above the CPI (20% per year for the next five years). (SACOSS 2010, p. 3)

### *Expenditure on water and wastewater*

Data on household expenditure on water and wastewater services collected by the Australian Bureau of Statistics (ABS) shows that expenditure on water and wastewater services represents a small proportion of household income on average. Table 8.1 shows the average weekly household expenditure on water and wastewater services in each Australian jurisdiction in 2007-08 by quintile of disposable income.

For Australia, average expenditure on water and wastewater services by households with the lowest 20 per cent of disposable incomes was \$7.26 per week or 2.11 per cent of household income. Average weekly expenditure by households with the highest 20 per cent of disposable incomes was higher (\$14.11), but represented a smaller proportion of income (0.52 per cent).

**Table 8.1 Average weekly household expenditure on water and wastewater services by jurisdiction, 2007-08**

<i>Jurisdiction</i>	<i>Disposable income quintile<sup>a</sup></i>			<i>All households</i>
	<i>Lowest</i>	<i>Middle</i>	<i>Highest</i>	
<b>Australia</b>				
a) Water and sewerage (\$)	7.26	10.50	14.11	10.84
b) per cent of disposable income	2.11	1.01	0.52	0.81
<b>New South Wales</b>				
a) Water and sewerage (\$)	6.06	10.26	13.75	10.24
b) per cent of disposable income	1.91	1.01	0.50	0.78
<b>Victoria</b>				
a) Water and sewerage (\$)	7.67	9.71	12.23	9.83
b) per cent of disposable income	2.17	0.94	0.46	0.77
<b>Queensland</b>				
a) Water and sewerage (\$)	5.20	5.64	6.91	6.07
b) per cent of disposable income	1.34	0.51	0.28	0.46
<b>South Australia</b>				
a) Water and sewerage (\$)	7.89	11.98	17.16	12.46
b) per cent of disposable income	2.37	1.31	0.68	1.00
<b>Western Australia</b>				
a) Water and sewerage (\$)	7.60	10.83	13.09	10.58
b) per cent of disposable income	2.12	0.94	0.45	0.73
<b>Tasmania<sup>b</sup></b>				
a) Water and sewerage (\$)	4.22	3.37	3.15	3.67
b) per cent of disposable income	1.25	0.38	0.16	0.38
<b>Northern Territory<sup>b</sup></b>				
a) Water and sewerage (\$)	14.33	15.56	19.37	16.52
b) per cent of disposable income	2.99	1.11	0.67	0.94
<b>ACT<sup>b</sup></b>				
a) Water and sewerage (\$)	13.28	17.56	17.70	16.55
b) per cent of disposable income	2.63	1.27	0.52	0.90

<sup>a</sup> Quintiles of disposable income are estimated by ranking all households from lowest disposable income to highest disposable income, and then dividing the households into five equal or nearly equal sized groups. Households that did not report any expenditure on water and wastewater services were excluded from the analysis after quintiles were estimated. Disposable income is defined as gross income less income tax.

<sup>b</sup> Estimates for Tasmania, the Northern Territory and the ACT are based on small survey samples and might be unreliable.

Source: ABS (*Survey of Income and Housing 2007-08*, Expanded CURF, Cat. no. 6541.0, RADL).

Across jurisdictions, the proportion of disposable income spent on water and wastewater services by households in the lowest 20 per cent of incomes was consistently low, ranging from 2.99 per cent in the Northern Territory to 1.25 per cent in Tasmania.

---

The Commission has heard evidence that ABS surveys might understate expenditure on water and wastewater services as tenants or unmetered apartment dwellers often don't pay for water and wastewater services directly. These costs are instead recovered through body corporate fees or rent (Australian Council of Social Service, trans., p. 43).

To include consideration of costs borne by households through rent and body corporate fees, the Commission undertook its own analysis of consumption patterns and expenditure on water and wastewater services of different consumer groups (technical supplement 2) (box 8.2). This analysis utilised consumption data from water utilities aggregated at Census collection district level and matched with median household income data from the 2006 Census. The Commission found that, in low-income areas of Sydney and Melbourne (those collection districts with median household incomes in the lowest quintile), average household expenditure on water and wastewater services — assuming all costs were borne by households and before concessions were deducted — averaged just over 1 per cent of income, and ranged between 0.3 per cent and 4.9 per cent of income in 2005-06. This is consistent with the estimates obtained from ABS survey data.

In addition to representing a small proportion of income, recent increases in the price of water and wastewater services have had a relatively minor impact on household budgets compared with price increases of other essential goods and services (figure 8.1). From 2005-06 to 2009-10, prices for water and wastewater services in Australian capital cities increased by 48 per cent on average, ranging from 60 per cent in Sydney to 26 per cent in Hobart. This was more than the increase in average capital city prices for electricity (39 per cent), housing (21 per cent) or food (19 per cent), and significantly more than the increase in the Consumer Price Index (CPI) (13 per cent) (ABS 2011a).

However, in the same period, the increase in expenditure on water and wastewater services as a share of total household expenditure (0.2 per cent), was less than the increase for energy (0.3 per cent) (of which electricity forms the major component), food (0.4 per cent) or housing (2.1 per cent). In dollars, the estimated increase in average annual household expenditure on water and wastewater services between 2005-06 and 2009-10 was \$238 and was exceeded by increases in expenditure on energy (\$447), food (\$1429) and housing (\$3411) (table 8.2). This is because water and wastewater represents a smaller share of household expenditure than energy, food or housing and greater relative price rises for water and wastewater services have less impact on total expenditure than smaller price increases in these other goods and services.

## Box 8.2 The effect of income on consumption of water and wastewater services

As part of its inquiry, the Commission analysed consumption of, and expenditure on, water and wastewater services of different consumer groups utilising data from water utilities aggregated by Census collection districts matched with median household income data from the 2006 Census. The Commission found:

- average water consumption increases with income
- very-high-income households consume much more water than moderate and low-income households
- water and wastewater service bills represent a small proportion of household income for all income groups
- expenditure on water and wastewater services represent a smaller proportion of income for high-income households than low-income households.

### Average annual water and wastewater service bills for Census collection districts, by income quintile<sup>a</sup>, 2005-06

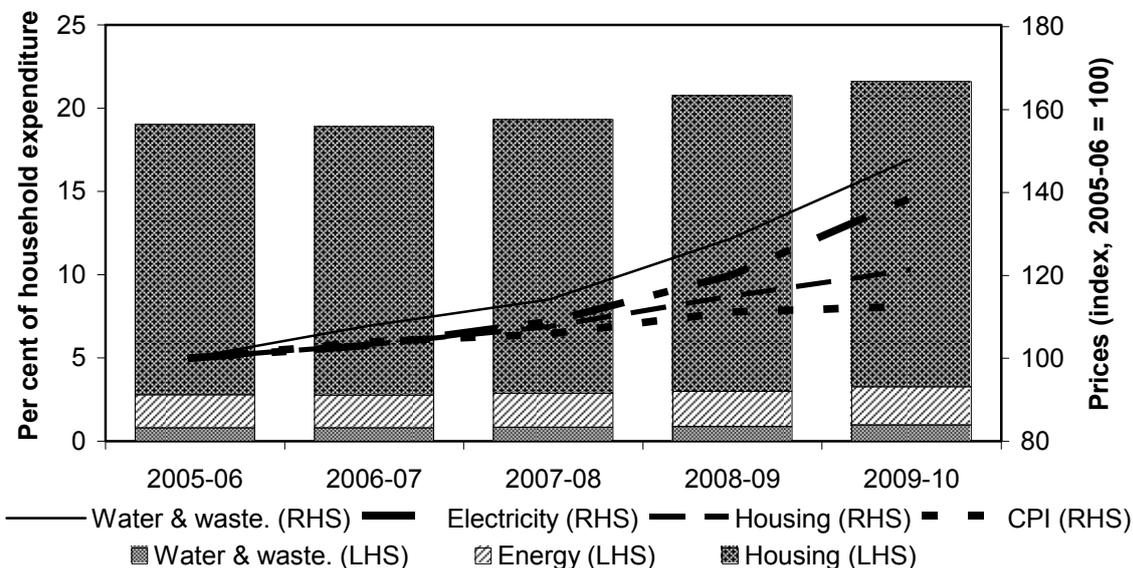
	Units	Quintile of median household income					Total
		1 Lowest	2	3	4	5 Highest	
<b>Melbourne<sup>b</sup></b>							
Median household income <sup>c</sup>	\$'000	37	51	57	65	86	57
Average annual use	kL	174	181	192	207	255	202
Average total annual bill	\$	454	467	481	503	570	494
Proportion of income	%	1.27	0.93	0.84	0.76	0.64	0.89
Range - low	%	0.79	0.61	0.56	0.42	0.28	0.28
Range - high	%	3.00	1.37	1.45	1.15	1.11	3.00
<b>Sydney<sup>d</sup></b>							
Median household income <sup>c</sup>	\$'000	38	53	63	78	102	63
Average annual use	kL	199	208	218	221	251	219
Average total annual bill	\$	658	673	688	692	728	688
Proportion of income	%	1.75	1.26	1.10	0.89	0.71	1.10
Range - low	%	0.94	0.91	0.70	0.55	0.30	0.30
Range - high	%	4.88	2.21	1.79	1.52	1.19	4.88

<sup>a</sup> Quintiles of median household income are estimated by ranking all collection districts according to median household income, and then dividing the total number of collection districts into five equal or nearly equal sized groups. <sup>b</sup> Data for Melbourne represents the combined data of South East Water and Yarra Valley Water. <sup>c</sup> Median of the 2006 Census collection district median household income within the quintile.

<sup>d</sup> Does not include expenditure in the second tariff block (>400kL).

Source: Technical supplement 2.

**Figure 8.1 Prices and household expenditure<sup>a</sup> for selected essential services, 2005-06 to 2009-10**



<sup>a</sup> Household expenditure is defined as household final consumption expenditure. Expenditure on housing includes imputed rent from owner-occupied dwellings.

Sources: ABS (*Consumer Price Index, Australia Jun. 2011*, Cat. no. 6401.0); ABS (*Australian System of National Accounts 2009-10*, Cat. no. 5204.0).

**Table 8.2 Average annual household expenditure on selected goods and services<sup>a</sup>**

	2005-06	2009-10	Change
	\$	\$	\$
Water and wastewater	586	825	+238
Energy	1 444	1 891	+447
Food	7 733	9 162	+1 429
Housing <sup>b</sup>	11 823	15 233	+3 411

<sup>a</sup> Current prices. Average annual household expenditure is defined as household final consumption expenditure divided by projected number of Australian households. <sup>b</sup> Expenditure on housing includes imputed rent from owner-occupied dwellings.

Sources: ABS (*Australian Demographic Statistics, Sep. 2010*, Cat. no. 3101.0); ABS (*Australian System of National Accounts 2009-10*, Cat. no. 5204.0).

### *Number of households experiencing payment difficulties*

The available evidence indicates that relatively few households experience payment difficulties for water and wastewater services compared with the larger numbers experiencing difficulty meeting other costs (particularly electricity).

---

In Victoria, a survey conducted from 2007 to 2008 by the Victorian Council of Social Service and Emergency Relief Victoria (2009) found that electricity or gas costs were the most commonly nominated contributor to financial hardship for those seeking emergency relief assistance (12 per cent), followed by phone costs (10 per cent), petrol (10 per cent), food (9 per cent) and rent (8 per cent). Water and wastewater was the sixth most commonly cited contributor at 7 per cent.

*Anglicare Victoria's Hardship Survey 2010* reports that water was the fifth most commonly cited payment difficulty for clients of emergency relief centres (27 per cent of respondents). Other costs more commonly cited as being behind payment were rent and electricity (47 per cent), telephone (44 per cent) and gas (40 per cent) (Anglicare Victoria 2010).

The number of flow limitations for non-payment of water reported by the National Water Commission and Water Services Association of Australia in the *National Performance Report 2009-10*, indicate that only a small proportion of consumers have their water flow limited for non-payment of water bills. In 2009-10, Australia's major urban water utilities (those with more than 100 000 connections) limited the flow of 0–0.45 per cent of their customers accounts for non-payment of bills. Of all utilities whose performance is reported on, Westernport Water in Victoria restricted the largest share of its customers for non-payment (1.31 per cent) (NWC and WSAA 2011).

In comparison, rates of disconnection reported for non-payment of electricity bills in 2009-10 were higher. Statewide electricity disconnection rates recorded in New South Wales (0.6 per cent), Victoria (0.59 per cent), South Australia (0.66 per cent), Western Australia (0.38 per cent) and Tasmania (0.62 per cent), exceeded the rates of restriction of all but one major water utility (ERA 2011a; IPART 2011a).

There is some evidence that recent water and wastewater price rises and other cost of living pressures have increased the number of households seeking assistance, though the total number still remains small. In New South Wales, a study of people who had their utility service disconnected or limited because of non-payment of bills found that the share of total respondents whose dwelling most recently had its water flow limited increased from 9 per cent to 14 per cent between 2004 and 2008 but was still much lower than the share that had their electricity (81 per cent) or gas (16 per cent) service disconnected (PIAC 2009).

In its submission to this inquiry, Sydney Water (sub. 21, p. 20) stated 'the number of Sydney Water customers seeking financial assistance has grown by more than 20 per cent in the past two years'. However, at public hearings, Sydney Water clarified:

---

It's quite small. I would have to check the number, but it is in the thousands, compared to a population of 4.3 million. ... I don't actually think it is directly connected to the price of water, though that doesn't help. But more recently what we have noticed in Sydney is that the impact of rising power prices seems to have had quite an impact and people's power bills have gone up rather a lot. (trans., pp. 98–99)

A survey conducted by the Independent Pricing and Regulatory Tribunal (IPART) of utility users in Sydney, the Blue Mountains and Illawarra showed that the number of users who had approached water utilities in the past three years about payment difficulties was very low, about 1 per cent for all surveyed income groups in 2010. In contrast, a larger proportion of electricity users of all income groups approached their retailer because of payment difficulties (3–10 per cent) (IPART 2010b). This might be due to the larger size of electricity bills or a greater preparedness of electricity utilities to disconnect services.

In its response to the draft report, CUAC stated:

... the essential nature of water services and the potential for restriction mean that consumers may pay a water bill and go without other important goods and services (such as medicine, or a child's school excursion). Although paying a water bill contributes to financial hardship (lack of money for other essentials) for such consumers, this hardship will not be visible in business' performance data. Hence, the rate of requests for payment assistance is not a reliable measure of payment difficulties. (sub. DR143, p. 12)

The Commission accepts that self reporting might understate actual instances of hardship. However, the low cost of water and wastewater services relative to incomes and small number of people whose dwelling has its water flow is restricted for non-payment of bills, clearly indicates that it is not a major cause of hardship. Addressing hardship through the urban water sector would therefore not directly address the causes of financial hardship and would not be an effective policy tool in combating it.

#### FINDING 8.2

*Expenditure on water and wastewater services represents a small proportion of income, even for low-income groups. Price increases in water and wastewater services are likely to have had less impact on consumers than price increases of other essential goods and services such as energy, food and housing (for which expenditure represents a greater share of incomes).*

---

## **What will be the impact of forecast price increases and pricing reforms?**

Community organisations told the inquiry of their concern that future price increases and possible pricing reforms (such as flexible pricing or removing inclining block tariffs) could have detrimental effects on low-income and disadvantaged consumers.

### *Forecast price increases*

Recent pricing decisions by economic regulators and governments will result in retail prices for water and wastewater services increasing significantly in Australia in the next few years (chapter 2).

These price increases might affect households differently. Low-income households on average consume less water than high-income households and consequently might have less discretionary water use. They therefore might not be able to reduce consumption in the event of higher prices to the same extent as households with higher incomes (box 8.2).

However, as the total cost of water and wastewater services represents a small proportion of income (even for low-income households), forecast price increases in water and wastewater services — although contributing to increasing living costs — are unlikely to significantly impact on affordability. To illustrate, a 50 per cent increase in the cost of a good or service that comprises just 5.0 per cent of income would increase costs as a proportion of income by only 2.5 per cent.

In addition, some of the forecast price increases are due to inefficient investment (chapter 5). The reforms advocated by the Commission in this report are aimed at reducing future inefficient investment to the benefit of all water users, including those with low incomes.

### *Pricing reforms*

A number of pricing reforms are proposed in chapter 6 to improve economic efficiency. These reforms would result in the unwinding of complex cross-subsidies between households in different locations and/or with different consumption patterns, and result in complex distributional outcomes. The impact on different households would depend on the specific pricing arrangements in place, the reforms implemented and the consumption characteristics of individual households (box 8.3). Nonetheless, there will be winners and losers from pricing reforms.

---

### Box 8.3 Factors affecting household water consumption

As part of its inquiry, the Commission undertook econometric analysis of the socio-economic factors affecting water consumption using data provided by water utilities matched with Australian Bureau of Statistics census data aggregated to the Census collection district level.

The Commission found that household size and income are the most influential determinants of residential water consumption. Household size is a relatively stronger determinant of non-discretionary consumption and income is a stronger determinant of discretionary consumption.

Block size is positively related to water consumption and climate also appears to have a significant impact on consumption over large geographical areas. Other factors, such as dwelling type, concession status and educational and occupational status of households might also affect water consumption depending on regional and utility specific factors.

Although household water consumption increases with household size, it does so at a decreasing rate as there are economies of scale in water consumption within households.

Low-income households have less discretionary water use or fewer means and/or less preparedness to invest in water efficiency measures than high-income households. As a result, their usage is less sensitive to water restrictions and price increases than that of high-income households.

*Source:* Technical supplement 2.

The adoption of flexible (or scarcity) pricing, in the place of long-run marginal cost pricing, would result in lower prices on average, benefitting all consumers. However, prices would be more variable, rising gradually in periods of short supply when storage levels decrease and falling sharply when storages fill. Implementing tariff choice could allow consumers to choose a service level that meets their preferences for price and level of security, negating some of the concern generated by the prospect of higher prices (chapter 6). Modelling conducted by the Commission for Melbourne and Perth indicates that the price of water under flexible pricing would remain below \$2 per kL more than 90 per cent of the time (technical supplement 1).

Postage stamp pricing results in cross-subsidies from areas that are less costly to service, to areas that are more costly to service. Moving to location-specific pricing would result in an unwinding of these cross-subsidies with higher costs for those in high-cost areas and lower costs for those in low-cost areas.

Depending on how inclining block tariffs are designed, replacing them with flat volumetric tariffs that reflect the variable costs of water provision might increase

---

total costs for moderate water users and decrease costs for small and large water users.

Moving away from pricing services based on rateable land values would increase costs for those living in areas with low property values and decrease costs for those in high property value areas, other things equal.

If governments wish to pursue distributional objectives, such as supporting low-income consumers, they should do so at least cost. In contrast to the perverse inefficiencies and inequities generated by manipulating prices to improve affordability outcomes (and relying on non-price measures to manage demand), governments have other measures available to them that are more efficient, flexibly targeted and transparent.

### **Achieving affordability objectives at least cost to efficiency**

The tax and transfer system is the primary instrument governments use to ensure that all people can achieve a minimum acceptable standard of living and are able to afford the necessities of life. The main features of the tax and transfer system include:

- concessions and rebates on the consumption of a wide range of goods and services for low-income individuals and families
- income support payments for those who are unable to support themselves financially
- family assistance, to assist with the cost of raising children
- the direct provision of services below cost, such as, education, health and public housing
- tax rates that increase with income.

#### *Concessions and rebate policy*

All levels of government offer concessions or rebates to particular groups of low-income earners on consumption of some goods and services, including water and wastewater, electricity, medicines, public transport and local council rates. Eligibility for these concessions is typically based on holding one or more of a number of Australian Government concession cards targeted towards low-income groups.

Concessions and rebates on water and wastewater services are administered and mostly funded by State, Territory and Local Governments. The Australian Government provides some funding to states and territories through a National Partnership Agreement to make concessions on certain services available to all Pensioner Card holders, including water and wastewater. The value of concessions or rebates offered, the method in which they are applied and their eligibility requirements vary considerably between jurisdictions (tables 8.3 and 8.4).

**Table 8.3 Water and wastewater concessions, selected statistics, 2009-10**

		<i>Sydney</i>	<i>Victoria</i>	<i>Brisbane</i>	<i>Western Australia</i>
Total expenditure on concessions	\$m	114.5	112.4	14.0	64.2
Customers receiving concessions	%	13.7	31.7	12.6	20.5
Average concession	\$	509	168	310	336

*Sources:* Department of Human Services (Victoria) (2010); Productivity Commission estimates; Sydney Water (2011c).

Concessions and rebates can better address affordability issues compared with adjusting prices because they can:

- be targeted towards particular groups assessed as being in need, such as low-income earners or people with certain medical conditions
- result in less cost to economic efficiency compared with price distortions.

However, in practice, concession arrangements have a number of weaknesses (Australia's Future Tax System Review Panel 2009).

First, concessions and rebates can only address the affordability of one good or service at a time but households purchase many essential goods and services. As such, governments have developed concession and rebate arrangements for a number of different consumption items. This results in a complex and expensive arrangement, in that:

- consumers can be confused about what assistance is available and from whom
- the administration costs can be higher than otherwise might be the case
- governments can find it difficult to ascertain the impact of particular concessions in isolation from other assistance measures and, therefore, the value for money achieved by each concession.

**Table 8.4 Concessions and rebates for water and wastewater services, by jurisdiction, 2011-12**

<i>Jurisdiction</i>	<i>Eligibility</i>	<i>Concession</i>
NSW (metropolitan)	Owner occupiers with Pensioner Concession Card, Department of Veterans Affairs (DVA) Gold Card	<ul style="list-style-type: none"> <li>• 100% of water service charge to a maximum of \$36.22 per quarter and 83% of wastewater service charge</li> <li>• 33% of usage charges to a maximum of 100 kL per year for residences with only a water service</li> </ul>
NSW (other)	Owner occupiers with Pensioner Concession Card, DVA Gold Card	<ul style="list-style-type: none"> <li>• \$87.50 on water rates or charges and the same again on wastewater rates or charges</li> </ul>
Vic	Pensioner Concession Card, Health Care Card, DVA Gold Card	<ul style="list-style-type: none"> <li>• 50% of the total bill capped at \$270.20 for customers with water and sewerage services</li> <li>• 50% of the total bill capped at \$135.10 for customers with a single service</li> </ul>
Qld (south-east)	Owner occupiers with Pensioner Concession Card, DVA Gold Card	<ul style="list-style-type: none"> <li>• \$120 on water service and usage charges</li> <li>• additional council concessions might also apply</li> </ul>
Qld (other)	Owner occupiers with Pensioner Concession Card, DVA Gold Card	<ul style="list-style-type: none"> <li>• 20% on gross local government rates and charges including water and sewerage charges capped at \$200 per year</li> </ul>
SA	Pensioner Concession Card, DVA Gold Card, Health Care Card, or meet low income provisions	<ul style="list-style-type: none"> <li>• 25% on total water bills (\$125 minimum, \$235 maximum per year) plus \$105 on sewerage rates, for owner occupiers</li> <li>• 25% on the total water bills (\$72 minimum, \$182 maximum per year), for tenants</li> </ul>
WA	Pensioner Concession Card, State Concession Card, State Seniors Card, Commonwealth Seniors Card	<ul style="list-style-type: none"> <li>• 50% of annual service charges and water usage up to a maximum of 150 kL in Perth, 400 kL in the south of the state and 600 kL in the north, for Pensioner Concession and State Concession Card holders</li> <li>• 25% of annual service charges capped at \$46.65 for water charges and \$175.75 for sewerage charges, for State Seniors Card holders</li> <li>• 50% of annual service charges, for holders of both a State Seniors Card and Commonwealth Seniors Health Card</li> </ul>
Tas	Pensioner Concession Card, Healthcare Card, DVA Gold Card	<ul style="list-style-type: none"> <li>• \$75.08 each on water and wastewater bills</li> </ul>
NT	Northern Territory Pensioner and Concession Card	<ul style="list-style-type: none"> <li>• concessional water service charge of \$0.725 per day and usage charge of \$0.407 per kL is applied</li> <li>• concessional wastewater service charge of \$0.754 per day is applied</li> </ul>
ACT	Pensioner Concession Card, Low Income Health Care Card, DVA Gold Card, asylum seekers	<ul style="list-style-type: none"> <li>• 68% of water supply charge</li> </ul>

*Sources:* Community Services Directorate (ACT) (2011); Department for Families and Communities (SA) (2011); Department of Communities (Qld) (2010); Department of Health (NT) (2011); Department of Premier and Cabinet (NSW) (2011); Sydney Water (2011b); Tasmanian Government (2011); Water Corporation (2011a); Yarra Valley Water (2011).

---

Second, concessions for water and wastewater services sometimes apply to the volumetric component of the bill, in addition to the fixed component, preventing consumers from facing an efficient price signal and resulting in efficiency costs (chapter 6).

Third, concessions can be regressive with income. If they are paid on the volumetric component, concession holders with higher incomes might receive a larger benefit, because other things equal, they are likely to consume more than those with lower incomes (technical supplement 2). This is particularly relevant in jurisdictions such as Western Australia where water concessions have relatively relaxed eligibility requirements for older people (State Seniors Card and Commonwealth Seniors Health Card holders are eligible and these cards have more generous means testing).

Concessions can also be regressive if they are targeted toward particular low-income groups and not others. Specifically, the treatment of pensioners and the unemployed contrasts greatly. In jurisdictions other than Victoria, South Australia, Tasmania and the ACT, holders of Centrelink Health Care Cards (which include the unemployed) are ineligible for concessions although holders of Pensioner Concession Cards (such as aged pensioners) are eligible. This is despite the maximum pay rates for the aged pension being significantly higher than maximum pay rates for unemployment benefits.

Fourth, eligibility for concession cards is often based on an income threshold, and this can create a strong incentive to reduce or understate incomes. Concession holders who earn an income around the cut-off for a concession card can face a significant marginal tax rate if earning more means they lose all their entitlements stemming from a concession card. This can reduce incentives to increase paid work.

Fifth, because concessions are applied to water bills and it is administratively difficult to provide concessions tailored to individual household characteristics, water and wastewater concessions can result in inequitable outcomes:

- Concession arrangements do not take account of the number of occupants in a household so the arrangements are more generous for small households than larger households.
- Tenants or owner occupiers of units in multi-dwelling buildings that do not have individual meters and who pay for their water and wastewater services through rent or body corporate fees are not typically eligible for concessions, though they might have a similar level of need to those paying for bills directly and receiving concessions.
- Tenants who are charged for water usage by their landlord are often not eligible for concessions.

---

*Current State, Territory and Local Government concession arrangements for water and wastewater services are inefficient and inequitable. Efficiency gains can be made by replacing or amending water and wastewater concessions with direct payments to targeted households or rebates on the fixed component of water and wastewater service bills.*

#### ***Other elements of the tax and transfer system***

Income support payments are the principal source of government assistance for those who are unable to support themselves financially. There is a variety of payments targeted to those who are not expected to work, those unable to work and those who are unemployed or studying. In addition, family assistance is provided to assist with the cost of raising children and payment rates are based on the number of dependants. Both income support payments and family assistance are adjusted regularly for general movements in prices and to address policy related changes such as was the case when the Goods and Services Tax was introduced in 2000 and as is proposed in the recently announced Clean Energy Future Policy.

Both income support payments and family assistance are provided to recipients as direct cash payments and have a number of beneficial characteristics over both pricing and concession affordability measures.

First, eligibility and rates of payment for income support and family assistance are means tested against the income and assets of the recipient, and take into account the specific circumstances of an individual or family including income from other sources (such as a spouse) or number of dependent children. People in similar circumstances are treated the same and people in different circumstances are treated differently. For example, an unemployed single person is treated the same as other unemployed singles, but differently from low-income families with children. These payments can therefore achieve more equitable outcomes.

Second, direct cash transfers empower recipients to maximise the utility from their available resources according to their individual needs and preferences. For example, recipients of cash transfers are able to use their income to pay for water for their garden if they wish, go to the movies with friends, or spend it in any other way that maximises their personal benefit.

Third, although any transfer will reduce incentives to work, direct cash transfers are typically reduced on a sliding scale as incomes increase. This avoids the high marginal tax rates that can be created by concessions linked to concession cards.

---

In addition, the rates of payment for different types of benefits are set to encourage workforce participation. Allowances, which are paid to the unemployed and students, are paid at lower rates and have lower income and assets tests than pensions, which are paid to those who are not expected or are unable to work, such as the aged or persons with a disability. This is intended to encourage those who can work to seek employment, without unnecessarily constraining the living standards of those who cannot, or are not expected to work.

Fourth, cash transfers do not change the prices faced by consumers, so pricing signals are maintained and efficiency losses are not as high as when prices are distorted or concessions are tied to consumption.

#### FINDING 8.4

*For low-income households, the affordability of water and wastewater services and other essential goods and services is most efficiently achieved through non-concession elements of Australia's tax and transfer payments system.*

#### *Improving the effectiveness and efficiency of assistance*

Given the in-principle superiority of income support and family assistance payments in comparison to concessions and pricing measures for providing assistance, in the draft report the Commission recommended that the Council of Australian Governments (COAG) commission a review of concessions (draft recommendation 9.1). The Commission argued that given that affordability issues appear to be the result of general cost of living pressures rather than being urban water specific, there is a strong argument that a review of concessions should be broader than just the urban water sector. As utilities, particularly electricity and gas, are cited as a principle cause of hardship by those seeking emergency relief, a review of all utilities concessions appears warranted. The review, as recommended, was to include the appropriateness of current concessions and the merit and scope for abolishing concessions and providing assistance through other elements of the tax and transfer system.

The Commission's draft recommendation was endorsed by a number of participants (Infrastructure Australia, sub. DR107; Water Directorate, sub. DR121; Tenants Advice Service, sub. DR103; Yarra Valley Water, sub. DR115). However, some participants were concerned with the Commission's draft recommendation.

CUAC (sub. DR143) and PIAC (sub. DR144) expressed concern that addressing the affordability of utility services through income support payments would result in a reduction in the level of assistance and poorer outcomes for low-income groups.

---

Although CUAC agreed that addressing affordability issues through income support payments is a better way of assisting low-income groups, it said ‘unfortunately, however, this is not occurring ... [and] ... unless and until unemployment benefits are substantially increased, concessions and other affordability measures will remain a necessity for the sector’ (sub. DR143, pp. 14–15).

CUAC (sub. DR143) and WACOSS (sub. DR160) also contended that the scope of the recommended review is too narrow. CUAC stated:

CUAC is of the view that there is room for improvement in effectiveness and efficiency of concessions, particularly in some jurisdictions other than Victoria. We also note that there are inconsistencies, both within and between jurisdictions, in terms of the impact of concessions on affordability. However, concessions are only one comparatively small component of support provided for people on low incomes, and it is not possible to examine concessions separate from other factors that impact on affordability. Any review of concessions needs to examine all of these aspects together. Such a review should have as its aim identification of the most effective and efficient way of ensuring that utilities are affordable for low income consumers. The review should not pre-suppose a particular approach such as abolition of concessions. (sub. DR143, p. 15)

Similarly, WACOSS stated:

A comprehensive review of concessions across all levels of government and the provision of recommendations to the Council of Australian Governments (COAG), as recommended by the Henry Review, is an important step in addressing inefficiencies in current concession and rebate frameworks. The Council asserts it is more appropriate that the Report supports a comprehensive national review of concessions that would table recommendations for reform of water concessions, rather than make specific suggestions such as abolishing concessions systems in favour of assistance through the tax and transfer payment system. It would be appropriate that such a review should consider essential service affordability and equity issues holistically. (sub. DR160, pp. 16–17)

The Commission agrees that the objective of the review should be to identify the most effective and efficient way of ensuring that the services of utilities are affordable for low-income consumers and has revised the wording of its recommendation to reflect this. However, the Commission considers that the inherent weaknesses of the current concession arrangements provide a sufficiently strong case for the review to specifically consider their replacement with other elements of the tax and transfer system.

The Commission understands that community organisations have concerns about the adequacy of total assistance for low-income groups, and in particular the disparity of payment rates and indexation arrangements for pensions and unemployment benefits. These issues are broader than the terms of reference for this inquiry. However, if COAG considers it appropriate, the Commission’s proposed

---

review of utility concessions could take place as part of a broader review of concessions for other goods and services, with consideration of the adequacy of income support payments and family assistance. This would be consistent with a recommendation by Australia's Future Tax System Review Panel (2009) that a review be undertaken of all concessions across all levels of government (Recommendation 107).

Because utility concessions are provided by State, Territory and Local Governments but eligibility is predominantly based on Commonwealth concession cards, it is appropriate that a review should occur at the national level and involve close consultation with all levels of government.

#### RECOMMENDATION 8.1

***COAG should commission a review of concessions on utility services across all levels of government. The review should:***

- ***identify the most effective and efficient way of ensuring that the services of utilities are affordable for low-income consumers***
- ***assess the appropriateness of existing arrangements for providing concessions, including eligibility criteria***
- ***assess the merit of, and scope for, abolishing concessions and providing relevant assistance to low-income households using other elements of the tax and transfer payments system.***

Although the in-principle benefits of relying on income support payments and family assistance to meet affordability objectives are clear, additional assistance measures might be warranted if there is a clear and sizable burden on a specific group that is disadvantaged. In the urban water sector, these situations might exist in a limited number of circumstances.

First, postage stamp pricing reform, as discussed in section 6.4, raises significant issues for uneconomic regional utilities and might lead to significant hardship in some regional areas. The Commission is aware that the cost of supplying water and wastewater services varies considerably between country towns, in some extreme cases exceeding \$30 per kL for water and \$5000 per connection per year for wastewater services (ERA 2006). A transition to cost-reflective prices in these circumstances would expose some communities to a significant burden.

In these situations, the most efficient way of providing assistance would be to provide a lump sum payment to affected households, or for the service to be subsidised through a Community Service Obligation payment to water utilities. To maximise efficiency, whether subsidies are provided directly to households or to

---

utilities, they should be independent of the actual level of consumption — the price of water should reflect the marginal cost of provision (chapter 6). In this way, it will not affect users' incentives to conserve water. Service provision in regional areas, including funding for uneconomic regional utilities, is discussed in chapter 13.

Second, individuals with medical conditions that require significant amounts of water such as patients requiring haemodialysis treatment at home might be exposed to high costs. Many State, Territory and Local Governments have recognised the special requirements of patients undergoing haemodialysis at home and provide a rebate offsetting the water costs of treatment. If these costs represent a significant burden on haemodialysis patients, the Commission considers that the provision of the required water, like other items required for patients' treatment, should be dealt with through the health system.

### **Alleviating financial hardship**

Even when access to water and wastewater services is universal and affordable, there will be situations when some customers find themselves in financial hardship and find it difficult or impossible to pay their bills. SA Water's *Customer Assist Program* states:

Financial hardship can occur due to a number of circumstances including unemployment, low or reduced income, ill health, domestic violence, addiction, unexpected large or multiple bills and relationship breakdown. (SA Water 2011f, p. 1)

In addition, the nature of billing for household utilities — infrequent and large bills — might also increase payment difficulties for some households. Below-ground leaks or taps accidentally left running for long periods can also subject households to unexpectedly large bills.

#### ***Hardship policies***

A hardship policy outlines a company's actions regarding customers who fail to pay their bills and commonly includes:

- the facility to negotiate an agreed payment plan outside of normal payment timeframes and debt recovery processes
- referral to community financial counselling services
- a commitment to provide customers with information about available concession or rebate arrangements and dispute resolution processes.

---

Hardship policies are an intermediate measure to avoid disconnecting or limiting the flow of water to dwellings. They have obvious benefits for those customers with a strong desire to pay their bills but have difficulty doing so.

Hardship policies are strongly supported by community organisations. The Tasmanian Council of Social Service stated:

We also support the requirement that water and sewerage service providers establish and implement approved hardship policies that ensure that no household is disconnected from supply for inability to pay. Hardship policies should deal proactively with consumers experiencing financial hardship by offering such options as payment plans with instalments tailored to individual consumer circumstances; referral to financial counselling and support services; and occasional and negotiated payment or total bill waivers. (sub. 13, p. 2)

Similarly, PIAC stated:

We've previously called for the development of a comprehensive statewide framework to address hardship issues in relation to water and wastewater usage. Such a framework should provide that all water utilities provide a hardship program for people in financial hardship and provide for the mandatory minimum elements for such hardship schemes. (trans., p. 62).

In a 2008 review of Australia's consumer policy framework, the Commission argued that there can be benefits to utilities themselves in maintaining hardship policies because they help utilities to:

- recoup some payment in situations where a customer is simply unable to pay immediately rather than unwilling to pay, thus reducing costs of debt collection; and
- identify potential problem customers and apply preventative measures before substantial debts arise. (PC 2008c, p. 481)

Reflecting this view, Yarra Valley Water stated:

Yarra Valley Water has in place a hardship policy and programs that are recognised as best practice for Australian utilities. ... We have established this program based on a business case and this basis has been recognised by the Essential Services Commission in its price reviews. (sub. 19, p. 24)

Although residential water supplies are not commonly disconnected in Australia due to non-payment of bills, water utilities are often permitted to, but rarely do, limit the flow of water to a dwelling. This is intended to provide sufficient water to allow only basic water uses such as drinking, cooking, hygiene and sanitation (two litres per minute is a commonly cited limited flow rate for non-payment of water bills). Given the importance of water to personal and public health, disconnection or flow limitation of water services should be avoided where possible. However, if a user does not follow payment plans or other conditions of hardship provisions, flow

---

restrictions provide a reasonable compromise between protecting an individual's right to water and creating an incentive through inconvenience to contribute to the cost of providing the service.

### *Other assistance measures*

#### *Exceptional circumstances grants*

In addition to concessions and rebates, State and Territory Governments sometimes provide grants to assist disadvantaged households experiencing exceptional circumstances, such as an uncharacteristically large bill or other financial crises, with their utility bills.

- The Water Payment Assistance Scheme in New South Wales provides \$25 vouchers (multiples can be provided) that are issued by community welfare organisations to customers experiencing hardship including a loss of income, high water bills, illness, family crisis or unexpected bills or expenses (EWON 2011b).
- The Utility Relief Grant Scheme in Victoria provides assistance to utility customers who have experienced a temporary financial crisis within the last 12 months, and hold an eligible concession card, or are registered with a utility hardship program (Department of Human Services (Victoria) 2011).
- The Hardship Utility Grant Scheme in Western Australia pays 85 per cent of the outstanding bill for applicants who are unable to pay their utility bills and are at risk of disconnection, up to a limit of \$450 or \$750 depending on their location (Department of Child Protection (Western Australia) 2011).

The availability of exceptional circumstances grants are more tightly controlled than concessions. Eligibility conditions typically require that claimants' circumstances be assessed by a financial counsellor and that the receipt of a grant precludes receipt of additional assistance for a period of time. These measures provide encouragement for potential applicants not to 'game the system' by engaging in behaviour that could lead to a financial crisis and eligibility for grants.

### *Alternative payment methods*

Some of the problems attributable to the payment of water and wastewater bills might be due to the infrequent and consequently large size of these bills. Alternative payment arrangements can assist low-income and disadvantaged households to budget for large regular payments or reduce the size of bills.

---

Centrepay is a free bill payment facility for recipients of Centrelink payments. It allows payment recipients to pay bills by having a regular amount deducted from their Centrelink payments.

The majority of water utilities in Australia currently accept Centrepay as a method of payment and this is likely to have a positive effect on the ability of low-income and disadvantaged customers to meet their obligations in relation to water bills.

Another payment method aimed at increasing customer control of their expenditure on utilities is prepayment meters. Although prepayment meters are an established means of payment for electricity in South Australia, Tasmania, the Northern Territory and the ACT, the Commission is not aware of any instances in Australia where prepayment meters for household water use have been implemented. The technology has been implemented overseas, primarily in developing countries.

Prepayment meters can assist customers to manage credit issues stemming from the payment of utility services after they are consumed, by allowing them to pay for water services in advance. However, there are also costs involved in establishing and maintaining prepayment meter systems. The lower aggregate cost of water and wastewater services and fewer payment difficulties compared to electricity are two factors that might limit the demand for prepayment meters in the urban water sector and work against a business case for these devices.

#### FINDING 8.5

*It is in the interests of consumers for utilities to have well designed hardship policies that apply to customers having difficulty paying their bills. Such hardship policies could include payment extensions or payment plans. Other measures provided by governments to alleviate hardship for low-income and disadvantaged consumers in exceptional circumstances also have merit, including utility grant schemes (State and Territory Governments) and Centrepay (provided by Centrelink).*

## 8.2 Consumer policy framework

The consumer policy framework in the urban water sector refers to the government policies that seek to directly promote better outcomes for consumers of water and wastewater services. It is of particular importance, as:

- the services are essential, and failure to provide an adequate level of service can have significant harmful effects on consumers

- the monopoly provision of services by government-owned utilities means that consumers cannot change their provider in response to poor service or excessive prices.

Consumer policy in the urban water sector should aim to ensure that there is an acceptable level of access for all consumers, disputes are dealt with effectively and the industry serves the interests and preferences of consumers.

### Best practice consumer protection

Beyond generic national consumer legislation, such as the *Competition and Consumer Act 2010* (Cwlth), the responsibility for consumer protection arrangements in the urban water sector lies with State and Territory Governments. Arrangements vary considerably between and within jurisdictions (table 8.5). Common consumer protection arrangements include:

- independent economic regulators to monitor compliance with legislation and regulatory instruments
- licensing of urban water utilities
- industry or customer codes defining service standards and consumer protections
- independent dispute resolution by special utilities ombudsmen or more general services.

**Table 8.5 Jurisdictional comparison of urban water consumer protection arrangements**

	<i>Independent economic regulator</i>	<i>Licensing of water utilities</i>	<i>Industry customer code</i>	<i>Independent dispute resolution</i>
NSW (metropolitan)	•	•		•
NSW (other)				•
Victoria (metropolitan)	•	•	•	•
Victoria (other)	•	•	•	•
Queensland (south-east) <sup>a</sup>	•	•	•	•
Queensland (other)				•
Western Australia <sup>b</sup>	•	•		•
South Australia <sup>b</sup>				•
Tasmania	•	•	•	•
Northern Territory		•		•
ACT	•	•	•	•

<sup>a</sup> Under the *Water Supply (Safety & Reliability) Act 2008 (Queensland)*, regional water utilities in Queensland are required to be registered and publish customer service standards. <sup>b</sup> Western Australia and South Australia are currently reviewing their customer protection arrangements for water and wastewater services.

---

### *Ensuring consumers are protected*

Licensing and/or customer codes are the primary industry-specific means of providing protection for consumers in the urban water sector. Industry codes or water utility licenses commonly include:

- standard contractual terms and conditions
- minimum standards of service
- conditions for disconnection or restriction
- provisions for customers with payment difficulties (hardship policies)
- provision of pricing and service information to customers.

Although licensing itself can provide a mechanism with which to apply consumer protection arrangements to individual water utilities, industry codes can be made as a separate regulatory instrument and applied to all utilities in a jurisdiction as a condition of licensing. The benefit of industry codes is that they facilitate application of consistent consumer protection provisions across a number of water utilities. However, as pointed out by the Australian Water Association in its response to the draft report (sub. DR157), the costs of specific service standards can vary between and within jurisdictions and this might warrant different standards in different areas.

Water utilities in Victoria, south-east Queensland, Tasmania and the ACT have industry codes. Industry codes have also been proposed in South Australia and Western Australia.

Although jurisdiction and utility specific characteristics might warrant different standards for customer protection, the development of common standards where feasible, is preferable to standards being developed for each utility. In the Commission's consideration of institutional arrangements in chapter 10, it has recommended that charters outlining performance requirements for water utilities be developed and that these be consistent across water utilities where possible.

### *Independent dispute resolution*

An area of inconsistency between and within jurisdictions is the form of independent dispute resolution. Together with suppliers' own dispute resolution processes, ombudsman schemes are the main avenue through which customers can seek redress in the event of a dispute with a water utility. Examples of disputes dealt with by ombudsmen include disagreements over service quality, billing and disconnections or flow restrictions.

---

Ombudsman schemes provide a low cost alternative to the court system for small value disputes that would otherwise be unlikely to be resolved because of the high cost of legal action. Alison Joseph highlighted the high personal and financial costs that can be involved in some disputes:

I found a barrister who would act for me with experience in water law and he suggested it would be \$10 000 to \$15 000. I'm disputing a \$40 charge. So in the end I had to read all the legislation myself and present an argument to VCAT [Victorian Civil and Administrative Tribunal] myself. (trans, p. 211)

In New South Wales, Victoria and Queensland, specialist industry-based energy and water ombudsmen operate under memoranda of understanding with State Government ombudsmen to resolve disputes between water utilities and their customers. However, in New South Wales and Queensland, the coverage of industry-based ombudsman schemes does not extend to water services provided by Local Governments. Instead, as also occurs for customers of major water utilities in South Australia, Tasmania and the Northern Territory, customers can make complaints to State and Territory Government ombudsmen. In Western Australia, customers of water utilities are able to make complaints to the Department of Water, and in the ACT, customers can complain to the Civil and Administrative Tribunal.

There are significant differences in the powers and resources of State and Territory Government ombudsmen compared to industry-based energy and water ombudsmen. State and Territory Government ombudsmen are typically empowered to investigate the administrative acts of a range of government departments and authorities, and concentrate on ensuring that the processes undertaken by the water utility are correct. They can make recommendations to government-owned water utilities but cannot make binding decisions. In contrast, specialist energy and water ombudsmen have a much narrower focus and greater expertise for dealing with complaints from energy and water consumers. They also have dependable funding through levies on their member utilities and are empowered to make binding decisions.

An inquiry into water supply and sewerage services in non-metropolitan New South Wales recommended that 'the Energy and Water Ombudsman NSW scheme be adopted by local water utilities as a mandatory requirement, provided it can be demonstrated that there are net benefits in doing so' (Armstrong and Gellatly 2008, p. 6).

---

## *Tenants*

Tenants are sometimes not considered customers of water utilities under legislation. This can mean that they do not have the same rights as owner occupiers when dealing with their water utility.

A number of state and territory residential tenancies acts now specify that the payment of water charges are to be agreed between the landlord and the tenant. This can mean that landlords receive a bill from the water utility and invoice the tenant for water usage. Because the tenant does not have a contractual arrangement with the water utility they might not be considered a customer and can fall outside the customer protection framework.

The Tenants Advice Service (sub. DR103) stated that in Western Australia this raised a number of issues including that it can prevent tenants:

- gaining access to information about their consumption or bill
- qualifying for concessions and hardship policies
- requesting the water utility to reconnect them or repair a fault in an emergency
- making a complaint or having a dispute resolved.

A similar issue exists in South Australia and is being considered by the Essential Services Commission of South Australia in its consideration of the economic regulation of the South Australian water industry (ESCOSA 2010). In principle, the Commission accepts that tenants should have access to consumer protections commensurate with those provided to owner occupiers. The Commission's recommendation that tenants be subject to direct billing for water and wastewater services where separately metered (recommendation 6.3), would improve the standing of tenants in this respect.

## *Fostering best practice*

The most prominent consumer protection issues in the urban water sector are likely to be the same across and within jurisdictions, such as the negative consequences of disconnection and greater payment difficulties due to infrequent billing and the prevalence of credit as a purchase method. As such, a large proportion of best practice consumer policy framework principles, such as the existence of provisions for customers facing hardship and independent dispute resolution, are likely to be equally applicable in most areas of Australia.

The inconsistency in protection arrangements has the potential to result in very different outcomes for consumers, particularly in New South Wales and

---

Queensland, where the regulatory arrangements for metropolitan water utilities and local councils contrast greatly.

For example, in New South Wales the metropolitan utilities (Sydney Water and Hunter Water) are licensed by IPART to provide retail water services. As part of this licensing, the metropolitan utilities are subject to a number of customer protection provisions including meeting specific service standards, providing information to customers about their contract and maintaining a hardship policy. In contrast, local council utilities are not required to be licensed and are not covered by these arrangements.

PIAC stated:

... the lack of a consistent approach to hardship across the 106 local water utilities in NSW results in an inequity and inconsistency in the availability of hardship programs for disadvantaged consumers across NSW. (sub. 61, p. 10)

However, prescriptive consumer protection requirements can have significant costs and different arrangements will be appropriate in different circumstances. For example, industry-based ombudsmen have many benefits over State and Territory Government ombudsmen in terms of expertise and funding. However the cost of maintaining these organisations, particularly for small jurisdictions could be considerable. There are likely to be some scale economies in incorporating water and energy ombudsmen, but even with these it is unlikely that there is a sufficiently strong case for industry-based ombudsmen in smaller jurisdictions, such as the Northern Territory and the ACT. Proposals to introduce national dispute resolution arrangements for energy in the National Electricity Market (PC 2008c) could affect the feasibility of industry-based ombudsmen for water in the future.

RECOMMENDATION 8.2

***Governments should develop best practice consumer protection principles for retail–distribution utilities in consultation with consumer advocacy bodies and other interested parties. At a minimum, the guiding principles should include:***

- ***retail–distribution utilities having clearly defined service standards and provisions to assist consumers facing hardship***
- ***rights for tenants that are commensurate with those of owner occupiers***
- ***access to an independent dispute resolution process, preferably by a specialist utilities industry ombudsman.***

---

## Expression of consumer preferences

Individuals often lack the means — time, money and know-how — to represent their views as consumers in policy and regulatory forums. This means that decision makers often have limited information on consumer views on augmentation options, preferences and preparedness to pay for services or specific levels of service quality and security. As this information is often critical to determining the efficient cost structure of utilities and supply security, decision makers are left in the position of having to crudely estimate, and often make up, this information. Not only does this lead to potentially highly inefficient and costly consumer outcomes, it is part of the lack of clarity of the roles of various industry participants (box 8.4).

### Box 8.4 Why is having consumer input important?

Regulators and policy makers require input from consumers because some policy decisions in the urban water sector require tradeoffs and value judgments:

Further improvements in performance levels will eventually require further increase in expenditure resulting in higher prices to customers. Our role in this process is to make that trade off transparent and to ensure that decisions about performance improvement are subject to review. In our pricing determinations and license reviews IPART therefore tries to balance arguments for further improvements against an assessment of customers' willingness to pay for these higher standards and an assessment of the costs and benefits of government standards and policy. (IPART 2011b, p. 3)

However, there is rarely consensus in community preferences and regulators and water utilities are often unsure how to resolve this:

Currently, water businesses must determine what tradeoffs between objectives are acceptable, for example, when tariff structures adopted to promote water conservation impact negatively on equity or on economic development objectives. ... Customer consultation is one means of obtaining some guidance; however, views may differ among the various segments of the community and judgements are needed on the relative weights to be placed on differing views. (ESC 2007, p. 71)

At times, governments have not trusted the water industry to deliver on consumer preferences. When discussing how regulators formed a view about what the community wants, the Independent Pricing and Regulatory Tribunal stated:

In many cases those decisions are made by governments, rather than ourselves. For example, the desalination plant is an important increase in the level of service provided to the Sydney community. That was ultimately a decision made by the government following an election campaign in which — the desalination plant was one of the issues that was mentioned in the election campaign. That was a political decision taken out of our hands. (IPART, trans., p. 451)

Consumer policy advocates can overcome this problem by ensuring that consumer interests are represented in both policy and regulator decision making. Having effective consumer involvement in these forums will reduce the risk of regulators

---

and ministers making poor decisions because of poor information on consumer preferences.

In the consultations for this inquiry, there was less input from individuals and organisations representing the interests of consumers than from those representing government or industry. In addition, policy advocates that did contribute to the inquiry (and who generally represented disadvantaged groups), noted that limited resources had not allowed them to participate fully and the resources available contrasted with those in the energy sector (box 8.5).

The Australian Council of Social Service (ACOSS) stated:

... ACOSS certainly welcomes the Commission's interest and particularly the encouragement that we have had to participate, but I will say unambiguously that there are no resources available to community customer advocates in this sphere, in stark contrast with the at least reasonable attempt to support demand-side engagement in the market for electricity and gas through the Consumer Advocacy Panel, which is funded by a levy on customers. (trans., p. 43)

CUAC argued:

There is an immediate need for a stronger consumer voice in national water reform processes. Effective professional consumer advocacy is an important means through which this can be achieved. Unfortunately, consumer advocacy in this area is currently constrained by a lack of resources. Compared to the energy sector, consumer advocacy in water is less vigorous and under-resourced. (sub. 46, p. 11)

Similarly, the Consumer Action Law Centre submitted:

We remain deeply concerned that there is very little opportunity for meaningful engagement in the water sector by consumers due to a significant lack of resourcing, which puts at risk the representation of consumer interests on a range of complex issues. (sub. DR133, p. 1)

In this respect, the experience of the Commission in this inquiry mirrored that in its 2008 *Review of Australia's Consumer Policy Framework*, in that 'a number of consumer advocacy groups argued that they, or the consumer movement generally, lack sufficient resources to adequately represent consumer interests in policy forums' (PC 2008c, p. 279).

---

### **Box 8.5 Government intervention to support consumer advocacy**

Two areas where governments have intervened to support consumer advocacy are the energy and communications sectors.

#### **Energy**

The Consumer Advocacy Panel (the Panel) was established in 2008 (it replaced the National Electricity Consumer Advocacy Panel operating since 2001) to fund grants for advocacy and research on electricity and natural gas consumer issues.

Funding for the Panel's electricity projects is derived from a levy on consumers, and for natural gas projects, from participating states and territories. In 2009-10, the Panel approved 40 grants totalling \$2.2 million. The projects included a range of activities namely submissions, reports, attendance at meetings, participation in policy and decision making processes and presentations, in addition to developing the advocacy capability of the funded organisations.

#### **Communications**

The Australian Government established the Australian Communications Consumer Action Network (ACCAN) in 2009 to act as the peak body representing the interests of consumers in relation to communications and telecommunications issues.

ACCAN undertakes research and policy development, educates consumers and advocates for them on communication consumer issues. ACCAN is funded through license fees for telecommunications carriers and received \$1.8 million funding in 2009-10. ACCAN provides \$250 000 per year in grant funding for projects that further its goals.

*Sources:* ACG (2011); Department of Broadband, Communications and the Digital Economy (2010).

### *The case for government involvement*

In its 2008 review, the Commission found that consumer advocacy organisations had difficulty attracting funding for a number of reasons:

- Individual consumers have an incentive to 'free ride' on the advocacy efforts of others. This situation is not as pervasive for company advocacy where interests are more focused and organisation is easier.
- Consumers might not see representation as an important issue or might believe (perhaps falsely) that their interests are already being represented.
- The perception that consumer organisations do not represent the interests of all consumers equally. For instance, there is a common perception that consumer groups are particularly focused on the interests of a relatively small group of disadvantaged users (PC 2008c).

---

Specifically for the urban water sector, it is also possible that consumer policy advocacy suffers from competition for limited resources from other utility areas, such as electricity, in which price and regulatory developments are seen as having a greater impact on consumers.

In its 2008 report, the Commission also accepted that ‘there is a general case for governments to help ensure that consumer representatives have the financial wherewithal to make an effective input into policy’ (PC 2008c, p. 280) and:

... there would potentially be net benefits from the provision of additional taxpayer resources for consumer advocacy provided there are means of ensuring that it generates advocacy that is appropriately representative and that benefits significant numbers of consumers. (PC 2008c, p. 281)

In addition, the case for government involvement in the urban water sector is particularly significant as:

- equity and consumer interest issues are often cited as reasons for implementing inefficient pricing and non-price demand management policies
- the scope for reform in the urban water sector outlined in this report is significant and implementation of the recommended reforms might have distributional effects.

#### *Which consumers’ views should be represented?*

Consumers are diverse and sometimes have conflicting interests. For example, as noted in chapter 7, some consumers prefer to face restrictions in periods of short supply in exchange for a lower price, while others are willing to pay a premium to avoid reducing their water use.

Consumer advocacy organisations often focus on disadvantaged groups. For example, CUAC states that it was:

... established to ensure the representation of Victorian consumers in policy and regulatory debates on electricity, gas and water. In particular, CUAC represents the interests of low income, disadvantaged, rural and regional, and Indigenous consumers. (CUAC 2011a, p. 1)

Although representing the interests of disadvantaged consumers is important, it is also important that the interests of the majority of users of water and wastewater services who are not disadvantaged are also represented. To the extent that consumer interests conflict, consumer policy advocacy that provides an informed and impartial account of each consumer group’s specific interests would provide policy makers and regulators with the best basis for making informed decisions. As

---

such, any consumer and advocacy arrangements funded by government should include governance arrangements that ensure that the interests of all consumers are represented in a balanced way.

*Institutional arrangements for funding consumer policy advocacy and research in the urban water sector*

In its 2008 report, the Commission recommended (recommendation 11.3) public funding be provided to:

- support the basic operating costs of a representative national peak consumer body
- assist the networking and policy functions of general consumer advocacy groups
- enable an expansion in policy related research, including the establishment of a dedicated National Consumer Policy Research Centre and contestable research grants for specific consumer policy issues (PC 2008c, pp. 291–92).

The Commission understands that arrangements to support consumer policy advocacy and research are still being pursued by COAG. It is the Commission's view that these reforms remain an important outstanding opportunity to improve outcomes in regulatory and policy decision making.

Support for consumer advocacy and research in the urban water sector would be most appropriately assisted through general consumer arrangements consistent with those the Commission recommended in 2008. A contestable grants pool for generic consumer advocacy would enable the need for consumer advocacy in the urban water sector to be assessed in the context of other pressing issues for consumers.

RECOMMENDATION 8.3

***COAG should progress implementation of measures to support consumer advocacy and research consistent with recommendation 11.3 of the Commission's 2008 Review of Australia's Consumer Policy Framework.***

In addition to increased support for generic consumer advocacy and research, the Commission considers there might be a formal role for a consumer representative body in supply augmentation, pricing and setting service standards (chapter 10).

---

## 9 Framework for reform

### Key points

- There is a compelling case for reforming the urban water sector.
- The overall objectives for urban water reform should be to ensure the delivery of water, wastewater and stormwater services in an economically efficient manner so as to maximise net benefits to the community.
- Analysis of the scope to achieve efficiency gains suggests that the lower-level objectives for reform should be to:
  - achieve water security at lowest expected cost
  - give water users greater choice
  - maintain adequate protection of public health
  - directly target environmental outcomes
  - promote affordability and consumer protection efficiently
  - reduce the cost of regulation
  - remove impediments to integration of the water cycle
  - introduce greater competition and promote innovation where cost effective
  - exploit economies of scale more fully, particularly in non-metropolitan New South Wales and Queensland.
- The policy and other recommendations made earlier in this report, if implemented, would go some way to achieving some of the above reform objectives.
- Beyond this there is a need to consider institutional, governance, regulatory and structural reform tools (as is done in subsequent chapters).
- The Commission's preferred approach to reform is to adopt a portfolio manager model, under which the responsibility for achieving water security is assigned to a central body. This approach will lead to more certain outcomes than the alternative of creating a competitive market and devolving responsibility to consumers.

In the Commission's view the analysis of the scope for efficiency gains presented in chapters 5 to 8 of this report makes a compelling case for reforming the urban water sector. To realise these gains governments should firstly:

- set clear objectives for the sector

- 
- ensure that government policies are consistent with these objectives in the following areas that significantly impact on service provision and resource allocation:
    - public health
    - environment
    - service delivery of potable water, non-potable water, wastewater and stormwater services
    - water property rights across the water cycle.

Recommendations and guidance on these issues are contained in earlier chapters. The remainder of this report focuses on:

- identifying specific reform objectives
- putting in place best practice institutional, regulatory and governance arrangements for:
  - public health regulation
  - environmental regulation
  - economic regulation
  - service delivery of potable water, non-potable water, wastewater and stormwater services
- assessing the case for structural reforms to achieve benefits through increased competition and other means
- reform implementation and monitoring.

## **9.1 Objectives for reform**

The primary objective for urban water reform should be to provide water, wastewater and stormwater services in an economically efficient manner so as to maximise net benefits to the community (chapter 3). The analysis in chapters 5 to 8 of this report identifies the types of efficiency gains that are possible, and where feasible quantifies them. The following summarises the most important types of gains. These can be thought of as lower-level objectives for reform.

---

## **Achieving water security at lowest expected cost**

The largest efficiency gains are likely to be from improving the coordination of supply and demand, particularly through making better supply augmentation decisions and more efficient allocation of water resources. This requires:

- the removal of government subsidies and policy bans that distort decisions
- considering supply augmentation and demand management options (including more flexible pricing) together
- considering the costs and benefits of all supply augmentation options
- taking a real options (or adaptive management) approach.

Given community sensitivities about the health, environmental and cost characteristics of some augmentation options, it is critical that adequate information (including costs, benefits and risks) be provided to consumers and that consumers be consulted prior to major decisions being made.

In addition, many urban water systems are becoming more complex and this increases the importance of decisions about which supply sources to operate at any one time.

## **Giving water users greater choice**

Consumers frequently face restrictions governing when they can use water and what they can use it for. In many areas water restrictions have been in place for most of the last decade. More recently, as dam levels have risen, temporary restrictions have often given way to ‘permanent water saving measures’. The community’s willingness to accept restrictions has been admirable, but reliance on this goodwill has deprived many households of their preferred choices.

With restrictions in place, hundreds of thousands of households sought to maintain outdoor watering by installing their own rainwater tanks and/or greywater systems. Many gardens have been substantially modified to require less water. In many cases, the cost to the community of these responses greatly exceeds the cost that would have been incurred if alternate approaches to maintaining water security had been used (such as more flexible pricing, and timely and appropriately scaled augmentation of the reticulated water supply system). Many of those without tanks (perhaps because they could not afford the large capital cost of installation) have had to do without water they would have willingly paid for.

---

Consumer choices are constrained in the name of water efficiency/conservation in various other ways as well. Appliances that fully informed people may have chosen to buy have been banned because they have been deemed to be not sufficiently water efficient. Those wanting to fill their swimming pool with around \$100 worth of water may find that they are required to firstly purchase a pool cover and obtain a permit. Information provided to consumers can also overstate the benefits of water efficiency and conservation and lead to poorly informed choices.

As demonstrated in chapter 7, restrictions and other constraints place unnecessary costs on the community that are substantial.

There is more to giving consumers greater choice than removing restrictions and mandatory water efficiency measures. Urban water services are generally provided by regional monopolies and so currently consumers have no choice but to live with the decisions made by their provider (and decisions imposed on their provider by regulators and governments). Because of this there may be a case for consumer representatives to have a formal role in policy/regulatory decisions, and the pricing and procurement decisions of utilities. Allowing water utilities to develop multiple service offerings is a further means for allowing greater consumer choice.

### **Maintaining adequate protection of public health**

Australia's urban water sector generally performs well in protecting public health, although improvements are needed in some regional areas. The task of protecting public health, however, is becoming more complex as supply sources are diversified and increasingly complex treatment systems are introduced (PWC 2011). In addition, reforms that introduce new institutional arrangements and new market participants can place stress on the existing arrangements for managing health risks. Given the importance of the urban water sectors role in protecting public health, it is essential that adequate protection of public health is maintained and improvements made where needed.

### **Directly targeting environmental outcomes**

Measures to increase water conservation, reuse and recycling are often implemented on the premise that they will improve environmental outcomes. In reality, the relationship between these measures and environmental outcomes is indirect and uncertain. What are needed instead are policies that directly target identified environmental problems in an efficient way. Changing focus in this way would allow the objectives of the *National Strategy for Ecologically Sustainable Development* to be more fully realised.

---

For example, subsidising water recycling so as to reduce river extractions and improve the health of riverine ecosystems may or may not produce an environmental benefit. It may simply result in dam levels being a bit higher than otherwise or reduce the amount of rural–urban trade. A preferable approach would be for governments to ensure that environmental flows, wastewater discharge standards and standards for stormwater management are calibrated to maintain valued ecosystems in a healthy state in a cost-effective manner.

In some cases doing this will make water recycling projects viable and so they become part of the solution. The message is that rather than mandating water recycling in the hope that this will improve environmental outcomes, these outcomes should be directly targeted and recycling schemes be allowed to emerge where they can contribute cost effectively.

### **Promoting affordability and consumer protection efficiently**

There are various arrangements in place in the urban water sector that are at least partly motivated by the desire to promote affordability and protect consumers, particularly those on low incomes. These include:

- using a pricing structure that includes an initial allocation of water at a low volumetric price
- ‘postage stamp’ pricing across large geographic areas
- using water restrictions and other non-price demand management measures in lieu of higher prices during times of high water scarcity
- providing concessions on water bills to concession card holders
- hardship policies.

Chapters 6 to 8 demonstrate that while some of these arrangements have merit, many of them, particularly those that relate to pricing, are poorly targeted and inefficient. Reform should seek to find more efficient ways of achieving affordability for low-income groups, including by relying more heavily on the social security and taxation systems.

It is also apparent from chapter 5 that the costs of providing water, wastewater and stormwater services are higher than they need to be in some places due to various inefficiencies. Reforms that increase efficiency can lower these costs, thereby increasing affordability for everyone, including those on low incomes.

---

## **Reducing the cost of regulation**

Health, environmental and economic regulation has costs as well as benefits and it is important that regulatory approaches are calibrated to maximise net benefits. Regulatory costs include the direct costs of funding regulatory agencies and the compliance costs they impose on regulated entities. The Commission's analysis indicates that there are several areas where current arrangements appear to fall short of maximising net benefits. These include:

- economic regulation (particularly detailed price determinations by regulators) that may be imposing higher costs than alternative governance and monitoring arrangements
- wastewater discharge standards that in some cases have been increased without analysis of costs and benefits
- regulation of distributed water systems, such as greywater systems, that are inconsistent, impose unnecessarily high compliance costs and stifle innovation
- mandatory requirements that new dwellings be designed to use less potable water that override consumer preferences and impose additional costs.

It is clear, therefore, that regulatory reform should form part of any integrated reform program. Improvements are needed in:

- the rigour with which the case for regulation is assessed
- analysis of the costs and benefits of different regulatory options
- institutional and governance arrangements for regulators
- the conduct of regulators.

## **Removing impediments to integration of the water cycle**

There are two main conceptual models for integrated water cycle management. The first assumes that water conservation, reuse and recycling are objectives in their own right, and that the reliance of urban areas on external water sources should be minimised. Analysis in chapter 5 demonstrates that this model is flawed and that it is influencing current arrangements in ways that cause substantial inefficiencies.

The second model, which the Commission advocates, is to treat integrated water cycle management as a coordination issue. Arrangements are needed to ensure that the interrelationships between water, wastewater and stormwater services, and between these services and the environment and urban development, are factored into decision making in a coordinated way. There is a range of impediments, such

---

as unclear property right arrangements for stormwater and wastewater, that need to be addressed in order to achieve this. Where this is done, water recycling and reuse (including through the use of distributed systems) will be undertaken wherever it provides net benefits to the community.

### **Introducing greater competition where cost effective**

Reforms that introduce greater levels of competition have achieved significant efficiency gains in other utility sectors, such as electricity and gas. The potential gains in urban water are likely to be more modest because:

- limited forms of competition have already been introduced through contracting out and build, own and operate arrangements
- compared with other utility sectors, a greater proportion of costs are in natural monopoly elements of the supply chain (for which competition in the market would be inefficient).

Even so, the gains from increased competition (in various forms, including competition for the market, yardstick competition and competition from distributed water systems) could be substantial, particularly for bulk water supply. It is difficult to estimate these gains because they often come in the form of innovations that are inherently unpredictable. What is needed is to weigh up the costs and risks of increasing competitive pressures against the plausible benefits. Taking a phased approach, as advocated by Ruff and Swier (sub. 47), may also be beneficial.

### **Exploiting economies of scale more fully**

The available literature on economies of scale and views expressed by many inquiry participants, suggest that significant efficiency gains could be achieved by increasing the effective size of small utilities, particularly in New South Wales and Queensland. Many of them, however, are operated by Local Governments and it is possible that in some cases their remaining functions would become less efficient if water were separated out into larger regional entities. The reform challenge, therefore, is to more fully exploit available economies of scale, while recognising possible impacts on the efficiency of Local Government and the benefits that local provision can have for consumers. Success in doing this could result in various benefits, including improved asset management and higher service standards (for example, fewer ‘boil water’ notices).

At the other end of the spectrum, the vast majority of South Australia, Western Australia and the Northern Territory are each serviced by one water utility. In these

---

cases, disaggregation could bring benefits from greater focus on regional community and industry needs, without the loss of economies of scale.

## 9.2 Reform options

The recommendations made earlier in this report, which are universally applicable, would go some way to achieving the reform objectives discussed above. Further gains can be obtained from consideration of institutional, governance, regulatory and structural reform tools. This is the task of the remainder of this report.

The analysis in chapters 5 to 8 identifies that the largest potential efficiency gains are from improving the coordination of supply and demand, particularly through improving economic efficiency in supply augmentation. At a high level, there are two fundamental ways to achieve this outcome. One is to assign responsibility for achieving water security at lowest expected cost to a central body (a ‘portfolio manager’ model). The other is to rely on the creation of a competitive market, with agents investing in and offering water services for sale based on expectations about future market conditions, thereby devolving responsibility for security of supply to consumers via their retailers.

It is the Commission’s judgment that the portfolio manager model is the preferred approach at this time given:

- community attitudes to water services
- the current state of development of the sector
- challenges in designing and implementing a competitive market
- unresolved issues about whether underlying regional industry characteristics can support the creation of a competitive market.

