



National Competition Council

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A Viable and Sustainable  
Water Industry

Staff Discussion Paper

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The views expressed in this paper are those of the author and do not necessarily reflect those of the National Competition Council.

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### **The National Competition Council**

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It is a federal statutory authority which functions as an independent advisory body for all governments on the implementation of the National Competition Policy reforms. The Council's aim is to 'help raise the living standards of the Australian community by ensuring that conditions for competition prevail throughout the economy which promote growth, innovation and productivity'.

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# Executive overview

Water reform is one of the most complex and challenging of the reform commitments of Australian governments under National Competition Policy (NCP). It will be one of the most rewarding, however, in terms of favourable economic and environmental outcomes if implementation of the reform package is timely and complete.

This paper contemplates how the water industry may look after the reforms are in place. It focuses on the role of the reforms in moving the industry towards one that is economically viable and ecologically sustainable.

Considerable time will pass before the full benefits of all the reforms are realised, especially the environmental outcomes. Some reforms, however, are already showing tangible benefits, and widespread support is helping to sustain the reform movement.

## The industry

If all the reforms are fully and successfully implemented, then Australia's water industry post reform will become efficient, flexible, sustainable and capable of delivering higher quality water with greater security of supply. Water will be properly priced and the rights to water will be extensively traded. The focus will have moved away from increasing the quantity of water available and towards the efficiency of water use and the better management of Australia's water resources.

The reforms will help change attitudes towards efficient water use and conservation, and water's scarcity value will be better appreciated (including through pricing that reflects its scarcity).

The industry is expected to remain predominantly publicly owned, but some privatisation (including through leasing out facilities and contracting out services) will occur. Wastewater treatment and disposal and recycling activities (in which the private sector is becoming heavily involved) will form a larger component of the industry. The industry's infrastructure will be of a higher quality and more productive, and some competition will have emerged.

## Economic impacts

Water is one of Australia's largest industries, so the potential economic gains from its improved performance are considerable. Like other structural policy initiatives of governments, the water reforms involve initial costs and

dislocation for some. The sustainability of economic activity that depends on water will be enhanced, however, in the longer term, by proper and timely implementation of the reforms. Overall economic growth also is expected to benefit from the reforms. The detriments to GDP, such as activity reductions where water is diverted to the environment, can be confined if more efficient use of water compensates for the loss of supply.

Further, the impact of the reforms on a 'Green GDP' measure of activity would be favourable.

An important source of improved economic performance will be gains from water trading. Trading allows water to flow to its highest value uses (including in sectors other than agriculture) and provides more options for irrigators. The environmental impacts of water trading will need to be monitored, but efficient and extensive water markets will reduce the economic cost of environmental flows.

The water reforms are having various impacts on the supply of and demand for water, but constraints on supply will be the dominant factor determining future use. These constraints can be relieved by the considerable water savings from improving the efficiency of water storage, transportation and use, especially by rural consumers.

The reforms are correcting the underpricing of water. The deferral of the building of new dams and water distribution infrastructure is postponing the large cost and price impacts of such expenditure. Households are lowering their bills through water conservation. The new pricing regimes arising from the reforms have established equal treatment of customers, including through the elimination of cross-subsidies.

## Environmental outcomes

A major focus of the reform framework is better environmental outcomes. Governments and communities have made progress in committing to remedies for environmental problems, but the severity of the problems means that reform gains will take longer to achieve and be expensive initially (for governments and water users). A still limited knowledge base also means that the nature and extent of the environmental improvements will be less predictable than other reform outcomes.

The emphasis in the reform principles on market-determined outcomes has the additional advantage of benefiting the environment, though market mechanisms alone are insufficient to ensure environmental protection. The environmental objectives of the reform framework are helping to achieve better economic outcomes, but issues such as how to secure more water for the environment and who pays for the water are central and will continue to receive much attention from governments and other stakeholders.

## Rural and regional development

The reforms have most impact on rural consumers. Properly managed and implemented, and with appropriate responses by irrigators, the reforms are expected to produce eventually a more productive rural sector, which will be beneficial for regional Australia.

The water reform objective to produce sustainable river systems will enhance the consumptive rights of rural users and reduce their business risk, including through better water quality and improved security of supply. Also assisting the viability of Australia's rural businesses will be the better definition of the property right represented in a water entitlement.

Increased recreational use of river systems and the attendant increased tourism will help particular regions. The reforms could have differential impacts on rural economies and communities, depending on geographic shifts in production patterns as a consequence of water allocations and trading.

## Consultation and research

The provision in the reform framework for governments to consult on proposals for change is leading to better informed communities, customers and other key stakeholders. Community-based groups are now influential in water matters. Decisions are more likely to be consensus driven and therefore satisfy more interest groups, leading to overall welfare gains.

Successful implementation of the water reforms depends on extensive scientific research and the build-up of knowledge. Increased amounts are being spent on research, which is producing better decisions and innovative solutions. Water research is leading to efficiency gains and providing the information required to set and then achieve environmental goals. More remains to be done in this area, however.

## Implementation of the reforms

The initial timetable for the reforms was optimistic. It was subsequently extended given the constraints on the acceptance and implementation of the reforms.

Water reform involves extensive change, so careful management has been needed to ensure communities understand and support the changes. Jurisdictions are introducing the reforms at somewhat different rates, and some differences are emerging in the application of the reforms. As a consequence, reform will be more 'complete' in some jurisdictions than in others, with implications for their respective water industries, water users and environments.

Jurisdictional variances in implementation also reflect differences in the starting points of the various States, the health of their river systems and their water policies before the 1994 Council of Australian Governments (CoAG) Agreement.

Once implemented, the reforms are likely to be durable; the potential loss of NCP payments will help ensure they remain in place. Widespread community support for the reforms will also assist durability.

The reforms are producing an economically viable water industry, but it is too early to judge whether the expectations for an ecologically sustainable industry will be fulfilled. Any shortfalls between environmental expectations and outcomes will partly result from resistance to cutbacks in supply for consumptive use and from the cost of securing water for the environment. The absence of scientific data for properly planning and implementing the environmental aspects of the reforms also will be a factor.

Given the slow acting nature of the environmental reforms, there is a heavy premium on them being implemented properly, completely and early. Monitoring and regular, interim evaluations of their outcomes will be necessary.

Jurisdictions may agree to changes and additions to the reform framework as the remaining reforms are implemented and begin to have their full impacts. A desire for outcomes beyond those being achieved may lead governments to decide to enhance the reform package.

# **A viable and sustainable water industry**

Water reform is one of the most complex and challenging of the reform commitments of Australian governments under National Competition Policy (NCP). It will be one of the most rewarding, however, in terms of favourable economic and environmental outcomes if implementation of the reform package is timely and complete.

The reforms are ambitious, but they will achieve far-reaching and beneficial change in the water industry.

This paper contemplates how the water industry may look after these reforms are in place. It focuses on the role of the reforms in moving the industry towards one that is economically viable and ecologically sustainable. Also discussed are the implications of the reformed industry, such as for customers, the economy and rural and regional development.

Even if governments fully adhere to the timeframes for implementation of the reforms, considerable time will pass before the full benefits of the reforms are realised, especially the environmental outcomes. Some reforms, however, are already showing tangible benefits which, along with widespread support for change in the water industry, are helping to sustain the reform movement.

Attachment A lists the key principles of the water reform framework to which Australian governments have committed, and notes the problems that the principles were designed to address. It also lists the policy actions being taken to address the problems and anticipates the outcomes of those actions, such as the impacts on the water industry, its participants and the broader community



# 1 A reformed water industry

If all the reforms are fully and successfully implemented, then Australia's water industry will become efficient, flexible, sustainable and capable of delivering higher quality water with greater security of supply. Water will be properly priced and the rights to water will be extensively traded.

In rural areas, the reforms will help move the focus away from increasing the quantity of water available and towards the efficiency of water use as a means of stimulating development.

As in all other successful Australian economic endeavours, the focus will be on increasing value added — in this case, from applying water resources. It will be on the better management and more productive use of existing water resources, rather than automatically seeking to develop additional resources to respond to higher demand.

As Harris (2002) notes, 'there is a quiet revolution going on — individual farmers, irrigators, manufacturers and many ordinary people are beginning to change their practices, minimise their environmental impacts and focus on quality rather than quantity'.

The reforms will help change attitudes towards efficient water use and conservation, and the scarcity value of water will be better appreciated (including through pricing that reflects its scarcity). Certain measures to help address the external impacts of the supply and use of water, particularly environmental degradation, will be in place. Importantly, the legitimate needs of the environment for water will be recognised.

Given the intractability of the environmental problems, however, those measures will have only begun to alleviate the impacts and, in the case of salinity, may only slow the pace of degradation in certain areas.

Water policies and the institutional arrangements for water will be superior to those prevailing before Australian governments agreed to the water reform framework. Water policies will not be stagnant, but will continue to evolve, responding to emerging challenges and opportunities in the industry and to changes in community expectations.

## **An industry in need of reform**

This vision contrasts with the state of the industry and the policies and practices under which it operated before the reforms commenced. Most customers were unfairly charged, water suppliers were inefficient, investment decisions were poor and institutional governance was inadequate.

The policy framework in which the industry operated was not producing ideal outcomes (including market-determined outcomes), and insufficient regard was given to the environmental and other external impacts of the industry. Limited knowledge and recognition of environmental needs were particular issues.

Attachment A details the problems and deficiencies in the water industry which the CoAG reforms were designed to address. The following were among the most prominent issues:

- Urban water and wastewater pricing approaches had little regard to differential patterns of consumption; they incorporated cross-subsidies, disadvantaging industrial and commercial customers; and they provided no incentive for the efficient use of water.
- Below-cost pricing of rural water produced resource allocation inefficiencies (by distorting rural production and water consumption decisions) and wasteful water use, aggravating the environmental damage. Inadequate pricing also meant insufficient financial provision for major asset maintenance and refurbishment.
- Many investment decisions in new supply and distribution were having adverse economic, environmental and fiscal outcomes.
- Inappropriate institutional arrangements for the industry led to inadequately defined roles and responsibilities with the potential for conflicts of interest. It was not uncommon, for example, for the water provider to be also the regulator, standard setter and resource manager.
- Water providers mostly made inadequate (often negative) rates of return and were not efficient (for example, using outdated technology and wasteful techniques for water delivery).
- Degradation/depletion of Australia's water resources was widespread and extensive. Excessive extraction of water was stressing river systems, and the degradation was leading to losses of productive land, poor water quality and reductions in biodiversity.
- The water entitlements of irrigators were poorly specified, tied to land title and attenuated in a number of ways.
- The opportunities for water trading were limited; regulation, not price, played the major role in allocating water among irrigators.
- The base of scientific knowledge and the research being undertaken were insufficient to enable informed decisions on efficient and sustainable water provision and use.
- The public needed opportunities for input on water issues, and public education programs on water conservation etcetera were limited.

## 2 The drivers of change

CoAG's adoption in February 1994 of a strategic framework for the reform of Australia's water industry, followed by the linking (in April 1995) of NCP payments to the implementation of the reforms, was a catalyst for change in the water industry.

The principles of the water reform framework are listed here, along with the main aspects of their application.

- *Proper pricing of rural and urban water.* This is to be achieved through consumption-based pricing; full cost recovery, including a real rate of return earned by water suppliers; removal of cross-subsidies, or their transparency; and disclosure of, and payments to, suppliers for community service obligations (CSOs).
- *Investment in new rural water schemes.* New schemes have to be economically viable and ecologically sustainable.
- *Institutional role separation.* Service provision is separated from the roles of water resource management and standard setting and regulation.
- *Delivery of water services.* Efficient service delivery is undertaken on a commercial basis and meets international best practice, with inter-agency performance compared. The management of water districts is devolved to their irrigators.
- *Allocations and entitlements — environment.* Allocations of water for the environment are legally recognised and formally determined on the basis of the best possible scientific research.
- *Allocations and entitlements — rural customers.* Formally determined allocations are made and water title is separated from land title and clearly specified (including through a register of water entitlements).
- *Trading in entitlements.* Trading in water entitlements is fully operational and cross-border trading is undertaken where it is socially, physically and ecologically sustainable.
- *Integrated resource management.* Integrated approaches to natural resource management are in place and there is full recognition of the interdependency of the different natural resource components, including water.
- *Water quality.* Water quality is improved by the implementation of the National Water Quality Management Strategy.

- *Public consultation and education.* Government agencies and service deliverers consult on proposals for change, and other initiatives and public education programs (including programs in schools) are conducted.

The reforms are an integrated package and their mutually reinforcing nature will help to achieve better environmental and economic outcomes, and better outcomes for communities. For example:

- allocations of water for the environment help produce sustainable river systems which ensure consumptive rights in the long run, including through better water quality and improved security of supply<sup>1</sup>; and
- the economically viable and ecologically sustainable tests may constrain the building of new dams, but lower urban demand arising from other features of the water reform package (such as higher water prices, improved efficiency in use, and less waste) will defer the need for additions to supply.

Some water reform was occurring before the CoAG decisions and further reforms would have emerged in the absence of the decisions, but they probably would have been less extensive, possibly reactive and without the holistic attributes of the CoAG reforms. Further, they might have been too late to prevent irreparable damage to certain river systems.

Australian governments' collective approach to reform is more likely to succeed than the individual, uncoordinated approaches that might otherwise have been taken. It is, moreover, necessary for dealing with waterways flowing through more than one jurisdiction. Another important advantage of the collective approach is that water authorities and providers from different jurisdictions can learn from one another through the exchange of commercial and scientific information on common issues, and through benchmarking.

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<sup>1</sup> In the short term, environmental allocations, to the extent they require allocations for consumptive uses such as irrigation to be cut back, could reduce economic activity by leading to lower agricultural output. More efficient use of irrigation water and crop substitution, however, would mitigate the impact on output.

## 3 The outcomes of reform

### A transformed industry

The industry had assets valued at over \$90 billion in replacement cost terms in 1999 (Productivity Commission 1999).<sup>2</sup> This establishes water as one of Australia's largest industries, with assets estimated to be of a similar magnitude to those of the electricity, telecommunications and airline sectors.<sup>3</sup>

The provision of water and wastewater services to the largest urban areas in Australia produced \$4.6 billion in revenue in 2000-01 and \$792 million in dividends for the government owners of the service providers (Water Services Association of Australia 2001a).

The water industry, in value added terms, is more than one-quarter the size of the manufacturing and the agricultural sectors, almost half the size of the electricity industry and three times the size of the gas industry. As such, the overall economic gains from improving its performance are potentially considerable.

Water extraction and use has grown rapidly in the past. From 1985 to 1996-97, total use increased by 65 per cent (much the same as the increase in real GDP over the same period). Use for irrigation grew by 76 per cent, urban/industrial consumption increased by 55 per cent and rural use rose by 2 per cent.

Australia has more water supply than most other countries in per person terms, but also a high level of water consumption per person. Further, water supplies are not abundant in the areas of highest demand.

The water reform framework will have a number of impacts on the supply of, and demand, for water and thus affect future growth in the **industry's size**.

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<sup>2</sup> The estimated replacement cost in 2000-01 of the assets of the major urban water providers was \$50 billion.

<sup>3</sup> ABS asset value data for the industry are not separately available. The net capital stock of the electricity, gas and water supply (including sewerage and drainage services) industries in 2000-01 was \$111 239 million (current prices). Only the mining and transport and storage sectors exceeded these sectors in size.

Supply will be the dominant factor determining use; falling large falls in agricultural and pastoral prices and the consequent redundancy of parts of primary industry, a shortage of demand for water is unlikely. Allocations for the environment and the economic and ecological criteria for new rural investments will tend to limit additions to supply for the major water user, the irrigators.<sup>4</sup>

On the demand side, consumption-based pricing and prices based on full cost recovery will have some depressing impact on demand, but produce less waste and greater efficiencies in the storage, distribution and use of water.

Use on a per person basis will be lower in urban areas and, with the introduction of environmental allocations, the drawdown for consumption from stressed river systems is likely to be lower. While use in rural areas may decline, water will flow to higher value applications and trading will produce geographic shifts in use.

Changes in use will arise independently of water reform. They will reflect, for example, population increase and its geographic movement; lifestyle changes; changes in industrial structure (with manufacturing becoming a smaller share of the economy and possibly fewer water-intensive manufacturing industries remaining); and from changes in agricultural and pastoral activities. The latter may involve shifts to more (subject to water availability) or less water-intensive crops, depending on movements in commodity prices, and changes in animal stock levels.<sup>5</sup>

While allocations for the environment in stressed river systems may reduce supply for consumptive use, they will help ensure the long-run sustainability of those systems and, therefore, secure supply in the longer term.

There is some potential for supply shortages in urban areas to have an impact on the supply of irrigation water. If left to market forces, supply would be diverted to satisfy urban demand (because urban customers would be prepared to pay higher prices than irrigators). Such situations could be averted, however, by improvements in the efficiency of water storage, transportation<sup>6</sup> and use (especially by rural consumers).