This judgment is consistent with the views expressed by the large majority of inquiry participants. Centralised responsibility for water security exists at present and so the reform agenda proposed by the Commission represents an evolution of current arrangements, rather than a radical change. On the other hand, many of the changes that would take place under the Commission’s approach would provide experience and lead to the development of skills, knowledge and management systems that might in the long run support the creation of competitive water markets. The reform agenda proposed by the Commission, however, is not predicated on this necessarily being an achievable or desirable end point.

Where central planning occurs, as in the recommended portfolio manager model, an important challenge is creating incentives for efficiency and innovation. Chapters

---

10 and 11 tackle the institutional, governance and regulatory dimensions to this challenge. They propose universally applicable reforms that would allow water utilities to focus on delivering water services at lowest expected cost, without being subject to undue political and regulatory constraints. These reforms would also increase transparency and accountability in the urban water sector and ensure clear roles and responsibilities for government ministers, departments, water utilities, regulators and the private sector.

Chapter 12 builds on the universal reforms by considering structural reforms to increase competitive pressures for efficiency and achieve other benefits. Four stylised structural options are presented, with the degree of structural separation and the role of competition and contestability progressively increasing with each successive option. Options 2, 3 and 4 are likely to be most suited to large cities and the costs and benefits of each are discussed.

Chapter 13 specifically addresses reform in regional areas. The problems that reform should seek to address are somewhat different for regional areas than for large cities. In particular, there are many smaller water utilities that face major challenges to meet desired service standards, manage assets, attract suitably skilled staff and remain financially viable. A range of options for addressing these challenges is put forward in this chapter.

Chapter 14 identifies the priorities for reform, discusses how reforms should be implemented, and deals with transitional issues. In doing so, it outlines a timetable for reform. The chapter also presents a monitoring and review framework for assessing the efficiency gains from reform.



---

# 10 Improving institutional arrangements

## Key points

- Reforming existing institutional arrangements for urban water provision is central to achieving the efficiency gains discussed in earlier chapters. The majority of the improvements can be achieved independently of structural reform.
- There is a need for better definition and separation of the roles and responsibilities of organisations in the urban water sector. In particular, there is a need for clear delineation between the roles and responsibilities of elected representatives (those decisions regarding ‘public interest’ considerations), water utilities (typically commercial and operational decisions), regulatory agencies, and consumers.
- Procurement of supply augmentation should be assigned to retailer–distributors to appropriately align risks and incentives.
- In many instances, particularly relating to health and the environment, objectives given to water utilities would be more appropriately re-assigned to other agencies. Utilities should then operate within the health and environmental policies determined by governments.
- Although progress has been made, there is scope to further improve governance arrangements of government-owned urban water utilities to ensure their independence, to clarify their responsibilities and to ensure they are accountable for their performance against the government’s objectives. Utilities (except where embedded in Local Government) should be incorporated under the *Corporations Act 2001* (Cwlth), governments should ensure directors of utilities are appointed on merit, and there should be requirements for ministerial directions to be publicly disclosed.
- Further, State and Territory Governments should introduce charters for urban water utilities incorporating best practice governance arrangements. The charters would provide guidance to utilities on items such as:
  - obligations to serve (security of supply and obligation to procure)
  - obligations regarding public health and the environment
  - transparent processes and procedures for supply augmentation
  - principles for pricing and service offerings, and transparent processes and procedures for setting prices
  - nature and funding of Community Service Obligations
  - annual performance reporting requirements, provision for independent reviews and sanctions for poor performance against the charter.

---

To achieve the potential efficiency gains discussed in earlier chapters, existing institutional arrangements for urban water services need to be reformed. Much of the institutional reform can be implemented independently of the structural reform options considered in chapters 12 and 13. The reforms discussed in this chapter and chapter 11 can be considered to be universally applicable reforms. Although they have the potential to significantly improve governance, their success depends ultimately on the ongoing commitment of governments to the intent of the reforms.

The benefits of more clearly assigning roles and responsibilities to urban water sector participants are outlined in section 10.1. A framework for improving governance arrangements is set out in section 10.2. Section 10.3 contains details on ways of improving governance arrangements, while the Commission's preferred governance instrument, a charter between shareholder governments and utilities, is set out in section 10.4.

## **10.1 Assigning roles and responsibilities**

The Commission considers that much clearer definition of the roles and responsibilities of institutions in the urban water sector is needed to best achieve the overarching objective of maximising net benefits to the community. In particular there is a need for clear delineation between decisions best taken by elected representatives (those regarding 'public interest' considerations), utilities (commercial and operating decisions), regulatory agencies and consumers.

### **Role of government**

As discussed in chapter 4, there are clear roles and responsibilities for governments (elected representatives) in the urban water sector, namely to:

- set objectives for the development of urban water policy and relevant objectives for each institution
- develop best practice policy frameworks and principles in relation to public health, the environment and service delivery that are consistent with the objectives
- define property rights for environmental and consumptive use water, including stormwater and wastewater
- appropriately assign roles and functions to institutions
- put in place best practice institutional and governance arrangements for:
  - public health, environmental and economic regulation relating to the sector

- 
- delivery of water, wastewater and stormwater services.

Ministers and other elected representatives (for example, local councillors) are uniquely placed, and indeed obliged, to make decisions that have a strong public interest component. They have the authority of a democratic mandate, and are best placed to resolve the tradeoffs between conflicting public interest matters arising in the urban water sector. It is also their role to provide governance oversight to water utilities and regulators, and to appoint water utility board members and regulators.

For those decisions most appropriately made by utilities or regulators, it is important for government to establish service provision and regulatory institutions that are at arm's length from day to day politics (to ensure that decisions made by these bodies are genuinely de-politicised). Guidance is provided in this chapter on designing appropriate institutional and governance arrangements.

### **Role of utilities**

It is important that 'day to day' management of water utilities is assigned to the board and staff of the utilities. For example, after governments have made decisions about water security targets, consequent commercial decisions about operations and investment are best left to the utilities.

Utilities should not be policy making bodies, and should operate within the health and environmental policies determined by governments. Water utilities have often been given a broad role (particularly prior to the era of commercialisation) and, at times, have played a major part in determining urban growth boundaries (Public Record Office Victoria 2005). The Commission does not consider this to be an appropriate role for utilities.

That said, utilities do have a legitimate advisory role in policy development. For example, they have a role in providing information to governments about the likely cost of infrastructure provision, future levels of demand and likely timing of augmentation, or about the effects of development on water quality. However, they should not be given (even de facto) broader planning responsibilities. Further, decisions about allocation of water to environmental and consumptive uses, which have at times been assigned to utilities, are also most appropriately decisions for government (although not decisions *between* consumptive uses — decisions such as choices between urban uses or rural uses are best left to markets).

---

## **Role of regulators**

The role of independent regulators is to achieve governments' regulatory objectives in a manner unencumbered by political considerations. The Commission notes that regulators are increasingly being required to make decisions regarding the 'public interest' that are properly the preserve of governments. For example, regulators often appear to be involved in decisions about whether the pricing regimes for water should be achieving income redistribution objectives. In general, water pricing should be directed at efficiency outcomes, not used to achieve distributional outcomes (chapter 8). Decisions about distributional outcomes should rest with governments, not regulators, and be dealt with by other policy means.

The role of regulators is to make decisions on matters assigned to them by government. They should not be advocates of the interests of particular groups (such as the businesses being regulated, consumers or particular lobby groups).

## **Role of consumers**

Consumers are best placed to make decisions about their own consumption patterns. Governments and utilities should facilitate this by pricing efficiently, providing choice in tariff and service offerings and consulting with customers about augmentation and pricing.

## **10.2 Framework for improving governance of utilities and regulators**

To ensure good governance outcomes, it is important to put in place a framework from which best practice governance is likely to emerge. Critical to such a framework is ensuring:

- the independence of utilities and regulators from government
- governments, utilities and regulators have clear areas of responsibility
- governments, utilities and regulators are accountable for their areas of responsibility.

The Commission considers the establishment of a governance charter between the government (as shareholder) and utilities would be one key tool in establishing best practice governance arrangements for utilities.

---

## Independence

Governance arrangements for both utilities and regulators are designed to provide a degree of independence from government and prevent politicisation of day to day decisions. In recent years, utilities have been placed on a more commercial footing and provided with greater incentives to establish and maintain a commercial focus. This followed concerns about the performance of government controlled urban water utilities, and government infrastructure providers more generally in the 1980s (IC 1992).

For those water utilities set up as government trading enterprises (GTEs), the government retains ownership on behalf of the public. GTEs are established as separate corporatised legal entities. To establish similar incentives to those existing for private sector managers, and remove politicisation of management decisions, GTEs are given greater autonomy in areas such as pricing, investment and commercial strategy. Some are established as company GTEs, to which corporations law applies. The attraction of this is that the corporations law places a legal duty on directors to act in the interests of the company and provides a framework that discourages attempts to influence directors.

Most GTEs in the urban water sector are under State or Territory Government control. The principal exceptions to this are in non-metropolitan New South Wales and Queensland, where regional utilities are largely operating units of general purpose local councils with 'ring fenced' businesses, and Tasmania where utilities are owned by groups of Local Governments (chapter 2).

Ministers usually have the power to direct GTE boards, although often there are restrictions on the directions that can be given (for example, they might be restricted to non-commercial objectives). There are also sometimes requirements to consult with board members before issuing directions. To ensure transparency, there are generally requirements to make ministerial directions in writing and to publicly release them.

Although governments have typically set utilities up as GTEs to promote their independence, there are inescapable (although manageable) tensions in the GTE model. On the one hand, corporatised GTEs are expected to operate as though they were private sector businesses in order to create commercial incentives for efficient performance and to benefit from having expert and accountable boards and management and to reduce politicisation of decision making.

On the other hand, government ownership can bring with it policies specifically applying to government entities (such as employment conditions), the requirement to protect public funds, protection from bankruptcy and the potential for ministerial

---

political and policy intervention. Ministers might seek to influence decisions for political reasons or take a whole-of-government perspective on what constitutes the public interest when making decisions on matters such as GTE borrowing and dividend policies, Community Service Obligations (CSOs), terms of employment and industrial policies. These tensions make it essential to establish sound governance procedures.

In the Commission's view, implementation of the corporatised government trading enterprise model has been deficient, with governments generally not assigning water utilities the level of autonomy (and responsibility and accountability) that is envisaged under the model. As the Water Services Association of Australia (WSAA) has said:

Looking to the corporatisation and commercialisation frameworks of the various State and Territory Governments, these are largely consistent with the principles set out by the Commission in its draft [report] recommendations. There also has been long-held agreement to the principle of separating Government's role as policy-maker and regulator from that of commercial services delivery. The enabling legislation for State-owned Corporations in NSW, for instance, has been in place for more than 20 years, and is grounded in similar principles. Similar legislative frameworks are evidenced in other jurisdictions, also. What is lacking is the robustness of these arrangements to ongoing political interference, particularly during periods of crisis. (sub. DR145, p.13)

Similar issues apply in Local Government-controlled urban water utilities, where councillors have the same political incentives to intervene in decision making as do ministers in the State Government-owned entities. The scope for councillors to intervene is greatly lessened where water utilities are separate entities from the council, particularly if:

- utilities are under the control of multiple councils, such as in south-east Queensland, and in the 'county council' model applied in parts of New South Wales)
- or there are independent directors (currently required by legislation in south-east Queensland, although the Queensland Government has announced it intends to amend legislation to allow councillors to sit on boards) (Robertson 2011a).

State Governments can also use various mechanisms to intervene in the normal operations of utilities owned by Local Government, as can be seen by recent experience in south-east Queensland and Tasmania.

Improving GTE performance requires clear delineation between external and internal governance. External governance refers to the authority and systems utilised by ministers for the control and supervision of GTEs. Internal governance

---

refers to the systems of direction and control within an organisation, and is the responsibility of the board (or equivalent) and senior management of the GTE (PC 2005a).

As either a corporate or departmental model is clearly inappropriate for independent regulators, independence is achieved by establishing regulators as ‘statutory authorities’. This is commonly the case for economic regulators but less so for environmental and health regulators. The enabling legislation will generally detail the relationship between the government and the regulator, establishing the level of independence with which the regulator will operate. Government should ensure that agencies have a clear understanding of their role and provide for adequate oversight to ensure they operate within their delegation (Australian Government 2003).

## **Responsibility**

To ensure utilities and regulators have clear areas of responsibility, and that these are properly understood, it is important for governments to adequately define their functions and to set them clear objectives. There also needs to be clear delineation about where authority lies between ministers and the entity.

### *Objectives and functions*

For utilities to be clear about their objectives and functions, these need to be spelt out clearly by governments. Although the intention of creating corporatised GTEs is to promote a commercial focus, GTEs have often been given other objectives that can conflict with that focus (such as health or environmental objectives).

Importantly, GTEs should have no regulatory functions, which should have been transferred to separate agencies or government departments at the time GTEs were formed. Similarly, GTEs should have no policy-making functions. GTEs should be required to abide by competitive neutrality principles.

The functions of regulators are typically set out in enabling legislation, as are the processes and procedures they are expected to undertake. As with GTEs, regulators are often given conflicting objectives with little guidance on how to prioritise them. This means they must choose which objectives to prioritise, which effectively involves them making policy decisions more appropriately made by ministers.

---

### *Ministerial authority and independence of utilities and regulators*

GTE boards should be independent, responsible and accountable for internal governance. Directors should be appointed because of their expertise and ability to govern the GTE, rather than being representatives of particular constituent interest groups.

In the case of regulators, enabling acts typically give ministers the power to give directions, such as to hold particular inquiries, or oversee particular industries. However, acts should limit the ability of ministers to provide direction on how regulators deal with individual matters. There usually is, and should be, a requirement for ministerial directions to regulators to be made public.

As with GTE board members, regulators should be appointed on skill and merit, and should not represent particular groups.

### **Accountability**

Having established independence and assigned objectives and functions, it is important to create incentives for GTEs to perform their functions well. Open and transparent decision making can assist in holding utilities and regulators accountable. Measures to ensure accountability and transparency include public consultation, reporting of decisions and performance monitoring. There is also a requirement for sanctions in the event of underperformance.

### *Public consultation*

There is no competitive market to reveal the preferences of consumers across a wide range of product characteristics of urban water services. This is particularly the case regarding service quality and reliability matters. For example, there is no obvious mechanism to inform decision makers about how much consumers are prepared to pay for increases in service quality.

Open and transparent consultation therefore has an important role to play in informing utilities and regulators about the preferences, and preparedness to pay, of water consumers. Consultation can take a number of forms, including submissions, hearings, market research and the use of consumer representative groups.

---

### *Public reporting*

Economic regulators are either subject to statutory requirements for the promulgation of their decisions or do so as a matter of general practice. This is appropriate as public reporting of decisions is an important aspect of transparency. Environmental and health regulators are often not subject to the same reporting obligations.

The reasons for decisions and the methodology for making determinations must also be provided to ensure accountability. Regulators are generally required by their governing legislation to publish reasons for their decisions, although legislation does not usually provide any guidance on how thoroughly the reasons for decisions should be explained. The Commission considers it is important for regulators to provide detailed explanations for their decisions.

### *Reviews of performance and sanctions for underperformance*

To ensure accountability, it is important to have ongoing reporting of how well utilities and regulators are meeting their objectives. This should include regular reporting by the entities themselves, typically through annual reports. Performance information could be signed off by auditors in the same way as financial information. To ensure a balanced picture of the performance of entities, performance reporting should include a diverse range of indicators appropriately reflecting the entity's objectives. Accountability is enhanced where there is also (less frequent) independent reviewing and reporting by another entity addressing not only the longer term conduct of the utility, but potentially the performance of the industry as a whole and the efficacy of the regulatory framework.

There needs to be effective sanctions available in the event of underperformance by utilities or regulators. Given their responsibility for external governance, it is the responsibility of ministers (or councillors for Local Government utilities) to act in the event of underperformance by a utility. The most appropriate sanction for underperformance is typically the removal of board members. In the event of underperformance or systematic failure to meet the objectives of the charter, removal of a Local Government might also be appropriate. Appointing administrators to run aspects of the Local Government's water operations could also be an option. Appropriate sanctions for underperformance are discussed further in section 10.4 in the context of the Commission's proposed governance charter.

Dealing with underperformance by regulators is complicated. Although it is important that regulators are accountable, if it is easy for ministers to dismiss regulators in the event that they disagree with regulatory decisions, there is the

---

potential for independence to be undermined. This is discussed further in section 10.3.

## **10.3 Improving governance arrangements for utilities and regulators**

### **Ensuring independence**

Although governance arrangements are designed to create a high degree of independence from day to day political pressures for utilities and regulators, in practice tensions remain. However, there are a number of ways in which the independence of utilities and boards could be improved.

#### *The Corporations Act and GTEs*

The *Corporations Act 2001* (Cwlth) places a number of obligations on directors, including an obligation to always act in the interests of the corporation, and protects directors from inappropriate influence. Utilities that are constituted under the Corporations Act tend to see this as being beneficial. For example, Yarra Valley Water stated:

There are certain attributes of the current governance arrangements that Yarra Valley Water considers effective, including our current Corporations Law corporate form ... Corporations Law provides a strong foundation for good governance and a clear framework including director accountabilities and reporting disciplines. Essentially the organisation is compelled to abide by the same strictures as any other business ... Yarra Valley Water believes the Corporations Law model works well and delivers efficiency and service improvements. As a business, Yarra Valley Water feels that it is under an obligation to seek efficiencies and innovations to deliver best value for its shareholder. (sub. DR115, p. 4)

ACTEW Corporation stated:

ACTEW is already a Corporations Law corporation, and its relationship with the ACT Government is set out in the Territory-owned Corporation Act (ACT). ACTEW considers this arrangement to be fully effective and a model for other jurisdictions. (sub. DR119, p. 4)

Other participants considered that the disciplines imposed by the Corporations Act could be replicated by constituting utilities under state or territory acts. For example, the Australian Water Association (AWA) said:

---

With respect to the idea that utilities be constituted under the Corporations Act 2001 (Cwlth), AWA's view is that, in as much as the spirit of the 1994 COAG Water Reforms and the NWI work toward utilities being placed on an equal footing with the private sector, and in as much as competitive neutrality is desirable, the recommendation could be supported in principle ... [however] it is likely to be just as effective, if not more so, to have utilities constituted under well-designed and transparent state statutes, than constituting these agencies under the *Corporations Act (Cwlth) 2001*. (sub. DR157, p. 9)

While the NSW Government stated:

The governance arrangements which apply to the NSW Government owned water utilities are consistent with commitments made under the National Competition Policy. The NSW Government is unaware of any evidence that indicates that there would be advantages in constituting them under the *Corporations Act 2001 (Cwlth)*. (sub. DR146, p. 25)

There are significant benefits in constituting utilities under the Corporations Act. These benefits can also be obtained via State or Territory Government acts that place directors under the same obligations as does the Corporations Act. However, the Commission would see State or Territory Government legislation without the obligations and potential sanctions contained in the Corporations Act as being likely to result in inferior outcomes.

In its 2008 inquiry into the Melbourne retail water sector, the Victorian Competition and Efficiency Commission (VCEC), concluded Victorian water utilities should be changed from state-owned companies to statutory corporations, based in part on practicalities relating to the prevailing institutional arrangements in Victoria:

[VCEC] considers it is important to ensure that an appropriate corporate form is in place, consistent with the fiduciary duties under which directors operate. Although moving the retailers from state owned companies to statutory corporations would involve some costs, given that the commercial flexibility of the retailers is significantly less than when they were set up companies and that the Government is imposing an increasing number of non-commercial obligations on them, [VCEC] believes that it would be more appropriate that they be made into statutory corporations. (VCEC 2008, pp. 165–166)

Yarra Valley Water saw the conclusion by VCEC as appropriate where accountabilities were somewhat blurry, but stated the Corporations Law model would be preferred were the Commission's governance reforms implemented:

[VCEC's] conclusion is appropriate where it is accepted that water utilities should have multiple and somewhat blurred accountabilities and are representing the State. However, one of the Commission's key findings and draft recommendations is the need for State Governments to clarify the objectives of water utilities including trade-off decisions to improve economic efficiency. Given this, a Corporations Law company

---

would be the better corporate form to achieve outcome based government obligations. (sub. DR115, p. 5)

The Commission considers governance arrangements should be changed to ensure utilities have greater responsibility and accountability to operate in a manner consistent with the GTE model. This means, for example, having greater incentives to reduce costs and set efficient prices, and having fewer non-commercial objectives. A move back to constituting water utilities as statutory entities would be viewed by the Commission as a retrograde step, particularly as it considers the current blurring of responsibilities to be the cause of many of the problems in the urban water sector.

### *Ministerial directions*

With GTE board members generally appointed by ministers, there is scope for governments to influence decisions of board members even in the absence of formal directions.

In the draft report, the Commission sought feedback on the prevalence of ministerial directions and whether they were publicly reported. Feedback to the Commission suggests that ministerial directions are relatively rare and, when made, are generally made public. This is consistent with earlier research by the Commission (PC 2005a). However, this only enables the Commission to conclude there are few *formal* directions made. Given comments made by many participants in the sector that actions of governments had demonstrated that they were not committed to the principles of independence, the Commission assumes that informal intervention could be quite common.

To ensure independence, responsibility and accountability, the Commission considers it appropriate that *all* ministerial directions to utilities be publicly disclosed. Procedures for the issuing of directions, and for ensuring their public availability, should be included in the Commission's proposed charter between the government and the utilities.

Concern about ministerial directions potentially undermining independence is not restricted to utilities. IPART also highlighted the ability of ministers to direct regulators:

This review should also consider the powers of governments to direct both water suppliers and regulators. For example, there is a provision in the IPART Act (Section 16A) for a portfolio minister to direct the Tribunal to include in prices the efficient cost of complying with specified requirements. These requirements are understandable to the extent that [they] may allow a government to give effect to a political agenda that is important to it. However, overuse of such provisions in less important areas may

---

weaken incentives for efficiency by requiring investments to take place for which the costs exceed the benefits. (sub. 58, p. 43)

The enabling acts under which regulators operate typically allow a number of mechanisms by which governments can direct regulators (such as s. 16A of the *Independent Pricing and Regulatory Tribunal Act 1992* in New South Wales). Ministers often also determine important parameters such as the initial regulatory asset base, which can have a significant impact on pricing.

An example of a regulator being given limited freedom with regard to a price determination comes from New South Wales. On 2 May 2011, the New South Wales Minister for Finance and Services Greg Pearce wrote to IPART requesting it to determine the pricing for Sydney Desalination Plant Pty Ltd (SDP) (that is, Sydney's Kurnell desalination plant), following SDP being declared as a monopoly supplier under s. 51 of the *Water Industry Competition Act 2006* (NSW).

Part 13(1)(c) of the IPART Act gives the minister the power to require IPART to consider specified matters when making investigations. In the case of the desalination plant determination, IPART was given a number of prescriptive pricing principles that had to be met as part of its determination, including that 'the structure of prices should encourage SDP to be financially indifferent as to whether or not it supplies water' (Pearce 2011, p. 1).

Another example of regulation failing to prevent political intervention, however, comes from Queensland. The Queensland Competition Authority (QCA) has been monitoring prices charged by council-owned utilities since 2010, and the Queensland Government had indicated that the QCA would commence full price determination for the utilities in the near future (sub. 60). However, the Queensland Government has since capped distribution and retail charges for water and wastewater in south east Queensland to rise by no more than the Consumer Price Index for the two years from 1 July 2011 (Robertson 2011b) despite the QCA having reported that the utilities in question were not abusing their market power.

There are similar issues in Tasmania, where the regulator regularly reports on the damaging impact of politically determined prices on the long-term viability of the state's water utilities.<sup>1</sup>

Requirements imposed on regulators by governments to effectively 'pass through' increased costs stemming from decisions imposed on water utilities by governments

---

<sup>1</sup> The economic regulator is scheduled to commence price determinations from July 2012 (sub. 70). There is, however, considerable political concern within the State about the impact on water users of moving towards full cost recovery.

---

(such as investment in desalination plants) are of particular concern to the Commission. If ‘de-politicisation’ of decisions is seen as an argument for independent regulation, then such instructions from government undermine this. Politicians are effectively making decisions relating to the costs to be recouped by the utility and the regulator is effectively only a mechanism for these decisions to be imposed.

These examples highlight that the presence of independent regulatory institutions does not ensure an absence of political intervention in pricing decisions. If governments feel politically compelled to intervene, they can either instruct regulators to price in a particular manner, override the decisions of a regulator or remove regulators from the price setting process. Independent price regulation is no ‘magic bullet’ for achieving de-politicisation of pricing decisions.

Ministerial arrangements for regulators can also affect their independence. Regulators would be likely to have increased independence where they report to a different minister (or ministers) to the minister with portfolio responsibility for water. Regardless of ministerial arrangements, it is important that any direction from ministers should be provided in writing, and be publicly disclosed.

### *Appointment principles*

Sound principles for the appointment of public sector boards were enunciated by the Nolan Committee in the United Kingdom (COSIPL 1995). The recommendations of the Committee (including the creation of an Office of the Commissioner for Public Appointments to monitor appointments to boards) were subsequently adopted in full by the UK Government and continue to guide board appointments in the United Kingdom to this day. Other major Nolan Committee recommendations included:

- Ultimate responsibility for appointments should remain with ministers.
- Appointments should be guided by the overriding principle of appointment on merit.
- Merit selection procedures should take account of the balance of skills and backgrounds required, and these should be clearly specified.
- The basis on which members are appointed and how they are expected to fulfil their role should be made explicit.
- Candidates for appointment should be required to declare any significant political activity which they have undertaken in the past five years.
- Codes of conduct should be developed, incorporating requirements to declare, and deal with, potential conflicts of interest.

---

The Commission considers the recommendations of the Nolan Committee provide a sound basis for appointing both GTE board members and regulators.

There might be merit in governments further easing constraints on remuneration levels for GTE boards to ensure they are competitive with private sector remuneration. However, there are currently many worthwhile candidates offering their services at prevailing rates of remuneration, and there is great reluctance on the part of the public to the paying of private sector levels of remuneration to GTE board members.

RECOMMENDATION 10.1

***To strengthen independence, responsibility, accountability and transparency:***

- ***directors of utilities should be appointed on merit, following a transparent selection process***
- ***ministerial directions should be publicly disclosed at the time they are made and disclosed in the annual report***
- ***utilities (except where embedded in Local Government) should be incorporated under the Corporations Act 2001 (Cwlth)***
- ***directors and officers of utilities (except where the utility is embedded in Local Government) should be subject to the obligations under the Corporations Act.***

With regard to regulators, arrangements for their removal are probably of greater importance than appointment procedures. If removal of regulators is straightforward, they are more likely to comply with the wishes of government. However, if regulators were almost impossible to remove, this could lead to poor decision making and a lack of accountability. Getting the balance right is difficult.

As an example of an accountability measure that could potentially weaken regulatory independence, the *Economic Regulation Authority Act 2003* (WA) contains the following statutory provisions for the removal of a regulator by the Governor on the advice of a minister:

- (a) mental or physical incapacity to carry out the person's duties in a satisfactory manner;
- (b) the person being an insolvent under administration within the meaning of that term in the *Corporations Act 2001* of the Commonwealth;
- (c) neglect of duty;
- (d) misconduct;
- (e) incompetence; or
- (f) the person's absence, without leave or reasonable excuse, from 3 consecutive meetings of the governing body of which the person had notice.

---

While most of these reasons are fairly standard for independent bodies, the inclusion of ‘incompetence’ in the list of reasons a regulator could be dismissed is unusual and brings an element of subjectivity, and carries some risk that it could be used to remove a regulator, on the pretext that they are judged to be incompetent if the minister disagrees with their regulatory decisions. On balance, the Commission considers such subjective criteria for the removal of regulators is inappropriate where a single minister has the power to dismiss (although such an arrangement might be less problematic were the parliament involved in a deliberative or consenting manner). Issues of competency are best dealt with through use of appropriate selection processes and limited fixed term appointments.

### *Recognising and funding CSOs*

Prior to the GTE governance reforms starting in the 1990s, governments typically recognised the broader public benefits of non-commercial functions undertaken by GTEs by funding their (almost inevitable) operating deficits. Today, it is generally acknowledged to be more appropriate to calculate the costs of providing these broader benefits (or CSOs) and to make corresponding payments from the budget (PC 2005a). For example, water utilities are typically ‘compensated’ for the need to provide concessional tariffs to disadvantaged customers.

Strict adherence to explicit on-budget funding for CSOs by governments improves external governance of GTEs by recognising and funding the economic and social benefits to the community provided by the GTEs over and above the direct benefits reflected in the prices paid by consumers. It also requires CSO payments to be subjected to annual scrutiny through the budget process (PC 2005a). In addition, the use of explicit CSO payments reduces concerns about competitive neutrality where publicly-owned utilities are potentially subject to private sector competition.

Use of CSO payments appears widespread in the water sector. The Commission notes that the National Water Commission (NWC) concluded in its 2009 Biennial Assessment that:

In most jurisdictions, community service obligation (CSO) payments to metropolitan water providers are largely transparent and are reported on publicly through annual reports and annual pricing reviews. This is consistent with the NWI. (NWC 2009a, p. 169)

The Commission agrees with this assessment, and also notes that the NWC highlighted that use of transparent CSOs was also widespread for non-urban utilities that had failed to achieve lower bound pricing (with CSOs accounting for the revenue shortfall).

---

The Commission considers it desirable to regularly review the appropriateness of CSO payments to ensure they are truly cost reflective, and that they accurately reflect government priorities. CSOs, and the payments associated with them, should be specified in the proposed governance charter.

### *Determination of dividends*

While arrangements vary across GTEs, shareholders (usually ministers but sometimes Local Governments) ultimately have the power to effectively determine the level of dividends paid by GTEs, often on the advice of the board. This potentially limits the capacity of GTE boards to plan for the use of retained earnings for future investment and capital replacement needs (particularly if combined with restrictions on GTE borrowing). If this impedes the efficient management of GTE assets or leads to reduced investment, it could ultimately lead to inadequate service provision and, potentially, unnecessarily higher prices in the long run.

It has been suggested that some councils subject to general ‘rate capping’ by State Governments use water utilities to cross-subsidise other council activities to offset the effects of rate capping. For example, Midcoast Water has said:

It should be noted that rate pegging only applies to general fund rate increases. It does not apply to water and sewerage charges. Where it does affect these areas is when councils, particularly the larger councils, use their water and sewerage businesses to heavily subsidise the general fund. (sub. DR104, p. 3)

The fiscal situation of governments should not be a consideration in the setting of dividend payments, and concern expressed about governments taking ‘excessive’ dividends and using GTEs as ‘cash cows’ is legitimate. However, shareholding ministers ultimately do have a role to ensure that, over time, dividends provide an appropriate return on public funds. While large dividend payments might raise concerns about ‘excessive’ rates of return or, if investment is affected, the viability of future service provision, tolerance of low rates of return, if sustained for an extended period of time, must at some point represent an implicit subsidy to urban water utilities or their customers (PC 2006c). They also represent a potential source of subsidy to public providers relative to any private providers that might participate in water markets, which would violate competitive neutrality principles.

Based on the Commission’s GTE performance monitoring reports over the years and the evidence on dividends in chapter 2, it is unlikely that dividend payments have affected the investment plans of urban water utilities to any significant degree. (Moreover, at various times and across various utilities concerns have been expressed about dividend payments being both too low and too high). However, many jurisdictions appear to have a predetermined percentage of profits to be paid

---

in the form of dividends, and some flexibility in this regard is likely to be desirable. In devising dividend policies, it is important to be cognisant of the need for investment.

The inclusion of future investment intentions in publicly available corporate plans would therefore enhance transparency and accountability by allowing the public to make better informed judgments about whether dividend payments to governments were consistent with each GTE's previously stated investment intentions. Currently, investment intentions are typically foreshadowed in information provided to regulators, although the purpose of these documents means there might be an incentive to overstate investment intentions (to influence regulatory outcomes).

There are also strong arguments for making the initial recommendations regarding the size of dividends and assessment of the capacity to pay a responsibility of GTE boards. This would be consistent with private sector practice, and that of a number of Australian Government GTEs such as Airservices Australia. In the event that ministers, as representatives of the owners, override this recommendation, they should be required to publicly provide reasons for doing so.

Appropriate arrangements for determining dividends, and the associated reporting requirements, should be specified in the proposed governance charter.

### *Borrowing arrangements*

The ability of water utilities to obtain capital in their own right has implications for their independence and their ability to perform their functions. If governance arrangements allow utilities to be relatively free to obtain capital, they are less dependent on government. If their borrowings can only be done through central agencies, or if they require ministerial approval, their independence is reduced.

However, there is a need to protect taxpayers who potentially bear the risk of reckless GTE borrowing. Where GTEs are monopolies, water consumers also potentially bear the risk of poor investment decisions that could potentially flow through to increased water prices.

Evidence provided to the Commission during this inquiry suggests that GTEs are relatively comfortable with their current borrowing arrangements. Arrangements for GTE borrowing are typically the same as for other government agencies, whereby the Treasurer, as a representative of the shareholder, approves broad borrowing limits and risk management processes.

---

Arrangements in New South Wales are typical. In that State, borrowings from the New South Wales Treasury Corporation (TCorp) are guaranteed, while borrowings obtained from other sources are only government guaranteed if the Treasurer has specified such a guarantee in writing. To ensure competitive neutrality, a fee is charged to expose Government businesses to the risk-related cost of debt they would face if they were required to borrow funds based on their stand-alone credit rating rather than the rating of the State of New South Wales.

All government businesses subject to the guarantee fee are required to obtain an annual credit rating on a stand-alone basis to assess a business's level of competitive advantage from access to guaranteed borrowings. Government businesses pay for their individual rating assessments, using credit rating agencies selected by New South Wales Treasury on a competitive tender basis (NSW Treasury 2010).

Arrangements for borrowing by water utilities should be specified in the proposed governance charter.

## **Ensuring responsibility**

Ensuring responsibilities are clearly delineated involves consideration of a number of factors.

### *Clear and non-conflicting objectives*

Chapter 3 highlighted the gains to be made by setting, prioritising and allocating objectives appropriately. A problem currently with GTEs is that they are typically given a number of conflicting (or even seemingly mutually exclusive) objectives, often with limited guidance provided by governments about the relative importance of the conflicting objectives. Without such guidance, it is difficult to establish how GTEs have performed *overall*. They are likely to have done well against some objectives, and less well against others.

While many participants were relatively sanguine about the ability of water authorities to balance conflicting objectives, they have typically acknowledged that GTEs are forced to make difficult tradeoffs. Yarra Valley Water stated:

Dealing with conflicting objectives is core business for a water utility. We're owned by governments, so we inevitably share the conflicting objectives that governments have. ... we have to balance the social needs against the cost of these projects against the environmental impacts, and the industry has developed a number of models in that regard ... none of them are perfect, and all of them have some elements of subjectivity in them, because the science isn't concrete. Particularly on the social side it's difficult.

---

It's opinion based ... so you have to tread a difficult course I think to balance those ... elements and be accountable for the final decisions that are made in the end. (trans., p. 222)

In many instances, particularly relating to health and the environment, objectives given to water utilities would be more appropriately allocated to other agencies. For example, setting of environmental standards for proposed supply augmentations is overwhelmingly a matter for environmental regulators. Removing environmental objectives from water utilities would enable them to maintain their predominantly commercial focus. Where conflicting objectives are considered unavoidable, guidance should be given on how to prioritise them.

Regulators, like water utilities, also have to generally deal with a number of conflicting objectives when making determinations. Where regulators are given conflicting objectives, they must implicitly prioritise them. ACTEW Corporation highlighted the dilemmas faced by the regulator in the ACT:

The current framework for water regulation in the ACT provides a broad range of factors to be balanced by the regulator. This is a very difficult assignment that effectively results in considerable discretion to the regulator and significant levels of regulatory risk for the utility. (sub. 45, p. 4)

To ensure decisions about where the 'public interest' lies continue to be made by elected representatives, and not by regulators determining which objectives take priority, governments should try to avoid having conflicting objectives in regulatory acts. Where conflicting objectives are considered unavoidable, regulators should be given clear guidance by government on how to prioritise objectives.

However, this is generally not the case. For example, box 10.1 shows the matters the QCA must have regard to under s. 170ZI of the *Queensland Competition Authority Act 1997* (Qld) when making a price determination.

No guidance is provided on, nor is it obvious, how these matters should be prioritised. Nor is such guidance provided in most equivalent regulatory acts across jurisdictions, providing regulators with enormous discretion.

As with utilities, many of the objectives given to regulators would be more appropriately allocated to other agencies (and dealt with through mechanisms such as memoranda of understanding). Removing non-core objectives from regulators would enable them to concentrate on their core focus.

---

### Box 10.1 **Multiple and conflicting objectives — an example**

Under its legislation, the Queensland Competition Authority has to have regard to the following matters when making a price determination:

- the need for efficient resource allocation
- the need to promote competition
- the protection of consumers from abuses of monopoly power
- decisions by the Ministers and Local Governments under part 3 about pricing practices of monopoly business activities involving the supply of water
- the legitimate business interests of the water supplier carrying on the monopoly water supply activity to which the determination relates
- in relation to the monopoly water supply activity
  - the cost of providing the activity in an efficient way, having regard to relevant interstate and international benchmarks
  - the actual cost of providing the activity
  - the quality of the activities constituting the water supply activity
  - the quality of the water being supplied
- the appropriate rate of return on water suppliers' assets
- the effect of inflation
- the impact on the environment of prices charged by the water supplier
- considerations of demand management
- social welfare and equity considerations, including Community Service Obligations, the availability of goods and services to consumers and the social impact of pricing practices
- the need for pricing practices not to discourage socially desirable investment or innovation by water suppliers
- legislation and government policies relating to ecologically sustainable development
- legislation and government policies relating to occupational health and safety and industrial relations
- economic and regional development issues, including employment and investment growth.

*Source: Queensland Competition Authority Act 1997 (Qld).*

Where conflicting objectives were considered unavoidable, the presence of an overarching objects clause in regulatory acts would be an effective way of providing guidance to regulators about how to prioritise objectives. For example, the objects clause of the legislation enabling the national electricity market

---

highlights the objective of the law as being to ‘promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity’ (Ruff and Swier, sub. 47, p.7). Including similar objects clauses in legislation relevant to the urban water sector would represent a positive step forward.

RECOMMENDATION 10.2

***Governments should review objectives currently given to water utilities and regulators, and remove those that would be more appropriately allocated to other agencies.***

***Where conflicting objectives are seen as unavoidable for utilities or regulators, guidance on how to prioritise objectives should be given through a governance charter for utilities or through the inclusion of an overarching objects clause in regulatory acts.***

***Service obligations and responsibility for efficient procurement and investment***

Chapter 5 highlighted the significant costs associated with poor supply augmentation decisions. These poor decisions stem, in part, from (often short-term) political pressures on governments influencing their (long-term) supply augmentation decisions.

One possible alternative for ‘de-politicisation’ of supply augmentation decisions is the formation of an independent procurement entity (IPE) to deal with supply augmentation matters. The introduction of such a body has been proposed in Western Australia by the Economic Regulation Authority (ERA) (ERA 2008a).

The ERA proposed that the IPE be established as a statutory authority with the explicit objective of ensuring maintenance of supply security at least expected cost, within given policy and regulatory constraints. In broad terms, as envisaged by the ERA, the IPE would receive a supply security requirement determined by the WA Government and, subject to this, identify future supply shortfalls and seek ways to meet these shortfalls via supply augmentations and demand management options.

Major advantages of the IPE would be ‘de-politicisation’ of supply augmentation decisions and, in a Western Australian context, enhanced competitive neutrality (ERA 2008a).

IPART suggested water utilities themselves could tender for augmentation options:

There are a number of ways in which competition can be introduced into the potentially competitive areas of the industry. The best choice is likely to depend on the

---

circumstances in a particular area. For example ... competitive arrangements could be entered into to obtain additional supplies of bulk water. The water agency itself (or the government) could call for tenders for the augmentation option or suite of options. The least cost suite would be awarded supply contracts with the purchaser. This type of single purchaser agreements may be an important transitional step in developing a market in bulk water. Such agreements would enable the private sector to avoid assuming demand risk, if necessary, through take or pay arrangements. (sub. 58, pp. 38–39)

The Commission considers that, given the information they possess about the preferences of their customers, water utilities are best placed to make supply augmentation decisions. Were government to only determine the supply obligations of water utilities and leave the investment and augmentation decisions to utilities, this would, in the Commission’s view, reduce the likelihood of poor investment decisions. The proposed governance charter, with its insistence on use of competitive processes, should satisfactorily deal with competitive neutrality issues.

The charter would set out the processes to be followed by the utilities in making decisions, including procedures for public consultation. To ensure lowest cost procurement, the charter should seek to facilitate competition ‘for the market’ by specifying transparent, competitive processes for procurement and investment. The retailer-distributor would effectively operate as a ‘portfolio manager’ (chapter 12 and appendix F), weighing up the offerings of various potential water suppliers. As noted above, the charter would also set out risk sharing arrangements between the government and the utilities stemming from supply augmentation decisions.

The Commission also considers it appropriate that those water utilities given an obligation to supply customers under the charter have responsibility for implementing voluntary demand management measures (where these were economically justified), and water restrictions (in the rare event they are needed) (chapter 7). The charter should give utilities the power to make decisions on restrictions and enforce them. It will also need to spell out the circumstances under which utilities can exercise their power to mandate restrictions.

RECOMMENDATION 10.3

***Retail–distribution utilities should be assigned responsibility for meeting security of supply standards and procuring water and wastewater services because:***

- ***they are best placed to understand consumer preferences and can develop service offerings based on the opportunity cost of supply***
- ***they can facilitate contestability and competition for water and wastewater services from potential service providers***

- 
- *they would have commercial responsibility for efficient operation and procurement of supply, which strengthens commercial incentives and risk management of operations and investment*
  - *it can preserve many of the efficiencies inherent in a vertically-integrated utility, even though vertical and horizontal separation of bulk supply is possible*
  - *it can mitigate against the high cost of formal price control regulation and the potential for inefficiencies arising from government ownership through the use of competition for procurement of supply and other services.*

### *Pricing principles*

In chapter 6, the Commission noted that introducing flexibility into retail pricing would enable utilities to better manage demand in line with changes in water availability, and achieve water security at least expected cost. Rather than recommending flexible retail pricing be introduced in a prescribed way, the Commission's preferred approach is for utilities to have the flexibility to provide a range of tariff offerings to consumers, thereby allowing consumers to express their preferences on security of supply and price stability.

The Commission considers that its proposed charter should allow for this pricing flexibility. It should not contain highly prescriptive pricing principles, but rather ensure that utilities are free to set tariffs in a manner consistent with economic efficiency. To ensure efficient resource allocation, the charter should incorporate requirements for full cost recovery, and reflect the principle that water pricing should take account of the marginal opportunity cost of water (chapter 6).

For all utilities, the charter should include a commitment to 'upper bound' full cost recovery as defined in the National Water Initiative (NWI). Metropolitan utilities currently aim for this. As discussed in chapter 13, the Commission does not consider that the manner in which the NWI full cost recovery definition for rural areas is currently being interpreted by governments is consistent with genuinely achieving full cost recovery, given that lower bound pricing does not involve recovery of the opportunity cost of capital. Moreover, the Commission considers lower bound pricing to be a vague and somewhat malleable concept which is interpreted differently across jurisdictions.

In chapter 13, the Commission finds that many regional urban water utilities have ongoing low or negative rates of return, and that there appears to be little movement towards upper bound pricing. Moreover, State Governments seem satisfied that

---

these utilities are compliant with the NWI commitments. In effect, it appears State Governments are tolerating ongoing very poor rates of return.

The Commission accepts that for some small utilities, upper bound full cost recovery might be unachievable or undesirable given social or health benefits provided by utilities. However, it would be preferable for assistance to these utilities to be provided in the form of an explicit CSO payment rather than by tolerating ongoing poor rates of return.

IPART expressed a similar view:

IPART is concerned that full cost recovery is not being achieved due to subsidies from local, state or federal Governments that distort price signals. However, IPART recognises that government assistance may be necessary in meeting minimum standards in some communities. However, this should be done through transparent customer service obligation (CSO) payments rather than accepting non-commercial rates of return on capital or cross-subsidies. Subsidies for capital expenditure should be unusual. (sub. 58, p. 17)

The Commission considers that charters for all utilities should contain commitments to move toward upper bound pricing within three years of the charter commencing. Where State or Territory Governments agree that full cost recovery is unachievable, the charter should spell out explicit CSO payments to utilities and the purpose of those payments. Where no CSOs have been identified as being justified, and no payments made, it should be assumed that utilities are expected to move towards upper bound full cost recovery within three years. The charter should also spell out mechanisms requiring utilities to try to reduce the required CSO payment over time where practicable.

RECOMMENDATION 10.4

***Charters should require all water utilities to achieve full cost recovery (including a return on assets) within three years of a charter being implemented. Where achieving full cost recovery solely through customer charges is considered unachievable or undesirable given the costs of meeting the utility's social, health or environmental obligations, State or Territory Governments should provide explicit Community Service Obligation payments to utilities. Charters should require that utilities reduce reliance on Community Service Obligation payments over time where practicable.***

To ensure progress against the charter commitments, and that utilities do not unduly take advantage of any market power they might have, the charter should include performance reporting mechanisms incorporating the monitoring of rates of return

---

against returns that might be considered appropriate for the utility given the risk involved in its operations.<sup>2</sup>

To deal with concerns about monopoly pricing, rather than having a regulator set prices as currently occurs in many jurisdictions, the regulator (or another body) could monitor what would effectively be an implied ex post ‘revenue cap’ to ensure returns were not excessive (and any excess returns were returned to consumers in the next billing period). Importantly, judgments about whether returns were excessive would have to be made over time, particularly once the opportunity cost of water is factored into decision making and returns become potentially more variable.

Determining an appropriate rate of return is important. If the rate of return is set too high, this means businesses might recover revenues that exceed costs which might encourage ‘under-consumption’ of infrastructure relative to efficient levels. If the rate is set too low, this can deter investment in infrastructure. The Commission considers this latter prospect to generally be a worse outcome as in the long run it is likely to involve greater efficiency losses.

Some guidance on what might be considered an appropriate rate of return is provided by the weighted average cost of capital (WACC) calculated by regulators for utilities in recent years. The WACC is the rate of return on capital commensurate with the commercial risk associated with the businesses’ regulated activities such that the businesses recover efficient costs (ACCC 2011), and is consistent with the upper bound pricing principles in the NWI. Appropriate rates of return are likely to vary between utilities depending on the nature of the utility, the location and the industry structure in which each utility operates. Regulators around Australia have recently determined the real pre-tax WACC for water utilities at between 6 and 7 per cent. (The Essential Services Commission in Victoria allows a real post-tax WACC of just over 5 per cent) (PWC 2010).

### *Asset valuation*

The charter should ensure that assets are valued in a transparent manner. A number of participants have raised issues with current asset valuation practices. Some have suggested the use of depreciated optimised replacement cost (DORC) valuations has led to windfall returns to water utilities on assets that would have otherwise been almost fully depreciated. For example, Terence Dwyer wrote:

---

<sup>2</sup> This could be done by comparing the rate of return for the utility with a ‘risk free’ rate of return plus an appropriate risk premium for the utility.

---

DORC may lack economic merit but it has wonderful features for infrastructure owners ... one can blithely ignore the past history of who financed and contributed to public works and proceed to write up their value and claim a required rate of return on the capitalised value ... the effect of such artificial and contrived accounting is to enable water utilities to generate astounding cash surpluses on cash actually invested while showing apparently low rates of return. (sub. 57, attachment 2, p. 13)

This is effectively a debate about whether historical cost or replacement cost methodologies are more appropriate for regulatory asset valuations. Using historical cost methods, assets are valued at their net book value and depreciated in line with accounting standards or a schedule nominated by a regulator. Under DORC, assets are valued at the cost of their remaining service potential, although their value is 'optimised' in that their value will be lowered by regulators if the investments are seen as 'sub-optimal' given technological progress or previous inefficient investment decisions. DORC therefore values assets at the cost of the new technology optimally deployed (PC 2001b).

Use of DORC valuations is often favoured over historical cost valuations to 'smooth' price paths. The Australian Competition and Consumer Commission (ACCC) has previously stated:

... if a business values its assets on a historical basis and those assets are fully depreciated, then access prices and revenues based on those asset values would be very low. The business would have an incentive to invest in replacement assets in order to raise their revenues and may even over invest in additional capacity because of the high demand stimulated by the low prices. As a consequence, prices could jump once revenues are determined on the new asset values, and it is even possible that fully depreciated assets could be replaced, even though they may still have a substantial remaining economic life. (ACCC 2001, p. 36)

However, while the use of DORC valuations can avoid major fluctuations in prices, it can have the effect of providing windfall gains to owners of infrastructure. If an infrastructure owner had recovered the cost of an investment, and a DORC valuation allowed increased returns, this would provide an element of economic rent to the infrastructure owner (PC 2001b).

DORC valuations can also result in windfall losses for infrastructure owners if DORC leads to the value of sub optimal assets being written down. A particular issue likely to emerge in the urban water sector relates to those investments that were effectively imposed on utilities by governments, that might turn out to be sub optimal. Under DORC principles these assets should probably be written down in value. If assets are written down, this implies a windfall loss for the government-owned utilities and therefore a loss for taxpayers. If the assets are not written down in value, this implies water consumers will face higher charges for an

---

inefficient network (presumably through an increased fixed charge, as the volumetric charge for water should be unaffected).

IPART stated that it doubted the community in New South Wales was ready for pricing based on replacement cost:

There is one view which I do understand, and that's the engineering view, which is that what you should do is base the asset value on the replacement cost of the assets. The difficulty with that is that if you were to do that, say, for Sydney Water's network, you would find that prices would have to rise by several times the amount they are at the moment and you might just wonder whether the community is up for that. (trans. p. 33)

Urban water regulators, including IPART, have therefore typically adopted a 'line in the sand' policy for asset valuation. In IPART's case, assets existing in the year 2000 have been valued based on their value at that time and newer assets have been valued at their actual cost. As explained by IPART:

Subsequent to 2000, we have added onto the asset value, assets that are replaced, at the cost of replacement and at the same time we subtract depreciation and we also make adjustment for inflation. So the asset base has moved forward on that basis. So, if you like, existing assets are less than replacement cost; new assets are at replacement cost; as assets get replaced, yes, their value will rise through time. In the limit, if all assets were replaced, you would end up at an asset valuation that was at replacement cost, but it probably won't happen that way. (trans. p. 34)

Sydney Water has highlighted issues with the 'line in the sand' approach:

What does the line in the sand imply for allocative efficiency? If prices are less than half that implied by the optimised replacement value of assets, what incentives for investment does this create? The line in the sand may constitute a barrier to entry in the urban water industry that will need to be addressed if water or wastewater markets are to develop. (sub. 21, p. 23)

Importantly, the pricing principles the Commission considers to be most appropriate for urban water utilities (that is, pricing based on the marginal opportunity cost of water) diminish the importance of the asset valuation method used from a pricing perspective. Effectively, all previously incurred capital costs are treated as sunk, and economic rents can be earned or losses incurred. The issue is whether general taxpayers benefit from rents (or incur costs associated with asset writedowns) or whether they are passed on to customers through lower (or higher) fixed charges. However, to promote good investment decision making under the portfolio manager framework, with a government-owned retailer–distributor, there is a strong argument for making utilities and their customers accountable for investment decisions (box 10.2).

---

### Box 10.2 **Marginal opportunity cost pricing and asset valuation**

In chapter 6, it was recommended that the volumetric price of water should be based on the marginal opportunity cost of supplying water. By its very nature, this is a forward looking concept and sunk capital costs have no bearing on current volumetric prices. Although investments procured by retailer–distributors (using the portfolio manager approach) are made on the expectation of the full recovery of costs, there are no ‘guarantees’ ex post.

Under this framework, the ex post recovery of investment could be paid for through adjustments to the fixed part of two-part water tariffs (a form of taxation on water consumers), or by general taxpayers (through lower rates of return or other forms of government subsidy). If any scarcity rents are earned, these can similarly be returned to water consumers (through lower charges) or taxpayers (possibly through a lump sum payment).

Under the portfolio manager approach, the demand-side risk is borne by the retailer–distributors (for reasons outlined in appendix F). In a competitive market, this risk is usually borne by shareholders because firms are price takers and cannot levy taxes. However, the situation is different for a government-owned utility, where the community (water consumers or taxpayers) must pay for the investment one way or another. The issue now becomes should the utility’s risk be allocated to customers or general taxpayers.

One factor influencing this choice is the form of ‘taxation’ which has the lowest marginal efficiency cost. Another important factor is the incentive created for the utility to efficiently invest in, and operate, facilities in its portfolio. The application of full cost recovery is more likely to create these incentives compared with potential subsidies from government (general taxpayers). Pressure from customers to keep prices and charges as low as possible, while achieving full cost recovery, is most likely to create these incentives. These pressures are increased by adopting the best practice institutional arrangements being recommended in this chapter.

Therefore to promote good investment decision making, there is a strong argument for making utilities and their customers accountable for investment decisions by adjusting fixed water charges to cover any revenue shortfalls, or return any economic rents, arising from setting volumetric prices based on the marginal opportunity cost of supply. This would be consistent with the pricing principles for the portfolio manager outlined in appendix F.

Under this framework, asset revaluation plays a much less significant role compared with that played under current regulatory price setting practices.

Given that there is no ‘correct’ valuation approach, and there are good arguments for and against historical and replacement cost valuations, the approach of taking a ‘line in the sand’ and valuing assets commissioned after that point based on replacement cost is probably as reasonable an approach as any. As the ‘line in the sand’ approach is the approach currently taken by regulators in most jurisdictions, it

---

has the advantage of having achieved a level of acceptance, and also of providing an element of pricing and revenue stability. The Commission therefore considers that the proposed charters should, at least initially, continue to use the same principles for asset valuation used currently by regulators.

### *Resourcing of regulators*

To operate effectively, regulators require adequate resourcing to perform their tasks. Inadequate resourcing (including a lack of relevant expertise) is a common reason for regulatory delays (PC 2009a), which can add significantly to the cost of operations for utilities and distort supply augmentation decisions. Governments should therefore ensure regulators are provided with adequate resources or, subject to appropriate cost recovery principles, should ensure there is provision within legislation for regulators to recover costs.

Financial independence of regulators is likely to reduce opportunities for political interference. If regulators are able to employ staff and allocate their own budget, this is likely to lead to greater independence. In Victoria, for example, the regulated water utilities make a ministerially determined contribution to the costs of economic regulation by the Essential Services Commission.

If cost reflective, it is appropriate for the costs of regulation to be built into the prices ultimately paid by consumers (PC 2001a), and these funding arrangements are likely to promote the regulator's independence. Independence would be further promoted if the room for ministerial discretion was removed (although there might be other reasons for maintaining it, such as to provide greater flexibility or to guard against regulators seeking additional revenue through 'regulatory creep' or, in other words, moving into areas previously not envisaged by government).

Where regulators are funded on a cost recovery basis, charges should be regularly reviewed to ensure they are cost reflective. While adequate resourcing is imperative, it is also important not to provide excessive resources to regulators, or excessive opportunities for regulators to engage in cost recovery. These provide incentives for regulatory creep.

### *Drinking water standards*

State and Territory Governments have responsibility for ensuring drinking (potable) water quality. There are diverse arrangements (regulatory and non-regulatory) in

---

place for this purpose. This was recognised by PWC in its recently released report for the NWC, *Review of urban water quality regulation in Australia*<sup>3</sup>:

The legislative foundations of the state and territory regulatory frameworks are ... multifaceted and vary from jurisdiction to jurisdiction ... National guidelines exist and these provide a degree of commonality across the jurisdictions. State and territory implementation of the guidelines, however, varies. Some jurisdictions, for instance, include adherence to key national guidelines as a licence condition for water authorities. Other jurisdictions, meanwhile, refer to the national guidelines, but do not enforce their adherence. (PWC 2011, p. 13)

Some State and Territory Governments (for example, Victoria and Queensland) already have robust arrangements in place for management of drinking water quality. A number of other jurisdictional governments have recently taken steps to strengthen drinking water quality regulations. For example, the *Public Health Act 2010* (NSW) and the *Safe Drinking Water Act 2011* (SA) both impose explicit obligations on drinking water suppliers.

These legislative instruments generally require that urban water utilities comply with the risk-management approach to drinking water quality described in the *2004 Australian Drinking Water Guidelines* (ADWG) (box 10.3). The Commission considers that these guidelines provide a robust and efficient set of arrangements for managing drinking water quality in Australia, and that state and territory regulatory frameworks should be consistent with the ADWG to the fullest extent possible.

The regulatory arrangements in Victoria provide a good example of how the guidelines are operationalised in state legislation. The *Safe Drinking Water Act 2003* (Vic) requires that utilities:

- develop and implement a risk management plan
- comply with standards for drinking water quality (and these standards are consistent with the ADWG)
- disclose (and report on) relevant water quality information (consistent with the requirements of the ADWG framework).

Notwithstanding recent progress by some jurisdictions on this issue, the Commission is concerned that the current arrangements might not be sufficient to guarantee that *all* Australian water utilities comply with the ADWG.

---

<sup>3</sup> This report described the regulatory and legislative arrangements in place in each jurisdiction in more detail.

---

### Box 10.3 Australian Drinking Water Guidelines

The *2004 Australian Drinking Water Guidelines* (ADWG), developed by the National Health and Medical Research Council in collaboration with the Natural Resource Management Ministerial Council, incorporates the *Framework for the Management of Drinking Water Quality* (the Framework) and provides the Australian community and the water supply industry with guidance on what constitutes good quality drinking water.

The ADWG form one element of the National Water Quality Management Strategy (NWQMS) — a national framework of policies and principles to improve the management of water quality across Australia. The NWQMS was agreed in 1992 and covers all aspects of water quality management (groundwater, sewerage systems, water recycling and drinking water).

The ADWG framework is based on a preventative strategy which focuses attention on total system management (from catchment to consumer). There are 12 elements to the Framework:

- commitment to drinking water quality management
- assessment of the drinking water supply system
- preventive measures for drinking water quality management
- operational procedures and process control
- verification of drinking water quality
- management of incidents and emergencies
- employee awareness and training
- community involvement and awareness
- research and development
- documentation and reporting
- evaluation and audit
- review and continual improvement.

The ADWG also define guideline values (both health and aesthetic values) for a range of physical and chemical characteristics of drinking water. For E.coli (or thermotolerant coliforms), performance of a water system is regarded as satisfactory (over the long term) if at least 98 per cent of samples contain no E.coli (one failure in 50 samples).

Source: NHMRC (2004).

---

Given the potentially catastrophic consequences for public health of a breach of drinking water quality standards, the Commission recommends that all water utilities be required by legislation to:

- develop, implement and adhere to an approved drinking water quality risk management plan
- comply with relevant drinking water quality standards
- disclose (and report on) water quality information.

State and Territory Governments should ensure that each of these legislative obligations is consistent with the requirements of the ADWG. These obligations could also be explicitly contained in the governance charter.

In the event of significant non-compliance with legislative requirements, serious sanctions, including financial penalties and dismissal, should apply. To be consistent with the penalties that apply for non-compliance with Occupational Health and Safety legislation, the Commission envisages that managers and directors of utilities, or other accountable persons such as councillors, would be personally liable for the full risks associated with non-compliance.<sup>4</sup>

Finally, the Commission considers that regular, public reporting on the performance of utilities with respect to the provision of safe drinking water is important. The NWC publishes information on the water quality performance of utilities with more than 10 000 connections.<sup>5</sup> For smaller water utilities, information on water quality outcomes is less transparent (although the NSW Office of Water does publish annual information on microbiological and chemical compliance for all utilities in that state). State and Territory Governments should publicly report on the water quality performance of utilities not already covered by the NWC reporting or other jurisdiction-specific processes. This reporting could be incorporated into performance reporting against the governance charter.

---

<sup>4</sup> The Commission notes that such sanctions are already provided for in a number of jurisdictions. For example, in New South Wales the *Public Health Act 2010* (clause 15) states that the maximum penalty for a person that supplies drinking water not fit for human consumption is 12 months imprisonment. Likewise, the South Australian *Safe Drinking Water Act 2011* imposes a penalty of \$100 000 or imprisonment for 4 years if a person knowingly provides unsafe drinking water to the public. A penalty of \$75 000 applies if the person ‘ought reasonably to know’ the water is unsafe, or \$50 000 if it is unsafe.

<sup>5</sup> Specifically, the NWC provides information on microbiological compliance, chemical compliance, the existence of a risk-based drinking water management plan and the public disclosure of drinking water quality performance.

***Compliance with the Australian Drinking Water Guidelines (ADWG) (or equivalent regulations) should be a legislated requirement for all Australian urban water utilities. Specifically, utilities should be required to:***

- develop, implement and adhere to an approved drinking water quality risk management plan***
- comply with relevant standards for drinking water***
- disclose (and report on) water quality information.***

***State and Territory Governments should ensure that each of these legislative obligations is consistent with the requirements of the ADWG.***

***Sanctions should apply if water utilities do not comply with these requirements, and directors or other accountable persons such as councillors should be personally liable for non-compliance.***

***Public provision of information on the microbiological and chemical quality of drinking water is critical. Where utility performance against these measures (as defined in the ADWG) is not already publicly reported on (for example, by the National Water Commission), utilities should report on these measures.***

***Performance reporting requirements against the proposed governance charter would represent a suitable mechanism for such reporting.***

The governance charters should also contain reference to any other water quality guidelines or standards that utilities were expected to adhere to, such as guidelines relating to wastewater, stormwater or recycled water.

Once guidelines or standards were agreed, it would be the expectation of the Commission that health regulators would grant approvals where proposed activities were consistent with the guidelines. The Commission has heard evidence of health regulators sometimes imposing additional standards beyond, for example, the ADWG. Although it is understandable that regulators would take a cautious approach where public health is concerned, once guidelines have been agreed that are widely considered to be robust and appropriate, they should represent the basis on which the sector should be regulated if the imposition of unnecessary costs is to be avoided.

---

## **Ensuring accountability**

To achieve good outcomes, it is important to ensure accountability of all players in the urban water sector. To ensure accountability, there is also a need for transparency. In particular, there is a need for transparent public consultation processes for utilities and regulators, and for public reporting of regulatory decisions and the reasons for them.

Performance reporting by utilities is important for ensuring accountability. This is discussed in detail in section 10.4 (in the context of arrangements for the Commission's proposed governance charter).

### *Importance of public consultation*

A number of utilities pointed to efforts at determining consumer preferences. For example, Yarra Valley Water pointed to its customer consultative committee, which discusses proposals impacting on customers (sub. DR115), and the NSW Government noted Sydney Water currently has a Corporate Customer Council, a Commercial and Industrial Customer Forum and the provision to establish short-term Advisory Groups (sub. DR146).

As with utilities, it is important for regulators to consult widely if they are to make informed decisions. As the Hawke Review of the EPBC Act said:

Public participation is a critical process needed to inform high-quality decision-making. It provides a form of review of material put before the decision-maker and contributes further evidence on environmental, social and economic impacts of proposed developments. (Australian Government 2009b, p. 242)

Typically, regulators are given the power to determine their own consultative processes. It is relatively rare for the manner in which they consult to be prescribed in legislation (although some regulatory enabling acts allow ministers to determine consultative processes when initiating particular references to regulators). Some regulatory acts prescribe that hearings be held in public. It is, of course, important to strike a balance between the need for consultation, and the desire not to unnecessarily burden urban water sector participants with compliance costs and 'red tape'.

The Commission sees merit in the approach in some areas (such as Victoria and South Australia with their economic regulators) of requiring regulators to publish a charter of consultation. These charters are intended to set out processes for regulators to publish their future work program, to notify interested parties of inquiries and decisions, and to undertake consultation with stakeholders.

---

The production of publicly released draft reports has the potential to significantly enhance the consultative process, while also providing greater quality assurance through opportunities for comment. The Commission itself generally adopts this approach and finds it highly beneficial. Draft reports can be used to promote more constructive dialogue between regulators and stakeholders, as well as providing stakeholders with greater guidance about the position of regulators. They can also provide a basis for informing stakeholder submissions and for effective discussion at subsequent public hearings.

Arrangements for consumer participation in regulatory processes are currently unsatisfactory. As Biggar recently stated in an ACCC/Australian Energy Regulator working paper that highlighted the scope for improving customer involvement in regulatory processes:

The involvement of customers in most regulatory processes in Australia is relatively weak and under-developed. Customers do not take direct responsibility for regulatory outcomes. Customers are not directly involved in approving investments or investment-tariff trade-offs, or trade-offs between tariffs and service quality. Customers are not directly involved in the design of incentives, risk-sharing arrangements, or in the design of the regulatory framework itself. There is relatively little scope for customers to enter into new, innovative, or out-of-the-ordinary arrangements with regulated firms. (Biggar 2011, p. 42).

A range of institutional approaches have been proposed, and indeed implemented, to facilitate a greater role for the public in utility pricing. For example, Littlechild (2008) has encouraged the use of ‘negotiated settlements’ between customers and utility companies as an alternative to current regulatory arrangements.

Such arrangements involve customers, customer groups and appointed customer representatives taking an active role in negotiating price and quality issues with utilities, with the regulator then approving (or otherwise) the settlements. The regulator would also potentially become involved if no agreement could be reached. Governments could assist in facilitating the negotiated settlement process by helping to establish bodies to represent consumers.

Littlechild (2008) provides various examples of negotiated settlements in the United States and Canada, including those overseen by the Federal Energy Regulatory Commission (FERC) in the United States and the National Energy Board in Canada (both dealing with gas pipelines), and those facilitated by the Office of Public Counsel in Florida.

Advantages of negotiated settlements include reduced costs for the parties involved (in terms of both time and money), reductions in regulatory uncertainty and greater flexibility with regard to potential outcomes. The parties to a dispute are less

---

constrained than the regulator. The reduced costs and greater flexibility associated with negotiated settlements can result in better deals for consumers.

In the draft report, the Commission sought feedback on whether there would be merit in creating a formal representational role for a new consumer advocacy body that would make representations to utilities and other policy makers in matters such as reliability standards, service offerings and supply augmentation.

In response to the draft report, the Consumer Utilities Advocacy Centre (CUAC) suggested its preferred model for a consumer representative body would involve:

1. Creation of a relatively small National Water Consumer Advocacy Centre (3–4 FTE staff) that would:
  - undertake research, policy development and advocacy; support information sharing, networking and joint advocacy among state and territory consumer advocates; develop an online ‘one stop shop’ information resource for consumers and organisations; and identify research priorities which would guide a grants program administered by the Consumer Advocacy Panel; and
2. Establishment of a national water consumer research/advocacy grants program that would:
  - fund projects according to research priorities identified with the National Water Consumer Advocacy Centre; and
  - be administered by the existing Consumer Advocacy Panel for energy, an independent body that provides grants for consumer advocacy and research focussed on small and medium users. (sub. DR143, p. 21)

CUAC envisaged that the National Water Consumer Advocacy Centre and the grants program would be funded initially through consolidated revenue, with a view to funding via a levy on water businesses at a later stage. The establishment of a national water consumer research/advocacy grants program was seen by CUAC as an alternative model for developing a strong consumer advocacy body.

The Australian Water Association considered a consumer advocacy body would be most appropriately constituted at the utility level:

AWA member utilities engage regularly with customers through a variety of means and the idea of convening a customer representative body is not opposed. However, we do not believe that a national representative body would be desirable, given that there are numerous utilities in Australia each providing water services in various ways under unique circumstances. Unless the responsibilities of a national customer representative body were very broad and shallow – which would cause one to wonder whether it is worth the effort – such a national body is unlikely to produce recommendations that are representative of customers within any particular utility’s area of operations. If this approach were to be adopted it would be best done at a utility level. (sub. DR157, p. 10)

---

Given the widely recognised difficulties involved with determining consumer preferences in the urban water sector, the Commission considers there is merit in looking at the formation of a body, independent of decision makers, to give voice to consumer preferences. Were such a body to be created, it would be important that it was truly representative of all consumers. This would not be an easy task but would be critical to the success of the negotiation process. It would be important that the body not be ‘captured’ by particular customers, such as major water users or disadvantaged groups.

Although formation of such bodies might initially require government funding, the Commission envisages they would ultimately be funded according to cost recovery principles through a surcharge on water bills. This would best ensure that the incentives of the entity were aligned with the wishes of customers, and that the costs associated with the entity were appropriately reflected in the price of water.

The Commission considers governments should further consider options for the formation of a representative consumer body.

#### *Public reporting of regulatory decisions*

The Commission notes that, overall, economic regulators tend to be more transparent and have better practices for public consultation than many health and environmental regulators. Economic regulators also typically publish detailed reasons for their decisions, providing the public with greater reassurance that all of the costs and benefits of decisions have been adequately considered.

Following the draft report, a number of health and environmental regulators and jurisdictions highlighted measures they had in place to ensure transparency and accountability. For example, the NSW Government highlighted the processes followed by the Environmental Protection Agency in New South Wales and NSW Health (sub. DR146).