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<sup>4</sup> The agricultural sector accounts for 70 per cent of water use in Australia, mining and manufacturing for 6 per cent, gas and electricity for 6 per cent, other service industries for 2 per cent and households for 8 per cent (Water Services Association of Australia 2001b). (The remaining 8 per cent represents delivery losses and unaccounted for losses of water.) Broadacre farming uses more than half of the water consumed by the whole of the agricultural sector.

<sup>5</sup> Given these factors, use of per person consumption levels is a better means of gauging the success of the reforms in inducing economies in water use.

<sup>6</sup> Through, for example, piping water and using lined channels.

The potential efficiencies are considerable.

- The planned Wimmera–Mallee pipeline, for example, would save 93 000 of the 120 000 megalitres currently used by that system. The envisaged capital cost (\$300 million) is considerable, however, being equivalent to a per megalitre one-off cost of around \$3 200.
- A New South Wales cotton farm, by adopting better irrigation techniques, has raised its yields (as a result of less waterlogging) and increased its water use efficiency by 45 per cent, giving an overall lift in annual profit of \$100 000 (*Australian Financial Review*, 24 April 2002, p. C5).
- As much as 40 per cent of water channelled for irrigation is lost to evaporation and seepage (Australian Academy of Technological Sciences and Engineering and the Institution of Engineers, Australia 1999). The Cooperative Research Centre for Freshwater Ecology (2001) estimated that 15 per cent of irrigation water from the Murray River is lost from seepage. The Land and Water Resources Research and Development Corporation suggests that irrigators should be able to achieve 70–85 per cent water use efficiency, but many (especially flood irrigators) are operating at below 50 per cent efficiency.<sup>7</sup>

An important question is whether the pursuit of efficiencies in water use and other water saving approaches such as recycling will satisfy, at a reasonable cost, the increasing rural and urban demand for water. It has been some years since a major new dam was constructed; some are under consideration and higher water prices may render them economic.

Both price and use factors will affect overall **expenditure on water and provision of water** under the reformed industry structure. For example:

- Conservation induced by education, efficient pricing and a reduced need for new water storage and distribution infrastructure will lead to lower expenditure.
- Offsetting lower consumption, however, will be higher priced water; increased investment in water use efficiency measures, wastewater recycling and stormwater use; and more expenditure on water planning and management and research.<sup>8</sup>

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<sup>7</sup> Some of the ‘inefficiencies’, however, consist of losses of irrigation water to river systems. For this reason, care needs to be taken in measuring the environmental gains from water efficiency savings.

<sup>8</sup> Environmental mitigation expenditures (including the short-run opportunity cost of allocations for the environment, expenditure on research and the water planning process, and expenditure on salinity control, alleviation and rehabilitation) will be higher under the new policy regime, but this will be expenditure on the environment, not on water.

If overall expenditure is higher, then it would be for a higher quality product with greater supply certainty, and would account for the external costs of supply of water (such as environmental degradation).

**Wastewater treatment and disposal and recycling** activities will form a larger component of the industry than they do now; in 2000-01 only 7.8 per cent of wastewater was reused, although this was a large increase on the 4.9 per cent reused in 1996-97 (Water Services Association of Australia 2001a).

With a sharper focus on water conservation, the rate of growth of wastewater discharge will slow. Higher priced water, higher wastewater charges and environmental objectives will provide incentives to expand these activities. The private sector is becoming heavily involved in the recycling business.

The water reforms are significantly affecting the **participants** in the industry. At the end of the reform process, bulk and urban water supply will probably still be predominantly State and local government owned, but suppliers will have become profitable, efficient, innovative, accountable and more prepared to adopt new technology. Most rural irrigation schemes will have been devolved from government ownership to irrigator operation and management and, in that sense, will be regarded as private.

The water industry does not have the advantage of direct competition (see 'Prospects for competition' box) to spur its efficiency. The new institutional arrangements noted above, however, are promoting efficient service delivery on a commercial basis via monitoring and inter-agency performance benchmarking. (Some of the other NCP reforms, as noted in footnote 9, are also helping to improve industry performance.)

Greater efficiency on the part of suppliers is leading to lower prices, improved service and the more productive use of assets. The Productivity Commission's (1999) modelling of the macroeconomic effects of the water reforms estimated that they would improve labour productivity by 16 per cent and capital productivity by 5 per cent across the water industry.

Water service provision is being separated from resource management, standard setting and regulatory enforcement. This separation clarifies the roles and responsibilities of the institutions, allowing them to focus on their core business and minimising the scope for conflicts of interest. The changes establish accountability and transparency, and introduce a structural basis for applying other, relevant NCP principles.<sup>9</sup>

Those parts of the industry that service urban needs will remain predominantly publicly owned, but the policy and institutional environment

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<sup>9</sup> These are the principles relating to independent prices oversight of government business enterprises (GBEs), competitive neutrality, structural reform of public monopolies, legislation review and access to services provided by significant infrastructure facilities. All the States except South Australia and Western Australia now have independent prices oversight, and Western Australia has committed to introduce it.



will be conducive to part privatisation of suppliers, including through the leasing out of facilities and the contracting out of services.<sup>10</sup>

More generally, the market-based orientation of the reforms is improving the performance of the industry. Proper pricing, for example, provides a better guide to the timing and type of new investments to augment system capacity. Where higher prices result, they can be an important driver of innovation and efficiencies.

With complete implementation of the reforms, the industry's **infrastructure** will become higher quality and more productive. The profitability of suppliers will provide funding for better infrastructure, and the reform principle that new rural water schemes need to be economically viable and ecologically sustainable will have a positive influence.<sup>11</sup> Through its limiting effect on new investment, that principle provides an incentive for the more efficient use of existing water infrastructure.

The reforms are correcting the **underpricing of water**. Cost savings in water delivery on account of efficiency enhancements by suppliers are only partially offsetting the requirements for full cost recovery and a positive real rate of return. In the longer term, however, the deferral of the building of new dams and water distribution infrastructure (given efficiencies in water use) will postpone the large cost and price impacts of such expenditure.

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<sup>10</sup> United Water and Riverland Water, for example, are large private contractors to SA Water. United Water manages and operates Adelaide's water supply and wastewater treatment. On its commencement, United Water's cost of operations was 20 per cent below the historical cost of the operations that it took over from SA Water.

<sup>11</sup> This principle applies to rural schemes only, so a scheme designated for urban water provision could be constructed without compliance with the principle.

### **Prospects for competition**

Participants in the industry are natural monopolies, and there is no prospect of competition in areas such as bulk transmission and local reticulation. Scope for competition does exist, however:

- among irrigation districts as a result of tradeable water entitlements;
- at the common geographic boundaries of water suppliers;
- between retail water suppliers and suppliers of water-saving technologies (such as water-saving shower roses, garden watering timers, etc.);<sup>12</sup>
- where there are competing locations for dams;
- where the rights to supply water services can be franchised; and
- in the bidding phase, between potential operators of greenfields dams/bulk water providers.

Competition may also develop between specialised service providers, such as water agents. New water providers may emerge (through the break-up of large existing providers), although some existing providers and irrigation districts are merging. In Victoria, for example, around 400 nonmajor urban providers were amalgamated into 15 providers in the early 1990s. Interconnection between adjacent areas is possible and, combined with the virtual universality of metering, can set up opportunities for retail contestability.<sup>13</sup>

As prices and customer sophistication increase, the pressure for competitive reforms and better industry performance will grow.<sup>14</sup> The establishment of customer councils and the development of service charters and complaints mechanisms are providing customers with more influence.

The established, monopoly suppliers are being subject to some (although very limited) competition from private provision of water. Household use of rainwater tanks is one example, although this practice is highly uneconomic and seems to be motivated primarily by private environmental concerns. Domestic consumers can privately source their water also through bores, carted water and bottled water.

Higher prices and reduced supply is inducing increased on-farm private provision too (via tapped groundwater supplies and harvested surface flows), subject to the regulation of such use.

Prospects for competition are best in the treatment and disposal of wastewater. The cost of small, self-contained treatment systems is falling and their environmental impacts are improving. Large industrial users of water are more likely to source their own water requirements from on-site supplies; for example, Tasman Asia Pacific (1997) notes that around two thirds of water used by New Zealand industry is privately sourced.<sup>15</sup>

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<sup>12</sup> In many cases, however, rather than compete with water-saving technologies, water retailers actively encourage water conservation by their customers. They do so to defer the building of new, expensive and environmentally contentious collection and supply infrastructure.

<sup>13</sup> Achieving retail contestability is by no means simple, with different product quality being one issue.

<sup>14</sup> The Tasman Asia Pacific (1997) report on third party access in the water industry noted that past widespread and long-term underpricing of water discouraged new entry to the market.

<sup>15</sup> Such data need to be interpreted carefully, as re-use of water can be regarded as self-sourcing.

**Regulation** of the industry is still evolving. But it is becoming more sophisticated and informed, and decisions are being backed by a greater weight of results from research and development work.

## **Impacts on consumers**

Customers in almost all urban areas accept the availability of adequate supplies of drinkable water as a given, and expenditures on water typically account for minor parts of their budgets. The reforms, nevertheless, have changed the way in which consumers are charged for their water use. Public consultation and education programs have made more customers aware of the issues affecting their access to water and their influence over those issues. Quality of life improvements are thus resulting from the reforms (see social outcomes section).

Most urban customers are benefiting from the reforms. The introduction of two-part tariffs has generally led to higher prices, but reduced consumption has led to lower water bills.

- The Water Services Association of Australia (2001a) reports that over the five years ending 2000-01, the customer average bill in urban areas declined in real terms by around 5 ½ per cent.

Pricing based on consumption rather than property values is giving customers control over the size of their water bills and establishing equal treatment of customers with similar use levels.

The cross-subsidies between different customer classes have been marked. In the past, commercial and industrial users paid considerably more for water than households did. An Industry Commission (1992) study found that in 1990-91 the average commercial establishment paid 15 times more for its water than the average household paid.

This situation is changing. The Productivity Commission's (1999) modelling of the macroeconomic effects of the water reforms estimated that the reforms would reduce the prices paid by commercial and industrial users (relative to the supply price) by 40.2 per cent and 1.3 per cent respectively, and increase prices (relative to the supply price) paid by residential and other users by 7.5 per cent and 31.5 per cent respectively.

- The Productivity Commission's (2002) more recent study found that over the 10 year period to 2000-01, real water prices paid in Sydney by low use and medium water use businesses fell by 75 per cent and 65 per cent respectively. High use business customers were subject to real water price increases of around 9 per cent. Prices paid by average industrial customers in Adelaide fell by 8 per cent over the same period.

Rural irrigators are generally paying higher prices for water with the introduction of consumption-based pricing and full cost recovery by water

suppliers. Water is around 8 per cent of total farm costs, on average, so higher prices can be a sizeable additional impost for water-intensive activities. As noted in the Rural and Regional Development section, offsets can be found through reducing waste in on-farm distribution and use and by changing crops. Higher prices and limits on available surface water may lead to more accessing of groundwater.

## **The environment**

A major focus of the water reform framework is on producing better environmental outcomes. There has been progress in committing to remedies for the environmental problems, but given the severity of the problems, gains from the reforms will take longer to achieve, be expensive initially (for governments and water users) and be more challenging than the other elements of the reform framework. Further, given a still limited knowledge base, the nature and extent of the environmental improvements will be less predictable than other outcomes from reform.

Widespread and extensive degradation and depletion of Australia's water resources has been occurring. Excessive extraction of water is stressing river systems, and the degradation is leading to losses of productive land, poor water quality and reductions in biodiversity.

### **Environmental degradation**

Stressed river systems are producing algal blooms; changes to stream integrity, including erosion, are occurring; native fish species are declining; and salinity and turbidity are increasing. More than half of assessed river basins have excessive turbidity and nutrients and there is excessive salinity in 32 per cent of assessed basins (National Land and Water Resources Audit 2001).

An estimated 26 per cent of surface water management areas are already or close to being overused (compared with sustainable flow regime requirements). And 30 per cent of groundwater management areas are already or close to being overused compared with their estimated sustainable yield. A similar proportion are fully or overallocated (National Land and Water Resources Audit 2001).

The environmental obligations of the water reform framework are a necessary but not sufficient condition for rehabilitation of Australia's degraded waterways. They need to be accompanied by integrated approaches to natural resource management.

The making of allocations of water for the environment will help maintain biodiversity, address salinity, visually improve waterways, lakes and dams, and produce habitat improvements for fish and birds. At the same time, the reforms will help to check the progress of land degradation.

The emphasis in the reform principles on market-determined outcomes has the additional advantage of benefiting the environment (although market

mechanisms are not sufficient to ensure the required level of environmental protection).

- Volumetric pricing for urban customers is inducing water savings through efficiencies in use and reduced consumption is lowering the cost of treating wastewater and the environmental damage from it.
  - Average household consumption in the ACT, for example, fell from more than 400 kilolitres in the late 1980s to 257 kilolitres in 1999-2000 (*The Canberra Times*, 9 February 2002, p. C5). (Some part of this fall, however, would be attributable to changed accommodation patterns, such as more apartment dwelling and smaller house blocks, which would reduce water use for gardens.)<sup>16</sup>
  - Per person water use in Sydney, Melbourne and Newcastle fell by 7 per cent, 12 per cent and 14 per cent respectively from 1990 to 2000 (Water Services Association of Australia 2001b).<sup>17</sup>
  - Per person consumption by customers of a selection of major Australian water utilities fell by 17 per cent over the 10-year period to 2000-01 (Productivity Commission 2002).
- Volumetric pricing of business wastewater is inducing conservation in water use, ensuring appropriate cost recovery from polluting industries and, where there is also charging according to quality, providing an incentive for the discharge of cleaner wastewater.
- In rural areas, higher prices and volumetric pricing are encouraging less waste and more efficiency in water use. These changes are helping to address salinity and waterlogging problems. Further, water-intensive crops and techniques are not being artificially encouraged through subsidised pricing.
- Water trading can have favourable environmental impacts from reduced overwatering (because unneeded water can be sold) and from the opportunity to transfer water from use on degraded land. (Environmental guidelines need to be in place, however, to avoid potentially unfavourable impacts, such as degradation of the instream environment through inappropriate flow management resulting from trading or from the selling of water to degraded land). On the other hand, trading can lead to greater extraction of water for consumptive use if it allows previously unused water to be sold.

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<sup>16</sup> The comparison also could be distorted by unusual climatic conditions, such as higher than average rainfall in 1999-2000.

<sup>17</sup> The association notes that technological change and education campaigns also contributed to this reduction.

The environmental objectives of the water reform framework are also helping achieve economic objectives, as shown by the following examples.

- Sustainable river and groundwater systems enhance consumptive rights in the long run, including through better water quality and improved security of supply.
- Allocations for the environment can lower supplies for consumptive use, but this provides incentives for less waste and for the trading of water to higher value added uses.
- Unpolluted water is essential for the health of oyster farms, and estuarine and coastal fisheries

More generally, the public consultation and education objectives of the water reform framework are heightening awareness of environmental degradation and building a strong constituency for rehabilitation.

How more water for the environment can be secured and who pays for the water are central issues, nevertheless, and will continue to receive much attention from governments and other stakeholders. The alternatives are the purchase of water from existing users; a clawback of entitlements; or supply increases through efficiencies in storage, transportation and use. While the last of these options would provide the most gains for the various interests involved, all the alternatives are expensive and/or raise contentious issues.

## **Impacts on the economy**

The water reforms constitute an important part of governments' microeconomic reform agendas. Like most other structural policy initiatives of governments, the reforms involve initial costs and dislocation for some. In the longer term, however, the reforms are likely to enhance the sustainability of economic activity that depends on water and lead to higher overall economic growth.

Contributions to economic growth will be made from:

- the more efficient use of resources involved in water provision generally;
- the redistribution of water to more productive uses (see the water trading section), resulting in higher value agricultural and other outputs (such as mining);
- the more efficient use of water, resulting in greater output from the same level of supply;
- fewer quality-related losses in water dependent industries such as aquaculture and fisheries;

- reduced government subsidies to customers and water providers, resulting in improved efficiency in resource allocation;
- the more efficient use of new and existing water assets and systems. The 'economically viable' test for new investments in rural schemes, along with the associated removal of government subsidies for uneconomic projects, is improving efficiency in resource allocation by reducing wasteful investment and ensuring future generations do not have to pay for current decisions;
- increased recreational and tourist activity induced by cleaner river systems and storages (especially fewer algal blooms). Some reservoirs are unsuitable for recreation over 25 per cent of the time, as a result of algal blooms (Australian State of the Environment Committee 2001); and
- reduced economic cost of water contamination. The total costs of managing algal blooms were estimated to be around \$200 million a year during the late 1990s (Land and Water Research Development Corporation 1999).