The Commission considers there would be public benefits from more widespread adoption of these practices by health and environmental regulators. Moreover, as discussed elsewhere in this report, many existing urban water regulations in the health and environmental areas do not appear to provide *net* benefits and few appear to have been assessed on this basis. Increased transparency and public consultation would be likely to reduce the possibility of regulations being enacted that were effectively a burden on the community without providing substantial gains or risk reduction.

---

### *Merit review of regulatory decisions*

The potential for merit review is important both for safeguarding the rights of those regulated and for ensuring regulators follow due process in making their decisions. In the words of the Administrative Review Council:

The principal objective of merits review is to ensure that those administrative decisions in relation to which review is provided are correct and preferable:

- Correct – in the sense that they are made according to law; and
- Preferable – in the sense that, if there is a range of decisions that are correct in law, the decision settled upon is the best that could have been made on the basis of the relevant facts.

This objective is directed to ensuring fair treatment of all persons affected by a decision. Merits review also has a broader, long-term objective of improving the quality and consistency of the decisions of primary decision-makers. Further, merits review ensures that the openness and accountability of decisions made by government are enhanced. (Administrative Review Council 1999)

Given appeals are likely to be expensive and time consuming, there should be benefits from ensuring a relatively simple, straightforward appeal process. It is also important that the appeal body is independent from the regulator and, also, preferably from government. This is especially the case where the government owns water utilities. The Australian Competition Tribunal would appear to be an appropriate body to hear appeals against regulatory decisions with respect to economic regulation, although the Commission has some concerns about the potential cost and timeliness of appeals to this body.

Following the draft report, of those participants that commented on possible appeals bodies, most supported the Australian Competition Tribunal as an appeals body for economic regulatory issues. For example, the Lower Macquarie Water Utilities Alliance and the Centroc Water Utilities Alliance said they concur ‘with the suggestion that the Australian Competition Tribunal is the most appropriate appeals body’ (sub. DR131, p. 16).

The Australian Water Association thought the Australian Competition Tribunal to be an appropriate appeals body, but considered a state-based body could be preferable (sub. DR157).

With regard to health and environmental regulation, there is no equivalent body to the Australian Competition Tribunal and there might be greater reliance on civil and administrative tribunals (such as the Australian Government’s Administrative Appeals Tribunal, the Administrative Decisions Tribunal in New South Wales or the Victorian Civil and Administrative Tribunal), *ad hoc* panels or formal court

---

processes (including bodies such as the Land and Environment Court in New South Wales or the Environment Resources and Development Court in South Australia).

The Commission does not consider that the cost of establishing new appeal bodies to deal with matters arising from the urban water sector alone can be justified. Extending access to, and if necessary jurisdiction of, existing bodies would deliver suitable outcomes, especially where such bodies already have jurisdiction over some of the decisions made by the relevant regulators.

There is also the question of third party appeals (that is, whether third parties not directly involved in a regulatory decision can appeal). Although third party appeals can be problematic, appeal processes are likely to improve regulatory decision making and the Commission therefore does not consider third party appeals should be prevented. Rather, efforts should be made to ensure appeal processes are designed to prevent participants using them mischievously.

The Commission's recent report on planning, zoning and assessments identified a number of practices which should reduce vexatious third-party appeals and reduce opportunities to 'slow down' planning processes. These included clear identification of appellants and their grounds for appeal, ensuring courts had the capacity to award costs against parties seen to be appealing for purposes other than planning concerns, and prohibition of appeals where parties had not objected at earlier stages of the planning process. Requirements for parties to meet and discuss issues (mediation) can also reduce the third party appeals which proceed to court (PC 2011d).

#### RECOMMENDATION 10.6

*Governments should ensure that environmental and health regulators are more transparent and accountable in their decision making by:*

- *ensuring environmental and health regulators publish draft decisions for public comment (except in emergency situations)*
- *ensuring environmental and health regulators publish reasons for their decisions in a similar manner to economic regulators*
- *establishing merit review procedures administered by existing jurisdictional courts or tribunals.*

## **10.4 A charter between governments and utilities**

As discussed throughout this chapter, the Commission considers that the urban water sector would produce better outcomes if governments, in their capacity as utility owners, created publicly available charters to provide water utilities with

---

guidance. Each charter would seek to ensure the practices of the utilities were consistent with the shareholder government's overarching objective for the sector. The charters would have some elements that are common across all utilities, while others would be specific to the individual utility concerned (especially to retailer–distributors).

The charter, which the Commission anticipates would be a relatively brief document (approximately five to six pages), would set out those items highlighted in this chapter:

- obligations to serve (security of supply and obligation to procure)
- obligations regarding public health and the environment
- transparent processes and procedures for supply augmentation (cost–benefit analysis, public consultation, tenders for supply, public reporting of the decision, and monitoring of the process by an independent body)
- principles for pricing and service offerings
- transparent processes and procedures for setting prices that involve public consultation, public reporting of decisions and periodic review by an independent body
- borrowing and dividend policies
- customer service standard/hardship policies
- risk allocation (between consumers, the government shareholder and private suppliers)
- nature and funding of CSOs
- annual performance reporting requirements and provision for independent reviews
- sanctions for poor performance against the charter.

The Commission considers the charter, as part of the revised institutional and governance arrangements, would obviate the need for regulatory price setting in the sector, and therefore anticipates the charter would also cover a number of areas currently determined by regulators, such as levels of return, asset valuations and pricing structures. (Issues relating to the appropriate pricing of infrastructure are discussed in chapter 6).

The Commission notes that since the concept of the charter was discussed in the draft report, it has received widespread support from participants, although there are differing views about the precise role of the charter, what should be included and what processes should be undertaken in drawing up the charter. A number of

---

participants also questioned whether a governance charter could adequately replace regulatory price determination (box 10.4).

**Box 10.4 Participants' views on the Commission's proposal for governance charters**

A number of participants have expressed support for the Commission's proposed charter:

The Commission's recommendation on creation of a charter with Government ... with outcome based obligations is supported and should lead to a substantial improvement in economic efficiency and provide considerable benefits to our customers. (Yarra Valley Water, sub. DR115, p. 4)

AWA sees advantages in this approach. As indicated in the opening paragraphs to this submission, AWA is concerned about the potential for political interference in the operation and regulation of water utilities, to the detriment of the majority of consumers and to the utility in question. A transparent Charter, incorporating best practice governance arrangements and governments' requirements for the performance of utilities, may help to [clarify] the competing objectives faced by utilities. (Australian Water Association, sub. DR157, p. 9)

We support the concept of a charter for water utilities that sets out governments' expectations and includes transparent processes for decision-making about supply augmentation and other matters. (IPART, sub. DR118, p. 3)

Melbourne Water is broadly supportive of the ... findings and recommendations in respect of establishing an industry objective and introducing charters to provide greater clarity around the responsibilities and accountabilities of the stakeholders in the industry, and greater transparency ... It is also supportive of the ... recommendations to ensure that these processes are transparent and accessible ... Melbourne Water considers that [the charters] should clearly specify the roles, accountabilities and required decision making processes and transparency requirements under both normal (business as usual) and extreme (emergency) conditions. (Melbourne Water, sub. DR156, p. 3)

City Administration agrees that State and Territory Governments should draw up charters for urban water utilities incorporating best practice governance arrangements and governments' requirements for the performance of utilities and there should be public consultation on the charter. (City of Wanneroo, sub. DR150, p. 5)

Although some participants are doubtful the proposed charters will be as effective as the Commission envisages:

While, in a perfect world, governments would commit to and abide by such commitments to implement principled reform, including efficient pricing and full cost recovery, the experience with implementation of [National Water Initiative] commitments over many years suggests that this is much harder to achieve in practice when governments face many conflicting pressures. (National Water Commission, sub. DR130, p. 4)

A charter of expectations between the government and each water utility is strongly supported by this submission as a means for clarifying the roles and responsibilities of water utilities ... [however] the proposed charter would do little to alter the dynamics of the urban water sector ... none of the claimed benefits of the proposed charter support the removal of economic regulation. (Dr Ron Ben-David, sub. DR158, pp. 34–36)

---

## **Implementing charters**

Where water utilities are controlled by State or Territory Governments, implementation of charters should be relatively straightforward. Where water utilities are controlled by Local Governments, the Commission still considers that charters are desirable. It is likely, however, that the development of a ‘common charter’ by State or Territory Governments would be preferable to a separate charter being developed for each Local Government. This would also deal with the problem of utilities owned by multiple councils where no one council could exercise control. There might need to be subtle differences in the content of charters depending on the nature of specific water businesses and their legal form.

## **Monitoring performance against the Commission’s proposed charter**

It is envisaged that the performance of the utility against the charter would be publicly reported annually against a range of measures specified in the charter. This report would form part of the annual report of each utility and would be verified by auditors. It is anticipated that regulators would play an important role in developing this reporting framework especially in those jurisdictions, such as Victoria, where reporting frameworks are already well developed.

There will be a number of utilities that are similar regarding their type of operations, size and other characteristics. The Commission considers it would be helpful for the performance reports of similar utilities to be collated and summary statistics to be produced on an annual basis in much the same way as performance information is currently collated by the NWC and WSAA, or the NSW Office of Water.

Beyond this, it is appropriate that more detailed analysis of the utility’s performance is undertaken periodically (for example, every five years). This role could be undertaken by either the relevant jurisdictional economic regulator or auditor general. The Commission anticipates this review would include publication of draft findings and seek comment from the public and the utility before providing a report to the relevant government (to be publicly released) who would be expected to respond to any material findings or recommendations.

For performance monitoring to be effective, the objectives set for GTEs should be clearly defined and, importantly, measurable.

In jurisdictions with a large number of Local Government water utilities (namely New South Wales and Queensland), there could be administrative issues with having the performance of utilities reviewed simultaneously. There might be benefits in staggering performance reviews so that different groups of utilities are

---

reviewed in different years, or alternatively in grouping utilities together to make the task more manageable. Another option might be to only perform ‘high level’ (that is, less detailed) performance reporting of utilities generally, but to focus more extensively on utilities seen as poor performers.

## **Dealing with poor performance against the charter**

Where a State or Territory government owns a GTE, the Commission considers that removal of board members, and possibly entire boards, would be an appropriate sanction for ongoing poor performance.

Following the draft report, some participants expressed concern that the use of (then unspecified) sanctions under the governance charter could increase the possibility of political interference rather than reducing it. For example, Dr Ron Ben-David said:

By placing great reliance on ‘appropriate sanctions’ to be applied by Ministers, the Draft Report’s proposed arrangements would increase rather than decrease the potential for political intervention. (sub. DR158, p. 9)

The Commission agrees that any form of threat hanging over GTE board members potentially increases the possibility of political interference. However, there is a need for tradeoffs between independence and accountability, and board members must be accountable for the performance of utilities. The Commission considers that the current regulatory and governance frameworks, especially those in place for the major metropolitan utilities, are not effective in holding directors to account. Ministers, not regulators, must be responsible for external governance of the utility, meaning they have a responsibility to ensure boards are performing adequately, and to act when it becomes apparent that a board is performing poorly.

The Commission’s preferred governance arrangements are designed to ensure performance reporting processes are thorough and transparent. Where board members are dismissed because monitoring against the charter indicated poor performance, the public would have access to the information used by ministers to reach such a decision. If board members were kept in place despite ongoing poor performance, the public would also be able to see this and, if sufficiently concerned, ultimately hold ministers to account. The transparency of the arrangements should prevent undue political interference.

Where councils have responsibility for water provision, applying sanctions might be more problematic. Given councillors are democratically elected representatives, replacing them with unelected officials would generally only be justified based on evidence of widespread malfeasance or extremely poor performance across a number of areas. However, it could be an option where an independent review has

---

established manifest poor performance and systematic failure to meet the objectives of the charter.

A further option for State and Territory Governments dealing with Local Governments would be, where feasible and appropriate, to appoint administrators to running aspects of the Local Government's water operations (while leaving elected officials in place). However, such provisions would need to be used sparingly, only where there is clear evidence that they were likely to be beneficial and only after an independent review of performance found such measures to be justified.

RECOMMENDATION 10.7

*State and Territory Governments should draw up charters for urban water utilities incorporating best practice governance arrangements and governments' requirements for the performance of utilities.*

*The charter would set out details about:*

- *obligations to serve (security of supply and obligation to procure)*
- *obligations regarding public health and the environment*
- *transparent processes and procedures for supply augmentation and economic assessments (public consultation, tenders for supply, public reporting of the decision, and monitoring of the process by an independent body)*
- *principles for pricing and service offerings*
- *transparent processes and procedures for setting prices that involve public consultation, public reporting of decisions and periodic review by an independent body*
- *borrowing and dividend policies*
- *customer service standard/hardship policies*
- *risk allocation (between consumers, the government shareholder and private suppliers)*
- *clearly specified and fully funded Community Service Obligations*
- *annual performance reporting requirements and provision for independent reviews*
- *sanctions for underperformance against the charter.*

*There should be public consultation regarding the contents of the charter. Independent economic regulators in each jurisdiction would also be well placed to provide advice to the government.*

---

*Independent economic regulators, or some other appropriate government agency, in each jurisdiction, could oversee reporting against the charter. Reporting against the charter should incorporate a variety of performance indicators across various aspects of water utilities' performance.*

---

# 11 Rethinking price regulation

## Key points

- The primary rationales for current (and planned) price setting arrangements in the urban water sector are:
  - preventing the exercise of market power by monopoly utilities:
    - setting prices above the cost of supply to increase profits
    - X-inefficiency, whereby a lack of competitive forces reduces the incentive for utilities to minimise the cost of supply
  - avoiding politicisation of utility pricing
  - ensuring full cost recovery.
- After considering these rationales, and taking account of the reforms proposed elsewhere in this report, it is the Commission's view that the benefits of ongoing price setting would be unlikely to exceed the associated costs.
- Following implementation of improved governance requirements (particularly governance charters between utilities and shareholder governments), State and Territory Governments should move away from regulatory price setting to a price monitoring regime (where some form of prices oversight is considered necessary). Within five years of moving to a price monitoring regime, there should be independent reviews to determine:
  - whether water utilities are misusing their market power and, if they are, what action should be taken to deal with this
  - whether ongoing price monitoring is likely to produce net benefits to the community and, therefore, whether it was still required.

Independent prices oversight has been a key feature of reform in the urban water sector. As part of the National Water Initiative (NWI), COAG stated:

77. The Parties agree to use independent bodies to:

- i) set or review prices, or price setting processes, for water storage and delivery by government water service providers, on a case-by-case basis, consistent with the principles ... above; and
- ii) publicly review and report on pricing in government and private water service providers to ensure that the principles ... are met. (COAG 2004, p. 16)

---

Although pricing by metropolitan water utilities in all jurisdictions is subject to oversight by independent regulators, there are jurisdictional differences regarding the role of regulators in the setting of utility prices. In Victoria, the ACT, and for the larger utilities in New South Wales, regulators set the individual prices charged by water utilities for most of the services they offer.

In other jurisdictions, regulators generally have an advisory role (with governments responsible for setting prices). There are also differences between arrangements for metropolitan and rural water utilities. For example, in Victoria all utilities are subject to price setting by regulators. However, in New South Wales and Queensland, Local Government utilities set their own prices under guidelines developed by State Governments.

The South Australian and Tasmanian Governments have announced that regulators will, in future, set prices in those states (although it appears Queensland has determined instead to continue with its current ‘interim’ monitoring regime indefinitely). More information about prices oversight across jurisdictions is contained in appendix B.

The urban water sector is generally considered a ‘natural monopoly’ sector. Concerns about the misuse of market power by businesses characterised as natural monopolies has led to high levels of government direction and regulation of prices.

In this report, the Commission has made a number of recommendations for governance and institutional reform (chapter 10) which, if adopted, would lead to improved performance of the sector. The recommended changes include:

- clarification and prioritisation of objectives
- greater clarification of the roles and responsibilities of governments, utilities, regulators and consumers
- government ownership of retailer–distributors, which would be given responsibility for procurement and security of supply (using a portfolio manager framework)
- the incorporation of utilities (which are not embedded within Local Governments) under the *Corporations Act 2001* (Cwlth) (or state equivalent)
- a charter between the government and utilities, which would guide pricing, procurement of supply and financial performance
- public reporting by utilities of performance against the charter
- periodic public review of utility performance against the charter, with sanctions for poor performance.

---

In light of these recommendations, it is appropriate to reconsider the appropriate form of prices oversight. In doing this, the Commission has applied the principles of effective regulation detailed in chapter 5, which involve identifying the potential problems and how significant they are likely to be, weighing up the options for dealing with the problems and adopting the option generating the greatest net benefit for the community.

## 11.1 What is the rationale for prices oversight?

The primary rationales advanced for price regulation of the urban water sector can be summarised as:

- preventing the exercise of market power by monopoly utilities:
  - setting prices above the cost of supply to increase profits (Viscusi et al 2005)
  - X-inefficiency, whereby a lack of competitive forces reduces the incentive for utilities to minimise the cost of supply and offer innovative services (Viscusi et al 2005)
- avoiding politicisation of utility pricing
- ensuring full cost recovery.

### Market power and inefficient pricing

The exercise of market power can lead to economic inefficiencies, including dynamic and allocative inefficiency. Concern about market power in the presence of natural monopoly has been the traditional reason for implementing independent price regulation. As stated by the NSW Government:

The economic case for regulating natural monopolies to ensure they do not exert market power is long-established, and price regulation of monopoly service providers is an established way of seeking to ensure that monopolies do not abuse their market power in terms of pricing or service quality. Water utilities' prices are regulated because parts of their supply chain, such as transmission and distribution, are natural monopolies. (sub. DR146, p. 4)

Other participants also expressed concerns about the potential for monopoly pricing. For example, Amy-Rose West suggested inadequate pricing oversight in Queensland has led to poor outcomes for consumers:

Existing governance and institutional arrangements are ineffective in Queensland. As a consequence households in Coolum Beach and throughout South East Queensland are deprived statutory protection against pricing abuse by government monopoly business entities that should be available under National Water Initiative Pricing Principles. This

---

is due to an ongoing Queensland Government refusal to refer legitimate prices oversight investigation requests to the Queensland Competition Authority (QCA) for independent assessment under Part 3 of the Queensland Competition Authority Act. (sub. 9, p. 1)

The efficiency costs of exercising market power by charging monopoly prices can be illustrated using a simplified framework (box 11.1). It is also worth noting that the gains from policy intervention (that is, reduction in the loss of consumer welfare) decline as the degree of market power is reduced as the ‘monopoly price’ moves closer to the ‘efficient price’ (PC 2004b). The size of the potential monopoly pricing problem, and therefore of the prospective benefits from regulatory intervention, depend on the extent to which monopoly power is exercised in practice.

### **Market power and X-inefficiency**

The absence of competitive forces can reduce incentives for management of a monopoly water utility to minimise the cost of supply and undertake innovation in its procurement of new supplies, operations, and their service offerings to customers. In particular, it is often argued that government-owned businesses in particular are likely to ‘seek an easy life’ rather than seek out efficiency improvements, innovate and respond to customer demands.

The Independent Pricing and Regulatory Tribunal (IPART) noted that the gains from exercising market power need not always end up with shareholders:

It is often overlooked that monopoly rents are more likely to be appropriated by management and workers than owners where utilities are government owned. (sub. DR118, p. 8)

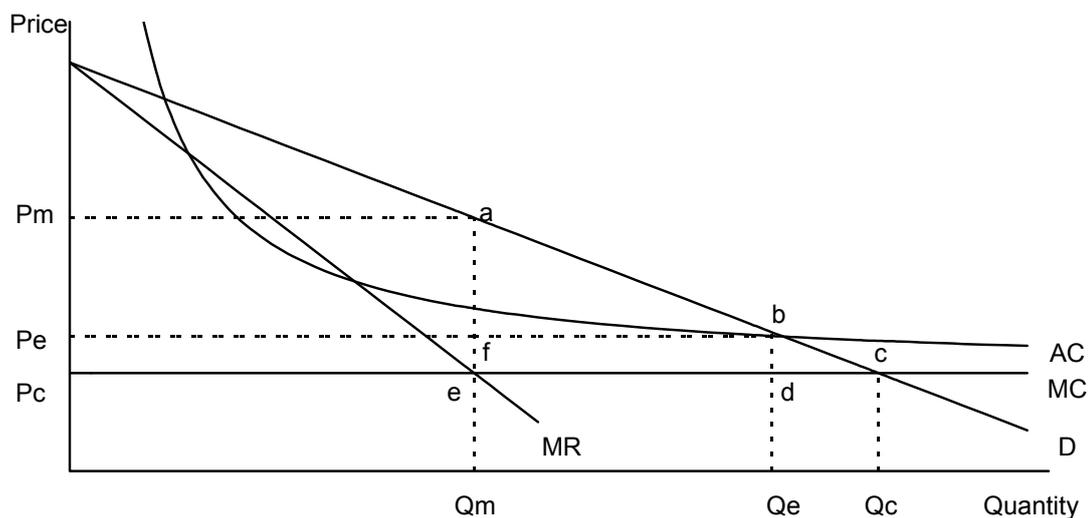
To illustrate that X-inefficiency existed previously in water utilities, and implying an ongoing need to address it, IPART said:

The reform process has yielded clear efficiency gains. At the start of the 1990’s there was considerable scope for the water utilities to make cost savings. By 2005, Sydney Water employed less than half the staff it had employed when IPART was established in 1992. These staff reductions also translated into reductions in operating expenditures ... over the four years to 1996 Sydney Water, at the behest of IPART, was able to reduce operating expenditures by almost 20%. Close and ongoing regulator oversight meant that pressure was able to be maintained on operating expenditures over the following decade to the benefit of the consumers of Sydney Water’s services. (sub. DR118, pp. 8–9)

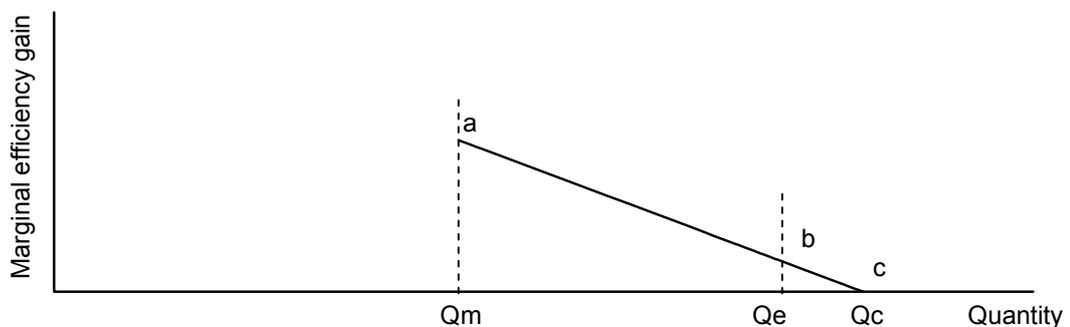
**Box 11.1 Interaction between efficiency losses from and level of market power: a stylised, comparative static, 'textbook' model**

A water utility with market power seeking to maximise profits would do this by increasing price to  $P_m$  and reducing supply to  $Q_m$  (where marginal revenue equals marginal cost). In the presence of economies of scale, the lowest price the utility could sustain in the longer term would be at point b (where price equals average cost).

Moving from point a to point b both improves overall efficiency and involves a transfer of income from the monopolist to users. The net efficiency gain is the area abde, derived from a gross improvement of area  $abQ_eQ_m$ , less the resource cost of the improvement being the area  $edQ_eQ_m$ . This net efficiency gain is distributed to consumers (triangle  $abf$ ) and the water utility (rectangle  $fbde$ ). There is also a transfer of income from the water utility to users of the area  $afP_eP_m$ .



Importantly, marginal efficiency gains decline as the gap between price and marginal cost narrows. The marginal efficiency gain from the increase in consumption arising from lowering the price, decreases as the quantity is increased from  $Q_m$  to  $Q_e$ .



---

Essential Services Commission (ESC) Chairperson Dr Ron Ben-David has painted a pessimistic picture of the current urban water sector with regard to X-inefficiency:

In a competitive market, failure to invest adequately in capital upgrades and product development would be a form of ‘commercial suicide’. Monopolists do not face this threat (other than, perhaps, over the very long term). Therefore, commercial and intellectual underinvestment is only possible where considerable market power exists. Anecdotally at least, it would seem that, overall, the water sector is characterised by underinvestment in capital upgrades and a low level of attention to enhanced product offerings ... Under-investment occurs precisely because market power exists and because it is being exploited by water utilities (and their respective shareholders). This leads to outcomes for customers that are less efficient than those that would prevail had competitive forces been at play. (sub. DR158, pp. 30–31)

### **De-politicisation of pricing decisions**

Many participants supported price regulation as way of preventing politicisation of pricing decisions. As discussed in chapter 10, there are a number of tensions within the government trading enterprise (GTE) model with regard to governments wishing to intervene in the activities of water utilities. For example, governments might seek to gain political popularity by setting prices lower than they would otherwise be, or could seek to set prices higher than otherwise to improve their budgetary situation.

It is argued that having independent regulators setting prices assists in de-politicising pricing decisions.

Sydney Water highlighted the issue of political interference:

I think the regulators have pretty much stopped the monopoly power abuse, but what they haven’t stopped in all jurisdictions is politicians telling them not to put prices up. So in Queensland you get huge infrastructure spends without anybody working out how to pay for it, and it not being reflected yet in water prices, and now it’s starting to be reflected and everyone is going, ‘Hey, what’s happening here?’ (trans., p. 113)

### **Full cost recovery**

The argument that price regulation can be used to ensure full cost recovery is related to the de-politicisation argument, and is based on the view that political incentives have traditionally led to water prices being set inefficiently low. Many see the role of regulation as ensuring the recovery of costs. As IPART has stated:

There is some support for the view that the role of price regulation is to achieve outcomes similar to those that would accrue from a long term contract between producers and consumers, in part to protect sunk investments. (sub. DR118, p. 4)

---

Pricing at below full cost recovery can encourage inefficiently high consumption and potentially places utilities under financial stress and discourages future investment and maintenance (unless government compensates utilities through Community Service Obligation payments). The long-term implications of underrecovery could be quite significant in terms of quality of service provision. A report prepared by former Australian Competition and Consumer Commission (ACCC) Commissioner David Cousins for the SEQ Council of Mayors expressed concern about State Government interference in Queensland pricing decisions:

State government criticism of Councils for the pricing of the distributor–retailers seems contrary to the basis on which the Government established these entities as independent bodies, having a commercial focus and subject to independent prices oversight. State Government, or Council, suggestions to ignore the costs of providing water services, or to restrict the degree of efficient cost recovery through pricing intervention, will result in inefficient and possibly inequitable prices being set. Recent legislation, requiring the [Queensland Competition Authority] to consider the application of price paths when proposed price increases exceed the rate of inflation and giving the Minister power to make codes relating to price determinations, raises concerns that efficient pricing will be compromised. (Cousins 2010, p. 4)

Tasmania’s economic regulator recently highlighted the consequences of current government-determined price caps in that State:

The fact that the corporations, under accounting requirements, have been required to adopt impaired asset values, much lower than the true replacement cost of those assets, is indicative that revenues under the current pricing arrangements are insufficient to ensure the sustainability of the corporations in the longer term. This outcome means that, without further revenue and price increases after the interim period, the corporations will not be able to fund sufficient levels of investment to maintain their assets. ... The unsustainability of the industry is also highlighted through the extent that expected revenues are below full cost recovery and, more importantly, the fact that all three corporations will require increases in debt to fund their cash obligations. At some point after the interim period, revenue and prices will need to rise at a rate greater than five per cent per annum for some customers for the corporations to achieve sustainability. The only alternative would be to sacrifice or defer dividends and/or capital expenditure at some point. (OTTER 2010a, p. 26)

A complication of implementing full cost recovery is that costs incurred might not always be efficient, or might reflect a desire by governments to have excess capacity. As discussed in chapter 10, where inefficient investment decisions mean costs incurred are not optimal, decisions have to be made about whether to write down the value of assets (leading to lower charges for consumers, but a loss for taxpayers) or to charge consumers for non-optimised services. In the case of government-owned utilities, the critical distinction is in the category of tax payer (that is, whether they pay for the infrastructure as a tax payer or water user) and the marginal efficiency of taxation instruments.

---

## 11.2 How significant are these problems likely to be?

In determining the best way to deal with the problems identified, it is important to gauge their significance. It is also important to consider whether these problems would be less significant after the implementation of the governance and institutional reforms recommended elsewhere in this report.

### Significance of monopoly pricing concerns

The Commission accepts that publicly owned urban water utilities are likely to possess market power, and could potentially misuse that power. However, the misuse of market power is likely to be small under the Commission's recommendations if utilities are government-owned<sup>1</sup> and shareholder governments are committed to:

- efficient pricing,
- setting the objectives of the utilities and putting in place good governance arrangements (including a commitment to transparent, competitive bulk water supply and outsourcing arrangements)
- processes and procedures such as independent performance reporting to hold governments and utilities accountable.

Some participants questioned the commitment of governments to efficient pricing. The National Water Commission (NWC) noted that governments can see utilities as an easy source of revenue and suggested that, in view of conflicting priorities, governments have encouraged utilities to price at above efficient levels<sup>2</sup>:

The NWC observes that there have also been occasions where their owner governments have used water businesses as revenue-raising instruments. While, in a perfect world, governments would commit to and abide by such commitments to implement principled reform, including efficient pricing and full cost recovery, the experience with implementation of NWI commitments over many years suggests that this is much

---

<sup>1</sup> Government ownership as a solution to potential abuse of market power by natural monopolies is long accepted (see, for example, Viscusi et al 2005). However, government ownership is often associated with inefficient production and political intervention, meaning sound governance procedures and use of measures such as competitive tendering are particularly important.

<sup>2</sup> If utilities were used as 'cash cows' or effectively instruments of taxation (Viscusi et al 2005), the manner in which this was done would determine how distorting the impacts would be. If the 'excessive' charges took the form of a lump sum, water allocation decisions would be unaffected. However, if volumetric charges were set at above efficient levels, consumption decisions would be affected and the effects would be relatively distorting.

---

harder to achieve in practice when governments face many conflicting pressures. (sub. DR130, p. 4)

The issue of governments using water utilities as ‘cash cows’ is discussed in chapter 10. Although this is a legitimate concern, the Commission concludes, based on its GTE performance monitoring reports over the years and the evidence on dividends in chapter 2, that it is unlikely that excessive dividend payments have been extracted from utilities to any significant degree, and notes that more often there have been concerns that dividend payments are too low. More importantly, regardless of past practices (and in view of the ongoing potential for demands for excessive dividends), the Commission recommends that the inclusion of appropriate mechanisms for determining dividends should be incorporated in the Commission’s proposed governance charter (chapter 10).

The NWC has been concerned about the potential for monopoly pricing, and has cited the difference between regulated revenue proposed by water businesses and that approved by the regulator in recent years as evidence of a problem that needs to be addressed:

One indicator of the gains from stronger economic regulation (i.e. powers to set prices) is the difference between regulated revenue proposed by water businesses and that approved by the regulator ... [based on] outcomes from price determinations for the ESC (2005-06 to 2007-08) and IPART (2005-06 to 2008-09) ... examples where the revenue approved by the regulator was much below that proposed by the water businesses include:

- Sydney Water (1.95 per cent or \$122 million)
- Melbourne Water (5.52 per cent or \$86 million)
- Gippsland Water (9.67 per cent or \$17 million).

This suggests there were large cost savings in delivering the required services. (NWC 2011b, p. 67)

However, this could also be evidence of regulatory ‘gaming’. As the NWC itself added:

The potential for regulatory gaming should be considered when interpreting these estimates. For example, a regulated business may submit inflated estimates of required revenues anticipating a downward adjustment by the economic regulator. However, incentive for ‘gold plating’ is not unique to regulated water businesses and without the scrutiny of an economic regulator scope for gold plating by water businesses is much higher. (NWC 2011b, p. 67)

The ‘gaming’ process that is almost an inherent feature of price setting is such that the difference in revenue proposed by the utility and that approved by the regulator

cannot truly be seen as indicative of the effectiveness of regulation. The issue of regulatory gaming is discussed further later in the chapter.

The Commission also notes that the examples highlighted by the NWC are not typical of regulatory outcomes for all of the utilities they analysed. The differences between revenue proposed by the utility and that approved by the regulator are typically small and, due to previously unforseen investment, for many utilities the approved revenue was higher than that initially sought (table 11.1) (NWC 2011b).

**Table 11.1 Proposed and approved revenues, New South Wales and Victorian water utilities**

New South Wales 2005-06 to 2008-09, Victoria 2005-06 to 2007-08

<i>Utility</i>	<i>Proposed revenue (\$m)</i>	<i>Approved revenue (\$m)</i>	<i>Difference (%)</i>
Sydney Catchment Authority	666.5	652.5	-2.10
Sydney Water	6274.0	6151.8	-1.95
Hunter Water	614.9	631.6	2.72 <sup>a</sup>
Melbourne Water	1560.9	1474.8	-5.52
City West Water	673.5	691.3	2.64 <sup>a</sup>
South East Water	1043.8	1019.1	2.36 <sup>a</sup>
Yarra Valley Water	1101.6	1101.3	-0.03
Barwon Water	256.7	276.2	7.60 <sup>a</sup>
Central Highlands Water	129.4	122.2	-5.56
Coliban Water	139.7	135.6	-2.93
Gippsland Water	179.9	162.5	-9.67
Goulburn Valley Water	108.7	111.2	2.30 <sup>a</sup>
North East Water	88.7	88.9	0.23 <sup>a</sup>

<sup>a</sup> Observed price increases generally reflect additional expenditure that businesses put forward to deliver programs not initially included in water plans.

Source: NWC 2011b.

Further, as will be discussed later in the chapter, this table only demonstrates divergence in a range of cost and revenue parameter forecasts required to set utility prices. There is no inherent reason to assume that the conclusions reached by regulators were necessarily more accurate than those reached by the utilities.

Evidence that misuse of market power in the urban water sector is not a large problem is that the major concerns in the urban water sector have traditionally related to low rates of return, underpricing, financial distress and, at times, subsequent concern about inadequate maintenance and investment.

---

Where concerns about excessive pricing have existed, they have usually stemmed from cross-subsidies between customers — such as from business to domestic customers — prior to the microeconomic reform era.

IPART commented on the issue of cross-subsidies:

Further, in our view, any analysis of the most efficient structure for the regulation of water utilities' prices should take account of the government ownership characteristics of these monopolies. The experiences of Australia and other jurisdictions reveals a strong tendency towards social or political pricing, extensive non-transparent cross-subsidies and underpricing, even where utilities have been established on a more commercial basis. Under the current price regulation framework these pressures for hidden subsidies are contained through the regulator's processes of transparency and public participation and through the clear separation of the policy, shareholder and regulator roles. We are concerned that a move to mere price monitoring would allow greater political intervention in pricing to go undetected and/or otherwise lead to inefficient pricing outcomes. (sub. DR118, p. 7)

The reforms recommended in chapter 10 are designed to ensure the independence of utilities, clarify roles and responsibilities and ensure accountability (with potential sanctions for poor performance). Increasing the freedom of utilities to set tariffs, and making Community Service Obligations explicit, should prevent politically motivated pricing decisions and non-transparent cross-subsidies.

The proposed chapter 10 reforms involve clear separation of the policy, shareholder and regulatory roles, and would ensure transparency in pricing decisions. The Commission considers that, particularly following implementation of its proposed governance reforms, the potential for monopoly pricing would be quite limited.

The use of regulators to deal with monopoly pricing concerns also presents the danger that the regulator might come to see itself as a consumer advocate, rather than an impartial regulator focused on efficiency. As Biggar recently wrote:

There is a need to clarify the role of the regulator itself. At present there is some confusion whether a utility regulator in Australia should act on behalf of customers, soliciting and promoting their views, or whether it should objectively weigh and assess the claims of both parties — playing the role of an independent arbitrator. This is particularly an issue for the Australian Competition and Consumer Commission ... which plays a consumer protection role in other sectors. The combination of increasing political pressure on utility prices, combined with weak and ineffective representation from consumer groups, is leading to increased pressure on regulators ... to exercise a customer protection role ... customer advocacy and independent arbitration are two distinct roles which should be performed by two different entities. (Biggar 2011, p. 7)

---

If regulators tended to make decisions on pricing which were, at least in the short term, favourable to consumers (by setting prices low), this could have the impacts discussed earlier associated with underrecovery.

As discussed in chapter 10, the Commission considers it would be preferable to find ways to better involve consumers in supply and augmentation decisions — possibly through the formation of a group to represent the interests of consumers — rather than having the price regulator consider consumer advocacy to be part of its role.

### **Significance of X-inefficiency concerns**

IPART suggested that by providing a ‘hard budget constraint’ (sub. DR118, p. 7), price setting has, in the past, presented a mechanism for pressuring water utilities to improve their efficiency, and to pass on efficiency benefits to customers. The Commission accepts this, and also notes evidence to this effect from overseas urban water sectors which has been highlighted by the ACT’s Independent Competition and Regulatory Commission (sub. DR148).

However, what is less clear is whether this is an ongoing feature of price regulation, or whether the benefits are of a more ‘one off’ nature. It is noteworthy that the greatest expenditure reductions quoted by IPART relate to the four years to 1996, and there have been no major ongoing reductions over the last 15 years. This also suggests X-inefficiency is much less of a concern than it has been in the past. This is consistent with the changing nature of the utilities in recent years (chapter 2) and the greater use of contracting out and outsourcing (chapter 5).

The Commission considers that it is likely that the benefits of regulation in forcing utilities to be more efficient are likely to be heavily concentrated in the early years of regulation, and that in most Australian jurisdictions the potential for further efficiency gains would be limited. It is also noteworthy that regulators appear to be increasingly ‘hamstrung’ by government decisions that reduce their capacity to achieve efficiency improvements (for example, being required to pass through to consumers costs of supply augmentations without being able to assess the efficiency of those augmentations) (chapter 10).

In any case, in the Commission’s view, it is arguable that it was institutional and structural reforms, increased use of outsourcing and ‘competition for the market’, and improved management, rather than, or at least, as well as, regulation, that made the major contribution to a significant improvement in Sydney Water’s efficiency.

Given that the major water utilities in New South Wales and Victoria have been subject to price setting for a significant period of time, if the industry is correctly

---

characterised in the comments of Dr Ron Ben-David contained earlier in the chapter, then it is reasonable to ask why regulators have not succeeded in removing X-inefficiency.

The institutional and governance reforms proposed by the Commission, together with the creation of competition for the market at the wholesale level, would provide significant incentives for utilities to operate efficiently. Placing the obligation to supply with retailer–distributors would reduce the ‘blurring’ of responsibilities for water provision that currently exists, while appropriately placing the responsibility of determining supply security levels with government. If governments show commitment to the reforms, utilities would not be subject to politically expedient procurement decisions that have the potential to artificially increase their costs.

By giving utilities greater pricing freedom to tailor tariffs to customer preferences (chapter 6), the Commission’s proposed charter arrangements would increase incentives for utilities to develop new service offerings. There would also be increased public consultation under the charter, and periodic independent performance monitoring. The Commission considers that, following the implementation of these reforms, concerns about X-inefficiency would be fully addressed.

### **Will politicisation be an ongoing issue?**

The reforms discussed in chapter 10 are designed, in large part, to deal with political intervention in the running of water utilities. While *incentives* for political intervention will continue regardless of governance or regulatory arrangements, the creation of a governance charter to ensure the independence of utilities and clarify roles and responsibilities of ministers and utilities respectively would, in the Commission’s view, be more effective than using an economic regulator to deal with problems related to political intervention.

Chapter 10 discussed the number of mechanisms available to elected representatives to intervene in regulatory decision making, highlighting that their presence is not enough to ensure independent decision making.

IPART CEO James Cox stated in a speech in April 2011 that government ownership of utilities had a number of implications for regulators. One of these was:

Improving governance of the utilities may be the primary means for improving efficiency. Ultimately, the government, as owner of the major energy, water and transport businesses, has the most control and influence over the businesses’ behaviour. The incentives to improve cost-efficiency that are embedded in IPART’s price controls

---

are only effective to the extent that they align with the incentives that the government gives to the businesses' management. At present, there is not strong alignment (Cox 2011).

The Commission strongly concurs with this view. Moreover, the Commission also agrees with the CEO of IPART that governance and regulatory arrangements need to be aligned. If the governance reforms in the Commission's report are to be implemented, the accompanying regulatory frameworks would need to be properly aligned with them. Current price setting arrangements in a number of jurisdictions would not deliver that alignment.

### **Will cost recovery be an ongoing issue?**

The Commission accepts that underpricing has been a major issue in the urban water sector for many years, and that underpricing has led to overconsumption and probably underinvestment. However, the Commission does not consider it an appropriate role for regulation to prevent under-recovery of costs.<sup>3</sup>

Rather, price regulation should be focused on preventing abuse of market power where such power can be shown to potentially exist and to be highly likely to be exercised. Moreover, given the costs associated with price setting, it represents a very expensive way, relative to a governance charter, of trying to ensure government-owned water utilities move towards more efficient pricing (Were regulators pressured or 'captured' to make short-term decisions in favour of consumers, regulators themselves could promote underrecovery of costs).

Small rural areas where underrecovery is likely to be most significant are often not subject to price regulation, presumably because the compliance costs are considered too great for the relevant water authorities. (Small rural utilities are typically given guidelines or direction on price setting by State Governments). Numerically, there are considerably more water utilities not subject to independent price regulation than there are subject to it. Further, as demonstrated by the Victorian rural utilities discussed in chapter 13, even when smaller utilities are subject to price regulation, they can still persistently have negative rates of return. The Commission's proposed governance charter would be better placed than price regulation for dealing with underrecovery in rural areas.

---

<sup>3</sup> While price regulation could be used to set floor prices where predatory pricing is a concern, this is not an issue of concern in the urban water sector and in any event would constitute a breach of s. 46 of the *Competition and Consumer Act 2010* (Cwlth).

---

The importance of governance reforms if regulation is to play a diminished role was highlighted by Infrastructure Australia:

However, in the absence of the governance reforms being accepted or in the face of compromised implementation, removal of price setting is likely to result in under-recovery of full costs. This is likely, in turn, to lead to a reversion to the situation where utilities cut back on maintenance and investment, resulting in worker safety, water quality and water security being compromised. (sub. DR107, attachment, p. 11)

As detailed in chapter 10, the Commission envisages that utilities subject to the proposed governance charter would report regularly on their commercial performance, which would flag any issues relating to perceived under- or over-recovery of costs. There would also be periodic independent reviews by a regulator or suitable agency. Under the charter, utilities would be expected to fully recover costs and earn a commercial return on assets, although not one that raised concerns about excessive use of market power. Any directions to utilities from ministers would be in writing and publicly released.

Although there would still be political incentives to keep water prices low, there would also be potential for political embarrassment — given the ongoing responsibility of ministers for external governance — if performance reports against the charter found evidence of sustained poor commercial performance. Reports could also find evidence of inefficiency or poor investment decisions. There would also be continuing countervailing incentives to keep prices relatively high and provide more revenue to the government. Utility boards would be subject to sanctions under the charter for poor performance.

The Commission considers that underrecovery of costs should not be an issue under its proposed governance arrangements.

In a variation on the cost recovery theme, the Water Services Association of Australia (WSAA) suggested that, with significant price increases likely to be necessary for the next few years in many jurisdictions, independent price regulation would have a role in reassuring consumers:

Recent regulatory price paths to 2011-12 and 2012-13 suggest typical residential bills will increase significantly in the coming years if current consumption levels are maintained or increase. Price increases are not a result of regulation. Rather, independent prices regulation provides customers with a level of reassurance that regulator-approved price increases are ‘appropriate’, whilst benefitting businesses by allowing sometimes complex and contentious pricing issues to be debated in an expert and objective forum. (sub. 29, p. 20)

If governments and utilities wish to provide customers with reassurance that price rises are justified, they can do so through the use of transparent governance

---

arrangements (such as the Commission’s proposed charter), by ensuring appropriate water procurement and investment arrangements, by involving consumers in supply and pricing decisions, by employing regular performance reporting and through regular independent reviews of each utility’s performance. These measures should enable utility directors and managers to feel comfortable justifying their decisions to customers.

### **The Commission’s overall assessment of the scope for misuse of market power**

The Commission agrees that concerns about monopoly pricing, X-inefficiency and cost recovery are all legitimate given the natural monopoly nature of the sector, and the traditional levels of political interference in the operations of water utilities. However, it considers that implementation of the governance and institutional reforms in this report would significantly reduce their importance (and does not see misuse of market power or X-inefficiency as overly significant concerns even in the current environment).

## **11.3 Options for future prices oversight**

The three options for future prices oversight in the urban water sector can be broadly classified as:

1. continue with current (or intended) price setting arrangements
2. move to ‘lighter handed’ prices monitoring
3. have no formal prices oversight mechanisms (with utilities still subject to performance monitoring requirements).

### **Price setting**

In this report, the Commission uses the term price setting to describe various arrangements under which regulators effectively set maximum prices or revenues for services in a manner to ensure prices are reflective of the efficient costs of providing those services. In the urban water sector, regulators generally take a ‘building block’ approach to determine the revenue requirements of utilities and then set volumetric and fixed charges based on whether or not costs are directly attributable to consumption.

---

Other ‘price setting’ type arrangements include incentive regulation — where prices are typically set to fall in real terms over time to promote efficiency, while enabling utilities to keep the benefits of any efficient gains beyond the regulated price reduction (Littlechild 2009) — and revenue capping, where regulators set a maximum overall revenue limit, but allow flexibility of individual prices as long as total revenue stays within the cap.

Independent price setting has high informational requirements, with regulators needing to determine the operating, maintenance, administration and capital expenses (including a provision for an appropriate return on capital) associated with service provision. Utilities will have much of the relevant information whether there is price setting or not, but price setting involves duplication with the regulator also needing this information (and utilities incur additional costs from dealing with the regulator).

Price setting is often employed in industries with strong natural monopoly elements. Industries that have been, or are currently, subject to price setting arrangements include electricity and gas transmission and distribution, rail track access and telecommunications networks. However, outside the water sector, incentive regulation or revenue capping have typically been preferred because of their superior efficiency and cost characteristics.

## **Price monitoring**

Price monitoring can take several forms, involving various degrees of regulatory involvement and information provision. Under the price monitoring regime that has replaced price setting at major Australian airports, the ACCC monitors the prices, costs and profits relating to the supply of various services at those airports covered by the regime. The regime as a whole is periodically reviewed by an agency other than the regulator.<sup>4</sup> The intention of the monitoring framework is that the ACCC does not draw conclusions as to whether the prices and profit levels for monitored services are evidence of ‘taking advantage of monopoly power’, but the information assembled, and the ACCC’s reporting of it, helps to enhance market transparency to assist the competitive process and to inform judgments by the Government about whether, *prima facie*, use of monopoly power is likely to be a concern. If warranted, the ACCC could be directed to conduct a public inquiry, possibly leading to stricter price controls (PC 2006b, PC 2011c).

---

<sup>4</sup> The price monitoring regime for airport services is currently the subject of a separate Commission inquiry. The current regime was implemented following a 2002 inquiry by the Commission (which recommended moving from an earlier more heavy handed regime) and was previously reviewed by the Commission in 2006.

---

## **Reliance on performance reporting**

There is also the option of relying on general performance reporting to deal with market power concerns. If the objective of regulation is to replicate competitive market outcomes, improved governance arrangements and requirements for utilities to use ‘competition for the market’ principles could also seek to achieve this objective.

## **11.4 Assessment of regulatory options**

Assessing the relative merits of options requires an evaluation of the costs and benefits associated with them.

### **The potential benefits of options**

Price setting might have the benefit of providing consumers with reassurance that the prices paid for water are reasonable because they have been independently assessed as reflective of the efficient costs of providing a service. As price setting is assessed against efficient costs, it also potentially provides incentives for utilities to become more efficient.

Price monitoring has the potential to also achieve the same benefits as price setting, although outcomes are less certain. However, this flexibility can also be seen as an advantage of price monitoring. Price monitoring better enables utilities to tailor tariff offerings to the needs of particular customers than most forms of price setting, and might be more compatible with a ‘real options’ approach to supply augmentation, which the Commission considers would have considerable benefits (chapter 5).

In view of the costs associated with price setting, in other areas of the economy (such as airports, as discussed above) where government utilities have been subject to microeconomic reform or privatised, initial ‘heavy handed’ price setting has generally been rolled back. This can be seen in other countries, most notably the United Kingdom.

In its 2011 draft report on the price monitoring regime for airport services, the Commission found that there had been a marked increase in aeronautical investment since the move to price monitoring, and that aeronautical charges do not indicate systemic misuse of market power. The Commission also found that all participants in the sector expressed a strong desire to continue with commercial negotiation,

---

with no party seeking a return to price setting, although airlines have expressed dissatisfaction with negotiations with some airports (PC 2011b).

Regulation of ports in Victoria has seen a similar trend to that of airports nationally. Over time there has been a reduction in the number of services subject to price regulation, and price monitoring has replaced potentially more heavy handed regulation for those still subject to price regulation (ESC 2010a). Following a staged process with reviews, some ports are no longer subject to price regulation.

The Chairperson of the ESC, Dr Ron Ben-David, has stated that the urban water sector would be less amenable to a move to monitoring:

The adoption of price monitoring in Victoria's four commercial ports, and now the Port of Melbourne only, occurred gradually and as a result of successful prior reforms. These reforms addressed matters of governance and market structure. The Victorian Government only adopted price monitoring once these reforms were shown to have met the necessary conditions for a more light-handed approach to price regulation. The urban water sector is well behind the ports sector with respect to its governance arrangements and its market (or market-like) structures. It remains open to question whether or not it is even possible to undertake these reforms in the urban water sector. That is a matter worthy of great debate. (sub. DR163, p. 6)

The NSW Government expressed a similar view:

Light handed regulatory regimes involving price oversight are generally better suited to industries, such as airports and ports, with a relatively small number of well informed customers, or where there is actual competition or contestable markets in operation to place downward pressure on prices ... [the Commission's approach] is inconsistent with the approach taken in the energy market, where effectiveness of competition is the test to be met before price regulation is removed. (sub. DR146, p. 4)

While the Commission acknowledges that the urban water sector is not subject to the same competitive pressures as airports and ports, continued government ownership enables the urban water sector to be more amenable to the use of governance as an alternative to price regulation than are these sectors (or the energy sector). Rather than maximising shareholder value, government-owned urban water utilities should seek to meet the objectives of government and, in the Commission's view, should be subject to a charter specifying they commit to efficient pricing and efficient procurement and investment arrangements (chapter 10).

Yarra Valley Water suggested that the Victorian urban water sector has reached a level of maturity where consideration can be given to winding price regulation back subject to governance reforms being implemented:

The Commission's draft recommendation 11.4 proposes moving from regulatory price setting to a price monitoring regime with continued pricing oversight. The Commission has stated that *'the role of price regulation has traditionally been to deal with concern*

---

*about excessive pricing by infrastructure providers with market power*'. We endorse this proposal on the basis that:

- at least in Victoria, price regulation has moved to a relatively mature state
- the Victorian Government implements an outcome focussed charter (as proposed in draft recommendation 11.2)
- the Victorian Government re-commits to full cost recovery in its water utility charter. (sub. DR115, p. 7)

The Commission's proposed changes to governance set out in chapter 10 would also pick up much of the machinery regulators currently have in place. Yarra Valley Water has also highlighted that those aspects of the price setting process seen as beneficial in a governance sense could be incorporated into the proposed charter:

The water utility's charter with Government should require each water utility to adopt the good practices from independent price regulation such as a willingness to pay to substantiate increases in customer service standards, stakeholder consultation and transparent investment planning. (DR115, p. 18)

The third approach of relying on performance reporting — assuming good governance arrangements and appropriate shareholder (ministerial) oversight — also has the potential to achieve efficient pricing outcomes and provide incentives for utilities to operate efficiently. Like price monitoring, it provides greater flexibility for utilities and provides them with freedom to tailor tariffs to the needs of particular customers. It is likely to be the arrangement most compatible with a 'real options' approach to supply augmentation, although some regulators have stated a 'real options' approach would sit comfortably with their existing regulatory approach.

## **Costs associated with price regulation**

The major costs associated with price regulation can be broadly categorised as compliance and administration costs; costs associated with imperfect information and limited flexibility; lobbying or 'rent seeking' costs; and costs associated with investment distortions (PC 2009a). Price regulation also introduces regulatory risk and the possibility of regulatory error.

### *Compliance and administration costs*

There are potentially significant costs associated with complying with and administering regulation. The compliance costs faced by businesses involved in the urban water sector include:

- 
- management and staff time (including the potential need to hire additional staff, and costs associated with management being diverted from core business)
  - hiring of external expertise (such as engineers or lawyers)
  - purchase and maintenance of specially modified IT systems or other equipment required to ensure compliance
  - training costs.

Although these costs fall initially on businesses, many are likely to be passed on to consumers through higher prices. The burden of compliance costs in the urban water sector therefore falls mainly on consumers. There are also significant costs to government (ultimately passed on to consumers or taxpayers) associated with design and enforcement of regulation.

Urban water utilities do not generally compile specific information about the costs of complying with economic regulation, but some participants have suggested that they are relatively high. With regard to economic regulation in south-east Queensland, the Executive Director of the SEQ Council of Mayors stated:

The cost of complying with [The Queensland Competition Authority] is very, very high. I think that price monitoring report they delivered this year cost the entities directly \$2 million in fees - [The Queensland Competition Authority], plus their own compliance costs. It is an expensive business. (trans. p. 577)

With regard to administration costs for regulators, IPART said:

IPART's overall budget is about \$20 million a year. For that, we regulate electricity, gas, water, public transport, local government rates and we administer environmental schemes on behalf of the New South Wales government. So I would think the water component at a guess is five million a year. Obviously we do impose costs on the utilities themselves, I wouldn't deny that. We also impose costs on third parties in the process of making our inquiries, as you do. You sort of appreciate the effort that people make to come and help you. So yes, there are certainly costs. (trans. p. 449)

Since those comments, IPART has told the Commission that it estimates the indicative cost to IPART of a typical water price review is around \$360 000, including staff costs, expenditure on consultancies, the costs associated with public hearings and costs incurred through the various steps of the IPART review process. The costs can vary from one review to the next (Chadwick, A., IPART, Sydney, pers. comm. 29 June 2011).

IPART is unable to advise the Commission about the level of efficient costs it allows utilities to incur to meet their regulatory obligations (as this is not specifically identified in operating expenditure). The Commission understands this is also the case with regulators in other jurisdictions. The Commission has seen

---

little evidence of such analysis having been undertaken either at the time current regulations were implemented, or subsequently. In the absence of information about expenditure by regulators and regulated utilities, it is difficult to estimate the precise nature of these costs for the urban water sector.

### *Costs associated with imperfect information and limited flexibility*

Another problem with regulation is that of imperfect information and asymmetric information between the regulator and the regulated utility. Regulators typically do not have as much information as those being regulated.

Decisions by regulators also typically depend on assumptions made about a large number of parameters, and assumptions that can turn out to be erroneous. The assumptions made by regulators are not necessarily superior to those of utilities. For example, in April 2011 the Independent Competition and Regulatory Commission (ICRC) in the ACT announced that water and wastewater charges would increase beyond levels previously foreshadowed, in part because the demand for water was below that originally anticipated by the ICRC (ICRC 2011).

This example was highlighted by ACTEW Corporation:

Now, I would think that most consumers in the ACT would believe that the change in price as a result of the underestimation or the overestimation of volume was my responsibility and something that I should be reasonably accountable for. Yet it was not my estimate. It was a volume estimate above what ACTEW had recommended. It's not claiming that ACTEW were better at it ... just was that our estimate turned into something closer. Yet I don't think there is a real accountability of the regulator to the fact that two-thirds of what is seen by the community as a fairly significant price increase was due to a volume forecast problem the [ICRC] had determined. (trans., p. 712)

If regulation restricts the potential pricing strategies utilities can adopt, it might prevent efficient pricing or prevent service offerings being made that some consumers might find attractive. By reducing pricing flexibility for utilities, current price setting approaches would potentially obstruct the pricing reforms advocated by the Commission in this report.

Regulators can potentially demand higher quality standards than those actually demanded by consumers, which would unnecessarily increase prices. Decisions regarding tradeoffs between price and quality are often likely to be better made by enterprises responding to consumer demands.

---

### *Lobbying costs and rent seeking*

A potential cost of regulation — particularly where regulatory outcomes are uncertain — is the diversion of resources into lobbying and regulatory ‘gaming’ (or ‘rent seeking’), both by businesses involved directly in the urban water sector and by other interested parties. The more discretion regulators (including elected representatives) have over outcomes, typically the greater the potential for resources to be diverted into seeking to influence regulatory outcomes.

The dividing line between compliance costs and lobbying costs can be quite ‘blurry’ in some cases. For example, water utilities typically have to provide economic regulators with detailed plans about their future activities (including investment). However, as would be expected, these plans are generally couched in terms seeking to persuade regulators to make decisions favourable to the utilities. There is likely to be an incentive to overstate investment intentions or their associated costs. Consumer groups have much the same incentives to try to keep prices down.

Lobbying is also associated with ‘regulatory capture’, whereby a regulator might come to favour particular interests, such as consumers or particular producers, over others. Regulators can also be captured by governments or by populism (Banks 2003).

### *Investment distortions*

Compliance costs and regulatory uncertainty have the effect of reducing the returns and riskiness associated with investments, thereby lowering their attractiveness. Regulatory delays also potentially reduce investment, and can lead to sub-optimal investment strategies. For example, if there is a need for supply augmentation and the most attractive investment (from a cost–benefit viewpoint) is delayed by the regulatory process, the delay might lead to a less efficient investment taking place because it can be delivered in the truncated timeframe. This leads to an inefficient outcome, relative to the preferred investment, that can be considered a cost associated with regulatory delay.

ACTEW Corporation highlighted the impact of regulatory uncertainty on supply augmentation decisions:

So in a real options analysis once you introduce uncertainty what became apparent was that the dam would be chosen almost on every occasion because you had more possibility of [it proceeding] but the others just have been very difficult to get into place [due to the challenges associated with] getting interstate agreements, the environmental issues associated with each one and different environmental regulators. The Murrumbidgee–Googong pipeline had to go through New South Wales, the ACT

---

and the Feds to get decisions and they had different views. We've managed to get two down and the third one we have an approval of sorts to proceed. But it's the uncertainty of progressing those that makes it difficult. We're still negotiating after some considerable period with Snowy Hydro about releasing the water in an amount that works for us as well. But to get that project to work we also need the pipeline so that we can pump the water, otherwise we wouldn't be able to pump enough to make it a worthwhile proposition. (trans., pp. 83–84)<sup>5</sup>

Cousins (2010) discussed the impact of regulatory uncertainty on the investment intentions of some Queensland council-owned utilities:

The entities ... pointed to the uncertainty surrounding their regulatory environment. Should they wait to be told what to do by the regulator, or do they just get on and do it and convince the regulator later, if necessary, that what they have done is not inappropriate? (Cousins 2010, p. 27)

ACTEW Corporation stated that regulatory arrangements represented a disincentive to innovate:

A significant drawback of the governance structures typically applied in regulated natural monopoly markets, such as the urban water market, is the lack of reward to innovate. Whilst in the short term this may result in lower prices, it may also deprive water consumers of more significant price decreases or quality increases that may flow from research and development in the longer term. (sub. 45, p. 5)

Yarra Valley Water made similar comments:

The Essential Services Commission regulates Yarra Valley Water and other Victorian water utility prices. A key issue is that under current regulatory arrangements, the Essential Services Commission is unlikely to allow Yarra Valley Water to pass on any additional costs to its customers that it might incur in providing innovative infrastructure, even when the additional costs deliver a lower total cost for the community. (sub. DR115, p. 41)

## **Costs vary with different forms of regulation**

The costs associated with regulation will vary according to the form of regulation applied. Price setting is the most heavy handed form of price regulation, has the largest informational requirements, and is likely to impose the highest compliance costs. It also has the greatest capacity to reduce the flexibility of utilities to respond to the wishes of customers, or to make using a 'real options' approach to supply augmentation problematic, particularly where sunk costs might be incurred on

---

<sup>5</sup> Construction of the Murrumbidgee to Googong pipeline has now received final approval with the NSW Government issuing its licence for construction in early March 2011 (Downie 2011). The pipeline was originally announced in March 2009 (Corbell 2009).

---

discontinued projects (chapter 5). Less ‘heavy handed’ forms of price setting, such as revenue capping, are likely to have lower costs than more heavy handed forms.

The relatively high costs associated with price setting have been acknowledged throughout the microeconomic reform era. The Hilmer Committee in 1993 did not at that time see a role for price controls in view of the costs involved:

The Committee was not persuaded of a need to include a price control power. Regulated prices increase the risk of deterring efficient business activity. Moreover, firms have accepted all price recommendations of the [Prices Surveillance Authority] to date. In these circumstances, the Committee favours reliance on less intrusive powers unless and until serious compliance difficulties are encountered. The Committee sees some consistency in this regard with its strong stand against price fixing by firms — to the maximum extent possible, pricing decisions should be made by individual firms rather than regulators or cartels. (Independent Committee of Inquiry into Competition Policy in Australia 1993, p. 277)

WSAA gave examples of the costs associated with highly prescriptive regulation in New South Wales (box 11.2). The Commission considers that, even where adoption of a price setting regulatory framework was appropriate, there are unlikely to be gains from having a regulator setting 66 miscellaneous fees as in the case of Hunter Water (box 11.2). Such ‘micromanaging’ of tariff schedules requires a large amount of information to be passed between the regulator and the utilities, and significantly increases the cost of regulation. There is scope for price setting to be far less intrusive (for instance, by employing revenue capping).

Light-handed regulatory alternatives such as price monitoring typically impose fewer costs than price setting (not just in terms of compliance costs, but monitoring should be less likely to discourage investment). Whilst there might be significant informational requirements, these are likely to be less (if only because the level of cost allocation required is lower) and price monitoring does not restrict the pricing decisions of utilities in the same way as price setting, and can therefore be seen as less intrusive.

Price monitoring is likely to be more appropriate than price setting where the scope for abuse of market power is fairly limited, but where some concerns still remain about potential monopoly pricing.

---

### Box 11.2 **Highly prescriptive regulation: Hunter Water and miscellaneous fees**

WSAA highlighted issues surrounding highly prescriptive regulation in New South Wales (sub. DR145), including IPART's setting of 66 miscellaneous fees relating to the activities of Hunter Water:

WSAA's initial submission highlighted the case of Sydney Water, where the format of the ... IPART ... price determination leaves little scope for Sydney Water to negotiate with its larger commercial/industrial customers, or indeed develop more tailored pricing for certain groups of residential customers. In addition to Hunter Water's core water, wastewater and stormwater charges, IPART sets 66 miscellaneous fees, including charges for conveyancing certificates, standpipe rental/access, special meter reads, applications to connect to water supply and payment dishonour fees. Setting prices for each tariff component ... provides certainty, but diminishes the scope for pricing innovation and flexibility which could benefit both the business and its customers. (sub. DR145, p. 17)

Many of the fees are small and would apply to very few customers. Among the 66 fees, items include:

- property sewerage diagrams
- standpipe hire security bonds
- pump station design assessments
- tee and valve connections
- water cart tanker inspections
- inaccessible meter reading agreements.

The 66 'miscellaneous fees' set by IPART for Hunter Water represent only a fraction of all of the fees set by IPART for that utility.

*Source:* IPART (2009b).

Were there a move towards price monitoring or reliance on performance reporting regimes, it would be important for governments and regulators to ensure compliance costs were kept as low as possible. As noted by the Economic Regulation Authority, it could not be assumed compliance with monitoring would necessarily be less costly than with price setting:

Such reviews would necessarily involve examination of the service providers' costs and rate of return and the setting of productivity targets ... a price monitoring approach, to be effective, may not be any less intrusive or costly than regulation. (sub. DR140, p.4)

Dr Ron Ben-David suggested the performance monitoring arrangements proposed by the Commission in its draft report could be more costly and intrusive than existing arrangements:

The extensive reporting and auditing arrangements being proposed would largely mimic those currently in place. Moreover, the suggestion that there should be an

---

on-going assessment of efficiency and efficacy of service provision and investment would represent an enormous intrusion into the administration of water utilities. This imposition would dwarf current regulatory requirements. (sub. DR158, p. 35)

The Commission agrees that, depending on the monitoring arrangements implemented, there is no guarantee compliance costs would fall after a move towards price monitoring. However, the intention of any move to price monitoring would be to move to more ‘light handed’, less intrusive monitoring, not to continue ‘business as usual’ regulation without the price setting element, and certainly not to increase regulatory burdens. In its recent draft report on price regulation of airports, the Commission found that the costs associated with monitoring arrangements at airports had been low, while the arrangements had been effective in providing information about whether market power was being misused (PC 2011b).

Moreover, the improved governance arrangements recommended by the Commission are designed to achieve much more than current price setting sets out to do. The Commission is confident that the benefits of improved supply augmentation decisions, for example, would significantly exceed the costs associated with the Commission’s performance monitoring arrangements.

### **The Commission’s view on costs and benefits of prices oversight arrangements**

After considering the rationales currently used for existing and foreshadowed price setting arrangements in the urban water sector, and taking account of the reforms proposed elsewhere in this report, it is the Commission’s view that the benefits of ongoing price setting would be unlikely to exceed its costs. Problems associated with monopoly pricing and X-inefficiency are likely to be largely eradicated following implementation of the Commission’s institutional and governance reforms (which incorporate much of the framework currently utilised by regulators). Establishing good governance procedures is a more effective way of ensuring full cost recovery compared to regulatory price setting.

## **11.5 Future arrangements for prices oversight**

In the short term, given the current reliance on price setting, the time required to implement the Commission’s suggested governance reforms, and the need for consumers and other participants in the sector to be confident their interests are being protected, some form of price regulation should continue. However, in view of the Commission’s assessment that the scope for potential misuse of market power in the urban water sector is limited, there is a strong case for price or revenue

---

monitoring to be adopted — as part of a broader performance monitoring framework — to represent a more light handed regulatory option compared with price setting.

Once satisfactory governance arrangements are in place, the Commission recommends all states and territories where prices for the urban water sector are currently set by regulators should move to a price monitoring regime.

The current price monitoring arrangements in Queensland should continue beyond the interim period (or be ended if they can not be shown to be providing net benefits). Although it has been the understanding of the Commission that Queensland intended to move to price setting in 2013, it notes the Queensland Government has indicated it intends to continue with price monitoring in south-east Queensland:

There are clear advantages in maintaining a price monitoring regime in specific circumstances and Queensland will maintain a price monitoring approach in SEQ for the SEQ Distributor-Retailers. (sub. DR167, p. 6)

The Commission considers that the Queensland Government should abandon any previous plans to implement price setting and, instead, continue with the current price monitoring arrangements.

The current Queensland arrangements (prior to recent political interventions in pricing) represent a suitable interim arrangement — ahead of consideration of further regulatory reform — and the Commission considers there would be benefits of implementing them (or similar arrangements) in other jurisdictions in place of the current price setting regimes (although the Commission notes that some participants, including WSAA, consider that the Queensland monitoring system could be made less costly for business).

Within five years of moving to price monitoring, State and Territory Governments should complete an independent review of whether price regulation is likely to provide ongoing net benefits (including whether misuse of monopoly power is an ongoing problem and therefore whether a stronger form of regulation might be warranted). If misuse of market power is not seen as a problem, or if net benefits of price regulation cannot be demonstrated, the price monitoring regime should be replaced by a self-reporting regime (as part of a broader performance monitoring framework) as described in chapter 10, which could be overseen by an independent regulatory agency, by an auditor-general, or an agency such as the NSW Office of Water. If implemented in a particular state or territory, there would be merit in assessing the effectiveness of the self-reporting regime in an independent review. To ensure arrangements had been adequately ‘bedded down’, such a review should

---

take place after a period of no less than 5 years. The Commission is satisfied this approach, coupled with the governance reforms it has proposed (chapter 10) is consistent with the approach contained in clause 77 of the NWI Agreement.<sup>6</sup>

RECOMMENDATION 11.1

*State and Territory Governments should move away from regulatory price setting to a price monitoring regime (where some form of prices oversight is considered necessary). Independent regulatory price setting should only be applied where it can be demonstrated that price monitoring and appropriate governance arrangements are unlikely to prevent misuse of market power.*

*Within five years of moving to a price monitoring regime, all State and Territory Governments should initiate independent reviews (not by regulatory agencies) to determine:*

- *whether water utilities are misusing their market power and, if they are, what action should be taken to deal with this*
- *whether ongoing price monitoring is likely to produce net benefits to the community and, therefore, whether it is still required. If such benefits can not be demonstrated, all price regulation should be abolished and replaced by a self-reporting regime to be overseen by an appropriate government agency in the relevant jurisdiction.*

*Rather than proceeding to implement a price setting regime, Queensland should continue with its interim price monitoring arrangements until it undertakes a review within five years of whether price regulation produces net benefits to the community.*

*The National Water Initiative pricing principles should be amended to make it clear that independent regulatory price setting, should not be applied unless it can be demonstrated that a more light-handed approach is unlikely to prevent the substantial misuse of market power.*

## **The future role of regulators**

The Commission agrees that regulatory oversight has had some benefits for the urban water sector, particularly by providing a mechanism to encourage improvements in efficiency. Although not supportive of price setting where there is appropriate governance, the Commission sees there is an ongoing potential role for economic regulators. Given the experience of most economic regulators in

---

<sup>6</sup> Paragraph 77 is shown at the start of this chapter.