Positive environmental outcomes from the reforms will also have beneficial economic impacts. The reforms' contributions to lessening the pace of land degradation and to the restoration of some past degradation will leave Australia with more productive land. In addition, the reforms' contribution to reducing the salinity of river systems will increase the supply of usable water and mean less damage to crops.

### **Modelling results**

The Productivity Commission (1999) estimated that the water reforms would have a positive, although negligible, impact on GDP, and marginally improve export volumes and post-tax real wages. The study might have underestimated the positive impact on GDP because the modelling focused on the metropolitan and nonmetropolitan urban water reforms and did not cover the effects of the reforms covering water trading, water rights and the criteria for new water investments. (The relatively minor estimated impacts of the water reforms may also reflect the reforms' small, positive effects on prices.<sup>18</sup>)

A recent study (Australian Academy of Technological Sciences and Engineering and the Institution of Engineers, Australia 1999) shows that an 'adaptive management scenario' for water use (which incorporates key features of the reforms) produces an outcome for various macroeconomic variables in 2020-21 that is hardly different from the 'trend scenario'. The latter scenario (which envisages water use growth at past rates), however, is found to be unsustainable given constraints on water availability. Under the 'adaptive management scenario', the share of agriculture in the economy would remain the same as in the 'trend scenario', although the regional distribution of activities would be different; there would be more efficient use of water; and a shift to more intensive forms of irrigated production.

The Australian Water Resources Commission estimated in the early 1990s that better practices by water providers would reduce asset replacement costs by up to 30 per cent and that better staffing practices would reduce those costs by 10 per cent. The Productivity Commission (1999) estimated that these savings would permanently increase GDP by 0.21 per cent, although the slow pace of asset replacement means that the maximum potential increase over the short to medium term would be 0.07 per cent.

**The reforms will produce some detriments to GDP, such as activity reductions where water is diverted to the environment. There is scope for such detriments to be confined, however, if the more efficient use of the remaining supply compensates for the loss of water supply for consumptive use. (As noted earlier, there is a large potential for savings, especially with rural water provision and use.) Sustainable river systems (in terms of quality and reliability of supply) mean that output that depends on water can be maintained over the long run.**

**Over time, the activity enhancements resulting from better functioning water institutions, viable water providers and more efficient allocation and use of water are expected to overwhelm the detriments from lower water inputs to production. The impact of the reforms on a 'Green GDP' measure of activity is expected to be more favourable than the effect on the conventional GDP measure.<sup>19</sup>**

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<sup>18</sup> The water reforms were estimated to add 0.2 per cent to the GDP deflator, whereas electricity and gas, and road reforms were estimated to reduce the deflator by 0.34 per cent.

<sup>19</sup> 'Green GDP' is a measure that accounts for notions of sustainability of production and consumption by quantifying any depletion and degradation of a natural resource. The measure can incorporate the services provided by the environment. Use of a 'Green GDP' measure can help determine whether a country is using its stock of natural resources and environmental assets in a sustainable way.



Australia's trade is being assisted by the implementation of the reforms. The growing efficiency and sophistication of Australia's water industry are promoting the export of water technology, training and 'know-how' (in water resource management, pricing, wastewater treatment, water filtration and environmental protection).<sup>20</sup>

## Water trading

The opportunities for gains from trading in water entitlements are considerable. Subject to any necessary safeguards, markets invariably produce better economic outcomes than the outcomes of administered systems that restrict interchange.

Trading in water is not extensive partly because government regulation and irrigation districts impose constraints. Water trading was possible in 40 of the 46 systems reported on in the 1998-99 Australian irrigation benchmarking report. The report noted, however, that permanent and temporary water transfers in that year represented only 7.5 per cent of total water entitlements of the systems where trade took place (High Level Steering Group on Water 2000).

- Another study (Department of Land and Water Conservation 1999) found in New South Wales in 1997-98 that 11.5 per cent of the total entitlement to consumptive uses was traded, overwhelmingly through temporary trades and mostly within the particular river system. The value of the trades was conservatively estimated at \$60–100 million.

The incentives for water trading are growing nevertheless. Water is becoming more valuable and its supply for consumptive purposes may tighten as a result of drier conditions in some areas and allocations for the environment. This change will set up pressures on jurisdictions to remove constraints.

Once trading is fully accepted and practised, significant economic benefits will arise from the increase in output as water entitlements flow to their highest value uses.

- Water trading in New South Wales in 1997-98 increased the value of irrigated agriculture by \$65 million (Department of Land and Water Conservation 1999). This is regarded as a conservative estimate because the availability of water can save a crop in its final stages (when otherwise it would have been lost) and because the multiplier effects of the addition to agricultural income are not taken into account.

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<sup>20</sup> As noted by White (2000), the development of Australia's water industry and its overseas market advantages have also been fostered by some special problems it faces, including a range of climatic zones, extremely variable climate and poor quality water.

- The Department of Natural Resources and Environment (2001) estimates that the annual increase in returns to Victorian irrigators as a result of trading is now just under \$12 million (providing a net present value of annual trade of over \$100 million). These data do not include the benefits from water traded from Victoria into other States.<sup>21</sup>
- The gains from trading are large where the water sold would not otherwise have been used by the vendors. (A review of a trial of interstate water trading found that 99 per cent of the (admittedly few) trades were of water which was not being used at its origin (Young, MacDonald, Stringer and Bjornlund 2000).)

The benefits will be maximised when trading is occurring between catchments,<sup>22</sup> jurisdictions and industry sectors, and under longer term contracts.

- Most current trades are temporary. Constraints on permanent trades arise from the volatility of water values and uncertainty about future values. Potential sellers may be holding back because they expect much higher prices in the future.

The increase in trading is being facilitated by the development of water markets, although they may not become deep for some time. Competition between water agents and legislative change will lead to product innovations (such as options, leasing of entitlements, and sale and leaseback arrangements), with consequential benefits for irrigators.

Trading is also assisting industrial development in other sectors. The ability to secure water rights is facilitating, for example, investment in rural areas by new water users such as mining and manufacturing.

The removal of barriers between water markets through trading will reduce the differences in water entitlement values across irrigation districts<sup>23</sup>. Also, trading across jurisdictions will set up incentives for consistent approaches towards pricing, the defining of property rights/entitlements, exchange rates for water and environmental considerations.

- Without consistency, trading could lead to less than ideal economic and environmental outcomes, as well as inequities. Inconsistencies, even

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<sup>21</sup> The department also points to the employment creation from water trading. For each 1000 megalitres of irrigation water used on horticulture, 30 on-farm, processing and support industry jobs are created. In dairying 15, such jobs are created. By contrast, only one job would be lost from the trade of a similar quantity of water out of grazing

<sup>22</sup> Such trading involves the transfer of water entitlements between two catchments in the one river basin, not the actual transfer of water between the catchments. The catchments are part of the one river system, so end-of-river flow is unaffected by trading.

<sup>23</sup> Subject to adjustment for any differences in the nature of the entitlements.

within systems, can be extreme. In the Murray–Darling Basin, for example, there are 23 different types of property right.<sup>24</sup>

The environmental impacts of water trading will need to be monitored. Trading will have positive environmental impacts (such as from reduced overwatering, because unneeded water can be sold, and from the opportunity to transfer water from use on degraded land). It will have adverse environmental consequences, however, if the highest value uses of water are more environmentally damaging than the uses from which the water was traded, or if water is traded from ecologically healthy to unhealthy areas (such as from low salinity to high salinity areas). The water reform framework provides for protections against adverse environmental outcomes from trading.

Efficient and extensive water markets will reduce the economic cost of achieving environmental flows.

- If an allocation for the environment cuts irrigators' entitlements, then the cost of that reduction (in terms of lost production) can be minimised if those producing higher value crops can purchase water from the lower value producers. If water were freely traded between the Murrumbidgee and Murray regions and Victoria, the fall in average farm gross margins in the Southern Murray–Darling Basin arising from a cutback in water allocations would be reduced by up to an estimated 80 per cent (Gordon, Kemp and Mues 2000).
- Simulations by Heaney (2002) estimated that trade in water rights has the potential to reduce the direct cost of lost agricultural production from increasing environmental flows in the Murray–Darling Basin by around one third, and to reduce the overall net economic cost (which reflects the gains from reduced water salinity) by half.

## Rural and regional development

Rural businesses are disproportionate consumers of water, with irrigators accounting for three quarters of water used in Australia. Give that water constitutes a higher share of the cost structures of farmers than of most other businesses, the reforms will have their greatest impact on rural users.

Properly managed and implemented, however, and with the appropriate response from irrigators, the reforms are expected to produce a more productive and profitable rural sector, which will be beneficial for regional Australia.

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<sup>24</sup> One reason for this is the involvement of five jurisdictions in water management in the Basin.

Water quality and availability is a critical factor in the sustenance of farming businesses. The objective of the water reform framework to produce sustainable river systems will enhance the consumptive rights of rural users in the long run and reduce their business risk, including through better water quality and improved security of supply.

Better definition of the property right represented in a water entitlement will assist the viability of Australia's rural businesses in the following ways.

- The separation of farmers' water title from land title, and the formal determination and clear specification of water title (including through the establishment of a register) create a more bankable and tradeable asset.<sup>25</sup>
- The clarity of water entitlements and the certainty of title induce more credit suppliers into the (currently bank-dominated) rural finance sector, with favourable impacts on the cost and availability of funding.
- Farmers can use the tradeable asset represented in the water title to restructure their businesses.

Full cost recovery by water suppliers makes more funds available for maintaining irrigation systems, and removes unfair cost advantages for farmers in particular regions who benefit from subsidised pricing. Security of supply for irrigators will also improve because they will no longer have to depend on government expenditures to maintain and enhance their irrigation systems (Such dependence can mean delays in the allocation of government funding).

More generally, the contribution of water trading to the viability of existing rural businesses and to the establishment of new ones is potentially considerable. By enabling the market to meet water demands, trading facilitates options and opportunities for farmers, including greater flexibility in farming practices and crop choice. The greater security of supply for irrigators can come at a cost, however, with less certainty about the price of additional purchases of water.

Where allocations for the environment reduce supply for consumptive uses, farm values can be affected, although the more certain rights to water for rural use would have offsetting impacts. The granting of structural adjustment assistance in such circumstances is an issue for governments.

A viable rural sector will have favourable implications for regional development. In addition, increased recreational use of river systems and water bodies, and the attendant increased tourism will help particular regions.

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<sup>25</sup> The underlying asset value is considerable. The Department of Natural Resources and Environment (2001) notes that the value of Victorian farmers' water entitlements is around \$2 billion.

The reforms, nevertheless, could have differential impacts on rural economies and communities, depending on geographic shifts in production patterns as a consequence of water allocation and trading outcomes. Areas where supplies are not restricted and/or that actively purchase water from other systems will do better than other areas under the reforms.

On the other hand, farming businesses and their communities will benefit from the injection into the local economy of the proceeds from water entitlement sales. Further, where farmers sell entitlements that they have not been using, they receive a windfall gain (and still retain their farms).

Farmers and rural communities are subject to a wide range of influences and pressures. In assessing the impact of the water reforms on them, it is important to distinguish between the effects of the reforms and the effects of other, external factors, such as cost and price pressures. Governments have provided rural adjustment schemes (both general and specific) in the past, and, no doubt, will continue to do so where new schemes are justified.

## **Social outcomes**

The provisions in the reform framework for governments to undertake consultation on change proposals and education programs on water use are leading to more informed communities, customers and other key stakeholders. Community-based groups, such as regional water management committees, are now influential in water matters.

These activities mean better decisions. In particular, decisions are more likely to be consensus driven and, therefore, to satisfy more interest groups, leading to overall welfare gains.

The water reforms are improving quality of life. By ensuring the maintenance of water quality standards, the reforms help avoid sickness and associated health costs. Achievement of the environmental objectives of the framework will have visual benefits too (from cleaner and fuller rivers, possibly higher dam levels and less degraded land), create better recreational opportunities (fishing, swimming, boating); lead to more drinkable water in the lower reaches of river systems, and increase biodiversity.

The reforms are having favourable equity impacts. Equal treatment of customers is being established through consumption-based charging and the elimination of cross- subsidies among different types of customer. No-one is paying for the water used by others.<sup>26</sup>

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<sup>26</sup> The impacts on consumers section indicates the extent of cross subsidisation.

## **The contribution of research**

Successful implementation of the water reforms depends on the availability of extensive scientific knowledge and data. It requires considerable research into the ecology and hydrology of water systems; on means for more efficient collection, storage, distribution and use of water; and on improving the performance of the industry participants.

- Greatly increased amounts are being spent on research. The Department of Primary Industries and Energy spent just \$300 000 on a 1985 review of Australia's water resources and water use. In contrast, a sizeable proportion of the \$29 million spent on the 2001 National Land and Water Resources Audit would have been directed to water research.

The water industry is subject to demanding environmental protection requirements, and is addressing these by applying better and more sophisticated techniques and technology. More research is being carried out into environmental flows, the valuation of the environment, total catchment management, and so on. Past underinvestment in, and slow adoption of, new technology were partly related to plentiful water supply in some areas and inefficient pricing regimes, both of which provided little or no incentive for research into supplying and using water more efficiently and sustainably.

The increased focus on research is producing better decisions on water issues and the adoption of innovative solutions. It is leading to efficiency and productivity gains, and providing the information required to set and achieve environmental goals. Much more remains to be done, however.

- For example, preliminary estimates for most surface water and groundwater resources have been made, but insufficient scientific data and knowledge are available to determine sustainable yields conclusively. There is still insufficient information to determine the health of Australia's inland waters conclusively, though the science has developed to the stage where river health can be nationally assessed (Australian State of the Environment Committee 2001).

## **Government finances**

The reforms are likely to lighten the fiscal burden on governments (and taxpayers) of the water industry, as shown for the following areas.

- The reforms are resulting in reduced government subsidies and assistance for water suppliers and for uneconomic dams and irrigation systems. Further, more efficient and profitable water businesses are paying higher dividends to their government owners.

- **On the other hand, governments are making higher expenditures on research and development, and on the planning processes, and may assist farmers who are subject to reduced water allocations.**
- **Payments for CSOs (such as subsidies for low income earners) will add to government expenditures, but the transparency of these payments and any remaining subsidies will ensure the regular review of their value.**

## 4 Implementation of the reform framework

### Timing

When adopting the water reform framework in 1994, CoAG (optimistically) noted that the reforms could be implemented within a five-to-seven year period, although it acknowledged that this timetable depended on the availability of financial resources to facilitate structural adjustment and asset refurbishment.

- Completion dates were established for the major reforms in the CoAG agreement (1998 for urban water pricing, the institutional reforms, water trading and allocations for the environment, and 2001 for reform of rural water pricing), but some of these deadlines were later extended.

CoAG (2002) recently noted that 'substantial progress' was being made on the national water reforms, but that 'Water management is currently in a transition phase'.

Significant constraints on implementation of the reform framework have included:

- the complexity of some of the reforms (for example, those that require much research and analysis before effective application);
- the need for extensive consultative and educative processes;
- the demands that the reforms have placed on governments, institutions and stakeholders, including financial demands; and
- the low base from which many of the reforms were initiated.

The reforms will not be fully effective until later than 2005 (the year specified in the 1999 Tripartite meeting as the date for completion of the reforms). Environmental outcomes, in particular, will not be realised in full for a considerable time.

Jurisdictions are introducing the reforms at different rates; similarly, some differences are emerging in the application of the reforms. As a result, reform will be more 'complete' in some jurisdictions than in others, with consequences for their respective water industries, water users and environments.



Variances among jurisdictions' implementation of reform reflect the States/Territories' different starting points,<sup>27</sup> the health of their river systems, their water policies before the 1994 CoAG Agreement, the diversity of administrative and legislative environments across States and Territories, and the different interests and strengths of the relevant stakeholder groups.

The CoAG water reform framework will continue to dominate the water policies of jurisdictions. (Policy change and reforms initiated by jurisdictions and exclusive to their jurisdiction will most likely remain minor.)

The reforms are likely to be durable — the potential loss of NCP payments will help ensure they remain in place. Durability will also be assisted by the institutions that have been established or changed during implementation of the reforms and by the widespread community support for the reforms. Such support will facilitate decisions on, and the implementation of, any further reform.

## **The adequacy of the reforms**

The pricing, investment and other obligations of the NCP reforms are producing an economically viable water industry. It is too early, however, to judge whether the expectations for an ecologically sustainable industry will be fulfilled. There is a view that most jurisdictions do not yet have adequate baseline data available to enable an assessment of the ecological outcomes of the water reforms (Cullen 2000).

Any shortfalls between environmental expectations and outcomes will partly result from resistance to cutbacks in supply for consumptive use and from the cost of securing water for the environment. The absence of the scientific data necessary for the proper planning and implementation of the environmental aspects of the reforms will also be a factor. Determining the appropriate quantum of water allocations for the environment, for example, is a complex and lengthy undertaking.

Given the slow acting nature of environmental reforms, there is a heavy premium on implemented these properly, completely and early. Monitoring and regular, interim evaluations of their outcomes will be necessary.