---

determining regulatory parameters, they could provide useful advice to the government on issues such as rates of return and asset values. Many regulators have established processes that could also facilitate public consultation ahead of the drafting of the Commission's proposed governance charter (chapter 10) by government.

For example, as described in chapter 10, the Commission envisages the charter would require utilities to fully recover costs (incorporating an appropriate return on the shareholder government's investment) but not to price in a manner that would allow a return above this or in some other way that damages economic efficiency. Regulators could play an important advisory role to governments in the drafting of charters. They could also be involved in ensuring the utility complies with the public reporting requirements of the charter, and in monitoring performance against the charter.

## **11.6 Is there merit in a national economic regulator for the urban water sector?**

A number of participants have suggested a national economic regulator for the urban water sector would be preferable to the current arrangements involving individual State and Territory regulators. WSAA, which recommended a review of the costs and benefits of introducing a national regulator, said:

A single and national regulator — and nationally consistent principles to guide economic regulation — could provide for the following:

- standardised approach to economic regulation across all jurisdictions
- access to precedents and information from other industries
- superior ability to attract and retain staff with sufficient expertise and experience to administer economic regulation. (sub. 29, p. 23)

Cousins (2010) also argued that consideration should be given to forming a national economic regulator:

Such a regulator would be more able to isolate itself from the tensions associated with State and local government relations which are more evident in Queensland than in other jurisdictions, than could the [Queensland Competition Authority]. (Cousins 2010, p. 44).

The Commission agrees there are a number of potential benefits from having a national regulator (rather than state and territory regulators). These include:

- economies of scale and scope in regulation

- 
- enforcement costs might be reduced
  - for companies trading in more than one jurisdiction, compliance costs might be reduced by the need to deal with only one regulator
  - possibly reduced risk of regulatory error through greater pooling of expertise and resources
  - greater consistency of legal interpretation
  - increased ability to withstand political pressures at the state level (although this might be offset by pressures at the Commonwealth level).

These potential advantages have to be offset against some possible disadvantages of having a single national regulator. These include:

- reduced ability to design the most effective regulatory regime for the circumstances of any particular jurisdiction
- reduced local knowledge of the sector
- more difficult access to the regulator for stakeholders (although steps could be taken to alleviate this, and the regulator would presumably have offices around Australia)
- more significant consequences of regulatory error, or unintended outcomes from decisions, with only one national regulator
- reduction in resources for state and territory regulators that need some scope economies to continue to discharge functions with respect to other industries.

Although there are benefits from moving to a national regulator, the Commission considers these benefits could be achieved (with fewer offsetting costs) by moving to a more consistent regulatory approach across jurisdictions. If price regulation of the urban water sector is to continue, COAG could look at developing principles to ensure more nationally consistent economic regulation of the urban water sector. This process would be distinct from the existing COAG/NWI pricing principles, with the focus on standardising regulations and regulatory procedures (and reducing regulatory burdens). Importantly, if moves are made in this direction, they should not preclude any jurisdiction from moving away from price regulation or moving to more ‘light handed’ forms of regulation.

The Business Council of Australia also suggested that, in addition to dealing with price and access matters, a national regulator could set ‘a range of technical standards such as the quality of drinking water’ (sub. 66, p. 25). Although there are advantages for sector participants in having fewer regulators, the Commission is of the view that drinking standards would be best left to health regulators rather than by an entity that would otherwise be first and foremost an economic regulator. As

---

noted elsewhere in this report, if regulators are given too many conflicting areas of responsibility, the conflicts would be very hard to manage.

## 11.7 Third party access regulation and licensing

In addition to the price setting arrangements across jurisdictions, the urban water sector is also subject to third party access regulation and licensing. The use of third party access regimes has the potential to increase competition with the sector (although also to discourage investment), while licensing regimes seek to ensure standards of quality are met (although they can create concerns about creating barriers to entry).

### Third party access

Third party access arrangements seek to enable entities to gain access to the services provided by an infrastructure facility on commercial terms and conditions. Access arrangements are typically used when infrastructure facilities exhibit natural monopoly characteristics, and where, in the absence of regulation or competition from substitute services, facility owners are likely to obtain substantial and enduring market power.

This market power could be exercised in two main ways, namely by charging access prices significantly above costs, or by denying access to the service/ making access onerous. Regardless of how this market power was exercised, the effect would be that output of the final service provided by the monopoly infrastructure would generally be lower than desirable, leading to an economic efficiency loss for the community. Third party access regimes seek to curb market power stemming from control of infrastructure facilities and, by extension, reduce any efficiency losses that might follow.

The national approach for dealing with third party access arrangements is via Part IIIA of the *Competition and Consumer Act 2010* (Cwlth) (formerly the Trade Practices Act). As described by the National Competition Council (NCC):

In broad terms, the [National Access Regime] provides a means of promoting competition in markets where the ability to compete effectively depends on being able to use a monopoly infrastructure service. At the same time, the regime ensures that infrastructure owners receive a commercial return and that incentives for efficient investment are not affected. (sub. 12, p. 1)

---

Part IIIA provides three ways for a third party to gain access to a service:

- declaration of an asset by a minister, following a recommendation by the NCC (declaration providing access seekers with a legal right to negotiate and a mandatory dispute resolution mechanism.)
- use of an existing access regime established by a state or territory and deemed to be ‘effective’
- seeking access under terms and conditions specified in a voluntary undertaking given by the service provider and accepted by the ACCC (PC 2010b).

The undertaking option is an alternative to declaration. It is designed to give infrastructure owners and operators greater certainty about the access conditions applying to their infrastructure.

Following a decision by the Australian Competition Tribunal to declare sewerage and interconnection services owned by Sydney Water, the New South Wales Government developed a State-based third party access regime for water infrastructure services under the *Water Industry Competition Act 2006* (NSW) (WICA). The NCC has said the WICA access regime ‘effectively mimics’ the Part IIIA regime, substituting IPART for the ACCC as the arbiter in any access dispute, and a decision of the Premier of New South Wales for a declaration decision under Part IIIA (sub. 12).

The NCC did, however, conclude that the WICA regime meets the criteria to be certified effective and the relevant Minister accepted this recommendation in 2009 and certified the WICA as effective for 10 years. Following this, the sewerage services in New South Wales previously declared under Part IIIA had their declaration revoked (as a result of now being subject to an ‘effective’ State-based regime).

The NCC has raised doubts about whether the National Access Regime process would provide an adequate level of certainty about the terms of conditions of access to urban water infrastructure assets, while also noting that some urban water sector infrastructure assets might not meet the ‘national significance’ test required for declaration under Part IIIA. The NCC suggested jurisdictional regimes for access to gas pipelines and electricity infrastructure might represent a good basis for drawing up an equivalent regime for urban water:

Governments have, for example, adopted jurisdictional access regimes for gas pipelines — which rationalise the process of determining what pipelines are regulated, allow for light handed and fuller forms of regulation and use of a national regulatory body — and for regulation of the electricity sector — which apply the relevant regulation to virtually all transmission and distribution infrastructure without requiring case by case

---

declaration or coverage decisions. The Council considers that this approach could be used as a model for development of jurisdictional regimes for access regulation of urban water infrastructure. (sub. 12, p. 8)

Although the Commission has previously highlighted a number of concerns with third party access regimes, and particularly their potential to discourage investment in vital infrastructure (PC 2001b), it is strongly of the view that the urban water sector would benefit from increased competitive pressures. The Commission notes the advice of the NCC that reliance on Part IIIA might not provide this. The Commission is also inclined to this view.

The Commission sees the primary policy challenge is to ensure ongoing innovation in the sector, and ensuring that distributed systems developments are not obstructed by the attitudes or business processes of incumbent utilities. As such, there is a role for State and Territory Governments to consider legislating jurisdiction-based third party access regimes in the manner that New South Wales has done. However, in developing these jurisdictional arrangements, the State and Territory Governments should ensure that regulatory differences do not obstruct interstate trade.

Queensland also has a generic third party access regime contained in Part 5 of the *Queensland Competition Authority Act 1997* (Qld). To date, no water or sewerage assets have been declared under the regime, and the Queensland Department of Environment and Resource Management has said:

The Government has not requested that the [Queensland Competition Authority] assess whether water and wastewater services ... are eligible for declaration on the basis that without the potential for new entrants in the market at this point in time, the costs of regulation would most likely outweigh any benefits ... at this point in time, the preference would be to encourage commercial negotiations with new access seekers. (sub. 60, p. 28)

The Commission understands that moves toward implementing a third party access regime for water infrastructure are under active consideration in Victoria and South Australia. An independent review of the National Access Regime is currently scheduled to be commenced by 31 December 2012. The Commission considers this review is well placed to make recommendations about the most appropriate future third party access arrangements for the urban water sector.

Third party access arrangements are typically more problematic with vertically-integrated entities, as there is an incentive for the infrastructure owner to provide favourable access to their own upstream or downstream operations. While urban water utilities have legislated monopolies, these concerns about discrimination are unlikely to be a significant issue (as there are no major 'rivals' to discriminate against). Further, under the non-vertically-integrated sectoral models

---

discussed in chapter 12, third party access issues would be expected to be less significant.

RECOMMENDATION 11.2

***The Australian Government should proceed with the scheduled independent review of the National Access Regime. This review should commence no later than 31 December 2012. The terms of reference should include an examination of the interaction between the national and state-based regimes, including those for the urban water sector.***

## **Licensing**

While establishing third party access arrangements to facilitate entry to markets, the WICA also establishes a licensing regime for private sector entrants requiring them to obtain licences in order to construct, maintain or operate any water industry infrastructure or to supply water (potable or non-potable) or provide sewerage services by means of any water industry infrastructure. The purpose of the licensing regime is, in IPART's words, 'to ensure the continued protection of public health, consumers and the environment' (sub. 58, p. 39).

The NSW Government noted a number of licences had been issued under the WICA:

By the end of September 2010, six network operator licences and five retail supplier licences had been issued.

- One project proposes to supply wastewater services in regional NSW.
- Another will build and operate a new recycled water plant at Fairfield, which will initially provide 4.7 billion litres of high-quality recycled water a year to industrial and irrigation customers via a network of retrofitted gas pipes.
- A licence has been issued to operate a recycled water treatment plant in Sydney's Central Business District which will supply recycled water for indoor non-drinking uses.
- Another project is licensed to undertake sewer mining at Darling Harbour to provide recycled water for non-drinking purposes. (sub. 65, p. 9)

Some private sector stakeholders see the WICA as having been significant in creating competition. For example, The Water Factory Company said:

The NSW government has created a competitive marketplace through the *Water Industry Competition Act 2006* (WICA). The NSW WICA competitive decentralised urban water market is delivering value in many ways other than direct water price reductions. Ultimately this competitive market place may assist in lessening increases

---

in water pricing and provide consumers with multiple water supply options and technologies that reduce the overall annual cost of water services. (sub. DR123, p. 3)

IPART has noted that the costs of the licensing scheme, and the potential for it to create barriers to entry, need to be balanced against health and environmental concerns:

Licensing application and ongoing compliance costs for a licensee are not insignificant. However, the costs of such a scheme and the potential barriers to entry that may be present need to be balanced against the imperative to protect public health and safety and to ensure no harm to the environment. In an effort to reduce any potential barriers to entry, we have recommended changes to the legislation to enable the introduction of a tiered licensing regime. In such a regime, low risk projects would either be exempt or subject to a lighter form of regulation. (sub. 58, pp. 40–41)

The Victorian Department of Health has also highlighted health concerns associated with new entrants to the urban water sector:

If a nationally consistent third-party access regime were to be developed, it is important to consider the broader implications of this type of regime on public health, existing and future integrated water management strategies, existing State and Territory regulatory frameworks, and the capacity and skills within the water industry to effectively deliver such regimes. If third-party access regimes are adopted by the States and Territories, the regimes will need to be effectively linked to existing or future public health and environmental regulatory frameworks for supplying drinking water, using recycled water, and managing sewerage and stormwater networks (assuming these frameworks are satisfactory in the first place). (sub. 16, p. 2)

The Commission agrees that it is important to protect public health and the environment as new participants emerge in the water market. However, it is also important that this is done in a manner that does not make participation in the sector unattractive for private sector participants. In licensing new entrants, governments and regulators should ensure that the standards required to obtain a licence are no greater than absolutely necessary to ensure health and environmental standards are protected.

---

## 12 Structural options for large cities

### Key points

- Structural reform can be an effective way to facilitate competition in the urban water sector, and in turn generate productive, allocative and dynamic efficiency benefits. However, structural reform is not a cost-free exercise. It may reduce economies of scale or scope, increase transaction costs and impose transition costs (such as the costs associated with breaking up and/or establishing new utility businesses).
- Four structural options for organising the urban water, wastewater and stormwater supply chain in Australia's large cities are presented. These options:
  - are based on structural models that already exist in the urban water sector
  - assume that the universally applicable reforms are in place
  - are designed to maximise the role of competition 'for the market' (and for bulk water services in particular).
- Option 1 does not involve any structural separation. The universally applicable reforms would ensure that the monopoly, vertically-integrated utility draws on the 'least expected cost' combination of available water and wastewater services (including supply augmentations) to satisfy demand. These services could be provided internally or by external parties (via contracts). This option demonstrates the capacity of governance and institutional reform to deliver significant (competition-related) efficiency gains without structural change.
- Options 2 through 4 illustrate how structural reform can build on the efficiency gains achieved under option 1. Option 2 involves vertical and horizontal separation of the bulk water supply function. This option strengthens competition for supply of bulk water services (relative to option 1), with corresponding efficiency benefits.
- Option 3 extends this type of competition to the wastewater treatment and discharge function, and provides strong incentives for innovation by wastewater treatment service providers, including the production of recycled wastewater products.
- Breaking up the retailer–distributor (option 4) would support yardstick competition between geographic monopolies, permit trade in water services and strengthen competition between bulk water and wastewater treatment service providers.
- All of these options ensure that security of supply objectives are met efficiently. In addition, there is scope to adapt these options to accommodate changing market conditions as the urban water sector develops over time.
- All State and Territory Governments should assess, case-by-case, the merits of these (and other) options and implement structural reform where appropriate.

---

The universally applicable reforms described in this report are expected to deliver important benefits. In particular, facilitating greater levels of competition ‘for the market’ within the bulk water element of the supply chain will facilitate more efficient use of, and investment in, bulk water infrastructure (efficient bulk water resource allocation), with significant associated efficiency gains (chapter 5).

Competition for bulk water services is feasible under a range of structural arrangements. However the level of competition that is achieved — and the associated costs and benefits — can vary. This chapter describes how competition for the market could be used to generate efficiency gains under four alternative industry structures. These options also provide scope to introduce or increase competition (of different types) across other supply chain activities, for example, wastewater treatment.

The chapter begins by describing the relationship between industry structure and competition, the various types of competition that might be pursued and the non-competition related efficiency consequences of structural reform (section 12.1). This is followed by an assessment of the costs and benefits of four structural options that could feasibly apply in Australia’s large cities (box 12.1). Option 1 (section 12.2) is based on the vertically-integrated monopoly model. Options 2 through 4 (sections 12.3 to 12.5) involve undertaking some degree of structural separation. Section 12.6 concludes and sets out the way forward.

**Box 12.1 Defining large cities**

The structural options set out in chapter 12 are most relevant for large urban water systems with multiple bulk water sources, or where there is potential for the development of multiple alternative bulk water sources (including large-scale recycled wastewater or stormwater schemes).

For the purposes of this inquiry, such locations are termed large cities. The Commission envisages that this encompasses the eight state and territory capital cities, and potentially a number of large, non-metropolitan urban centres — for example, Newcastle (New South Wales), Geelong (Victoria) and Townsville (Queensland).

The purpose of this chapter is not to determine which structural option should be adopted, or whether there is a case for structural reform in any one of Australia’s large cities. This should be determined by jurisdictions on a case-by-case basis. Rather, this chapter identifies some of the competition and non-competition related benefits and costs of a range of structural options, and might be useful in informing this assessment.

---

## 12.1 Competition, efficiency gains and structural reform

There are potentially large efficiency gains that could be realised in Australia's urban water sector. Competition is one way of achieving these efficiency gains.

### Benefits of competition

Establishing competition in any market, including the urban water sector, should not be regarded as an end in itself (PC 2002). However, competition does serve as a mechanism for achieving allocative, productive and dynamic efficiency gains, and economic growth. For example, competition can provide a strong incentive for service providers to:

- seek out cost efficiencies and minimise costs, putting downward pressure on prices
- innovate, providing consumers with a wider range of goods and services (including recycled water products)
- undertake efficient investment
- improve the quality of services provided to customers.

The precise efficiency benefits that competition facilitates depends on the type and level of competition that is established.

### Types of competition

There are four types of competition that could feasibly apply to the urban water sector (appendix G):

- Competition in the market: multiple providers compete to supply water and wastewater services to the same group of consumers, and consumers are able to choose between these competing providers.
- Competition for the market: where businesses compete (for example, via auction or tender) for the right to provide water and wastewater services.
- Yardstick (or comparative) competition: can range from publicly reporting on the performance of multiple, comparable utility businesses, to the active use by economic regulators of 'league tables' as a means of setting prices. Performance reporting and benchmarking is undertaken by the Essential Services Commission (ESC) and the NSW Office of Water in Victoria and New South Wales respectively. Performance reporting is also undertaken by the National Water

---

Commission (NWC) and Water Services Association of Australia (WSAA), via the annual *National Performance Report* series.

- Competition for the resource: competitive markets for the exchange and trade of water allow users to buy and sell water according to the value they place on it, with corresponding allocative efficiency gains.

The Commission regards competition for the market as a potentially powerful mechanism for achieving efficiency gains in the urban water sector. This approach has been used extensively in electricity and gas industries in the past, and to a more limited extent, in areas of Australia's urban water sector (chapter 5). As set out earlier, the Commission has proposed four options based on this approach.

Yardstick (or comparative) competition and competition for the resource (trade or exchange of water) also have the potential to deliver material efficiency benefits, and can be achieved at relatively low cost (at least in the case of informal trading). There is scope to capitalise on yardstick competition and competition for the resource (to varying degrees) under each of these four options, as described in the remainder of this chapter.

Competition in the market represents the purest form of competition (and is often termed full or 'perfect' competition). Competition of this form can deliver significant efficiency gains, albeit under certain conditions. If well-functioning markets already exist, competition in the market can develop 'naturally'. Alternatively, competition in the market can be administratively established (that is, markets can be created).

Naturally occurring competition depends on a number of preconditions being met, for example:

- many producers offering a relatively similar/homogenous product
- many consumers that can choose between competing providers
- low or no transaction costs
- low or no barriers to market entry or exit (over the long term), and so on.

Where these conditions do not hold, and competition in the market does not occur naturally, there might be a case for *establishing* competition. The National Electricity Market provides an example of this approach.

Administering competitive markets is a complex and costly task, and has relatively onerous preconditions. The Commission is not convinced that there is a compelling case for creating this type of competition in the urban water sector at this time — a view strongly supported by inquiry respondents. The absence of any international

---

precedent of urban water markets compounds the risk and uncertainty associated with establishing competition of this kind in the Australian urban water sector at this time.

The Commission recognises that this circumstance might change as the urban water sector develops. For this reason, the structural options proposed in this chapter are capable of evolving over time to accommodate more complex market conditions.

### **Contestable urban water services**

Introducing or improving competition is particularly relevant for those elements of the supply chain that are potentially contestable. However, it is also possible for competition to be used in the natural monopoly elements of the supply chain, for example, via contracting out the operation of monopoly infrastructure.

Based on reform experiences in other infrastructure industries, the particular characteristics of the urban water sector, and the economic analysis undertaken on this issue to date, the areas of the water and wastewater supply chain that are potentially contestable are (figure 2.1, chapter 2):

- bulk water services
  - potable and non-potable bulk water supply (from various sources, including recycled wastewater and stormwater products)
  - bulk water storage
  - bulk water treatment
  - bulk water transfer (movement of water via the bulk water service providers' own infrastructure — as opposed to the shared network, for example, from dam to treatment facility)
- water and wastewater retailing services<sup>1</sup>
- wastewater treatment and discharge services.

It follows that the non-contestable (or natural monopoly) elements of the urban water sector include:

- potable water supply network services
  - distribution
  - transmission

---

<sup>1</sup> Includes retailing of potable and non-potable water supplies.

- 
- non-potable water supply distribution network services
  - wastewater network services
    - distribution
    - transmission
  - stormwater network services
    - distribution (collection of stormwater and (1) transport of stormwater to the transmission network, (2) local discharge of stormwater and/or (3) stormwater recycling)
    - transmission (transport and discharge of stormwater into lakes, bays and so on).

The four structural options set out in this chapter will support competition (of various forms and intensities) in each of the contestable areas of the supply chain. In addition, these options allow for competitive processes to be applied to the natural monopoly elements of the supply chain (for example, network operation could be contracted out). Modelling undertaken by the Commission indicates that competition will be most beneficial (that is, deliver the most significant productive, allocative and dynamic efficiency benefits) at the bulk water level. For this reason, strengthening competition for bulk water services is the primary focus of options 1 through 4.

## **Competition and industry structure**

It is possible to introduce competition of some form under any industry structure (box 12.2). However, the extent to which competition delivers efficiency gains varies with the structural arrangements of the industry.

Disaggregated industry structures are generally more conducive to competition (and the achievement of associated efficiency gains) than integrated industries. However, this does not mean that structural separation is always efficient (or that competition is impossible under an integrated model). Undertaking structural reform to facilitate greater competition will have costs, and these costs can be significant (discussed below). To justify structural reform, it is critical to demonstrate that the expected benefits of reform outweigh the expected costs.

In addition, although competition is often the primary objective of structural reform, there are other non-competition related benefits of structural reform that can also be important (such as economies of scale and scope efficiencies). These benefits are

---

particularly relevant for chapter 13 (regional reform), and are discussed briefly in the following section.

**Box 12.2 Industry structure**

An industry can be defined in terms of its horizontal and vertical structure. Vertical structure refers to the way in which successive elements of the supply chain are configured — that is, whether they are integrated (aggregated) or separate (disaggregated). Horizontal structure reflects how businesses are organised within each element of the supply chain (that is, whether a particular supply chain activity is carried out by a single business or multiple providers).

Together, the incidence and type of vertical and horizontal separation within an industry constitutes its structural arrangements. There is a range of structural arrangements that could feasibly exist within the Australian urban water sector. This range is bounded by two extreme cases, namely, a vertically-integrated monopoly utility providing all water and wastewater goods and services (this model has been the norm in Australia for a long time), and a vertically and horizontally disaggregated industry structure (decentralised competition). Structural change refers to any alteration to the prevailing industrial organisation.

## **Other efficiency consequences of structural reform**

### *Economies of scale and scope*

Economies of scale and scope are relevant concepts for determining the optimal (efficient) structural arrangements for an industry. Any assessment of structural reform proposals must take explicit account of these measures.

Structural reform of the urban water sector will alter the operating scale of affected water businesses, all else equal. This may give rise to a gain or loss of economies of scale. Economies of scale impacts are best analysed with reference to the long-run average cost curve of a business (appendix G). The negatively sloped section of this curve reflects increasing returns to scale (or economies of scale). These returns diminish (as scale increases) until all economies of scale have been exploited. At this point the business is said to be operating at its ‘minimum efficient scale’ (and achieving constant returns to scale). In practice, a business usually exhibits constant returns to scale over a range of output levels. If the long-run average cost curve is positively sloped over certain output levels, the business is said to be exhibiting decreasing returns to scale (or diseconomies of scale).

---

Structural reform that involves horizontal aggregation could move water utilities toward their minimum efficiency scale, so as to realise economies of scale efficiencies. This is most relevant for regional areas and is considered in more detail in chapter 13.

Alternatively, horizontal disaggregation may be desirable where:

- a utility achieves constant returns to scale over a wide range of outputs — such that horizontal separation would not impose material scale losses — and there are other (non-scale related) efficiency benefits anticipated from disaggregation (for example, yardstick competition)
- a very large utility is exhibiting decreasing returns to scale (so there are direct economies of scale efficiencies from reducing the size of the utility).

It is problematic to make general statements or conclusions about the scale impacts of structural reform (appendix G). In practice, this will depend on the particular circumstances of the affected water utilities. For example, network costs represent a significant component of total utility costs, and can vary dramatically across different locations and circumstances. Other relevant considerations include the geography, geology and topography of the region (as this affects pumping costs), variability of wastewater flows (wet weather flows), asset life cycles, climate and rainfall variability, and the distances between centres of urban demand (IPART 2007a). Scale impacts should therefore be assessed on a case-by-case basis.

Economies of scope exist if it is more economical to provide two or more related products together, than for each of them to be provided separately. Economies of scope may arise because there is significant sharing of inputs or facilities across multiple activities. The existence of economies of scope is often used to justify the production of upstream and downstream products or services in an integrated environment.

There is no consensus in the literature to determine whether there are material scope economies between water supply and wastewater services (appendix G). Although a number of studies have found evidence in favour of joint provision, this tends to be strongest for smaller water utilities, and is therefore more relevant for regional areas (chapter 13). Likewise, the literature on scope economies between two or more water supply functions (for example, bulk water and water transmission) indicates that these efficiencies will vary depending on the specific functions under consideration, and the location, size and circumstances of the utility.

On this basis, it is prudent to assess the quantum of scope economies between water supply and wastewater service provision, and/or between individual elements of the water supply and wastewater supply chains, on a location-specific (and

---

utility-specific) basis. That said, the Commission recognises that there are economies of scope between bulk water dispatch and bulk water network management. A desire to preserve these efficiencies (alongside the introduction of competition) is one of the key motivations for using the ‘portfolio manager model’ (Joskow 1997 and appendix F) as the foundation of options 1 through 4.

### *Transaction costs*

Transaction costs refer to the costs of providing goods or services through the market (using external parties) rather than in-house (appendix G). Vertical separation may increase total transaction costs, as costs that were previously internalised are revealed. However, transaction costs are not exclusive to disaggregated industry structures. Vertically-integrated utilities routinely contract out a range of services, and in doing so incur various transaction costs. The impact of any reform (structural or otherwise) on total transaction costs depends on the nature and circumstances of that reform, and should be assessed accordingly.

In practice, the full range of potential efficiency impacts of structural reform are extensive. For example, structural reform can (1) lead to changes in the level of market information and transparency, (2) mean customers are located closer to (or further away from) the utility that serves them, or (3) exacerbate (or mitigate) skills shortages. These impacts are discussed in more detail as part of the assessment of individual structural options (chapters 12 and 13).

### **Way forward**

The remainder of this chapter considers how competition *for* the provision of water and wastewater services can be achieved (or improved) under four structural options (options 1 to 4, described in sections 12.2 to 12.5 respectively). In doing so, all competition and non-competition related efficiency consequences are considered. This discussion assumes that all of the universally applicable reforms are in place, and that property rights to water, wastewater and stormwater have been clarified (chapter 5).

Option 1 is based on the vertically-integrated monopoly model. This option assumes that no vertical or horizontal separation of the supply chain has been undertaken (as is currently the case in Adelaide, Perth, Hobart, Darwin and the ACT). The Commission’s assessment of this option (section 12.2) demonstrates the capacity of governance and institutional reform (as described by the universally applicable reforms) to support competition for the market — and deliver significant efficiency gains — despite the utility being integrated.

---

In this context, option 1 represents the minimum amount of reform that should be undertaken in Australia's large cities, and provides a baseline against which other options (that do involve structural reform) can be judged. The Commission's assessment of options 2, 3 and 4 suggests that breaking up the integrated monopoly utility would deliver additional efficiency gains, all else equal. However, there will be costs and risks associated with structural reform and these should also be considered.

The options considered in this chapter are not 'new ideas', and do not constitute a radical departure from the current arrangements for urban water supply in large Australian cities. These options are based on structural models that have been adopted by the urban water, gas and electricity sectors at different times throughout their evolution.

Finally, the Commission does not assume that there is a case for pursuing structural reform in one or all of Australia's large cities. Nor does the Commission consider that the structural options presented here are necessarily the 'right ones' for individual water systems. Instead these options, and the associated discussion of their costs and benefits, should be regarded as a starting point for jurisdictions to assess the case for structural reform in Australia's large cities.

## **12.2 Option 1: Vertically-integrated water and wastewater utility**

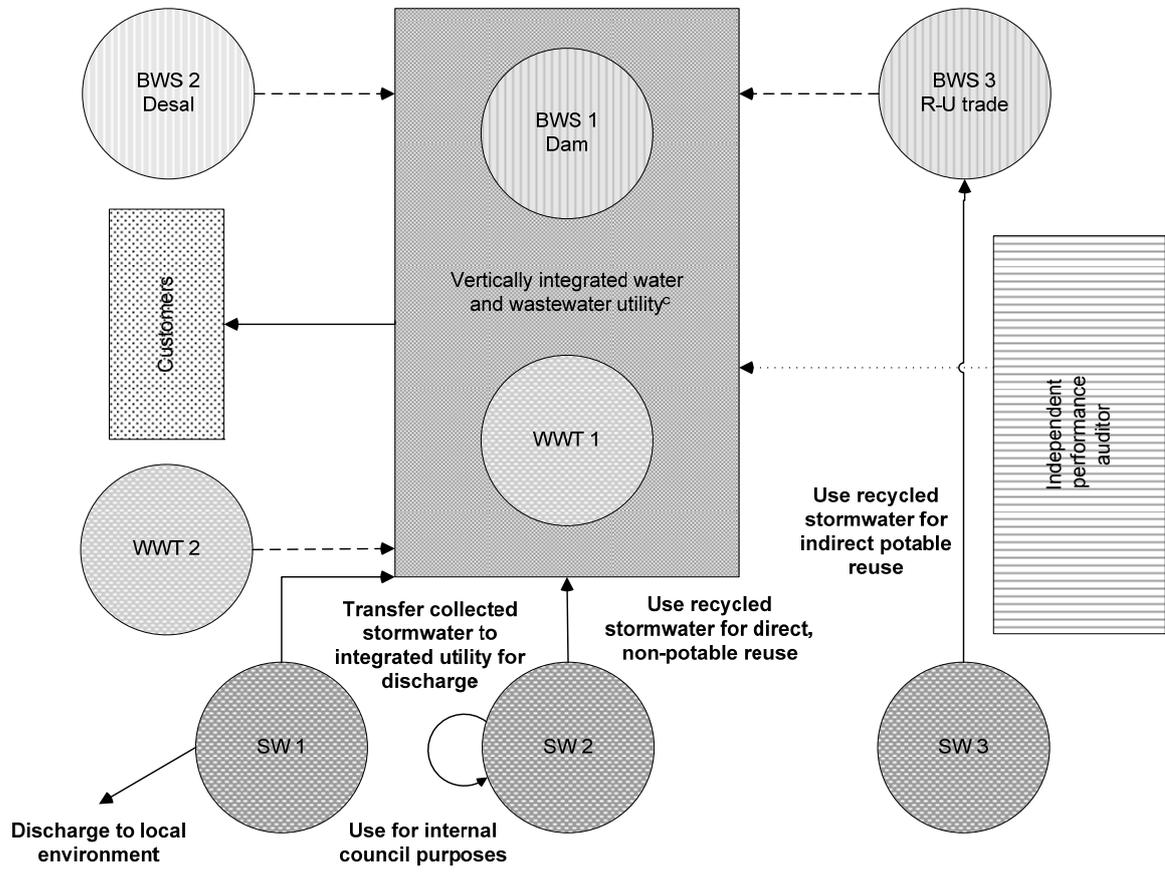
Option 1 is characterised by two key features. First, the urban water and wastewater supply chain is vertically integrated. The monopoly, vertically-integrated model represents one extreme of the range of structural arrangements that could characterise the urban water sector. Second, the full set of universally applicable reforms set out in this report apply to this vertically-integrated entity (including an obligation to serve and responsibility for security of supply).

### **Description**

The vertically-integrated utility (figure 12.1) would control all network infrastructure (except stormwater distribution networks) and various bulk water and wastewater treatment assets under option 1. Consistent with the charter, the vertically-integrated utility would be required to operate at *least expected cost*. To achieve this, the utility would need to draw on the most efficient combination of available services to meet its various (existing and future) needs, for example, bulk

water services (including new supply augmentations), wastewater treatment services and so on.

Figure 12.1 Option 1a, b



<sup>a</sup> The four figures presented in this chapter (figures 12.1 to 12.4) set out some of the key features of the structural options described in sections 12.2 to 12.5 respectively. These diagrams are not intended to capture the full range of transactions that would occur amongst market participants under each option, and should be viewed as highly simplified illustrations of how each option might operate. The arrows reflect the flow of services between industry participants. <sup>b</sup> BWS = Bulk water service provider; SW = Stormwater distribution service provider (for example, a local council), WWT = Wastewater treatment service provider. <sup>c</sup> The vertically-integrated utility could provide all required water and wastewater services internally (except for stormwater distribution services). Alternatively, the utility could procure required services from third parties via contracts, for example, the utility could purchase bulk water services from BWS 2 and BWS 3, and wastewater treatment services from WWT 2. The integrated utility might also contract out the operation of networks, or various retail functions, if this is more cost-effective than internal provision.

Available services include:

- Internally provided services: the integrated utility would be capable of providing all water and wastewater services internally (except stormwater collection and distribution), either by utilising existing assets or by investing in new infrastructure. For example, in figure 12.1 the integrated utility could draw on dam water (BWS 1) to fulfil its bulk water requirements.

- 
- Externally provided services: the utility may elect to procure water and wastewater services from external, third party service providers (for example, the desalination plant owner (BWS 2) in figure 12.1). The utility would enter into bilateral contracts with these parties for the provision of services (box 12.3).

An independent performance auditor (such as a jurisdictional economic regulator or auditor general) would periodically review and assess the operating and procurement decisions made by the integrated utility against criteria set out in the charter agreement. It is this aspect of the governance reforms that is expected to encourage private sector participants to offer services (including augmentation options) to the integrated utility. Option 2 is designed to further strengthen potential external service providers' perceptions of competitive neutrality, and is discussed later in this chapter.

External service providers could choose to offer one, many or all services required by the vertically-integrated utility. These providers would be commercially oriented and would compete on their merits (against each other and the utility) to fulfil the requirements of the integrated entity.

The precise combination of services selected by the utility would be determined by its demand requirements (existing and forecast) and the cost competitiveness of available options. All relevant costs would need to be considered. For example, in assessing the relative cost of dispatching bulk water from different sources the utility would need to consider storage costs, network costs, forecast demand, expected future inflows, the opportunity cost of dispatching water today as compared to a point in the future (intertemporal considerations) and any costs (penalties) associated with *not* taking contracted water (for example, if the utility has entered into some form of take or pay arrangement with a bulk water service provider).

In this sense, the vertically-integrated utility can be thought of as a portfolio manager. It *controls* the dispatch of all bulk water assets in its portfolio regardless of who owns these assets (likewise, if a utility-owned asset is physically operated by a third party under contract, the utility would retain control of bulk water dispatch from that asset). Consistent with the charter arrangements, the portfolio manager utility would adopt a real options approach to optimise the dispatch of these bulk water assets. Likewise, the integrated utility would effectively control the timing and type of investment in bulk water infrastructure (regardless of whether this investment is financed by the utility or an external party (via contract)). These features of option 1 are also common to options 2 through 4.

---

### Box 12.3 Risk-sharing arrangements and economic rents

In assessing the service offerings made by competing commercial providers, the utility would need to consider all aspects of the proposal, for example price, volume, flexibility provisions, penalties, term and so on. Once a procurement decision has been taken, these terms and conditions would be set out in a bilateral contract between the utility and the service provider.

In the case of new supply augmentations, one of the most important considerations is the nature of the risk-sharing arrangements. The bulk water service provider (the investor) is best placed to manage risks regarding construction, maintenance and physical operation of bulk water assets. However, if the service provider was also forced to take on demand side risk (and risk around rainfall variability), revenue may be too uncertain to guarantee recovery of capital costs. This could compromise the commercial viability of individual investments, and give rise to security of supply concerns in the longer term.

To manage this, demand side risk and risk around rainfall variability should be allocated to, and managed by, the utility. A fixed periodic charge that is independent of whether or not the bulk water asset is drawn upon (operated), could be levied on the utility. This charge would be set so that the bulk water investor recovers its capital costs over the life of the contract.

If the utility decides to draw water from this source, any operating costs incurred by the service provider could be recovered through a volumetric charge. There are various ways this could be achieved, for example, the contracts could specify precise operating volumes and forward prices in advance, or more flexible arrangements (such as take or pay provisions) may be negotiated. Regardless of how operating costs are managed, recovery of capital costs would be assured through the fixed capacity charge.

By taking on the demand side and rainfall variability risk, the utility could earn economic rents when prices are high (during times of scarcity). However, there are several options for distributing these rents. They can be:

- distributed back to customers through a rebate
- paid to government in the form of a resource rent tax
- retained by the utility for use in future investments.

The allocation of rents has distributional implications, but any impact on economic efficiency is likely to be marginal. For example, if revenue from the resource rent tax is used to reduce taxation in another sector of the economy, associated consumption and production decisions could be affected. Ultimately, it is the role of governments to decide on policies for distributing economic rents.

The same principle would apply to other water supply and wastewater services. For example, the utility would control the utilisation of all wastewater treatment plants in its portfolio, regardless of whether these assets are owned internally or externally (under contract).

---

Services procured from external parties would not necessarily be limited to the potentially contestable areas of the supply chain. For example, the integrated utility might also elect to contract out the operation of network assets, if there are cost efficiencies from doing so. Indeed, the South Australian Government currently contracts out the management, operation and maintenance of Adelaide's water and wastewater network infrastructure (as well as its water, wastewater and recycled water treatment plants).

The arrangements for stormwater distribution and transmission that would apply under option 1 (as detailed below) would remain more or less unchanged under each of the other three options presented in this chapter. Critically, these proposed arrangements assume that clear, well-defined property rights to stormwater have been put in place (chapter 5).

Stormwater collection, distribution and local discharge (and/or recycling) would be undertaken as a vertically separate service from other urban water supply chain activities<sup>2</sup>. Specifically, individual local councils would be responsible for managing and collecting stormwater in their municipality and either:

- directly discharging stormwater into the local environment (local discharge)
- harvesting and treating stormwater for reuse (stormwater recycling)
- transporting it to the (shared) stormwater transmission network for discharge.

The extent to which local councils draw on one or all of these options would be determined by the relative costs and benefits of each option. This arrangement is broadly consistent with how stormwater services are currently provided in most large Australian cities.

In the case of local discharge, the council would be responsible for meeting any relevant standards or regulatory requirements associated with stormwater discharge. For example, the quality of stormwater discharged into the local environment would be subject to regular testing, and where it fails to comply with relevant regulations, the offending council would incur a penalty. This arrangement would be relatively simple to administer as the entity responsible for stormwater quality in the local region (the council) is readily identifiable.

This approach provides councils with a clear financial incentive to undertake efficient investment in stormwater management activities, for example, education and community awareness programs, infrastructure improvements and water

---

<sup>2</sup> In regional areas, water and wastewater services are often provided by the local council (chapter 13). Where this is the case, stormwater distribution and collection would not be a vertically separate function (it would remain integrated with other local council water supply activities).

---

sensitive urban planning. In some cases councils might elect to impose fines on households or businesses responsible for stormwater pollution.

As an alternative to discharge, councils could choose to recycle stormwater and use it for internal council purposes (thereby reducing the total volume of water purchased), or to supply the integrated utility with potable or non-potable water supply (via contract). In assessing the case for stormwater reuse, councils would need to weigh up the costs of discharge relative to the costs and benefits of harvesting and treating stormwater (chapter 6).

Private parties would also be able to negotiate with local councils to undertake stormwater collection services independently of councils. For example, local businesses and residents might wish to collect stormwater and produce recycled stormwater products for on-site use, and/or for sale to the vertically-integrated entity. Canberra Airport provides an example of local businesses undertaking on-site stormwater harvesting (box 12.4).

**Box 12.4 Stormwater harvesting by Canberra Airport**

Canberra Airport collects rainwater runoff from hangar and office building roofs for use in toilets, irrigation and for fire fighting purposes. Canberra Airport has stormwater storage capacity of over 2 million litres — the largest non-ACTEW water storage in the ACT.

Water recycling plants are also in place at Canberra Airport and have the potential to treat 100 000 litres of wastewater every day. Canberra Airports' Blackwater Recycling Treatment Plant, launched in 2007, was the first commercial large scale water recycling system in the ACT, and the first at an Australian airport.

Canberra Airport has reported that it no longer requires any water from ACTEW for non-potable purposes.

*Source:* Canberra Airport (2010).

Finally, local councils might transport stormwater to the (shared) transmission network for discharge. Councils would purchase stormwater transmission services from relevant asset operators (via contracts), and pass these costs onto rate payers. (Under the current arrangements, households and businesses in metropolitan areas are billed directly for these services by the utility — chapter 6).

---

Some stormwater transmission assets would be operated by the utility. Specifically, the utility<sup>3</sup> would be responsible for operating the infrastructure that is used exclusively for stormwater management, such as large pipes and drains (stormwater-specific transmission assets). Network infrastructure that has uses outside of stormwater transmission (such as rivers, creeks and wetlands) would be operated by whichever entity is considered to be the most appropriate manager of that asset, for example, a government department responsible for waterways or parks management<sup>4</sup>.

These asset operators (stormwater transmission service providers) would be responsible and accountable for stormwater once it is injected into the transmission network. This means that service providers would need to achieve compliance with water quality standards and regulations<sup>5</sup>, and would incur financial penalties in the event of non-compliance (as noted earlier, this responsibility would fall to councils in the case of local (or direct) stormwater discharge). Clear, well-defined property rights for stormwater are fundamental to enforcing these accountabilities.

In the case of natural transmission assets (such as rivers and creeks), regulatory compliance would be achieved ‘automatically’, as local councils would be responsible for meeting environmental standards at the point of injection (chapter 6). For other transmission assets (such as large pipes and drains that are *not* part of the environment), this may not be the case. If local council did inject polluted stormwater into these transmission assets, it would be the responsibility of the asset operator to ensure that stormwater is treated to a compliant level ahead of discharge into the environment.

This highlights the challenging task facing some stormwater transmission service providers. Multiple councils contribute to stormwater transmission flows (reflecting the shared nature of transmission infrastructure), and individual councils do not necessarily consider the full costs of their actions when determining the quality, volume and timing of stormwater to be injected into the transmission system (although as noted earlier, quality issues are less relevant for natural transmission

---

<sup>3</sup> In options 2 and 3 the retailer–distributor would take on the stormwater transmission function performed by the integrated utility under option 1. Under option 4, the network transmission entity would be responsible for these tasks. The role of councils would remain unchanged.

<sup>4</sup> The amount, rate and quality of water to be discharged in natural water courses would depend on the environmental circumstances of individual water resources.

<sup>5</sup> Where the transmission infrastructure is a large drain or pipe, this responsibility would take effect at the point where stormwater is discharged into the environment. Where the transmission infrastructure is a natural resource (for example, a river) stormwater quality would need to be managed at discharge and throughout the transmission process (as the river is part of the environment).

---

assets as local councils remain directly accountable for stormwater quality). This generates a coordination problem between stormwater supply chain participants, and if left unresolved, may lead to sub-optimal stormwater outcomes (chapter 5).

To address this, it is critical that local councils face appropriate incentives to manage stormwater efficiently — that is, to invest in cost-effective stormwater management actions at the local level. One way to achieve this is to structure the stormwater transmission charge (paid by councils to transmission service providers) so that it reflects the quality, volume and timing of stormwater injected into the transmission system. This would ensure that individual councils face the full cost of having their stormwater discharged via the transmission system.

For example, if stormwater was found to be polluted at the point of injection into a large drain, the relevant transmission service provider would treat it (to the necessary standard) and recover the costs of that treatment from offending councils. Likewise, councils that are identified as contributing proportionally more to peak flows (and hence to total network capacity requirements) could be charged a higher price relative to other councils. This could encourage councils to invest in infrastructure solutions that reduce or smooth stormwater flows into the transmission system during heavy rainfall events, where this is cost-effective.

In practice, achieving efficient stormwater outcomes will involve a combination of (individual and joint) local council initiatives, as well as broader, system-wide actions by one or more stormwater transmission service providers. The arrangements for stormwater described here are designed to provide market participants with more explicit signals about the relative costs and benefits of their stormwater management decisions, and thereby support discovery of the efficient, least-cost combination of stormwater management activities.

Transmission service providers — like local councils — could also choose to treat stormwater for reuse if the expected benefits outweigh the costs. The Commission expects that the arrangements for stormwater described here (namely, well-defined property rights to stormwater and explicit prices for stormwater treatment, transmission and discharge), will ensure that the case for stormwater recycling at all levels is revealed.

The Commission recognises that implementing a stormwater transmission charge that varies with the quality, volume and timing of stormwater flows would involve costs, and may not be economically justified in all circumstances. In practice, the most efficient approach to managing stormwater (and overcoming the coordination problem between local councils and transmission service providers) should be determined on a case-by-case basis, taking into account the circumstances of

---

individual locations and water systems. The Commission encourages State and Territory Governments to investigate the merits of alternative approaches to structuring the stormwater transmission charge.

## **Assessment**

The vertically-integrated model is not typically associated with competitive market outcomes. However, by requiring the integrated utility to consider all service offerings put forward by external parties, the universally applicable reforms will support greater levels of competition for the market (relative to current arrangements), with corresponding efficiency benefits. Importantly, this option also preserves the scope economies between bulk water dispatch and other supply chain activities (such as network operation).

### *Efficient bulk water resource allocation*

The greatest anticipated benefit of option 1 (and specifically, adoption of the universally applicable reforms) relates to the achievement of efficient resource allocation within the bulk water element of the supply chain. These efficiencies arise because:

- bulk water investment decisions (including the type and timing of investments) are informed by a real options approach
- dispatch of bulk water assets is undertaken optimally (sources are dispatched by the portfolio manager utility according to their relative costs, and all costs are considered).

Although a market price for bulk water would not be created under option 1, the investment and dispatch outcomes that would arise would be consistent with an efficient (market determined) price for bulk water (chapter 6).

The Commission considers that these features of option 1 would deliver significant efficiency gains for the urban water sector. However, the precise efficiency gains that result from compelling the vertically-integrated entity to take a real options approach to bulk water service provision will critically depend on the range and diversity of services offered to the utility. In turn, this will depend on the level of competition amongst external bulk water service providers, as it is through competition and innovation that the price, quality and variety of water services (including recycled water products) is expected to improve.

---

There is some risk that potential service providers could be deterred from offering services to the integrated utility if, for example, they consider that the utility will unfairly favour internally provided services over externally provided services. Agritech Smartwater (sub. DR126) and Southern Cross Water and Infrastructure Corporation (sub. DR99) considered that government-owned utilities may be biased against external investment options, and cited the Western Australian Government's recent rejection of the Wellington and Brunswick dam investment proposals (in favour of the Binningup seawater desalination plant) as evidence of this. Agritech Smartwater considered:

The project [to treat saline water in Wellington dam] has been assessed and costed by the largest engineering, wastewater treatment and reverse osmosis groups in the world, who have described it as a “no brainer” ... Despite the fact of the Agritech Smartwater proposal obvious benefits and acceptance and support from water users, environmental groups, Councils and ratepayers together with technical and engineering support the Government and Water Corporation continued to reject the proposal. (sub. DR126, pp. 1-2)

A number of respondents to this inquiry indicated that they have cost-effective urban water investment options ready to roll-out (for example, the pumped storage and water transfer scheme proposed by Barry Trembath Consultant (sub. 82)). However, if potential service providers do not have adequate confidence in the governance arrangements they might decide not to enter the market for service provision at all. Where this is the case, some of the anticipated benefits of option 1 would not materialise. This concern could be remedied by breaking up the vertically-integrated entity (option 2).

Efficient resource allocation is not limited to the bulk water function. Option 1 would also improve resource allocation in other elements of the supply chain. For example, the utility would be obligated to fulfil its wastewater treatment requirements at least expected cost, taking into consideration all available service offerings.

### *Economies of scope*

An important feature of option 1 is that the utility retains control of bulk water dispatch even though it might not own all bulk water assets. This preserves any economies of scope efficiencies between dispatch and other elements of the supply chain. The importance of this was recognised by Joskow in describing the portfolio manager model:

The key technical challenge is to expand decentralised competition in the supply of generation services in a way that preserves the operating and investment efficiencies that are associated with vertical and horizontal integration, while mitigating the

---

significant costs that the institution of regulated monopoly has created. (Joskow 1997, p. 127)

Likewise, the utility would determine the utilisation of wastewater treatment plants (irrespective of ownership arrangements), and would be able to exploit any scope efficiencies between wastewater treatment and other activities. The issue of scope economies is discussed further in section 12.3.

### *Transaction and administration costs*

There would be transaction costs associated with option 1, including the costs of the vertically-integrated entity contracting with external service providers. These costs are not expected to be significant relative to the efficiency benefits on offer. Indeed, a number of vertically-integrated entities currently contract out a large portion of their capital and operating works, suggesting that this is an efficient strategy for these utilities despite the transaction costs involved.

The performance auditor would incur costs in monitoring and reporting on the performance of the vertically-integrated entity against the charter requirements. The chief component of these costs would be with respect to assessing the efficiency and prudence of the utilities' procurement decisions.

This section has described the efficiency gains that would be achieved by adopting the universally applicable reforms, even if the water utility remains vertically integrated. The remainder of this chapter describes three alternative options that would involve structural reform, but that also present opportunities for additional efficiency gains.

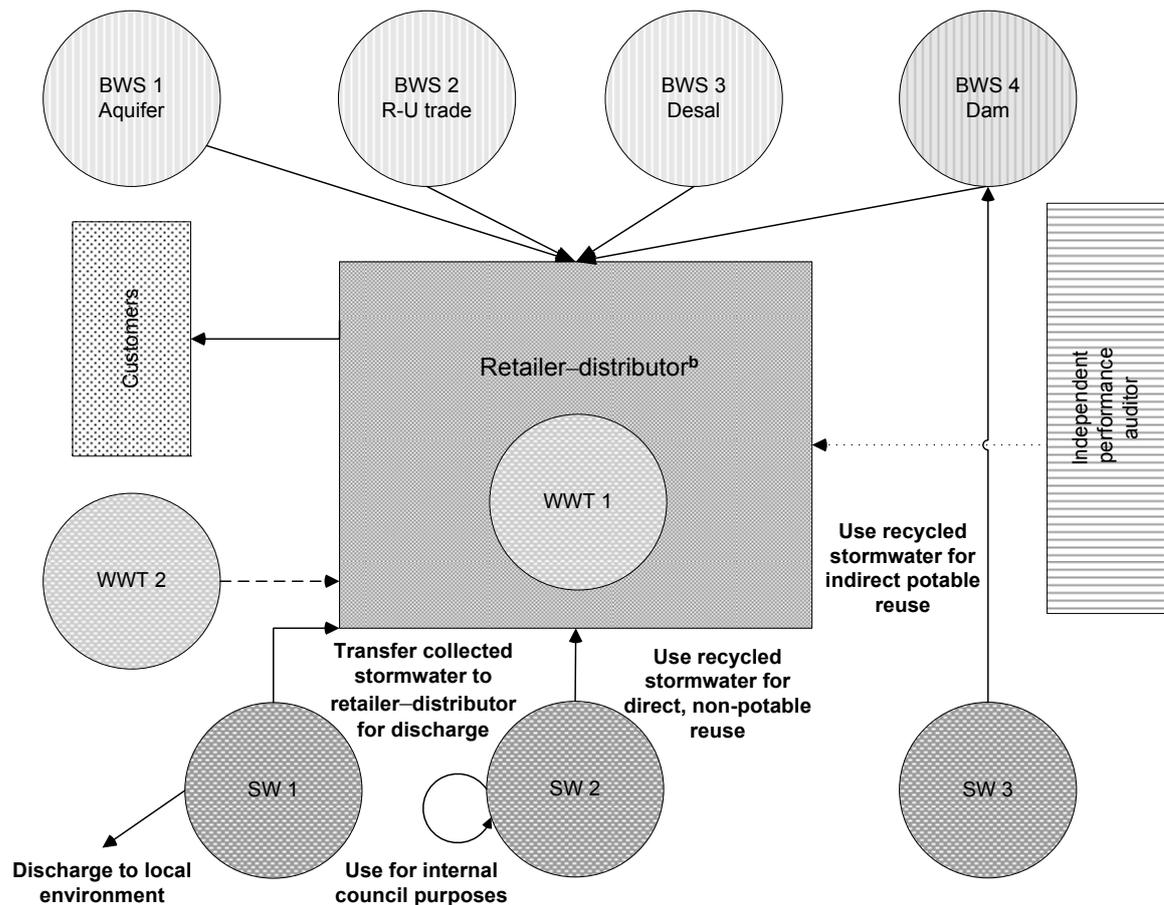
## **12.3 Option 2: Vertical and horizontal separation of the bulk water supply function**

Option 2 involves vertically separating the bulk water function from other elements of the supply chain (such that the integrated utility cannot provide bulk water services internally) *and* horizontally disaggregating the bulk water function (such that existing supply sources are owned by multiple separate legal entities). The primary motivation for implementing this option is to build on the benefits of option 1 by establishing greater competition for provision of bulk water services.

## Description

The institutions involved in the urban water and wastewater sector under option 2 are identified in figure 12.2.

Figure 12.2 Option 2<sup>a</sup>



<sup>a</sup> BWS = Bulk water service provider; SW = Stormwater distribution service provider (for example, local council); WWT = Wastewater treatment service provider. <sup>b</sup> The retailer-distributor would need to procure bulk water services from external service providers (that is, from BWS 1–4) via contracts. The retailer-distributor could provide all other water and wastewater services internally (except for stormwater distribution services), but might choose to procure these services from external parties (if this is more cost-effective).

Option 2 would include a single, government-owned ‘retailer-distributor’<sup>6</sup>. The retailer-distributor would face the same charter requirements as the vertically-integrated entity (option 1). However, the retailer-distributor would have no ownership interest in bulk water infrastructure (dams, aquifers, weirs,

<sup>6</sup> The term retailer-distributor is used to describe the monopoly utility in options 2, 3 and 4. However, the functions of this entity are not necessarily limited to retail and distribution services only. Rather, this will vary between options, as described throughout the remainder of this chapter.

---

desalination plants and so on). By consequence, the retailer–distributor would be unable to meet its bulk water needs internally<sup>7</sup>. Instead, the retailer–distributor would need to procure required bulk water services (including supply augmentations) from bulk water service providers via bilateral contracts. Importantly, the retailer–distributor would still control the dispatch of these assets.

Bulk water service providers would include private providers (as in option 1) as well as ‘incumbent’ bulk water utilities. These incumbent businesses will have been established as part of the structural reform process to assume ownership of existing bulk water assets. It is likely that these incumbent bulk water providers would be publicly-owned, at least initially, and would be subject to some form of performance monitoring and reporting by an independent auditor.

Both incumbent and new bulk water providers would own all infrastructure related to their respective supply sources and would be responsible for all maintenance associated with these assets.

The role for government remains largely unchanged from option 1. However, State and Territory Governments would need to break up incumbent monopoly bulk water suppliers and establish new bulk water businesses. This will require:

- determining the most cost-effective way to group existing assets into new entities
- dealing with existing property rights to these sources — box 12.5.

## **Assessment**

Option 2 is expected to have both competition and non-competition related efficiency consequences (relative to option 1).

### *Efficient bulk water resource allocation*

Competition amongst bulk water service providers is expected to strengthen considerably under option 2 (relative to option 1).

By removing all scope for internal bulk water service provision (a consequence of vertical separation), prospective service providers are likely to have greater confidence in the integrity of the procurement process. This would encourage new entry into the bulk water services market, and in turn strengthen competition

---

<sup>7</sup> Technically the retailer–distributor could provide some bulk water services internally if it used collected wastewater or stormwater to produce recycled water products.

---

amongst bulk water service providers. Assigning ownership of existing assets to separate entities (rather than a single incumbent bulk water business) would also be important for encouraging new entry (and strengthening competition). If all existing assets were owned by a single entity, prospective service providers might consider that the incumbent business has too much market power for the market to be truly competitive.

**Box 12.5 Existing entitlements**

In some cases, the retailer–distributor may currently hold entitlements to water in the supply sources owned by the incumbent providers. Options for managing this circumstance include:

- Allocate the water entitlements to the retailer–distributor, but transfer ownership of the underlying asset infrastructure to the relevant incumbent bulk water provider.
  - For example, if the retailer–distributor presently holds entitlements to water in a dam, the retailer–distributor could pay the incumbent bulk water service provider that owns the dam for provision of services associated with managing the asset (for example catchment management fees or water treatment fees), but would not pay for the actual water.
- Vest the water entitlements with the incumbent bulk water utility. The retailer–distributor would then need to contract with the service provider for that water, just as it would for any bulk water source.

The preferred approach to dealing with existing water entitlements may depend on perception it creates for new entrants about the degree of contestability in bulk water service provision. Specifically, divesting the retailer–distributor of all financial interest in existing bulk water sources (both commodity and infrastructure) might imply more robust and genuine competition.

Each incumbent bulk water business would need to make dispatch offers to the retailer–distributor under option 2. This would reveal the true cost competitiveness of incumbent bulk water assets, and ensure that the most efficient combination of existing bulk water sources are drawn upon to meet demand. By contrast, decisions around the dispatch of existing assets would be entirely internal to the integrated utility under option 1, and it could be difficult (and costly) for the auditor to ascertain whether dispatch decisions had been taken optimally. This also means that option 2 would provide market participants (and prospective service providers) with greater information about the relative efficiency of alternative bulk water sources.

Finally, establishing multiple incumbent bulk water utilities presents an opportunity to benchmark the efficiency and performance of individual bulk water suppliers (and managers), and to use this information to drive further productive and dynamic efficiency gains (appendix G). The allocation of bulk water assets to separate

---

businesses might also allow for more specialised focus on the operation and management of particular assets, with corresponding efficiency improvements.

These features of option 2 are expected to drive greater productive, allocative and dynamic efficiency benefits relative to option 1.

### *Economies of scope impacts of vertical separation*

Opponents of vertical disaggregation often refer to the economies of scope losses between supply chain elements. For example, if bulk water supply and water retailing share common resources (such as office facilities, payroll systems, or corporate staff), vertical separation will force duplication of these resources. In this instance, the relevant concern is whether separation of the bulk water function from other elements of the supply chain is likely to impose significant scope losses.

On the one hand, the Commission anticipates that option 2 would preserve most of the scope efficiencies associated with integrated service provision (despite all bulk water infrastructure being owned by external parties). Specifically, the retailer–distributor would continue to control the dispatch of bulk water (via contracts). Accordingly, the retailer–distributor would be able to exploit any economies of scope between dispatch and network operation (namely, efficient network management), and/or between dispatch and retailing (such as managing short-term variations in demand).

Notwithstanding this the Commission recognises that — relative to option 1 — the retailer–distributor may have marginally *less* flexibility to manage network constraints and fluctuations in demand (or put another way, may incur slightly higher costs in undertaking these tasks). The materiality of this issue would depend on the precise nature of the contracts that the retailer–distributor enters in to.

For example, if customer demand outturns below forecast demand, the utility could end up with excess water supply (assuming that the utility contracted for bulk water dispatch in advance, and that it based its dispatch decisions (volumes) on forecast demand). Under option 1, the integrated utility would be able to adjust (at relatively low cost) internally provided supply volumes to manage this. This option would not be available under option 2 — instead, the retailer–distributor would need to draw on more formal mechanisms. For example, the retailer–distributor could negotiate more flexible contracts with external service providers that provide scope to vary contracted volumes in the short term (for example, take or pay provisions or options contracts).

---

This is common practice in the gas industry, and is unlikely to involve significant additional costs. These strategies may also be used by the retailer–distributor to hedge against expected future price fluctuations. In the event large industrial users are able to operate independently of the retailer–distributor, this would provide the retailer–distributor with an additional alternative option for managing risk, uncertainty and demand and supply imbalances.

On the other hand, it is possible that option 2 could give rise to economies of scope *benefits*. For example, removing ownership of bulk water assets from the retailer–distributor (via vertical separation) might allow the utility to give more specialised attention to its other responsibilities (such as network management or retail services), with corresponding efficiency gains. It is reasonable to assume that the potential efficiencies associated with separating the bulk water function from other supply chain activities motivated, at least in part, the decision to vertically separate the bulk water function in Sydney, Melbourne and south-east Queensland.

Few parties responding to the inquiry commented specifically on the scope economies associated with vertical separation of the bulk water supply function — perhaps in part due to the fact many large cities have already undertaken this sort of reform. The Water Corporation expressed broad support for retaining a vertically-integrated structure in Western Australia:

The other benefit of an integrated utility is that the one organisation is making decisions that bring in the whole water cycle ... People talk about information asymmetries; information asymmetries exist because some organisations generate the information and others try and get the information. If you can have the decision making done efficiently within the (one) organisation with all the information, I think that is going to lead to a better outcome. (trans., p. 318)

In practice, the extent to which vertical separation leads to economies of scope gains or losses will depend on the specific characteristics of the water system. Even if some scope losses are anticipated, these are likely to be minor and should not be viewed in isolation of the potential efficiency benefits that vertical separation would deliver. Larry Ruff and Geoff Swier stressed that scale and scope impacts should not distract policy makers from the pursuit of broader competition objectives:

Critics of such unbundling, including the vertically-integrated monopoly, have argued (and still do) that such unbundling reduces the economies of scale, scope and coordination that justified vertical integration in the first place ... such monopoly economies are often historical and static, while the main purpose of introducing competition is to get the forward-looking and dynamic efficiencies that come with innovation and better investment decisions. Any competitive reform involves costs, benefits and risks; it should be undertaken only if the benefits are likely to outweigh the costs, and with a well-considered (preferably phased and adaptive) implementation strategy to minimise the risks. (sub. 47, p. 15)

---

### *Economies of scale impacts of horizontal separation*

Option 2 could give rise to adverse economies of scale impacts. Existing bulk water assets would be owned by a number of incumbent bulk water businesses following reform (in place of a single owner, as in option 1), and this may lead to some duplication of costs. However, option 2 does not preclude separate entities from undertaking tasks on a joint or cooperative basis, where there are scale efficiencies from doing so. For example, in Tasmania a number of services are undertaken by a ‘common service provider’ on behalf of the three water and sewerage corporations, to preserve economies of scale efficiencies.

There would also be direct, start-up costs associated with establishing new bulk water businesses. It is difficult, at this point, to speculate on the precise costs involved with disaggregation, and in practice this will vary across locations and utilities. However, whilst it is reasonable to expect that non-trivial costs will be incurred each time a new entity is established, this is no different to what occurs in other sectors of the economy on a regular basis.

### *Other costs*

Transaction costs might increase under option 2 if the number of contracts between the utility and external parties increases (relative to option 1). In this circumstance the independent performance auditor would also have an expanded role, as it would have more contracts to review. In addition, the auditor would need to monitor and report on the performance of the publicly-owned incumbent bulk water businesses. Any additional measures taken by the retailer–distributor to cost-effectively manage risk and uncertainty may also impose costs — for example, any costs associated with negotiating more flexible dispatch contracts.

Finally, options 2 through 4 (and the undertaking of structural reform more generally) present a range of financial and accounting issues that will need to be resolved by relevant governments. This includes developing arrangements for valuing public assets, transferring this infrastructure to new entities, disposing of any surplus assets, assignment and funding of employee entitlements, managing any financial risks faced by governments as a result of the reform process, and so on.

The Commission recognises that these are important matters, and could have consequences for the extent of competition that develops under these options (and the efficiency gains that are achieved). For example, the way that public assets are valued could influence the service offerings made by incumbent service providers. However, similar issues have confronted — and been dealt with — by governments on a number of occasions as part of previous reform processes. The costs associated

---

with managing these issues in the urban water context are not expected to be so large that the case for reform is compromised.

The Commission anticipates that option 2 could deliver significant efficiency gains for the sector (relative to option 1) due to the achievement of more robust competition amongst commercial providers of bulk water services. However, it is essential to consider the precise costs and benefits of option 2 on a case-by-case basis.

## **12.4 Option 3: Vertical and horizontal separation of the wastewater treatment function**

Option 3 extends options 1 and 2 by establishing greater competition for wastewater treatment services. This presents an opportunity for achieving further efficiency gains, but could involve additional transaction costs and scale and scope impacts.

### **Description**

The wastewater treatment and discharge function would be vertically separated from the monopoly retailer–distributor under option 3, and all wastewater treatment services would be purchased via bilateral contracts with service providers (figure 12.3). Wastewater network services (transmission and distribution) would continue to be provided by the integrated utility.

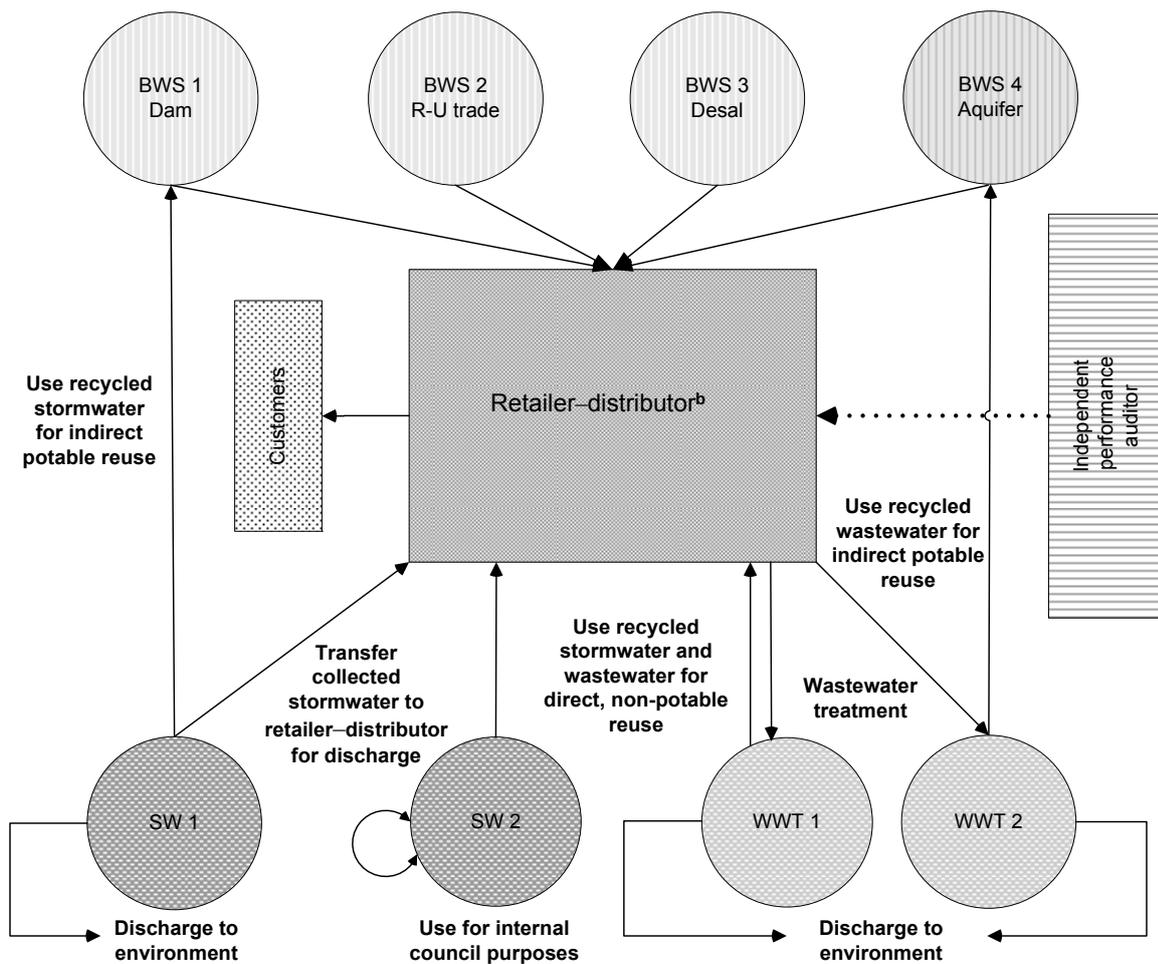
The market for wastewater treatment and discharge services would function in much the same way as the market for bulk water services (option 2). Following vertical separation of this function, existing wastewater treatment assets would be horizontally disaggregated and ownership of these plants would be transferred to incumbent wastewater treatment businesses. State and Territory Governments would be responsible for determining how existing assets should be assigned to new incumbent wastewater treatment businesses.

Wastewater treatment service providers (incumbent and new) would compete on their merits to satisfy the service requirements of the integrated utility. The retailer–distributor would assess these alternatives and select the most efficient (least expected cost) combination of water treatment and discharge services to meet demand (existing and new). The retailer–distributor would effectively control the utilisation of wastewater treatment plants via contractual arrangements.

Contracted wastewater treatment service providers would receive wastewater from the wastewater network (managed by the retailer–distributor), undertake treatment

of wastewater (to varying standards) and discharge treated wastewater to the environment. In the event a treatment facility is not connected to the established wastewater network, the service provider would also be responsible for transporting wastewater from the wastewater transmission network to a treatment facility (wastewater transfer).