Further changes to the framework may be agreed on as the remaining reforms are implemented and as they begin to have their full impacts. A desire for outcomes beyond those being achieved also may lead governments to enhance the current reform package.

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<sup>27</sup> With regard to their legislative frameworks, for example.

# Attachment A

## Water reform: principles, policy actions and outcomes

The following table lists the key principles of the water reform framework to which Australian governments have committed and notes the problems that the principles were designed to address. It lists the policy actions being taken to address the problems and notes the various outcomes of those actions, such as the impacts on the water industry, its participants and broader community

Principle—proper pricing of urban water		
<i>Problems</i>	<i>Policy actions</i>	<i>Outcomes</i>
<ul style="list-style-type: none"> <li>• Pricing approaches were based on property values and had little regard to differential patterns of consumption among users<sup>28</sup></li> <li>• Pricing approaches were inequitable; they incorporated cross-subsidies and disadvantaged industrial and commercial water customers<sup>29</sup></li> <li>• Water authorities could be required to provide subsidised (by other customers) services as part of government welfare programs</li> <li>• Pricing practices did not provide an incentive for</li> </ul>	<ul style="list-style-type: none"> <li>• Consumption-based pricing</li> <li>• Full cost recovery, including real rate of return earned by suppliers, with a limit on rates of return</li> <li>• Removal of cross subsidies, or improved transparency</li> <li>• Disclosure of, and payments to deliverers, for community service obligations (CSOs)</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate pricing ensures efficient use of existing water systems and provides a guide to the timing and types of new investment to augment system capacity</li> <li>• The introduction of price signals induces behavioural change by consumers. Accordingly, where prices are higher, water bills may still be lower on account of reduced consumption (including through less waste)</li> <li>• Volumetric pricing rather than pricing based on property values gives customers some control over the size of their water bills</li> <li>• Prices can be used if necessary as a tool for demand management</li> </ul>

<sup>28</sup> In New South Wales in 1993 two part pricing was in effect in only 9 per cent of households.

<sup>29</sup> It was reported that in one jurisdiction the value of this cross subsidy was \$300 million per annum. In some jurisdictions there were also cross subsidies between urban and rural customers and between high and low volume water users. (Report of the Working Group on Water Resource Policy to the Council of Australian Governments 1994)

<p>the efficient use of water</p> <ul style="list-style-type: none"> <li>• Real rates of return were inadequate in some cases and excessive in others<sup>30</sup></li> <li>• Under-recovery of the costs of trade waste services was common<sup>31</sup></li> <li>• The incorporation of the costs of externalities in pricing was limited</li> </ul>		<ul style="list-style-type: none"> <li>• Volumetric pricing induces water savings through efficiencies in use</li> <li>• Volumetric pricing (combined with heightened conservation tendencies) induces private provision</li> <li>• Equal treatment of customers is established through payment according to consumption and by the elimination of cross-subsidies. Equal treatment is established both within a group (such as households) and between groups (such as households and business customers)</li> <li>• Reduced government subsidies to customers and water providers improves allocative efficiency</li> <li>• The transparency of any remaining subsidies and of CSO payments ensures regular review of their value</li> <li>• The efficiency of water suppliers improves</li> <li>• The profitability of suppliers provides funding for better water infrastructure</li> <li>• Reduced consumption lowers the cost of treating wastewater and the environmental damage from wastewater</li> <li>• Volumetric pricing of business wastewater through trade waste charges induces conservation in water use, ensures appropriate cost recovery from polluting industries and (depending on how the charges are structured) can provide an incentive for the discharge of cleaner wastewater</li> </ul>
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<sup>30</sup>In 1988-89, real rates of return of metropolitan water providers averaged 1.8 per cent (Industry Commission 1992).

<sup>31</sup> Industry Commission 1992.

<b>Principle—proper pricing of rural water</b>		
<i>Problems</i>	<i>Policy actions</i>	<i>Outcomes</i>
<ul style="list-style-type: none"> <li>• Inadequate (low) pricing meant insufficient provision for major asset maintenance and refurbishment needs in rural areas<sup>32</sup></li> <li>• Below-cost water provision produced allocative inefficiencies (by distorting rural production and water consumption decisions) and wasteful and inappropriate water use, aggravating the environmental damage of water use</li> <li>• Inconsistent price setting between districts produced inequities, and adverse resource allocation outcomes and locational choices, having negative regional and national economic effects<sup>33</sup></li> <li>• Pricing was determined partly by developmental considerations rather than wholly by commercial considerations</li> <li>• Irrigators were slow to adopt new and alternative water use techniques</li> <li>• The incorporation of the costs of externalities in pricing was limited</li> </ul>	<ul style="list-style-type: none"> <li>• Consumption-based pricing</li> <li>• Full cost recovery, including non-negative real rate of return earned by suppliers</li> <li>• Removal of cross-subsidies, or improved transparency</li> <li>• Disclosure of, and payments to deliverers, for CSOs</li> </ul>	<ul style="list-style-type: none"> <li>• Higher prices reduce consumption (including through less wastage and overwatering) and encourage more trading</li> <li>• Lower consumption reduces salinity and waterlogging problems</li> <li>• Water-intensive crops and techniques are not artificially encouraged through subsidised pricing</li> <li>• Higher prices induce water savings through efficiencies in storage, distribution and use, with the savings being effected through the adoption of innovations</li> <li>• Appropriate pricing does not influence incentives for water trading</li> <li>• Higher prices induce increased on-farm, private water provision, subject to the regulation of such provision</li> <li>• Full cost recovery means that more funds are available for maintaining irrigation systems and unfair competitive advantages for farmers in particular regions from subsidised pricing are removed</li> <li>• Equal treatment of consumers is enhanced by consumption-based payment and by the elimination or improved transparency of cross-subsidies (although city/country and nonmetropolitan/urban irrigator cross subsidies may remain)</li> </ul>

<sup>32</sup>Rates of return on irrigation assets were often negative; in 1988-89, they varied between -0.9 and -5.2 per cent (Industry Commission 1992). The Commission estimated that in New South Wales achieving a non-negative return on capital would have required a 50 per cent increase in charges. If full costs, including capital replacement costs, and a 5 per cent return on assets were to be achieved, charges would have had to rise by 250 per cent.

<sup>33</sup>In 1995 water charges in Victoria on the New South Wales border were almost four times charges across the border in New South Wales. There was a similar differential on the border between New South Wales and Queensland.

		<ul style="list-style-type: none"> <li>• Reduced government subsidies to customers and water providers improves allocative efficiency</li> <li>• The removal of dependence on government expenditures improves security of supply for irrigators improved by (given that government expenditure is subject to approval delays)</li> <li>• Transparency of any remaining subsidies and CSO payments ensures a regular review of their value</li> <li>• The efficiency of water suppliers improves</li> <li>• The profitability of suppliers provides funding for better water infrastructure</li> </ul>
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<b>Principle—investment in new rural schemes</b>		
<i>Problems</i>	<i>Policy actions</i>	<i>Outcomes</i>
<ul style="list-style-type: none"> <li>• Investment decision were sub-optimal (economically and environmentally)</li> <li>• Capital subsidies led to investment in noneconomic facilities and overengineering of systems<sup>34</sup></li> <li>• Capital subsidies led to the fragmentation of the industry<sup>35</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Approval of investment in rural water provision limited to economically viable and ecologically sustainable projects</li> </ul>	<ul style="list-style-type: none"> <li>• The removal of Government subsidies for uneconomic projects reduces wasteful investment in rural schemes and ensures future generations do not have to pay for poor current decisions</li> <li>• Subsidies are given only where an objective assessment reveals net benefits from government assistance</li> <li>• Recognition of environmental impacts means improved environmental outcomes, although relative to the status quo <i>ex ante</i> (that is, any new dam would have some adverse ecological impact)</li> <li>• The failure of some proposed projects to satisfy the investment requirements could lead to pressure on supplies and price, and, therefore, to</li> </ul>

<sup>34</sup> In the early 1990s, NSW provided capital grants to local authorities for up to 50 per cent of the capital cost of new works. Queensland paid subsidies of 20 per cent for dams, bores, pumping stations, etc.

<sup>35</sup> This occurred in Victoria – subsidies for non-metropolitan providers meant that small towns had little incentive to seek service provision from larger authorities in the area, so achieving economies of scale.