Figure 12.3 Option 3<sup>a</sup>



<sup>a</sup> BWS = Bulk water service provider; SW = Stormwater distribution service provider; WWT = Wastewater treatment service provider. <sup>b</sup> The retailer-distributor would need to procure bulk water and wastewater treatment services from external service providers (BWS 1–4 and WWT 1 and 2) via contracts. The retailer-distributor could provide water and wastewater network services, retailing services and some stormwater transmission services internally, but may choose to contract out these services if this is more cost-effective.

As an alternative to discharge, service providers could elect to treat wastewater further and produce recycled wastewater products (where there is a commercial incentive to do so). Recycled wastewater could potentially be used on-site by the wastewater treatment service provider, sold to the retailer-distributor (as a source of potable or non-potable water supply) or sold to other large users (if relevant). In this

---

context, there is potential for these service providers to take on the dual role of wastewater treatment service provider and bulk water service provider.

## **Assessment**

The most substantial benefit of option 3 stems from achieving efficient resource allocation within the wastewater treatment and discharge element of the supply chain.

### *Efficient wastewater treatment resource allocation*

Option 3 would support efficient investment in — and operation of — wastewater treatment assets.

Vertical separation of the wastewater treatment function would mean that the retailer–distributor cannot provide these services internally. This is expected to improve potential service providers’ perceptions of competitive neutrality, and encourage more private service providers to enter the wastewater treatment market. Respondents to this inquiry indicated that there is considerable capacity for private sector companies to offer competitive wastewater treatment services (for example, Water and Carbon Group (sub. 31)). In turn, competition between wastewater treatment service providers is expected to be more robust (relative to options 1 and 2), with direct benefits for economic efficiency.

Breaking up existing wastewater treatment assets would also have important efficiency benefits. Separate incumbent businesses would compete on price (and other) terms to serve the retailer–distributor. This competitive process would reveal the true cost competitiveness of individual treatment plants, and ensure that existing assets are utilised (dispatched) on a least-cost basis. If all existing assets were transferred to a single incumbent business (no horizontal separation), it would be more difficult to judge the prudence of the incumbents’ operating decisions. A single, dominant incumbent business might also deter potential service providers from offering wastewater treatment services to the retailer–distributor, with corresponding impacts on competition and efficiency.

It might also be possible to achieve efficiency gains by subjecting the incumbent publicly-owned wastewater treatment businesses to comparative performance reporting by an independent auditor (appendix G). In addition, individual wastewater treatment plants might be operated more efficiently under this option if respective businesses pay more attention to the specific characteristics of the assets they operate following separation.

---

A particularly important consequence of more rigorous competition amongst wastewater treatment service providers is with respect to innovation. The stronger incentive on wastewater treatment service providers to innovate (relative to options 1 and 2) has potentially significant efficiency benefits. First, the discovery of alternative approaches to wastewater management and discharge is expected to give rise to lower-cost (and/or higher quality) service options, with direct benefits for consumers. Second, option 3 is expected to focus service providers on the commercial opportunities available via wastewater recycling and reuse.

The emergence of these products is likely to strengthen competition in the market for bulk water services (to the extent that recycled wastewater products serve as an alternative source of potable and/or non-potable water supply for the retailer–distributor).

#### *Economies of scope impacts of vertical separation*

Based on the same logic that applies to option 2, the Commission does not expect that removing ownership of wastewater treatment infrastructure from the retailer–distributor would lead to any material loss of economies of scope.

The retailer–distributor — as the entity that determines the utilisation of wastewater treatment assets — would still be able to exploit any synergies between wastewater treatment and network operation (efficient network management), and/or between wastewater treatment and wastewater retailing (balancing short-term supply and demand). This may lead to additional costs (relative to options 1 and 2), if more complex (flexible) contractual arrangements are required, however the Commission does not expect that these costs would be significant. Indeed, a number of private, stand-alone wastewater treatment plants already operate in different regions of Australia, suggesting either that any economies of scope losses associated with separation have been overcome via other arrangements, or that scope losses are justified by other efficiency gains associated with separation.

As in option 2, there may even be scope benefits associated with vertical separation, if relieving the retailer–distributor of the wastewater treatment function allows it to put more effort into its remaining activities (that is, the retailer–distributor could become more specialised, with associated efficiency benefits).

---

### *Economies of scale impacts of horizontal separation*

Scale impacts may be a more critical consideration. If option 3 is pursued, State and Territory Governments would need to transfer existing wastewater treatment assets to multiple incumbent entities.

This process should give due consideration to the scale impacts of disaggregation (and recognise that scale impacts will be location (and utility) specific). For example, if three incumbent treatment plants are currently serviced by a single engineer, transferring these assets to two or more separate businesses could lead to a net increase in labour costs. Notwithstanding this, incumbent businesses could choose to work cooperatively to minimise shared costs.

There would also be costs associated with establishing these new businesses (as per option 2). It will be important for governments to consider the materiality of these costs when determining how existing assets should be broken up.

### *Other efficiency impacts*

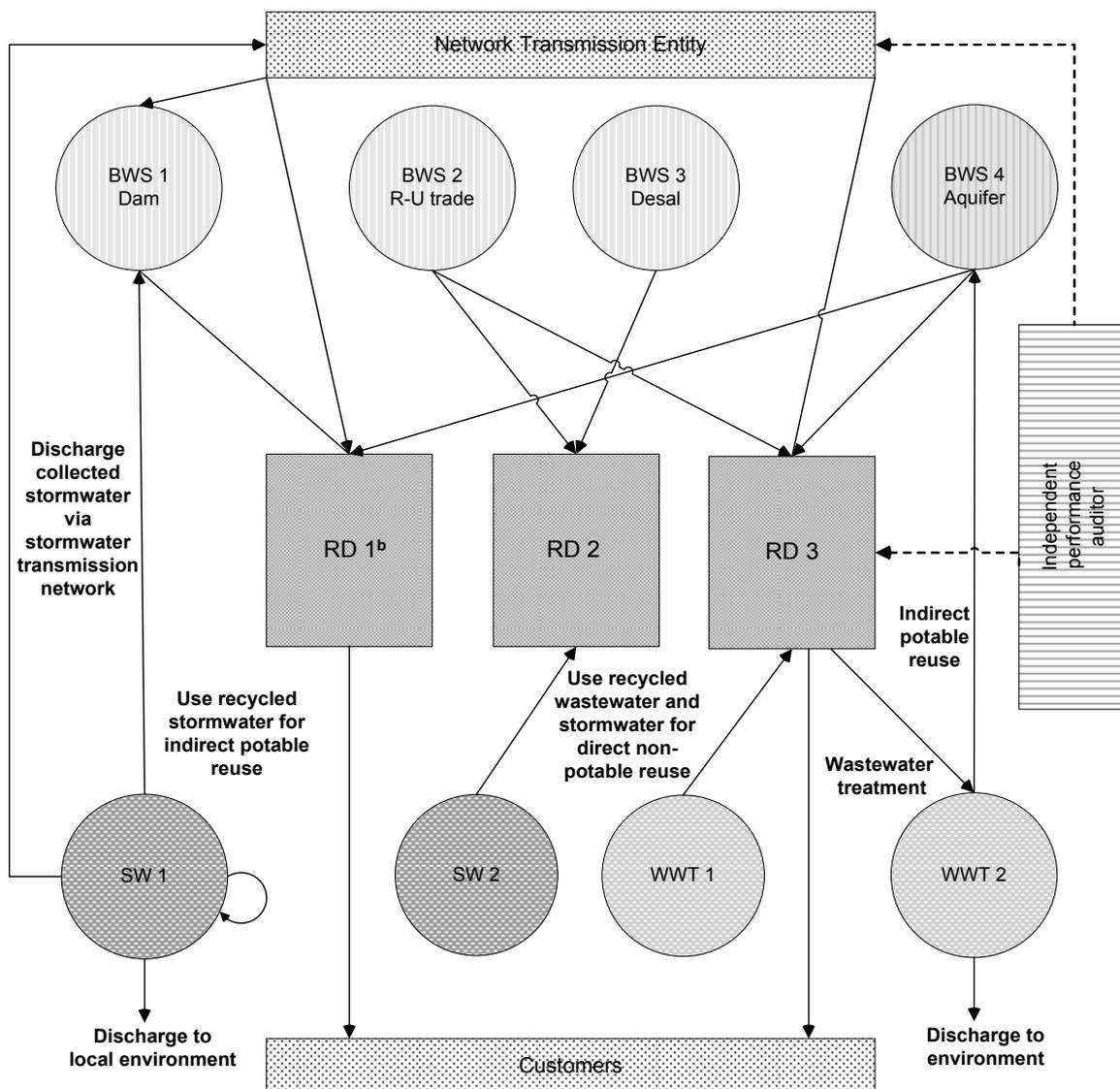
Transaction costs could increase under option 3 if the number of contracts between the utility and external wastewater treatment services providers increases (relative to options 1 and 2). The role of the independent performance auditor would also expand as it would need to assess the prudence of these contracts, and monitor and benchmark the performance of the incumbent, publicly-owned wastewater treatment utilities.

The benefits of strengthening competition for wastewater treatment and discharge services (option 3) might not rival those generated by establishing greater competition for bulk water services (option 2). However, wastewater treatment and discharge services represent a significant component of total industry costs (chapter 2), so any efficiencies that are achieved could lead to material cost savings for consumers. The merits of proceeding with the type of structural reform will depend on the associated costs and benefits, including the impacts on scale and scope economies, and should be considered on a case-by-case basis.

## **12.5 Option 4: Horizontal separation of retail-distribution**

Option 4 is characterised by the same arrangements for the supply of bulk water services, wastewater treatment services and stormwater distribution services as option 3. However, option 4 involves horizontal separation of the monopoly retailer–distributor to create multiple geographic monopolies (figure 12.4).

Figure 12.4 Option 4a



<sup>a</sup> BWS = Bulk water service provider; SW = Stormwater distribution service provider; WWT = Wastewater treatment service provider; RD = Retailer-distributor. <sup>b</sup> The retailer-distributors would only be able to provide water supply and wastewater distribution and retailing services internally.

This sort of industry structure has already been established in Melbourne and south-east Queensland (Melbourne Water<sup>8</sup> was disaggregated in 1994 to form a single wholesale water company and three retailer-distributors. Reform in south-east Queensland took effect in 2010 and involved consolidating 17 retail

<sup>8</sup> In 1991 the Melbourne and Metropolitan Board of Works merged with a number of smaller urban water authorities to form Melbourne Water.

---

water businesses and 25 bulk water service providers into three retailer–distributors<sup>9</sup> and two bulk water authorities<sup>10</sup>).

In addition, a dedicated network transmission entity would be established under option 4 to provide water supply, wastewater and stormwater<sup>11</sup> transmission services.

## Description

There would be two or more government-owned retailer–distributors under option 4 that would be responsible for:

- potable water distribution services
- non-potable water distribution services
- water and wastewater retailing services
- wastewater distribution services.

Each retailer–distributor would be subject to the standard charter arrangements (chapter 10). The retailer–distributors would need to procure required bulk water services, wastewater treatment services and network transmission services from relevant service providers via contracts (that is, none of these services could be provided internally). Option 4 does not entail full retail competition, and customers would be unable to choose their preferred retailer–distributor. This would be determined on a geographic basis, similar to the arrangements currently in place in Melbourne.

As in the previous options, the retailer–distributors would be required to fulfil their obligations in an efficient, least-cost manner. The retailer–distributors could elect to act cooperatively, or form a consortium, if they consider this to be a cost-effective way to manage risk and uncertainty, or minimise costs.

---

<sup>9</sup> Allconnex Water is one of the three retailer–distributors that was established following reform. In July 2011, Gold Coast City Council voted to leave Allconnex Water and intends to go back to providing water and wastewater services directly (Kippen 2011) (chapter 2).

<sup>10</sup> The two bulk water authorities, Seqwater and WaterSecure (desalination plant), were merged on 1 July 2011 to form a single bulk water supply provider.

<sup>11</sup> The network transmission entity would operate stormwater transmission infrastructure that is used exclusively for managing stormwater (such as large pipes and drains), and would provide stormwater transmission services using these assets. Under options 1 through 3, these assets would be operated by the utility (section 12.1).

---

A distinguishing feature of option 4 would be the establishment of a single network transmission entity (or water grid manager). This entity would own and operate the potable water, wastewater and stormwater transmission networks, and would provide network services to transmission network users via a contract carriage<sup>12</sup> model.

Specifically, users would enter into long-term, bilateral capacity contracts with the transmission entity for required network services. Network users could include the retailer–distributors, large users (if relevant), and the bulk water and wastewater treatment service providers. Local councils (and potentially other parties involved in the collection of stormwater) could also contract with the network entity for stormwater transmission and discharge services. Transmission contracts would assign ‘capacity rights’ to respective networks, and may specify specific network injection and discharge points, or allow for short-term adjustments to contracted capacity volumes (for example, via take or pay provisions, or ‘use it or lose it’ arrangements).

The network transmission entity would be subject to similar governance arrangements to the retailer–distributors. A charter would set out pricing and investment principles consistent with the efficient operation of (and investment in) network infrastructure, and the transmission entity would be subject to review against a range of criteria by the independent performance auditor. The transmission entity would be entirely responsible for maintenance and investment in these assets. To facilitate this, prices for network services would provide the entity with sufficient returns to undertake efficient levels of network maintenance and investment. Long-term capacity contracts between the transmission entity and users would support investment in network augmentation.

Option 4 would allow for informal, voluntary trading of bulk water, wastewater treatment and network transmission services. A ‘bulletin board’ system that provides market participants with information on available water and network capacity could be used to facilitate trading.

Option 4 is characterised by similar structural and institutional arrangements to those that apply in Australia’s various gas markets (box 12.6), and the Western Australian electricity market. In particular, all of these models include:

---

<sup>12</sup> In a contract carriage market, network users (such as the retailer–distributors) would contract for a volume of water to be delivered over a specified time period, which translates into a network capacity requirement. The network transmission entity would sell this capacity right to the retailer–distributor in the form of a transportation contract. Contract carriage models are common in gas markets, such as in the United States and Australia (outside of Victoria).

- 
- a portfolio manager utility that is responsible for procuring sufficient commodity and capacity (via long-term bilateral contracts) to meet new and existing demand
  - a market for trading residual commodity and capacity to manage short-term imbalances.

## **Assessment**

Option 4 is expected to:

- support yardstick competition at the retail-distribution level
- permit trade in water — albeit in an informal, limited context — with consequential allocative efficiency benefits
- strengthen competition amongst providers of bulk water supply and wastewater treatment services and provide further incentives for innovation.

However, there will be scale and scope impacts associated with option 4, and an increase in total transaction costs. In particular, transmission network management could become more challenging.

### *Yardstick competition*

Option 4 presents an opportunity to introduce yardstick (or comparative) competition between the retailer–distributors. To facilitate this, the independent auditor would compare, assess and benchmark the performance of the retailer–distributors. Utilities could be compared on a range of metrics related to cost-effective and efficient water and wastewater service delivery.

The publication of this information would impose an incentive on utilities to seek out cost efficiencies, improve service quality and innovate (with respect to tariffs, and the quality, security and source of water provided to end users). In addition, reporting on utility performance implicitly reveals information about the performance of utility managers, which could be effective in supporting a market (or at least sharper price signals) for managerial talent.

---

## Box 12.6 Australian gas markets

### East coast gas markets (outside of Victoria)

- Gas is purchased via large, confidential long-term contracts. Terms, prices and quantities can vary significantly. Contracts may contain take or pay provisions. Prices are reviewed periodically over the life of the contract. Between reviews, prices are typically indexed (often to the CPI).
- Transmission capacity is purchased via large, confidential long-term contracts with the owner or operator of a pipeline (contract carriage model).
- Up until recently, secondary trading (of commodity and capacity) took place on a bilateral and voluntary basis (facilitated by a bulletin board system). A mandatory wholesale spot market for balancing purposes (the Short Term Trading Market) was established in Sydney and Adelaide in 2010 and is operated by the Australian Energy Market Operator (AEMO). The contract carriage model remains in place.

### Victorian gas market

The Victorian gas market differs from other Australian gas markets:

- A mandatory net pool spot market (operated by AEMO) is used for balancing purposes. The spot price is set by the highest-priced gas scheduled to meet demand, and is calculated assuming there are no constraints on the transmission network. The spot price only applies to imbalance volumes. Most gas is traded under contracts, which provide a financial hedge against spot market outcomes (though spot prices are widely used as a guide to underlying contract prices).
- GasNet owns and maintains the Victorian Transmission System (VTS), but AEMO operates the network. Users pay tariffs (set by the Australian Energy Regulator) to GasNet for actual gas flowed.
- A market carriage model is used to allocate capacity on the VTS (so network users do not contract for capacity, and there is no secondary capacity trading). This means that market participants effectively have 'firm' access to the pipeline system.
- AEMO is responsible for relieving network constraints, where the cost of this is recovered from those network users who are deemed to have caused the constraint (to the extent that this is possible).

The Commission does not consider that the arrangements in place in the Victorian gas sector are necessary or cost-effective for the Australian urban water sector in the short term. However, once the sector matures, more sophisticated and formal mechanisms for managing residual balancing and allocating network capacity may be required.

Sources: AEMO (2010b); AER (2011).

Yarra Valley Water considered:

Comparative competition has created a dynamic environment leading to innovation and creativity. It is Yarra Valley Water's experience that individuals respond positively to

---

the challenges presented by comparative competition, and this has helped in building an achievement oriented and vibrant culture, which helps retain and attract talented staff. (sub. 19, p. 18)

and

When we first went to regulation ... comparative reports included a feature on innovation. Those innovations were independently audited and then the regulator would then publicly report on innovations. As far as we're concerned that was a real spur to do things differently, to look for efficiencies and service improvements. When the regulator moved to regulating non-metro water utilities, maybe for reasons of complexity or whatever, they dropped reporting the innovations. We're monopolies, geographic monopolies, we need those external spurs. Human nature is that when you compare you're going to want to look good. (trans., p. 325)

In practice, the value of comparative competition in driving productive efficiency is highly dependent on the extent to which utility performance can be meaningfully compared, and the accuracy and quality of published information. Some participants query the value of yardstick competition on that basis. For example, Larry Ruff and Geoff Swier 'doubt that this type of analysis would be of much value given that even efficient costs for different urban water sectors depend on history, geography, etc' (sub. 47, p. 9). Some of the benefits, costs and risks associated with yardstick competition, including comments made by respondents to this inquiry, are discussed in more detail in appendix G.

The Commission recognises that full retail competition could deliver a range of efficiency benefits for urban water consumers, and that retail competition has been successfully introduced for non-residential water customers in Scotland (appendix C). However, there are also material costs, complexities and risks involved with setting up arrangements that support retail competition, and the Commission is not convinced that the benefits are sufficient to justify these costs at this time. As such, retail competition is not included as a core element of option 4.

Notwithstanding this, option 4 does not preclude the establishment of retail competition at some point in the future. The case for introducing competitive retail arrangements should be assessed by jurisdictions on a periodic basis, once arrangements akin to option 4 have been implemented.

### *Opportunities for trade*

Disaggregation of the monopoly utility opens up opportunities for retailer–distributors to informally trade water products and services (including network services) with each other on a bilateral, voluntary basis. Trading opportunities could

---

be expanded further by allowing large water users to operate as independent buyers and sellers of urban water services.

Increased trading opportunities should provide utilities with greater flexibility to manage risk and short-term supply and demand imbalances (and hence reduce any costs associated with managing these risks). The potential benefits of trade are verified by evidence that many utilities are already trading with rural water businesses and individual irrigators where they are able to do so.

Trade not only enhances allocative efficiency within the sector but also provides participants with sharper price signals about the value of water products and services (relative to options 2 and 3). This information will not be exclusive to transacting parties only — the bulletin board system will provide all market participants with important, transparent pricing information.

The Commission acknowledges that there are a number of alternative mechanisms available for dealing with imbalances that are more sophisticated than secondary, bilateral trading (for example, a net pool spot market, as exists in the Victorian gas market). However, the Commission also considers that the urban water sector is in the relatively early stages of its development, and it is unlikely that there is a need (or a case) for developing trading arrangements any more elaborate than secondary trading at this time.

Notwithstanding this, as the sector develops — and the number of participants and the number of trades increases — a secondary bilateral trading system could become cumbersome and inefficient, and a more formal and complex mechanism for trading imbalances might be required. Option 4 does not present any barriers to the development of these arrangements. Indeed, the Commission expects that option 4 would evolve and adapt to accommodate market conditions in whichever way is necessary, as the urban water sector matures. Gas markets provide a ready precedent of how balancing arrangements can develop over time in response to changing market conditions.

### *Competition amongst service providers*

Disaggregation at the retail-distribution level would be expected to strengthen competition amongst bulk water and wastewater treatment service providers, in response to the emergence of multiple buyers of these services.

Under options 2 and 3, the single retailer–distributor would serve as the only (monopsony) buyer of bulk water and wastewater treatment services (assuming large users are not able to operate independently in the market). This is regarded as

---

a form of imperfect competition. As the only purchaser of services, the monopsonist retailer–distributor might dictate terms to service providers in the same manner that a monopolist controls the market for its buyers. This can lead to adverse efficiency impacts for investment in, and operation of, bulk water and wastewater treatment infrastructure.

Option 4, by breaking up the monopsony buyer, is expected to reduce or eliminate any market power held by the retailer–distributor, with corresponding efficiency gains. In addition to increasing the number of buyers in the market, option 4 might also change the *nature* of demand for these services. For example, retailer–distributors, in an effort to differentiate themselves or seek out cost efficiencies (in response to incentives imposed by yardstick competition), might demand new and innovative products and services. This represents a further source of competitive pressure on bulk water and wastewater treatment service providers to innovate and respond to customer needs, with corresponding benefits for the prices and quality of these services.

#### *Transmission network management (economies of scope)*

The governance reforms (chapter 10) should impose a strong incentive on network operators (namely, the integrated utility (option 1), the retailer–distributor (options 2 and 3) and the network transmission entity (option 4)), to achieve efficient operation of — and investment in — network infrastructure under all options. This is precisely the sort of ‘network optimisation’ role that is often associated with water grid manager models (box 12.7).

The contracts in place between the utility (or utilities) and external service providers would constrain network operating decisions to some extent under all of options 1 to 4. However, as discussed earlier in this chapter, more flexible contracts would help overcome this, and in turn facilitate efficient network management and short-term supply and demand balancing.

---

**Box 12.7 Water grid manager**

A water grid manager (WGM) is a relatively new organisational concept for exploiting efficiency gains in the urban water sector. There is no single definition of a WGM. In general terms, a WGM is designed to optimise the operation of the water grid (network). However, the precise arrangements for ownership of bulk water and network infrastructure; responsibility for investment in these assets; and entitlements to bulk water volumes, can vary across different WGM models.

The south-east Queensland WGM (SEQWGM) provides a useful example of one characterisation of the WGM concept. The SEQWGM does not own any infrastructure assets but owns the water entitlements. It purchases bulk supply and transport services, sells water and water services to grid customers and oversees the physical operation of the water grid.

With the urban water sector becoming increasingly connected, there have been further proposals for WGMs in other parts of the nation, and the Commission understands the formation of a WGM is still under active consideration in Victoria.

In addition, options 1 through 4 provide scope for the flow of water and wastewater to be ‘rearranged’ to maximise network efficiency (without breaching contract terms). Specifically, under options 1, 2 and 3 the monopoly utility (as the network operator *and* purchaser of contracted services) would be able to do this as part of its internal operations (and the charter obligations would ensure that the utility exploits these efficiencies). Under option 4 (where the network is operated independently of the utilities), it would be necessary for the network operator to use more formal ‘swap’ arrangements to achieve network efficiencies — box 12.8. Swap arrangements constitute an additional — albeit fairly trivial — transaction cost of option 4.

Adopting option 4 could have other impacts on network operation. On the one hand, network management could be undertaken *more* efficiently if there is a stronger incentive on the network operator (the transmission network entity) to manage transmission networks at least cost (relative to options 1 through 3). This could follow from the improved information at the disposal of the independent performance auditor, namely, the information contained in transmission contracts. Better information would facilitate more efficient performance management by the independent performance auditor, and place additional pressure on the transmission network entity to achieve cost efficiencies in network management (relative to the incentives created under options 1, 2 and 3).

---

**Box 12.8 Water swaps**

Water-for-water swaps provide for the exchange of water at one location for the equivalent amount (and quality) of water at another location. Swaps ensure that contractual agreements are honoured as efficiently as possible, that is, the contracted volume of water is taken from the relevant source (bulk water service provider) and the contracted volume of water is delivered to the relevant buyer (retailer–distributor), but the actual molecules of water that are dispatched and delivered may not be the same.

Swap arrangements not only reduce short-term operating costs (for example, by minimising pumping costs or easing congestion on the network) but also deliver significant cost savings over the longer term, by reducing or delaying the need to invest in capacity.

Swap arrangements are common in the Australian gas industry. A National Competition Council (Firecone Ventures 2006, p. 9) survey found that these swaps are used to:

- minimise pipeline transmission costs
- smooth load (given inverse season variation in load shape between retailers at different locations)
- manage outages or other interruptions to anticipated production
- support entry into new markets (where the retailer does not have adequate existing supply arrangements).

Network management might also improve under option 4 (relative to other options) if there are benefits associated with having an entity that specialises in network operation only (as compared to an integrated utility that might not give the achievement of network efficiencies sufficient priority or focus relative to other activities).

On the other hand, there is a risk that network management could become more challenging once there are multiple retailer–distributors, and these network users are able to trade. It is difficult to assess how material this issue would be for the urban water sector. The Commission has not received any empirical evidence that substantiates this view, and gas markets around Australia (outside of Victoria) have successfully adopted (variations of) the option 4 model without any apparent issues with regard to transmission network management.

However, the Commission recognises that network management generally becomes more challenging as networks expand and are increasingly interconnected. For example, a meshed (or web) network — characterised by an interconnected network of pipelines with multiple injection and withdrawal points, and scope for

---

bi-directional flows depending on market conditions — presents a much more complex network management task relative to a point-to-point or radial network.

In this context, it is critical to consider the nature and complexity of the infrastructure ahead of establishing arrangements for network management. The Australian gas market provides a good example of how different networks might require different arrangements — unlike the rest of Australia (which operates under a contract carriage model) the Victorian transmission network is managed under a market carriage model. This reflects the ‘mesh-like’ characteristics of that states’ gas network relative to other systems (box 12.6).

The Commission does not expect that option 4 would present significant network management issues for metropolitan regions of Australia’s urban water sector. The bulk water, wastewater and stormwater networks in the majority of Australia’s large cities are generally not highly interconnected or complex (although the Melbourne bulk water network could be regarded as transitioning toward a meshed network structure).

Notwithstanding this, the precise nature of Australia’s bulk water, wastewater and stormwater networks — and the extent to which network management issues might arise under an option 4 type approach — should be considered in more detail as part of assessing the case for reform. If material network management issues are anticipated (either now or at a future time, as networks expand), it might be more appropriate to consider alternative options for managing the transmission system (for example, a market carriage system based on a net pool concept with an independent system operator, as in Victoria — box 12.6).

As described earlier, this would represent a natural extension of option 4. There are no barriers to this transition being undertaken — rather, the Commission considers that this would be the logical ‘pathway’ for the urban water sector to follow (and is analogous to how natural gas markets have developed in Australia).

### *Economies of scale impacts*

Replacing the single retailer–distributor with multiple geographic monopolies may reduce scale economies. However, this is only likely if disaggregation produces utilities that are *below* minimum efficient scale (section 12.1 and appendix G). Based on the available evidence, the Commission does not expect that horizontal separation at the retail-distribution level will impose significant scale efficiency losses for large cities. That is, the scale of regions such as Sydney, Adelaide and Perth is sufficient to ensure that multiple utilities can be created without causing these businesses to operate below minimum efficient scale.

---

There would also be costs associated with establishing the new retailer–distributor businesses. However, even if option 4 does impose additional start-up costs and scale losses, it is important to weigh these against the competition-related benefits of reform. These sorts of efficiency benefits contributed to the Victorian Competition and Efficiency Commission (VCEC) decision to retain horizontal separation of the retail-distribution function in metropolitan Melbourne, despite the cost savings on offer from reintegration:

The information available to the Commission [the VCEC] suggested that there would be operating and capital cost savings of between \$19 million and \$25 million per year from merging three retailers into one. Most of these savings would be in operating costs, rather than in capital expenditure. (VCEC 2008, p. XXIII)

The VCEC concluded that there would be a range of costs and risks associated with reintegration that would serve to outweigh these benefits, including ‘the potential loss of dynamic efficiencies through, for example, less flexible decision making, or slower uptake of cost-reducing innovations’ (2008, p. XXIII).

#### *Transaction, administration and regulatory costs*

Option 4 will put upward pressure on transaction costs (relative to options 2 and 3) as network users will be required to contract with the network entity for transmission services. In addition, the role of the independent performance auditor will increase under option 4 to include:

- monitoring and review of the network transmission entity
- monitoring and review of each of the retailer–distributors
- comparative performance reporting and benchmarking of the retailer–distributors’ performance.

The costs associated with administering other regulatory, legislative and licensing arrangements may also increase under option 4, as a consequence of the larger number of participants involved in the sector.

If large users are able to buy (or sell) potable and/or non-potable water independently of the retailer–distributors, it might be necessary to develop (informal or formal) arrangements that provide these users with access to the retailer–distributor owned distribution networks. This issue is not unique to option 4, and would also be relevant under options 2 and 3. This could be achieved via third party access arrangements, or obligations imposed on the retailer–distributors (via the charter) to provide access to large users on certain terms and conditions.

---

The cost of developing necessary access and pricing arrangements may be relatively minor given the number of available precedents (including the New South Wales third party access arrangements for water distribution networks, and various examples of gas transmission pipeline pricing and access arrangements).

As for options 2 and 3, the economies of scale and scope impacts of option 4, and the materiality of any increase in transaction, administration and regulatory costs, will be location (and utility) specific, and should be assessed on a case-by-case basis.

### *Better focus on geographic markets*

The creation of multiple geographic monopolies may allow individual retailer–distributors to better accommodate the preferences and requirements of each region, take greater account of geographic and community specific factors and implement more location-specific (efficient) pricing arrangements, relative to options 2 and 3. In turn, this could drive localised water supply solutions that are more tailored to the needs and circumstances of the particular region. Customers that value an arrangement that puts retailer–distributors in closer proximity to the customers they serve might view option 4 more favourably relative to other arrangements.

## **12.6 Conclusion**

Each of the four structural options proposed in this chapter supports some level of competition for bulk water services (including supply augmentation). This is where the Commission considers there is the greatest scope for efficiency gains in the urban water sector.

These options are capable of evolving over time to accommodate more complex market conditions — for example, option 4 could be adapted to include a net pool (spot market) for balancing purposes, a market carriage system for allocating transmission network capacity and full retail contestability. Importantly, all of the options will ensure that security of supply objectives are met in an efficient (least-cost) manner.

As set out in chapter 10, all urban water utilities should adopt the universally applicable reforms. In the case of large cities, this means that the absolute ‘minimum’ reform option is option 1. Notwithstanding this, the Commission anticipates that there is a case for most, if not all, of Australia’s large cities to adopt arrangements akin to option 2, 3 or 4 — that is, to go beyond this minimum

(table 12.1). This is particularly true for those regions where structural separation has already been undertaken.

**Table 12.1 Opportunities for efficiency gains**

<i>Large city</i>	<i>Potentially applicable option(s)</i>
Sydney	Option 3 or 4
Melbourne	Option 4
Brisbane (south-east Queensland)	Option 3 or 4
Adelaide	Option 2 or 3
Perth	Option 2 or 3
Hobart	Option 1, 2 or 3
Darwin	Option 1, 2 or 3
ACT	Option 1, 2 or 3

However, the Commission acknowledges that there are a wide range of structural options that could be implemented in large Australian cities, and that the four models presented here might not be relevant or appropriate in some cases. In practice, the most suitable and efficient structural option for each of Australia's large cities will depend on a range of location (and utility) specific factors, including the existing structural, institutional and regulatory arrangements in place. For this reason, it is prudent to consider the merits of these models on a case-by-case basis.

The Commission recommends that State and Territory Governments undertake a comprehensive review of the costs and benefits of pursuing structural reform in large cities. The review should be public and transparent, and ensure that all interested parties are consulted. It is vital that this work considers the full range of costs and benefits of structural reform, and in particular, gives explicit regard to the competition-related efficiency benefits of structural reform. Where a case in favour of structural reform is identified, relevant State and Territory Governments should proceed with implementing reform.

RECOMMENDATION 12.1

***There is a range of structural reform options for urban water supply in Australia's large cities, including:***

- ***Option 1 — a vertically-integrated utility with improved governance and processes***
- ***Option 2 — vertical separation of the bulk water supply function from other elements of the supply chain, and horizontal separation of the bulk water supply function***

- 
- *Option 3 — vertical and horizontal separation of the wastewater treatment function (in addition to option 2)*
  - *Option 4 — horizontal separation of the retail–distribution function (in addition to option 3).*

*State and Territory Governments should undertake a detailed assessment of the full costs and benefits of undertaking structural reform by the end of 2013.*

---

## 13 Reform in regional areas

### Key points

- Regional water utilities face diverse supply and demand circumstances and are subject to a wide range of governance and institutional arrangements. Some regional utilities are confronting complex and significant challenges (including skills shortages, rising regulatory standards, significant capital requirements and a declining customer base). The universally applicable reforms will deliver important efficiency gains. Structural reform might generate additional benefits for regional areas and alleviate some of these challenges.
- A significant number of regional water utilities do not fully recover costs (including capital costs). It is difficult to estimate the extent of this issue as data is incomplete and approaches to assessing full cost recovery vary. Adoption of the universally applicable reforms would ensure that (1) the financial performance of all utilities is reported on annually and (2) all utilities achieve genuine full cost recovery (either via customer charges or subsidy funding) within three years.
- Horizontal aggregation of regional utilities (including the transfer of water assets and revenue from councils) can generate economies of scale efficiencies and provide utilities with better access to skilled labour. Where aggregation is efficient, a (council-owned) corporation is the best-practice organisational structure, although the county council model has considerable merit. Alternatively, a regional alliance approach can lead to cost savings and facilitate greater resource sharing, and does not involve any significant changes to the assets and responsibilities of councils.
- There is scope to achieve material efficiency gains in areas of regional New South Wales and Queensland by either aggregating utilities or establishing regional alliances. State Governments, in consultation with Local Governments, affected communities and other parties should determine the precise approach to reform.
- There has been little analysis of the costs and benefits of retaining the large public water corporations in South Australia, Western Australia and the Northern Territory, relative to adopting a more disaggregated approach. Relevant State and Territory Governments should undertake this analysis and publicly report on the findings.
- The quality of water supply and wastewater services provided to Indigenous communities should be comparable to the standards of services provided to non-Indigenous communities of a similar size and circumstance. Outcomes in Indigenous communities should be reviewed and reported on regularly, using the same metrics used for non-Indigenous communities.

---

This chapter begins by providing an overview of the regional water, wastewater and stormwater sector (the regional water sector) (section 13.1). Water utilities<sup>1</sup> that serve customers in regional areas are confronting a range of challenges, and these are also described, drawing on evidence provided as part of this inquiry.

The Commission anticipates that the universally applicable reforms set out in this report will deliver significant efficiency gains for regional water utilities. However, in certain cases there may also be merit in pursuing structural reform of the regional water sector to achieve additional efficiency benefits, and this is the focus of chapter 13.

Specifically, section 13.2 identifies the potential benefits and costs of horizontally aggregating regional water utilities. This is followed by section 13.3, which considers the merits of the regional alliance model — an alternative approach to achieving efficiency gains in regional areas. Section 13.4 sets out some of the potential benefits of disaggregating the three utilities that provide water services to most — if not all — of urban water customers in South Australia, Western Australia and the Northern Territory respectively. Finally, section 13.5 considers a number of outstanding issues that are relevant for the regional water sector.

## **13.1 Regional water, wastewater and stormwater sector**

The purpose of this section is to identify the distinguishing features of the regional water sector, and to set out the primary motivations for considering structural reform.

### **Key characteristics**

‘Regional Australia’ — in the context of this inquiry — encompasses all areas of Australia that receive reticulated water and wastewater services, but are located outside of large cities (box 12.1, chapter 12). This means the regional water sector includes large regional towns through to remote villages and Indigenous settlements.

---

<sup>1</sup> The Commission is using the term ‘utility’ to describe all entities that are responsible for providing water supply services. This includes local councils (if water supply is an embedded function of the local council) and stand-alone water supply entities (such as public corporations or county councils). In addition, the term regional water utility is used to characterise regional utilities that provide water supply services, wastewater services or both, unless stated otherwise.

As such, it is not practical to develop a ‘one size fits all’ definition of the regional water sector, or a regional water utility. The utilities that serve regional areas face diverse supply and demand circumstances and are subject to a wide range of governance and institutional arrangements (table 13.1 and box 13.1).

**Table 13.1 Regional water utilities**

<i>Jurisdiction</i>	<i>Regional utilities</i>	<i>Size of regional utilities</i>
		Number of property connections (approximately)
New South Wales <sup>a</sup>	106	26 large (> 10 000) 26 medium (3 001 to 10 000) 19 small (1 501 to 3 000) 25 very small (200 to 1 500)
Victoria <sup>b</sup>	13	Regional water and sewerage corporations (14 000 to 134 000)
Queensland <sup>c</sup>	71	11 large (> 25 000) 26 medium (1 000 to 25 000) 34 small (< 1 000)
South Australia	3	South Australia-wide water utility (1.5 million) Coober Pedy District Council (1 500) Roxby Downs Water <sup>d</sup> (1 300)
Western Australia <sup>e</sup>	5	Western Australia-wide water utility (1.1 million) Four small local utilities
Tasmania	3	Regional water and sewerage corporations (43 000 to 95 000)
Northern Territory	1	Northern Territory-wide water utility (80 000)
ACT	1	ACT-wide water utility (145 000)

<sup>a</sup> Sydney Water Corporation, Hunter Water Corporation, Hawkesbury Council and Sydney Catchment Authority are not included in this figure. Ten regional New South Wales utilities do not have water supply (wastewater utilities only) (NSW Office of Water 2010a). <sup>b</sup> Excludes the three Melbourne metropolitan water businesses. <sup>c</sup> There are 83 urban water and wastewater service providers and 77 non-urban service providers in Queensland. 71 of the urban service providers are located outside of south-east Queensland (Department of Environment and Resource Management, sub. 60). <sup>d</sup> Roxby Downs Water is a separate business unit of Roxby Downs Council. <sup>e</sup> The Water Corporation supplies the majority of water customers in Western Australia. Bunbury is supplied by Aqwest and Busselton by Busselton Water. Rottneest Island Authority and Hamersley Iron also provide potable water supply services (ERA 2011d).

*Sources:* ACTEW Corporation (sub. 45); Department of Environment and Resource Management (sub. 60); District Council of Coober Pedy (2011); Essential Services Commission (2011a); NSW Office of Water (2010a); Power and Water (2011); Roxby Downs Council (2010); SA Water (2011a); Water Corporation (sub. 78).

In the large majority of cases, regional water utilities operate within general purpose Local Government councils, or as ‘stand-alone’ public water corporations (State Government-owned or Local Government-owned). Less common models for service delivery include the county council model and the regional alliance model (box 13.1).

---

## Box 13.1 Service delivery models in regional Australia

### General purpose Local Government council

General purpose Local Government councils provide a range of functions (for example roads, waste disposal and childcare services). Some councils also have direct responsibility for the operation and management of water supply and wastewater infrastructure. In some cases, the water supply and wastewater function is a distinct, separate business unit, for example, Shoalhaven Water (Shoalhaven City Council, sub. 15). In New South Wales, the water supply and wastewater operations of local councils are required to be financially ring-fenced from other council activities.

### Public water corporation

Public water corporations are established by legislation as distinct legal entities (chapter 10). The shareholder-owner(s) might be the State Government (Victoria), or multiple Local Government councils (Tasmania). The corporation's board of directors are appointed by the shareholder(s), and corporations are able to make dividend and tax equivalent payments to the shareholder(s). Establishing a corporation would involve transferring asset ownership and operating responsibility from existing utilities to the corporation. Some water corporations operate as dual energy and water service providers, for example Essential Energy (Broken Hill), Power and Water Corporation (Northern Territory) and ActewAGL (ACT).

### County council

County councils operate independently of local councils, with boards of management appointed by constituent councils. County councils own all relevant assets, and are responsible for service delivery, operation and maintenance of assets, and investment. There are four water supply county councils and one water supply and wastewater county council in New South Wales. County councils are established by proclamation under the *Local Government Act 1993* (NSW), and any change to the constitution of a county council must be approved by the minister.

### Regional alliance

The regional alliance model is a relatively new organisational concept for water utilities. Under this model, certain water supply and/or wastewater functions are provided centrally (on behalf of all member utilities) and paid for on some apportioned basis. Regional alliance members may include local council utilities and/or county councils. Ownership of water and wastewater assets, and responsibility for service delivery, are retained by member councils. This model is described in more detail in section 13.3.

Regional water utilities vary significantly in terms of customer numbers and geographic coverage. Broadly speaking, regional utilities have fewer customers (property connections) relative to metropolitan utilities — giving rise to a considerably smaller revenue (rates) base — and annual residential water supplied

---

per property is generally less than in capital cities (Armstrong and Gellatly 2008, p. 20).

Prices for water and wastewater services can vary considerably across regional communities. In New South Wales, the Independent Pricing and Regulatory Tribunal (IPART) sets prices for Hunter Water Corporation, Gosford City Council, Wyong Shire Council<sup>2</sup> and Essential Energy (Broken Hill). The Essential Services Commission (ESC) determines water and wastewater prices in Victoria. In regional Queensland and other areas of New South Wales prices are not regulated by an independent economic regulator (chapters 2 and 6). Instead, prices are set by individual utilities. The *NSW Best-Practice Management of Water Supply and Sewerage Guidelines* set out best-practice water supply pricing principles for regional water utilities in New South Wales.

Regional water utilities are often heavily (or solely) reliant on one water source that supplies a number of towns (serviced by different water utilities), as well as large water consumers (such as irrigators or major mining sites and processing facilities). Inland regional utilities generally have limited options for diversification due to their location — for example, establishing physical linkages between water supply systems may not be feasible or cost-effective.

Distribution networks are a major investment component of water supply system costs, and customer density has a large effect on infrastructure costs. The lower population density of regional areas means that capital costs per customer are generally higher, for example, there are more wastewater treatment plants per head of population, and fewer customers per kilometre of water supply main (NSW Office of Water 2010a, p. 54). The *NSW Performance Monitoring Report 2009-10* shows that the number of properties served per kilometre of water supply network is as low as five in some regional areas (NSW Office of Water 2011). In Tasmania, Cradle Mountain Water has the highest number of pump stations per 100 kilometres of wastewater network — a consequence of servicing the mountainous west coast of Tasmania (OTTER 2011a).

Operating, maintenance and administration costs (OMA) per property tend to be higher in regional areas across all states and territories (NSW Office of Water 2010a, p. 56). Factors that contribute to this include:

- number of small, discrete urban water systems operated by the utility (network costs)

---

<sup>2</sup> Gosford City Council and Wyong Shire Council are now the Central Coast Water Corporation (appendix B).

- 
- distances between centres of demand in regional areas, including the remoteness of some customers
  - physical characteristics of regional water systems, including challenging geology, geography and topology — these features can have a significant effect on water transportation costs, particularly in pumped systems (as compared to gravity-fed systems).

Regional water utilities in Victoria, New South Wales and Queensland typically earn a lower economic real rate of return (ERRR) relative to their metropolitan counterparts (NSW Office of Water 2010a, p. 59; and chapter 2). This issue is discussed further in the following section.

### **Critical issues confronting the regional water sector**

This inquiry has heard evidence to indicate that — in many areas — regional water utilities are financially sound, compliant with regulatory and legislative requirements and responsive to changing demand and supply conditions, and that services are provided to customers in an efficient and effective manner. However, in other parts of regional Australia there are concerns about the viability of water businesses, and the safety and quality of services provided to customers.

The principal concerns confronting regional water utilities — as presented to this inquiry — are set out below, ahead of an assessment of the scope for structural reform to address some of these issues.

#### *Financial performance*

Economic and financial viability is a critical pre-requirement for any efficient business — regional water utilities should earn sufficient revenue to cover all direct and indirect costs (including capital financing costs). Where this is true, the utility can be regarded as achieving genuine full cost recovery (chapter 10 sets out the Commission’s approach to defining and assessing full cost recovery).

Based on evidence presented to this inquiry the Commission is concerned that a number of regional water utilities are not achieving full cost recovery and are not operating on a commercially viable basis. The basis for these concerns are two-fold:

- reports prepared by various government agencies point to underrecovery of costs by a number of regional utilities

- 
- in some regions there is little or no reporting on the financial performance of regional water utilities, making assessments of full cost recovery virtually impossible
  - the true extent of underrecovery may be more pronounced than these reports suggest due to misreporting
    - industry and government approaches to assessing full cost recovery are variable and often misleading
    - the quality and rigour of financial data provided by regional water utilities is uncertain.

### *Published estimates of full cost recovery*

The *2009-10 National Performance Report* prepared by the National Water Commission (NWC) and Water Services Association of Australia (WSAA) provides ERRR information for 12 of Victoria's 13 regional water utilities. The NWC considers that an ERRR greater than or equal to zero is equivalent to full cost recovery. The Commission's concerns with this approach are discussed in the following section. However, even on this basis there is evidence of significant underrecovery of costs within Victoria's regional water sector — in total, five of the 12 utilities earned a negative ERRR in 2009-10 (and an additional five utilities earned an ERRR of less than 2 per cent) (NWC and WSAA 2011).

The Commission recognises that a low or negative return in any one year is not unusual and does not necessarily imply that a business is not financially viable. However, historical data indicates that many of these utilities have been earning low or negative rates of return over a sustained period. For example, Central Highlands Water earned a negative ERRR in the four years to 2009-10. Likewise, South Gippsland Water reported a negative return in each year for the period 2005-06 to 2008-09 inclusive (NWC and WSAA 2011).

The *2009-10 NSW Water Supply and Sewerage Performance Monitoring Report* reports that two per cent of New South Wales utilities did not fully recover costs for water supply in 2009-10. The two utilities that did not achieve full cost recovery were Albury and Murrumbidgee. For wastewater services, four utilities (Berrigan, Carathool, Coonamble and Upper Hunter) failed to fully recover costs in 2009-10 (NSW Office of Water 2011). However, the number of utilities that earned a negative ERRR for water supply and wastewater services was much higher than this (box 13.2). As set out later in this section, the Commission considers that these utilities are underrecovering costs.

---

The *Tasmanian Water and Sewerage State of the Industry Report 2009-10* prepared by the Office of the Tasmanian Economic Regulator (OTTER) reports that in 2009-10, Southern Water earned an ERRR of 1.08 per cent, followed by Ben Lomond Water with 0.63 per cent and Cradle Mountain Water with -0.45 per cent (OTTER 2011a). OTTER concludes that the three Tasmanian water and sewerage corporations are not yet fully recovering costs, and note that an ERRR of around 7 per cent is required for full cost recovery.

### **Box 13.2 Full cost recovery by New South Wales utilities?**

The *2009-10 NSW Water Supply and Sewerage Performance Monitoring Report* indicates that 32 regional water utilities reported a negative economic real rate of return (ERRR) for water supply services in 2009-10 (in addition to the two utilities that were identified as not achieving full cost recovery), and 16 utilities had a negative ERRR for wastewater services.

Even though these 32 utilities did not earn zero or positive returns, they were considered to be fully recovering costs due to making a subsequent commitment to significantly increase 2010-11 prices.

This follows similar outcomes in previous years. In 2007-08, 25 regional water utilities reported a negative ERRR for water supply services (and an additional seven utilities failed to fully recover costs). In 2008-09, 35 regional water utilities reported a negative ERRR for water supply services (and an additional four utilities failed to fully recover costs). The Commission does not consider that utilities earning negative returns (particularly over a sustained period) are achieving genuine full cost recovery, as discussed later in this chapter.

*Sources:* NSW Office of Water (2009, 2010a, 2011).

Data on the financial performance of regional water utilities in Queensland is extremely limited (although the Queensland Water Directorate (sub. DR138) provided some rate of return information for a small group of utilities). In addition, the Commission understands that local council utilities in Queensland are *not* required to produce separate (ring-fenced) financial accounts for their water supply and wastewater operations. This makes it very difficult to determine whether local councils are shifting costs and revenue between different functions, and accordingly, to determine whether water services are provided on a full cost recovery basis.

The Local Government Association of Queensland (LGAQ) indicated that cross-subsidisation of council activities does take place in Queensland, particularly for smaller councils:

---

In many instances water businesses have been generating revenue that has been transferred to other aspects of council business. (trans., p. 563)

The Commission recognises that work is underway to improve the scope and quality of publicly available data on the financial performance of Queensland utilities (box 13.3). This will be critical to obtaining a better understanding of the economic performance of regional utilities. To complement this, the Commission strongly encourages the Queensland Government to require that local councils financially ring-fence their water supply and wastewater operations from other council activities.

### **Box 13.3 Queensland's SWIM data portal**

The Statewide Water Information Management (SWIM) data portal — a joint initiative of the Queensland Water Directorate and the Local Government Association of Queensland, in partnership with the Queensland Government — has been designed to:

- reduce the reporting requirements imposed on councils by State and Australian Government reporting agencies
- improve the accuracy and consistency of water reporting
- increase the amount of information that is publicly available to industry participants.

The SWIM data portal coordinates the data requests of all Queensland Government departments into a single data request. Councils submit all data once per year, and are then provided with data reports that can be forwarded directly to the Queensland Government. Use of the SWIM system is voluntary — Queensland Water Directorate reports that in 2009-10, 85 per cent of mainstream councils used the SWIM system.

Councils cannot access data on the performance of individual councils, but can observe median values for groups of comparable councils (for example, councils in the same region, or councils of a similar size). This provides scope for performance benchmarking and incentives for improvement in industry standards. The Queensland Water Directorate is currently running a pilot project that would make information on the performance of individual councils publicly available. A report is expected to be produced in late 2011.

*Source:* Queensland Water Directorate (2011).

### *Misreporting*

Agencies define (and interpret) full cost recovery in different ways, creating confusion and inconsistency within the industry. For example:

- 
- The National Water Initiative (NWI) (clause 66(v)) states that full cost recovery for rural and regional water utilities is demonstrated by ‘achievement of lower bound pricing<sup>3</sup> for all rural systems in line with existing NCP [National Competition Policy] commitments’ and ‘continued movement towards upper bound pricing<sup>4</sup> for all rural systems, where practicable’ (COAG 2004, p. 14). The NWI does not impose a timeframe within which either of these outcomes should be achieved.
  - The NWC and WSAA *National Performance Report* series includes data on the ERRR earned by water and/or wastewater businesses with more than 10 000 connections. The *National Performance Framework* (that accompanies these reports) indicates that the purpose of reporting on this measure is ‘to demonstrate that the ... businesses meet the requirements of National Competition Policy to achieve full cost recovery’, where an ERRR greater than or equal to zero is considered equivalent to full cost recovery (NWC and WSAA 2010b, p. 81). The NWC and WSAA define the ERRR (for water and wastewater operations) as<sup>5</sup>:
 

(Revenue from water or sewerage operations – operating, maintenance and administration costs – current cost depreciation) x 100% / Written down replacement cost of fixed assets plus plant and equipment. (NWC and WSAA 2010b, p. 82)
  - The NSW Office of Water note that regional water utilities achieve full cost recovery if:
 

Either the economic real rate of return [as defined by the NWC] or the return on assets is greater than or equal to zero ... [or] if a local water utility has significantly increased its charges in order to recover its costs [that is, despite earning a negative ERRR]. (NSW Office of Water 2011, p. 84)

---

<sup>3</sup> The level at which to be viable, a water business should recover, at least, the operational, maintenance and administrative costs, externalities, taxes or tax equivalent regimes (not including income tax), the interest cost on debt, dividends (if any) and make provision for future asset refurbishment/replacement. Dividends should be set at a level that reflects commercial realities and stimulates a competitive market outcome (COAG 2004, p. 29).

<sup>4</sup> The level at which, to avoid monopoly rents, a water business should not recover more than the operational, maintenance and administrative costs, externalities, taxes or tax equivalent regimes, provision for the cost of asset consumption and cost of capital, the latter being calculated using a weighted average cost of capital (COAG 2004, p. 30). The main difference between lower and upper bound pricing is that ‘the former recovers interest on debt and provides for the payment of dividends, while the latter recovers the opportunity cost of capital (a return on the financing capital including an appropriate risk premium)’ (Roper, Sayers, and Smith 2006, p. 25).

<sup>5</sup> Revenue from operations includes all developer cash and asset contributions for the water and sewerage business. Revenue from operations excludes interest income, grants for acquisition of assets and gain/loss on disposal of assets for the water and sewerage business. Current cost depreciation expense should be based on the change in the written down replacement cost of the fixed assets over the reporting period.

---

These approaches are not consistent with the Commission's view of genuine full cost recovery (chapter 10). For example, achieving lower bound pricing, or earning a positive ERRR (as defined by the NWC and WSAA), is not equivalent to full cost recovery as neither of these outcomes provides for any return on capital.

Likewise, the Commission does not consider that evidence of 'movement toward' upper bound pricing — with no identified timeframe within which upper bound pricing should be achieved — is sufficiently precise or robust to be considered full cost recovery. In addition, the ambiguous nature of this requirement is unlikely to support rapid progress by regional utilities toward full cost recovery. Indeed, the NWC's 2009 *Second biennial assessment of progress in implementation of the National Water Initiative* found:

Progress has been made by most states in implementing best practice pricing in rural and regional areas ... most government-owned rural water service providers have achieved lower-bound pricing or have transparent Community Service Obligations in place to account for any revenue shortfall below the lower revenue bound. However ... the financial performance of regional and rural water utilities is highly variable and generally below that of metropolitan urban utilities. (NWC 2009a, p. 176)

This was reiterated by WSAA in its submission to the NWC assessment process:

Little progress has been made to move regional cities and towns where water services are provided by local governments towards upper bound pricing as required by the NWI. (WSAA 2009a, p. 2)

The NSW Office of Water definition of full cost recovery is not only inconsistent with the Commission's approach (chapter 10), but also appears to conflict with the views of some of the local councils that they report on. In responding to this inquiry the Water Utilities Sharing Group (a regional alliance between Gwydir Shire Council, Moree Plains Shire Council and Walgett Shire Council) considered that full cost recovery is not a realistic goal for some regional utilities:

The prices passed onto end-users for these [water] services do not, and cannot, reflect the actual cost of service provision. (sub. DR102, pp. 1–2)

This suggests that these councils may not consider that they are operating on a full cost recovery basis. Yet all three of these councils were classified as achieving full cost recovery in 2008-09 and 2009-10 by the NSW Office of Water.

The Commission's views on current approaches to assessing full cost recovery are summarised in table 13.2. The use of different (and in most cases, misleading and unclear) definitions of full cost recovery by various agencies casts doubts over the quality of published information on cost recovery, and has led to considerable confusion within the industry. Parties responding to this inquiry proposed several,

wide-ranging interpretations of the full cost recovery principle and how it should be measured — box 13.4.

**Table 13.2 Approaches to assessing full cost recovery**

	<i>Definition of full cost recovery</i>	<i>Commission's comment</i>
National Water Initiative	<ul style="list-style-type: none"> <li>• For rural water systems: achievement of lower bound pricing; and continued movement toward upper bound pricing</li> </ul>	Definition of lower bound pricing is vague and interpreted differently across agencies and jurisdictions Lower bound pricing does not include recovery of the opportunity cost of capital No identified timeframe for achieving either of the full cost recovery requirements
National Performance Reports (NWC and WSAA)	Economic real rate of return (ERRR) greater than or equal to zero	Does not provide for a return on capital
NSW Performance Monitoring Report (NSW Office of Water)	ERRR greater than or equal to zero, or a significant increase in prices	Does not provide for a return on capital A number of utilities earn consistently negative ERRRs but continue to be assessed as achieving full cost recovery. Increasing prices in response to poor returns in the preceding year does not constitute genuine full cost recovery and is unlikely to be sustainable.

Even putting aside the problems associated with disparate industry interpretations of full cost recovery, the Commission has some concerns about the quality and rigour of the financial data (including rate of return information) that currently feeds into reporting processes. This information is based on self-reporting by regional water utilities and is not always independently audited. For example, only selected indicators reported on in the NWC and WSAA *National Performance Report* series are audited (and this only takes place on a three-yearly cycle). The three ERRRs reported by the NWC and WSAA (indicators F17 to F19) are *not* classified as auditable indicators (although some components of these indicators — such as revenue and OMA expenditure — are auditable indicators) (NWC and WSAA 2011).

The *2009-10 NSW Water Supply and Sewerage Performance Monitoring Report* notes that auditing arrangements in New South Wales are more comprehensive than the NWC and WSAA arrangements, and that the ERRR *is* audited (and on an annual basis):

---

In addition [to the NWC and WSAA reporting requirements] the 30 NWI financial performance indicators have been independently audited for all of the New South Wales utilities. (NSW Office of Water 2011, p. vii)

The Commission commends the NSW Office of Water on these arrangements. However, the Commission remains concerned that current reporting processes (outside of New South Wales) might not be sufficiently robust to ensure that reported financial information is consistently accurate.

#### **Box 13.4 Comments by inquiry participants on full cost recovery**

The NSW Water Directorate considered:

Economic real rate of return demonstrates that if that's positive, then you're charging enough. (trans., p. 474)

In contrast, the Independent Pricing and Regulatory Tribunal commented:

We've tended to determine rate of return in the order of 7 per cent real for the organisations we have set prices for ... [for] very low or negative rates of return — I think it's questionable whether full cost recovery has been achieved there because, after all, the capital has an opportunity cost. (trans., p. 454)

Centroc and Lower Macquarie Water Utilities Alliances suggested that a positive economic real rate of return is not equivalent to full cost recovery:

The economic real rate of return is a useful benchmarking comparator, but we would also support a benchmark that reflects full economic cost. (sub. DR131, p. 17)

Daryl McGregor, a representative of both of these alliances noted:

The full economic cost is the way forward. Economic real rate of return can be a variable and doesn't really give these sorts of organisations the right sort of information to go forward, I don't think. (trans., p. 467)

Infrastructure Australia considered that a rate of return that provides for future investment is critical:

There have to be real questions asked about the extent to which utilities that are claimed to be recovering full costs is actually true, both in the sense of: are they actually getting a real rate of return? ... I'm not confident at all that Local Governments are recovering the costs to replace infrastructure. (trans., p. 500)

Riverina Water County Council considered (trans., p. 620) 'if your cost point includes all of your expected outgoings, your depreciation, your replacement into the future [including financing and repaying debts]' then covering those costs is sufficient.

In summary, the Commission is concerned about the robustness of available information on full cost recovery, and considers that the incidence of underrecovery of costs is more significant than current reporting suggests.

---

FINDING 13.1

*A significant number of regional water utilities in New South Wales, Victoria, Queensland and Tasmania are not fully recovering costs (including capital costs). Based on publicly available financial indicators, the incidence of underrecovery of costs is more pronounced than a number of government agencies suggest, due to the way that full cost recovery is defined and assessed by those agencies.*

The universally applicable reforms are expected to address these concerns:

- Charter agreements between State and Territory Governments and regional utilities would include a requirement that utilities achieve genuine full cost recovery (as defined by the Commission — chapter 10) within three years of the charter arrangements commencing.
- The utility's auditor would verify relevant financial data as part of the annual statutory financial reporting process. This would include rate of return information and data on full cost recovery. The precise audit requirements should be set by the jurisdictional economic regulator (or an alternative agency, as determined by the relevant government).
- The performance of regional water utilities against the charter requirements (including achievement of full cost recovery) would be publicly reported on annually. State and Territory Governments would determine the appropriate agency to undertake this role.

The Commission expects that regional water utilities will be better positioned to operate on a full cost recovery basis (and hence comply with the charter requirements) once the reforms proposed in this report are in place. For example, cost-reflective pricing arrangements (chapter 6) would allow utilities to recover the efficient cost of providing services to customers. Likewise, the undertaking of structural reform (as described in this chapter) offers scope to improve the economic viability of utilities.

In the event governments determine that regional utilities should not pass on the full cost of service provision to customers, there is a role for government funding to ensure that affected utilities operate on a full cost recovery basis (recommendation 10.6). This is discussed in more detail in section 13.5.

### ***Skills shortages***

In the regional water sector access to skilled labour is a two-dimensional problem. First, as skilled labour becomes more difficult to secure, utilities must dedicate

---

greater resources toward attracting, retaining and training staff, putting upward pressure on costs. Second, where utilities cannot access appropriate skilled persons, there are direct consequences for asset management and the quality of services delivered to customers.

The reasons for reported skills shortages are numerous. Armstrong and Gellatly identified the following drivers (2008, p. 94):

- utilities cannot offer competitive remuneration
- graduates are attracted to city areas
- the number of graduates from disciplines such as engineering are insufficient relative to demand
- the ageing profile of the industry, and looming retirements.

A number of inquiry respondents commented on this issue. The LGAQ considered:

A lack of skills capability is a national problem that is manifested strongly in Queensland. The water industry has not placed enough emphasis on attraction, retention and up skilling. With a workforce with a high average age, retirement of baby boomers will have a large impact on the industry over the next five years. (sub. 20, p. 6)

Similarly, WSAA (sub. 29, p. 33) noted ‘many areas of New South Wales are unable to attract skilled staff owing to declining populations and the associated reductions in the provision of community services’. Kempsey Shire Council (sub. 30, p. 20) expect that there will be ‘major shortfalls in staff capabilities and a significant loss of expertise due to retirement over the next 5–10 years’ and that this shortage will coincide with increasing demand for skilled people to operate high technology treatment plants.

In practice, structural reform might provide some assistance to water utilities confronting skills shortages, but will fall well short of solving the problem. Concerns about insufficient skilled labour are not unique to the regional water sector, or even to the Australian water sector more generally. Many industries are reporting problems with respect to attracting and retaining sufficient numbers of skilled staff. Given the complex nature of this issue, and the broad range of industries affected, it is more appropriate for governments to address these concerns directly (for example, via appropriate education, training and workforce policy measures), rather than on a water sector-specific basis.

However, the Commission has identified one particularly acute and important skill gap within the urban water sector more specifically. Evidence presented to this inquiry suggests that water utilities do not always have the adequate skills,

---

knowledge or technical capability to take efficient (optimal) infrastructure investment and operating decisions (chapter 5). Adopting a real options approach to supply augmentation and dispatch assumes a certain level of economics knowledge and water utilities may not have access to this expertise. The Commission considers that the industry generally would benefit from developing capability in this area (chapter 14).

### *Compliance with public health and environmental regulations and standards*

Non-compliance with public health and environmental regulations and/or standards is not unique to regional water utilities. However, the incidence of non-compliance tends to be higher in regional areas relative to metropolitan cities.

Compliance with drinking water quality standards is a particular issue for regional water utilities. For example, in 2009-10, 99 per cent of the 20 700 drinking water samples tested in New South Wales were compliant with the microbiological water quality (E. coli) component of the *2004 Australian Drinking Water Guidelines* (ADWG) (chapter 10). However, the non-compliant samples were virtually exclusive to the regional water utilities. Specifically, 11 regional utilities (each serving between 500 and 7 200 properties) were deemed non-compliant<sup>6</sup> with the ADWG (NSW Office of Water 2011).

Information on drinking water quality outcomes in Queensland is limited. However, a 2009 study by the Department of Environment and Resource Management (DERM) revealed serious issues with drinking water quality in regional Queensland — the incidence of potential harmful microbiological organisms per water sample was over 3 per cent for small water utilities (fewer than 20 000 connections) (LGAQ, sub. 20). The LGAQ noted:

Further risk based studies by the Department indicated that 7 per cent to 15 per cent of water service providers have assets in poor to very poor condition while 12 per cent to 15 per cent have poor to very poor operational maintenance practices. Alarming, 9 per cent to 18 per cent had high to very high drinking water quality risks. This demonstrates that while for the most part conventional standards are being met, there is a fundamental underlying issue relating to water quality standards which are indirectly linked to asset management and capacity for the service provider. (sub 20, p. 14)

The Queensland Water Directorate also raised concerns about drinking water quality in regional Queensland:

---

<sup>6</sup> For an individual water utility to comply with the ADWG, the required number of samples must be tested and at least 98 per cent of the samples must contain no E.coli.

---

Compliance with public health standards and uptake of the Australian Drinking Water Guidelines (ADWG) is patchy across Queensland ... small and remote councils in particular can have difficulty in demonstrating compliance. (sub. DR138, p. 33)

The three recently established water and sewerage corporations in Tasmania continue to face difficulties complying with public health and environmental regulations, a legacy of the local council water utilities the corporations replaced:

We have a large number of boil water alerts, generally serving low population numbers. My business [Southern Water] has a proportionately high number of water and wastewater failures per 100 kilometres of pipeline compared to any of the other benchmarks that are out there. (Southern Water, trans., p. 408)

OTTER reported that in 2009-10, 24 small drinking water supply schemes (servicing 1.1 per cent of the Tasmanian population) operated with a permanent boil water alert. In total, four per cent of the Tasmanian population serviced with reticulated water supply received non-compliant drinking water in 2009-10 (OTTER 2011a). Similar problems were observed with respect to wastewater services:

The Tasmanian water corporations are underperforming ... Major utilities (those with between 50 000 and 100 000 customers) in other states generally achieved higher than 99 per cent compliance of sewage treatment, while Ben Lomond Water and Southern Water reported only around 94 per cent compliance (volume-weighted). Similarly, Cradle Mountain Water's sewage compliance is well below the expected levels, and compared to other non-major utilities across Australia (those with between 20 000 and 50 000 customers), is performing below the average, with only 85 per cent of sewage volume compliant with regulatory limits. Other similar sized water utilities reported an average 94 per cent compliance (excluding Power and Water in Darwin) of treated sewage in 2008-09. (OTTER 2011a, p. 90)

There are valid reasons to expect that aggregation would improve regulatory compliance in some circumstances. For example, if aggregated utilities have greater access to financial resources and specialist skills they might be better placed to invest in infrastructure and undertake appropriate asset management. This was recognised by Armstrong and Gellatly:

Smaller utilities have a much lower compliance with best-practice management requirements than large ones. It is important to recognise that this is not a reflection on the ability of staff in small utilities who are almost all doing exceptionally well in trying circumstances. Rather, it is a reality that corporate structures, access to specialist technical skills and financial resources offer the opportunity to be proactive and to consistently meet planning, public health and environmental requirements. (Armstrong and Gellatly 2008, p. 25)

Evidence of positive correlation between utility size and regulatory compliance in Queensland and New South Wales further supports this. The DERM study (referred

---

to earlier) found that larger water utilities are much more likely to comply with drinking water quality standards — while the incidence of harmful organisms per water sample was 3.31 per cent for small service providers, on a statewide basis the rate of contaminated samples dropped to 0.57 per cent (sub. 20, p. 14). Likewise, large utilities in New South Wales have a significantly higher level of overall compliance with the *Best-Practice Management of Water Supply and Sewerage Guidelines* relative to smaller utilities<sup>7</sup> (Armstrong and Gellatly 2008).

Notwithstanding this, there is a limit to the extent that structural reform can drive improvements in utility performance against environmental and public health standards. In practice, other measures will usually be required to ensure that utilities comply with these standards. This is particularly the case for drinking water quality, given the potentially catastrophic consequences of a breach of these standards. To remedy this, the Commission considers that all Australian water utilities should be required (by legislation) to fully comply with all of the requirements of the ADWG (recommendation 10.5).

### *Regulatory and administrative burden*

A number of respondents to this inquiry commented on the high costs imposed on water utilities by the existing regulatory and legislative framework, and considered that regional utilities face proportionally greater costs and difficulties managing these requirements relative to metropolitan utilities. These concerns include:

- The level of performance required by regional utilities has trended upward over time, and these standards (particularly with regard to public health and environmental outcomes) are not determined with reference to costs and benefits.
- Reporting requirements on regional utilities have increased, both in terms of the frequency of reporting, and the scope of activities that are subject to reporting.
- The legislative and regulatory framework is ad hoc and inconsistent — the roles of government agencies are not clearly defined, and often overlap, causing confusion for water utilities, and exacerbating compliance costs.

Rising regulatory requirements, in concert with a cumbersome regulatory framework, have direct cost impacts for utilities. Businesses are forced to dedicate greater resources towards understanding their obligations, and achieving (and

---

<sup>7</sup> Notwithstanding this general trend, non-compliance with the ADWG is not unique to small and remote water utilities. For example, in New South Wales Mid-Western Regional (which supplies a population of around 23 000) did not comply with the ADWG in 2009-10 (NSW Office of Water 2011).

---

demonstrating) compliance. Kempsey Shire Council (sub. 30, p. 18) commented ‘environmental and public health standards have led to a significant increase in the capital and operating costs of water utilities’. Likewise, Water Quality Research Australia considered:

It must be recognised ... that there is a cost in meeting legislative requirements, resourcing, monitoring and reporting costs. These are often intrinsic, often hidden costs at the moment, that are needed to develop, maintain and audit compliance. These costs should be duly acknowledged as a necessary cost of business. (trans., p. 275)

The Queensland Water Directorate noted:

A large raft of legislative requirements introduced over the past five years appear to have been created without any meaningful regulatory impact analysis or consultation with the industry resulting in expensive and time consuming requirements that are beyond the ability of some service providers to incorporate in the required timeframes. (sub. DR138, p. 34)

The NSW Office of Water suggested that rising sewage standards explain a significant component of recent increases in utility costs:

More stringent requirements for compliance with the Department of Environment, Climate Change and Water (DECCW) licences for larger sewerage systems (these often require nutrient removal and disinfection facilities), are a key driver of OMA (operating, maintenance and administration) costs in New South Wales ... the statewide median OMA cost has risen from \$240 to \$340 per property over the past 17 years, largely due to more stringent standards for sewage treatment and increased management costs. (NSW Office of Water 2010a, p. 42)

There is a widespread concern amongst utilities that revisions to regulatory arrangements are not made on the basis of rigorous cost–benefit analysis, and in particular, do not consider the cost impacts on water utilities and the communities they serve.

Similar themes emerged as part of the Armstrong and Gellatly inquiry, with submitting parties noting that ‘agencies often have conflicting or overlapping goals and objectives and local water utilities are forced to deal with these’ (2008, p. 70). The inquiry recommended that the ‘reporting and regulatory roles undertaken by State Government agencies be reviewed with a view to streamlining these requirements and to ensure a consistent approach across these agencies’ (2008, p. 5).

The reforms proposed in chapters 10 and 11 of this report are expected to address many of these issues. For example, the Commission has recommended that all regulation is developed with reference to costs and benefits, and that where existing regulatory requirements are not cost-effective, they are removed or reduced.

---

## Way forward

Regional water utilities face a range of complex economic, demographic and geographic challenges, and there is no ‘one size fits all’ solution to addressing these issues. In certain cases there may be no solution, as some of these issues reflect the reality of water supply and wastewater service provision in regional areas, and will not be removed or even alleviated via reform.

Notwithstanding this, the Commission expects that the universally applicable reforms will lead to material efficiency gains in the regional water sector. In addition, to the extent that some of the problems confronting these utilities are driven by the sub-optimal operating scale of businesses, there may also be a role for structural reform.

To inform this debate, the following sections consider the costs and benefits of three reform options for regional areas. Option 1 (section 13.2) involves horizontally aggregating multiple regional water utilities to form larger utilities (either a regional water corporation or a county council). Option 2 (section 13.3) is the regional alliance model (or regional organisation of councils). This option would deliver some of the economies of scale benefits of option 1 without requiring a fundamental restructure of Local Government water utilities.

These two options are of most relevance to regional areas serviced by water businesses operating on a relatively small scale, such as throughout regional New South Wales and areas of Queensland outside of south-east Queensland.

Option 3 (section 13.4) considers the merits of disaggregating large jurisdiction-wide water utilities, as exist in South Australia, Western Australia and the Northern Territory.

### 13.2 Option 1: Horizontal aggregation

Aggregating two or more regional water utilities to form a single water business (option 1) would involve transferring responsibility for water and wastewater service provision, and ownership of related assets, away from Local Government councils.

The precise benefits and costs of option 1 will depend on the way in which aggregation is undertaken, and the size and compositions of the aggregations that result — these decisions are best informed by the particular location, characteristics and circumstances of affected regional water utilities.

---

However, this section identifies some of the generic benefits and costs of horizontal aggregation, and might inform subsequent analysis of more specific reform proposals. Aggregated utilities may elect to operate as a public corporation or as a (asset-owning) county council — the relative merits of these organisational structures are discussed later in this section.

## **Benefits**

### *Economies of scale efficiencies*

By definition, an aggregated water utility will serve more customers relative to the stand-alone water utilities it comprises. This may allow the utility to earn more revenue, with a less than proportionate increase in costs. Where this is the case, aggregation is considered to have revealed ‘economies of scale efficiencies’ (section 12.1).

For example, an aggregated businesses may be able to service all customers using one water treatment plant in place of multiple plants, or deal with all customer complaints via a single complaints department. An aggregated utility may also realise economies of scale in procurement, administration and training (Armstrong and Gellatly 2008). For example, larger utilities, due to their increased buying power, may have greater capacity to secure goods or services from the private sector at more cost-competitive levels.

The Tasmanian Water and Sewerage Corporations noted that structural reform in that state has ‘provided the ability to combine like capital projects to provide a more attractive package of work to external providers’ (sub. 43, p. 6) and consider there may be further gains in this area:

There is an opportunity for this to be done between the corporations such that larger national companies might also be attracted into the market. Similarly there are opportunities to look outside our own sector, possibly in combination with utilities such as electricity and gas, to leverage longer-term maintenance contracts with larger national firms. (sub. 43, p. 6)

Likewise, there may be scale benefits with regard to accessing funding for capital projects and servicing debt, with flow-on benefits for asset management. For example, larger utilities are more likely to have the appropriate financial strength to access debt funding to undertake efficient investment.

Evidence of scale efficiencies is provided by the recent Tasmanian urban water reform experience:

---

Reform has provided the scope for the rationalisation of overloaded and ageing assets that were previously constrained by lines on a map. Combining existing systems and decommissioning assets which are either antiquated or surplus to requirements offers potential to make more efficient use of existing facilities and in doing so, realise significant capital, maintenance and operational cost savings. (Tasmania Water and Sewerage Corporations, sub. 43, p. 5).

The reform process undertaken in Victoria also provides evidence of cost savings from aggregation. For example, Gleeson (1999) suggests that reform led to reductions in operating costs across the industry of between 20 and 35 per cent. Dollery, Keogh and Crase (2005) found more modest cost savings, suggesting amalgamations delivered an 8.5 per cent reduction in costs. However, it is important to recognise that urban water reform in Victoria coincided with local council amalgamations and corporatisation of regional water businesses. It would be misleading to attribute all of the efficiency benefits of this reform process to an increase in operating scale, or to expect that the same sorts of benefits will materialise in other regions where local councils are not amalgamated simultaneously, or a corporation structure is not adopted.

Where aggregation does move utilities closer towards minimum efficient operating scale (section 12.1) (and therefore give rise to scale efficiencies), the financial position of the water utility will improve, with flow-on benefits for consumers — including lower prices and improved service quality. In addition, as more utilities become financially independent, reliance on government funding will subside, reducing pressure on consolidated revenue. Gleeson considered that urban water reform in Victoria led to significant savings for the State Government:

During the 1997/98 year the non-metropolitan water industry paid a dividend to the State Treasury of \$20.6 million. This is a \$50 million turn-around in the impact of water supply on Treasury. (Gleeson 1999, p. 9)

In practice, the extent to which aggregation leads to scale economies will depend on a range of factors. For example, LGAQ (sub. 20, p. 8) caution ‘economies are not easily achieved where a large number of small communities are spread at great distance’. Likewise, Burdekin Shire Council noted:

... urban water supply is sourced from bores from the sand aquifer, and has minimal treatment to produce high quality drinking water at low cost. This is different to most other urban water supplies. It does not make sense to aggregate the Burdekin urban water supply with other urban water supplies located geographically close, as no increased efficiencies would result. (sub. 27, p. 2)

The Commission supports case-by-case assessment of the scale benefits (if any) from horizontal aggregation, with due regard to the specific circumstances of the region (section 12.1).

---

## *Skills shortages*

Aggregation may reduce the skilled labour problem facing regional water utilities, but it is certainly not expected to solve it entirely. A number of respondents suggested that a large utility might have greater capacity to attract and retain skilled staff relative to small, stand-alone utilities. Kempsey Shire Council (sub. 30, p. 10) considered ‘larger utilities will offer the benefits of providing greater opportunities for training, career paths and progression’. Likewise, LGAQ (sub. 20, p. 8) noted ‘group access to specialised senior staff is seen as a strong benefit for regional collaboration’. Armstrong and Gellatly reached a similar finding:

Larger organisations serve to provide staff with opportunities to move professionally up through the organisation. This can be very attractive to prospective employees, and may serve to reduce the degree of industry ‘churn’. (Armstrong and Gellatly 2008, p. 91)

In Tasmania, the Ministerial Water and Sewerage Taskforce (MWST) identified greater skills availability as a key benefit of structural reform:

Increased scale would improve the ability to attract and retain key staff. This is of particular importance given the skill shortages for engineering and technical expertise that exists nationwide. Career opportunities for key staff would also increase, which would assist in retaining essential skills in Tasmania. (MWST 2006, p. 11)

Aggregated utilities may also be able to reduce the size of their workforce overall, for example, if there is capacity to allocate skilled labour resources more efficiently. However, the extent to which this is possible will depend on a range of factors, such as the distances that staff have to travel to carry out their functions, and the number (and type) of assets (including networks) managed by the utility. A number of inquiry respondents emphasised that aggregation is unlikely to provide opportunities for rationalisation of operational staff. This was recognised by Armstrong and Gellatly:

Councils that are proposing the transfer of water supply and sewerage assets and operations to another entity do not expect an impact on operational staff because customer service levels would need to be at least maintained following the transfer. The impact of the transfer is more likely to affect some managerial and administrative staff. (Armstrong and Gellatly 2008, p. 47)

As noted earlier, it is not realistic to expect that structural reform will solve the skilled labour problem in regional areas. However, to the extent that aggregation does ease skills shortages (albeit by a marginal amount) this could increase rates of regulatory compliance and improve the quality of services provided to customers.

---

### *Transaction costs*

Aggregation is expected to reduce the costs of regional water utilities collaborating on issues that are common to the region, such as water resource management, water system planning and integrated water cycle management. For example, where multiple regional water utilities share a common bulk water source, such as a dam or river, aggregation will remove the coordination and transaction costs involved with management of that resource. The risks associated with individual utilities having inconsistent or conflicting asset management plans and policies would also be avoided.

Armstrong and Gellatly (2008, p. 29) considered that aggregation would support ‘increased ability to coordinate integrated water cycle management across whole catchments’, relative to the status quo. The Institute for Sustainable Futures noted:

Each interface between one entity and another in the whole spectrum of planning for and providing community services and activities creates a potential barrier to achieving fully integrated service provision, integrated water cycle management, holistic planning, including land-use planning and strategic community planning, and all the other desirable goals associated with Fourth Generation Urban Water Management. (Institute for Sustainable Futures 2008, p. 11)

More efficient and cost-effective resource and environmental management was a key motivation for the recent horizontal aggregation of water utility businesses in Auckland (appendix C).

Aggregation may also reduce the transaction costs associated with regional utilities interfacing with State and Territory Government departments. In particular, the administration and regulatory costs of coordination with government agencies (for example, with regard to administering public health and environmental regulations, performance reporting, licensing arrangements and policy development), are likely to fall following aggregation, due to the smaller number of water utilities in regional areas that government agencies must engage with.

Although aggregation might reduce total transaction costs in some circumstances, it is important to recognise that organisations can become ‘too big’, and that there is a natural limit to what can be efficiently undertaken within one organisation. This point is best made by Ronald Coase:

As a firm gets larger, there may be decreasing returns to the entrepreneur function, that is, the costs of organising additional transactions within the firm may rise. Naturally, a point must be reached where the costs of organising an extra transaction are equal to the costs involved in carrying out the transaction in the open market. (Coase 1937, p. 394)

---

In circumstances where utilities are inefficiently large, the costs and complexities of internalised operations and decision making become significant, and the most appropriate remedy may in fact be to *disaggregate* the integrated entity (section 13.4). If aggregation is expected to produce a utility that is at risk of decreasing returns, the case for structural reform becomes considerably weaker.

### *Yardstick competition*

Consolidation of regional water utilities is not motivated by the pursuit of competition, and does not provide opportunities for competitive pressure to develop in the same way that vertical and horizontal separation does (chapter 12). However, aggregation — coupled with the performance reporting requirements set out in chapter 10 — may provide scope for some form of comparative performance reporting, or ‘yardstick competition’, between aggregated regional water utilities (section 12.1).

Under the proposed charter arrangements the performance of all utilities would be reviewed and publicly reported on annually. To the extent that two or more utilities face broadly similar supply and demand conditions, this information could be used to drive efficiency gains across the sector. Southern Water identified this as an important benefit of urban water reform in Tasmania, ‘comparative competition has been very good and an important part of our start-up’ (trans., p. 403). Kempsey Shire Council (sub. 30, p. 14) considered that aggregation would ‘provide for a level of soft competition ... in relation to pricing and financial performance’.

Yardstick competition also provides strong incentives for innovation by regional water utilities. A number of respondents to this inquiry suggested that this has been a significant benefit of establishing yardstick competition between the three metropolitan Melbourne retailer-distributors (section 12.1 and appendix G). Greater scope to meaningfully compare the performance of larger-scale regional water utilities is also expected to generate rivalry between utility managers, with corresponding benefits for utility performance.

Currently, there is no comprehensive performance reporting or benchmarking of all Australian regional water utilities, although significant inroads have been made in recent years. For example, the ESC and the NSW Office of Water report on the relative performance of regional water utilities in Victoria and New South Wales respectively. The WSAA and NWC *National Performance Report* series has been important in driving improvements in utility performance, and building the case for further reform of the urban water sector. However this reporting is limited to utilities that serve more than 10 000 properties and therefore excludes a large number of regional water utilities.

---

Benchmarking the performance of all Australian urban water utilities is unlikely to be a cost-effective or particularly informative exercise under the current arrangements due to the (large) number and (small) size of utilities in some areas of regional Australia, and the sensitivity of individual utility performance to respective local conditions. As discussed in chapter 12, the value of performance benchmarking is highly dependent on the extent to which utilities can be meaningfully compared on a common set of metrics. To the extent that aggregation produces fewer utilities of larger scale, the case for undertaking comprehensive national benchmarking of regional water utilities is likely to improve (and the charter reforms (chapter 10) will ensure that necessary performance information is readily available).

### *Economies of scope*

Aggregation may lead to economies of scope efficiencies if, for example, water and wastewater services receive more focus when they are delivered via a specialised water body (such as a water corporation) following aggregation, compared to where these services are provided by general purpose local councils. Kempsey Shire Council observed:

Most water utilities in New South Wales are managed by general purpose Councils whose major focus is on issues other than water and sewer. This situation often leads to water and sewer issues only receiving secondary consideration. This situation is exacerbated in smaller Councils where management and technical staff also share general purpose roles. In these situations the level of focus on water issues is often minimal due to external pressures, rather than the needs of the water utility operation. (sub. 30, p. 14)

Some commentators view scope efficiencies as a key benefit of urban water reform in Victoria. Gleeson considered:

In Victoria, many local councils viewed their water supply functions as just another municipal department, ranking alongside rubbish collection and parks and gardens in importance. This approach ... stifled initiative and creativity, resulted in inadequate funding of infrastructure investment, replacement and maintenance, and a failure to embrace new technologies and strategies. (Gleeson 1999, p. 4)

Notwithstanding the range of potential benefits from aggregation, opponents of such reform have identified a number of potential costs and risks. These are considered below.

---

## Costs

### *Financial implications for local councils*

A number of inquiry participants (mainly Local Governments and their representative organisations) expressed serious concerns about the impact of water utility aggregation on local council revenue and overall financial viability. The Local Government and Shires Associations of NSW (LGSA NSW) noted:

The provision of water supply and sewerage services is a significant responsibility, often making up a quarter or more of councils' annual budget and employing a significant number of their workforce ... institutional reform, particularly reform that would remove water supply and sewerage functions from Local Government, needs to be thoroughly assessed against the impacts it might have on the financial sustainability of councils and on local and regional economies and employment. (sub. 63, p. 4)

Similarly, Professor Brian Dollery warned against regionalisation of non-metropolitan water authorities:

One predictable consequence (of aggregation in Tasmania) has been a sharp deterioration in the fiscal viability of the affected councils. This suggests that claims centred on the efficiency gains from 'regionalisation' of municipal water authorities should be tested carefully. In general, it would appear that the 'regionalisation' of local water authorities will inflict economic and social damage ... this should be carefully considered since water revenue often represents a high proportion of total council income. (Dollery, Professor Brian, sub. 1, p. 1)

A number of respondents to the Armstrong and Gellatly inquiry strongly advocated retaining Local Government ownership of water system infrastructure to preserve the financial sustainability of councils:

The adverse impact on general fund functions from removing water supply and sewerage functions from the ambit of direct local council responsibility is a major determinant to the organisational structure model that councils prefer to operate under. About 90 per cent of councils have opted for 'no change' or binding alliance, both of which ensure that assets and operations remain in the ownership and control of councils. (Armstrong and Gellatly 2008, p. 45)

Despite these concerns, some local councils that responded to this inquiry supported aggregation of regional water utilities, including the transfer of assets out of local councils.

Kempsey Shire Council (sub. 30) supported the aggregation of regional water utilities, with appropriate transitional arrangements to minimise the financial impact on local councils (for example, employment provisions and financial assistance). Cootamundra Shire Council (sub. DR100) indicated strong support for establishing

---

a council-owned regional water corporation to undertake all water and wastewater functions in the region currently serviced by Riverina Eastern Regional Organisation of Councils (REROC), Goldenfields Water County Council (GWCC), Riverina Water County Council (RWCC), Young Shire and Harden Shire. Midcoast Water (a county council) also advocated aggregation and proposed that the New South Wales Government reduce the number of water authorities in regional New South Wales to 14 (sub. 51).

In the case of Tasmania, the MWST noted that aggregation could actually benefit local councils:

Reducing Local Government's direct involvement in the delivery of water and sewerage services would mean that councils would assume less financial and political risk associated with maintaining increasingly expensive infrastructure from a small revenue base. They would be able to focus on providing service requirements in other areas that are truly unique to their municipality. (MWST 2006, p. 13)

A number of respondents considered that there are significant synergies ('economies of scope') within general purpose local councils that would be lost as a consequence of aggregation, with corresponding cost implications. The LGSA NSW anticipated material scope losses from aggregation:

In council-owned and operated water utilities technical and managerial synergies arise from the integration of engineering, asset management and corporate planning systems for water supply and sewerage, roads and transport, communication, waste management, or recreational services. Economies of scope also arise from the ability to effectively and efficiently coordinate strategic land use planning and land use development control with infrastructure intensive services such as water supply and sewerage services as well as private commercial and residential related investment into water solutions ... Large, stand-alone water supply and sewerage providers may well achieve some economies of scale, however cannot capture the identified economies of scope. (sub. 63, p. 7)

The issue of scope efficiencies across council activities was also raised by several respondents to the Armstrong and Gellatly inquiry:

Economies of scope are an important consideration for general purpose councils. Overhead costs are able to be spread across all functions and this generates cost efficiencies. The water supply and sewerage functions of councils are deeply interwoven with the other functions of councils. Billing, customer interface, accounting and finance, human resource management services and other such services are shared by all council functions and the water and sewerage function as a revenue generating arm contributes substantially to the cost of these functions. Councils reported that their water and supply and sewerage revenue can represent up to 35 per cent of total revenue ... it is clear from most council submissions that the benefits of economies of scope will be severely diminished with the transfer of water supply and sewerage functions to another entity. (Armstrong and Gellatly 2008, p. 12)

---

A number of inquiry respondents suggested that aggregation will make it more costly and difficult to attract skilled staff to Local Government councils once responsibility for water supply is transferred:

The work interest for an engineer in a small council is enhanced by having water as part of the service. Loss of a water service function makes the council vulnerable to loss of key staff for more challenging roles. Similar issues face other professional and trades staff in small councils. (Institute for Sustainable Futures 2008, p. 10)

Similar concerns were conveyed by the LGSA NSW:

Water supply and sewerage services contribute to a critical mass of responsibilities that make council viable and attractive for skilled professionals. Especially in smaller councils, these services are a significant part of engineers' and senior officers' workload. Employees are often multi-skilled and shared between general purpose functions and water, providing efficient workforce flexibility. Removal of water would eliminate these synergies and result in loss of staff due to insufficient workload, or because their services become unaffordable for councils. (sub. 63, p. 4)

Some inquiry participants pointed out that there are benefits associated with joint provision of water supply, wastewater and stormwater services (most notably, Integrated Water Cycle Management), and considered that these efficiencies would be lost following aggregation:

Institutional models that result in the removal of water supply and sewerage functions from councils have the potential to severely disrupt the integration that currently exists, inevitably leading to reduced capacity to implement integrated water cycle management and water sensitive urban design. (Centroc and Lower Macquarie Water Utilities Alliances, sub. DR131, p. 12)

Cooma-Monaro Shire Council also commented on the benefits associated with council provision of water services alongside other services:

The Council has a well established record of providing high quality drinking water and wastewater services to its community in conjunction with other Local Government functions in a way that effectively interlinks planning, resource and environmental management. (sub. DR106, p. 2)

The Commission recognises that aggregation may have important implications for the way councils do business. However, while revenue and assets will be lost, so will the current and future operating and capital cost obligations of the water utility. The Commission is not convinced that the financial sustainability of councils is necessarily dependent on the net or gross income from water and wastewater services, or scope economies between council functions. Rather, the Commission considers that factors such as the population (and rates base) of the council region, the governance arrangements and financial management of the council, and the cost of complying with various regulatory and reporting requirements imposed by State

---

and Territory Governments, are more critical drivers of council revenue, costs and financial sustainability.

### *Job losses and other community impacts*

As described earlier, aggregation may result in some rationalisation of water utility staff (particularly managerial and administrative staff). A number of submitting parties to this inquiry suggested that a transitional strategy be developed to minimise any adverse impact on regional employment as a consequence of aggregation. Most of these participants indicated that this should be funded by the relevant State Governments.

The impacts of structural reform in regional areas may extend beyond job losses. As local employment opportunities reduce, families may be forced to leave regional areas in search of work, with ensuing impacts for the local community, for example a reduction in school enrolments. These impacts will be further exacerbated if local councils become less viable, or deliver fewer, poorer quality services following the loss of water supply and wastewater functions.

The United Services Union stated (cited in Armstrong and Gellatly (2008)):

Since the ‘regionalisation’ of water and the forcible removal of local water utilities will have deleterious effects on the economies of small affected communities, setting into play negative multiplier effects and reducing the local population base it will obviously adversely impact upon broader local council sustainability and local community sustainability. (Armstrong and Gellatly 2008, p. 26)

In contrast, MidCoast Water found that there were no adverse impacts on local employment following structural reform in the Greater Taree City and Great Lakes Councils region:

When MidCoast Water was formed in 1997, both the local councils were concerned about job losses ... Both councils were given an opportunity to provide services on a contract basis but in typically local Government fashion, they both declined as they couldn’t reach an agreement on how the services could be supplied. ... MidCoast Water also decided that for the first two years any new positions would be offered on a competitive basis from our constituent councils. ... The interesting aspect of this process was that each time MidCoast Water selected an employee from these councils, each council replaced the employee. There were no job losses from the formation of MidCoast Water. (sub. DR104, p. 2)

Amalgamation will inevitably mean that service providers are located further away from (at least some of) their customers, relative to the current arrangements. Some participants fear that aggregated regional utilities will be less focused on — and accommodating of — the particular circumstances of individual communities,

---

leading to a deterioration in service quality. The issue of how accountable larger regional utilities will be to local communities was also raised. Respondents expressed a specific concern that drinking water quality could be reduced following aggregation, and that utilities will be less responsive to customer complaints on these matters.

For example, Shoalhaven City Council commented ‘council, as the tier of government that is closest to its customers, is very conscious of the need to balance the competing demand of communities’ (sub. 15, p. 5). Moree Plains Shire Council expressed a similar view:

Local Government is the organisation best able to provide sustainable services to local communities [and] ...is best able to respond quickly to meet community expectations. Regional Water Corporations by their very nature have the tendency to take the local out of the decision making process. (sub. DR101, p. 5)

The LGSA NSW (sub. 63, p. 5) refer to the geographic, demographic, climate related and socio-economic diversity in regional areas, and claim ‘Local Government is best placed to identify local requirements and community preferences and should therefore have the autonomy to establish solutions that suit their local/regional circumstances’. Likewise, the LGAQ (sub. 20, p. 8) warn that ‘combining small and struggling water businesses in the name of economies of scale can result in an amalgamated struggling water business that has the additional burden of cultural issues and poor on-ground links with its dispersed communities’.

The Commission does not expect that aggregation would diminish the accountability of regional water utilities to the local communities they serve. The (council-owned) corporation and county council models would ensure that elected local representatives remain responsible for water and wastewater outcomes in their local communities. Armstrong and Gellatly considered:

Notwithstanding the transfer of assets to the corporation, the councils as shareholders will have considerable influence on the corporation’s operations and set the broad strategic direction for the corporation ... The shareholding councils are accountable to their respective communities and this will ensure that the operation of the corporation broadly reflects the communities’ interests. (Armstrong and Gellatly 2008, p. 54)

In addition, the charter arrangements (chapter 10) would strengthen the performance requirements on regional utilities (relative to the current arrangements), thereby minimising the scope for service quality to deteriorate following reform.

Concerns about adverse community impacts were also evident in the lead up to reform in Victoria. Gleeson (1999, p. 8) notes ‘the biggest impediment to rationalisation of the industry was the issue of local representation’. However, Gleeson argues that such opposition should not derail the reform process:

---

There is no doubt that replacement of local political representatives with skills based boards has delivered substantial benefits to customers not previously possible — improvements in efficiencies, quality, service and costs. Five years down the track the regional communities at large are very comfortable with the arrangement. Clearly what is important to the customer is the quality of water product, the quality of water services they receive and the price they are required to pay. Our experience is that if you deliver on all these key aspects of utility services, then local representation will not be an issue. (Gleeson 1999, p. 8)

## **Weighing up the costs and benefits of aggregation**

Based on evidence presented to this inquiry and lessons from structural reform that has been undertaken in Victoria and Tasmania, there is scope for (appropriate) aggregation of regional water utilities to give rise to productive efficiencies for a number of local council water utilities in regional New South Wales and Queensland, relative to the current arrangements.

Such reform is expected to improve the financial performance of affected regional water businesses (via the realisation of economies of scale efficiencies), and reduce (albeit by a marginal amount) the impact of water industry skills shortages. This could support more efficient investment in — and operation of — water supply and wastewater infrastructure, increase the incidence of utility compliance with a range of public health and environmental regulations and improve the standards of services delivered to customers. Aggregation may also provide scope for yardstick competition, support more effective water system planning and reduce transaction costs.

In practice, the precise benefits and costs of aggregation will depend on the characteristics of the affected utilities, and should be assessed by relevant State and Territory Governments on a case-by-case basis. In particular, it is critical that factors such as network costs, the geography and topology of the area, coordination of water service provision with planning and resource management and distances between urban centres of demand are considered. This work should also take full account of the costs imposed on legacy Local Governments and their communities as a consequence of aggregation, and consider whether there is merit in developing arrangements for mitigating these impacts.

The assessment process should be public and transparent, and ensure that all interested parties are consulted. Where a case in favour of structural reform is identified, governments should proceed with implementing reform.

The Commission recognises that New South Wales has already dedicated significant resources towards this type of analysis, culminating in a series of

---

recommendations for aggregation of regional water utilities throughout non-metropolitan New South Wales. The Commission endorses the large majority of the findings and recommendations of the Armstrong and Gellatly inquiry, and urges the New South Wales Government to progress this work as soon as possible.

Specifically, the Commission:

- Fully endorses recommendations 2, 3, 5, 6 and 7 of the Armstrong and Gellatly inquiry report.
- Agrees that aggregation of regional water utilities will lead to efficiency gains (as implied by recommendation 1) but does not necessarily support grouping these utilities into 32 regional aggregations. Rather, the precise approach to aggregation should be determined by jurisdictions following a comprehensive cost–benefit analysis of aggregation options (including catchment-based groupings, corporatisation of utilities and the establishment of alliances).
- Does not endorse recommendation 4, as the Commission does not consider that it is efficient for water utility prices (regional or otherwise) to be approved by an independent body (chapter 11).

RECOMMENDATION 13.1

***The New South Wales Government should provide a formal response to the recommendations of the Armstrong and Gellatly inquiry as a matter of priority.***

Queensland has also made significant progress toward utility consolidation in recent years (as part of a broader Local Government reform program), particularly in south-east Queensland. In addition, the Commission notes that the LGAQ is currently working with local councils to explore alternative institutional arrangements for water service provision (sub. DR134). The Commission expects that further utility aggregations in regional areas of Queensland would be efficient. The Queensland Government should consider the costs and benefits of further consolidation of water businesses in more detail as a matter of priority.

The Commission recognises that there will be a number of regional water utilities in New South Wales and Queensland for whom aggregation is not an efficient option. In this circumstance there may be merit in corporatising the stand-alone utility, or conversely, adopting a more informal approach to resource sharing, such as a regional alliance (option 2, section 13.3). Alternatively, the best solution may be to retain the current local council water utility model, pending implementation of the various reforms set out in chapter 10.

However, where the benefits of aggregation *do* outweigh the costs, it is necessary to determine whether the aggregated utility should operate as a regional water

---

corporation or as a asset-owning county council. The relative merits of these two organisational structures are considered in the following section.

### **Corporatisation or county council?**

The public water corporation model is described in box 13.1 (the Commission is not proposing the United Kingdom model of private ownership of regional water companies).

Many of the benefits of establishing a regional water corporation arise as a consequence of the commercial focus and discipline the corporation model implies. For example, a regional water corporation would report against clearly defined objectives and targets related to the efficient and effective management of the corporation, and would be accountable for performance against these objectives (chapter 10). These arrangements are widely considered to create strong incentives for efficient investment and operation of assets.

The corporation model is also considered to promote informed, independent and objective decision making. The corporation model provides for appointment of directors that have relevant specialist skills, and sufficient authority and autonomy to make strategic and commercial decisions regarding maintenance and capital expenditure. This arrangement ensures efficient, cost-effective decisions are taken to secure future water supplies without, for example, undue influence from council politics.

This is consistent with the findings of Byrnes, Crase, Dollery and Villano:

Wastewater utilities in Victoria were found to be 22 percent more pure technically efficient when compared to utilities in New South Wales of a similar size ... [possible reasons for this include] first, the composition of the boards of Victorian utilities during the period was a function of relative expertise, rather than a proportional representation of the Local Government area each utility served ... second, skilled managers may be relatively more attracted to Victorian utilities due to the prospect of reporting to a board, rather than the general manager of a council, and dealing with a broader set of stakeholders, rather than simply within local government. (Byrnes, Crase, Dollery and Villano 2009, p. 167)

Byrnes, Crase, Dollery and Villano (2010) found that water utilities in Victoria were 13 per cent more efficient when compared to utilities in New South Wales of a similar size. The authors argued that this was largely due to the governance arrangements in place in Victoria since the 1990s, which were thought to permit a greater degree of professional managerial competence, largely due to the ability to

---

attract skilled managers to larger water corporations as opposed to the achievement of scale economies.

Infrastructure Australia also indicated support for the corporation model:

Local government-owned regional water corporations have the best potential to meet aggregated water utilities' objectives because of the strong governance structures they bring. There is also much to recommend the county council model as applied in New South Wales. (sub. DR107, p. 14)

A regional water corporation would operate on the same basis as private sector participants, thus promoting competitive neutrality. Kempsey Shire Council (sub. 30, p. 10) considered 'being classed as an infrastructure corporation [means] the risk profile will be lower, thereby giving access to more competitive borrowing rates'.

Finally, there may be scope for the corporation model to reduce skills shortage problems (over and above the benefits achieved via aggregation), if skilled managers are particularly attracted to utilities that follow a corporate structure. Armstrong and Gellatly (2008, p. 25) suggest that this is one of the benefits to have arisen from the Victorian reform experience. Kempsey Shire Council agreed:

For generation X and Y individuals, the opportunity to work in a large corporate entity in a lifestyle location in regional New South Wales, will be a significant attraction. More and more people in this demographic are looking to move from metropolitan areas but need professional career opportunities to do so. (sub. 30, p. 13)

The county council model (box 13.1) involves many of the same benefits, costs and risks as the corporation model, and was supported by a number of respondents to this inquiry. RWCC noted:

The county council model for water utilities continues to be a very successful structure that has allowed Riverina Water to provide financially viable water supply services to a range of communities spread over four local government areas. Without the benefit of being able to share costs, as well as many other advantages such as access to professional, technical and administrative resources, many of the smaller communities could not have a financially viable water supply. (sub. 50, p. 14)

MidCoast Water considered that the county councils model has delivered significant benefits for the MidCoast region (sub. 51 and sub. DR104). MidCoast Water recently expanded its operations and now provides water supply and wastewater services to customers in the Gloucester Shire Council region:

Gloucester Council has reached the conclusion that it can no longer provide these services at a cost effective rate to its customers. MidCoast Water believes that there are many other smaller councils that are in the same position but do not wish to acknowledge this. (sub. DR104, p. 3)

---

Likewise, GWCC strongly supported the county council model (sub. 56). GWCC considered that this model promotes the sharing of water resources across local government boundaries, and facilitates the cost-effective utilisation of management, engineering and technical skills. REROC favoured this model over a corporation approach:

The county council structure does give rise to increased efficiency while retaining 'ownership' within the serviced communities ... The structure provides a viable alternative to the GTE or corporation's structures ... [and] has worked very well in NSW. (sub. DR165, p. 5)

RWCC considered that the county council model offers many benefits but should be restricted to water supply services only:

The county council model, we believe, has proven to be a very effective water supply model over a long period of time, in excess of 50 years, but that the same effectiveness will not necessarily flow to sewer collection and treatment ... We haven't had any council try to withdraw in that period, so we think we must be doing something right. We do run only water, not the sewerage. The sewerage is run by the general purpose councils, which, if you think about it, with such a wide area — which would be over 20 000 square kilometres, with a number of disparate towns and villages — it doesn't make sense to have a centralised sewerage treatment plant. (trans., p. 617)

The NSW Water Directorate noted support for the county council model if this is the approach favoured by local councils:

We're fully supportive of county councils. If a local group of councils wanted to form a county council as their method of delivery, we would be perfectly supportive of that. (trans., p. 480)

No respondents to this inquiry indicated strong opposition to the county council model.

MidCoast Water (sub. 51) recognised that this model does present some potential disadvantages, namely, the perception that the elected members could make political decisions with little regard for sound financial management, or the inability of the constituent councils to cooperate effectively with each other. However, these sorts of issues would be dealt with via the universally applicable reforms. Specifically, a charter would be established between the county council and the State Government that would directly address these risks.

The Commission considers that there are considerable benefits associated with each of these organisational structures. The commercial orientation of a corporation, and the appointment of a skills-based board, are particularly desirable characteristics and may strengthen the case for corporatising aggregated utilities relative to

---

establishing county councils (although the Commission’s universally applicable reforms may narrow this gap).

In practice, the appropriateness of adopting either approach will ultimately depend on the circumstances of the individual utility, and should be considered in that context.

### 13.3 Option 2: Regional alliance

The regional alliance model (option 2) could be an efficient alternative to aggregation of regional water utilities. This option would deliver some of the same resource sharing and scale benefits of option 1 but, unlike aggregation, assets and responsibility for service delivery are retained by individual councils.

#### Description

A regional alliance model (or regional organisation of councils (ROC)) (box 13.1) allows for certain water and wastewater services to be provided centrally, for example, drought management, water security planning, integrated water cycle management, demand management and water quality management<sup>8</sup> (Centroc and the Lower Macquarie Water Utilities, sub. DR131).

Membership of a regional alliance is voluntary — member councils elect to be part of the alliance and decisions made by the alliance are not binding. This is reflected in the legislation that supports the establishment of regional alliances (or ROCs) — in New South Wales alliances are established under s. 355(d) of the *Local Government Act 1993* (NSW):

A function of council may ... be exercised ... jointly by the council and another council or councils (including by means of a Voluntary Regional Organisation of Councils of which the councils concerned are members).

An alternative alliance model (canvassed in the Armstrong and Gellatly report) is the binding (or mandatory) alliance model (box 13.5). The Commission understands that there are no examples of the binding alliance model in the water sector at present.

---

<sup>8</sup> The functions of a regional alliance are not necessarily limited to water and wastewater service provision — many alliances (and ROCs) provide a range of general purpose local council functions on behalf of member councils. However, this discussion focuses on the role that regional alliances could have in water and wastewater service provision only.

---

Under the regional alliance model a deed of agreement (or memorandum of understanding) would be established that represents the commitment made by participating councils to the regional alliance. This would specify the structure of a board of management, the funding arrangements for a secretariat, and arrangements for sharing of data, intellectual property and so on. All member councils would be represented on the board of the regional alliance.

There are a number of (water supply and/or wastewater) regional alliances currently operating throughout New South Wales, and the Commission understands that several new alliances are being considered. For example, Wagga Wagga City Council (sub. DR116) is proposing that a water and wastewater alliance be established between RWCC, GWCC, and a number of Local Government utilities (including Wagga Wagga).

The alliance structure (in so far as it relates to water and wastewater) is less common in Queensland. However, the LGAQ note that a group of regional councils (the Remote Area Planning and Development Board (RAPAD) group of councils) have agreed to participate in a pilot program that will explore the merits of adopting the alliance model (sub. DR134).

### **Box 13.5 Binding alliance**

The distinguishing feature of a binding (or mandatory) regional alliance (as described by Armstrong and Gellatly (2008)) is the presence of a binding alliance entity (BAE). The BAE would be legally separate from council members and would coordinate the functions of the alliance. The binding alliance model would require legislation to make membership of the alliance compulsory, and to compel member councils to implement the strategies and operating plans set by the BAE.

These features mean that the binding alliance model would be a more costly option (both in terms of start-up and operating costs) relative to the voluntary alliance.

The risks of this model for member councils are potentially significant. Assets and responsibility for service delivery are retained by individual councils, and councils would remain entirely accountable for all water and wastewater outcomes, including compliance with customer service, public health and environmental standards. However, councils would be bound to operate water supply and wastewater systems and infrastructure in accordance with the capital expenditure and operating plans determined by the (non-risk bearing) BAE.

The Commission considers that this approach could leave member councils highly exposed to a centralised decision making process. If member councils choose to manage this risk by retaining an excessive amount of internal resources, many of the scale benefits of cooperation across utilities would be eroded.

---

## Assessment

A number of respondents to this inquiry expressed strong support for the regional alliance model. The LGSA NSW preferred this approach over aggregation (option 1):

Catchment-based, regional strategic water supply and demand planning and infrastructure delivery could be achieved ... without losing the economies of scope associated with the integration of water supply and sewerage functions and general purpose functions. (sub. 63, p. 7)

Likewise, the LGAQ:

... recognises the benefits of economies of scale but argues that they are best achieved through cooperation rather than wholesale institutional change ... group access to specialised senior staff is seen as a strong benefit of regional collaboration. This is difficult under current arrangements and might be more achievable if stronger cooperative arrangements were put in place. (sub. 20, p. 8)

There was strong support for this model from existing New South Wales alliances. Centroc and Lower Macquarie Water Utilities Alliances considered:

We set out initially to improve best practice across the eight councils and to focus on resource sharing and mentoring and developing training programs throughout the region because as you can appreciate, we've got a very small council in Brewarrina and Bourke, and they have struggled over time. So in terms of best practice, I think we've made substantial ground. We've gone from 63 per cent overall compliance with New South Wales best practice criteria, 63 per cent in 2006-07, to pretty close to 90 per cent ...

... we have established supervisor and operator subgroups within the structure and they meet frequently and they visit each other ... and that's shown tremendous returns to the organisation. We've developed a regional water quality management plan, a regional integrated water cycle management plan, a regional drought management plan, a regional demand management plan, a regional stormwater harvesting strategy, and we're moving more and more into policy development so that everything that they do is governed by a set of criteria that's common to that region. (trans., p. 462)

REROC reported that the alliance model supports bulk procurement practices, with associated cost savings for councils, and can assist councils in obtaining State Government funding:

REROC has been successful in accessing substantial funding for water savings and water quality projects. Currently the organisation is managing almost \$2 million in funding from the NSW Environmental Trust to deliver 25 projects in water conservation, water harvesting, water quality, improved environmental flows and salinity. In addition the Organisation received \$1.6 million from Strengthening Basin Communities to fund a number of planning activities that respond to a world with less water. (sub. DR165, p. 4)

---

This point was also made by the Centroc and Lower Macquarie Water Utilities Alliances:

Grants are more readily accessible regionally, another reason for taking the alliance approach ... most recently, Centroc has been successful in accessing funds for a regional training, workforce, mentoring, procurement and resource sharing plan. (sub. DR136, p. 3)

The Centroc and Lower Macquarie Water Utilities Alliances provided the Commission with data on estimated cost savings from operating under the alliance model (sub. DR136). This indicates that councils in the Centroc alliance saved (on average) around \$60 000 each by undertaking three major best practices projects jointly (rather than independently) — a total saving of about \$960 000 across all 16 member councils. In the case of the Lower Macquarie Water Utilities Alliance, it was suggested that councils saved around \$76 000 each for five major studies — a total saving of about \$377 000.

A number of participants considered that local utilities are the appropriate decision-makers regarding investment in, and operation of, local water supply and wastewater systems, and considered that the alliance model preserves this arrangement. Dubbo City Council (a member of the Lower Macquarie Water Utilities Alliance) noted:

A wide range of benefits flow from Local Councils owning and operating water supply and sewerage in terms of sustainability, effectiveness and efficiency. Such benefits do not arise in some alternative institutional arrangement where an external organisation owns and/or operates water supply and sewerage functions in isolation from Local Government. (sub. 86, p. 9)

Likewise, Lithgow City Council (sub. DR155) and Bathurst Regional Council (sub. DR108) (each a member of the Centroc alliance) considered that the current structural arrangements should be retained:

... [council] is experienced in managing the catchments of two dams that supply the Bathurst Local Government area. In fact the productive catchments contribute substantial inflows far downstream to the Burrendong Dam. (Bathurst Regional Council, sub. DR108, p. 1)

Wagga Wagga City Council considered that the alliance model should not be limited to Local Government councils only, and anticipated that there would be significant benefits from establishing an alliance between water supply county councils and local councils that provide wastewater and stormwater services to the same region:

I think there are some fairly significant efficiency advantages that could be gained out of that ... We currently bill separately for sewer and for water ... under an alliance type of agreement, maybe we could do that collectively, so one bill goes out to the customer

---

for both water and sewer ... Obviously multi-skilling of staff, running a crew out to Tarcutta or Mangoplah or somewhere to deal with a sewer issue, they could also deal with a water issue while they're there. (trans., p. 658)

A number of parties commented on the benefits associated with capitalising on the resource sharing benefits of an alliance without losing the synergies between water, wastewater and stormwater (or Integrated Water Cycle Management) at the council level. The LGSA NSW noted:

The regional alliance model avoids ... the cost that is associated with not being able to undertake integrated water cycle management. ... Councils do stormwater, land use planning and they deliver water supply and sewerage. So they are actually able to deliver a truly integrated approach. (trans., pp. 539–40)

Likewise, Riverina and Murray Regional Organisation of Councils considered:

Integrated water cycle management undertaken by a single utility simply makes good commonsense. To segregate those functions as has occurred elsewhere in Australia and in some parts of NSW makes no sense whatsoever and can often result in a disjointed approach to Integrated Water Cycle Management, urban planning and regional community development generally. (sub. DR164, p. 9)

In weighing up the case for urban water reform in Tasmania, the MWST recognised the benefits of alliance-type models, but considered that the efficiency gains that can be achieved under this approach are limited relative to utility consolidation (option 1):

Some Local Governments, such as the Derwent Valley Council, are exploring opportunities for utilising the skills and asset bases of the Bulk Water Authorities to integrate through the value chain and deliver services on their behalf. In other cases, municipalities are seeking to enter cooperative arrangements to share resources and develop consistent planning schemes and other arrangements ... Such reform may eventually stagnate, as cherry picking of the best opportunities for integration will occur. (MWST 2006, p. 11)

MidCoast Water also expressed concerns about the regional alliance model:

This model works up to a point but the biggest weakness is that it will not provide the funding necessary for the upgrade of water related services in small towns. (sub. DR104, p. 4)

and

I don't think in the long term the alliance model can survive. Local Government is very fickle and I think the alliances that have formed are doing an excellent job ... [but] at the end of the day, when it comes down to the dollars to replace the infrastructure, that will be the test ... the alliance will serve a purpose, but they may have to look at something else a bit further down the track. (trans., p. 492)

---

MidCoast Water suggested that some councils might be moving toward the alliance model as a way of avoiding more substantial reform:

The alliance solution is a typical answer by Local Government when fronted by reform. By forming an alliance the councils hope that reform will ‘go away’ and they continue on as normal. (sub. DR104, p. 5)

Finally, Dollery, Grant and Crase (2011) sought to identify the key factors that underpin productive partnerships between Local Government councils and found that intangible factors, such as strong social networks and mutual trust between potential partner councils, are extremely important for the subsequent success of regional alliance-type arrangements.

### *Conclusion*

Establishing a regional alliance is expected to deliver more modest benefits relative to utility aggregation, but would also involve fewer costs. Where it is not clear that the benefits of structural reform (aggregation) are sufficient to outweigh the costs, but there are strong possibilities for efficiency gains via greater resource sharing and the joint provision of certain water utility functions, a regional alliance model may be preferable to retaining the existing, stand-alone local council utility structure.

Indeed, success of (and support for) existing alliance structures suggests that this is a valid and appropriate approach to achieving efficiency gains in the regional water sector.

The success or otherwise of such alliances might also help inform the case for subsequent aggregation of utilities, and can therefore serve as an interim step towards establishing a regional water corporation or county council.

#### RECOMMENDATION 13.2

***The Governments of New South Wales and Queensland should consider the merits of aggregation of regional water utilities, case-by-case, based on:***

- ***identification of the affected utilities***
- ***preferred grouping of utilities, in consultation with Local Governments, affected communities and other interested parties***
- ***the relative merits of alternative organisational structures, including the county council and public corporation models.***

***Where the expected benefits of horizontal aggregation do not outweigh the costs, governments should consider the case for establishing regional alliances.***

---

## 13.4 Option 3: Horizontal disaggregation

As set out in chapter 2, water customers in regional areas of South Australia, Western Australia (outside of Bunbury and Busselton — table 13.1), and the Northern Territory are served by the respective jurisdiction-wide public water corporation.<sup>9</sup> This contrasts with Victoria and Tasmania, where multiple regional water corporations — each servicing a defined geographic area — have been established.

The primary motivations for horizontally disaggregating large, jurisdiction-wide water utilities include to:

- better align water system planning and water resource management with provision of services
- remove diseconomies of scale (where the large utility is operating above an efficient scale) (chapter 12 and appendix G)
- open up opportunities for yardstick competition between regional water utilities
- put customers in closer proximity to their water service provider, in turn making utilities more accountable to their local communities, and providing customers with greater scope to influence the activities and performance of the utility
- support more ‘region-specific’ water and wastewater outcomes
- implement more location-specific pricing arrangements (chapter 6). Although there is scope for statewide utilities to set water prices on a location-specific basis, this has not been the case historically. The Water Corporation in Western Australia has moved towards more differential pricing arrangements in recent years, but these arrangements do not constitute location-specific pricing at this stage.

The Commission notes that a number of new supply sources have recently been proposed in regional areas for location-specific reasons. For example, BHP Billiton plans to build a desalination plant at Point Lowly (in South Australia) to provide water supply to the Olympic Dam mine, and a solar desalination plant is being developed in Ceduna to provide the region with an alternative supply source.

These developments will have a range of impacts for residents, businesses and the local environment. The Commission considers that a local water utility might be better placed to identify, manage and address these impacts, relative to a centralised

---

<sup>9</sup> The ACT is also supplied by a single statewide corporation but is not regarded as a potential candidate for disaggregation due to its size and geographic coverage.

---

State or Territory Government agency that is located a considerable distance from the local community.

The City of Wanneroo considered that the case for disaggregation should be looked at in Western Australia:

Replacing the current model may result in:

- Improved competition and therefore economic benefits to the community;
- Better water resource management and planning; and
- Opportunities for local government to become a water service provider increasing revenue and therefore investment in local communities.

However, it should be appreciated that whilst such a structure can be considered it may not be viable at the present time. (sub. DR150, p. 6)

In looking at options for regional water reform in New South Wales, the Institute for Sustainable Futures considered the merits of a single, statewide water service provider and concluded:

This option would represent the option most divorced from local inputs; while the sheer size of the organisation would create a risk of it wielding too much political control over water matters, pushing local concerns further into the background. Also at risk would be integration efforts. (Institute for Sustainable Futures 2008, p. 23)

The South Australian Government did not support disaggregation and stated ‘any benefits gained from a structural change would be far outweighed by the scale losses involved’ (sub. DR132, p. 8). No evidence was supplied to the Commission to support this view.

The Commission recognises that the Economic Regulation Authority in Western Australia (ERA) has undertaken work that considers the merits of alternative structural arrangements for Western Australia. This includes a piece of work undertaken by the Allen Consulting Group (ACG), *Water Industry Structure Study Analysis of Alternative Reconfiguration Options in the South-West of Western Australia*. ACG found that there would be economies of scale benefits from merging Aqwest (Bunbury) and Busselton Water with the Water Corporation, relative to the existing arrangements (Water Corporation, sub. 78).

However, this analysis does not explicitly assess the full range of costs and benefits (including the prospects for competition and other dynamic efficiencies) associated with breaking up the Water Corporation such that regional areas are serviced by separate stand-alone utilities. Likewise, the Commission is not aware of any work that has considered the merits of alternative structural arrangements in South Australia and the Northern Territory.

---

The Commission considers there would be benefit in relevant State and Territory Governments commissioning an independent review of the prospects for achieving a more efficient water supply and wastewater industry through structural separation. In some cases structural reform may not be efficient. However, the merits of re-defining the boundaries of ‘postage stamps’ used for pricing purposes in these jurisdictions should also be considered, with a view to achieving more efficient — and more location-specific — pricing arrangements for water and wastewater services (chapter 6).

RECOMMENDATION 13.3

*The Governments of South Australia, Western Australia and the Northern Territory should consider the costs and benefits of replacing the single, jurisdiction-wide public corporation model with a regional water corporation approach (horizontal disaggregation).*

*In assessing the costs and benefits, factors other than scale should be considered, including opportunities for yardstick competition, the proximity of utilities to the customers they serve, opportunities for more location-specific pricing arrangements and the effectiveness of water resource management and water system planning.*

## **13.5 Other issues for regional areas**

This section considers a number of other regional-specific issues that have been raised by participants during the course of this inquiry, but will not necessarily be adequately addressed by the reforms proposed so far in this report.

### **Government funding**

As set out in chapter 5, the Commission considers that it is only appropriate to provide water utilities with State and Territory Government funding in a very limited and specific set of circumstances (recommendation 5.3). The conditions that could potentially justify subsidy funding of regional water utilities are described below.

#### *Full cost recovery may not be appropriate*

The reforms set out in chapter 10 require that utilities pass on the true (efficient) cost of service provision to customers, consistent with the notion of full cost recovery (recommendation 10.6). However, in certain circumstances governments

---

may determine that it is not appropriate to pass on these costs to water consumers. For example, if a utility services extremely remote customers with a very high cost to serve, governments may decide to limit the extent to which utility costs are passed through to customers for affordability reasons. Where this is the case, the utility would not be financially self-sufficient (without government subsidy funding).

This issue was recognised by the LGSA NSW:

Regional circumstances will dictate what is achievable and in some regions, particularly in rural and remote regions, communities might not be able to afford the desired level of water supply and sewerage service even from a regional perspective ... To ensure local water utilities throughout the whole of regional New South Wales can provide safe secure water supply and sewerage services, the Associations support the retention of a permanent funding program to provide technical and financial assistance to local water authorities for the renewal and enhancement of water supply and sewerage infrastructure in areas of need. (sub. 63, p. 10)

Australian Water Association also noted the important of subsidy funding:

Where the capacity of consumers to pay the full cost of current services and maintenance (of which there may be a significant backlog due to past under-investment) is limited, explicit and transparent subsidies may need to be paid to ensure that consumers are provided with the services they need. (sub. DR157, p. 13)

RWCC commented:

Some communities have water supply systems that will never be financially viable in their own right. Some form of subsidy will always be required for such communities if they are to retain reticulated water supply. (sub. 50, p. 4)

Likewise, GWCC (sub. 56) considered that where water supply systems are financially unviable to begin with (and therefore established via government funding), they will continue to be unviable and require ongoing subsidies.

The Commission recognises the critical importance of achieving safe and secure urban water and wastewater service provision for all communities, irrespective of their location. Accordingly, subsidy payments should be made available where governments determine that customers should not pay for the full costs of service provision (this is likely to be the case for a number of regional water utilities that provide water and wastewater services to remote Indigenous communities). Subsidy funding would not necessarily be limited to ongoing operations — funding for capital works may also be required by these utilities to bring assets up to a safe and efficient standard. Any government funding should be provided by way of an explicit Community Service Obligation, using general taxation revenue, and should be subject to periodic review.

---

In identifying those utilities for which a subsidy arrangement is efficient, jurisdictions should also consider the relative costs and benefits of supplying these regions with water and wastewater services via stand-alone water and wastewater systems (self-supply), rather than via the reticulated network.

Regional water utilities would be responsible for administering subsidy payments to water customers. To maximise efficiency, subsidy payments should be independent of the actual level of consumption and administered in the form of a rebate (chapters 6 and 8). This will ensure that the subsidy does not affect users' incentives to conserve water.

### *Capital works assistance*

In the event significant, urgent and critical capital requirements cannot be financed by (otherwise economic and financially self-sufficient) regional water utilities, State and Territory Governments might choose to provide one-off subsidy payments to these utilities. For example, funding might be used to upgrade water supply and wastewater infrastructure to ensure safe and secure water services.

This funding should only be provided if it is clear that there are sufficient public benefits (for example, with respect to public health) to justify the subsidy, and the amount of the subsidy is commensurate with these benefits. Any subsidy funding should be provided by way of an explicit Community Service Obligation payment. In some circumstances, concessional loans may be appropriate. Alternatively, State and Territory Governments may choose to provide debt funding for required capital investments and recover this over time as utilities move to full cost recovery.

Water Utilities Sharing Group noted:

Low interest loans advanced to communities facing water supply and wastewater service issues would be beneficial for those communities having the capacity to take responsibility for such services and the ability to service those loans. This ensures that ownership of the asset is always retained by the relevant community, which experience suggests results in a better outcome for those end-users. (sub. DR102, p. 5)

### *Reform incentives and assistance*

Where there are external (social) benefits from expediting the reform process, it may be appropriate to provide regional water utilities with a financial incentive to adopt specific reforms, subject to agreed timelines and outcomes.

---

Likewise, there may be a case for providing Local Government councils (affected by reform) with temporary funding assistance to compensate for economies of scope losses and/or to help councils adjust to the new arrangements.

The case for providing utilities with incentive payments for undertaking structural reform, and/or short-term financial assistance for affected local councils, should be considered by State and Territory Governments in the context of devising an urban water reform program.

RECOMMENDATION 13.4

*If State and Territory Governments choose to subsidise the provision of water supply and wastewater services in regional areas (consistent with recommendations 5.3 and 10.4), the relative merits of alternative supply options for these customers (including moving to a system of self-supply) should be considered.*

*The case for providing financial incentives to facilitate reform, and assistance for local councils adversely affected by reform, should be determined by State and Territory Governments. If assistance is provided, it should be transitory and limited to impacts resulting directly from reform implementation.*

### **Information on water supply outcomes in Indigenous communities**

The challenges associated with providing adequate water and wastewater services to remote Indigenous communities are well recognised. Although there is little data or information on water supply outcomes in Indigenous communities, there are genuine concerns about the quality of water and wastewater services in some areas (over and above the sorts of problems identified in non-Indigenous regional communities).

For example, the Armstrong and Gellatly (2008, p. 96) inquiry, drawing on advice from the NSW Department of Energy and Water, concluded that ‘the current situation of managing water and sewerage services in Aboriginal communities is not currently effective due to a number of challenges’. These were identified as staff/skills, water quality standards, revenue and the relationship between Indigenous communities and the local water utility. This is consistent with the findings of the Department of Water (WA):

Access to appropriate water and wastewater services in Western Australia’s remote (Aboriginal) settlements is a significant challenge due to labour constraints and the high cost of service delivery to small, geographically dispersed and very remote communities. (sub. 38, p. 4)

---

COAG has recognised that the quality of water services provided to some Indigenous communities is of considerably lower standard than for the wider community. This is reflected in the 2009 *COAG National Partnership Agreement on Remote Service Delivery*, which includes a principle that remote Indigenous communities, and remote communities with significant Indigenous populations, are entitled to standards of services and infrastructure broadly comparable with that in non-Indigenous communities of similar size, location and need elsewhere in Australia.

The Commission strongly endorses this principle, and considers that the standards of water and wastewater services provided to all Indigenous communities should be provided at comparable (in terms of location and scale) standards to the rest of the Australian community, as a matter of priority. State and Territory Government funding should be provided for this purpose, as per recommendations 10.6 and 13.4.

There would be benefit from State and Territory Governments undertaking regular reviews of water supply and wastewater outcomes in Indigenous communities, and publicly reporting on these findings. This would facilitate more timely progress towards achieving equitable standards of water services between Indigenous and non-Indigenous areas, and improve the availability of data and information on water supply outcomes in Indigenous communities.

It is essential that water supply and wastewater outcomes in Indigenous communities are assessed on the same metrics that are used for non-Indigenous communities (and likewise, that public reporting on water and wastewater outcomes is consistent across both groups). This point was made by the Commission in the *Overcoming Indigenous Disadvantage 2009* report (which relied on Australian Bureau of Statistics (ABS) data, and the 2006 Community Housing and Infrastructure Needs Survey (CHINS) specifically):

ABS CHINS data used in this chapter to report on drinking water, sewerage and electricity services are limited to discrete Indigenous communities and definitions are not comparable to those used for performance reporting by major water, sewerage and electricity utilities. It would be useful if data could be collected for discrete Indigenous communities using standard industry indicators, definitions and guidelines. (SCRGSP 2009, p. 9.30)

The Commission's position on this issue has not changed, and it is critical that any assessments of water supply and wastewater outcomes in Indigenous communities are based on the same metrics, parameters and performance targets as apply in non-Indigenous communities. This includes reporting by the ABS, the NWC and WSAA (via the *National Performance Report* series) and State and Territory Governments.

*State and Territory Governments should undertake regular public reviews of water and wastewater outcomes in Indigenous communities. Water and wastewater services should be assessed against the same metrics that are used to measure service quality in non-Indigenous communities.*

## **Integration of water supply and wastewater services**

There are a number of stand-alone water supply only and wastewater only utilities in various parts of regional Australia. For example, in New South Wales there are ten utilities that provide wastewater services only, and four utilities that provide water supply services only (NSW Office of Water 2011).

In Western Australia, Aqwest and Busselton Water provide water supply services to Bunbury and Busselton respectively, yet the Water Corporation is responsible for wastewater service provision in these regions. In other areas the converse applies — the Water Corporation provides water supply services but wastewater is managed separately (for example, in Kalgoorlie-Boulder). The ERA also licences 20 small wastewater services providers (less than 1 000 connected properties) in Western Australia, including 18 Local Government authorities, Rottnest Island Authority and Hamersley Iron (ERA 2011d).

As set out in chapter 12 and appendix G, existing evidence on economies of scope between water supply and wastewater service provision is mixed. However, for smaller utilities the evidence is more heavily weighed in favour of joint provision, and it is this finding that is most relevant for the regional water sector.

A number of respondents to this inquiry considered that there is merit in integrated provision of water supply and wastewater services in regional areas. Wagga Wagga City Council supported consolidating the two services, and noted (sub. 54, p. 6) ‘water supply and sewerage services are currently spread across two organisations making integrated water cycle management less effective’. Cootamundra Shire Council considered:

... that to create a system that would be viable in the long term, water and sewer must be treated as two parts of the same water cycle management system and not be separated. (sub. DR100, p. 3)

The Centroc and the Lower Macquarie Water Utilities Alliances indicated support for integration in principle, but considered that case-by-case analysis is important:

---

There may be opportunities for reintegrating water supply and wastewater services in regional areas where they are currently provided separately [but] we would suggest that each case should be assessed on its merits. (sub. DR131, p. 17)

The NSW Water Directorate pointed to potential cost savings from integration:

I think it [integration] makes a lot of sense in terms of cost efficiencies and operational aspects. Small utilities that have to have a sewer crew specifically for that and maybe to do some storm water or the like, if they had some of the water function or were able to transfer the sewer function to the county council, I think there could be some efficiency gains there. (trans., p. 483)

In Tasmania, the MWST concluded:

A lack of effective planning means that water supply and wastewater management are often considered in isolation of each other. This can, and does, lead to problems such as overlooking the impact that changes in one may have on the other. (MWST 2006, p. 11)

The Commission expects that there are likely to be scope economies from a single utility providing water supply and wastewater services in regional areas, rather than these services being provided by two separate agencies. As opportunities for wastewater reuse and integrated water cycle management expand, scope economies between these services might increase further.

Notwithstanding this, the Commission considers that it is appropriate to assess the case for reintegration of water supply and wastewater services in regional areas (where they are currently provided separately), on a case-by-case basis. This would form part of the above assessment of reform options (recommendations 13.2 and 13.3).



---

## 14 Implementing reform and monitoring progress

### Key points

- The 'universally applicable' reforms should be the highest priority for reform of Australia's urban water sector. These include setting an overarching objective for government policy, developing appropriate policies that align with this objective, aligning roles and responsibilities and putting in place best practice institutional, regulatory and governance arrangements.
- An intergovernmental agreement should be formulated through the COAG process, by the end of 2012, on a reform program that commits each jurisdiction to:
  - implementing the universally applicable reforms identified by the Commission
  - determining the case for reform and, where appropriate, implementing structural reform.
- However, agreement across all jurisdictions is not necessary for the State and Territory Governments to implement the Commission's recommendations. State and Territory Governments should immediately commence enacting reforms unilaterally.
- The universally applicable reforms, and an assessment of the case for structural reform, should be completed by no later than the end of 2013. Where a case in favour of structural reform is identified, the reform process should be completed by the end of 2015.
- State, Territory and Local Governments will be the major fiscal beneficiaries of the Commission's proposed reforms to the urban water sector. Therefore, there is no case for Australian Government funding to promote urban water reforms.
- There might be a need for specific transitional assistance from State and Territory Governments to those local authorities in regional urban areas disadvantaged by urban water reform.
- Assistance from Water Services Association of Australia and/or the National Water Commission should be provided to utilities to build the capacity and expertise required to implement the recommendations in this report.
- Progress in implementing reforms should be monitored and reported on. The National Water Commission could perform this role.
- An independent public review of the reform package should occur after five years.

---

Chapters 3–8 of this report set out the scope for achieving efficiency gains from reforming Australia’s urban water sector. Chapters 10–13 outline institutional, regulatory and structural reform options for achieving these efficiency gains. The terms of reference for this inquiry ask the Commission to report on a proposed work program, including implementation plans for the outlined options, identifying:

- practical actions that the Australian, State and Territory and Local Governments can undertake to implement options for reforms, including any transitional arrangements
- priority areas where greatest efficiency gains are evident and where early action is practicable
- quantitative and qualitative indicators for efficiency gains in the urban water and wastewater sectors.

In section 14.1 of this chapter, the Commission’s recommended reforms are summarised and the reform priorities are identified. In section 14.2, the practical steps that governments can take to implement these reforms and deal with transitional issues are outlined. A framework for facilitating, monitoring and reviewing reform is outlined in section 14.3.

## **14.1 The reform package**

In this report the Commission has made many recommendations for reform of Australia’s urban water sector, a number of which are similar to those proposed by the National Water Commission (NWC) in its *Urban Water in Australia: Future Directions* report (NWC 2011c). This section summarises the universally applicable reforms detailed in chapters 10 and 11, and explains why these are the highest priority reforms. It also summarises the optional structural reforms identified by the Commission in chapters 12 and 13.

### **Highest priority reforms — universally applicable reforms**

Some of the Commission’s recommended reforms have been identified as applicable to all states and territories, and all urban water systems within those states and territories, irrespective of their individual geographic or structural characteristics (chapters 10 and 11). These are referred to as the ‘universally applicable’ reforms, and are summarised in table 14.1.

---

**Table 14.1 Universally applicable reforms**

---

**Set overarching objective for government policy in the sector**

---

Provision of water, wastewater and stormwater services in an economically efficient manner to maximise net benefits to the community.

**Develop appropriate policies and principles that align with overarching objective**

---

Ensure the costs, benefits and risks of all supply augmentation and demand management options are considered using a real options approach.

Remove 'policy bans' on sources of supply augmentation.

Provide consumers with information on all supply augmentation options, and on the costs and benefits of using price and non-price demand management measures.

Restrict provision of subsidies to the limited set of circumstances identified by the Commission.

Ensure developer charges are set efficiently, and that developers have the option of building required infrastructure themselves where appropriate.

Ensure separate meters are installed in new dwellings, and tenants are charged directly for both fixed and volumetric charges where water is separately metered.

Limit use of mandatory water restrictions and water use efficiency and conservation measures to the set of circumstances identified by the Commission.

Allow retailer–distributors to offer a variety of tariffs to suit consumer preferences, subject to policy guidelines that promote efficient pricing.

Clearly define property rights.

Develop a set of best practice consumer protection principles.

**Put in place best practice institutional, regulatory and governance arrangements**

---

Clearly define the objectives, roles and responsibilities of elected representatives, utilities and regulators (economic, health and environmental), and those decisions best made by consumers.

Assign retailer–distributors with responsibility for meeting security of supply standards and procuring water supply and services.

Ensure best practice governance of Government Trading Enterprises (GTEs) by devising a charter that gives guidance to utilities on:

- obligations to serve (security, reliability, procurement)
- principles and transparent processes for choosing supply augmentation, setting prices and achieving cost recovery
- borrowings and dividends policies
- customer service standards/hardship policies
- risk allocation
- nature and funding of Community Service Obligations
- performance reporting requirements and sanctions for poor performance.

Monitor performance of GTEs against the charter.

Make directors and officers of utilities subject to the obligations under the *Corporations Act 2001*.

Further apply corporatisation model to GTEs and appoint an independent skills based board.

Ensure that the six principles of good regulatory practice are applied when developing policy and regulation governing the urban water sector.

Phase out regulatory price setting, and allow utilities to set their own prices subject to guidance in the charter. Adopt price monitoring where necessary.

Mandate compliance with the Australian Drinking Water Guidelines.

Assess provision of water and wastewater services to Indigenous communities against the same metrics used to measure service quality in non-Indigenous communities.

---

---

It is the Commission's view that implementing the universally applicable reforms should be the highest priority for reforming Australia's urban water sector. These reforms to policy, governance and institutions are likely to yield the greatest efficiency gains. They would allow water utilities to focus on delivering water and wastewater services at least expected cost, without being subject to undue political and regulatory constraint. They would also enhance transparency and accountability in the urban water sector and ensure clear roles and responsibilities. Ongoing government support and restraint from political intervention is essential to ensure the effectiveness of reforms.

Not only is it feasible to begin implementing these universally applicable reforms immediately (see below), but it is also highly desirable in the current environment where it is unlikely that a water shortage will materialise for several years (with the possible exception of south-west Western Australia). This allows policy makers to implement these reforms without the pressure of major demand management or supply augmentation measures needing to take place.

## **Secondary reform priorities — structural reform**

A further set of reforms focus on the efficiency gains available from making changes to the structural arrangements of urban water systems (table 14.2). The Commission has identified that these reforms should be optional, as there is no 'one size fits all' approach to structural reform (chapters 12 and 13). Furthermore, the Commission has emphasised that the range of feasible options is not limited to the proposals put forward in this report.

Decisions on structural reform need to be made on a case-by-case basis. An assessment of the costs and benefits of structural reform is therefore essential before implementation takes place (chapters 12 and 13). Such assessments should be open and transparent and involve public consultation.

### RECOMMENDATION 14.1

*The universally applicable reforms to policy, governance and institutions identified by the Commission should be the highest priority for all governments as they present the greatest scope for efficiency gains. These universally applicable reforms centre on:*

- *setting an overarching objective for government policy in the sector for the provision of water, wastewater and stormwater services in an economically efficient manner to maximise the net benefits to the community*
- *developing appropriate policies and principles that align with this objective*

- *assigning roles and responsibilities appropriately*
- *putting in place best practice institutional, regulatory and governance arrangements.*

*Governments should also assess the case for structural reform, and implement structural reform where appropriate. Assessments should be open and transparent and involve public consultation.*

**Table 14.2 Structural reform options to consider**

<i>Reform</i>	<i>Description</i>
<b>Metropolitan areas</b>	
Vertically-integrated water utility (option 1)	Provide water and wastewater services at lowest expected cost, considering all available internal and external (bilateral contracting) options
Contestability in bulk water supply (option 2)	Vertical separation of the bulk water supply function Horizontal separation of bulk water service providers
Contestability in bulk water supply and wastewater treatment (option 3)	In addition to option 2 reforms: <ul style="list-style-type: none"> <li>• vertical separation of the wastewater treatment function</li> <li>• horizontal separation of wastewater treatment service providers</li> </ul>
Contestability in bulk water supply and wastewater treatment, and yardstick competition (and trade) in retail–distribution (option 4)	In addition to option 3 reforms: <ul style="list-style-type: none"> <li>• horizontal separation of retail–distribution function into regional geographic monopolies that could trade contracted services</li> <li>• shared transmission network services provider/grid manager</li> <li>• transmission services also procured using bilateral contracts</li> </ul>
<b>Regional urban areas in NSW and Qld (outside of south-east Qld)</b>	
Aggregate utilities to exploit economies of scale	Aggregated utilities could be organised as: <ul style="list-style-type: none"> <li>• county councils</li> <li>• regional water corporations</li> </ul>
Retain existing structure but provide some services centrally	Establish a regional alliance of utilities
<b>Regional urban areas in SA, WA and the NT</b>	
Disaggregation of jurisdiction-wide utilities	Options include: <ul style="list-style-type: none"> <li>• multiple regional water corporations</li> <li>• retain jurisdiction-wide utility but price according to geographic boundaries</li> </ul>

## **14.2 The role of governments in implementing reform**

This section identifies a role for COAG in the reform process, and outlines the actions that can be taken by the Australian Government, and State and Territory

---

Governments. It also includes a roadmap for reform that details the suggested timing of implementation of the Commission's reform program.