		<p>more efficient water use</p> <ul style="list-style-type: none"> <li>• The requirements for new investment produce more efficient use of existing water infrastructure</li> <li>• Over time, the quality, efficiency and productivity of Australia's water infrastructure are enhanced</li> </ul>
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**Principle—institutional role separation**

<i>Problems</i>	<i>Policy actions</i>	<i>Outcomes</i>
<ul style="list-style-type: none"> <li>• The State agency responsible for allocating water typically also was the wholesale and retail water provider</li> <li>• Institutional arrangements were less than optimal, including inadequately defined roles and responsibilities with the potential for conflicts of interest</li> </ul>	<ul style="list-style-type: none"> <li>• Separation of service provision from the roles of water resource management, standard setting and regulatory enforcement, with each role undertaken by separate agencies (some of which may be private)</li> </ul>	<ul style="list-style-type: none"> <li>• Roles and responsibilities are clarified and simplified, and the separated organisations focus on their core business</li> <li>• Accountability and transparency are established</li> <li>• Conflicts of interest are minimised</li> <li>• A structural basis for applying the competition principles is established</li> <li>• Regulation is improved, with effective and professional regulators</li> <li>• Compliance with quality standards</li> <li>• Prices determination is a transparent and independent process</li> </ul>

**Principle—efficient delivery of water services**

<i>Problems</i>	<i>Policy actions</i>	<i>Outcomes</i>
<ul style="list-style-type: none"> <li>• Outdated technology was used for water delivery and wastewater treatment and disposal</li> <li>• Water providers were slow to adopt new technology</li> <li>• Service provision was not fully costeffective</li> </ul>	<ul style="list-style-type: none"> <li>• Efficient service delivery on a commercial basis and meeting international best practice</li> <li>• Comparisons of interagency performance</li> <li>• Devolution of management of systems to irrigators</li> </ul>	<ul style="list-style-type: none"> <li>• The efficient operation of suppliers leads to lower prices, better service and more productive use of existing assets</li> <li>• Accountability and transparency are established</li> </ul>

**Principle—allocation of water to the environment**

<i>Problems</i>	<i>Policy actions</i>	<i>Outcomes</i>
<ul style="list-style-type: none"> <li>• Degradation and depletion of Australia's water resources were widespread and extensive, and inadequately addressed by existing policies</li> <li>• Overallocated and overharvested river systems led to stressed river systems</li> <li>• Economic losses resulted from environmental degradation<sup>36</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Legal recognition and formal development of allocations for the environment</li> <li>• The determination of allocations using the best scientific information available at the time</li> </ul>	<ul style="list-style-type: none"> <li>• Better environmental outcomes include restored biodiversity; constraints on the rate of increase in salinity; visual improvements to waterways, lakes and dams; habitat improvements for fish and birds (wetlands); and tourist/recreational advantages (boating, fishing and swimming)</li> <li>• Sustainable river systems enhance consumptive rights in the long run, including through better water quality and improved security of supply</li> <li>• More scientific research is undertaken on the ecology and hydrology of water systems, producing better decisions and the adoption of innovative solutions</li> <li>• Water quality improves</li> <li>• Lower supplies allocated for consumptive use, producing higher prices, less waste, a shift of water to higher value added uses and, possibly, some loss of output from water-starved activities</li> <li>• Farm (water rights) values are adversely affected where allocations are reduced</li> </ul>

<sup>36</sup> It was estimated that land degradation caused by, among other things, salinity and waterlogging, was costing \$600 million annually in the late 1980s.

**Principle—water allocations for rural customers**

<i>Problems</i>	<i>Policy actions</i>	<i>Outcomes</i>
<ul style="list-style-type: none"> <li>• Entitlements for irrigation water were poorly specified (with regard to security of tenure and access to water) and attenuated in a number of ways</li> <li>• Entitlements were inflexible because they were linked to land ownership</li> </ul>	<ul style="list-style-type: none"> <li>• Formally determined allocations, backed by the separation of water property rights from land title</li> <li>• Clear specification of entitlements</li> </ul>	<ul style="list-style-type: none"> <li>• Formal determination of allocations provides more certainty to the consumer about security of supply</li> <li>• The separation of water title from land title, along with its clear specification (including the establishment of a register), creates a bankable and tradeable asset</li> <li>• The clarity of entitlements and certainty of title induces more credit suppliers into the (currently bank dominated) rural finance sector</li> <li>• Farmers can use the tradeable asset represented in the water title for restructuring of their businesses</li> </ul>

**Principle—trading in water entitlements**

<i>Problems</i>	<i>Policy actions</i>	<i>Outcomes</i>
<ul style="list-style-type: none"> <li>• Limited trading opportunities (in part due to opposition by irrigation districts) meant limitations on water flowing to higher value uses</li> <li>• Restrictions were placed on transferable entitlements, including allowing only temporary transfers and transfers only between irrigators and only within defined geographic boundaries. Transfers were closely supervised</li> <li>• Regulation, not price, played the major role in the allocation of water among competing users</li> <li>• Trading was impeded by the diversity of 'water products' on the market —</li> </ul>	<ul style="list-style-type: none"> <li>• Fully operational trading in water entitlements</li> <li>• Cross-border trading where socially, physically and ecologically sustainable</li> </ul>	<ul style="list-style-type: none"> <li>• Transfers occur across greater distances, between catchments, jurisdictions and sectors, and for greater periods of time</li> <li>• Deep and informed water markets are available for irrigators</li> <li>• Output increases as water entitlements flow to their highest value uses and to more productive areas</li> <li>• Irrigators have more options for their businesses and greater flexibility in farming practices and crop choice. They can respond to new opportunities</li> <li>• Irrigators have greater security of supply, but at the cost of less certainty about water prices</li> </ul>



<p>that is different security of supply and therefore different values attached to different products</p>		<ul style="list-style-type: none"> <li>• Other industries that depend on water, such as mining, can invest with the security that water can be purchased</li> <li>• Geographic shifts occur in agricultural and pastoral production, possibly having (adverse and beneficial) impacts on rural and regional economies and communities</li> <li>• The removal of barriers between water markets reduces dispersion in the values of water entitlements among irrigation districts</li> <li>• Trading across jurisdictions sets up incentives for consistent approaches towards pricing, property rights/entitlements and environmental considerations</li> <li>• Opportunity for trading introduces some competition between water suppliers, with beneficial consequences for customers</li> <li>• Reduced overwatering has favourable environmental impacts (because unneeded water can be sold). Irrigators have the opportunity to transfer water from use on degraded land. Potentially unfavourable impacts can be avoided if environmental guidelines for trading are in place</li> </ul>
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<p><b>Principle—integrated resource management</b></p>		
<p><i>Problems</i></p>	<p><i>Policy actions</i></p>	<p><i>Outcomes</i></p>
<ul style="list-style-type: none"> <li>• Inadequate base of scientific knowledge and insufficient research being undertaken to determine what is efficient and sustainable water provision and use</li> </ul>	<ul style="list-style-type: none"> <li>• Full recognition of the interdependency of the different natural resource components, including water</li> <li>• Integrated approaches to natural resource management</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental outcomes improve (see above)</li> <li>• Further land degradation is constrained and some past degradation is restored</li> <li>• Higher quality water and a greater security of supply ensure sustainable rural output contributing to GDP growth in the long term</li> <li>• More scientific research produces a greater body of scientific knowledge and leads to more informed decisions</li> </ul>

<b>Principle—public consultation and education</b>		
<i>Problems</i>	<i>Policy actions</i>	<i>Outcomes</i>
<ul style="list-style-type: none"> <li>• Consumers had insufficient information to manage their water use</li> <li>• Changes were made without full stakeholder input</li> <li>• Public education programs were limited</li> </ul>	<ul style="list-style-type: none"> <li>• Consultation between government agencies and service deliverers on proposals for change and other initiatives</li> <li>• Public education programs, including in schools</li> </ul>	<ul style="list-style-type: none"> <li>• Wide consultation produces more information on which to base decisions</li> <li>• More decisions are consensus driven and therefore more likely to satisfy more interest groups, leading to overall welfare gains</li> <li>• A better informed public on water issues<sup>37</sup> and on the need for (and benefits from) reform means governments can implement the water reform framework more easily and fully, with further reform more likely to be accepted</li> <li>• Waste is reduced<sup>38</sup></li> <li>• Rural communities recognise that some past and present farming practices put agricultural activity and the environment at risk</li> </ul>

<sup>37</sup> A recent survey showed an awareness level of 88 per cent of Melbourne Water’s water conservation program (*The Age*, 12 February 2002, p. 8).

<sup>38</sup> Queensland’s WaterWise initiatives are reported to have resulted in savings in water use of between 15 and 30per cent in some local government areas (High Level Steering Group on Water 2000).

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