*A nationally coordinated approach — a role for COAG*

Agreement of all jurisdictions is not necessary for individual State and Territory Governments to pursue most of the reform program proposed by the Commission.

However, effective arrangements for integrating and coordinating policy and its administration are fundamental for successful reform of the urban water sector. In its draft report, the Commission suggested that the COAG process can facilitate this, and ensure a nationally consistent approach to reform, supported by a standardised framework for monitoring progress.

In its submission to the draft report, the NWC expressed support for a role for COAG:

... the NWC concurs that COAG should adopt an agreed set of national objectives for the urban water sector and general principles to guide reform. (sub. DR130, pp. 1–2)

According to the NWC, a nationally coordinated approach will help meet common challenges, establish a benchmark for best practice, reduce barriers to competitive entry across jurisdictions, increase consistency, assist with the dissemination of knowledge and address emerging cross-border issues arising from the increasing connectivity of urban systems (NWC 2011c).

Infrastructure Australia said:

Even though progress with implementation of the National Water Initiative is mixed, it would seem to have a degree of moral force that extends beyond governments' contemporary policy positions. Gaining agreement to implementation of the priority, universally-applicable reforms and institutionalising this agreement within the National Water Initiative provides the opportunity for widening this moral force. (sub. DR107, attachment, p. 18)

The Commission suggests that COAG should secure agreement from jurisdictions on a reform program that deals explicitly with the *universally applicable* reforms, according to an agreed timetable. Such an agreement would specify the desired outcomes and priorities and, where appropriate, provide for interim targets and for adjustment to targets as new information emerges or where circumstances change. It would also recognise that some of these universally applicable reforms are already in place in some jurisdictions.

The intergovernmental agreement would also express commitment to implementing *structural reform*, with agreed deadlines for progress. However, it would need to

---

provide jurisdictions with considerable flexibility to determine which structural reforms best suit the individual circumstances of jurisdictions. Each jurisdiction presently has different structural arrangements, and these often vary between metropolitan and regional urban areas. Furthermore, the issues facing regional urban areas are different from those facing metropolitan areas, meaning that the appropriate structural reform options will differ. Determining the preferred option will require assessment of the costs and benefits of structural reform on a case-by-case basis, negotiations between State and Territory and Local Governments, and consultation with the industry and consumers.

In submissions to the Commission's draft report, support for flexibility with respect to structural reform was expressed by the Local Government Association of Queensland (LGAQ) (sub. DR134), the New South Wales Government (sub. DR146), the Queensland Water Directorate (sub. DR138) and the South Australian Government (sub. DR132).

It is the Commission's view that, given the strong case for reform of the urban water sector, formulating a new intergovernmental agreement on the reform program should be a priority for COAG. The Commission suggests that the new intergovernmental agreement should be in place by the end of 2012.

As recommended in chapter 8, the Commission has also identified a role for COAG to commission a review of concessions on utility services across all levels of government, including the scope to abolish concessions and assist low-income households through other elements of the tax-transfer system. The Commission suggests that this should be commissioned by no later than 2012, for completion by the end of 2013.

RECOMMENDATION 14.2

***COAG should develop an intergovernmental agreement by the end of 2012 that commits each jurisdiction to implementing the universally applicable reforms identified by the Commission, and to implementing structural reform, with agreed deadlines for progress.***

*Australian Government action*

The Commission has identified only a limited role for the Australian Government in the urban water reform program. The involvement of the Australian Government is limited to:

- Articulating an objective for the urban water sector in relevant Australian Government policy documents that emphasises the provision of water,

---

wastewater and stormwater services in an economically efficient manner to maximise the net benefits to the community (chapter 3). It is the Commission's view that the objective setting task should begin immediately.

- Abolishing the provision of subsidies for the supply of water, wastewater and stormwater services, except in the limited circumstances outlined in chapter 5. This should begin immediately.
- Proceeding with, and responding to, the scheduled independent review of the National Access Regime. This should commence no later than 31 December 2012.

The Commission has also identified a role for the NWC. This is discussed below.

### *Incentive payments*

The Commission recognises that in the past the Australian Government has provided financial incentives to states and territories in order to facilitate national reforms. Such payments were widely seen as successful in garnering support for the National Competition Policy (NCP) reforms beginning in the mid-1990s.

The logic behind the NCP-related payments was that the reforms would have a significant pay-off in terms of gross domestic product, leading to additional tax revenue which, because of vertical fiscal imbalance, would flow disproportionately to the Australian Government. The pool of available funding was developed with reference to modelling by the Industry Commission, while the National Competition Council made recommendations on competition payments.

The NCP-related payments therefore provided both a mechanism for sharing the benefits of reform, and an accountability mechanism, with states and territories 'penalised' where reform commitments were not satisfactorily implemented.

Some submissions to the draft report expressed support for the Australian Government to make incentive payments to the states and territories to facilitate urban water reforms. For example, Yarra Valley Water said:

The Commission's proposals, if implemented, would make a significant contribution to improving productivity across Australia's urban water sector and, importantly, contribute to an increase in national income. It is for this reason we believe that the Commonwealth Government needs to provide incentives to the States to deliver these urban water reform proposals in a timely manner — similar to that which occurred with the urban water reforms of the 1994 COAG Water Reform Agenda. Otherwise the costs and barriers to implementation are likely to be greater than the perceived benefits. (sub. DR115, p. 16)

---

In response to the draft report, the South Australian Government said:

... it is disappointing that the Commission finds that there is no case for Federal funding. The possibility of financial assistance to resource and achieve specific reforms at this stage would indicate the Federal Government's priority for reform in the urban water sector might provide some incentive and greater capacity for more comprehensive and accelerated implementation. (sub. DR132, p. 9)

With regard to the urban water reforms recommended in this report, the Commission considers that State and Territory and Local Governments are likely to be major beneficiaries, with reforms likely to lead to better investment decisions and more cost-reflective pricing. This will in turn reduce the need for assistance provided to utilities by State and Territory Governments to ensure cost recovery, and will lead to increased dividend payments and tax-equivalent payments.

The benefits that will accrue to the states and territories from reforming the urban water sector, together with an effective monitoring regime (see below), should be sufficient to ensure compliance with agreed reforms.

Therefore, the Commission does not see a case for the Australian Government to provide incentive payments to the states and territories.

If the Australian Government chooses to continue to provide subsidies for the supply of water, wastewater and stormwater services — an action that is not supported by the Commission, except in limited circumstances (chapter 5) — a condition of these payments should be jurisdictions compliance with commitments under the revised intergovernmental agreement.

### *State and Territory Government action*

In its draft report, the Commission stated that agreement across all jurisdictions is not necessary for the State and Territory Governments to pursue the bulk of the Commission's recommendations, as most relate to the implementation of best practice. The Commission suggested that State and Territory Governments should act unilaterally to immediately commence the reform process.

This was endorsed by many participants (including Australian Water Association (AWA), sub. DR157; City of Wanneroo, sub. DR150; New South Wales Government, sub. DR146; and Yarra Valley Water, sub. DR115). For example, LGAQ said:

The draft report also recommends that it is not necessary for the State and Territory Governments to reach an agreement before implementing the recommendations highlighted in the report. The Association strongly supports this measure given the

---

difficulty of aligning the priorities of different jurisdictions, especially where different urban water models exist. (sub. DR134, p. 8)

Likewise, the South Australian Government stated:

South Australia ... agrees that reform should not be held up in anticipation of a new national agreement. South Australia has a clearly stated policy position for the urban water sector and is well advanced in implementing necessary reforms. (sub. DR132, p. 8)

Some elements of the universally applicable reforms are already in place to differing degrees across jurisdictions. For example, many have moved towards greater commercialisation of water utilities and implemented some pricing reforms. Therefore, implementation requirements will vary considerably within and between jurisdictions.

The universally applicable reforms can generally be accommodated within existing structural arrangements and some should be able to start without delay, especially those that draw on well established reform principles and do not require legislative change.

The first and most crucial step for reform is to set an overarching objective for government policy that focuses on the provision of water, wastewater and stormwater services in an economically efficient manner to maximise net benefits to the community. As noted in chapter 3, the concept of 'economic efficiency' encapsulates many of the more specific objectives that should be pursued in the urban water sector, including those related to water security, water quality and the environment, and can be used to guide the tradeoffs that need to be made between these objectives. This overarching objective will set the context for all other reforms to follow (where they are not already in place).

It is the Commission's view that State and Territory Governments should implement all of the universally applicable reforms by the end of 2013. Where public consultation and legislative change is not required, however, a number of the universally applicable reforms could be implemented right away, and be completed well ahead of this deadline. The Commission considers it important that the objective for the sector is set early, and that subsidies cease ahead of the end of 2013. A deadline for these tasks of the end of 2012 is therefore suggested.

The structural reform process should start concurrently with the universally applicable reforms, especially in light of the long lead time that might be required to implement such reforms.

---

The first step is for each State and Territory Government to assess the case for structural reform in large urban cities and regional urban areas. The Commission suggests that State and Territory Governments should arrange for open and transparent reviews to be conducted to assess the case for structural reform. These reviews should involve consultation with Local Governments where appropriate, and be made public. The Queensland Water Directorate emphasised the need for consultation:

The process of sudden reform with limited consultation of local government and the water sector in Queensland over the past five years has left a legacy of distrust and ill-will among all stakeholders. Sustainable change that meets the needs of regional communities can be achieved only through collaborative approaches. (sub. DR138, p. 41)

The Commission considers that this assessment could be completed by no later than the end of 2013. However, for some jurisdictions, such as regional urban areas in New South Wales, much of the work has already been done and the assessment could be completed well ahead of this deadline.

Where a case in favour of structural reform is identified by a jurisdiction, the Commission considers that the reform process should be completed by no later than the end of 2015. However, the Commission expects that many jurisdictions could finish well ahead of this time. For example, some vertical separation of the supply chain has already occurred in Sydney, Melbourne and Brisbane, and regional urban utilities have already been reformed in Victoria and Tasmania.

The Commission received limited feedback on its proposed timetable for reform contained in the draft report. Feedback received included the following:

- ... experience with structural reform of council boundaries in Queensland throughout 2005 to 2007 suggests that the investigation phase, whilst required to be comprehensive, should not be prolonged. The timing of elections, both at a local and state level is also critical to the duration of the investigation phase and subsequent implementation process. (LGAQ, sub. DR134, p. 8)
- NSW looks forward to the Commission's views and recommendations on potential to streamline reform processes currently underway and considers that the Commission's proposed timetable is likely to be ambitious. (New South Wales Government, sub. DR146, p. 41)
- The most crucial reform is improved clarity of Government obligations on water utilities. This reform should be able to be delivered within 18 months. The full package of reforms suggested by the Commission should be able to be delivered by 2015. (Yarra Valley Water, sub. DR115, p. 23)

On balance, the timetable put forward in this final report is consistent with the limited feedback received.

---

RECOMMENDATION 14.3

*Some universally applicable reforms should be implemented by the end of 2012, including setting an objective for the sector and ceasing (except in limited circumstances) subsidy payments.*

*The other universally applicable reforms should be in place by the end of 2013.*

*A review of the case for structural reform should also be completed by the end of 2013 and, where a case in favour of structural reform is identified, the reform process should begin immediately thereafter and be completed by the end of 2015.*

RECOMMENDATION 14.4

*Agreement across all jurisdictions is not necessary for State and Territory Governments to pursue the recommendations made by the Commission, as most relate to implementation of best practice regionally. State and Territory Governments should immediately commence enacting universally applicable reforms unilaterally and reviewing the case for structural reform.*

Table 14.3 sets the Commission's suggested 'roadmap' for reform. It summarises the actions required by governments, Water Services Association of Australia (WSAA) and the NWC, and the timelines for these tasks.

### *Transitional issues*

Although the Commission expects urban water reform to result in an overall net benefit to the community, these benefits might not be distributed uniformly, and some individuals might be disadvantaged by reform (particularly in the short term).

The Commission does not consider that its proposed reforms would have large labour market effects. Much of the structural change in the industry has already taken place (chapter 11). Some workers made redundant in regional urban areas might be unable to find new work or might need to retrain or relocate to find new work, although it is likely that any workplace reduction will be facilitated by early retirement given the age profile of the industry workforce.

Further, the employment effects of reform would not always be negative. Some pricing reforms might enable greater investment and promote improvements in water quality and in the services provided by utilities. This could have employment benefits in the urban water sector. As the transitional labour market effects are expected to be small, it is the Commission's view that there is no need to develop a specific structural adjustment package to facilitate reforms.

**Table 14.3 Roadmap for reform**

Action	Recommendation	End of calendar year					
		2012	2013	2014	2015	2016	2017
<b>COAG</b>							
Formulate new intergovernmental agreement	14.2						
Commission a review of concession arrangements	8.1						
Progress implementation of measures to support consumer advocacy as per 2008 Review of Australia's Consumer Policy Framework	8.3						
Conduct independent review of reform program	14.7						
<b>State and Territory Governments</b>							
Universally applicable reforms — set overarching objective and restrict provision of subsidies	3.1, 5.3, 13.4, 14.3						
Universally applicable reforms — others	4.1, 5.1, 5.2, 5.4, 6.1, 6.2, 6.3, 6.4, 7.1, 7.2, 7.3, 8.2, 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 11.1, 14.3, 14.4						
Regularly review outcomes in Indigenous communities	13.5						
Assess case for structural reform	12.1, 13.1, 13.2, 13.3						
Implement structural reform as appropriate	14.1						
<b>Australian Government</b>							
Universally applicable reforms — set overarching objective and restrict provision of subsidies	3.1, 5.3, 14.3						
Commission a review of National Access Regime	11.2						
<b>NWC/WSAA</b>							
NWC and/or WSAA to provide support to utilities to build capacity and expertise	14.5						
NWC to monitor reform progress	14.6						

Likewise, the Commission does not expect there to be any significant effects on affordability in the transitional period of reform. As long as reforms are supported by an effective education campaign that provides consumers with objective

---

information to aid them in making decisions (chapter 7), the Commission does not see a case for any specific transitional assistance related to affordability.

Some Local Governments might experience difficulty in coordinating and implementing structural reform in some regional urban areas, requiring some specific transitional assistance (chapter 13). The Commission envisages that such transitional assistance would be temporary, and provided by State and Territory Governments.

### 14.3 Facilitating reform and monitoring progress

As noted in chapters 5 and 6, a major impediment to achieving efficiency gains in the urban water sector is the lack of expertise within utilities for:

- adopting a real options approach to investment
- calculating the marginal opportunity cost of water
- translating the marginal opportunity cost of water into a range of retail tariff options for consumers.

Widespread adoption of these tools will require capacity building within utilities. The Commission considers that there is a role for the NWC and/or WSAA to provide leadership in working through the proof of concept and the practicality of adopting these frameworks.

#### RECOMMENDATION 14.5

***The National Water Commission and/or Water Services Association of Australia should provide ongoing support to utilities to build capacity and expertise in adopting a real options approach, determining a framework for calculating the marginal opportunity cost of water, and devising a range of retail tariff offerings.***

To be effective, encourage compliance and prevent backsliding, the reform program needs to be backed up by performance monitoring. As such, the reform program should be supported by independent monitoring and reporting of progress made in implementing reforms. Many participants agreed with the need for monitoring of reform (including AWA, sub. DR157; City of Wanneroo, sub. DR150; GE Energy, sub. DR142; Infrastructure Australia, sub. DR107; NWC, sub. DR130; the Queensland Water Directorate, sub. DR138).

The Commission considers that the NWC would be the most obvious body to monitor the progress of reform. Alternatively, the COAG Reform Council or the National Competition Council could perform such a task.

---

Currently, the NWC completes biennial assessments of progress in implementing the National Water Initiative. It could be appropriate for this frequency of assessment to continue.

RECOMMENDATION 14.6

***Progress against COAG agreed water reforms should be subject to monitoring. The National Water Commission could perform this role.***

This report contains a series of recommendations to improve the efficiency of Australia's urban water sector from the point of view of the community as a whole. The Commission acknowledges that the outcomes of the proposed changes are not known with certainty and circumstances can change over time. This is especially so in light of the fact that there is no 'one size fits all' approach to reform, and there is limited international experience to draw upon with some of the proposed reforms.

Moreover, given the other reviews of Australia's urban water sector that are underway or recently completed (chapter 1), additional reforms and adjustments are likely to be made to the framework in coming years. Such changes could have implications for the sector, over and above the changes proposed by the Commission.

The Commission therefore considers that, after a sufficient time period, there should be an independent public review of the impact of the proposed new arrangements.

The Commission considers that five years would be an appropriate time period after which this review should take place. This would give the sector a realistic opportunity to respond to the changed environment before the effectiveness of the new arrangements are examined and consideration is given to any further changes that might be required.

Many draft report submissions agreed with the need for an independent review after five years (including AWA, sub. DR157; City of Wanneroo, sub. DR150; GE Energy, sub. DR 142; Infrastructure Australia, sub. DR107; NWC, sub. DR130; Queensland Water Directorate, sub. DR138).

RECOMMENDATION 14.7

***An independent public review of the implementation of the reform package should take place after five years.***



---

## References

- Abbott, M. and Cohen, B. 2010, 'Industry structure issues in the water and wastewater sectors in Australia', *Economic Papers*, vol. 29, no. 1, pp. 48–63.
- ABC News 2009, *Garrett Rejects Traveston Dam*, [www.abc.net.au/news/stories/2009/11/11/2739725.htm](http://www.abc.net.au/news/stories/2009/11/11/2739725.htm) (accessed 21 January 2011).
- 2011, *New desalination plant capacity to double*, [www.abc.net.au/news/2011-08-01/desalination-plant-capacity-doubles/2819766](http://www.abc.net.au/news/2011-08-01/desalination-plant-capacity-doubles/2819766) (accessed 4 August 2011).
- Abrams, B., Kumaradevan, S., Sarafidis, V. and Spaninks, F. 2011, *The Residential Price Elasticity of Demand for Water*, Joint research study, Sydney, February.
- ABS (Australian Bureau of Statistics) 2006a, *An introduction to Socio-Economic Indexes for Areas (SEIFA)*, Information Paper, Cat. no. 2039.0, Canberra.
- 2006b, *Water Account Australia 2004-05*, Cat. no. 4610.0, Canberra.
- 2008, *Population Projections Australia, 2006 to 2101*, Cat. no. 3222.0, Canberra.
- 2010a, *Energy, Water and Environment Management, 2008-09*, Cat. no. 4660.0, Canberra.
- 2010b, *Environmental Issues: Water Use and Conservation Australia*, Cat. no. 4602.0.55.003, Canberra.
- 2010c, *Measures of Australia's Progress, 2010*, Cat. no. 1370.0, Canberra.
- 2010d, *Water Account Australia 2008-09*, Cat. no. 4610.0, Canberra.
- 2010e, 'Water Choices of Perth households', *Western Australian Statistical Indicators*, Cat. no. 1367.5, Canberra.
- 2010f, *Year Book Australia, 2009-10*, Cat. no. 1301.0, Canberra.
- 2011a, *Consumer Price Index, Australia, June 2011*, Cat. no. 6401.0, Canberra.
- 2011b, *Labour Force, Australia, Detailed, Quarterly, May 2011*, Cat. no. 6291.0.55.003, Canberra.
- ACCC (Australian Competition and Consumer Commission) 2001, *Response to the Productivity Commission Position Paper: Review of the National Access Regime*, June.

- 
- 2010, *Sydney Airport Corporation Limited's Price Notification for Regional Air Services: Decision*, September.
- 2011, *Pricing Principles for Price Approvals and Determinations Under the Water Charge (Infrastructure) Rules 2010*, Canberra, June.
- ACG (Allen Consulting Group) 2007, *Saying Goodbye to Permanent Water Restrictions in Australia's Cities: Key Priorities for Achieving Water Security*, Report to Infrastructure Partnerships Australia, May.
- 2009, *Urban Water — A Vision and Road Map for National Progress April 2009*, Report by the GAP Forum on Water Reform, April.
- 2011, *Evaluation of 2009-10 Consumer Advocacy Panel grants*, May.
- ACIL Tasman 2007a, *Frameworks for Water Source Procurement in WA*, Discussion paper prepared for the ERA inquiry into competition in the water & wastewater services sector, October.
- 2007b, *Size and Scope Economies in Water and Wastewater Services*, October.
- ACT Government 2004, *Think Water, Act Water Volume 1: Strategy for Sustainable Water Resource Management in the ACT*, April.
- ACT Ombudsman (nd), *About us*, <http://ombudsman.act.gov.au/pages/about-us/> (accessed 31 March 2011).
- ACTEW 2006, *Legislative Framework*, [www.actew.com.au/water/legislation.aspx](http://www.actew.com.au/water/legislation.aspx) (accessed 9 March 2011).
- 2010a, *ACTEW Welcomes ICRC Report into the Enlarged Cotter Dam*, [www.actew.com.au/news/ArticleDetail.aspx?id=1172](http://www.actew.com.au/news/ArticleDetail.aspx?id=1172) (accessed 2 March 2011).
- 2010b, *Submission to the ACT Public Sector Review*, November.
- ActewAGL 2011, *Water Abstraction Charge*, [www.actewagl.com.au/water/networks/wac.aspx](http://www.actewagl.com.au/water/networks/wac.aspx) (accessed 28 March 2011).
- Administrative Review Council 1999, *What Decisions Should be Subject to Merits Review?*, [www.ag.gov.au/agd/WWW/arcHome.nsf/Page/Publications\\_Reports\\_Downloads\\_What\\_decisions\\_should\\_be\\_subject\\_to\\_merit\\_review#dec7](http://www.ag.gov.au/agd/WWW/arcHome.nsf/Page/Publications_Reports_Downloads_What_decisions_should_be_subject_to_merit_review#dec7) (accessed 8 July 2011).
- AEC Group 2009, *Benchmarking of Infrastructure Charges Queensland High Growth Councils — Final Report*, September.
- AECOM 2010, *Review of Regional Water Quality and Security*, Report prepared for Infrastructure Australia.

- 
- AEMO (Australian Energy Market Operator) 2010a, *An Introduction to Australia's National Electricity Market*, July.
- 2010b, *Guide to the Victorian Gas Wholesale Market*, January.
- 2010c, *National Transmission Network Development Plan: Consultation Paper*, January, [www.aemo.com.au/planning/0418-0002.pdf](http://www.aemo.com.au/planning/0418-0002.pdf) (accessed 30 June 2011).
- AER (Australian Energy Regulator) 2011, *State of the Energy Market 2010*, December.
- Albanese, A. (Minister for Infrastructure and Transport) and Shorten, B. (Assistant Treasurer) 2010, *Airport Pricing, Investment and Services Review*, Joint Media release, AA492/2010 Joint, 9 December.
- Anglicare Victoria 2010, *Anglicare Victoria's Hardship Survey 2010*, Anglicare Victoria Policy, Research and Innovation Briefing, no. 4, Abbotsford, June.
- Arbués, F., García-Valiñas, M. and Martínez-Espiñeira, R. 2003, 'Estimation of residential water demand: A state of the art review', *Journal of Socio-Economics*, vol. 32, no. 1, pp. 81–102.
- Armstrong, I. and Gellatly, C. 2008, *Report of the Independent Inquiry into Secure and Sustainable Urban Water Supply and Sewerage Services for Non-Metropolitan NSW*, Sydney, December.
- Auckland Council 2010, *Council-controlled Organisations*, [www.aucklandcouncil.govt.nz/EN/AboutCouncil/HowCouncilWorks/CCO/Pages/Home.aspx](http://www.aucklandcouncil.govt.nz/EN/AboutCouncil/HowCouncilWorks/CCO/Pages/Home.aspx) (accessed 15 February 2011).
- Austin, P. 2010, 'Opposition slams 'waste' in Brumby's water policy', *The Age*, 16 September.
- Australia's Future Tax System Review Panel 2009, *Australia's Future Tax System Report to the Treasurer, Part Two — Detailed Analysis — Volume 2*, Canberra, December.
- Australian Financial Review 2011, 'NYC sewage a money-making green solution', 11 February, p. 64.
- Australian Government 2003, *Review of Corporate Governance of Statutory Authorities and Office Holders* (Uhrig Review), Canberra, June.
- 2006, *Rethinking Regulation: Report of the Taskforce on Reducing Regulatory Burdens on Business — Final Government Response*, Canberra.
- 2009a, *Regional and Local Community Infrastructure Program \$550 Million Strategic Projects*, [www.infrastructure.gov.au/esp/files/RLCIP\\_550\\_31082009m.pdf](http://www.infrastructure.gov.au/esp/files/RLCIP_550_31082009m.pdf) (accessed 30 March 2011).

- 
- 2009b, *Report of the Independent Review of the Environmental Protection and Biodiversity Conservation Act* (Hawke Review), October.
- 2010a, *Best Practice Regulation Handbook*, Canberra.
- 2010b, *Water Efficiency Labelling and Standards (WELS) Scheme*, [www.waterrating.gov.au/index.html](http://www.waterrating.gov.au/index.html) (accessed 21 January 2011).
- 2011a, *About the Water Efficiency Labelling and Standards (WELS) Scheme*, [www.waterrating.gov.au/about/index.html](http://www.waterrating.gov.au/about/index.html) (accessed 21 March 2011).
- 2011b, *Budget Paper No. 2: Budget Measures 2011-12*, [www.budget.gov.au/2011-12/content/bp2/html/index.htm](http://www.budget.gov.au/2011-12/content/bp2/html/index.htm) (accessed 8 July 2011).
- AWA (Australian Water Association) 2008, *Submission to the Inquiry into Secure and Sustainable Urban Water Supply and Sewerage Services for Non-metropolitan NSW*.
- Ballance, T. and Taylor, A. 2005, *Competition and Economic Regulation in Water – The Future of the European Water Industry*, London.
- Banks, G. 2003, *The Good, The Bad and The Ugly: Economic Perspectives on Regulation in Australia*, Address to the Conference of Economists' Business Symposium, 2 October, Canberra.
- Barakat and Chamberlin, Inc. 1990, *Rate Design: Traditional and Innovative Approaches*, Research project 2343-4, Electric Power Research Institute, Oakland, California.
- Barbier, E.B. and Heal, G.M. 2006, 'Valuing ecosystem services', *Economists' Voice*, vol. 3, no. 3, [www.bepress.com/ev/vol3/iss3/art2/](http://www.bepress.com/ev/vol3/iss3/art2/) (accessed 3 March 2011).
- Barker, A., Murray, T. and Salerian, J. 2010, *Developing a Partial Equilibrium Model of an Urban Water System*, Productivity Commission Staff Working Paper, Melbourne, March.
- Barnes, P. 2011, *Multifactor Productivity Growth Cycles at the Industry Level*, Productivity Commission Staff Working Paper, Canberra.
- Barnett, C. (Premier and Minister for State Development (Western Australia)) and Marmion, B. (Minister for Environment; Water (Western Australia)) 2011, *Perth's New Major Water Supply Secured*, Media release, 1 August.
- Barwon Water 2011, *Fees and Charges (Residential Customers)*, [www.barwonwater.vic.gov.au/residential/bill/fees](http://www.barwonwater.vic.gov.au/residential/bill/fees) (accessed 22 March 2011).
- Barzilay, J.I., Weinberg, W.G. and Eley, J.W. 1999, *The Water We Drink: Water Quality and its Effects on Health*, Rutgers University Press, New Brunswick.

- 
- BASIX (nd)a, *About BASIX*, [www.basix.nsw.gov.au/information/about.jsp](http://www.basix.nsw.gov.au/information/about.jsp) (accessed 21 March 2011).
- (nd)b, *Changes to BASIX Index Water Targets*, [www.basix.nsw.gov.au/information/water\\_target.jsp](http://www.basix.nsw.gov.au/information/water_target.jsp) (accessed 29 March 2011).
- Baskin, B. 2010, 'Tyrell and Bligh blame each other over water', *Townsville Bulletin*, 14 October, [www.townsvillebulletin.com.au/article/2010/10/14/176961\\_news.html](http://www.townsvillebulletin.com.au/article/2010/10/14/176961_news.html) (accessed 7 June 2011).
- Baumann, D., Boland, J. and Hanemann, W. 1998, *Urban Water Demand Management and Planning*, McGraw Hill, USA.
- Baumol, W. 1977, *Economic Theory and Operations Analysis*, Prentice Hall International, London.
- 1982, 'Contestable markets: an uprising in the theory of industry structure', *The American Economic Review*, vol. 72, no. 1, pp. 1–15.
- Beatty, K. 2011, *Unsung Water Savings: How People in Greater Sydney Saved Water During Drought Restrictions*, Paper presented at AWA's 4th National Water Efficiency, WEN and WICD Conference, Melbourne, 1–3 March.
- Beatty, R.J., Coombes, P.C. and Kozorovski, P. 2009, *Integrated Water Resources Planning Efforts in Australia Need to Grow Up*, Paper presented at the 32nd Hydrology and Water Resources Symposium, Newcastle.
- Ben Lomond Water 2010, *2010-2011 Water and Sewerage Charges*, [www.benlomondwater.com.au/NorthWater/\\_Documents/Our%20Charges/LCC%20Residential%20Fees%20FY11%20v2.pdf](http://www.benlomondwater.com.au/NorthWater/_Documents/Our%20Charges/LCC%20Residential%20Fees%20FY11%20v2.pdf) (accessed 22 March 2011).
- BIE (Bureau of Industry Economics) 1995, *Issues in Infrastructure Pricing*, Research report 69, Canberra, August.
- Biggar, D. 2011, *Public Utility Regulation in Australia: Where Have We Got To? Where Should We Be Going*, ACCC/ AER Working Paper no. 4, July.
- Birge, J. and Louveaux, F. 1997, *Introduction to Stochastic Programming*, Springer Series in Operations Research, New York.
- Bligh, A. (Premier and Minister for Reconstruction (Queensland)) 2011, *Premier Says Enough is Enough — Water Blame Game Ends*, Media release, 7 April.
- BOM (Bureau of Meteorology) 2009, *Monthly Rainfall: Melbourne Regional Office, Data for 1856–2008*, [www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p\\_nccObsCode=139&p\\_display\\_type=dataFile&p\\_startYear=&p\\_stn\\_num=086071](http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=139&p_display_type=dataFile&p_startYear=&p_stn_num=086071) (accessed 15 March 2010).
- 2011a, *Building Your 'Weather' Skills*, [http://www.bom.gov.au/info/ftweather/page\\_30.shtml](http://www.bom.gov.au/info/ftweather/page_30.shtml) (accessed 26 April 2011).

- 
- 2011b, *Water Storage*, [water.bom.gov.au/waterstorage/awris/index.html](http://water.bom.gov.au/waterstorage/awris/index.html) (accessed 7 March 2011).
- Bonbright, J., Danielsen, A. and Kamerschen, D. 1988, *Principles of Public Utility Rates*, Public Utilities Report Inc. Arlington, Virginia.
- Borenstein, S. 2002, 'The trouble with electricity markets: understanding California's restructuring disaster', *Journal of Economic Perspectives*, vol. 16, no. 1, pp. 191–211.
- Borison, A., Hamm, G., Farrier, S. and Swier, G. 2008, *Real Options and Urban Water Resource Planning in Australia*, Water Services Association of Australia Occasional paper no. 20, April.
- Brealey, R.A., Myers, S.C. and Marcus, A.J. 1984, *Fundamentals of Corporate Finance*, 3rd edn, McGraw-Hill Primis Custom Publishing, Boston, USA.
- Brennan, D. 2006, *The Efficiency and Equity Implications of Perth's Inclining Block Urban Water Tariffs*, Paper presented at the 50<sup>th</sup> Annual Conference of the Australian Agricultural and Resource Economics Society, Sydney, NSW, 8–10 February.
- 2008, 'Missing markets for storage and the potential economic cost of expanding the spatial scope of water trade', *The Australian Journal of Agricultural and Resource Economics*, vol. 52, no. 4, pp. 471–85.
- 2010, 'Economic potential of market-oriented water storage decisions: evidence from Australia', *Water Resources Research*, vol. 46, pp. 1–9.
- , Tapsuwan, S. and Ingram, G. 2007, 'The welfare costs of urban outdoor water restrictions', *The Australian Journal of Agricultural and Resource Economics*, vol. 51, no. 3, pp. 243–61.
- Building Commission Victoria 2011, *Make Your Home Green: 6 Star Standard*, [www.makeyourhomegreen.vic.gov.au/www/html/1962-introduction.asp?intSiteID=3](http://www.makeyourhomegreen.vic.gov.au/www/html/1962-introduction.asp?intSiteID=3) (accessed 27 July 2011).
- Business Council of Australia 2006, *Water Under Pressure — Australia's Man-made Water Scarcity and How to Fix it*, Melbourne.
- Byrnes, J., Crase, L. and Dollery, B. 2006, 'Regulation versus pricing in urban water policy: the case of the Australian National Water Initiative', *The Australian Journal of Agricultural and Resource Economics*, vol. 50, no. 3, pp. 437–49.
- , ——, —— and Villano, R. 2009, 'An analysis of the relative efficiency of wastewater utilities in non-metropolitan New South Wales and Victoria', *Australian Journal of Regional Studies*, vol. 15, no. 2, pp. 153–69.

- 
- , ——, —— and —— 2010, ‘The relative economic efficiency of urban water utilities in regional New South Wales and Victoria’, *Resource and Energy Economics*, vol. 32, no. 3, pp. 439–55.
- Caica, P. (Minister for Environment and Conservation, South Australia) 2010, House of Assembly, Estimates Committee B, *Hansard Extracts*, 11 October.
- 2011, *ALLWATER Chosen as Preferred Bidder to Manage Adelaide’s Water and Wastewater Services*, Media release, 9 February.
- Canberra Airport 2010, *Canberra Airport Environment Strategy*, June.
- Caramanis, M., Schweppe, F.C. and Tabors, R.D. 1983, *Spot Pricing and its Relation to Other Load Management Methods*, MIT Energy Laboratory Report MIT-EL 83-001, Cambridge.
- Carpenter, A. (Premier of Western Australia) 2007, *Second Seawater Desalination Plant to be State’s Next Major Water Source*, Media statement, 15 May.
- Cave, M. 2006, ‘Six degrees of separation: operational separation as a remedy in European telecommunications’, *Communications & Strategy*, no. 64, pp. 89–104.
- 2009, *Independent Review of Competition and Innovation in Water Markets: Final Report*, April.
- Central Market Agency Scotland 2010, *Market Code 27 September 2010*, [www.cmascotland.co.uk/cma\\_docs/file/market\\_documents/market\\_code/Market-Code-20100927v15-clean%20upload.pdf](http://www.cmascotland.co.uk/cma_docs/file/market_documents/market_code/Market-Code-20100927v15-clean%20upload.pdf) (accessed 17 March 2011).
- 2011, *Central Market Agency*, <http://cmascotland.com/index.php> (accessed 10 February 2011).
- Chambers, R.G. and Quiggin, J. 2000, *Uncertainty, Production, Choice, and Agency: The State-Contingent Approach*, Cambridge University Press, Cambridge, UK.
- CIE (Centre for International Economics) 2008, *Technical Documents: Updated Estimates of the Cost of Water Restrictions in the ACT Region*, Prepared for ActewAGL, September.
- 2010a, *Pricing Principles for Recycled Water and Stormwater Reuse*, Waterlines report series no. 31, National Water Commission, Canberra.
- 2010b, *Tillegra Dam: Socioeconomics — An Independent Review*, Prepared for the NSW Department of Planning, October.
- CITIC Pacific Mining 2010, *Desalination Plant a World First*, [www.citicpacificmining.com/articles/latest-news/desalination-plant-a-world-first](http://www.citicpacificmining.com/articles/latest-news/desalination-plant-a-world-first) (accessed 13 July 2011).

- 
- City of Charles Sturt (nd), *Water Proofing the West – Stage 1*, [www.charlessturt.sa.gov.au/webdata/resources/files/Living\\_Green\\_Expo\\_Poster\\_-\\_WPW.pdf](http://www.charlessturt.sa.gov.au/webdata/resources/files/Living_Green_Expo_Poster_-_WPW.pdf) (accessed 28 June 2011).
- City of Onkaparinga 2010a, *Water – The Change Challenge for the City of Onkaparinga*, [www.aprs.com.au/australian-water-management-news/water-the-change-challenge-for-the-city-of-onkaparinga](http://www.aprs.com.au/australian-water-management-news/water-the-change-challenge-for-the-city-of-onkaparinga) (accessed 27 June 2011).
- 2010b, *Water Proofing the South Stage 2*, [www.onkaparingacity.com/onka/living\\_here/our\\_environment/water\\_management/water\\_proofing\\_the\\_south/water\\_proofing\\_the\\_south\\_stage\\_2.jsp](http://www.onkaparingacity.com/onka/living_here/our_environment/water_management/water_proofing_the_south/water_proofing_the_south_stage_2.jsp) (accessed 24 March 2011).
- City of Whitehorse 2011, *Rainwater Tank Rebate*, [www.whitehorse.vic.gov.au/Rainwater-Tank-Rebate.html](http://www.whitehorse.vic.gov.au/Rainwater-Tank-Rebate.html) (accessed 17 June 2011).
- City West Water 2011, *Moonee Valley Racing Club*, [www.citywestwater.com.au/documents/Moonee\\_Valley\\_Racing\\_Club.pdf](http://www.citywestwater.com.au/documents/Moonee_Valley_Racing_Club.pdf) (accessed 21 March 2011).
- Clarke, J.M. 1940, 'Toward a concept of workable competition', *The American Economic Review*, vol. 30, no. 2, pp. 241–56.
- Clennell, A. 2007, 'Keep desalination on the backburner, says adviser', *The Sydney Morning Herald*, 12 April.
- COAG (Council of Australian Governments) 1994, *Council of Australian Governments' Communiqué 25 February 1994 - Water Resource Policy*, [www.coag.gov.au/coag\\_meeting\\_outcomes/1994-02-25/index.cfm](http://www.coag.gov.au/coag_meeting_outcomes/1994-02-25/index.cfm) (accessed 1 April 2011).
- 1995, *Agreement to Implement the National Competition Policy and Related Reforms*, Attachment A of Council of Australian Governments Meeting 11 April 1995, [www.coag.gov.au/coag\\_meeting\\_outcomes/1995-04-11/docs/attachment\\_a.cfm](http://www.coag.gov.au/coag_meeting_outcomes/1995-04-11/docs/attachment_a.cfm) (accessed 1 April 2011).
- 2004, *Intergovernmental Agreement on a National Water Initiative between the Commonwealth of Australia and the Governments of New South Wales, Victoria, Queensland, South Australia, the Australian Capital Territory and the Northern Territory*, [www.coag.gov.au/coag\\_meeting\\_outcomes/2004-06-25/docs/iga\\_national\\_water\\_initiative.pdf](http://www.coag.gov.au/coag_meeting_outcomes/2004-06-25/docs/iga_national_water_initiative.pdf) (accessed 22 November 2010).
- 2008, *Council of Australian Governments' Meeting 29 November 2008 - Climate Change and Water*, [www.coag.gov.au/coag\\_meeting\\_outcomes/2008-11-29/index.cfm](http://www.coag.gov.au/coag_meeting_outcomes/2008-11-29/index.cfm) (accessed 1 April 2011).
- 2010, *National Urban Water Initiative Pricing Principles*, [www.environment.gov.au/water/publications/action/pubs/nwi-pricing-principles.pdf](http://www.environment.gov.au/water/publications/action/pubs/nwi-pricing-principles.pdf) (accessed 8 November 2010).

- 
- Coase, R. 1937, 'The nature of the firm', *Economica*, vol. 4, no. 16, pp. 386–405.
- Coelli, T. and Walding, S. 2005, *Performance Measurement in the Australia Water Supply Industry*, CEPA Working papers series no. 01/2005, University of Queensland, June.
- Coliban Water 2009, *Coliban Offers Water Trading Pilot for a Second Year*, [www.coliban.com.au/about/media\\_and\\_public\\_affairs/releases/release.asp?ID=277](http://www.coliban.com.au/about/media_and_public_affairs/releases/release.asp?ID=277) (accessed 12 March 2011).
- Colmar Brunton Social Research 2008, *ACT Water Users Research: Final Report*, Prepared for Infrastructure Development Branch, Water Division, ActewAGL, June, unpublished.
- Community Services Directorate 2011, *Water Concession*, [www.dhcs.act.gov.au/wac/concessions/water\\_concession](http://www.dhcs.act.gov.au/wac/concessions/water_concession) (accessed 19 July 2011).
- Coombes, P.J. and Barry, M.E. 2008, 'The relative efficiency of water supply catchments and rainwater tanks in cities subject to variable climate and the potential for climate change', *Australian Journal of Water Resources*, vol. 12, no. 2, pp. 1–16.
- , Frost, A., Kuczera, G., O'Loughlin, G. and Lees, S. 2002, 'Rainwater Tank Options for Stormwater Management in the Upper Parramatta River Catchment', Paper presented at the 27<sup>th</sup> Hydrology and Water Resources Conference, Melbourne.
- and Kuczera, G. (nd), *Integrated Urban Water Cycle Management: Moving Towards Systems Understanding*, [www.bonacciwater.com/research\\_IWCM\\_.php#02](http://www.bonacciwater.com/research_IWCM_.php#02) (accessed 23 June 2011).
- Corbell, S. (Minister for Environment, Climate Change and Water (ACT)) 2009, *Securing Canberra's Water Supply*, Media release, 25 March.
- COSIPL (Committee on Standards in Public Life) (Nolan Committee) 1995, *Summary of the Nolan Committee's First Report on Standards in Public Life*, HMSO, London.
- Costa, P. (Minister for Water and Minister for Corrective Services (New South Wales)) 2010, *Sydney's Desalination Project Wins National Award*, Media release, 12 March.
- Cousins, D. 2010, *Review of Water Prices: Final Report*, Report for the Council of Mayors (SEQ), Monash University Centre for Regulatory Studies, December.
- Cowan, S. 1997, 'Competition in the water industry', *Oxford Review of Economic Policy*, vol. 13, no. 1, pp. 83–92.

- 
- 2004, ‘Utility regulation and risk allocation: the roles of marginal cost pricing and futures markets’, *Journal of Regulatory Economics*, vol. 26, no. 1, pp. 23–40.
- Cox, J. 2011, *Conference on Regulatory Reform*, Speech, IPART, 12 April.
- Cruse, L. and Dollery, B. 2005, ‘The inter-sectoral implications of ‘Securing Our Water Future Together’’, *International Journal of Environmental, Cultural, Economic and Social Sustainability*, vol. 1, no. 5, pp. 13–22.
- CRCIF (Cooperative Research Centre for Irrigation Futures) 2008, *Irrigation of Urban Green Spaces: a Review of the Environmental, Social and Economic Benefits*, IF Technologies Pty Ltd.
- CSIRO 2007, *Climate Change in Australia*.
- 2008, *Water Availability in the Murray-Darling Basin*, A report to the Australian Government from the CSIRO Murray-Darling Sustainable Yields Project, Canberra.
- CUAC (Consumer Utilities Advocacy Centre) 2011a, *Consumer Utilities Advocacy Centre*, [www.cuac.org.au](http://www.cuac.org.au) (accessed 6 March 2011).
- 2011b, *About CUAC*, [www.cuac.org.au/about/](http://www.cuac.org.au/about/) (accessed 23 February 2011).
- Dalhuisen, J., Florax R., de Groot, H. and Nijkamp, P. 2003, ‘Price and income elasticities of residential water demand: a meta analysis’, *Land Economics*, vol. 79, no. 2, pp. 292–308.
- DECCEW (Department of the Environment, Climate Change, Energy and Water) 2009, *General Information for Water Users*, [www.environment.act.gov.au/\\_\\_data/assets/pdf\\_file/0006/152835/General\\_Information\\_Water\\_Users.pdf](http://www.environment.act.gov.au/__data/assets/pdf_file/0006/152835/General_Information_Water_Users.pdf) (accessed 9 March 2011).
- 2011, *Water*, [www.environment.act.gov.au/water](http://www.environment.act.gov.au/water) (accessed 9 March 2011).
- Degremont (nd), *Waste Water Treatment Plants*, [www.degremont.com.au/index.php?page=pimpana\\_waste\\_water\\_treatment\\_plant](http://www.degremont.com.au/index.php?page=pimpana_waste_water_treatment_plant) (accessed 14 March 2011).
- Delson, J.K. and Shahidehpour, S.M. 1992, ‘Linear programming applications to power system economics, planning and operations’, *IEEE Transactions on Power Systems*, vol. 7, no. 3, pp. 1155–63.
- Department for Families and Communities (South Australia) 2011, *Concessions*, [www.dfc.sa.gov.au/pub/Home/Financialsupportandgrants/Concessions/tabid/209/Default.aspx](http://www.dfc.sa.gov.au/pub/Home/Financialsupportandgrants/Concessions/tabid/209/Default.aspx) (accessed 19 July 2011).
- Department for Water 2010, *South Australian Water Industry Bill Explanatory Paper*, [www.waterforgood.sa.gov.au/wp-content/uploads/2010/11/dfw\\_explanatorypaper\\_wib.pdf](http://www.waterforgood.sa.gov.au/wp-content/uploads/2010/11/dfw_explanatorypaper_wib.pdf) (accessed 27 March 2011).

- 
- 2011a, *Cessation of Carryover Arrangements*, [www.waterforgood.sa.gov.au/rivers-reservoirs-aquifers/river-murray/cessation-of-carryover-arrangements/](http://www.waterforgood.sa.gov.au/rivers-reservoirs-aquifers/river-murray/cessation-of-carryover-arrangements/) (accessed 16 March 2011).
- 2011b, *City of Charles Sturt*, [www.waterforgood.sa.gov.au/using-and-saving-water/waterwise-communities/city-of-charles-sturt/](http://www.waterforgood.sa.gov.au/using-and-saving-water/waterwise-communities/city-of-charles-sturt/) (accessed 24 March 2011).
- Department of Broadband, Communications and the Digital Economy 2010, *Funding of Consumer Representation Grants Program to Telecommunications Annual Report 2009-10*, Canberra.
- Department of Child Protection (Western Australian) 2011, *Hardship Utilities Grant Scheme*, [www.dcp.wa.gov.au/servicescommunity/Pages/HardshipUtilitiesGrantScheme\(HUGS\).aspx](http://www.dcp.wa.gov.au/servicescommunity/Pages/HardshipUtilitiesGrantScheme(HUGS).aspx) (accessed 28 March 2011).
- Department of Communities (Queensland) 2010, *Every Dollar Counts: Concessions Made Easy*, Brisbane.
- Department of Health (Northern Territory) 2011, *Aged and Disability Program – Fact Sheet*, [www.health.nt.gov.au/library/scripts/objectifyMedia.aspx?file=pdf/40/22.pdf&siteID=1&str\\_title=New concession rates for Power, Water and Sewerage from 1 July 2010.pdf](http://www.health.nt.gov.au/library/scripts/objectifyMedia.aspx?file=pdf/40/22.pdf&siteID=1&str_title=New%20concession%20rates%20for%20Power,%20Water%20and%20Sewerage%20from%201%20July%202010.pdf) (accessed 4 February 2011).
- Department of Health (South Australia) 2010, *Draft Safe Drinking Water Bill 2010 Explanatory Paper*, June.
- Department of Health and Families 2009, *Guidelines for Management of Recycled Water Systems*, September.
- Department of Human Services (Victoria) 2010, *State Concessions and Hardship Programs 2008–09 and 2009–10*, Melbourne.
- 2011, *Utility Relief Grant Scheme (Including The Non-mains Utility Relief Grant Scheme)*, [www.dhs.vic.gov.au/concessions/entitlements/hardship/utility-relief-grant-scheme](http://www.dhs.vic.gov.au/concessions/entitlements/hardship/utility-relief-grant-scheme) (accessed 28 March 2011).
- Department of Local Government and Planning (Queensland) 2011, *Queensland Development Code Current Parts*, [www.dlgp.qld.gov.au/building/current-parts.html](http://www.dlgp.qld.gov.au/building/current-parts.html) (accessed 23 June 2011).
- Department of Planning and Local Government (South Australia) 2010, *Rainwater Tanks*, [www.planning.sa.gov.au/go/rainwater-tanks](http://www.planning.sa.gov.au/go/rainwater-tanks) (accessed 23 June 2011).
- Department of Premier and Cabinet (New South Wales) 2011, *Applying for a Pensioner Concession Information Sheet*, [www.dlg.nsw.gov.au/DLG/Documents/information/05-63%20Pensioner%20Concession%20Info%20Sheet.pdf#xml=http://www.dlg.nsw.gov.au/Scripts/dtSearch/dtisapi6.dll?cmd=getpdfhits&DocId=1647&Index=c%3a%5cdtsearch%5cuserdata%5cAllDocuments&Hi](http://www.dlg.nsw.gov.au/DLG/Documents/information/05-63%20Pensioner%20Concession%20Info%20Sheet.pdf#xml=http://www.dlg.nsw.gov.au/Scripts/dtSearch/dtisapi6.dll?cmd=getpdfhits&DocId=1647&Index=c%3a%5cdtsearch%5cuserdata%5cAllDocuments&Hi)

---

tCount=11&hits=6+56+98+b9+104+137+146+21d+26a+276+280+&.pdf  
(accessed 4 February 2011).

Department of Water 2009, *Gnangara Groundwater Allocations Plan*, Water Resource Allocation and Planning Series, Report no. 30, Perth.

— 2011, *About Us*, [www.water.wa.gov.au/About+us/default.aspx](http://www.water.wa.gov.au/About+us/default.aspx) (accessed 31 March 2011).

— (nd)a, *Drinking Water*, [www.water.wa.gov.au/Managing+water/Drinking+water/default.aspx](http://www.water.wa.gov.au/Managing+water/Drinking+water/default.aspx) (accessed 15 June 2011).

— (nd)b, *Water Resource Management*, [www.water.wa.gov.au/Our+water+future/Water+resource+management/default.aspx](http://www.water.wa.gov.au/Our+water+future/Water+resource+management/default.aspx) (accessed 27 March 2011).

Department of Water and Energy 2007, *Best-Practice Management of Water Supply and Sewerage Guidelines*, August.

DERM (Department of Environment and Resource Management (Queensland)) 2009a, *Water Licences*, June.

— 2009b, *Water Supply (Safety and Reliability) Act—General Overview*, August.

— 2010a, *Environmental Values - Environmental Protection (Water) Policy 2009*, [www.derm.qld.gov.au/environmental\\_management/water/environmental\\_values\\_environmental\\_protection\\_water\\_policy/index.html](http://www.derm.qld.gov.au/environmental_management/water/environmental_values_environmental_protection_water_policy/index.html) (accessed 26 March 2011).

— 2010b, *Regional Water Supply Strategies*, [www.derm.qld.gov.au/water/regionalsupply/index.html](http://www.derm.qld.gov.au/water/regionalsupply/index.html) (accessed 26 March 2011).

— 2010c, *Taps and Toilets: Promoting Sustainable Water Practices in Urban Queensland*, Presentation to the Water Pricing Conference, September.

— 2010d, *Water Recycling Guidelines*, [www.derm.qld.gov.au/water/regulation/recycling/guidelines.html](http://www.derm.qld.gov.au/water/regulation/recycling/guidelines.html) (accessed 26 March 2011).

— 2011, *Drinking Water*, <http://www.derm.qld.gov.au/water/regulation/drinking/index.html> (accessed 22 June 2011).

DEWHA (Department of the Environment, Water, Heritage and the Arts) 2008, *National Urban Water and Desalination Plan: Implementation Guidelines*, December.

— 2009, *National Water Skills Strategy*, March.

Diehm, K. 2010, *Implementing Best Practice Pricing — A Regional Queensland Perspective*, Presentation to the Water Pricing Conference, September.

District Council of Coober Pedy 2011, *Water Services*, [www.cooberpedy.sa.gov.au/site/page.cfm?u=115](http://www.cooberpedy.sa.gov.au/site/page.cfm?u=115) (accessed 25 March 2011).

- 
- Division of Local Government (New South Wales) 2009, *Review of New England Strategic Alliance of Councils*, December.
- 2010, *Our Services*, [www.dlg.nsw.gov.au/dlg/dlghome/dlg\\_InformationIndex.asp?areaindex=SERVICES&index=700&mi=1&ml=1](http://www.dlg.nsw.gov.au/dlg/dlghome/dlg_InformationIndex.asp?areaindex=SERVICES&index=700&mi=1&ml=1) (accessed 1 April 2010).
- Dollery, B., Grant, B. and Crase, L. 2011, 'Love thy neighbour: a social capital approach to local government partnerships', *The Australian Journal of Public Administration*, vol. 70, no. 2, pp. 156–66.
- Keogh, C. and Crase, L. 2005, *Alternatives to Amalgamation in Australian Local Government: Lessons from the New Zealand Experience*, University of New England.
- Downie, G. 2011, 'Pipeline gets go-ahead as land owners compensated', *Canberra Times*, 5 March, p. 6.
- DPIPWE (Department of Primary Industries, Parks, Water and Environment) 2010, *Urban Water and Sewerage Reform*, [www.dpiw.tas.gov.au/inter.nsf/WebPages/HBAW-7T9W4V?open](http://www.dpiw.tas.gov.au/inter.nsf/WebPages/HBAW-7T9W4V?open) (accessed 27 March 2011).
- DSE (Department of Sustainability and Environment (Victoria)) 2006, *Sustainable Water Strategy Central Region: Action to 2055*, October.
- 2007, *Water Trading in Northern Victoria 1991-92 — 2005-06*, Melbourne, October.
- 2008, *Augmentation of the Melbourne Water Supply System: Analysis of Potential System Behaviour, Our Water Our Future*, Melbourne.
- 2010, *Draft Gippsland Region Sustainable Water Strategy: For Community Comment*, September.
- 2011a, *A Governance Guide to the Victorian Water Industry*, February.
- 2011b, *Living Victoria Water Rebate Program: Eligible Products*, [www.water.vic.gov.au/saving/home/rebates/products](http://www.water.vic.gov.au/saving/home/rebates/products) (accessed 6 July 2011).
- 2011c, *Victorian Water Register*, <http://waterregister.vic.gov.au/Public/Reports/WaterShareStatistics.aspx> (accessed 25 March 2011).
- DSEWPC (Department of Sustainability, Environment, Water, Population and Communities) 2009, *National Urban Water Planning Principles*, [www.environment.gov.au/water/policy-programs/urban-reform/nuw-planning-principles.html](http://www.environment.gov.au/water/policy-programs/urban-reform/nuw-planning-principles.html) (accessed 30 November 2010).
- 2010a, *Stormwater Harvesting and Reuse Projects*, [www.environment.gov.au/water/policy-programs/urban-water-desalination/stormwater-reuse/index.html](http://www.environment.gov.au/water/policy-programs/urban-water-desalination/stormwater-reuse/index.html) (accessed 24 March 2011).

- 
- 2010b, *Water Policy and Programs*, [www.environment.gov.au/water/policy-programs/towns-cities/index.html](http://www.environment.gov.au/water/policy-programs/towns-cities/index.html) (accessed 29 January 2011).
- 2011a, *Average Prices of Offers Pursued from Recent Tenders*, [www.environment.gov.au/water/policy-programs/entitlement-purchasing/average-prices.html](http://www.environment.gov.au/water/policy-programs/entitlement-purchasing/average-prices.html) (accessed 29 March 2011).
- 2011b, *National Rainwater and Greywater Initiative - Household Rebate*, [www.environment.gov.au/water/programs/nrgi/index.html](http://www.environment.gov.au/water/programs/nrgi/index.html) (accessed 23 June 2011).
- 2011c, *National Water Quality Management Strategy*, [www.environment.gov.au/water/policy-programs/nwqms/](http://www.environment.gov.au/water/policy-programs/nwqms/) (accessed 28 June 2011).
- DTF (Department of Treasury and Finance (South Australia)) 2010, *2010-11 Water and Sewerage Prices in South Australia*, [www.treasury.sa.gov.au/dtf/infrastructure\\_support/water.jsp](http://www.treasury.sa.gov.au/dtf/infrastructure_support/water.jsp) (accessed 6 March 2011).
- 2011, *2011-12 Drinking Water and Sewerage Prices Regulatory Statement*, Adelaide.
- Duloy, J. and Norton, R. 1975. 'Prices and incomes in linear programming models' *American Journal of Agricultural Economics*, vol. 57, no. 4, pp. 591–600.
- Dunstan, D. 2011, 'Bolte, Sir Henry Edward (1908 - 1990)', *Australian Dictionary of Biography*, Online edition, <http://adbonline.anu.edu.au/biogs/A170117b.htm> (accessed 18 February 2011).
- Edwards, G 2006, 'Whose values count? Demand management for Melbourne's water', *The Economic Record*, vol. 82, no. s1, S54–63.
- Engineers Australia 2010a, *Australian Capital Territory Infrastructure Report Card*, July.
- 2010b, *Australian Infrastructure Report Card*, November.
- 2010c, *New South Wales Infrastructure Report Card 2010*, July.
- 2010d, *Northern Territory Infrastructure Report Card 2010*, November.
- 2010e, *Queensland Infrastructure Report Card 2010*, October.
- 2010f, *South Australia Infrastructure Report Card 2010*, June.
- 2010g, *Tasmania Infrastructure Report Card 2010*, May.
- 2010h, *Victoria Infrastructure Report Card 2010*, February.
- 2010i, *Western Australia Infrastructure Report Card 2010*, October.
- Enke, S. 1951, 'Equilibrium among spatially separated markets: Solution by electric analogue', *Econometrica*, vol. 19, no. 1, pp. 40–7.

- 
- ENTOX (National Research Centre for Environmental Toxicology), TOXIKOS and the University of NSW 2008, *Recycled Water Quality: A Guide to Determining, Monitoring and Achieving Safe Concentrations of Chemicals in Recycled Water*, Review prepared for the Environment Protection and Heritage Council, the National Water Commission and the Queensland Government.
- Environment and Natural Resources Committee 2009, *Report of the Environment and Natural Resources Committee on the Inquiry into Melbourne's Future Water Supply*, Parliamentary paper no. 174, Session 2006–2009, June.
- EPA Tasmania (Environmental Protection Authority) 2010, *Annual Report 2009-10*, October.
- EPA Victoria (Environmental Protection Authority) 2003, *Guidelines for Environmental Management: Use of Reclaimed Water*, June.
- EPA Western Australia (Environmental Protection Authority) 2006, *South West Yarragadee Water Supply Development Water Corporation: Report and Recommendations of the Environmental Protection Authority*, Bulletin 1245, December.
- EPHC (Environment Protection and Heritage Council) 2011, *Australian Guidelines for Water Recycling*, [www.ephc.gov.au/taxonomy/term/39](http://www.ephc.gov.au/taxonomy/term/39) (accessed 25 March 2011).
- , NHMRC (National Health and Medical Research Council) and NRMCC (Natural Resource Management Ministerial Council) 2008, *Australian Guidelines for Water Recycling: Augmentation of Drinking Water Supplies*, May.
- ERA (Economic Regulation Authority) 2006, *Inquiry on Country Water and Wastewater Pricing in Western Australia*, Final report, Perth.
- 2008a, *Inquiry on Competition in the Water and Wastewater Services Sector*, Final report, Perth, June.
- 2008b, *Inquiry on Water Corporation's Tariffs*, Revised final report, January.
- 2009, *Inquiry into Tariffs of the Water Corporation, Aqwest and Busselton Water*, Final report, August.
- 2011a, *Annual Performance Report Electricity Retailers 2009-10*, Perth.
- 2011b, *Role of the Economic Regulation Authority*, [www.erawa.com.au/1/1013/1012/role\\_of\\_the\\_economic\\_regulation\\_authority.pm](http://www.erawa.com.au/1/1013/1012/role_of_the_economic_regulation_authority.pm) (accessed 22 June 2011).
- 2011c, *Water Licensing*, [www.erawa.com.au/1/78/51/water\\_licensing\\_.pm?s=1](http://www.erawa.com.au/1/78/51/water_licensing_.pm?s=1) (accessed 27 March 2011).
- 2011d, *Water, Wastewater and Irrigation Performance Report 2010*, March.

- 
- Ergas, H. 2009, 'New Policies Create a New Politics: Issues of Institutional Design in Climate Change Policy', in Productivity Commission, *Promoting Better Environmental Outcomes, 19–20 August 2008, Canberra*, Roundtable proceedings, pp. 165–88.
- ESC (Essential Services Commission) 2005, *Estimating Long Run Marginal Cost Implications for Future Water Prices*, Information paper, Melbourne.
- 2007, *Water Tariff Structures Review – Final Report*, Melbourne.
- 2009a, *Inquiry into an Access Regime for Water and Sewerage Infrastructure Services—Final Report, Volume I: Findings and Recommendations*, September.
- 2009b, *Metropolitan Melbourne Water Price Review 2008-09 — Final Decision*, April.
- 2009c, *Metropolitan Water Price Review 2008-09 — Final Decision — Tariff Elements*, Fact sheet, 3 June.
- 2009d, *Our Role*, [www.esc.vic.gov.au/public/Water/Our+Role.htm](http://www.esc.vic.gov.au/public/Water/Our+Role.htm) (accessed 2 February 2011).
- 2009e, *Review of Victorian Ports Regulation: Final Report*, June, Melbourne.
- 2010a, *Price Monitoring Determination for Victorian Ports 2010: Final Decision*, May, Melbourne.
- 2010b, *Water Pricing Estimator*, [www.esc.vic.gov.au/public/Water/Welcome+to+Water.htm](http://www.esc.vic.gov.au/public/Water/Welcome+to+Water.htm) (accessed 12 January 2011).
- 2011a, *Performance of Urban Water and Sewerage Businesses 2009-10*, [www.esc.vic.gov.au/NR/rdonlyres/AC90274F-1DE3-458C-8371-A4326D9981EE/0/Data200910PerformanceReport.xls](http://www.esc.vic.gov.au/NR/rdonlyres/AC90274F-1DE3-458C-8371-A4326D9981EE/0/Data200910PerformanceReport.xls) (accessed 25 March 2010).
- 2011b, *Water Price Review – Final Decision Fact Sheet 2*, [www.esc.vic.gov.au/NR/rdonlyres/CCDF15F9-7CFF-4377-AA39-A14F3AE289C9/0/FinalDecision\\_Factsheet2a\\_20050615.pdf](http://www.esc.vic.gov.au/NR/rdonlyres/CCDF15F9-7CFF-4377-AA39-A14F3AE289C9/0/FinalDecision_Factsheet2a_20050615.pdf) (accessed 19 April 2011).
- ESCOSA (Essential Services Commission of South Australia) 2010, *Economic Regulation of the South Australian Water Industry*, Statement of Issues, Adelaide.
- Eureau 2009, *Statistics Overview on Water and Wastewater in Europe 2008 Country Profiles and European Statistics*, Brussels.
- EWON (Energy and Water Ombudsman (New South Wales)) 2010, *Annual Report 2009-10*, Sydney.
- 2011a, *About Us*, [www.ewon.com.au/index.cfm/about-us/](http://www.ewon.com.au/index.cfm/about-us/) (accessed 29 March 2011).

- 
- 2011b, *PAS Vouchers*, [www.ewon.com.au/index.cfm/help-for-customers/help-paying-bills/pas/](http://www.ewon.com.au/index.cfm/help-for-customers/help-paying-bills/pas/) (accessed 28 March 2011).
- EWOV (Energy and Water Ombudsman (Victoria)) 2010, *Annual Report 2010*, Melbourne.
- 2011, *About EWOV*, [www.ewov.com.au/AboutEWOV.aspx](http://www.ewov.com.au/AboutEWOV.aspx) (accessed 27 March 2011).
- Expert Panel on Health 2007, *Advice to the Chief Minister of the ACT and the ACT Government on the Health and Public Safety of the Water2WATER Proposal*, 6 July.
- Falkenmark, M. 1991, *Approaching the Ultimate Constraint: Water-short Third-World Countries at a Fatal Crossroad*, Study Week on Resources and Population, Pontifical Academy, 17–22 November, Vatican City.
- FAO (Food and Agriculture Organisation of the United Nations) 2004, *Economic Valuation of Water Resources in Agriculture*, Rome.
- Firecone Ventures 2006, *Gas Swaps*, Report prepared for the National Competition Council as part of the NCC Occasional Series, Melbourne.
- Farrell, D. (Parliamentary Secretary for Sustainability and Urban Water) 2010, *Launch of the water metering Tasmania project*, Media release, 13 December.
- Fraquelli, G. and Moisa, V. 2005, *Cost Efficiency and Economies of Scale in the Italian Water Industry*, June.
- Fraser, A. (Treasurer and Minister for Employment and Economic Development (Queensland)) and Robertson, S. (Minister for Natural Resources, Mines and Energy and Minister for Trade (Queensland)) 2010, *Water Reforms Save Money for Householders*, Media release, 5 December.
- Freebairn, J. 2008, ‘Some emerging issues in urban water supply and pricing’, *Economic Papers*, vol. 27, no. 2, pp. 184–93.
- Frontier Economics 2004, *Promoting Competition in Sydney Sewerage Markets*, Melbourne.
- 2007, *The Economic and Social Impacts of Water Trading: Case Studies in the Victorian Murray Valley*, Report for the Rural Industries Research and Development Corporation, National Water Commission and Murray–Darling Basin Commission.
- 2008a, *Approaches to Urban Water Pricing*, Waterlines occasional paper no. 7, National Water Commission, July, Canberra.
- 2008b, *Review of Urban Water Entitlements in Australia*, Report for the Joint Steering Committee for Water Sensitive Cities, December.

- 
- 2008c, *Urban Water Markets*, Melbourne.
- 2011a, *Efficient Water Resource Pricing in Australia: An Assessment of Administered Scarcity Pricing in Urban Areas*, Waterlines report series no. 44, National Water Commission, Canberra.
- 2011b, *Externality Pricing in the Australian Water Sector*, Waterlines report series no. 43, National Water Commission, Canberra.
- Gallop, G. (Premier and Water Resources Minister (Western Australia)) 2005, *Successful Builder/operator of Kwinana Desalination Project Announced*, Media release, 14 April.
- Garcia, S., Moreaux, M. and Reynaud, A. 2004, *Measuring Economies of Vertical Integration in Network Industries: An Application to the Water Sector*, IDEI working papers 255, Institut d'Économie Industrielle, Toulouse.
- Garnaut, R. 2011, *Transforming the Electricity Sector*, Garnaut Climate Change Review Update Paper Eight, Canberra.
- George Wilkenfeld and Associates 2010, *Regulation Impact Statement: Minimum Water Efficiency Standards for Clothes Washers and Water Efficiency Labelling for Combined Washer-Dryers*, Prepared for the Department of the Environment, Water, Heritage and Arts, Canberra.
- GHD 2009, *Rouse Hill Recycled Water Plant*, [www.ghd.com/global/projects/rouse-hill-recycled-water-plan](http://www.ghd.com/global/projects/rouse-hill-recycled-water-plan) (accessed 23 March 2011).
- Giddings, L. (Premier (Tasmania)) 2011, *Amendment to Water and Sewerage Cap*, Media release, 16 June.
- Gleeson, L. 1999, *Water Reform in Victoria — A Real Success Story*, Paper presented to the 'Crossroads For the Future – Water Summit' Conference.
- Gleick, H. 2006, 'Basic water requirements for human activities: meeting basic needs', *Water International*, vol. 21, no. 2, pp. 83–92.
- Glenelg to Adelaide Parklands Recycled Water Project (nd), *The Glenelg to Adelaide Parklands Recycled Water Project*, <http://gapreuse.com.au/> (accessed 23 March 2011).
- Goulburn Valley Water Corporation 2008, *Annual Report 2007/2008*, Shepparton, Australia.
- Grafton, R.Q. and Kompas, T. 2007, 'Pricing Sydney Water', *The Australian Journal of Agricultural and Resource Economics*, vol. 51, no. 3, pp. 227–41.
- , ——, To, H. and Ward, M. 2009, *Residential Water Consumption: A Cross-Country Analysis*, *Environmental Economics Research Hub Research*

- 
- Reports*, Environmental Economics Research Hub, Crawford School, Australian National University.
- and Ward, M. 2008a, ‘Prices versus rationing: marshallian surplus and mandatory water restrictions’, *Economic Record*, vol. 84, no. s1, S57–S65.
- and — 2008b, ‘So much money down the drain’, *The Sydney Morning Herald*, 18 July.
- and — 2010, *Dynamically Efficient Urban Water Policy*, Centre for Water Economics, Environment and Policy research papers, no. 10–13.
- Grant Thornton 2010, *Water Industry Commission for Scotland — Cost Benefit Assessment*, undertaken for the Water Industry Commission for Scotland, May.
- Gujarati, D.N. 1995, *Basic Econometrics*, 3rd edn, Mc-Graw-Hill, Singapore.
- Hains, S. 2009, *Stormwater: Towards Water Sensitive Cities*, Presented at the Local Government Managers Association National Congress, Darwin, 26 May, <http://cweb.salisbury.sa.gov.au/manifest/servlet/binaries?img=8746&stypen=html> (accessed 14 March 2011).
- Hansen, L. and Sargent, T. 1996, ‘Recursive linear models of dynamic economies’, in: Sims, C. (ed.), *Advances in Econometrics: Sixth World Congress, Barcelona, Volume 1*, Cambridge University Press.
- Hayes, K. 1987 ‘Cost structure of the water utility industry’, *Applied Economics*, vol. 19, no. 3, pp. 417–25.
- Hazell, P.B.R. and Norton, R.D. 1986, *Mathematical Programming for Economic Analysis in Agriculture*, Macmillan, New York.
- Heady, E.O. and Srivastava, U.K. 1975, *Spatial Sector Programming Models in Agriculture*, Iowa State University Press, Ames, USA.
- and Vocke, G. (eds) 1992, *Economic Models of Agricultural Land Conservation and Environmental Improvement*, Iowa State University Press, Ames, USA.
- Hensher, D., Shore, N. and Train, K. 2006, ‘Water supply security and willingness to pay to avoid drought restrictions’, *The Economic Record*, vol. 82, no. 256, pp. 56–66.
- Hildebrand, J. and Sikora, K. 2007, ‘Money down the drain — \$260 million desal blowout’, *The Daily Telegraph*, 26 June.
- Hinchliffe, S. (Minister for Infrastructure and Planning (Queensland)) 2010, *Desalination Plant Officially Handed Over to State Government*, Media release, 1 October.
- Hobart Mercury 2011, ‘Water price shock looms’, 10 March.

- 
- Hochreiter, R. and Pflug, G. 2006, 'Financial scenario generation for stochastic multi-stage decision processes as facility location problems', *Annals of Operations Research*, vol. 152, no. 1, pp. 257–72.
- Hoffmann, M., Worthington, A. and Higgs, H. 2006, 'Urban water demand with fixed volumetric charging in a large municipality: the case of Brisbane, Australia', *The Australian Journal of Agricultural and Resource Economics*, vol. 50, no. 3, pp. 347–59.
- Hooper, R., Gallagher, K. and Armitage, R. 2009, *Whole-life Infrastructure Asset Management*, London.
- Howard, G. and Bartram, J. 2003, *Domestic Water Quantity, Service Level and Health*, World Health Organization, Geneva.
- Hoyland, K. and Wallace, S. 2001, 'Generating scenario trees for multistage decision problems', *Management Science*, vol. 47, no. 2, pp. 295–307.
- Hughes, N., Hafi, A. and Goesch, T. 2009, 'Urban Water Management: Optimal Price and Investment Policy Under Climate Variability', *The Australian Journal of Agricultural and Resource Economics*, vol. 53, no. 2, pp. 175–92.
- , ———, ——— and Brownlowe, N. 2008, *Urban Water Management: Optimal Pricing and Investment Policy under Climate Variability*, ABARE research report 08.7, Canberra, August.
- IC (Industry Commission) 1992, *Water Resources and Waste Water Disposal*, Report no. 26, Canberra, July.
- 1995, *Implementing the National Competition Policy: Access and Prices Regulation*, Information Paper.
- ICEWaRM (International Centre of Excellence in Water Resources Management) 2008, *National Water Skills Audit*, June.
- ICRC (Independent Competition and Regulatory Commission) 2002, *Utility Services Licence under the Utilities Act 2000 (ACT) issued to ACTEW Corporation*, August.
- 2009, *Compliance and Performance Framework*, [www.icrc.act.gov.au/utilitieslicensing/compliance\\_and\\_performance](http://www.icrc.act.gov.au/utilitieslicensing/compliance_and_performance) (accessed 9 March 2011).
- 2010a, *Utilities Regulatory Framework*, [www.icrc.act.gov.au/utilitieslicensing/licensing\\_regulatory\\_framework](http://www.icrc.act.gov.au/utilitieslicensing/licensing_regulatory_framework) (accessed 9 March 2011).
- 2010b, *Water and Sewerage*, [www.icrc.act.gov.au/waterandsewerage](http://www.icrc.act.gov.au/waterandsewerage) (accessed 5 March 2011).
- 2011, *Water and Wastewater Charges to Increase from 1 July 2011*, Media release, 20 April.

- 
- Independent Committee of Inquiry into Competition Policy in Australia 1993, *National Competition Policy: Report by the Independent Committee of Inquiry into Competition Policy in Australia* (Professor F. Hilman, Chairman), Canberra.
- Infanger, G. 1993, *Decomposition and (Importance) Sampling Techniques for Multi-Stage Stochastic Linear Programs*, Systems Optimization Laboratory, Department of Operation Research, Stanford University.
- Institute for Sustainable Futures 2008, *Options Paper on the Inquiry into Secure and Sustainable Urban Water Supply and Sewerage Services for Non-metropolitan NSW*, Prepared for the Local Government and Shires Associations New South Wales & NSW Water Directorate, February.
- and ACIL Tasman 2009, *Review of Water Restrictions*, Prepared for the National Water Commission.
- Intriligator M. 1971, *Mathematical Optimization and Economic Theory*, Prentice–Hall, New Jersey, USA.
- IPA (Institute of Public Affairs) 2008, *Water Supply Options for Melbourne: An Examination of Costs and Availabilities of New Water Supply Sources for Melbourne and Other Urban Areas in Victoria*, Occasional Paper, revised August 2008, Melbourne.
- IPART (Independent Pricing and Regulatory Tribunal) 2004, *Residential Water Use in Sydney, the Blue Mountains and Illawarra — Results from the 2003 Household Survey*, Sydney.
- 2005, *Investigation into Water and Wastewater Service Provision in the Greater Sydney Region*, Sydney.
- 2006a, *Pricing Arrangements for Recycled Water and Sewer Mining*, Sydney Water Corporation, Hunter Water Corporation, Gosford City Council and Wyong Shire Council, Sydney, September.
- 2006b, *Water - Recycled Water Pricing Review 2006, Fact Sheet 3* [www.ipart.nsw.gov.au/factsheets.asp](http://www.ipart.nsw.gov.au/factsheets.asp) (accessed 22 March 2011).
- 2007a, *Literature Review: Underlying Costs and Industry Structures of Metropolitan Water Industries*, Sydney, September.
- 2007b, *Residential Energy and Water Use in Sydney, the Blue Mountains and Illawarra — Results from the 2006 Household Survey*, Sydney.
- 2008a, *Residential Energy and Water Use in the Hunter, Gosford and Wyong — Results from the 2008 Household Survey*, Sydney.
- 2008b, *Review of Prices for Sydney Water Corporation’s Water, Sewerage, Stormwater and Other Services – Determination and Final Report*, p. 11.

- 
- 2008c, *Water Industry Commission Act 2006, The Access Regime — an Overview*, WICA Access fact sheet no. 1, August.
- 2009a, *Review of Prices for the Sydney Catchment Authority From 1 July 2009 to 30 June 2012*, Sydney.
- 2009b, *Review of Prices for Water, Sewerage, Stormwater and Other Services for Hunter Water Corporation*, July.
- 2010a, *Residential Energy and Water Use in Sydney, the Blue Mountains and Illawarra — Results from the 2010 Household Survey*, Sydney.
- 2010b, *Residential Energy and Water Use in Sydney, the Blue Mountains and Illawarra — Results from the 2010 Household Survey — Electricity, Gas and Water Research Report — Appendix E Detailed Survey Results*, December.
- 2011a, *Electricity Retail Businesses' Performance Against Customer Service Indicators in NSW for the Period 1 July 2006 to 30 June 2010*, Information paper, January.
- 2011b, *Performance of NSW Metropolitan Water Utilities, 2009/10 Water — Performance Report*, May.
- 2011c, *Review of Price Structures for Metropolitan Water Utilities*, Discussion paper, Sydney.
- 2011d, *Review of Prices for Sydney Desalination Plant Pty Limited's Water Supply Services for the Period to 30 June 2017*, Issues paper, Sydney
- 2011e, *Review of Prices for Sydney Water Corporation's Water, Sewerage, Stormwater and Other Services*, Issues paper, Sydney.
- (nd), *Private Sector Licensing*, [www.ipart.nsw.gov.au/water/private-sector-licensing/private-sector-licensing.asp](http://www.ipart.nsw.gov.au/water/private-sector-licensing/private-sector-licensing.asp) (accessed 29 March 2011).
- Ipsos MORI 2008, *Customer Engagement Survey*, Report prepared for Ofgem, August.
- Joskow, P.L. 1989, 'Regulatory failure, regulatory reform, and structural change in the electrical power industry', *Brookings Papers on Economic Activity: Microeconomics*, pp. 125–99.
- 1991, 'The role of transaction cost economics in antitrust and public utility regulatory policies', *Journal of Law, Economics and Organization*, vol. 7, special issue, pp. 53–83.
- 1997, 'Restructuring, competition and regulatory reform in the U.S. electricity sector', *Journal of Economic Perspectives*, vol. 11, no. 3, pp. 119–38.
- Kall, P. and Wallace, S. 1994, *Stochastic Programming*, 2nd edn, John Wiley & Sons, Chichester, UK.

- 
- Kemp, S. 2004, *The Determinants of Urban Residential Water Demand in Sydney, The Blue Mountains and Illawarra*, Working Paper no. 1, IPART, Sydney.
- Kenway, S.J., Priestly, A., Cook, S., Seo, S., Inman, M., Gregory, A. and Hall, M. 2008, *Energy Use in the Provision and Consumption of Urban Water in Australia and New Zealand*, CSIRO: Water for a Healthy Country Flagship.
- Ker, P. 2009, 'Desal plant to run 'until dams reach 65%''', *The Age*, 11 July.
- Khan, S. and Roser, D. 2007, *Risk Assessment and Health Effects Studies of Indirect Potable Reuse Schemes*, Centre for Water and Wastewater Technology report no. 2007/08, 18 April.
- Kippen, T. 2011, 'Council opts out of Allconnex', *Gold Coast Mail*, 27 July.
- Kolstad, C. 1989, 'Computing dynamic spatial oligopolistic equilibrium in an exhaustible resource market: the case of coal', in Labys, W., Takayama, T. and Uri, N. (eds), *Quantitative Methods for Market-Oriented Economic Analysis over Space and Time*, Gower Publishing Company, London, pp. 87–104.
- Koutsoyiannis, A. 1977, *Theory of Econometrics*, 2nd edn, Macmillan Press, London.
- Labys, W., Takayama, T. and Uri, N. (eds) 1989, *Quantitative methods for Market Oriented Economic Analysis Over Space and Time*, Gower Publishing Company, London.
- Lane, M. and Littlechild, S. 1976, 'Weather-dependant pricing for water resources in the Texas high plains', *Water Resources Research*, vol. 12, no. 4, pp. 599–605.
- and — 1980, 'A stochastic programming approach to weather-dependent pricing for water resources', in *Stochastic Programming, International Conference on Stochastic Programming, 15–17 July 1974*, Oxford, pp. 357–68.
- LECG (LECG Limited Asia Pacific) 2011, *Competition in the Australian Urban Water Sector*, Waterlines report series no. 42, National Water Commission, April, Canberra.
- Liberal Victoria and the Nationals for Regional Victoria 2010, *The Victorian Liberal Nationals Coalition Plan for Water*, authorised by Tony Nutt.
- Littlechild, S. 1970, 'Marginal cost pricing with joint costs', *The Economic Journal*, vol. 80, no. 318, pp. 323–35.
- 2008, 'Some alternative approaches to utility regulation', *Economic Affairs*, vol. 28, no. 3, September, Institute of Public Affairs, Oxford.
- 2009, 'Regulation, over-regulation and some alternative approaches', *European Review of Energy Markets*, vol. 3, no. 3, pp. 153–9.

- 
- LMWUA (Lower Macquarie Water Utilities Alliance) 2009, *Response of the Lower Macquarie Water Utilities Alliance to the 'Report of the Independent Inquiry into Secure and Sustainable Urban Water Supply and Sewerage Services for Non Metropolitan New South Wales'*.
- Lobina, E. and Terhorst, P. 2005, *D19: WaterTime Case Study – Edinburgh, UK*, [www.watertime.net/docs/WP2/D19\\_Edinburgh.doc](http://www.watertime.net/docs/WP2/D19_Edinburgh.doc) (accessed 22 February 2011).
- London Economics 1997, *Water Pricing: The Importance of Long Run Marginal Costs*, Prepared for Ofwat, February.
- Maler, D. and Vincent, J. 2005, *Handbook of Environmental Economics: Valuing Environmental Change, Volume 2*, North-Holland, Amsterdam.
- Markham, J. 1950, 'An alternative approach to the concept of workable competition', *The American Economic Review*, vol. 40, no. 3, pp. 349–61.
- Marques, R. and De Witte, K. 2007, *Designing Incentives in Local Public Utilities, An International Comparison of the Drinking Water Sector*, Centre for Economic Studies, University Leuven.
- and — 2010, 'Towards a benchmarking paradigm in the European public water and sewerage services', *Public Money & Management*, vol. 30, no. 1, pp. 42–8.
- Marsden Jacob Associates 2007a, *An Economic Evaluation of the Proposed Traveston Crossing Dam in South East Queensland*, Report prepared for Queensland Water Infrastructure Pty Ltd, Melbourne.
- 2007b, *The Cost-effectiveness of Rainwater Tanks in Urban Australia*, Waterlines report, National Water Commission, March.
- Martin, N. 2004, 'Corporatization as a means of improving water quality: the experience in Victoria, Australia', *Journal of Toxicology and Environmental Health*, part A, vol. 67, no. 20–22, pp. 1889–99.
- Martins, R., Coelho, F. and Fortunato, A. 2006, *Evaluating Cost Structure of Portuguese Water Utilities: Economies of Scale and Water Losses*, Faculty of Economics and GEMF, University of Coimbra, Portugal.
- Matheson, R. 2011, 'Water win', *Townsville Bulletin*, 9 March, p. 1.
- Mathew, A., Zhang, S., Ma, L. and Hargreaves, D. 2006, *A Water Utility Industry Conceptual Asset Management Data Warehouse Model*, Proceedings in the 36th International Conference on Computers and Industrial Engineering, pp. 3788–98, Taiwan.

- 
- Mayo, W. 1989, 'Pricing for capacity utilisation with public enterprises', *Australian Economic Review*, vol. 22, no. 3, pp. 16–24.
- Maywald, K.A. (Minister for Water Security (South Australia)) 2009, House of Assembly, Estimates Committee B, *Hansard Extracts*, 1 July.
- McCarl, B. and Spreen, T.H. 1980, 'Price endogenous mathematical programming as a tool for sector Analysis', *American Journal of Agricultural Economics*, vol. 62, no. 1, pp. 87–102.
- McDougall, B. 2007, 'Water issue to shape election', *The Daily Telegraph*, 16 February.
- McMahon, T., Vogel, R., Peel, M. and Pegram, G. 2007, 'Global streamflows – Part 1: Characteristics of annual streamflows', *Journal of Hydrology*, vol. 347, pp. 243–59.
- Meister, A.D., Chen, C.C. and Heady, E.O. 1978, *Quadratic Programming Models Applied to Agricultural Policies*, Iowa State University Press, Ames, USA.
- Melbourne Water 2008a, *2009 Water Plan*, November.
- 2008b, *Australian Water Markets Report 2007-08*, Canberra.
- 2009, *State of the Storages*, [www.melbournewater.com.au/content/water\\_storages/water\\_report/state\\_of\\_the\\_storages.asp](http://www.melbournewater.com.au/content/water_storages/water_report/state_of_the_storages.asp) (accessed 18 January 2011).
- 2010, *Annual Report 2009-10*, Melbourne.
- 2011a, *The Drainage System*, [www.melbournewater.com.au/content/drainage\\_and\\_stormwater/the\\_drainage\\_system/the\\_drainage\\_system.asp](http://www.melbournewater.com.au/content/drainage_and_stormwater/the_drainage_system/the_drainage_system.asp) (accessed 25 March 2011).
- 2011b, *State of the Storages*, [www.melbournewater.com.au/content/water\\_storages/water\\_report/state\\_of\\_the\\_storages.asp](http://www.melbournewater.com.au/content/water_storages/water_report/state_of_the_storages.asp) (accessed 3 August 2011).
- 2011c, *Sugarloaf Pipeline Project*, [www.melbournewater.com.au/content/water\\_storages/water\\_supply/water\\_distribution/sugarloaf\\_pipeline.asp?bhcp=1](http://www.melbournewater.com.au/content/water_storages/water_supply/water_distribution/sugarloaf_pipeline.asp?bhcp=1) (accessed 23 February 2011).
- 2011d, *Weekly Water Report*, [www.melbournewater.com.au/content/water\\_storages/water\\_report/weekly\\_water\\_report.asp](http://www.melbournewater.com.au/content/water_storages/water_report/weekly_water_report.asp) (accessed 13 January 2011).
- (nd)a, *Tarago Reservoir Reconnected*, [www.melbournewater.com.au/content/current\\_projects/water\\_supply/tarago\\_project/tarago\\_project.asp?bhcp=1](http://www.melbournewater.com.au/content/current_projects/water_supply/tarago_project/tarago_project.asp?bhcp=1) (accessed 2 March 2011).
- (nd)b, *What is Recycled Water?*, [www.melbournewater.com.au/content/water\\_recycling/what\\_is\\_recycled\\_water/what\\_is\\_recycled\\_water.asp](http://www.melbournewater.com.au/content/water_recycling/what_is_recycled_water/what_is_recycled_water.asp) (accessed 2 March 2011).

- 
- Miller, R. and Schneiders, B. 2010, 'Desal plant a \$570m-a-year drain', *The Age*, 17 September, [www.theage.com.au/victoria/desal-plant-a-570mayear-drain-20100916-15enu.html](http://www.theage.com.au/victoria/desal-plant-a-570mayear-drain-20100916-15enu.html) (accessed 2 March 2011).
- Ministerial Council for Federal Financial Relations 2011, *Implementation Plan for Augmentation of the Adelaide Desalination Plant (100 gigalitres per annum): National Partnership Agreement on Water for the Future*, [http://www.federalfinancialrelations.gov.au/content/national\\_partnership\\_agreements/environment/water\\_for\\_the\\_future/Adelaide\\_Desalination\\_Plant\\_IP.pdf](http://www.federalfinancialrelations.gov.au/content/national_partnership_agreements/environment/water_for_the_future/Adelaide_Desalination_Plant_IP.pdf) (accessed 8 August 2011).
- Mizutani, F. and Urakami, T. 2001, 'Identifying network density and scale economies for Japanese water supply organizations', *Papers in Regional Science*, vol. 80, no. 2, pp. 211–30.
- , Kozumi, H. and Matsushima, N. 2009, 'Does yardstick regulation really work? Empirical evidence from Japan's rail industry', *Journal of Regulatory Economics*, vol. 36, no. 3, pp. 308–23.
- MWST (Ministerial Water and Sewerage Taskforce (Department of Treasury and Finance)) 2006, *Reform of Tasmania's Water and Sewerage Sector*, December.
- Nauges, C. and van den Berg, C. 2008, 'Economies of density, scale and scope in the water supply and sewerage sector: a study of four developing and transition economies', *Journal of Regulatory Economics*, vol. 34, no. 2, pp. 144–63.
- Nemes, V., La Nauze, A., Walsh, C., Fletcher, T., Bos, D., RossRakesh, S., Plott, C. and Stoneham, G. 2010, *Saving a Creek One Bid at a Time: A Uniform Price Auction for Stormwater Retention in Urban Catchments*, Paper presented at the 2010 Australian Association of Agricultural and Resource Economics National Conference, Adelaide, February.
- New Zealand Government 2009, *Making Auckland Greater*, The Government's decisions on Auckland Governance, April.
- Ng, Y. 1987, 'Equity, efficiency and financial viability: public-utility pricing with special reference to water supply', *The Australian Economic Review*, vol. 20, no. 3, pp. 21–35.
- NHMRC (National Health and Medical Research Council) 2004, *Australian Drinking Water Guidelines*.
- Nicholson, B. 2011, 'Greens tap into the water vote', *Central Western Daily*, 9 March, [www.centralwesterndaily.com.au/news/local/news/general/greens-tap-into-the-water-vote/2097874.aspx](http://www.centralwesterndaily.com.au/news/local/news/general/greens-tap-into-the-water-vote/2097874.aspx) (accessed 24 March 2011).

- 
- NRETAS (Department of Natural Resources, Environment, the Arts and Sport) 2007a, *Wastewater Discharge Approvals and Licences*, [www.nt.gov.au/nreta/environment/waste/register/waste.html](http://www.nt.gov.au/nreta/environment/waste/register/waste.html) (accessed 8 March 2011).
- 2007b, *Water*, [www.nt.gov.au/nreta/water/](http://www.nt.gov.au/nreta/water/) (accessed 28 March 2011).
- (nd)a, *NT Water Act*, [www.nt.gov.au/nreta/water/bud/pdf/wateract\\_fs.pdf](http://www.nt.gov.au/nreta/water/bud/pdf/wateract_fs.pdf) (accessed 8 March 2011).
- (nd)b, *Water Allocation Planning*, [www.nt.gov.au/nreta/water/manage/water\\_allocation.html](http://www.nt.gov.au/nreta/water/manage/water_allocation.html) (accessed 9 March 2011).
- NRMMC (Natural Resource Management Ministerial Council) 2010, *National Water Initiative Pricing Principles*, April.
- , EPHC (Environment Protection and Heritage Council) and AHMC (Australian Health Ministers' Conference) 2008, *Overview of the Australian Guidelines for Water Recycling: Managing Health and Environmental Risks 2006*, March.
- NSW Government 2006, *2006 Metropolitan Water Plan*, May.
- 2007, *Metropolitan Water Plan: 2007 Progress Report*, September, [www.waterforlife.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0019/9505/MWP\\_Progress\\_Report\\_07.pdf](http://www.waterforlife.nsw.gov.au/__data/assets/pdf_file/0019/9505/MWP_Progress_Report_07.pdf) (accessed 11 July 2011).
- 2010a, *Decision on Tillegra Dam*, Media release, 28 November.
- 2010b, *Metropolitan Water Plan*, [www.waterforlife.nsw.gov.au/mwp](http://www.waterforlife.nsw.gov.au/mwp) (accessed 29 March 2011).
- (nd), *Water Industry Competition*, [www.waterforlife.nsw.gov.au/mwp/competition](http://www.waterforlife.nsw.gov.au/mwp/competition) (accessed 8 March 2011).
- NSW Office of Water 2009, *2007-08 NSW Performance Monitoring Report*, June.
- 2010a, *2008-09 NSW Performance Monitoring Report*, April.
- 2010b, *2008-09 NSW Water Supply and Sewerage Benchmarking Report*, April.
- 2010c, *2010 Metropolitan Water Plan: Water for People and Water for the Environment*, August.
- 2010d, *Pricing*, [www.water.nsw.gov.au/Urban-water/Country-towns-program/Best-practice-management/Pricing/default.aspx](http://www.water.nsw.gov.au/Urban-water/Country-towns-program/Best-practice-management/Pricing/default.aspx) (accessed 24 March 2011).
- 2011, *2009-10 NSW Performance Monitoring Report*, July.
- NSW Treasury 2010, *Commercial Policy Framework: Government Guarantee Fee Policy for Government Businesses*, TPP 10-04, September.

- 
- NWC (National Water Commission) 2008, *Australian Water Markets Report 2007-08*, Canberra.
- 2009a, *Australian Water Reform 2009: Second Biennial Assessment of Progress in Implementation of the National Water Initiative*, Canberra, September.
- 2009b, *Water Governance*, [www.nwc.gov.au/www/html/1112-water-governance.asp](http://www.nwc.gov.au/www/html/1112-water-governance.asp) (accessed 8 March 2011).
- 2010a, *The Impacts of Water Trading in the Southern Murray-Darling Basin: an Economic, Social and Environmental Assessment*, June.
- 2010b, *Urban Water Recycling*, Position statement, November.
- 2011a, *National Water Commission*, [www.nwc.gov.au/www/html/7-home-page.asp](http://www.nwc.gov.au/www/html/7-home-page.asp) (accessed 25 March 2011).
- 2011b, *Review of Pricing Reform in the Australian Water Sector*, April, Canberra.
- 2011c, *Urban Water in Australia: Future Directions*, Canberra.
- 2011d, *Water Use in Australia*, [www.nwc.gov.au/www/html/236-water-use-in-australia.asp](http://www.nwc.gov.au/www/html/236-water-use-in-australia.asp) (accessed 28 March 2011).
- and WSAA (Water Services Association of Australia) 2010a, *National Performance Report 2008–2009: Urban Water Utilities*, April.
- and — 2010b, *National Performance Framework 2009-2010: Urban Water Performance Report Indicators and Definitions Handbook*, May.
- and — 2011, *National Performance Report 2009–10: Urban Water Utilities*, April.
- O’Dea, G. and Cooper, J. 2008, *Water Scarcity: Does it Exist and Can Price Help Solve the Problem?*, Water working paper, IPART, January.
- OECD (Organisation for Economic Co-operation and Development) 2010, *Pricing Water Resources and Water and Sanitation Services*, OECD Publishing.
- 2011a, *Glossary of Industrial Organisation Economics and Competition Law*, [www.oecd.org/dataoecd/8/61/2376087.pdf](http://www.oecd.org/dataoecd/8/61/2376087.pdf) (accessed 25 March 2011).
- 2011b, *Greening Household Behaviour: The Role of Public Policy*, OECD Publishing.
- Office for Water Security 2011, *Rebates*, [www.waterforgood.sa.gov.au/using-and-saving-water/rebates](http://www.waterforgood.sa.gov.au/using-and-saving-water/rebates) (accessed 21 January 2011).
- Office of Water 2010, *About waterMAP*, [www.water.vic.gov.au/saving/industry/watermap/about-watermap](http://www.water.vic.gov.au/saving/industry/watermap/about-watermap) (accessed 8 March 2011).

- 
- 2011, *Desalination Plant*, [www.water.vic.gov.au/programs/desalination](http://www.water.vic.gov.au/programs/desalination) (accessed 8 March 2011).
- Ofgem (Office of Gas and Electricity Markets) 2008, *Energy Supply Probe — Initial Findings Report*, October.
- 2010, *Energy Supply Probe*, [www.ofgem.gov.uk/Markets/RetMkts/ensupro/Pages/Energysupplyprobe.aspx](http://www.ofgem.gov.uk/Markets/RetMkts/ensupro/Pages/Energysupplyprobe.aspx) (accessed 24 March 2011).
- Ofwat (The Water Services Regulation Authority) 2003, *Setting Water and Sewerage Price Limits for 2005–10: Framework and Approach*, March.
- 2007a, *International Comparison of Water and Sewerage Service 2007 Report*, April.
- 2007b, *Market Competition in the Water and Sewerage Industries in England and Wales, Part One: Water Supply Licensing*.
- 2007c, *Outcomes of Ofwat’s Internal Review of Market Competition in the Water Sector*.
- 2009a, *Guidance on Access Codes – Version 6*.
- 2009b, *Ofwat’s Response to the Cave Review’s Final Report on Competition and Innovation in Water Markets*.
- 2011a, *Ofwat*, [www.ofwat.gov.uk/](http://www.ofwat.gov.uk/) (accessed 24 March 2011).
- 2011b, *Register of New Appointments and Variations Granted to Date*, [www.ofwat.gov.uk/competition/inset/prs\\_web\\_insetapptstable.xls](http://www.ofwat.gov.uk/competition/inset/prs_web_insetapptstable.xls) (accessed 3 August 2011).
- (nd)a, *Appointed Water Companies*, [www.ofwat.gov.uk/competition/wsl/prs\\_web\\_appwcomp](http://www.ofwat.gov.uk/competition/wsl/prs_web_appwcomp) (accessed 22 February 2011).
- (nd)b, *New Appointments and Variations*, [www.ofwat.gov.uk/competition/inset/](http://www.ofwat.gov.uk/competition/inset/) (accessed 22 February 2011).
- (nd)c, *Types of Water Supply Licence*, [www.ofwat.gov.uk/competition/supplying/wsl/types](http://www.ofwat.gov.uk/competition/supplying/wsl/types) (accessed 22 February 2011).
- and DEFRA (Department for Environment, Food and Rural Affairs) 2006, *The Development of the Water Industry in England and Wales*.
- Olmstead, S. and Stavins, R. 2007, *Managing Water Demand: Price vs Non-price Conservation Programs*, A Pioneer Institute white paper, no. 39, July.
- Ombudsman Northern Territory 2011, *About Us*, [www.ombudsman.nt.gov.au/about-us/](http://www.ombudsman.nt.gov.au/about-us/) (accessed 31 March 2011).
- Ombudsman South Australia 2011, *Complaints*, [www.ombudsman.sa.gov.au/complaints](http://www.ombudsman.sa.gov.au/complaints) (accessed 26 March 2011).

- 
- Ombudsman Tasmania 2011, *Our Role*, [www.ombudsman.tas.gov.au/about\\_us/our\\_role](http://www.ombudsman.tas.gov.au/about_us/our_role) (accessed 27 March 2011).
- Ombudsman Western Australia (nd), *About Us*, [www.ombudsman.wa.gov.au/About\\_Us/Aboutus.htm](http://www.ombudsman.wa.gov.au/About_Us/Aboutus.htm) (accessed 27 March 2011).
- Onstream 2010, *About Us*, [www.onstream.com.au/about-onstream](http://www.onstream.com.au/about-onstream) (accessed 2 March 2011).
- OPC (Office of Public Counsel (Florida)) 2011, *About the Office of Public Counsel*, [www.floridaopc.gov/about.cfm](http://www.floridaopc.gov/about.cfm) (accessed 9 March 2011).
- Orange City Council 2009a *Blackmans Swamp Creek Stormwater Harvesting Scheme*, [www.orange.nsw.gov.au/site/index.cfm?display=147115](http://www.orange.nsw.gov.au/site/index.cfm?display=147115) (accessed 8 March 2011).
- 2009b, *Stormwater Official Opening*, Media release, 27 August.
- 2010, *Ploughmans Creek Stormwater Harvesting Scheme*, [www.orange.nsw.gov.au/site/index.cfm?display=158554](http://www.orange.nsw.gov.au/site/index.cfm?display=158554) (accessed 8 March 2011).
- OTTER (Office of the Tasmanian Economic Regulator) 2010a, *Review of the Interim Price Order for the Tasmanian Water and Sewerage Sector: Updated Advice to the Treasurer*, Hobart, November.
- 2010b, *Water*, [www.energyregulator.tas.gov.au/domino/otter.nsf/water-v/000](http://www.energyregulator.tas.gov.au/domino/otter.nsf/water-v/000) (accessed 3 March 2011).
- 2011a, *Tasmanian Water and Sewerage State of the Industry Report 2009-10*, March.
- 2011b, *Water and sewerage licence issued to Tasmanian Water and Sewerage Corporation (Southern Region) Pty Limited*, July.
- Oxera 2011, *Water Retail Market Savings: The Experience in Scotland*, May.
- Oyama, T. 1983, 'Applying mathematical programming to measure electricity marginal costs', *IEEE Transactions on Power Apparatus and Systems*, vol. PAS-102, no. 5, pp. 1324–30.
- 1987, 'Theoretical aspects of an electricity marginal cost model', *IEEE Transactions on Power Systems*, vol. 2, no. 2, pp. 413–21.
- Partnerships Victoria 2010, *Victorian Desalination Plant*, [www.partnerships.vic.gov.au/CA25708500035EB6/0/8ACBA1C56F57CF23CA25736E0001DCE8](http://www.partnerships.vic.gov.au/CA25708500035EB6/0/8ACBA1C56F57CF23CA25736E0001DCE8) (accessed 2 March 2011).
- Pearce, G. (Minister for Finance and Services (New South Wales)) 2011, *Terms of Reference for Referral of Sydney Desalination Plant Pty Ltd to IPART Under Section 52 of the Water Industry Competition Act*, 2 May, Sydney.

- 
- PC (Productivity Commission) 1999, *Impact of Competition Policy Reforms on Rural and Regional Australia*, Report no. 8, AusInfo, Canberra
- 2001a, *Cost Recovery by Government Agencies*, Report no. 15, Canberra.
- 2001b, *Review of the National Access Regime*, Report no. 17, Canberra.
- 2001c, *Review of the Prices Surveillance Act 1983*, Report no. 14, Canberra.
- 2001d, *Structural Adjustment — Key Policy Issues*, Commission Research paper, AusInfo, Canberra.
- 2002, *Competition Regulation of Infrastructure: Getting the Balance Right*, Gary Banks presentation to the IIR Conference, Melbourne, March.
- 2004a, *First Home Ownership*, Report no. 28, Melbourne.
- 2004b, *Review of the Gas Access Regime*, Report no. 31, Canberra.
- 2005a, *Financial Performance of Government Trading Enterprises 1999-00 to 2003-04*, Commission research paper, Canberra, July.
- 2005b, *The Private Cost Effectiveness of Improving Energy Efficiency*, Report no. 36, Canberra.
- 2005c, *Review of National Competition Policy Reforms*, Report no. 33, Canberra.
- 2005d, *Trends in Australian Agriculture*, Commission Research Paper, Canberra.
- 2006a, *Financial Performance of Government Trading Enterprises, 2000-01 to 2004-05*, Commission research paper, Canberra, July.
- 2006b, *Review of Price Regulation of Airport Services*, Report no. 40, Canberra.
- 2006c, *Road and Rail Freight Infrastructure Pricing*, Report no. 41, Canberra.
- 2006d, *Rural Water Use and the Environment: The Role of Market Mechanisms*, Research report, Melbourne, August.
- 2007a, *Financial Performance of Government Trading Enterprises, 2004-05 to 2005-06*, Commission research paper, Canberra, July.
- 2007b, *Performance Benchmarking of Australian Business Regulation*, Research Report, Melbourne.
- 2008a, *Annual Review of Regulatory Burdens on Business: Manufacturing and Distributive Trades*, Research Report, Canberra.
- 2008b, *Financial Performance of Government Trading Enterprises 2004-05 to 2006-07*, Commission Research Paper, Canberra, July.

- 
- 2008c, *Review of Australia's Consumer Policy Framework*, Report no. 45, vol. 2, Canberra.
- 2008d, *Towards Urban Water Reform: A Discussion Paper*, Commission research paper, Melbourne, March.
- 2008e, *What Role for Policies to Supplement an Emissions Trading Scheme?: Productivity Commission Submission to the Garnaut Climate Change Review*, May.
- 2009a, *Review of Regulatory Burden on the Upstream Petroleum (Oil and Gas) Sector*, Research report, Melbourne, April.
- 2009b, *Submission to the House of Representatives Standing Committee on Economics: Inquiry into Raising the Level of Productivity Growth in Australia*, September.
- 2010a, *Market Mechanisms for Recovering Water in the Murray-Darling Basin*, Final report, March.
- 2010b, *Wheat Export Marketing Arrangements*, Report no. 51, Canberra.
- 2011a, *Carbon Emission Policies in Key Economies*, Research report, Canberra.
- 2011b, *Economic Regulation of Airport Services*, Draft Inquiry Report, Canberra.
- 2011c, *Economic Regulation of Airport Services: Issues Paper*, January.
- 2011d, *Performance Benchmarking of Australian Business Regulation: Planning, Zoning and Development Assessment*, Research Report, Canberra.
- Peterson, D., Dwyer, G., Appels, D. and Fry, J. 2004, *Modelling Water Trade in the Southern Murray-Darling Basin*, Productivity Commission Staff Working Paper, Melbourne.
- Phlips, L. 1974, *Applied Consumption Analysis*, Elsevier Publishing, New York.
- PIAC (Public Interest Advocacy Centre) 2009, *Cut Off II: The Experience of Utility Disconnections*, Sydney.
- Porter, D. (nd), *Indirect Potable Reuse in the Las Vegas Valley*, [www.nvwra.org/mwg-internal/de5fs23hu73ds/progress?id=uVKvg6Qr1R](http://www.nvwra.org/mwg-internal/de5fs23hu73ds/progress?id=uVKvg6Qr1R) (accessed 20 June 2011).
- Powell, W. 2007, *Approximate Dynamic Programming: Solving the Curses of Dimensionality*, John Wiley and Sons, New Jersey.
- Power and Water Corporation 2010, *Annual Report*, September.

- 
- 2011, *About Us*, [www.powerwater.com.au/about\\_us](http://www.powerwater.com.au/about_us) (accessed 25 March 2011).
- Power, K. 2010, *Recycled Water Use in Australia: Regulations, Guidelines and Validation Requirements for a National Approach*, Waterlines report series no. 26, National Water Commission, March.
- Pressman, I. 1970, 'A mathematical formulation of the peak-load pricing problem', *Bell Journal of Economics*, vol. 1, no. 2, pp. 304–26.
- PUB 2010, *NEWater*, [www.pub.gov.sg/water/newater/Pages/default.aspx](http://www.pub.gov.sg/water/newater/Pages/default.aspx) (accessed 8 March 2011).
- 2011, *NEWater Overview*, [www.pub.gov.sg/water/newater/NEWater Overview/Pages/default.aspx](http://www.pub.gov.sg/water/newater/NEWaterOverview/Pages/default.aspx) (accessed 8 March 2011).
- Public Record Office Victoria 2005, *Melbourne Water Corporation [known as Melbourne and Metropolitan Board of Works to 1992]*, <http://www.access.prov.vic.gov.au/public/component/daPublicBaseContainer?component=daViewAgency&entityId=1007> (accessed 21 July 2011).
- PWC (PricewaterhouseCoopers) 2009, *Water Price Review 2009: Demand*, Report to the Essential Services Commission, Melbourne.
- 2010, *Review of Urban Water Security Strategies*, Report prepared for Infrastructure Australia, June.
- 2011, *Review of Urban Water Quality Regulation in Australia*, Waterlines report series no. 47, National Water Commission, May.
- QCA (Queensland Competition Authority) 2009, *Water Pricing Principles*, [www.qca.org.au/water/urban-water-pricing/](http://www.qca.org.au/water/urban-water-pricing/) (accessed 24 March 2011).
- 2010a, *Annual Report 2009–10*, Brisbane.
- 2010b, *SEQ Interim Price Monitoring Framework*, Final report, April.
- 2010c, *Water*, [www.qca.org.au/water/](http://www.qca.org.au/water/) (accessed 26 March 2011).
- 2011, *Final Report – SEQ Interim Price Monitoring, Part A – Overview*, March.
- Queensland Government (nd), *Final Progress Report Western Corridor Recycled Water Project: Stage 2*, [www.environment.gov.au/water/publications/urban/pubs/wsa-qld-08-final-report.pdf](http://www.environment.gov.au/water/publications/urban/pubs/wsa-qld-08-final-report.pdf) (accessed 13 January 2011).
- Queensland Ombudsman 2008, *Welcome to the Queensland Ombudsman*, [www.ombudsman.qld.gov.au/Default.aspx](http://www.ombudsman.qld.gov.au/Default.aspx) (accessed 26 March 2011).
- Queensland Water Directorate 2011, *Statewide Water Information Management*, [www.swim.qldwater.com.au/index.php](http://www.swim.qldwater.com.au/index.php) (accessed 18 July 2011).

- 
- Queensland Water Infrastructure (nd), *Wyaralong Dam Project Key Facts*, [www.wyaralongdam.com.au/Default.aspx?tabid=195&language=en-AU](http://www.wyaralongdam.com.au/Default.aspx?tabid=195&language=en-AU) (accessed 2 March 2011).
- Quiggin, J. 2007, 'Issues in Australian water policy', *Australian Chief Executive*, Committee for Economic Development of Australia, pp. 38–47.
- and Chambers, R.G. 2006, 'The state-contingent approach to production under uncertainty', *The Australian Journal of Agricultural and Resource Economics*, vol. 50, no. 2, pp. 153–69.
- QWC (Queensland Water Commission) 2007, *Urban Water Supply Arrangements in South-east Queensland*, May.
- 2010a, *Bulk Water Prices*, [www.qwc.qld.gov.au/reform/bulkwater/prices.html](http://www.qwc.qld.gov.au/reform/bulkwater/prices.html) (accessed 3 March 2011).
- 2010b, *South East Queensland Water Strategy*.
- Raphael, A. 2011, *WA's Southwest Records Driest Year*, <http://news.ninemsn.com.au/national/8193092/was-southwest-records-driest-year> (accessed 8 March 2011).
- RBA (Reserve Bank of Australia) 2011, *Capital Market Yields — Government Bonds*, Sydney, [www.rba.gov.au/statistics/tables/xls/f02hist.xls](http://www.rba.gov.au/statistics/tables/xls/f02hist.xls) (accessed 30 March 2011).
- RCAG (Royal Commission on Auckland Governance) 2009, *Report of the Royal Commission*, March.
- Regulation Taskforce 2006, *Rethinking Regulation: Report of the Taskforce on Reducing Regulatory Burdens on Business*, Report to the Prime Minister and Treasurer, Canberra, January.
- Residential Tenancies Authority (Queensland) 2010, *Water Charging*, Fact sheet, version 8, October, [www.rta.qld.gov.au/zone\\_files/fact\\_sheets/water.pdf](http://www.rta.qld.gov.au/zone_files/fact_sheets/water.pdf) (accessed 9 March 2011).
- Robertson, R. (Minister for Energy and Water Utilities (Queensland)) 2011a, *Government Ensures Greater Water Business Accountability and Transparency*, Media release, 20 July, Brisbane.
- 2011b, *Water Price Protection for Householders*, Media release, 9 May.
- Roper, H., Sayers, C. and Smith, A. 2006, *Stranded Irrigation Assets*, Productivity Commission Staff Working Paper, Melbourne.
- Ross, S. 1983, *Introduction to Dynamic Programming*, Academic Press, San Diego.
- Round, D.K. 2002, *Commentary on Proposed Price-service Offering (PSO) Approach to Regulation by Energex*, December.

- 
- Roxby Downs Council 2010, *Roxby Downs Council Annual Report 2009/2010*, Roxby Downs South Australia.
- SA Water 2009, *Adelaide Desalination Project 100 GL Expansion Works*, report to the Public Works Committee, June.
- 2011a, *About Us*, [www.sawater.com.au/SAWater/AboutUs/](http://www.sawater.com.au/SAWater/AboutUs/) (accessed 25 March 2011).
- 2011b, *Business Water Saver Program*, [www.sawater.com.au/SAWaterYourBusiness/SaveWaterInYourBusiness/](http://www.sawater.com.au/SAWaterYourBusiness/SaveWaterInYourBusiness/) (accessed 8 March 2011).
- 2011c, *Desalination – Project Information*, [www.sawater.com.au/SAWater/WhatsNew/MajorProjects/ADP\\_ProjectInfo.htm](http://www.sawater.com.au/SAWater/WhatsNew/MajorProjects/ADP_ProjectInfo.htm) (accessed 21 January 2011).
- 2011d, *KBR to Manage Adelaide Water Projects for Next Five Years*, Media release, 27 May.
- 2011e, *Rainwater Tank and Plumbing Rebate*, [www.sawater.com.au/SAWater/YourHome/SaveWaterInYourHome/rebates\\_rainwatertanks.htm](http://www.sawater.com.au/SAWater/YourHome/SaveWaterInYourHome/rebates_rainwatertanks.htm) (accessed 17 June 2011).
- 2011f, *SA Water Customer Assist Program*, [www.sawater.com.au/nr/rdonlyres/0f7b89a5-bd51-4fe9-9e58-8f77f9658f11/0/customer\\_assist\\_program.pdf](http://www.sawater.com.au/nr/rdonlyres/0f7b89a5-bd51-4fe9-9e58-8f77f9658f11/0/customer_assist_program.pdf) (accessed 28 March 2011).
- 2011g, *Water and Wastewater pricing*, [www.sawater.com.au/SAWater/YourAccount/UnderstandingYourAccount/Pricing+Information.htm](http://www.sawater.com.au/SAWater/YourAccount/UnderstandingYourAccount/Pricing+Information.htm) (accessed 22 June 2011).
- (nd), *All You Need to Know About Water and Wastewater Pricing for 2011/12*, [www.sawater.com.au/NR/rdonlyres/EE25A010-1383-4B12-BCC6-75D9EDDFB35B/0/Residentialpricing.pdf](http://www.sawater.com.au/NR/rdonlyres/EE25A010-1383-4B12-BCC6-75D9EDDFB35B/0/Residentialpricing.pdf) (accessed 4 July 2011).
- SACOSS (South Australian Council of Social Service) 2010, *Anti-Poverty Week 2010 Statement*, [www.sacoss.org.au/online\\_docs/APStatement2010.pdf](http://www.sacoss.org.au/online_docs/APStatement2010.pdf) (accessed 28 march 2011).
- Samuelson, P. 1952. ‘Spatial price equilibrium and linear programming’, *The American Economic Review*, vol. 42, no. 3, pp. 283–303.
- Scherer, C.R. 1976, ‘Estimating peak and off-peak marginal costs for an electric power system: an ex ante approach’, *The Bell Journal of Economics*, vol. 7, no 2, pp. 575–601.
- Schott, K., Wilson, S. and Walkom, S. 2008, ‘Urban water reform: an industry perspective’, *The Australian Economic Review*, vol. 41, no. 4, pp. 413–9.

- 
- SCRGSP (Steering Committee for the Review of Government Service Provision) 2009, *Overcoming Indigenous Disadvantage: Key Indicators 2009*, Productivity Commission, Canberra.
- SEQ Water Grid Manager 2011, *About Us*, [www.seqwgm.qld.gov.au/About-Us.aspx](http://www.seqwgm.qld.gov.au/About-Us.aspx) (accessed 24 January 2011).
- Seqwater 2009, *Hinze Dam*, [www.seqwater.com.au/public/catch-store-treat/dams/hinze-dam](http://www.seqwater.com.au/public/catch-store-treat/dams/hinze-dam) (accessed 2 March 2011).
- 2011, *Latest Dam Levels*, [www.seqwater.com.au/public/dam-levels](http://www.seqwater.com.au/public/dam-levels) (accessed 3 August 2011).
- Sibly, H. 2006a, 'Efficient urban water pricing', *The Australian Economic Review*, vol. 39, no. 2, pp. 227–37.
- 2006b, 'Urban water pricing', *Agenda*, vol. 13, no. 1, pp. 17–30.
- and Tooth, R. 2007, *Virtual Water Suppliers: Introducing Competition into Urban Water Supply*, Working Draft, Presentation to 3<sup>rd</sup> Annual Water Pricing Conference, Sydney, 27 September.
- SKM (Sinclair Knight Merz) 2005, *Eastern Water Recycling Proposal: Alternative Options to Meet Long Term Demands – Dams*, August.
- South Australian Government 2005, *Water Proofing Adelaide: A Thirst for Change 2005–2025*.
- 2009, *Water for Good*, June.
- 2011, *2011-12 Drinking Water and Sewerage prices Regulatory Statement*, May.
- South East Water 2008, *Submission to Independent Review of the Environmental Protection and Biodiversity Conservation Act*, December.
- Stayner, R. 1996, *Farm Sector Linkages to Regional Economies*, Research paper no. 13 1995-96, Department of the Parliamentary Library, Canberra.
- Steiner, P. 1957, 'Peak loads and efficient pricing', *Quarterly Journal of Economics*, vol. 71, no. 4, pp. 585–610.
- Stigler, G. 1942, 'The extent and bases of monopoly', *The American Economic Review*, vol. 32, no. 2, pp. 1–22.
- Stone & Webster Consultants 2004, *Investigation into Evidence for Economies of Scale in the Water and Sewerage Industry in England and Wales: Final Report for the Office of Water Services (Ofwat)*, January.

- 
- Swan, W. (Treasurer) and Wong, P. (Minister for Climate Change and Water) 2008, *\$1 Billion to Help Secure Urban Water*, Media release no. PW 251/08, 7 December (accessed 29 January 2011).
- Sydney Catchment Authority 2011a, *Sydney Catchment Authority*, [www.sca.nsw.gov.au/](http://www.sca.nsw.gov.au/) (accessed 29 March 2011).
- 2011b, *Water Storage and Supply Reports*, [www.sca.nsw.gov.au/dams-and-water/weekly-storage-and-supply-reports](http://www.sca.nsw.gov.au/dams-and-water/weekly-storage-and-supply-reports) (accessed 3 August 2011).
- Sydney Water 2006, *Australia's Largest Water Recycling Scheme Commissioned*, Media release, 11 September.
- 2007, *Contract Signed for Sydney's Desalination Project*, Media release, 19 July.
- 2009, *Rouse Hill Recycled Water Plant*, [www.sydneywater.com.au/Publications/FactSheets/FactSheetRouseHillRecycledWaterPlant.pdf](http://www.sydneywater.com.au/Publications/FactSheets/FactSheetRouseHillRecycledWaterPlant.pdf) (accessed 23 March 2011).
- 2010a, *Rouse Hill Water Recycling Scheme*, [www.sydneywater.com.au/Water4Life/RecyclingandReuse/RecyclingAndReuseInAction/RouseHill.cfm](http://www.sydneywater.com.au/Water4Life/RecyclingandReuse/RecyclingAndReuseInAction/RouseHill.cfm) (accessed 21 January 2011).
- 2010b, *Water Conservation and Recycling Implementation Report 2009–10*, Sydney.
- 2010c, *Water Recycling in Western Sydney*, March.
- 2011a, *Desalination Monthly Report*, [www.sydneywater.com.au/Water4Life/Desalination/MonthlyReport.cfm](http://www.sydneywater.com.au/Water4Life/Desalination/MonthlyReport.cfm) (accessed 20 January 2011).
- 2011b, *Pensioner Concessions: Concessions and Social Policy 2011-12*, [www.sydneywater.com.au/Publications/FactSheets/ConcessionsAndSocialPolicy.pdf](http://www.sydneywater.com.au/Publications/FactSheets/ConcessionsAndSocialPolicy.pdf) (accessed 19 July 2011).
- 2011c, *Statutory Information — Social Programs*, [www.sydneywater.com.au/annualreport/statutory\\_information/social\\_programs.html](http://www.sydneywater.com.au/annualreport/statutory_information/social_programs.html) (accessed 19 July 2011).
- (nd)a, *One on One Partnerships*, [www.sydneywater.com.au/water4life/InYourBusiness/AboutEDC/OneonOne.cfm](http://www.sydneywater.com.au/water4life/InYourBusiness/AboutEDC/OneonOne.cfm) (accessed 8 March 2011).
- (nd)b, *Operating Licence 2010–2015*, [www.sydneywater.com.au/WhoWeAre/OperatingLicence/](http://www.sydneywater.com.au/WhoWeAre/OperatingLicence/) (accessed 8 March 2011).
- (nd)c, *Rosehill-Camellia Recycled Water Scheme*, [www.sydneywater.com.au/MajorProjects/WesternSydney/RosehillCamelliaRecyclingWaterScheme.cfm](http://www.sydneywater.com.au/MajorProjects/WesternSydney/RosehillCamelliaRecyclingWaterScheme.cfm) (accessed 23 March 2011).

- 
- (nd), *Wollongong Water Recycling Plant*, [www.sydneywater.com.au/majorprojects/South/WollongongRecycledWaterPlant/](http://www.sydneywater.com.au/majorprojects/South/WollongongRecycledWaterPlant/) (accessed 7 March 2011).
- Takayama, T. and Judge, G. 1971, *Spatial and Temporal Price and Allocation Models*, North-Holland Publishing Company, Amsterdam.
- TAMS (Department of Territory and Municipal Services) 2009, *Storm Water Network*, [www.tams.act.gov.au/move/roads/stormwater/stormwater](http://www.tams.act.gov.au/move/roads/stormwater/stormwater) (accessed 5 March 2011).
- Tanner, L. (Minister for Finance and Deregulation) 2009, *Redundant Regulation Gets the Chop*, Media release no. 36/2009, 24 June, Canberra.
- Tasmanian Government 2011, *Discounts and Concession: Property, Water and Land Tax*, [www.concessions.tas.gov.au/concessions/property\\_and\\_land\\_tax](http://www.concessions.tas.gov.au/concessions/property_and_land_tax) (accessed 19 July 2011).
- Thomas, J.F. and Syme, G.J. 1988, 'Estimating the price elasticity of demand for water: a contingent valuation approach' *Water Resource Research*, vol. 24, no. 11, pp. 1847–57.
- Time Magazine 2008, In Spain, the Pain of No Rain, [www.time.com/time/world/article/0,8599,1739621,00.html](http://www.time.com/time/world/article/0,8599,1739621,00.html) (accessed 27 November 2009).
- Toowoomba City Council 2005, *Taking Control of Toowoomba's Future*, Briefing Paper, 1 July, [http://towards.toowoomba2050.com.au/index.php?option=com\\_docman&task=doc\\_view&gid=32&Itemid=23](http://towards.toowoomba2050.com.au/index.php?option=com_docman&task=doc_view&gid=32&Itemid=23) (accessed 15 March 2011).
- Topp, V. and Kulys, T. Forthcoming, *Productivity in Electricity, Gas and Water: Measurement and Interpretation*, Productivity Commission Staff Working Paper, Canberra.
- Torres, M. and Morrison Paul, C. 2006, 'Driving forces for consolidation or fragmentation of the US water utility industry: a cost function approach with endogenous output', *Journal of Urban Economics*, vol. 59, no. 1, pp. 104–20.
- Townsville City Council 2010, *Water Pricing*, [www.townsville.qld.gov.au/resident/water/Pages/waterpricing.aspx](http://www.townsville.qld.gov.au/resident/water/Pages/waterpricing.aspx) (accessed 7 June 2011).
- Troy, P., Holloway, D. and Randolph, B. 2005, *Water Use and the Built Environment: Patterns of Water Consumption in Sydney*, Research Paper no. 1, City Futures Research Centre, UNSW, Sydney.
- Turvey, R. 1968, 'Peak-load pricing', *Journal of Political Economy*, vol. 76, no. 1, pp. 101–13.
- Tynan, N. and Kingdom, B. 2005, *Optimal Size for Utilities? Returns to Scale in Water: Evidence from Benchmarking*, Public Policy for the Private Sector, World Bank Group, January.

- 
- Tyrell, L. 2010, Mayor's Budget Speech 2010, [www.townsville.qld.gov.au/council/publications/budget/Documents/Budget%20speech%201011.pdf](http://www.townsville.qld.gov.au/council/publications/budget/Documents/Budget%20speech%201011.pdf) (accessed 8 June 2011).
- UK Government 2009, *Budget 2009 Building Britain's Future*, Economic and Fiscal Strategy Report and Financial Statement and Budget Report, April.
- Unity Water (nd), *Murrumba Downs Sewage Treatment Plant Upgrade*, [www.unitywater.com/Murrumba-Downs-Sewage-Treatment-Plant.aspx](http://www.unitywater.com/Murrumba-Downs-Sewage-Treatment-Plant.aspx) (accessed 7 March 2011).
- Uri, N. 1989, 'Linear complementarity programming: electrical energy as a case study', in Labys, W., Takayama, T. and Uri, N. (eds), *Quantitative Methods for Market-Oriented Economic Analysis over Space and Time*, Gower Publishing Company, London, pp. 165–88.
- Utilities Commission 2009, *Water Supply Licence (Urban) Issued to Power and Water Corporation*, [www.nt.gov.au/ntt/utilicom/s\\_docs/lic\\_pw\\_water\\_varied\\_28012009\\_withseal.pdf](http://www.nt.gov.au/ntt/utilicom/s_docs/lic_pw_water_varied_28012009_withseal.pdf) (accessed 25 March 2011).
- (nd), *Water and Sewerage*, [www.nt.gov.au/ntt/utilicom/water\\_sewerage/index.shtml](http://www.nt.gov.au/ntt/utilicom/water_sewerage/index.shtml) (accessed 8 March 2011).
- VAGO (Victorian Auditor-General's Office) 2010, *Auditor-General's Report on the Annual Financial Report of the State of Victoria, 2009–10*, October.
- Valente, P., Mitra, G., Poojari, C.A. and Kyriakis, T. 2001, *Software Tools for Stochastic Programming: A Stochastic Programming Integrated Environment (SPInE)*, [www.carisma.brunel.ac.uk/papers/TR10\\_01.pdf](http://www.carisma.brunel.ac.uk/papers/TR10_01.pdf) (accessed 17 January 2011).
- van den Berg, C. 1997, 'Water privatization and regulation in England and Wales', *Public Policy for the Private Sector*, Note no. 115, World Bank.
- VCEC (Victorian Competition and Efficiency Commission) 2005, *Housing Regulation in Victoria: Building Better Outcomes*, Final Report, Melbourne.
- 2008, *Water Ways: Inquiry into Reform of the Metropolitan Retail Water Sector*, Final report. February.
- Victorian Council of Social Services and Emergency Relief Victoria 2009, *Under Pressure: Costs of Living, Financial Hardship and Emergency Relief in Victoria*, Melbourne.
- Victorian Government 2007, *Our Water Our Future: The Next Stage of the Government's Water Plan*, June.

- 
- 2008, *Government Programs and Actions: Sugarloaf Pipeline, Our Water Our Future*, [www.ourwater.vic.gov.au/programs/water-grid/sugarloaf](http://www.ourwater.vic.gov.au/programs/water-grid/sugarloaf) (accessed 17 June 2009).
- 2009, *Our Water Our Future*, [www.ourwater.vic.gov.au/programs/owof](http://www.ourwater.vic.gov.au/programs/owof) (accessed 2 February 2011).
- 2010a, *Sugarloaf Pipeline*, [www.ourwater.vic.gov.au/programs/water-grid/sugarloaf](http://www.ourwater.vic.gov.au/programs/water-grid/sugarloaf) (accessed 23 February 2011).
- 2010b, *The Next Stage of the Government's Plan*, [www.ourwater.vic.gov.au/programs/next-stage](http://www.ourwater.vic.gov.au/programs/next-stage) (accessed 2 February 2011).
- 2011, *Target 155*, [www.target155.vic.gov.au/](http://www.target155.vic.gov.au/) (accessed 21 January 2011).
- Victorian Liberal Nationals Coalition 2010, *The Victorian Liberal Nationals Coalition Plan for Water*.
- Viscusi, W.K., Harrington J. and Vernon J. 2005, *Economics of Regulation and Antitrust*, Fourth Edition, MIT, Cambridge.
- Wagner, H. 1974, *Principles of Operations Research*, 2nd edn, Prentice–Hall, New Jersey, USA.
- Water Corporation 2005, *Integrated Water Supply Scheme Source Development Plan 2005: Planning Horizon 2005–2050*, April.
- 2008a, *Kwinana Water Reclamation Project*, [http://watercorporation.com.au/\\_files/PublicationsRegister/7/kwrp-brochure.pdf](http://watercorporation.com.au/_files/PublicationsRegister/7/kwrp-brochure.pdf) (accessed 23 March 2011).
- 2008b, *Water Forever – Options for Our Water Future*, Perth.
- 2008c, *Water Restrictions (southern part of WA)*, Information Sheet, Perth.
- 2009a, LRMC model v1.12 July 2009, Perth (unpublished).
- 2009b, *Water Forever – Towards Climate Resilience*, Perth.
- 2010, *Perth Residential Water Use Study 2008–09*, October.
- 2011a, *Concessions – Seniors/Pensioners*, [www.watercorporation.com.au/A/accounts\\_rates\\_concessions.cfm](http://www.watercorporation.com.au/A/accounts_rates_concessions.cfm) (accessed 4 February 2011).
- 2011b, *Water Storage in Our Dams*, [www.watercorporation.com.au/D/dams\\_storage.cfm](http://www.watercorporation.com.au/D/dams_storage.cfm) (accessed 3 August 2011).
- 2011c, *Yearly Streamflow for Major Surface Water Sources*, [www.watercorporation.com.au/D/dams\\_streamflow.cfm](http://www.watercorporation.com.au/D/dams_streamflow.cfm) (accessed 1 April 2010).
- (nd)a, *Kwinana Water Reclamation Plant*, [http://watercorporation.com.au/K/kwinana\\_wrp.cfm](http://watercorporation.com.au/K/kwinana_wrp.cfm) (accessed 23 March 2011).

- 
- (nd)b, *Southern Seawater Desalination Project*, [http://www.watercorporation.com.au/D/desalination\\_plant2.cfm](http://www.watercorporation.com.au/D/desalination_plant2.cfm) (accessed 2 March 2011).
- (nd)c, *Water Supply*, [www.watercorporation.com.au/W/water\\_index.cfm?uid=9818-2171-5332-3690](http://www.watercorporation.com.au/W/water_index.cfm?uid=9818-2171-5332-3690) (accessed 27 March 2011).
- Watercare (Watercare Services Limited) 2010a, *2010 Annual Report*.
- 2010b, *About Watercare*, [www.watercare.co.nz/about-watercare/about-watercare/Pages/default.aspx](http://www.watercare.co.nz/about-watercare/about-watercare/Pages/default.aspx) (accessed 15 February 2011).
- Waterexchange 2009, *Weekly Trading History, Rural Regulated Markets*, [www.waterexchange.com.au/cgi-bin/\\_front/services.cgi?action=home](http://www.waterexchange.com.au/cgi-bin/_front/services.cgi?action=home) (accessed 29 July 2009).
- Waterwatch Scotland 2010a, *The Introduction of Competition into the Scottish Water Industry: A Customer Perspective*, August.
- 2010b, *Scope for Improvement in Retail Water Competition in Scotland, says Waterwatch Scotland*, [www.waterwatchscotland.org/news/scope-for-improvement-in-retail-water-competition-in-scotland-says-waterwatch-scotland/](http://www.waterwatchscotland.org/news/scope-for-improvement-in-retail-water-competition-in-scotland-says-waterwatch-scotland/) (accessed 8 February 2011).
- Weimar, D.L. and Vining, A.R 1992, *Policy Analysis: Concepts and Practice*, 2nd edn, Prentice Hall, New Jersey.
- Wesley Mission 2010, *Making Ends Meet: Financial Stress is Not Just About Money*, The Wesley Report no. 8, Sydney.
- Whincop, M. 2005, *Corporate Governance in Government Corporations*, Ashgate Publishing, London.
- White, S., Campbell, D., Giurco, D., Snelling, C., Kazaglis, A., Fane, S., Deen, A. and Martin, J. 2006, *Review of the Metropolitan Water Plan: Final Report*, April.
- WICS (Water Industry Commission for Scotland) 2008, *Water Industry for Scotland Begins Process to Revoke Aquavitae's Licences to Trade*, [www.waterbriefing.org/index.php/home/regulation-and-legislation/item/3435-water-industry-commission-for-scotland-begins-process-to-revoke-aquavitae%E2%80%99s-licences-to-trade?tmpl=component&print=1](http://www.waterbriefing.org/index.php/home/regulation-and-legislation/item/3435-water-industry-commission-for-scotland-begins-process-to-revoke-aquavitae%E2%80%99s-licences-to-trade?tmpl=component&print=1) (accessed 17 March 2011).
- 2009a, *Competition in the Scottish Water Industry: Achieving Best Value for Water and Sewerage Customers 2008–09*, [www.watercommission.co.uk/UserFiles/Documents/WICS%20competition%20report%20Final%20version%20170409.pdf](http://www.watercommission.co.uk/UserFiles/Documents/WICS%20competition%20report%20Final%20version%20170409.pdf) (accessed 24 March 2011).

- 
- 2009b, *Information Note 6: An Overview of the Competitive Retail Market*, [www.watercommission.co.uk/UserFiles/Documents/InfoNote6\\_1.pdf](http://www.watercommission.co.uk/UserFiles/Documents/InfoNote6_1.pdf) (accessed 10 February 2011).
- 2010a, *Competition in the Scottish Water Industry: Achieving Best Value for Water and Sewerage Customers 2009-10*, [www.watercommission.co.uk/UserFiles/Documents/Competition%20report%20-%20final.pdf](http://www.watercommission.co.uk/UserFiles/Documents/Competition%20report%20-%20final.pdf) (accessed 22 February 2011).
- 2010b, *Information Note 2: Our Role and Remit*, [www.watercommission.co.uk/UserFiles/Documents/Number%202.pdf](http://www.watercommission.co.uk/UserFiles/Documents/Number%202.pdf) (accessed 11 February 2011).
- 2010c, *Information Note 7: Business Customers: How Competition could Benefit You*, [www.watercommission.co.uk/UserFiles/Documents/Number%207.pdf](http://www.watercommission.co.uk/UserFiles/Documents/Number%207.pdf) (accessed 11 February 2011).
- 2010d, *Information Note 8: Retail Choice for Business Customers: FAQs*, [www.watercommission.co.uk/UserFiles/Documents/Number%208.pdf](http://www.watercommission.co.uk/UserFiles/Documents/Number%208.pdf) (accessed 11 February 2011).
- 2011, *Retail Competition in Scotland: An Audit Trail of the Costs Incurred and the Savings Achieved*, Stirling, Scotland.
- (nd)a, *General Licences*, [www.watercommission.co.uk/view\\_How\\_to\\_General\\_licences.aspx](http://www.watercommission.co.uk/view_How_to_General_licences.aspx) (accessed 11 February 2011).
- (nd)b, *Register of Licences*, [www.watercommission.co.uk/view\\_Register\\_of\\_licenses.aspx](http://www.watercommission.co.uk/view_Register_of_licenses.aspx) (accessed February 2011).
- (nd)c, *Specialist Licences*, [www.watercommission.co.uk/view\\_how\\_to\\_Specialist\\_licences.aspx](http://www.watercommission.co.uk/view_how_to_Specialist_licences.aspx) (accessed 11 February 2011).
- Williams, J. and Wright, B. 1991, *Storage and Commodity Markets*, Cambridge University Press, Cambridge.
- Williamson, O.E. 1966, 'Peak-load pricing and optimal capacity under indivisibility constraints', *The American Economic Review*, vol. 56, pp. 810–27.
- Wong, P. (Minister for Climate Change and Water) 2008, *Salisbury Stormwater Project to Reduce Murray River Reliance*, Media release, 8 October.
- 2009, *Additional \$228 Million to Help Secure Adelaide's Water Supply*, Media release PW budget 09, 12 May.
- , Rann, M. (Premier (South Australia)) and Maywald, K. (Minister for Water Security (South Australia)) 2009, *Go Ahead for \$150 Million in Stormwater Projects*, Media release, 2 November.

- 
- Wong, T.H.F. (ed) 2006, *Australian Runoff Quality: A Guide to Water Sensitive Urban Design*, Engineers Media, Crow Nest.
- Woodbury, K. and Dollery, B. 2004, 'Efficiency measurement in Australian local government: the case of New South Wales municipal water services', *Review of Policy Research*, vol. 21, no. 5, pp. 615–36.
- Worthington, A. and Higgs, H. 2011, *Economies of Scale and Scope in Australian Urban Water Utilities*, May.
- and Hoffman, M. 2008, 'An empirical survey of residential water demand modelling', *Journal of Economic Surveys*, vol. 22, no. 5, pp. 842–71.
- Wright, S. 2011, 'Desal to cost \$550m more than aquifer tap', *The West Australian*, 14 April.
- WSAA (Water Services Association of Australia) 2008a, *Real Options and Urban Water Resource Planning in Australia*, Occasional Paper no. 20, Melbourne.
- 2008b, *WSAA Report Card 2007–08*.
- 2009a, *Submission to Second Biennial Assessment of Progress in Implementation of the National Water Initiative*, February.
- 2009b, *WSAA Report Card 2008–09*.
- 2010a, *Implications of Population Growth in Australia on Urban Water Resources*, Occasional paper no. 25, July.
- 2010b, *WSAA Report Card 2009–10*.
- Xayavong, V., Burton, M. and White, B. 2008, *Estimating Urban Residential Water-demand with Increasing Block Prices: The Case of Perth Western Australia*, 52nd Annual conference of the Australian Agricultural and Resource Economics Society, Canberra, Australia, 6–8 February.
- Yaron, D., Plesner, Y. and Heady, E.O. 1965, 'Competitive equilibrium and application of mathematical programming', *Canadian Journal of Agricultural Economics*, vol. 13, pp. 65–79.
- Young, M., McColl, J. and Fisher, T. 2007, 'Urban water pricing: how might an urban water trading scheme work', *Droplet*, no. 5, University of Adelaide, February.
- YVW (Yarra Valley Water) 2007, *Submission to: Victorian Competition & Efficiency Commission: Inquiry into Reform of the Metropolitan Retail Water Sector*, Melbourne, October.
- 2010, *History of Melbourne's Water Supply*, [www.yvw.com.au/Home/Waterandsewerage/Waterqualityandsupply/HistoryofMelbourneswatersupply/index.htm](http://www.yvw.com.au/Home/Waterandsewerage/Waterqualityandsupply/HistoryofMelbourneswatersupply/index.htm) (accessed 27 March 2011).

---

— 2011, *Pricing Handbook 2011/12*, [www.yvw.com.au/yvw/groups/public/documents/document/yvw1002519.pdf](http://www.yvw.com.au/yvw/groups/public/documents/document/yvw1002519.pdf) (accessed 19 July 2011).